

Under 46 U.S. Code §6308, no part of a report of a marine casualty investigation shall be admissible as evidence in any civil or administrative proceeding, other than an administrative proceeding initiated by the United States.

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

2 Jacksonville, Florida held

3 17 May 2016

4 Volume 12

5 **CAPT Neubauer:** Good morning. This hearing will come to order. Today is May 17th,
6 2016 and the time is 9:01. We're continuing at the Prime F. Osborn Convention Center
7 in Jacksonville, Florida. I am Captain Jason Neubauer, of the United States Coast
8 Guard, Chief of the Coast Guard Office of Investigations and analysis, Washington D.C.
9 I'm the Chairman of the Coast Guard Marine Board of Investigation and the presiding
10 officer over these proceedings. The Commandant of the Coast Guard has convened
11 this board under the authority of Title 46, United States Code, Section 6301 and Title 46
12 Code of Federal Regulations Part IV to investigate the circumstances surrounding the
13 sinking of the SS El Faro with the loss of 33 lives on October 1st, 2015 while transiting
14 East of the Bahamas. I am conducting the investigation under the rules in 46 C.F.R.
15 Part IV. The investigation will determine as closely as possible the factors that
16 contributed to the incident so that proper recommendations for the prevention of similar
17 casualties may be made. Whether there is evidence that any act of misconduct,
18 inattention to duty, negligence or willful violation of the law on the part of any licensed or
19 certificated person contributed to the casualty, and whether there is evidence that any
20 Coast Guard personnel or any representative or employee of any other Government
21 agency or any other person cause or contributed to the casualty. I have previously
22 determined that the following organizations or individuals are parties in interest to the
23 investigation. Tote Incorporated, ABS, Herbert Engineering Corporation and Mrs.

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

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

12 These proceedings are open to the public and to the media. I ask for the
13 cooperation of all persons present to minimize any disruptive influence on the
14 proceedings in general and on the witnesses in particular. Please turn your cell phones
15 or other electronic devices off or to silent or vibrate mode. Please minimize entry or
16 departure into the hearing room except during periods of recess. Flash photography will
17 be permitted during this opening statement and during recess periods. The members of
18 the press are of course welcome and an area has been set aside for your use during
19 the proceedings. The news media may question witnesses concerning the testimony
20 that they have given after I have released them from these proceedings. I ask that such
21 interviews be conducted outside of this room. Since the date of the casualty the NTSB
22 and Coast Guard have conducted substantial evidence collection activities and some of
23 that previously collected evidence will be considered during these hearings. Should any

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

8 **Mr. Roth-Roffy:** Yes, sir. Good morning Captain. I am Thomas Roth-Roffy,
9 Investigator in Charge for the National Transportation Safety Board's investigation of
10 this accident. The safety board is an independent Federal agency, which under the
11 independent safety board act of 1974 is required to determine the cause or probable
12 cause of this accident, issue a report of facts, conditions and circumstances related to it
13 and to make recommendations for measures to prevent similar accidents. The safety
14 board has joined this hearing to avoid duplicating the development of facts.
15 Nevertheless, I do wish to point out that this does not preclude the safety board from
16 developing additional information separately from these proceedings if that becomes
17 necessary. At the conclusion of these hearing the safety board will analyze the facts of
18 the accident and determine a probable cause independently of the Coast Guard. At a
19 future date a separate report of the safety board's investigation will be issued that will
20 include our official determination of the probable cause of this accident. If appropriate
21 the safety board will issue recommendations to correct safety problems discovered
22 during this investigation. These recommendations may be made in advance of the
23 report. Thank you.

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1 **CAPT Neubauer:** Thank you. Before we begin I have a statement to read from the
2 previous proceedings. Throughout the hearing to date the MBI has been referencing
3 the safety management system or SMS operations manual for vessels revision 21,
4 which has a published date of August 2015. Tote has clarified that despite the August
5 2015 date, revision 21 had not been promulgated on the El Faro at the time of the
6 accident voyage. Therefore, going forward we will use or refer to revision 20 of the
7 SMS dated April 2014 ensuring that the Ops memos that were issued between April
8 2014 and October 2015 are incorporated into that version. Does that satisfy Tote's
9 concern on that matter?

10 **Tote Inc:** Yes, sir.

11 **CAPT Neubauer:** We will now call our first witness of the day. Captain Jack Hearn if
12 you could come forward please.

13 **LCDR Yemma:** Good morning, Captain.

14 **WIT:** Good morning.

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

20 **WIT:** Yes, sir.

21 **LCDR Yemma:** Thank you. You can be seated, sir. Sir, if you could press the button
22 on your microphone there.

23 **WIT:** Red light?

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1 **LCDR Yemma:** Yep. Please start by stating your full name and spelling your last name
2 for the record?

3 **WIT:** My name is John N. Hearn, H-E-A-R-N. I go by Jack Hearn

4 **LCDR Yemma:** Thank you, Captain. And can you describe for the board your current
5 employment and your position?

6 **WIT:** Currently I'm employed by Delaware Bay Pilots as a vessel traffic information
7 service watch officer. I'm also Executive Director of the American Professional Mariners
8 Association. But that's a voluntary position.

9 **LCDR Yemma:** Thank you. Can you also describe some of your prior relevant
10 maritime experience?

11 **WIT:** I went to sea for 40 years. I was Master for 25 of those 40 years. I graduated at
12 the U.S. Merchant Marine Academy.

13 **LCDR Yemma:** And what was your highest level of education completed?

14 **WIT:** I had some graduate school, some professional training through my career and
15 Bachelor of Science Degree in Marine Transportation.

16 **LCDR Yemma:** Thank you Captain. The board will have questions for you now.

17 **WIT:** Yes, sir, thank you.

18 **CAPT Neubauer:** Mr. Fawcett.

19 **Mr. Fawcett:** Thank you Captain. Good morning Captain Hearn.

20 **WIT:** Good morning, sir.

21 **Mr. Fawcett:** For the benefit of the transcribers could you please move the microphone
22 just a little bit closer. That will be very helpful.

23 **WIT:** Of course.

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1 **Mr. Fawcett:** Thank you, sir. So all of my questions will relate to the time frame
2 immediately leading up over the course of time to the accident day which was October
3 1st – October 1st, 2015 unless we specify otherwise. Also when referring to your
4 testimony Sea Star Line has eventually – it has gone through a number of different
5 names and it eventually has become the Tote entity that we know today. So they're
6 linked together so you know I may sometimes refer to Tote, but I may be actually
7 referring to Sea Star Line. So if you need to make clarification please do that.

8 **WIT:** Thank you. Yes, sir.

9 **Mr. Fawcett:** So we'll cover a couple of topics. And the way this works is after I finish
10 asking questions in general we'll pass it to the board. We'll move to the NTSB and then
11 the parties in interest will have follow up question opportunities and they will move on to
12 the next topic. At any time you would like to take a break please tell us and we will take
13 a break if necessary, ok?

14 **WIT:** Yes, sir, thank you.

15 **Mr. Fawcett:** So the first topic I would like to talk about is a general overview of
16 working at Sea Star Lines, Tote, when you were Master. But before I go there could
17 you elaborate on your maritime career, the types of vessels you worked on and the
18 positions you held if you would, sir?

19 **WIT:** My career started as an ordinary seaman on tug boats. I went to U.S. Merchant
20 Marine Academy training. There was a number of ships I was on in training, tankers
21 and general cargo vessels. But from there I graduated in 1979 and immediately went to
22 sea on tankers, the VLCC's and Coast Wise tankers. I did that for about 5 years. I
23 moved from the tankers to Naval Auxiliary ships, crane, what they crane ships. Worked

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1 in amphibious operations, the Navy for about 2 years. Then in 1986 I moved – I was
2 employed by Tote on the West Coast. I worked out there for 20 years on the Alaska
3 run. Starting as Chief Mate and within 3 years I was sailing as Master out there. So I
4 had 17 years as Master on the Alaska run. A few times during those periods I moved to
5 other voyages. There was a war in 1990 I was in the Sealift operations there. And in
6 2003 I was also on a ship that chartered and did Sealift operations to support the Gulf
7 War in 2003. I moved from Tote on the West Coast to Sea Star in 2007 and stayed with
8 Sea Star until I retired in 2015. Well excuse me I left the ship in 2013, I retired, took my
9 pension in 2015. I was Master for 25 years of my full career. Most of my experience
10 and expertise is with ro-ro cargo like the Tote ships and the Sea Star ships. And I was
11 involved with innovation on those ships for many years and the changes. Especially
12 learning some of the lessons you would in violent weather that you would encounter in
13 the Gulf of Alaska.

14 **Mr. Fawcett:** So you had mentioned an abbreviation VLCC, that's very large crude
15 carriers, is that correct, sir?

16 **WIT:** Yes, sir, that's correct.

17 **Mr. Fawcett:** All right. So how did you actually get the job with Sea Star Lines?

18 **WIT:** I transferred from Tote up on the West Coast, it was the same corporate family.
19 And the ship that became the El Faro was the Northern Lights, the ship I had worked on
20 when I was on Tote on the West Coast. And a position opened up on that ship. A
21 friend of mine retired and I asked if I could transfer to that ship again and I did.

22 **Mr. Fawcett:** So when you worked for Sea Star Line who did you directly report to
23 within the shore side management?

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1 **WIT:** When I started working for Sea Star, most direct reporting was to Steve
2 Tornello [sic] was the operations manager. After a year or two it – William Wisenborn,
3 Bill Wisenborn took over that position and I reported to him directly.

4 **Mr. Fawcett:** And just for the sake of comparison, when you left Sea Star Line was
5 there a different organizational structure, a different person that you reported to?

6 **WIT:** It had changed and it was a little more vague when I left. The operations
7 department had reduced to just one person, Don Matthews. There was a man named
8 Mr. Wagstaff was operations and terminal operations. He was just transitioning into
9 operations there. I also spoke to Lee Peterson who was running engineering for the
10 company. And the West Coast engineering staff at Tote had taken over a lot of
11 operations. But I wouldn't report to them, but I would usually report first to the people in
12 Jacksonville.

13 **Mr. Fawcett:** So if you would take some time to elaborate on the marine operations
14 manager and what that person would have done for you to provide support for the ship's
15 operation.

16 **WIT:** Marine operations manager would be the person that would give you operational
17 directive voyage orders, planning, scheduling, expectations of the ship on the voyage.
18 Whether it's a short term voyage or a long term period of time depending on what the
19 subject was really because it could be a number of subjects with the ship including
20 maintenance, operations, personnel, training of personnel to improve them. Regulatory
21 compliance with the Coast Guard and interstate and Federal compliance.
22 Communications and other functions with the safety management system. At that time
23 the companies were split and Inter Ocean American Shipping did a lot of our SMS

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1 functions, training and there might be some coordination with him on those types of
2 things also with the other things.

3 **Mr. Fawcett:** So was it – was it clearly understood that the marine operations manager,
4 who that was at any given time? In other words if the marine operations manager went
5 on vacation did you know who the alternate was or the relief so that you could be in
6 contact with somebody shore side?

7 **WIT:** There would be two ways to transition if there was someone that was not
8 available. The company had an email address for operations and it went to a number of
9 people. So if someone was not available the other person knew we would receive
10 those same messages and would pick up. So I might not even know that the other
11 person was not available. They would manage themselves. But the communications
12 that came from the ship to that general address would go to a number of people and be
13 directed to all of them that was on that address. And they managed that function
14 ashore.

15 **Mr. Fawcett:** Okay. So you had mentioned a couple of gentlemen that fulfilled the role
16 as marine operations manager and then you mentioned Don Matthews. Was Don
17 Matthews capable of providing the same level of support for operation that the marine
18 managers could?

19 **WIT:** No.

20 **Mr. Fawcett:** And why would you say that?

21 **WIT:** Don had not worked in those capacities long enough. He had – he was a good
22 person to work with, I liked working with Don and he was very good at disseminating the
23 information. You would get an answer if he did not have it. But he didn't have the

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1 marine background to speak on that same level of voyage experience, operational
2 experience with the ship. Especially off shore. When it came to shore side operations
3 Don knew exactly who to go to inside the terminal and within the management system.
4 That's basically how his function would help quite a bit. But when it came to experience
5 with the ships and the length of experience that Sea Star had operated the ships Don
6 had not been there that long either to – at least my experience with Don was that he
7 could not give me good operational experience or help or advice.

8 **Mr. Fawcett:** Now the marine operation manager when you had the opportunity to deal
9 with them, did they deal with just the ships on the Jacksonville run to Puerto Rico or did
10 they span the Alaskan trade?

11 **WIT:** In Sea Star the marine operations personnel only worked with the Puerto Rican
12 run. But they did – the ship had been chartered overseas, we were doing a number of
13 voyages to the Mideast and they also managed those functions. And I was the Master
14 on the ship of those voyages.

15 **Mr. Fawcett:** Outside like in the bigger Sea Star Lines picture and their umbrella
16 companies, whether it's Totem Ocean Express, was there somebody above them that
17 sort of looked at Sea Star Line globally in their operations and ensured that the safe and
18 efficient marine operation above the marine manager?

19 **WIT:** I believe that the company at that time when I was working with them there was a
20 number of people in the senior levels that looked at the entire scope of purpose of the
21 ship, mission of the ship, the mission of the company and they coordinated all of that.
22 When I reported directly to the operations managers I would rely and expect them to
23 move that information up the chain if it was pertinent to those people at their meetings

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1 or at their corporate level. And I know that the companies did trade personnel between
2 coasts and we also had operations at, at the time I worked there, in New Jersey and
3 they shared information, discussed things across the board. You know that was at their
4 level. And it would go to whatever level they felt it was important to reach.

5 **Mr. Fawcett:** Okay. This shift where the position of the marine operations manager
6 ceased to exist as you described it, do you know when that date was where they shifted
7 over where Mr. Matthews took over the shore side support of your operations?

8 **WIT:** Not specifically any more. I would say roughly 11 or 12, 2011 or 2012. But
9 without looking at records and things like that it would be hard to remember exact date
10 when people – when personnel left the company and it was just reduced to Lee
11 Peterson and Don Matthews over at Sea Star Lines in Jacksonville.

12 **Mr. Fawcett:** And was this part of a corporate reorganization or restructuring?

13 **WIT:** That's my understanding, yes.

14 **Mr. Fawcett:** And in the different lines of questioning related to ship board operations
15 there may be more questions about the role of marine operations manager, so I'll leave
16 it there and move on.

17 **WIT:** Yes, sir.

18 **Mr. Fawcett:** But would you expect, in general, that the marine operations manager
19 would be apprised of your route and your intentions on a voyage?

20 **WIT:** That is policy, yes.

21 **Mr. Fawcett:** And where would I find that policy at that time?

22 **WIT:** At the time I worked there that was in the safety management system. You kept –
23 you always advised the company of any change in route, any change in destination, any

1 change in the ETA especially so that they could manage operations at the next port. If
2 there was any critical need of the ship depending on those changes you advised them
3 and they would coordinate events in the next port or reporting and get things ready to
4 keep the ship running smoothly and efficiently. That was a lot of their function. And my
5 function was to keep them advised of that.

6 **Mr. Fawcett:** So looking at the safety management system, like I say we'll delve into
7 details later, but it says that you're going to advise the company of changes in course.
8 Now that – I mean you're not going to advise them of a minor course change, but what
9 would that implication – what would be the implications of that for you as Master?

10 **WIT:** A change of course would probably really mean a change of route and the original
11 voyage plan. And it could mean anything from security issues which have happened,
12 especially foreign voyage, but locally or regionally it would mean a deviation due to
13 weather conditions. Or I had one voyage where it was a military operation going on and
14 they detoured the ship away and it delayed the ship. So you would keep them advised
15 of any situation like that. Once again changing ETA, changing operations and let the
16 company know what the ship was up against so that they were aware of where you
17 were taking the ship and what you would be doing with it. Even if it was a relatively
18 routine thing you would put it in the position reporting system so that the company was
19 aware of some of the changes.

20 **Mr. Fawcett:** So in previous testimony we've heard it described that the typical route
21 from Jacksonville to San Juan back and forth has been described as the Atlantic route.
22 When you got ready during your time with Sea Star Line when the operations managers
23 were in place, were you expected to communicate with them as to the route you were

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1 taking before you departed? In other words whether you were going to take the Atlantic
2 route, whether you were going to take an alternate route on a voyage?

3 **WIT:** The routine route was the off shore route outside the Bahama Islands and most
4 direct and voyage efficient route. And there would not be any communication if that was
5 the routine. If you change from the routine and that's where the policy would step in you
6 would advise them. And if it was a change that you recommended based on other
7 functions of the voyage, for example repairs or weather conditions or things that you
8 thought would be favorable, it would be a discussion and a joint decision because you
9 just don't change from the routine without advising and sometimes getting advice from
10 the company about, you know the need for the mission of the voyage. I'm can give
11 examples of course. For example repairs. And if you're going on the off shore route,
12 it's winter voyage there's sea swell that could cause disruption to the repair work and
13 the safety of those repair work – or the efficiency of it, I would recommend going in the
14 inside route which was calmer and better weather. If the company had parameters or
15 thoughts that was not efficient they wanted the ship to get down there, things I would
16 not know about, they would let me know and we would have a mutual discussion and
17 decision about what was the best way to complete the expectations of the ship and
18 voyage. That's how decisions were made.

19 **Mr. Fawcett:** And like I said on various specific topics we'll talk more about that.

20 **WIT:** Yes, sir.

21 **Mr. Fawcett:** So explain if you would your leadership style as Master of the El Faro.

22 **WIT:** Well I try to incorporate bridge resource management skills, the law, the
23 regulatory compliance, the company's safety management system into all of my style.

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1 Of course then the other expectations that evolved through the years, social
2 expectations of fairness. And being situationally aware of all of that. Which is a
3 balancing job because tasks and expectations have increased over the years. I have a
4 25 year career as Master so that's changed quite a bit. I think my style was fair. It was
5 dutiful. I try not to get distracted by too many things that I could stay on the big picture
6 and keep situational awareness of not only the voyage, but the conditions of the voyage
7 and the expectations of the ship through the voyage from point to point so that I was
8 aware of planning. In fact I tried to keep the long term view including even seasonally
9 from my year to year what I could do to do the best I could for that ship. Manage
10 repairs, maintenance through seasons so you get the most effective and efficient use
11 out of it. The number one job right after safety of the voyage is efficiency and economy.
12 And to get the most commercial benefit out of the voyage because it's a commercial
13 operation and that's the expectation and purpose of the company.

14 **Mr. Fawcett:** All right. So you've described your personal leadership style. How did –
15 during the time where the marine operations managers were in – under employment in
16 the scheme of things, how did they – how did Sea Star Line evaluate your competency
17 as Master?

18 **WIT:** There was an evaluation process and well I worked with them every day basically
19 by basic communication. Saw them quite often in port. The Sea Star Line operation
20 went from a company office dock to a company dock so you saw the mangers routinely
21 on board the ship and you work with them closely. And they had an evaluation process
22 that was documented. I only went through one evaluation that I recall. But that's how
23 it's done.

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1 **Mr. Fawcett:** And the people that evaluated your competency were they other deck
2 officers with deck experience, or were – who would they be?

3 **WIT:** Evaluation that I remember seeing was Captain Rogers was the Deck Officer and
4 Master's licensed and in operations at Inter Ocean American Shipping in New Jersey. I
5 worked directly with him and for him. And then on the engineering and operation side
6 was Jim Coleman and Lee Peterson with Sea Star Line. They were both experienced
7 engineers and ship's officers also.

8 **Mr. Fawcett:** Could a licensed deck officer effectively perform an evaluation on your
9 competence?

10 **WIT:** I would hope so.

11 **Mr. Fawcett:** So what was your personal style when it came to bridge watch keeping?
12 And what you expected of deck officers.

13 **WIT:** I spent most of my time on the bridge. That's an important part of the ship's
14 voyage is to keep it safe, keep from, basically we can't hit anything which meant
15 underwater as well as on the surface. And a lot of that time was spent talking to those
16 officers. I would believe I was mentoring them, coaching them, being aware of what
17 they were doing, the conditions of the voyage. Even of the watch. There could be
18 periods of time looking ahead where they would encounter traffic, weather, navigational
19 hazards and we would discuss those issues routinely even watch to watch. And then I
20 left night orders anticipating any of those conditions. Sometimes they were very routine,
21 sometimes it was specific because the voyage or the conditions had changed to
22 evening fishing traffic, things like that. So nothing was taken for granted. And it was

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1 discussed routinely. I enjoyed working with the deck officers, I spent a lot of time with
2 them.

3 **Mr. Fawcett:** And while you were working for Tote who conducted the evaluations of
4 deck officers?

5 **WIT:** The Captain did the evaluation for deck officers on the ship.

6 **Mr. Fawcett:** And what was the required frequency?

7 **WIT:** Basically every tour.

8 **Mr. Fawcett:** And then when you conducted the evaluations of these deck officers, who
9 had sort of a final sign off? Did someone ashore take a look at those evaluations and
10 determine – I know there's a category on the evaluation about rehiring, I'm not sure if
11 that's the exact term, but whether they came back to the ship? Who outside the ship
12 reviewed the evaluations?

13 **WIT:** My recollection is that all the evaluations were submitted at the – when I left the
14 ship when we call turnover or change of Master they would be packaged and mailed
15 into the company's personnel management office. And either the Personnel Manager
16 or someone in that staff would review them and file them.

17 **Mr. Fawcett:** Did they ever give you feedback as to your evaluations?

18 **WIT:** Possibly. I don't remember anything specifically that an individual, but it's
19 possible.

20 **Mr. Fawcett:** Let's say I was serving under your command and you checked the box
21 that you didn't recommend rehiring, what would you expect the company to do after
22 they receive that evaluation?

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1 **WIT:** I wouldn't have an expectation. If they felt it was necessary to discuss it with me I
2 would be prepared for that. But I didn't have expectations of personnel. Not that I
3 recall.

4 **Mr. Fawcett:** You didn't have?

5 **WIT:** No, sir.

6 **Mr. Fawcett:** In the very broad sense what was your view of the Master's role
7 regarding cargo lashing, security and stability? We'll get into the details later, but your
8 overview of how you conducted the Master's role with regard to that.

9 **WIT:** Well you rely on the Chief Mate, it's his primary function is to take care of the
10 cargo, the deck maintenance. My job really was to look for the extraordinary situations
11 that might go beyond the routine that would help him identify anything that's critical.
12 And that's something that I know I spent a lot of time with the Chief Mates discussing
13 anything that might be a hazard or an obstruction to the routine of the voyage, or safety
14 of the voyage, or the personnel working. Whether it was hazardous cargo or we carried
15 – we carried cows and horses on the ship so there might be – just keeping the ship
16 clean and sanitary. Those were all routines that I would be more involved with them
17 because it was something that was a more difficult function and created more – it
18 involved more of the ship to stay safe. If it was a routine that was weather oriented I
19 tried to be much more aware of the weather situation for not only the voyage, but the
20 long term period of time and give Chief Mates an overview what was coming so they
21 didn't have to rely on looking at the weather alone and keeping track of voyage
22 expectations and safety. So I work with them on a broader sense to look for anything
23 extraordinary that would go beyond the routine scope and give them support that way.

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1 **Mr. Fawcett:** So looking – looking at the reliance on Chief Mates, if you had a new
2 Chief Mate join who hadn't spent time on the El Faro, the El Yunque or in the case of
3 the El Morro when she ran, how long would it take you as Master to bring them up to
4 speed as to the peculiar characteristics of the, and I don't mean peculiar but on the
5 unique characteristics of the El Faro and that type ship with that type of cargo?

6 **WIT:** Well everybody's different. And it would – so it's difficult to give an exact timeline.
7 Based on their previous education and experience. But I would – honestly it's a year or
8 two before a guy really gets the routine down of voyage experience, weather
9 experience, seasonal experience and expectations. So they would have to learn quite a
10 bit of it from their own personal experience. I would augment it and help them to
11 understand that. But it would be a minimum of a year before a brand new Chief Mate
12 would have enough hands on deck experience to understand what he was up against
13 out there.

14 **Mr. Fawcett:** And that includes people that have served as Chief Mate on other types
15 of vessels? When you say brand new you're not talking about a guy who just got his
16 license? You're talking about an experienced Chief Mate that comes to the El Faro, is
17 that correct?

18 **WIT:** Well, sir, once again, everybody's different. And no, it's not just a brand new
19 Chief Mate, it could be somebody coming from a different ship or an experienced officer
20 that's groomed up from the ranks. That's the best resource of officer because he
21 already has hands on experience with the ship, knows the routine, the cargo so there's
22 less range of information for him to learn. If they come from deck cargo operations they
23 already know how to work with longshoreman and the expectations of that kind of thing.

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1 If they've come from tankers then they don't have that background. They can pick it up
2 quickly if it's a – if they have a college education they might be better with the computer
3 systems and the regulatory side of things. But if they've come up through the ranks and
4 the hawse pipe, they might have a much better anticipation of deck maintenance and
5 cargo work. And it's balanced when they're learning, and like I said everybody's
6 different when they do that so you can't really pin a timeline for an individual to become
7 a good officer. But the minimum expectation I would think would be about a year.
8 Because they would need to go through seasons and go through operations for quite a
9 while before they start getting a relationship with the ship, the crew, personnel they are
10 working with ashore and how they get the most out of everything. And including myself
11 so we get a good working relationship going. It takes time. It's not something that
12 happens immediately.

13 **Mr. Fawcett:** Would your oversight of the new reporting Chief Mate be increased if you
14 were in a Caribbean hurricane season?

15 **WIT:** Absolutely.

16 **Mr. Fawcett:** And we'll revisit weather topics aside. But what's your operating
17 philosophy as Master when it comes to the engineering crew, the Chief Engineer, the
18 oilers, officers down in the engine room and the operation of the plant? What's your
19 philosophy on that as Master?

20 **WIT:** Well you heavily rely on the engineers of course. That's a separate profession on
21 the ship. They have a lot to do, it's technical work, it's sometimes – especially on that
22 Sea Star class, the Ponce class or the steam ships. It's hot and difficult work. The
23 most important thing I can do is create a good working relationship with them. And

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1 balance a trust so I understand what they're up against. And day to day, week to week,
2 voyage to voyage and seasonally. Because we also coordinate work not only on the
3 propulsion system and the habitability of the ship, but also repair structures and
4 coordination, what kind of work is going on. Because the ship needs repair
5 maintenance and a lot of the engineering staff will either take care of that, do it
6 themselves. Some of it falls under the responsibility and supervision of the Chief
7 Engineer himself. And I would say that after the bridge I spent most of my time talking
8 to the Chief Engineers on the ship.

9 **Mr. Fawcett:** So you mentioned bridge resource management. So under the practice
10 that you had on board the El Faro and the other ships, what was bridge resource
11 management like? What was your concept like? And did it include the engineering
12 department as part of the process for bridge resource management?

13 **WIT:** Well for me bridge resource management was using every resource, not just the
14 bridge and the equipment on the bridge, personnel and getting the most out of them and
15 helping them understand what my expectations or needs would be. Including the pilot
16 that you may bring on board. But also the engine room and engine room staff. You do
17 rely on them and have to coordinate with them and understand what they're up against
18 in the engine room. A lot of it is hands on work that they have to do and coordinate it.
19 And you want to give them a warning of time on what you're going to expect and need
20 so that they can be prepared and not someplace else in the engine room. Because you
21 can't of course see them. They're remote. The same thing with the crew of the ship
22 and what you're doing with them. Whether it's coming into port, different evolutions that
23 you go through for the ship coming in and out of port, getting – going through rough

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1 weather. And the same thing with office staff. If you need some support from them you
2 may coordinate it with them also. So you asked about engine room but then you
3 broadened it, and I guess I broadened my answer a little bit.

4 **Mr. Fawcett:** So you have considerable Alaskan experience. So looking at the time
5 when the marine operations manager was utilized to support shipboard operations, did
6 the Alaskan run from Tacoma to Alaska run, did they provide the same level of support
7 for shipboard operations that the Jacksonville operation, marine managers provided?

8 **WIT:** My experience with the company through the years I worked there was quite a bit
9 more – mostly quite a bit more support on the Alaska run than on the Sea Star run.

10 **Mr. Fawcett:** And in which particular ways?

11 **WIT:** For a long time – well it changed. It was a smaller staff originally in Alaska, on the
12 Alaska run. It increased to get more support for the ships. When I transitioned to Sea
13 Star there was a large staff and it was good support, in fact I would say equivalent. But
14 then it decreased and during my time with Sea Star.

15 **Mr. Fawcett:** And what went away?

16 **WIT:** Personnel. There was more personnel. There was a small staff at Tote in the
17 Alaska run. That staff increased and there was more support and backup support and
18 depth of knowledge with all those different people working there. And when I went to
19 Sea Star there was a broad depth of personnel working in the company. Quite similar
20 to what we had on the West Coast and I was used to that type of group of staff helping
21 the ship on a routine operation. But that staff had been reduced in Jacksonville to 2
22 people basically. And they were augmented by personnel on the west coast.

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1 **Mr. Fawcett:** So as Master of the El Faro when you take command of a ship do you
2 assess the particular vulnerabilities of the ships that you command?

3 **WIT:** Absolutely.

4 **Mr. Fawcett:** So looking at a few topics and we'll just talk to them – about them in
5 general. We'll revisit them elsewhere. Looking at the El Faro what were her
6 vulnerabilities with respect to the design, construction and watertight integrity?

7 **WIT:** That's – this is a broad scope, a big target to discuss. Watertight integrity is the
8 simplest one to answer immediately. The watertight integrity, with that class of ship
9 there are large cargo doors at the tank top level which is below the waterline on the 3rd
10 deck level which is barely above, typically above the waterline. And then on the 2nd
11 deck also. These watertight doors are large enough for a tractor trailer vehicle to drive
12 through. They're – that's a vulnerability because if you do take water into the holds
13 those gaskets have to be tight and prevent water from moving into the next cargo hold.
14 That's a hazard, that's a sea keeping hazard. The other vulnerability you have
15 watertight integrity on that class of ship is the manhole hatches that are on the 2nd deck.
16 That's another wear and tear item. Those are used frequently, constantly and again the
17 gaskets get dried out. It's a maintenance item. And sometimes they get forgotten
18 because they're off to the side. But those are your immediate watertight integrity
19 issues. Of course you're always looking to preserve the hull and protect the structure of
20 the ship. That's a key function. The ships are getting older. So that would be a
21 concern always to look at. If you can visual observation is difficult on a ship like that
22 because it's – you can't tell how thick steel is by looking at it. The structure itself and
23 the ship – the ships were excellent ships, I enjoyed working on them. They handled

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1 well, they maneuvered well. They did well in the rough sea. And they maneuvered well
2 in port. So they were easy to – no I shouldn't say easy, but they were reliable and good
3 to work with. So I think the hull was well designed, the ship was well designed. There
4 were no visibility problems from the bridge of the ship when you were maneuvering, you
5 could always see where you were going and what your concerns might be in handling it
6 in close quarters situations around traffic or docking and berthing it. The Sea Star ships
7 when you talk about structure they were ro-cons. So the containers were on the upper
8 decks. And with a heavy load of cargo they would be a tender ship as opposed to a
9 stiffer ship in the Alaska service. They had a higher GM. So and a tender ship is a little
10 bit more of a different animal to handle especially in rough weather and other
11 conditions. But for the most part they were good ships that way too.

12 **Mr. Fawcett:** And we'll revisit some of that later. But can you tell me about the – the
13 potential vulnerabilities of the ship in terms of the engineering plant, steering systems,
14 propulsion system?

15 **WIT:** My experience with the ship of vulnerable – excuse me, the vulnerability of the
16 steam ship typically are most common problem would be boiler integrity. The boilers –
17 it's a high pressure steam, high temperature system that wears out and needs repair
18 and maintenance quite frequently. That's something you have to watch. It can happen
19 unexpectedly with a boiler. Where a tube will let go and the engineers have to respond
20 quickly to preserve propulsion. That was our most common difficulty with the plant.
21 The second issue around the propulsion system was typically the condensers. We had
22 trouble with them for quite a while, but that reliability improved toward the end of the
23 service with my experience with the ships. They had gotten a lot of the – technology

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1 improved, services had improved and preventative maintenance had improved where
2 we knew what to do to keep the ships online. So the reliability was good there. The
3 generating system, the electrical generating system was fairly good. Something could
4 happen. Once again some technology had improved to monitor those systems so you
5 could see it. The – another vulnerability with the operating system like that is the
6 personnel. Having experienced people. If you don't have quite the experienced people
7 that know the system, know the plant and know how to handle something that might fall
8 out of the routine, or if it's something that you need done that you might not know they
9 have the skill level to manage, you have to get personnel down there. So it's not as
10 much a vulnerability, but it could be if it's an emergency and they have to handle it for
11 you.

12 **Mr. Fawcett:** Do you recall during your time on the El Faro if there were procedures or
13 checklists to restore the plant for different casualties?

14 **WIT:** There's certainly procedures to restore the plant. The – if you're restoring the
15 plant, depending on the casualty, depending on the situation, there's probably not a lot
16 of opportunity to go to a checklist for the engineering staff. The Chief Engineer would
17 have to know the system and know what the problems are. If you go through a
18 checklist and you try to go step by step it might preclude him from looking at the cause,
19 the real cause. The very first – very first question that an engineer will use ask when
20 they go to respond to a casualty or problem in the engine room is what's the last thing
21 you touched, talking to the engineer on watch. Because it could be something that he
22 caused. Or the last thing – the last alarm he heard or the last sound that he heard so
23 that they could go right to the most recent indication of why that plant was lost. That

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1 would be the first step in getting a solution because it's a complex system and they
2 have to understand what they're after and they want to get the system back on as
3 quickly as possible. So the checklist – if you went by a checklist you would start – you
4 would really if you had a problem you might be starting in the middle of the checklist.
5 So they would have to go to the problem itself first and then work their way from there.
6 And of course an engineer would be able to handle that answer much better.

7 **Mr. Fawcett:** So in general could you give us your philosophy on – command
8 philosophy on conducting drills and training?

9 **WIT:** Yes. Well drills were policy and something you did – there was a schedule for
10 them or plan, corporate plan for them. The priority for me was always to preserve the
11 best safety that I could see with – let me put it this way. The priority was where their
12 greatest risk would be. If it was rough weather seas and of course there's things to look
13 at there. If it's a ship that has a vulnerability like fire, of course you're looking at the fire.
14 And then what kind of fire are you trying to prevent. Whether it's – or try to fight or deal
15 with could be a cargo system or an engineering system. You want the skill level to
16 come up there. If your crew has limitations and say a new crew of the ship you just met,
17 I've increased drills to as many as several times a week with some of those voyages
18 especially a ship that I didn't know any of the crew. When I worked for the company we
19 broke out a couple ships with the maritime administration. There's so many limitations
20 and so many expectations it's quite broad because your scope of emergencies on a
21 ship can go from medical to fire to flooding, grounding and propulsion systems. So that
22 sometimes you have to – you move your training to just a few parts – segments at a
23 staff and how they will react to it. You don't incorporate the entire ship's crew.

1 Sometimes I focused on just the steward department with the galley fire sometimes.
2 The bridge group with just communication emergencies so we could respond. So it's
3 extensive and it can take a lot of your time. And after my bridge resource management
4 and engineering training I probably looked at my vulnerabilities with the ship whatever
5 they might be. Of course the voyage mission was right there with it. But you're always
6 looking for what is your greatest risk and what could hurt the ship and the mission of
7 keeping the ship safe so she can make her next voyage and keep commerce going for
8 the company.

9 **Mr. Fawcett:** So I want to focus on just one shipboard emergency situation. In the
10 hearing – in the first hearing we heard a recounting of a person missing at muster and
11 the efforts that were taken at sea to locate the person and determine the status of the
12 individual. If you were at sea and you had a muster at a life boat drill or something and
13 couldn't find a particular crew member, what steps would you take?

14 **WIT:** We train for that. It's one of the more common things you do. And I actually
15 design my station bill, the station bill that I prefer to use with that step in mind
16 immediately so that you could muster the personnel and there was an expectation of –
17 with the persons at the mustering locations of a head count. So you didn't have to know
18 who it was you just knew immediately by head count that someone was missing. And
19 then you could refer to the list very quickly that were kept at the mustering location, who
20 was missing so you could respond and look at the most immediate places you would
21 expect that person to be. Because it's an important thing depending on the emergency
22 how you're going to react once you have your personnel together.

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1 **Mr. Fawcett:** Okay. So you're at sea and you cannot locate an individual at the muster
2 point. What would you do next?

3 **WIT:** Depends on the emergency of course and the urgency of the situation. But if it's
4 a training situation you start working on making sure people understand how to look for
5 people and you probably would keep a squad or use a squad to look for them first. Not
6 just send the whole ship out there lose and then have to re-muster.

7 **Mr. Fawcett:** At some point would you consider the potential for man overboard?

8 **WIT:** Of course.

9 **Mr. Fawcett:** And what would you do. Well if we had man overboard you would react
10 to that. And then there will be a man – I mean we're talking about drills and training
11 here. But you would step to man overboard, protocols, get people in look out positions,
12 turn the ship or you could simulate turning the ship to the man overboard. The situation
13 there you would set an alarm on the bridge, or I should say there's a man overboard
14 alarm on most GPS devices. Get the position, the last position of the ship. Start your
15 search from that position and backtrack along the route. Looking for that. Reduce
16 speed, get the engineering staff ready so in case you have to maneuver the engines
17 and get the ship slowed down, which you will. And have the helmsman prepare in hand
18 steering, of extra bridge watch, binoculars out, people on the bow. It's an all hands
19 evolution. Someone could be in distress in the water and you want to get to them as
20 quickly as possible.

21 **Mr. Fawcett:** So have you had occasion to have ship riders aboard the vessel that
22 don't speak the English language.

23 **WIT:** Yes, sir.

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1 **Mr. Fawcett:** And how did you deal with them from a safety and orientation point of
2 view?

3 **WIT:** They're given an orientation immediate on board. Make sure that they
4 understand the basics of life saving equipment that they're issued. And typically there's
5 an interpreter or one person that's a primary contact to keep them together. And we
6 usually bring them to the mustering location so that they know exactly where to go.
7 Even if they are not with each other. They know where to go in an emergency and what
8 that general alarm sounds like so they know how to respond to that emergency and
9 what their expectation is. If it's a person that – if it's only one person or two persons
10 and it could be, sometimes we might bring them right to the bridge so that their with the
11 – with me in the emergency and we will take care of them from there. If it's a large
12 group of people they would go, typically with the crew and so there's several people that
13 can help them. You know manage the situation from there.

14 **Mr. Fawcett:** And how would you take them to the next step? In other words should an
15 actual emergency occur and they have to board the boat or board the rafts, how would
16 you accommodate the language difficulty based on the fact that you had non-English
17 speakers or?

18 **WIT:** You use – well you have your interpreter and your person and then you have
19 other crew members with them that can show them if they don't understand. Typically
20 that would be – you would rely very heavily on the steward department, some of the
21 other persons that did not have critical emergency skills and tasks. Then you would
22 augment – taking care of other people with the personnel that were available.

1 **Mr. Fawcett:** Would you consider part of bridge resource management to
2 accommodate like in a big picture the needs of the non-English speakers so that should
3 an emergency arrived – arise they know exactly what to do and what’s expected of
4 them?

5 **WIT:** Hopefully you’re prepared for that ahead of time with the orientation and the
6 mustering directions so they know how to react. The bridge management system once
7 you get into an emergency or steps to an emergency, they’re coordinating everything
8 with the expectation that other crew members are doing their job. There’s – the
9 communication is coming back from them if it’s a remote location whether it’s a fire or a
10 life boat situation, if you can’t see it directly in that ship you could look right down and
11 see what was going on at the life boat. You would try to confirm if you could that they
12 had everybody in position and ready to go. And if there was a problem then you would
13 deal with it separately.

14 **Mr. Fawcett:** Thank you.

15 **WIT:** You’re welcome, sir.

16 **Mr. Fawcett:** Was there ever within the Sea Star organization a duty officer that you
17 were able to contact for maritime matters?

18 **WIT:** The Operations Manager would be the first person I would think of for something
19 like that.

20 **Mr. Fawcett:** Looking at the experience that you’ve had working for Sea Star line,
21 during Hurricane Joaquin Captain Davidson sent an email ashore about his route and
22 intentions for Joaquin and he posed a question on the return voyage where he talked
23 about going a different route on the return. So it was some time, time might be a little

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1 bit in dispute whether it was 4 or 5 or 6 hours until someone at Tote responded, would
2 that be typical in your experience when you worked for Sea Star Line that there would
3 be that gap in time before that type of message was responded to?

4 **WIT:** It would not be unusual depending on the hours and the business hours of –
5 sometimes it could be even longer. Depending on if there was no urgency something
6 like that, he was coming on a return voyage so there was time for him to get a decision
7 on that. There could have been – you would expect them to – if there's a discussion
8 going on or other communications ashore regarding your request or the information you
9 gave them there could be a gap in time.

10 **Mr. Fawcett:** So how often when you worked at Sea Star Line did you communicate
11 ashore with the SAT phone?

12 **WIT:** It depended. I wouldn't hesitate to use the satellite phone. At least every voyage.
13 Or I shouldn't say every voyage, but every tour which was a 10 week set of voyages. It
14 was a voyage every week roundtrip. If it was a matter of discussion at a lot of times it
15 was around engineering and we would be in communication with them, or repair or
16 scheduling. It was easier to discuss by phone I would say. It was routine to go at least
17 every month, you know to be on the phone.

18 **Mr. Fawcett:** Is there any prohibition to using the SAT phone to communicate ashore?
19 Any limitations on it?

20 **WIT:** No, sir.

21 **Mr. Fawcett:** On the Puerto Rican run?

22 **WIT:** No, sir.

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1 **Mr. Fawcett:** I just have a couple of more questions and I'll wrap up this section. Could
2 you just in general describe your interaction as Master of the El Faro with ABS
3 surveyors?

4 **WIT:** It was good. I tried to meet them every time they were on board. But sometimes
5 they didn't need to meet the Master. And if they didn't I didn't get involved with them. I
6 would just be available for them. They were good to work with

7 **Mr. Fawcett:** How about your interaction with Coast Guard inspectors during your
8 service as Master of the El Faro?

9 **WIT:** The same.

10 **Mr. Fawcett:** And then just my final question, when the marine operations managers
11 were in position, were the lines of authority between you and ashore clear and
12 unambiguous?

13 **WIT:** Yes.

14 **Mr. Fawcett:** Later on when the transition occurred where you are now reporting to Mr.
15 Matthews, would you say the same of the lines of authority?

16 **WIT:** It was more difficult because the transition was going to the West Coast and it
17 was a transition period so I think things were changing and it wasn't quite clear. Mr.
18 Wagstaff was stepping in to operations, but I don't know if he was yet up to speed on
19 ship operations completely to handle things. So when it was disseminated to the
20 operations group I wasn't always sure exactly who was making the final decisions. It
21 depends on who they felt had the most experience with it or a person that was closer to
22 be able to handle and respond.

23 **Mr. Fawcett:** Thank you very much, sir. That's the end of my questions for this round.

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1 **WIT:** Yes, sir, you're welcome.

2 **CAPT Neubauer:** Captain Hearn we're about to transition to use a different line on
3 stability and cargo securing. We've been going for an hour, would you like to take a
4 break and we'll get back into it.

5 **WIT:** I'm fine if you want to continue.

6 **CAPT Neubauer:** Okay. All right we'll keep going then, sir. The next line is on
7 stability. Sir, I would like to talk about the stability that you experienced while doing the
8 Jacksonville to Puerto Rico run on that class.

9 **WIT:** Yes, sir.

10 **CAPT Neubauer:** Now did you – were you the Master of both the El Faro and the El
11 Morro for that run?

12 **WIT:** Yes.

13 **CAPT Neubauer:** And were you working for Tote around the time frame that the
14 Horizon Lines went out of business for that run?

15 **WIT:** Yes.

16 **CAPT Neubauer:** And did you notice any differences in the cargo load outs at that
17 time, sir?

18 **WIT:** Cargo was increasing, cargo volume and tonnage increased. We were picking up
19 the available cargo that was – that we could fit on the ship.

20 **CAPT Neubauer:** Would you say that the loads started to go to full load at that point?

21 **WIT:** We were going to full loads.

22 **CAPT Neubauer:** And when the transition occurred was there a designated GM safety
23 margin that used?

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1 **WIT:** There was.

2 **CAPT Neubauer:** And what was that margin?

3 **WIT:** We – as we, a little bit of an explanation there on that margin. The minimum GM
4 is calculated, but several of the Masters had discussed that I know, I was involved, that
5 the ship was very tender and it was a change in ship handling. It's something
6 concerning when a ship rights itself more slow then when it typically would right itself.
7 And we felt more comfortable having a margin above the minimum GM requirement on
8 arrival in San Juan. So we determined that in all good conditions .5 above the minimum
9 GM required for safe passage was acceptable. That we would arrive with about 2 ½,
10 .25, .3 above, still with good GM.

11 **CAPT Neubauer:** Do you remember the Masters that were involved in that discussion?

12 **WIT:** Yes. I'm pretty sure that Pete Villacamp [sic] and myself, I know I was very
13 involved with it. And it could have been Silo Convolo [sic] at the time, although I think
14 he had already left the company. I would expect Mike Richey and possible Captain
15 Lofffield.

16 **CAPT Neubauer:** Was there any company managers involved in that process, sir?

17 **WIT:** Bill Wisenborn [sic].

18 **CAPT Neubauer:** You said there was some concern voiced ahead of that meeting,
19 was that due to the vessel at the end of the voyage in Puerto Rico?

20 **WIT:** Yes.

21 **CAPT Neubauer:** Can you describe some of the conditions you experienced?

22 **WIT:** What I was observing with the ship was a very slow return, it was a – the ship was
23 becoming even more tender on arrival then when it was when it left. You could even

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1 feel the ship list, I shouldn't say list, but lean over as she rolled from a rudder command
2 alone, let alone rolling with a heavy swell. And because it was slow to right itself you
3 could feel the ship respond more difficultly. And there's always a concern that she's not
4 going to right herself adequately for other conditions. So we felt it important to build in a
5 safety margin in case any other conditions changed during the voyage. That you
6 needed that safety margin to preserve the stability of the ship. And for the routine
7 voyage we had decided that decimal 5, .5 foot above the minimum safe GM would be
8 adequate.

9 **CAPT Neubauer:** When you experienced that heel due to the rudder commands, what
10 kind of wind and weather were you in at that time?

11 **WIT:** Negligible really.

12 **CAPT Neubauer:** Before using a .5 foot minimum departure margin what margin is
13 generally used?

14 **WIT:** There was no policy on it before that. We had not been experiencing these heavy
15 loads and full capacity loads so it was a new experience for the company. At least in
16 my experience with them.

17 **CAPT Neubauer:** Would – are you aware of any departures that occurred right at the
18 required GM?

19 **WIT:** No.

20 **CAPT Neubauer:** Captain, did you have the ability to check your stability calculations
21 while underway?

22 **WIT:** Yes I did.

23 **CAPT Neubauer:** Was that frequently done?

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1 **WIT:** Every voyage.

2 **CAPT Neubauer:** And when did you – when would you generally check the GM
3 underway?

4 **WIT:** Almost immediately after departure from port. The Chief Mate would get the
5 report, generate a printout report and post it on my door. And once the ship was
6 underway and clear of port I would then go down and take a look at it. If there was any
7 concerns he would bring it up to the bridge and sometimes he would bring it up to the
8 bridge anyway to let me know.

9 **CAPT Neubauer:** Did you ever check it in route after you were underway for a few
10 days?

11 **WIT:** Yes, often.

12 **CAPT Neubauer:** Did you ever get a changed loading report from shore after getting
13 underway?

14 **WIT:** Not that I recall. It could have happened, but I don't recall anything.

15 **CAPT Neubauer:** Did you actively get involved with reviewing the stability load outs
16 prior to departure?

17 **WIT:** Prior to departure, if it was – if there was a concern, it may be something that was
18 brought to our attention. Anything that was a concern that's brought to my attention I
19 would get involved with.

20 **CAPT Neubauer:** Did you feel you had enough time from the end of loading to when
21 you got underway to adequately review the stability?

22 **WIT:** Yes. The routine of the ship is to expedite time and efficiency. So there was an
23 expectation of trust among the officers and the management system that everything

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1 would fall in line correctly. And if it did not then it's the kind of thing that we would have
2 to correct so that we could maintain that efficiency of operation.

3 **CAPT Neubauer:** You mentioned that you have a lot experience on the Northern
4 Lights ----

5 **WIT:** Yes, sir.

6 **CAPT Neubauer:** In Alaska. And that there was a difference in the vessel when it was
7 converted to con-ro.

8 **WIT:** Yes, sir.

9 **CAPT Neubauer:** Handling-wise. Did you ever hear any concerns voiced from Tote
10 management during the conversion process for the Northern Lights to El Faro for con-ro
11 service?

12 **WIT:** No, sir. But I have to correct, add, that I was not with the Northern Lights at the
13 time of conversion. I was on the West Coast with another ship. When I came to the El
14 Faro the ship had already been converted from the Northern Lights.

15 **CAPT Neubauer:** Did you ever hear from any safety managers shore side of any
16 concerns with the stability for the vessel after the conversion?

17 **WIT:** No, sir.

18 **CAPT Neubauer:** Were you aware of a potential flooding hazard from the vent ducts
19 that supply the cargo holds and engine room on the El Faro?

20 **WIT:** No.

21 **CAPT Neubauer:** Thank you Captain. At this time I'm going to pass the questioning to
22 Mr. Kucharski.

23 **Mr. Kucharski:** Good morning Captain Hearn. Mike Kucharski, NTSB.

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1 **WIT:** Good morning, sir.

2 **Mr. Kucharski:** Captain Neubauer with your permission I would like to go back to the
3 initial line of questions and ask general questions.

4 **CAPT Neubauer:** Of course.

5 **Mr. Kucharski:** Captain Hearn, so – so I guess I’m crystal clear and everyone’s crystal
6 clear on your experience with the Tote vessels, you mentioned you were Master on the
7 Tote vessels, this is the Ponce Class vessels we’re talking about, correct?

8 **WIT:** Yes, sir.

9 **Mr. Kucharski:** And the ro-ro service on the Alaska service, was that roll on, roll off?

10 **WIT:** Yes, sir, completely. To the upper decks it was completely roll on, roll off.

11 **Mr. Kucharski:** And which vessels did you have experience on?

12 **WIT:** All of them. The Westward Venture, Great Land and Northern Lights in Alaska.
13 And I did serve on all three ships for Sea Star in Puerto Rico.

14 **Mr. Kucharski:** Okay. So you served on the ro-ro vessels as Master in the Alaska run
15 prior to the draft marks being changed when it was in a ro-ro service and then you went
16 over to Sea Star and were those vessels all in the con-ro containers with the rolling
17 cargo?

18 **WIT:** Yes, sir. The Sea Star conversion was a ro-con with containers on the upper
19 decks and not ro-ro completely.

20 **Mr. Kucharski:** And when you mentioned you went to the Persian Gulf, I’m sorry,
21 correction, the Mideast, what vessels was that on?

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1 **WIT:** I was Master of the Northern Lights on a voyage and then I – and then after it was
2 converted to the El Faro which is a ro-con class, I was Master of that ship. So I've done
3 both types of vessels to the Mideast.

4 **Mr. Kucharski:** To the Mideast? Both types, both ro-ro and?

5 **WIT:** Ro-con.

6 **Mr. Kucharski:** Ro-con. So the – to build on what Captain Neubauer was asking about
7 the way the vessels handled or the stability margins, can you comment on that the
8 differences from when it was in ro-ro service to con-ro?

9 **WIT:** Well depending on how the ship was loaded of course also. The – there was two
10 stability issues with the ro-ro class ship where it was a lighter load. The stress was
11 typically a concern, not a limiting factor. The ships would get very close to a 90 and
12 even exceed it, or close to 100 percent margin on stress. But you did not have a GM
13 problem with that ship in either direction. They were – you didn't have to worry about
14 your margins there at all. They were good. You had good stability, the ship was a little
15 stiffer, so it would react quicker and right itself faster. The concern there of course is
16 cargo and personnel, the stress factors on them. The acceleration of course are greater
17 and quicker. The ro-con type ship especially if it's a heavily loaded ship is more tender
18 and slow reacting to right itself. It's – and because they were carrying heavier tonnage
19 they were slower. So you had a ship that just by tonnage it would react slower and
20 manage slower in a close quarters situation, docking, berthing situation and a sea
21 keeping situation. So those are the key points. But the ro-con did not have the stress
22 limitation. You didn't have to worry about stress. But the added tonnage in the mid-
23 body of the ship she was not stressed.

1 **Mr. Kucharski:** Do you remember what your stability margins in a fully loaded
2 condition were on the, when they were in the ro-ro configuration going to Alaska?

3 **WIT:** I recall around 6 foot GM and I think it could be as much as 12 foot GM South
4 bound with real light loads. But it's been quite a while since I took them on that run.

5 **Mr. Kucharski:** Okay. So you're saying that was excess GM or is that ----

6 **WIT:** No that would be about the GM number. The required GM was probably around
7 3 ½ feet, 4 feet.

8 **Mr. Kucharski:** So on the loaded North bound in Alaska if she had – the vessel had 6
9 foot GM ----

10 **WIT:** That's what I remember, sir.

11 **Mr. Kucharski:** And 3 ½ so it had about 2 ½ feet of excess GM?

12 **WIT:** Correct. If you want to call it excess, but margin above ----

13 **Mr. Kucharski:** Margin.

14 **WIT:** Minimum.

15 **Mr. Kucharski:** Captain Neubauer do we want to continue on stability questions?

16 **CAPT Neubauer:** Yes.

17 **Mr. Kucharski:** Captain Hearn was there any angle of heel which you would be
18 concerned about after it was converted, the Northern Lights to El Faro to the containers
19 on deck? Was there any angle of heel that you would be concerned about as far as for
20 cargo breaking lose?

21 **WIT:** Yes. You're always concerned when you start to roll the ship and heel. But once
22 you get to about 15 degrees things can start moving a little quicker and stress the
23 lashings. The cargo is relying on the lashings almost completely to stay in position.

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1 And you don't want to exceed, start exceeding that or getting close to the limits. Cargo
2 can stay in position even at 30 degree rolls. And the roll period is a factor in your
3 concern if it's fast or slow. A tender ship tends to hangover slower to react and respond
4 upright, become back upright. When it's slow like that it hangs on those lashings and
5 gives more opportunity for the cargo to shift or move. When it's faster, if it's very fast
6 acceleration forces are greater and break the lashing. So it's a concern either way.
7 You don't know what – depending on the type of cargo or the cargo concern I usually try
8 to be concerned about my weakest cargo lashing or my weakest cargo – my greatest
9 cargo concern what it might be, whatever limiting factor and if I can keep the ship
10 steady for that cargo then the rest of the cargo is usually safe enough to stay in position.
11 Typically it would be the ro-ro cargo down below decks on the second deck. That's the
12 highest area of center – above the center of gravity for them. And they had the fewer
13 lashing points to block cargo, the containerized cargo on the upper decks was very
14 reliable. And you could observe it visually from the bridge. Even at night we would flip
15 on the deck lights and if you saw cargo moving you might recognize that you have lose
16 lashings or lashings that have moved and you can go out and make a correction.

17 **Mr. Kucharski:** Captain we'll revisit cargo lashings in a little bit.

18 **WIT:** Yes, sir.

19 **Mr. Kucharski:** On the stability line was there any sea state and or wind state you
20 would try to avoid on the El Yunque, the El Morro and the El Faro? You were Master on
21 all three of those vessels, is that correct?

22 **WIT:** Yes, sir. Depending on direction, if it was on your beam of course it's a greater
23 concern then head on or even on your stern. But once you get to the sea state 7, you're

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1 starting to get near gale force conditions. And sea conditions, depending on the fetch
2 the ocean distance where that swell – there could be a developing swell along with it
3 that might be greater than sea state 7 seas. So you have swell with it. And that could
4 bring your bigger problems. Especially on that run you didn't always have a rough sea
5 state, but you could have ocean swell that was greater than the sea state conditions.
6 And that would be your first concern or something you would watch. And I would say
7 that, you know once you start taking beam seas at 15 feet, 10 to 15 feet you have to be
8 careful with your ship. But the ship will tell you. She'll start moving and rolling.

9 **Mr. Kucharski:** And just concentrating on stability, would that what you just described
10 for 7 sea state of 10 to 15 foot on the beam, would that be a concern for stability?

11 **WIT:** Everything's a concern for stability once you start moving the ship from her
12 upright position. If things change or move within the ship or something could change
13 and that could change your stability factors. So you're always concerned about every
14 little – every detail of the ship and you want to preserve the original stability and the
15 original position of the ship as long as possible. Not only for cargo equipment, but
16 personnel, efficiency of the voyage, maintenance, the work that's being done, people
17 are working around other components. Things that are hot, tools, steam lines in the
18 galley, guys are moving equipment they could get hurt. So you want to keep the ship as
19 stable as possible for the personnel living on board.

20 **Mr. Kucharski:** During your time as Master for Sea Star only, from Sea Star,
21 correction, from Sea Star onto the new management at – from Sea Star to Tote if you
22 will, was there any discussion of sea state conditions or wind conditions to avoid on
23 those vessels with the Tote personnel or the Sea Star personnel shore side?

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1 **WIT:** Not that I recall, sir.

2 **Mr. Kucharski:** Can you tell us what wind heel means to you?

3 **WIT:** What it means to me is the reaction of the ship to the wind that would force a ship
4 to have a – almost a permanent angle and heel over from simply the wind forces alone.

5 **Mr. Kucharski:** Did you experience wind heel going back on the ro-ro ships up in
6 Alaska?

7 **WIT:** Rarely.

8 **Mr. Kucharski:** I'm sorry your answer was rarely?

9 **WIT:** Rarely. Yeah it might be a very temporary wind heel that would buffet the ship a
10 little bit, but I would say it would be negligible.

11 **Mr. Kucharski:** Okay. Now compare that to the ships on the Puerto Rican run after
12 they were converted to containers also.

13 **WIT:** Umm huh. I really think it's, if it did have a wind heel it was hard to determine
14 from the difference with the swell. And if it was a wind heel or a wind force that wasn't
15 sufficient enough to push the ship over a little bit it would be negligible a degree or two
16 and you couldn't measure it or discern it from the swell condition and the other forces
17 that were moving the ship.

18 **Mr. Kucharski:** Were you aware of any wind heel calculations that were performed on
19 the con-ro?

20 **WIT:** It's hard to remember entirely the stability manual and the stability information for
21 the ship. I haven't seen it for quite a long time now. But I – and I've looked at a lot of
22 stability manuals since – some of my recall is mixed with those conditions. But if it was
23 in there I would have looked at it. But my experience with it was it was not a serious

1 factor for me to consider when I was managing the ship with other – other – other
2 issues.

3 **Mr. Kucharski:** How about in CargoMax the loading computer? Do you recollect
4 seeing any wind treatment in there?

5 **WIT:** I don't. Yeah there was a calculation and a figure on the side.

6 **Mr. Kucharski:** Were you aware of any particular down flooding points along the hull of
7 the vessel after, either before or after the conversion?

8 **WIT:** On the inside of the side shell or outside?

9 **Mr. Kucharski:** Outside of the side shell down – well were you aware of any down
10 flooding points either inside the shell or outside the shell?

11 **WIT:** Well inside the side shell of course the manholes and the watertight doors, the
12 cargo doors that we discussed earlier. The number 1 and number 2 watertight doors.
13 And there were man doors inside those also. There were two others, you can call them
14 scuttles, but they were watertight doors into the machinery space 1 aft of the
15 superstructure. That was also an emergency escape for the engineers that went all the
16 way down to the stern tube. And the second one was aft on the fantail that went down
17 into the steering gear area. And then there were scuttles along the side shell near the
18 side shell on the side of the ship that went into the cargo holds.

19 **Mr. Kucharski:** Okay. You were aware of the down flooding points on the exterior of
20 the ship that went into the cargo holds?

21 **WIT:** The only area that water could ingress into the cargo holds from the side shell
22 would be the ventilation trunks that I can recall.

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1 **Mr. Kucharski:** Did you ever see any calculations or any reference to that in the
2 stability manual?

3 **WIT:** I don't recall it.

4 **Mr. Kucharski:** Captain Neubauer I don't know if you want me to continue as far as
5 securing and down flooding areas?

6 **CAPT Neubauer:** Let's do the stability down flooding. And we'll do cargo securing next
7 round.

8 **Mr. Kucharski:** Okay. Securing the vessel as far as closures go.

9 **CAPT Neubauer:** Yes, let's continue with stability and then we'll do a break.

10 **Mr. Kucharski:** Captain Hearn did the company have any policy for closing of
11 watertight doors and hatches?

12 **WIT:** Well the policy is regulatory. Regulatory compliance. All the watertight doors and
13 hatches had to be secured prior to leaving for sea. They were inspected before leaving
14 for sea. And it was documented and logged that it was secured. And if it was opened
15 at sea for any reason it was also logged and kept a record of.

16 **Mr. Kucharski:** Were the watertight, the scuttle, are those watertight closures?

17 **WIT:** Yes, sir.

18 **Mr. Kucharski:** Were those opened and closed at sea?

19 **WIT:** They were opened and closed at sea.

20 **Mr. Kucharski:** For what purpose?

21 **WIT:** Maintenance and checking of cargo.

22 **Mr. Kucharski:** Were those logged during your time when they were opened?

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1 **WIT:** No they were not. That was not considered a cargo door. So it was – but it was
2 an ingress into the cargo spaces and it was a routine to inspect those at night to make
3 sure that they were – in case somebody left them open they would be secured again.

4 **Mr. Kucharski:** And who inspected those?

5 **WIT:** Typically the Boatswain would make a round when he finished working in the
6 evenings.

7 **Mr. Kucharski:** Did he report to anybody that they were all dogged or closed?

8 **WIT:** It became a routine. I know on the Alaska run we did. On the Puerto Rico run it
9 should have been a routine for the Boatswain to check into the bridge, but I don't recall
10 them doing it very well on that run.

11 **Mr. Kucharski:** The dampers on the outside of the hull forward.

12 **WIT:** Yes, sir.

13 **Mr. Kucharski:** Were those fire dampers?

14 **WIT:** Yes.

15 **Mr. Kucharski:** Were they normally opened or closed at sea?

16 **WIT:** Typically they would be open.

17 **Mr. Kucharski:** And why were they left open?

18 **WIT:** Natural ventilation to the cargo spaces and because those spaces were vehicle
19 spaces, you wanted some air to get into the area.

20 **Mr. Kucharski:** Did you ever close those?

21 **WIT:** They were closed routinely to make sure that they could close, but they were fire
22 dampers. They were closed at least and inspected every month to make sure they
23 were operating correctly. I don't recall ordering them closed for any other – any reason.

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1 Even if we did have some sea spray in the area it was negligible amount of water that
2 came through.

3 **Mr. Kucharski:** Thank you Captain.

4 **WIT:** Yes, sir, you're welcome.

5 **Mr. Kucharski:** No further along that line.

6 **CAPT Neubauer:** Mr. Roth-Roffy.

7 **Mr. Roth-Roffy:** Tom Roth-Roffy, NTSB.

8 **WIT:** Yes, sir.

9 **Mr. Roth-Roffy:** Good afternoon Captain Hearn.

10 **WIT:** Good morning, sir.

11 **Mr. Roth-Roffy:** Sorry, good morning. I would like to revisit the GM margin issue that
12 was previously addressed by other panel members.

13 **WIT:** Yes, sir.

14 **Mr. Roth-Roffy:** You mentioned that when the vessel started carrying heavier loads on
15 the Puerto Rican run that there was some concerns or issues with tenderness of the
16 vessel and that there was some internal discussions about increasing the GM margins.
17 Do you recall at what GM levels you experienced these tenderness conditions on the
18 vessel?

19 **WIT:** Well it was less than 4 feet, I think around 3 ½ to 3, I think it was 3 ½ feet. I'm
20 trying to remember the numbers without a reference. It wasn't necessarily the GM,
21 while I looked at it and found that the margin was close, but it was the ship itself that
22 was indicating a tender ship which was a difference experience in the GM. And looking
23 at that margin I immediately recognized also of course that we had to preserve that

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1 margin of safety. And looking at the fuel burn that we had to make sure that we could
2 do it in a routine voyage that we had an extra margin to maintain, good stability for the
3 ship. Required stability for the ship on arrival in port. We, over a number of voyages
4 determined that .5 was adequate minimum.

5 **Mr. Roth-Roffy:** So the trim and stability and the CargoMax had the limits specified, is
6 that correct?

7 **WIT:** Yes.

8 **Mr. Roth-Roffy:** Presumably, or could you discuss what your understanding is of that
9 limit that if you approach the limit would the vessel maintain adequate stability or was
10 that the absolute limit at which you should never go below?

11 **WIT:** No, sir. You would still have positive stability if you went below that required GM.
12 Because the ship was tender it was, and a mariner has a natural concern when you
13 upright yourself, the ship uprights slowly. You want the ship upright. So we had
14 discussed it and we wanted a margin of safety built in so that's how we came to that
15 number. But you still had, even if you went below the required GM the ship still would I
16 have positive stability until the center of gravity met the metacenter and then of course
17 you would not have positive stability and she could quite possibly would roll over. But
18 there was plenty – it was several feet. And that factor is quite large to destabilize the
19 ship, you know it's for several feet. So you have some margin there.

20 **Mr. Roth-Roffy:** So that GM limit there was still a measure of safety or conservative ---

21 -

22 **WIT:** Yes, sir, that's calculated by the Naval Architects in the system and you have to
23 preserve.

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1 **Mr. Roth-Roffy:** So when you experienced these tender conditions on the vessel you
2 didn't have any concerns that there – there was any errors or problems with the stability
3 calculations expressed in the T&S booklet or CargoMax?

4 **WIT:** I trusted them.

5 **Mr. Roth-Roffy:** Regarding the stability margins, was it your practice or the company's
6 practice to adjust the margins, the GM margins for different weather conditions? For
7 example if you anticipated heavy weather during a voyage. Would you consider
8 increasing even beyond the .5 margin?

9 **WIT:** If we had a limitation like that and there was concern, it would be something that
10 would be heavily discussed with the company. Because it's a – it was a tight margin.
11 And it was at the time we considered it, a .5 it was something we wanted for good
12 weather, routine voyage conditions. So if it was going to go past or change from those
13 original expectations it would be – it will be something that should be discussed among
14 management because it would change the load and the cargo, the ability to carry cargo.
15 And if there was a compromise there of how we would manage the voyage and keep
16 the ship in a safe condition for the voyage.

17 **Mr. Roth-Roffy:** So if you were departing Jacksonville anticipating meeting heavy
18 weather conditions you would consider increasing that GM margin above .5 is what I'm
19 understanding. What level would you seek?

20 **WIT:** The answer to that is yes. And I might even – I would, shooting from the hip here
21 without an opportunity to calculate it which I think we would try to do, even if it meant
22 taking another hour to discuss it which we had the full load and knew exactly what we
23 were dealing with, with the ship. I wouldn't hesitate to discuss with operations that we

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1 need to go a different route or to take some cargo off and go for about a foot to double
2 that number. And at least preserve a stronger margin knowing that we could have – we
3 could lose some of that margin, that safety margin to get to the required GM with known
4 factors such as free surface effect.

5 **Mr. Roth-Roffy:** Thank you Captain. That's all I have.

6 **WIT:** Yes, sir.

7 **CAPT Neubauer:** Captain Hearn we've been going for 90 minutes. Let's take a 15
8 minute break and we'll pass the line of questioning to the parties in interest next. And
9 the hearing is now recessed and will reconvene at 1045.

10 *The hearing recessed at 1031, 17 May 2016*

11 *The hearing was called to order at 1049, 17 May 2016*

12 **CAPT Neubauer:** The hearing is now back in session. At this time we'll go to the
13 parties in interest to continue on the line of questioning. Tote, please.

14 **Tote Inc:** Thank you Captain. Captain when did you leave your employment with Tote
15 Services? I just want to make sure that's clear.

16 **WIT:** The summer of 2013.

17 **Tote Inc:** Okay, thank you. When you were working on the Alaska run and
18 Jacksonville, who was your employer?

19 **WIT:** Inter Ocean American Shipping. It could have been at that time Inter Ocean,
20 they've changed names. IOT, IUM.

21 **Tote Inc:** And Inter Ocean became Tote Services, correct?

22 **WIT:** That's correct, sir.

23 **Tote Inc:** And so you never worked for Sea Star or Totem Ocean Trailer, correct?

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1 **WIT:** I did some work for Tote directly as a pilot in Alaska. First Class pilot just briefly
2 to fill in for one of the pilots that took a leave of absence. And I – but I don't recall ever
3 working for Sea Star directly.

4 **Tote Inc:** Okay, thank you. There was some discussion about the impact of Horizon
5 Lines going out of business and how that purportedly increased the amount of cargo
6 being carried on the ship. And I think you said you left in the summer of 2013.

7 **WIT:** That's correct, sir.

8 **Tote Inc:** And are you aware that Horizon Lines last sailing was in December of 2014?

9 **WIT:** No, not aware, I wasn't there at the time.

10 **Tote Inc:** Okay, thank you.

11 **CAPT Neubauer:** ABS do you have any questions?

12 **ABS:** No questions.

13 **CAPT Neubauer:** Mrs. Davidson do you have any questions?

14 **Ms. Davidson:** No questions.

15 **CAPT Neubauer:** Herbert Engineering do you have any questions?

16 **HEC:** No questions.

17 **CAPT Neubauer:** All right. At this time we'll go to a new line of questioning. I'm sorry
18 there is a couple more follow ups. Commander Denning.

19 **CDR Denning:** Good morning Captain. Just a few follow ups on that last line of
20 questioning.

21 **WIT:** Yes, sir.

22 **CDR Denning:** And then we'll move on to another line. You mentioned specifically
23 some folks, you know operations management folks within the company who you relied

1 on for advice. Can you tell us a little bit more about their background and specifically
2 why you trusted that particular advice?

3 **WIT:** The first person that comes to mind with Sea Star it was Bill Wisenborn [sic], the
4 Operations Manager. He had been with the company and I believe since the beginning,
5 meaning when they started Sea Star service with the El Yunque and the El Morro. He
6 was a Kings Point graduate. He had some sea experience, but he had a lot of voyage
7 experience working with the other ship Masters and the operation itself so that some of
8 the experiences that were encountered by other ships and other Masters were passed
9 on to him. And if I had a conversation sometimes he would reference things that he had
10 learned from them.

11 **CDR Denning:** Can you give us a few examples maybe of some of the conversations
12 you had or advice you sought and some of the input he gave you as a vessel Master?

13 **WIT:** Yeah voyage planning, route. We were looking – I was looking for opportunities
14 to pick up current or make the voyage more efficiently so that we could reduce fuel
15 costs and fuel burning through fuel efficiency. And we talked about that quite a bit. But
16 in talking to him I found that it was really a, almost a difficult thing to find. You know
17 there was not a seasonal experience at any of the Captain on the run had learned, and
18 he confirmed that for me. So that's an example, but.

19 **CDR Denning:** And – sorry.

20 **WIT:** That was just an example of what he did for me.

21 **CDR Denning:** And when you say seasonal experienced, is that weather related? Is
22 that what you mean by that?

1 **WIT:** Yes, but when I say season I mean the winter season compared to the summer
2 season. Sometimes currents change. And along with weather conditions change. And
3 you might have a summer current that you wouldn't have in the winter time and you
4 could take advantage of.

5 **CDR Denning:** So currents. And was he – did he provide guidance or advice to you
6 specifically regarding weather avoidance as well?

7 **WIT:** He has. And it was something that we had discussed. In fact when I first went
8 there we – I was on the run to the Mideast and sometimes we couldn't get a reliable
9 weather information. Mid-Atlantic and across and he sent weather reports to us, or the
10 office would, the staff under him. And he was very good in discussing opportunities for
11 other weather systems. In fact we purchased the weather system to give us more
12 reliable weather information on that run. And that system was used later for all the
13 ships.

14 **CDR Denning:** And what systems were those?

15 **WIT:** I think it was called Bon Voyage.

16 **CDR Denning:** Which is the system that was – that we've heard a lot of testimony
17 about and was – has been on these vessels for some time, correct?

18 **WIT:** I guess it has now. I used it and it was very good weather reporting, it was a little
19 different than the National Weather Service weather reporting and it gave you color and
20 information that you could visualize a little quicker and discuss. And weather is
21 important to a ship. You watch it all the time.

22 **CDR Denning:** Do you recall approximately when that system was purchased?

23 **WIT:** Probably 2008.

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1 **CDR Denning:** And to the best of your knowledge has there ever been a time when
2 Bon Voyage has not been employed on the vessels since – from that point until the time
3 you left?

4 **WIT:** No I think we had at least the weather information from it.

5 **CDR Denning:** So can you tell me how often you would reach back to either Mr.
6 Wisnborn [sic] or someone else in operations for – to seek advice on the topics you
7 just mentioned?

8 **WIT:** It was always on my list of things to do. If there was a subject developing whether
9 it was maintenance or operationally related it was an opportunity to – because
10 sometimes they were not available to visit and conversations are difficult unless it's a
11 person to person, so it was an advantage to have someone to discuss these things with
12 and so I looked for those opportunities. And if I had a list of items to go over with them
13 that I missed one week I would catch them the next week if I had that opportunity.

14 **CDR Denning:** You mentioned when Mr. Fawcett was leading the questions earlier on,
15 you said at one point the operations folks in the office had reduced to two. Do you
16 remember a time frame when that occurred and how that transition went?

17 **WIT:** Not completely. I think around '11 or '12, but I'm not sure.

18 **CDR Denning:** Then you mentioned that at times those – who – those that were left
19 would sometimes be augmented by people on the West Coast. How did that process
20 work? The augmentation process.

21 **WIT:** Well that was managed by them. And I would be answering for them if I
22 understood it. So they sent people when they felt they needed to or the
23 communications was done there with them. I would imagine that they, it's hard for me

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1 to remember now, but I think they were probably involved in the operations or
2 engineering general information emails and communications that came from the ship
3 where it was forwarded from – directly from the person in Jacksonville here dealing with
4 them completely. So that network was built into the communications for the company.
5 And if there was a person assigned to a responsibility, that came from the West Coast
6 also to help manage it.

7 **CDR Denning:** And when you say the West Coast can you recall who was consulted
8 on the West Coast?

9 **WIT:** Well the senior managers that, I would imagine made decisions on who would be
10 assigned for the work to get done or they would handle it themselves. It would be either
11 Cliff Hill or Phil Morrell.

12 **CDR Denning:** And who did they work for at that particular time?

13 **WIT:** Tote.

14 **CDR Denning:** When you say Tote it's challenging to a certain extent with parent
15 companies and subsidiary companies.

16 **WIT:** Tote on the West Coast on the Alaska run, that service out there. I don't know
17 the name of that company off hand. But it was called Tote back then.

18 **CDR Denning:** So would that be Totem Ocean Trailer Express?

19 **WIT:** Yes, sir.

20 **CDR Denning:** When you were describing the process by which the Masters of the
21 vessels got together and determined the .5 GM margin you specifically mentioned Bill
22 Wisenborn [sic] as a person from the company that took part in those conversations.
23 What input did he provide to those particular discussions?

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1 **WIT:** Well because we couldn't get together the conversations happened with Bill as
2 the contact point and the management point. He would discuss it with the Captains as
3 he visited the ships to discuss, you know something that was changing and something
4 that we should build a safe parameter around. So he was the lead officer of it, the
5 manager representing the company of course. And if he thought he needed to take it to
6 another level that was his responsibility. And he coordinated the discussions with other
7 Masters directly.

8 **CDR Denning:** Did you feel like he was supportive of the desire to create that margin?

9 **WIT:** Yes.

10 **CDR Denning:** So did you sense any resistance or push back from him personally?

11 **WIT:** No.

12 **CDR Denning:** Did he relay to you any resistance or push back from the rest of the
13 organization?

14 **WIT:** No it was a responsible – I had a feeling of a responsible management, culture.

15 **CDR Denning:** I just want to clarify one answer, question and answer. Captain
16 Neubauer asked you whether you would check, you know CargoMax paperwork while
17 underway several days in. And I just want to clarify for the record your answer was
18 often. Did that mean you would continually recheck it? In other words you had already,
19 or was that the first time you would check it, days in?

20 **WIT:** No, I would check it immediately on start of the voyage. And I kept it posted over
21 my desk. So it was right there in front of me. It was something that I would look at
22 regularly. It was a very routine document to have posted there, but it was right there if I
23 needed it immediately.

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1 **CDR Denning:** When you were asked about the – you spoke about the boilers and you
2 mentioned they needed frequent maintenance. A phrase you used you said sometimes
3 the tubes would let go. Can you describe what you meant by that?

4 **WIT:** A boiler tube letting go would be a rupture in the boiler tube and you would lose
5 water in the boiler. You would essentially lose the boiler. And there was another boiler
6 down there. I don't want to speak for engineers and an engineer procedure to preserve
7 propulsion, but letting go would mean that that boiler tube blew out and had a structural
8 – a failure.

9 **CDR Denning:** And then my final question when you were discussing wind heel and
10 specifically in light of the conversion from ro-ro to ro-con. Is some of that wind heel, the
11 increased wind heel that you would experience was that due to the additional sail area
12 of the containers on deck? Was that ----

13 **WIT:** That's what I would anticipate, sir.

14 **CDR Denning:** Thank you. That concludes my questions Captain.

15 **WIT:** Yes, sir.

16 **CAPT Neubauer:** Commander Odom.

17 **CDR Odom:** Good morning Captain.

18 **WIT:** Good morning, sir.

19 **CDR Odom:** So I know you don't want to speak too much for engineering, but I just
20 have a few more engineering related questions I would like to ----

21 **WIT:** Of course.

1 **CDR Odom:** Specific to weather was there ever any other issues that caused
2 propulsion issues like lube oil sloshing in the sumps that you're aware of? Or sediment
3 in the fuel and clogging the filters? Did that ever become an issue?

4 **WIT:** We're talking about engineering and weather conditions?

5 **CDR Odom:** Yes, sir.

6 **WIT:** Yes. Fuel is a concern. The rougher the weather the more possibility that sludge,
7 because fuel – some of the sludge settles to the bottom of the tanks. And in rough
8 weather or movement with the ship that sludge mixes with the oil as it would and it gets
9 into the strainers. And the strainers need to be cleaned more frequently. It's a difficult
10 messy process and if the ship's moving at the same time it's a problem for them. Even
11 though it's heated. So that's a concern. Another concern with rough weather is the
12 steam lines and around the steam plant. They're moving, they're hanging on what they
13 call hangers. But if a hanger breaks or heavy steam lines with superheated steam
14 under high pressure it's a danger for the personnel down there. You're concerned
15 about the steam line breaking, fracturing, moving away and letting go or a gasket letting
16 go and it can hurt an individual that's nearby severely, but it can also fill the engine
17 room space up with steam and it's difficult to breath.

18 **CDR Odom:** Did you have hangers let go while you were onboard the ships?

19 **WIT:** I've had steam lines fracture.

20 **CDR Odom:** And what about the lube oil sloshing, was that ever an issue?

21 **WIT:** Not that I recall. The lube oil itself is usually – I don't remember losing lube oil or
22 having a problem with the lube oil system.

1 **CDR Odom:** Thank you. And what about – did prop cavitation ever become an issue
2 in heavy seas?

3 **WIT:** It's an issue. It's something you would be concerned about, I wouldn't say
4 cavitation, but vibration if the propeller comes out of the water. Which happens in
5 rougher heavy swell, rough sea or a heavy swell. And you can feel that vibration. The
6 propeller system hangs on struts. So it's, on that class of ship it's not only outside of the
7 hull the stern tube is outside of the hull. And it's vulnerable to damage. And the
8 lubrication system to it is vulnerable also. And the seals are vulnerable. You want to
9 preserve that and protect it. Not only protect the machinery itself for voyage reliability
10 but also damage in a storm. So it's – it can be a concern.

11 **CDR Odom:** Can you describe some mitigating measures that you would take to
12 manage that?

13 **WIT:** Well if you're slamming your stern which is the concern which means that the
14 water – the stern of the ship comes out of the water and then settles into the next trough
15 of a wave with the force and the tonnage of the – the weight of the ship itself, it slams
16 and it's a pounding of the entire ship. You have to imagine 30,000 tons pounding at
17 once. It's heavy and you can feel it through the entire ship. That's – could be
18 catastrophic to machinery itself back there. And that's the concern and the damage that
19 can happen. What you do if your stern is slamming is typically the first thing you try to
20 do is I would get the ship into a head sea and ride it – you know ride better and slow
21 down, reduce speed. So speed is a factor if you can – if it will manage the weather
22 enough.

1 **CDR Odom:** And did it ever become an issue? Did the weather ever become so rough
2 that water entering the stacks, or coming down through the stacks would affect the
3 boilers and their performance?

4 **WIT:** No, sir.

5 **CDR Odom:** Thank you. Also we've heard that they have the capability when you lose
6 power in the engine room to back feed from the emergency generator to the engine
7 room for the purpose of restarting the boilers. Were you ever on board whenever that
8 was done?

9 **WIT:** Yes.

10 **CDR Odom:** Is that – how long does that take for them to align that system up and get
11 power back to the engine room?

12 **WIT:** It depends on the problems you're dealing with. And that can complicate the
13 situation not knowing what the problem might be. Another factor is the experience of
14 your personnel and how well skilled they are in understanding those steps and
15 procedures. If they're not experienced with it you have to communicate with them and
16 take steps – measures to make them understand so they know how to move along with
17 it. Because it's a – there's a trick to it and the Chief Engineer would be managing it.

18 **CDR Odom:** So was that something that was routinely – a procedure or was it
19 something that they train to the engineers or they would practice it at some point to
20 teach the engineers how to do that and line it up?

21 **WIT:** There was no training that I recall for something like that. Although the engineers
22 learned all the systems through their experience with the ship. Some of it would be
23 routinely done if there was expected maintenance on the ship. And they would get that

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1 experience and learn it so that if you had well experienced engineers they would know
2 immediately these procedures. That's what they do. They learn these procedures and
3 get to know them very well. If it's a first time for someone then they would have to be
4 learning it as they go. But the Chief Engineer would be very familiar with it. The First
5 Engineer would typically be very familiar of these steps and procedures. But once
6 again if there's a complication to the machinery system or systems they're giving them a
7 hard time that they're dealing with then they're managing that at the same time and that
8 makes it complicated in those steps. You know the issues have been broadened for
9 them.

10 **CDR Odom:** So if, going back to blowing a tube on a boiler or if you were in a situation
11 where you went down to one boiler, how would that effect your maneuvering of the ship
12 and the performance of the ship?

13 **WIT:** Ship on one boiler you don't have quite the steam power so you're going to go
14 slower in propulsion. And in reaction within maneuverability you have a slower
15 response to the system.

16 **CDR Odom:** Thank you. Based on the time that you worked on the ships, I'd like to
17 shift gears a little bit and go to the regulatory process a little bit.

18 **WIT:** Yes, sir.

19 **CDR Odom:** When you first started on the ships they were fully inspected by the Coast
20 Guard and they held a certificate of inspection that was completely managed by the
21 Coast Guard. And in the late '90's I think your ship enrolled in the alternate compliance
22 program. Are you familiar with that?

23 **WIT:** Yes, sir.

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1 **CDR Odom:** So can you kind of talk a little bit and describe some of the differences
2 from before the alternate compliance program and whenever your ship was fully
3 inspected by the Coast Guard and the shift over to the alternate compliance program
4 and the survey process and then the Coast Guard taking a step back and only doing
5 exams on your vessel?

6 **WIT:** I can. This could be a lengthy discussion really because there's a lot going on
7 there with the changes. When you had a full Coast Guard inspection and Coast Guard
8 officers came on board there may be several officers and typically would be more than
9 one. They had areas of expertise. Sometimes different Coast Guard officers would
10 come. It would take, depending on the plan and the operation of the ship if you're in a
11 shipyard and you had lay time and period the Coast Guard would stay right on board
12 with you and work. It was typically a 2 or 3 days evolution of tests, procedures and
13 inspections. And they had a book of material – of information that they would go check
14 and look at. And different officers on the ship would show them around and prove the
15 systems or give – or help them with the inspection so they could find their way around
16 quicker, make it more efficient. When that transitioned to the American Bureau of
17 Shipping inspection it was very similar including the period opportunity. The ABS
18 surveyors were sometimes more experienced personnel. They were – it wouldn't be
19 unusual to see them know the ship or the class of ship from other experiences. They
20 also had a broader and longer length of service and experience typically because they
21 were not serving in the Coast Guard. So they were older people that had seen more
22 things. And equally good to work with and sincere in their duties. But – and they had
23 sometimes – sometimes with the ABS they did not have quite the range of experiences

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1 because they would have engineers inspecting deck operations and things like that. So
2 they might not know it as well. But they would – you would try to develop a good
3 relationship with them so there was some trust that you were showing them the right
4 thing, not trying to show something improper and get away with it.

5 **CDR Odom:** Do you feel like the equipment on the ship received an equal level of
6 attention and inspection under the two programs?

7 **WIT:** Yes.

8 **CDR Odom:** Okay. What about the ACP program was started? Do you feel like the
9 Coast Guard officers you were dealing with at that point further, or had less experience
10 or their knowledge base of the ships was affected by that program?

11 **WIT:** Depending on the inspection or the situation. Most of the Coast Guard officers
12 that I met after were still very experienced and knowledgeable of ships and they knew
13 what they were looking at. And good to work with. They were busy so it was difficult for
14 them to spend – they didn't spend as much time with the ships, they came on board and
15 took care of business and left.

16 **CDR Odom:** Thank you. Shifting gears a little bit to the audit process. For conducting
17 the SMC audits and doing internal audits, what level of audit do you feel like ABS does
18 on the ships when they came on board and did the audits for the safety management
19 systems? Do you feel they were effective?

20 **WIT:** What's the SMC?

21 **CDR Odom:** Safety management certificate.

22 **WIT:** Okay. Thank you. And what was the rest of the question then on that?

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1 **CDR Odom:** The level of external audit that you received from ABS, do you think it was
2 thorough and do you think it effectively improved the safety management system
3 whenever they came and did the audit?

4 **WIT:** There's always room for improvement and learning. And that's part of the
5 purpose of the system to find things that are deficient and make a corrective action. It
6 was – but at the same time the safety management system had lifted the bar on safety
7 and expectations of the ship. So it was in many ways becoming safer. The – and in
8 many ways, because it touched the lives of the personnel working within the ship and
9 the requirements of the company to comply and it had to be proven. So that more
10 attention was paid to compliance with these systems and it certainly, it almost changed
11 the culture of ships and personnel working on them to a safer level.

12 **CDR Odom:** Were you – did you ever participate in the internal audits done by the
13 company?

14 **WIT:** Yes.

15 **CDR Odom:** And how – can you describe those to us and how they improved safety?

16 **WIT:** They were intense. We would try to be prepared for them. They were scheduled.
17 But it's nothing – something you can prepare for quickly. You have to be in compliance
18 through the year because the records were kept through the year and their job was to
19 look for deficiencies or where we were falling short of the expectations. It would be
20 intense because a lot of times it was done at the same time the routine voyage was
21 being made so these ships had a lot of work to do when they were in port. Sometimes it
22 would take several weeks to accomplish all of the tasks that they wanted to accomplish
23 or all the inspections or surveys. Or discussions with people, the interviews with

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1 personnel that they wanted accomplish. If they weren't available they would have to
2 come back and complete it later. But it was for the most part accomplished what they
3 wanted to do and again it may result in corrective actions. In which sometimes you felt
4 you were doing a good job and it was frustrating because it was even nit picky it got to
5 small details of what was required. But that's how they were accomplishing total
6 compliance and to the best possible compliance with the system.

7 **CDR Odom:** Thank you. One other question. Going back to the evaluations that were
8 performed by the company on the Masters of the vessels. How would you feel about a
9 Port Engineer or a person with an engineering background specifically evaluating you as
10 the Master of the vessel?

11 **WIT:** I would have no problem with that.

12 **CDR Odom:** Thank you very much.

13 **WIT:** Yes, sir.

14 **CAPT Neubauer:** Mr. Fawcett.

15 **Mr. Fawcett:** Good morning again Captain Hearn.

16 **WIT:** Good morning, sir.

17 **Mr. Fawcett:** I'm going to shift focus to weather, weather planning and weather
18 operations. So looking at the El Faro could the seas board the ship when you were
19 underway in such a way that they could damage cargo?

20 **WIT:** My voyages with the El Faro in rough weather were rare. I had some sea come
21 on board the ship possibly on a cross Atlantic voyage. I don't recall any heavy sea
22 coming on board that ship on the coastal voyage down to Puerto Rico.

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1 **Mr. Fawcett:** In Alaska did they have a practice of voiding cargo areas to prevent
2 damage to cargo from shipping seas?

3 **WIT:** Yes.

4 **Mr. Fawcett:** And I understand the ships were configured different that way in that
5 time, correct?

6 **WIT:** Not below deck. The second deck was very similar, almost identical basically.
7 There was a little bit of a change in configuration with hole openings or ramp openings
8 on the starboard side, but really not much. And – but the cargo loading was a little
9 different for the San Juan run compared to Alaska, Alaska had – Tote had – did not
10 have the ro-con configurations so cargo space was at a premium and we were running
11 full loads. If we were running full loads you might void certain areas that could get
12 damaged especially in the winter time. But on the Puerto Rico run with Sea Star you
13 did not really have that limitation typically and you could load cargo wherever you
14 wanted.

15 **Mr. Fawcett:** So we had talked about weather advisement services provided to the
16 vessel and you had mentioned Bon Voyage weather service that had been installed on
17 the vessel sometime approximately 2008. Was there any discussion at any time about
18 adding the weather routing subscription service to the package?

19 **WIT:** It was discussed, yes.

20 **Mr. Fawcett:** Could you elaborate?

21 **WIT:** Yes I can. It was discussed with Bill when we first bought the service and we,
22 and Bill Wisenborn [sic], we decided to just go with a weather information first to see
23 how reliable it was and how it compared to the National Weather Service. And it was a

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1 good system. Voyage planning and routing most of the Masters had quite a bit of
2 experience with voyage planning and routing on the runs, including myself. And I've
3 had voyage routing services with the United States Navy making recommendations and
4 sometimes they're not a reliable as the observer as the ship, you know when you're on
5 the ship itself observing the situation and conditions. You have a lot more experience
6 locally with the conditions and the opportunities for re-routing your ship compared to
7 someone at a remote location. And most of us felt more comfortable than – making the
8 decision ourselves with all the information we could get. And you may have more
9 information than just what Bon Voyage had to make a determination.

10 **Mr. Fawcett:** So did the availability of information change after the reorganization of
11 Sea Star Lines in the 2013 time frame? In other words you spoke about Mr. Wisenborn
12 [sic] and the marine operations managers. Once that position was vacated or no longer
13 in the organizational structure did you have as much weather information at your
14 disposal?

15 **WIT:** We had the same. Weather and it was more weather information than I ever had
16 previously in my career as a Master. On the run to Puerto Rico the ships had in the
17 Northern segment of the voyage satellite TV to watch the weather channel. We also
18 had enough coastal information that you could get weather information from NAVTEX
19 which is a VHF system on the ship. You had the high seas forecast that came in by
20 SAT-C and VH, or excuse me by medium frequency radio. And you had the Bon
21 Voyage. And we had internet on that ship. And internet email which could give you an
22 immediate on demand update on weather reporting. So if there was any new map

1 coming out you didn't have to wait to get it immediately. So you had extensive and
2 quite a bit of weather information.

3 **Mr. Fawcett:** So the internet access when you're speaking of immediate on demand
4 weather updates, are you speaking about usable feature of the BVS weather suite or
5 are you talking about plain old internet like all of us have where we can access the
6 National Hurricane Center?

7 **WIT:** We did not have access to internet itself. We had access to the internet systems
8 to get weather. Bon voyage was one and the other was the National Weather Service
9 where you sent an email to the National Weather Service with codes of weather reports
10 that you wanted and you would get an email reply and data transfer with those weather
11 maps transferred to your ship so you could print out, or observe them on your screen
12 the weather and the most recent report from the National Weather Service. And the
13 same thing with Bon Voyage.

14 **Mr. Fawcett:** Would that be what we describe as the FTP system, the file transfer
15 protocol?

16 **WIT:** That's what I – I think that's correct. It's hard to remember all that now.

17 **Mr. Fawcett:** Understand. But you could get that on demand? Did you have any
18 specific instructions to your ship's officers about when they were at sea and adverse
19 weather was anticipated what your expectations were to them in terms of accessing all
20 this different weather?

21 **WIT:** Yes. Well in my standing orders there were directions for just rough weather.
22 And any communications and anytime I anticipated something like that it would be an
23 active discussion and possibly in my night officers also to notify me of any changes in

1 conditions. Or if a weather report came in of course you would want to know if
2 something had changed that was not expected. You would – and we watched long
3 range on hurricanes also so we were planning them. And typically with the Second
4 Mates that I work with everywhere we also plotted hurricane season and hurricane
5 systems across the Atlantic. So we were kind of early warning watching what was
6 going on with those systems even if they were all the way over in Africa. So we had a
7 long rang expectation of what could possibly happen.

8 **Mr. Fawcett:** In alignment with what you just explained, how did you take into account
9 the, they call them spaghetti models, they are the various predicted tracks from all the
10 different models, were you able to take a look at the unpredictability of a particular storm
11 and from that plan your actions?

12 **WIT:** Yes. Well every storm can be unpredictable and you have to anticipate some of
13 that. And today's weather reporting is so good that you do get some advanced notice
14 even if – because you can get immediate updates or fairly immediate updates based on
15 their information, that's their function they do quite well of getting it out there sometimes
16 every six hours. That's your most recent information to make a decision on. So you get
17 that information, you watch for it and if it's a hazard to your ship especially a hurricane
18 storm or in the Gulf of Alaska they don't call them hurricanes but they're intense storms
19 or weather fronts, you're monitoring that as continuously as possible. Along with your
20 own ship position relative to that – that system. For example the – you're watching your
21 barometric pressure and how close you are to that storm to see if everything is checking
22 out. You just don't do it alone on watching the weather. You're watching, you're
23 monitoring your ship in relation to that storm and system.

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1 **Mr. Fawcett:** And are you relying on the feedback from your ship's officers in terms of
2 a team to gather their concerns, their ideas, their inputs for reducing the risk of or
3 consequences from encountering a hurricane?

4 **WIT:** Always. It's part of the bridge resource management system and structure. Yes.

5 **Mr. Fawcett:** So just a clarification. You mentioned observe and you talked about the
6 weather. At the time you were aboard did the anemometer or anemometers work
7 properly?

8 **WIT:** It's hard to recall. They have worked and not worked through the years because
9 it's a rugged device but they – and they encounter, they're constantly encountering the
10 weather. So they can fall into unreliability at different times and it's something you can't
11 just completely rely on.

12 **Mr. Fawcett:** Would your expectations be that as Master if you uncovered the fact that
13 one of your anemometers was not, either out of calibration, out of directional alignment
14 or the speed was not proper or correct, would it be fixed?

15 **WIT:** We would submit it for it to be fixed, yes.

16 **Mr. Fawcett:** And how would you do that?

17 **WIT:** There's a management procedure for submitting for a repair and you would follow
18 that. Whether it was – sometimes it might be a repair that you put through with the Port
19 Engineer or Operations Manager and they would hire somebody to do that. Or if it was
20 ordering parts to install that would be part of the purchasing system and you would
21 order another anemometer and then we would get it installed. Either we could do it our
22 self or if it was too technical they would hire somebody to do it technically for us.

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1 **Mr. Fawcett:** So if a Mate, you know notified you as the Master at 1400 hey it looks like
2 the anemometer blew off the ship or didn't work properly ----

3 **WIT:** Yes.

4 **Mr. Fawcett:** How soon would you get that condition rectified?

5 **WIT:** Our response would be immediate to put it in to the process of about getting it
6 repaired. Like everything it goes into a system of management and it's by internet and
7 electronic. And it would take, depending on the level of damage to it, it might – we
8 sometimes carried spare anemometers on board the ship and you can get it repaired
9 fairly quickly. But otherwise the ordering process might take a period of time. And then
10 depending on the voyage conditions it might take a period of time to get one on board.

11 **Mr. Fawcett:** And while you were aboard the ship did you estimate wind speed or did
12 you log it as observed? And I'm talking about for external release to NOAA as part of
13 the voluntary weather reporting program.

14 **WIT:** Well the different officers would do it differently depending on their skill level.
15 Many of them relied on the anemometer and they would – typically you're watching the
16 wind all the time if you're in a position. That's their job up there to observe conditions as
17 well as traffic and other – that's the watch officer's job. They would use – they should
18 use everything available to them. Many times in routine conditions wind speeds less
19 than 7, 6, they're very close in their observation and they may not use the anemometer
20 to verify it and validate it. It's – but at night it's difficult to see and you don't have
21 visibility and they may solely rely on the anemometer. But they should rely on both.

22 **Mr. Fawcett:** And so as Master of the ship in terms of encountering hurricanes and
23 intensification of weather conditions, would in periods of darkness, low visibility, would

1 an anemometer be, a working anemometer be a tool that you relied on to, you know, tell
2 if the hurricane was intensifying to certain levels?

3 **WIT:** If it was – if it had shown good reliability up to that point, yes.

4 **Mr. Fawcett:** Okay. So were you on board the El Faro as Master during Hurricane
5 Sandy?

6 **WIT:** Yes, sir.

7 **Mr. Fawcett:** I'm going to ask that an Exhibit 150 be put up which contains two slides.
8 And just to give you an idea to refresh your recollections it shows some of the
9 information from Hurricane Sandy. There were countless weather products developed
10 for Hurricane Sandy. What I would like you to do if you would, sir, is take a moment to
11 think about Hurricane Sandy and talk to us about how you approach a hurricane such
12 as Sandy with respect to the navigation of your ship to ensure the safety of the vessel.

13 **WIT:** Hurricane Sandy was a very large system. And all hurricanes have potential to
14 become very large in intensity and in range. One of the most serious concerns I have
15 especially around, what I would call a tight weather system, because it's a hurricane, it's
16 a low pressure system moving along an area is – is to stay outside of the scope of the
17 hurricane itself or the influence of the storm system itself so you can keep voyage
18 reliability, sea keeping reliability of the ship so you can get away from it. If you get into
19 the grip of the storm where you start losing speed or you're maneuvering your ship into
20 the sea to preserve – to protect other things that we talked about, slamming the stern,
21 and we've talked about keeping the cargo on board if you roll too heavily. You can get
22 trapped into fighting the conditions and the storm will move closer and closer to you.
23 That's a dangerous – so keeping away from that system enough that you can make

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1 good speed and run from the hurricane center is always one of my – the key factor
2 really in my determination of what to do. Hurricane Sandy was a large size and it had
3 done a lot of damage in Cuba. It was – there was a concern that it was going to go
4 close to the United States, it looked like that. And really the only option I had for the
5 ship was to go out into the Atlantic and across – cross that storm and then head South
6 where I could keep good weather conditions around the ship to make good speed and
7 to have the ability to out run the storms. Hurricanes are typically slow moving systems,
8 8 to 15 knots typically. That ship had the ability to make 20 knots. So I could continue
9 to open up sea room from the influence of the storm and avoid getting too close where I
10 would have to deal with the storm conditions and then possibly get caught by the storm.

11 **Mr. Fawcett:** So looking at a hurricane such as Sandy, what would be your concerns
12 for the winds generated and affecting your vessel? Just keep it to the winds for the
13 moment.

14 **WIT:** Well wind speeds of 7 knots, force 7 or less you can make good speed. With
15 those wind speeds at force 7 and above you're going to have stronger seas very rapidly.
16 I would probably, knowing that I'm out running a hurricane probably go a level or two
17 down to like force 5, because it's a weather prediction and it could be wrong and it's
18 certainly going to change. Because you're working with old information immediately
19 when you get a forecast and weather information. You have to give yourself a margin
20 there also of safety and anticipate that these conditions are going to change and
21 increase for the worse. So your precautions are stronger to stay away from the system.

1 **Mr. Fawcett:** So for the general public you mentioned force 7. Can you give an
2 approximate wind speed so that the public can understand what velocity you're talking
3 about?

4 **WIT:** 30 to 33 knots of wind.

5 **Mr. Fawcett:** And how about force 5?

6 **WIT:** 25 knots of wind.

7 **Mr. Fawcett:** Okay. So now looking at the sea effects of a hurricane such as Sandy,
8 what are your principal concerns for the preserving and protecting the ship and its
9 crew?

10 **WIT:** I'm a little bit confused on the question.

11 **Mr. Fawcett:** Well the seas. When you look at a hurricane chart, if I put up another
12 that had more specific information it would talk about the significant sea height that's
13 generated by the movement of a hurricane. Can you talk about what your – what the
14 sea height concerns are for you as Master?

15 **WIT:** Yes. The – well a hurricane is a slow moving system and that's also a big danger
16 for the ship. If you get into the grip of a hurricane it's because it's moving slow you're
17 going to be encountering heavy seas of any magnitude whether it's force 1 or force 4 for
18 a longer period of time than other storm systems, say a front that's moving through quite
19 rapidly. And my experience with the ships is once you start fighting the weather for a 12
20 hour period or longer cargo lashings start coming lose, people started getting fatigued,
21 mistakes start getting made on the ship and you want to stay away from those, fight
22 weather systems, those dangers. The longer you're in a storm the worse it is for the
23 ship. If it's over – if it's up to 24 hours you're certainly going to have cargo damage.

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1 Cargo's going to start breaking lose, you can't send people out in those conditions
2 because it's a hazard for personnel to go out there and deal with, you know the moving
3 objects on the ship. The cargo is heavy. It can crush a person. There's water on deck.
4 It's a hazard for them also and there may be electrical hazards out there as well. So
5 you want to stay out of the grip and the slow motion of that storm, because once you get
6 in it you're in it and you're in it until that storm moves away from you. You can't – you
7 probably can't run from the storm because you're also fighting the seas and trying to
8 protect the ship itself in the sea state that you're in. So you're vulnerable.

9 **Mr. Fawcett:** So you mentioned, you know a hurricane is a slow moving system. So in
10 a hurricane such as Hurricane Sandy if the forward speed of the hurricane markedly
11 reduced so that it went from 8 knots forward speed to almost stalled, as a Master of a
12 ship such as the El Faro what would be your principal concern?

13 **WIT:** Well a hurricane that stalls is now very unreliable and may change in any
14 direction. And my comprehension of it is that it may also intensify and grow. Not only in
15 intensity but size where it could reach out further away. So you would want a wider
16 margin from that system. And that's where you start to rely on weather projections and
17 projections of intensity and scope or range or reach of that storm system so that you
18 can stay out of it in case it starts to move again in your direction. So you can continue
19 to keep that voyage reliability and safety of that ability to move away from that system.
20 Run from that storm.

21 **Mr. Fawcett:** So when approaching a system such as this, what would be your
22 concerns about while you're on the voyage the proximity of Islands along the route?

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1 Would they be protection to you? Could they be a danger to you? What are your
2 thoughts on that?

3 **WIT:** Well there's – I know on this voyage here the Islands you have a great barrier
4 right there inside of the Bahama banks and the Bahama Islands. The ocean swells are
5 – don't reach through as strong. You have less fetch. You won't – probably won't have
6 this gray state and height. You are limited in your opportunity to go in certain directions.
7 If you get too close to an Island you would be even worried about getting pushed in
8 towards land or you could damage the ship and make it – it's a very dangerous situation
9 to be – not to have sea maneuvering room around the storm. So you want to keep that
10 sea keeping ability, that maneuverability for the ship. You want to preserve that. But
11 there's an advantage, that's not an uncommon technique to use land to get on the other
12 side of an Island to protect your ship from the intensity of a storm or a system. And it's
13 common there also to go inside the Bahama Islands if the storm's on the outside. Or if
14 the hurricane is on the inside like Sandy was, inside of the Bahama chain, then you're
15 going to probably have to go off shore or find an alternate route to get away from that
16 storm system.

17 **Mr. Fawcett:** As a seafarer what would be the danger of a lee shore?

18 **WIT:** What do you mean by that question, sir?

19 **Mr. Fawcett:** Well in other words would you put yourself in a situation in a storm like
20 Sandy to have the storm off shore of you with the Islands in lee of the storm and in the
21 lee of you ship? In other words you between the ship – you between the storm and the
22 Islands.

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1 **WIT:** Again what I mentioned earlier then that you're getting too close to land, you have
2 less maneuverability and you may find yourself trapped where your ship is close to the
3 Islands. One of the problems with a ship and a storm system is you're really navigating
4 the ship around the weather itself to protect the ship from pounding, from pitching, from
5 heavy rolling, from slamming, from losing cargo and all those conditions and damaging
6 the ship, the structures around the ship, the personnel. You have to preserve that.
7 More sea room helps you. If you're in close to land it's a danger. And the other
8 problem you have is you – once you get in the grip of the storm you can't turn away
9 from a navigational hazard like an Island or a Shoal. But if you're close to that you may
10 have to make a decision that you've got to turn the ship or manage the ship around that
11 other hazards so that you don't have the ship create a hazard for you, a danger for you
12 where you're dealing with a storm and you end up running into land.

13 **Mr. Fawcett:** So you mentioned the slow moving storm and I asked you about the
14 reduction in speed of a tropical system. As a Master if you see a storm pick up velocity
15 and move along at the 18 to 20 knot speed, what does that mean to you as a Master?

16 **WIT:** It usually means, especially a hurricane system that it's weakening.

17 **Mr. Fawcett:** And does that – how do you change what you're doing as Master should
18 you see a hurricane pick up its speed rapidly?

19 **WIT:** Of course it depends on where I am and the forecast and the other information I
20 can get. It's not just that condition that you're dealing with. And your position around
21 that system depends on what you may do. So there's some variable in there to – could
22 change, the answer to that question. But you monitor it, you're going to do the same
23 factors. You're going to stay away from the storm center in case things change. You're

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1 going to look for the best position to get that ship into an area where you continue to
2 make voyage distance and speed from the hazards of the storm. And if it's moving fast
3 towards you you're going to make the decision based on the predictions that you've got
4 and the information you've got now.

5 **Mr. Fawcett:** We're going to move into other weather topics and weather related
6 operations, but the storm avoidance is such an important topic that I would like to ask
7 members of the board, on this particular topic if they have any other questions or
8 perhaps the NTSB.

9 **CAPT Neubauer:** Captain I just want to follow up on one issue. If you encountered an
10 unpredictable or slow moving storm in fairly close proximity to your vessel while
11 underway, what would be your primary means of weather information that you would
12 use to monitor real time?

13 **WIT:** When I was with the ship it would be Bon Voyage and the National Weather
14 Service would be the two most frequent maps and information I could get.

15 **CAPT Neubauer:** And how – how would you get the National Weather Service
16 information?

17 **WIT:** There is a code system that you would email into the National Weather Service
18 and the codes would provide a weather map. And there's different codes for different
19 maps. You can look at the list, type the code in and it would respond with a data of
20 transfer of that map and you could print it out and look at it.

21 **CAPT Neubauer:** What was the typical response time, understanding that you could
22 initiate an email from the vessel to get a response in that system?

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1 **WIT:** Minutes. You're transmission would go out almost immediately. Some of those –
2 some of those messages I kept prepared and I would just cut and paste, cut and paste
3 basically and get it right out. The transmission was immediate. I would, my recollection
4 is minutes in response, 5 to 10 minutes.

5 **CAPT Neubauer:** And would that give you typically the vessel, or I'm sorry the storm
6 cones and predicted routes?

7 **WIT:** Yes it would. Depending on what you asked. You had different weather maps
8 and systems you could ask for. Sea state, wind speed, position of the storm,
9 predictions, forecasts, 24 hour forecast, 48 hour forecast. In a storm system or a
10 dangerous situation you would get all of them because you want all the information you
11 can get to help make a decision. And where you want to avoid, you know the areas you
12 may want to avoid. So you're getting as much information as you can.

13 **CAPT Neubauer:** Would you use the SAT-Cinformation?

14 **WIT:** I would use everything, sir.

15 **CAPT Neubauer:** At this time does NTSB have any weather related questions? Mr.
16 Kucharski.

17 **Mr. Kucharski:** Thank you Captain Neubauer. And Captain Hearn back to this FTP
18 system, how did you learn about that system?

19 **WIT:** I don't recall off hand. It was a new system for me. I was very pleased to see it
20 compared to early days when we worked in Alaska with – mostly relying on barometric
21 pressure and old weather maps that came by radio fax. Once we got email systems on
22 there, electronic data transfer that were strong enough to receive that data then
23 National Weather Service may have had it out sooner. I had done other voyage –

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1 voyages for the – under Navy charter. I may have learned it from there. But I – in fact
2 probably it came from either someone in the company that mentioned we could do this
3 service or another officer that had experience with it from where I learned it from. I don't
4 recall.

5 **Mr. Kucharski:** Was there any company guidance on use of the service or
6 recommendation to use it?

7 **WIT:** I don't recall that either.

8 **Mr. Kucharski:** Did you find it was easy to use, easy syntax?

9 **WIT:** Yes. It was a little difficult to understand the weather maps and you may have a
10 trial and error. Like many things with technology until you learn what maps were most
11 useful for you.

12 **Mr. Kucharski:** Do you know of any other Captains or officers within the Tote fleet that
13 use the service?

14 **WIT:** I think all of them used it. It was a common discussion of weather systems like
15 that. We shared information quite often. And the other officers were aware of it also on
16 the ship because the maps would go to the bridge and we would discuss, you know
17 that.

18 **Mr. Kucharski:** And could you share any feedback that you heard about the system?

19 **WIT:** Oh you're talking about the National Weather Service or the Bon Voyage?

20 **Mr. Kucharski:** FTP system.

21 **WIT:** FTP, it was good. It was a good improvement as information that we had not had.
22 And it was outstanding.

23 **Mr. Kucharski:** Was there – along your route did you get satellite TV along the route?

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1 **WIT:** Those ships had satellite TV service until – for about the 1st day out of Puerto
2 Rico. Or excuse me out of Jacksonville South. So it was in the Northern section of the
3 voyage.

4 **Mr. Kucharski:** Any reason it wasn't on the Southern section of the voyage?

5 **WIT:** There was a separate financial package to purchase and we didn't buy that
6 package.

7 **Mr. Kucharski:** Was there any discussion on the use of a weather routing service on
8 the Puerto Rico run especially during the hurricane season?

9 **WIT:** I don't know about a discussion specific for the hurricane season. Discussions
10 were about the same as I recall and mentioned earlier. That most of the Master felt with
11 their experience and knowledge of the ships and the run that they could and would feel
12 more comfortable weather routing with all the other information they got than to rely
13 solely on a weather routing system. So the cost may have been a factor in discussion,
14 but I don't remember it being purchased.

15 **Mr. Kucharski:** You mentioned cost. Do you have any idea what the cost was?

16 **WIT:** No, sir.

17 **Mr. Kucharski:** I would just like to revisit something you said about going off shore,
18 you know to gain more sea room in relationship to Mr. Fawcett's question about lee
19 shore.

20 **WIT:** Yes.

21 **Mr. Kucharski:** Did you ever use the Northwest Providence Channel or the Old
22 Bahamas Channel to avoid weather?

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1 **WIT:** Probably. I don't remember a specific voyage, but I may have. And I do not
2 remember detouring through there for weather. But I may have.

3 **Mr. Kucharski:** So would you be able to opine at all about use of a channel as far as
4 sheltering the ship from heavy sea conditions?

5 **WIT:** Yes. I have done that. But the decision was made before the voyage started.
6 And it was to – because we knew we had heavy swell from winter storms in the Atlantic
7 that we used the Old Bahama Channel route and the Straits of Florida.

8 **Mr. Kucharski:** Back to the anemometer you mentioned about there was a process if
9 you had to get something fixed you could send in a form for it.

10 **WIT:** Yes, sir.

11 **Mr. Kucharski:** Were you aware of any maintenance actually done on the
12 anemometers?

13 **WIT:** It was difficult to do maintenance to the anemometers they were typically on a
14 large or a tall mast or a pipe extending high above personnel and away from the
15 superstructure as far as possible or towards the edge where it would be a hazard to get
16 up there and do it or to lower it. So they typically were on their own to survive. You
17 know the elements until they finally broke and then we would replace them.

18 **Mr. Kucharski:** Did the ship carry a spare anemometer so you could just swap them
19 out?

20 **WIT:** I know that carried spare anemometers because there was a couple times where
21 they were becoming unreliable and we had back-ups. Especially on the Alaska run. I
22 don't remember a spare anemometer on the – with Sea Star. We may have had one or
23 they may have kept one in the – because those ships were in the same ports every

1 week. They could have had some spares in a warehouse ashore where there was a
2 spare available. But not on the ship.

3 **Mr. Kucharski:** Were you aware of the anemometers ever being calibrated?

4 **WIT:** No. The only – but I say no by scientifically, but we would compare the
5 anemometer to the visual observation and that's how you would know when it was not
6 coming reliable.

7 **Mr. Kucharski:** You mentioned earlier I believe it was when Mr. Fawcett was asking
8 you about being out in very rough weather, talk about heavy winds in excess of force 7,
9 big sea states.

10 **WIT:** Yes, sir.

11 **Mr. Kucharski:** Could you a little bit elaborate on – is it easy or is difficult to determine
12 wind direction and speed when you get above those conditions especially in dark?

13 **WIT:** In the dark you have to rely on other tools that are available to you. If you don't
14 have visual observation, and you may have some limited visual observation where you
15 can turn the flood lights on the ship and see spray coming across the deck or the bow of
16 the ship to see it locally as well as possible. The other tool that would be typically used
17 if the – is the anemometer. And I would use the radar quite often. You would turn the
18 radar range down to about a mile and a half range scale, possibly less, .75 and you
19 could see the hull of the ship on the radar scale. And you would have to turn the anti-
20 clutter down so that you squelch out a lot of the heavy sea state and you would be able
21 to pick up a swell return. And you would see the body of the ship, but you would also
22 see waves coming towards the ship from whatever direction. And the other indication
23 as you squelch down in those situations was the sea return itself. Which may be

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1 different than the swell return. The sea state is wind driven, which may be different than
2 the swell and you would – that may be stronger and further out from the ship and you
3 could put your vector on that so that you could see the sea state relative to your ship
4 and then you can make a determination of the wind direction there. The speed would
5 be more difficult. Many times what we would do, and I would do is look at the weather
6 maps that I had and the barometric pressure, knowing the barometric pressure that I
7 was at and the location relative to the storm and try to assume at least that the wind
8 speeds were about the same as what they were reporting in the weather map.

9 **Mr. Kucharski:** Did you find them at odds sometimes or to be differences on what you
10 were seeing on the weather map?

11 **WIT:** Yes.

12 **Mr. Kucharski:** Along the, sort of along the weather line, was there a process, a
13 natural process in place at Tote for the Master to discuss use of weather tracks, or
14 heavy weather routing? For you to discuss that with anyone at shore side on a regular
15 basis if heavy weather was expected?

16 **WIT:** Yes. Again policy. Any time you take the ship off of a route, the routine, you
17 have to consult the company and let them know what you're doing. So you would
18 advise them. Even if it was a warning ahead of schedule that there's weather out there,
19 it might not be a storm or hurricane, it may just be heavy swell that's creating less fuel
20 efficiency, more cargo lashing requirements and possibly a delay in arrival. You would
21 try to predict that and take the precautions needed and advise them so that if something
22 did come up on the voyage they were already aware that you had concerns.

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1 **Mr. Kucharski:** And this process was it more you advising the company or was it a
2 dialogue as far as the use of that weather route and concerns on, you know distances
3 or anything like that?

4 **WIT:** It would depend. If you did not have the opportunity to discuss anything with
5 anybody it may be in your departure plan. That there may be a concern. So there was
6 a remarks section in the departure plan that you could put weather information in there
7 or concerns about the voyage. And that was not uncommon to let them know. Or it
8 may be a separate person that you would identify and let them know ahead of time.

9 **Mr. Kucharski:** But no scheduled type of phone call where it went in you contacted?

10 **WIT:** Nothing scheduled because it was out of the routine.

11 **Mr. Kucharski:** How about heavy weather checklist? Are there any heavy weather
12 checklist that either you used, the company used?

13 **WIT:** I don't remember a heavy weather checklist. But there were heavy weather
14 conditions I mentioned earlier. They were in my standing orders. There was also heavy
15 weather parameters written into the operations manual for the company. And then
16 heavy weather conditions would often depend on voyage conditions and that would
17 become part of your voyage plan, what you were trying to preserve. It could be cargo
18 issues and concerns, it could be machinery issues and concerns. All of them. So part
19 of the process of dealing with heavy weather expanded to dealing with each department
20 head and what their concerns and conditions might be around the heavy weather that
21 was anticipated included the steward and the personnel on board the ship. You know
22 including meal planning. As simply as that they wouldn't be baking a turkey if they knew
23 that we were going to have rough weather, they would go to cheese sandwiches. But

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1 the engineers may hold off or expedite repairs or maintenance so that they knew that
2 they were prepared for rough weather. So it was voyage planning, more difficult than
3 having a checklist it was a plan and work to do. And you tried to use all of your skills
4 that you had to make good decisions and prepare for that. And take any precautions if
5 you needed to be ready.

6 **Mr. Kucharski:** You mentioned your standing orders. Can we copy – do you have
7 copy of your standing orders that we could uh ----

8 **WIT:** I'm sure there's a copy at home.

9 **Mr. Kucharski:** On the topic of heavy weather, have you had any formal heavy
10 weather training?

11 **WIT:** No. Well it depends on what you're talking about with heavy weather. I had
12 meteorology in college to understand weather conditions and – so that type of training I
13 had. There was study material for preparing to license and become a Master that you
14 had to prepare for and study. The – but with ship handling and sea keeping it was
15 mentoring on the ship and with the other officers that you dealt with. And that came
16 from experience working with others. Including men that you didn't work with but had
17 been on the voyage before or had other experiences and you would – if you had good
18 relationships with officers that you had met, contact them and asked them how they
19 managed. You know some of the same conditions. And there was – it would be sea
20 stories basically of what they did and what they encountered that may help you make
21 wiser and better decisions later on.

22 **Mr. Kucharski:** Did you attend any advanced ship handling courses?

23 **WIT:** I did.

1 **Mr. Kucharski:** Was heavy weather ship handling included in those courses?

2 **WIT:** No. There may have been weather conditions, but they were close quarter ship
3 handling for berthing, operations in close quarters around – in port and harbor.

4 **Mr. Kucharski:** How about any weather routing, either as a component of any
5 meteorological course or weather course that you attended?

6 **WIT:** The only weather routing training I would have had would have been the college
7 training around hurricanes that we discussed and observing hurricanes and the
8 conditions that you would try to avoid. And that's a standard. And it's self-study from
9 there.

10 **Mr. Kucharski:** Captain that's – I conclude on weather related questions.

11 **CAPT Neubauer:** Mr. Roth-Roffy.

12 **Mr. Roth-Roffy:** Good morning, sir. Tom Roth-Roffy, NTSB.

13 **WIT:** Yes, sir.

14 **Mr. Roth-Roffy:** Just a couple follow up questions on related to weather. You
15 mentioned some of your training and experience dealing with weather observations and
16 weather avoidance. I would just like to probe a little bit more on where you believe your
17 best information – that has served you the best in dealing with severe weather
18 conditions. Does it come early in your career through the university or do you believe
19 that the later experience you had was more significant or important to your skills as a
20 weather observer?

21 **WIT:** There's no replacing experience. I've probably been through at least 200 storm
22 systems, maybe more. And I don't know how many hurricanes, I've avoided or dealt
23 with where you don't encounter into the storm, but your doing what you can not to

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1 encounter. Including other storms at sea or conditions experience helps you in two
2 way. Number one how to deal with it if you're in it and how to respect it to avoid it.

3 **Mr. Roth-Roffy:** So if I'm understanding you then you think the experience that you've
4 had in being in storms is what has been more beneficial to your ability and your skill
5 level?

6 **WIT:** Yes, sir. There's no replacing it.

7 **Mr. Roth-Roffy:** And you've mentioned a few times that you would use all available
8 weather information in making your decisions on how to respond. Just curious about
9 the – all the various information that you do receive if you ever experience conflicts in
10 the information and how you would go about resolving conflicts and which information
11 you would rely on?

12 **WIT:** Umm you do see conflicts. Of course there's forecasts and a forecast you have
13 to recognize that it's – that it may be fallible based on other models. And there's been
14 conflicts sometimes within the same weather service system, the National Weather
15 Service where they not necessarily predict something, but they predict changes that you
16 did not anticipate. And the next weather map comes out different and it's a concern
17 because it's not what you were anticipating. That's where you have to rely on your own
18 visual observations and where you are in relation to the storm and stick to some of the
19 basics that you have and knowledge to make a good decision. But you can have
20 unreliable information. Another reason for building precautions into decisions. And I try
21 to be prepared for unreliable information because they are forecast.

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1 **Mr. Roth-Roffy:** And specifically regarding the BVS on board system and the National
2 Weather Service information, were those two weather sources of information consistent
3 largely or were they often inconsistent?

4 **WIT:** My experience with them was that they were very close. And the Bon Voyage
5 system is a little easier to use because they use more technology and color with their
6 system and a little bit of – there's a couple tools built into the system that you can use to
7 identify where your ship will be compared to the storm system or the weather that you're
8 encountering so you can predict and do voyage planning around it yourself. The
9 National Weather Service system of course is just weather information. And that's what
10 I was used to working with where you would put in on the chart, map it out yourself. So
11 the tools that came in with it helped expedite your decision.

12 **Mr. Roth-Roffy:** Thanks very much. That's all I have.

13 **WIT:** Yes, sir.

14 **CAPT Neubauer:** At this time I would like to go to the parties in interest. Tote do you
15 have any questions?

16 **Tote Inc:** Captain when you were sailing on the Puerto Rico trade who was the
17 Designated Person?

18 **WIT:** Harry Rogers.

19 **Tote Inc:** And did you communicate with him frequently?

20 **WIT:** Yes.

21 **Tote Inc:** And on what types of issues?

22 **WIT:** Safety management systems, security, training. Sometimes maintenance, and
23 sometime general operations of the ships themselves.

1 **Tote Inc:** Thank you, sir. No further question.

2 **CAPT Neubauer:** ABS?

3 **ABS:** Good afternoon Captain. My name is Jerry White I represent ABS.

4 **WIT:** Yes, sir.

5 **ABS:** Captain can you remind us or tell us again how long you served as Master
6 aboard the El Faro?

7 **WIT:** I went to the El Faro at, I remember election was 2007 and I left the ship – while
8 the ship laid up in 2009 I was on it until – I did a hitch or a 10 week tour on the El
9 Yunque, I went back to the ship in April of 2010. And I stayed with the ship until the
10 summer of 2011. And I went back to the ship for a 3 week period in 2012. Excuse me
11 3 month period of tour.

12 **ABS:** And you served as Master aboard her during that Hurricane Sandy?

13 **WIT:** Yes, sir. But Hurricane Sandy may have been the El Morro.

14 **ABS:** Could you tell us what the maximum wind was that you experienced on the El
15 Morro when you were avoiding Hurricane Sandy?

16 **WIT:** Less than force 5.

17 **ABS:** And force 5 indicated it was approximately ----

18 **WIT:** 25 knots.

19 **ABS:** 25 knots.

20 **WIT:** Yes.

21 **ABS:** Do you recall the maximum seas that you encountered with Hurricane Sandy?

22 **WIT:** Well we didn't get very close to Hurricane Sandy. I avoided it directly, but it was –
23 I probably – I would imagine I recall about a 10 foot swell, 10 to 12 foot swell.

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1 **ABS:** And do you recall what the maximum roll of the vessel was?

2 **WIT:** No. Probably 10 degrees or less.

3 **ABS:** As far as the El Faro, sir, in a loaded condition can you give us your recollection
4 as to the maximum GM you would sail?

5 **WIT:** In a loaded condition?

6 **ABS:** Yes, sir.

7 **WIT:** My recollection of a safe GM I think was around 3.8, but I can't recall off hand
8 because you know I relied on the records and what they would give us.

9 **ABS:** Sitting here today though do you recall what the maximum GM you would have
10 sailed with in a loaded condition?

11 **WIT:** I don't understand what you mean by the maximum GM.

12 **ABS:** You indicated there were parameters that you would take into account and
13 determine what a margin for safety would be incorporated in the GM, correct?

14 **WIT:** Umm huh, yes.

15 **ABS:** My question is based on that margin, the safety and based on your experience
16 aboard the El Faro do you recall what the maximum GM was in a loaded condition that
17 you ever sailed?

18 **WIT:** I think you're talking about the margin above the required GM.

19 **ABS:** I understand the maximum, the margin, but the question what's the maximum
20 margin, what's the maximum GM in a loaded condition.

21 **WIT:** The decision to check out stability or to look at stability is based on the minimum
22 GM. I don't understand what you mean by maximum GM.

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1 **ABS:** My question directed more to a loaded condition and your experience aboard the
2 El Faro as to what GM you expected in a loaded condition departing Jacksonville.

3 **WIT:** What ----

4 **ABS:** So with regard to that, do you recall what the maximum GM would have been
5 that you sailed with?

6 **WIT:** Oh the – you know I can't tell you because I – without looking at all those records
7 and there could have been over a couple of years different GM's that we had above the
8 minimum required.

9 **ABS:** Yes, sir.

10 **WIT:** Now I understand what you're asking. And I don't recall. Probably I would say 4
11 or 5 feet, but that's almost a guess that I would recall, but I don't remember.

12 **ABS:** But based on your discussions at the company and with the Masters you felt and
13 considered a GM margin of .5 would be a reasonable margin?

14 **WIT:** Above the minimum required, yes. That was from voyage experience.

15 **ABS:** And based on your time aboard the El Faro can you tell us what the worst sea
16 conditions that you experienced aboard as far as maximum roll or prevailing seas?

17 **WIT:** Umm, I took the ship through a couple of storms on a Trans-Atlantic voyage.
18 Would you like to know about those because it's a little bit different than the Puerto Rico
19 run?

20 **ABS:** That's okay. On a Trans-Atlantic voyage do you, did you experience a maximum
21 roll and maximum prevailing seas?

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1 **WIT:** Yes. Rolls above 25 degrees, between 20, about 25 degrees, maybe a few
2 reached 30. Wind conditions exceeding 50 knots. Seas 20 to 25 feet. Possibly a few
3 30 footers in there.

4 **ABS:** Did you ever sail aboard the El Faro and experienced a 100 knot wind?

5 **WIT:** I've experienced 100 knot winds on the Northern Lights, the same ship, the same
6 class but it was in Alaska. But not when it was the El Faro class.

7 **ABS:** Thank you. Nothing further.

8 **WIT:** Yes, sir.

9 **CAPT Neubauer:** Mrs. Davidson?

10 **Ms. Davidson:** Yes Captain, thank you. Captain Hearn my name is William Bennett
11 and I represent Teresa Davidson.

12 **WIT:** Yes, sir.

13 **Ms. Davidson:** I do want to go back to the storms in the Trans-Atlantic. You had
14 mentioned that you experienced winds in excess of 50 knots.

15 **WIT:** Yes.

16 **Ms. Davidson:** In excess of 60?

17 **WIT:** Possibly briefly. Gusts certainly.

18 **Ms. Davidson:** And that would be a force 10?

19 **WIT:** Yes.

20 **Ms. Davidson:** Tropical storm conditions?

21 **WIT:** Yes.

22 **Ms. Davidson:** And when you sailed in Alaska you had mentioned you had
23 experienced 100 knot winds.

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1 **WIT:** Yes.

2 **Ms. Davidson:** That's a hurricane force wind?

3 **WIT:** They're well above hurricane force.

4 **Ms. Davidson:** And you spent 25 years as the Master of vessels, correct?

5 **WIT:** Yes, sir.

6 **Ms. Davidson:** And you've done everything in your power to avoid storms, correct?

7 **WIT:** Well you do everything you can to avoid a storm system, but of course you're on
8 a ship at sea. So you can encounter it.

9 **Ms. Davidson:** But you do everything you can?

10 **WIT:** Yes.

11 **Ms. Davidson:** And despite ----

12 **WIT:** Well that depends. You know everything you can. There's maybe things that you
13 – that's a wide question.

14 **Ms. Davidson:** And while despite your diligence and your testimony here today about
15 your storm avoidance you did get caught up in several storms and that happens,
16 correct?

17 **WIT:** It happens.

18 **Ms. Davidson:** Because you rely on forecasts that may be wrong, correct?

19 **WIT:** You relay on forecasts that may be wrong.

20 **Ms. Davidson:** Thank you, sir. No further questions.

21 **CAPT Neubauer:** Herbert Engineering?

22 **HEC:** No questions.

1 **CAPT Neubauer:** Captain I just have a couple questions based on those questions
2 that were just asked. On the Trans-Atlantic voyage where you encountered the heavy
3 weather, do you remember – were you transiting full load? And was – also was the
4 vessel a ro-con at the time?

5 **WIT:** She was a ro-con. One voyage was fully loaded. I don't know if it was one of the
6 voyages where I encountered the heavy weather. We did have a full and down voyage
7 going across the Trans-Atlantic. So I can't compare apples to apples on that one
8 perfectly. But there was two rough storms that I encountered in those. Actually three
9 that I – one was a hurricane system that we avoid and we ran with. And then there
10 were two storms that hit me off of Gibraltar.

11 **CAPT Neubauer:** And, sir, when you had the meeting and decided on the .5 GM
12 margin did you press to get that into policy?

13 **WIT:** No, sir. I pressed just to get a good and responsible decision and approval from
14 the company to have that margin as reliable for us so that we didn't have to ask for it
15 every time.

16 **CAPT Neubauer:** Was there ever a discussion that that should be brought into
17 company policy?

18 **WIT:** I don't recall it.

19 **CAPT Neubauer:** Captain at this time we still have another line of questioning. But
20 we're at the lunchtime hour. I would like to recess until 1:15 and reconvene. Are you
21 available to come back at that time, sir?

22 **WIT:** I am, sir.

23 **CAPT Neubauer:** The hearing is now recessed and will reconvene at 1:15.

1 *The hearing recessed at 1209, 17 May 2016*

2 *The hearing was called to order at 1316, 17 May 2016*

3 **CAPT Neubauer:** The hearing is now back in session. Captain Hearn you're reminded
4 that you remain under oath from this morning.

5 **WIT:** Yes, sir.

6 **CAPT Neubauer:** We're now going to start up with our last line of questioning, sir.
7 That would be focused on cargo securing and some other general items. But this will
8 be the last round.

9 **WIT:** Yes, sir, thank you.

10 **CAPT Neubauer:** Mr. Fawcett.

11 **Mr. Fawcett:** Sir, Captain Hearn I have a couple follow up questions that we didn't get
12 to in the weather. Briefly can you tell the dir – using the direction of the wind can you
13 tell where the center of a tropical system lies?

14 **WIT:** By ballast law is something you would use if you look at wind it would be, unless
15 I've got this all turned around, you got to the right and somewhat behind you. Yes, you
16 can tell where the center low is. And it's something we would do.

17 **Mr. Fawcett:** Okay. Turning to the – and we talked about it briefly with the voyage
18 plan.

19 **WIT:** Yes, sir.

20 **Mr. Fawcett:** If I went aboard the El Faro when you were in command is the voyage
21 plan something you could hand me?

22 **WIT:** Yes. You would – there was a specific voyage plan, the route and some of the
23 details of planning and information that we would need at our fingertip, frequencies we

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1 used to contact other people, the route, the distances, locations. Other elements of the
2 voyage plan may be able to be handed to you depending on what your question was
3 and were about, because the work done on a ship is not just a voyage plan itself, but
4 the work being done during the voyage. Which is to me as Master part of my plan to
5 complete the voyage and the mission of the ship, but it's not part of the document in the
6 voyage plan that's up on the bridge. Like I said it depends on how you scope that out or
7 you know how you would want to narrow or broaden your request on that question.

8 **Mr. Fawcett:** Okay. So on a – when you worked for Tote or Sea Star Lines the
9 departure message has a place where the Master signs that they have reviewed and
10 approved the voyage plan. Did that exist when you worked for them?

11 **WIT:** I believe it did, yes, sir.

12 **Mr. Fawcett:** Okay. So in the navigational voyage plan that they asked you to approve
13 there, was it unique to each voyage?

14 **WIT:** It was routine. It was always unique to the voyage. But many voyage plans
15 especially going to Puerto Rico were routine and identical to the previous voyage plan.
16 Except for departure times and schedules.

17 **Mr. Fawcett:** Would they be stored in a binder or some other ----

18 **WIT:** We stored them in a binder and also electronically.

19 **Mr. Fawcett:** And how would those voyage plans change if the tropical weather was
20 out in the Caribbean that may influence the movement on the ship?

21 **WIT:** Many times it may start with the routine, but if it had to be changed it would be
22 documented and remarked and identified in the voyage plan. Or an update to the
23 voyage plan.

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1 **Mr. Fawcett:** So if a voyage was 185 South or 145 North, whatever the voyage number
2 was, that would be unique to the voyage plan in the binder?

3 **WIT:** The identification of the voyage plan would be unique to the voyage number. The
4 date of course is important because it's what happened on that day. And if it changed
5 during the day there may be an update. Those voyage plans were reported routinely at
6 noon everyday which was an imposition but it might be done in the morning. But you
7 could send in an alteration or a change to a voyage plan or conditions of the voyage at
8 any time.

9 **Mr. Fawcett:** And would all navigation watch officers be required to review and in some
10 way indicate that they understood the voyage plan?

11 **WIT:** Yes.

12 **Mr. Fawcett:** And you mentioned just a moment ago that the typical scheme under
13 today, I'm not sure if it's today, but leading up to the accident voyage date, was the ship
14 would report its position once daily at noon upon departure and on arrival. Were there
15 more frequent reports than that?

16 **WIT:** Only the position of the ship, the route of the ship and the routine voyage plan,
17 no. Any changes, yes. And as immediate as possible. And then there was other
18 conditions and voyage parameters that may be reported and usually immediately such
19 as a change in propulsion or conditions in the engine room or the cargo that we would
20 communicate to the company.

21 **Mr. Fawcett:** At any time that you served as Master for Sea Star Line or the various
22 iterations of Tote, did they ever communicate with the ship instructions to slow down,

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1 speed up, change course, or avoid weather or manage the voyage in any way shape or
2 form?

3 **WIT:** The voyage management from the company was normally focused on efficiency
4 for fuel and safety. So those – and those were – even though they would be routine
5 parameters if there as a question about it we may discuss it or we could do something
6 to improve efficiency. If there was a concern about a hazard or a difficulty with our
7 arrivals, for example coming into a port that I was unfamiliar with, daylight might be
8 safer than a night time arrival. That would be communicated and I would make
9 decisions with them on that if there was no other requirement that would prohibit me
10 from going for a safer time, I would ask for it.

11 **Mr. Fawcett:** Okay. So going back to my question. You mentioned the company
12 communicating with you about perhaps daylight arrival. Did the company ever tell you
13 to slow down because of port closures or for economy like for example you talked about
14 efficiency like stevedore times so there wouldn't be overtime in a port, anything like
15 that?

16 **WIT:** Yes. They would communicate. They would be aware of conditions in a port. A
17 port closure for example and would communicate that to the ship.

18 **Mr. Fawcett:** Any other times that come to mind related to speed up, slow down, or
19 routing that they told you to take to manage the voyage of the vessel?

20 **WIT:** It would be voyage orders. And it would normally be around arrival scheduling. If
21 I could make an earlier arrival to do so. If it was a later arrival for whatever condition
22 may be, cargo planning or if there was prohibiting safe navigation they would advise me
23 and we would, you know respond immediately to that direction.

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1 **Mr. Fawcett:** You mentioned that the internal audit process was a fairly lengthy
2 process, usually conducted in port where they talked to the ship's officers, they
3 validated the equipment on the ship and so forth. We're talking about the internal audit
4 process. After the restructuring of Tote did that change in terms of the amount of time
5 or level of detail invested in the internal audit process?

6 **WIT:** Not to my recollection.

7 **Mr. Fawcett:** Thank you very much Captain.

8 **WIT:** Yes, sir.

9 **CAPT Neubauer:** Mr. Kucharski.

10 **Mr. Kucharski:** Mike Kucharski, NTSB. Good afternoon Captain Hearn.

11 **WIT:** Good afternoon, sir.

12 **Mr. Kucharski:** Before I go into some cargo questions and securing of cargo there are
13 a couple of places I – jump a little bit here, but one has to do somewhat with stability.
14 And would you mind looking at Exhibit 195, they're photographs.

15 **WIT:** Yes, sir.

16 **Mr. Kucharski:** It says hold 3 vent openings – vent openings, do you see that? Okay.
17 The ----

18 **WIT:** I see the vent openings, yes.

19 **Tote Inc:** Sir, can we, excuse me. We're referring to Exhibit 195?

20 **Mr. Kucharski:** Correct.

21 **Tote Inc:** We were informed that those exhibits would not be used today and we did
22 not have those printed out because we were given those assurances.

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1 **CAPT Neubauer:** That is true. So we will – can you ask these questions without
2 referring to the pictures?

3 **Mr. Kucharski:** Sure. Captain Hearn on the vent trunks that went into the cargo holds,
4 on the second deck there are manholes with a number of bolts, I don't know maybe
5 about 20 bolts, do you know where I'm talking about?

6 **WIT:** Yes, sir.

7 **Mr. Kucharski:** Access plates to go into those vents.

8 **WIT:** Yes, sir.

9 **Mr. Kucharski:** Have you in your time on those vessels, let's concentrate on the El
10 Faro first, do you recollect those inspection plates being opened?

11 **WIT:** Yes.

12 **Mr. Kucharski:** Great. Could you tell us what you saw inside of that?

13 **WIT:** The fire damper arrangement was inside of them. And a void trunk for ventilation.

14 **Mr. Kucharski:** Are there any baffles inside of there?

15 **WIT:** Inside of there, no real baffle that I can recall. There would be the flooring and
16 the structural members, but nothing that would – a baffle.

17 **Mr. Kucharski:** And what was the condition of the inside of the trunk and the area
18 surrounding it, the metal?

19 **WIT:** Fair. It was surface rust, some dirt and debris because it was an unmaintained
20 space. It was normally bolted strongly closed and difficult to get into. They were only
21 opened for repair mostly and possibly some maintenance or inspections.

22 **Mr. Kucharski:** Were they opened at all, you said inspections, were they opened to
23 inspect? What did they inspect or what did the inspector inspect?

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1 **WIT:** There may have been an inspection where they were opened, not a routine basis,
2 but for a shipyard period. Not at sea.

3 **Mr. Kucharski:** Were those in the planned maintenance system, opening them up and
4 inspecting them?

5 **WIT:** Well certainly to operate the dampers was planned maintenance and routine and
6 done monthly if not more frequently. And the repairs were made to them almost
7 immediately. The – I don't recall any other planned maintenance in the system. But the
8 Chief Engineer would be responsible for all the planned maintenance programs.

9 **Mr. Kucharski:** How about if there's rust or any maintenance to be done? Who would
10 take care of that?

11 **WIT:** If it was surface rust on the outside or the inside and what was found the deck
12 department would take care of it. And if it was structural enough to do a welding repair
13 the Chief Engineer would resume responsibility.

14 **Mr. Kucharski:** I have a couple questions on training.

15 **WIT:** Yes, sir.

16 **Mr. Kucharski:** Did you have any formal training on the use of the CargoMax?

17 **WIT:** Not that I recall.

18 **Mr. Kucharski:** Do you recollect any of your officers, your Chief Mates that had any
19 training on the use of the CargoMax?

20 **WIT:** Not that I'm – not that I recall.

21 **Mr. Kucharski:** What is your most recent stability training that you've had? Let's say
22 up until when you left the – left Tote which was August 2013, is that correct?

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1 **WIT:** Yes, sir. Training. I studied for my Master's license and I obtained that in 1984.
2 Most of it was self-study.

3 **Mr. Kucharski:** How about securing of cargo? When did the cargo securing manual
4 go into effect about, do you recollect?

5 **WIT:** Well, sir, the cargo securing system or systems transitioned over the years.
6 When I arrived on the El Faro there already had been a cargo securing manual issued
7 to the ship. That was there. And of course I read that, studied it and that's something
8 you familiarize yourself sometimes when you need and sometimes if you have the time
9 to review it.

10 **Mr. Kucharski:** So no formal training, it was just review of the cargo securing manual?

11 **WIT:** No formal training.

12 **Mr. Kucharski:** Captain Neubauer I can go into cargo related if you would like to at this
13 time?

14 **CAPT Neubauer:** Yes, sir.

15 **Mr. Kucharski:** Captain Hearn would you say that except for the addition of the
16 fructose tanks that the basic stow positions and cargo securing methods on the roll on
17 roll off decks, second and deck below were basically the same as when they were –
18 when it was in ro-ro configuration?

19 **WIT:** Yes.

20 **Mr. Kucharski:** Were the ship's roll on roll off decks full pretty much Northbound,
21 Southbound, and I'm not talking about with loaded trailers, just with trailers both
22 Northbound and Southbound on the Puerto Rican run?

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1 **WIT:** My recollection is typically full or nearly full Southbound to San Juan and there
2 may be more open stows on the Northbound run.

3 **Mr. Kucharski:** Was there maintenance performed on the permanent cargo securing
4 devices while the vessel was underway?

5 **WIT:** If there was any maintenance or any deficiency in the – oh excuse me, did you
6 say permanent?

7 **Mr. Kucharski:** Permanent.

8 **WIT:** That you mean fixed?

9 **Mr. Kucharski:** Fixed.

10 **WIT:** Fixed to the ship, yes underway the crew members would clear the D-rings and
11 make sure they were free to use and possibly clean the area which would include the
12 deck buttons so that there was no debris or anything that would prohibit using them for
13 stowage when you put a ROLOC box back on them. So if they could they kept the
14 areas as clean as they could.

15 **Mr. Kucharski:** So were the stows voided so they could do the work on the deck area?

16 **WIT:** Not unless it was needed. Normally we would try to work around that area.

17 **Mr. Kucharski:** Was this maintenance ever entered into any planned maintenance
18 system or anything like?

19 **WIT:** It was a routine maintenance to keep the area clean and to work on the lashings.
20 The Chief Mates knew that. And they would sometimes increase that maintenance
21 because it was needed and they would identify it as a problem. So it was more of a on
22 as needed basis recognizing that they work with it daily.

1 **Mr. Kucharski:** So as far as the permanent or fixed securing devices that's what my
2 question dealt with specifically. Was that ----

3 **WIT:** And my answer was on that. Thinking of the D-rings and the deck buttons.

4 **Mr. Kucharski:** And that was ----

5 **WIT:** [In audible].

6 **Mr. Kucharski:** Kept – put something in the planned maintenance system?

7 **WIT:** I didn't work with the planned maintenance system so I didn't deal with it directly.

8 That would be the Chief Mate or the Chief Engineer. I was in discussions with it, but it
9 was not a function that I dealt with directly and I don't know if that specific item is
10 specifically identified in the planned maintenance.

11 **Mr. Kucharski:** Specific questions on lashing of cargo. Was it easy or were you able
12 to keep all the proper lashing angles with the trailers on the ro-ro deck when they're
13 packed in so tightly together?

14 **WIT:** It's difficult.

15 **Mr. Kucharski:** So were the angles, required angles, were they – were you able to
16 maintain them?

17 **WIT:** We – on a voyage by voyage basis we would maintain them if we needed to when
18 I was Master. The – it's a lot of work to move lashings if they're put on incorrectly, but
19 just that they're on the trailer is a big help because you only have to move it or shift it to
20 a better correct angle. Sometimes the lashers, the longshoreman may put it in the
21 wrong – wrong way and my crew would have to go out and fix that. And we wouldn't do
22 that if it was a routine good weather voyage on the Puerto Rico run.

23 **Mr. Kucharski:** Was a heavy weather or hurricane lashing profile in use every voyage?

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1 **WIT:** To Puerto Rico?

2 **Mr. Kucharski:** To Puerto Rico.

3 **WIT:** No, sir.

4 **Mr. Kucharski:** Please look at Exhibit 40, Appendix 17, it should be in about page 137.

5 **WIT:** I'm sorry the page numbers I'm seeing are by chapter I think, or section and page
6 number. What am I looking at? Cargo securing manual.

7 **Mr. Kucharski:** It's Appendix 17.

8 **WIT:** Section 17?

9 **Mr. Kucharski:** It's called Appendix 17 it's at the end of the – towards the end of the
10 cargo securing manual. It's called Appendix 17 the advanced calculation method for
11 non-standardized cargo.

12 **WIT:** I'm not sure where I am here.

13 **LCDR Yemma:** What was the page number again?

14 **Mr. Kucharski:** 137 by PDF.

15 **WIT:** Thank you. Page 137 by PDF. I got it. Advanced calculation method for non-
16 standardized cargo.

17 **Mr. Kucharski:** Correct. There's approximately 10 or 15 pages for the advance
18 calculation for transverse tipping, for transverse sliding, safety factors, balance of forces
19 and moments. Have you seen this form before?

20 **WIT:** I don't recall if I've seen it or not.

21 **Mr. Kucharski:** Have you ever seen anyone on the ships perform this calculation?

22 **WIT:** Which calc – there's – I see several pages.

23 **Mr. Kucharski:** The advanced calc – advanced calculation.

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1 **WIT:** Of these forms, no. I've never seen anybody do it.

2 **Mr. Kucharski:** Please look at Exhibit 40 page 102. I'm sorry, Exhibit 40 page 102.

3 **WIT:** Umm I think I've got a page 102 by – in the lower corner I think. I have the top of
4 the page devices, auto lashing, trailer lashing.

5 **Mr. Kucharski:** Yeah it has a ----

6 **WIT:** And a ROLOC box.

7 **Mr. Kucharski:** It has a picture – has pictures specifically I think it's called Exhibit 40,
8 I'm sorry it's P7 on there, on this like a diagram.

9 **WIT:** Yes, sir.

10 **Mr. Kucharski:** The tensioners.

11 **WIT:** Yes.

12 **Mr. Kucharski:** Okay. The barrel tensioners, is that what you would call them?

13 **WIT:** Yes, sir.

14 **Mr. Kucharski:** Do they use those to secure the lashings on the El Faro on the ro-ro
15 deck?

16 **WIT:** Yes.

17 **Mr. Kucharski:** How were they tensioned?

18 **WIT:** With a ratchet.

19 **Mr. Kucharski:** Was there any measurement to see what the actual tension on them
20 was?

21 **WIT:** There was no measurement and no way to measure. It was hand tight. But you
22 know through force with the ratchet which would be tight as a steel bar.

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1 **Mr. Kucharski:** Were you aware of any manufacturer's requirement on the
2 specification to tighten them?

3 **WIT:** I think that they were ratchet driven devices, but they recommended not using a
4 cheater bar or an additional bar to overtighten the device. That's all I can recall though.

5 **Mr. Kucharski:** The same Exhibit 40, page 37 Section 6.2.

6 **WIT:** Of page 37?

7 **Mr. Kucharski:** Yes please.

8 **WIT:** Yes, sir.

9 **Mr. Kucharski:** And it's, that section is entitled securing wheeled vehicles to the ship.

10 **WIT:** Yes.

11 **Mr. Kucharski:** And the following page number 8, item number 8.

12 **WIT:** Yes.

13 **Mr. Kucharski:** It reads pad eyes and luggage structural members of a cargo are often
14 better securing points that may be found on the trailers.

15 **WIT:** Yes.

16 **Mr. Kucharski:** Did you feel they were sufficient points on the trailers?

17 **WIT:** It's rare on a normal commercial tractor trailer to find a securing point at the
18 forward end and sometimes even at the after end that's very strong. There may be a
19 securing or lashing point, but it's rare. And Tote Service Alaska many of the shippers
20 were familiar with the more rugged cargo voyage and they had modified some of their
21 tractor trailers and vans to have securing points built into them. But on the East Coast
22 it's rare to see something like that. Or to find a routine van to have some other securing
23 point that would help for marine service.

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1 **Mr. Kucharski:** Would you please look at Exhibit 42, page 130. Title of the exhibit is
2 Tote lashing manual.

3 **WIT:** Typical stack weights and pounds.

4 **Mr. Kucharski:** Exhibit 42, page ----

5 **WIT:** Oh I'm sorry. I'm on the wrong exhibit.

6 **Mr. Kucharski:** Okay. Take your time. Jumping around a little bit. Page 130.

7 **WIT:** I see the – a photograph.

8 **Mr. Kucharski:** Yes. Could you tell us what we're looking at?

9 **WIT:** It's a little blurry. It looks like the undercarriage of a standard cargo van with a
10 slip hook or a grab hook into the undercarriage frame.

11 **Mr. Kucharski:** Into the trailer?

12 **WIT:** Of the trailer.

13 **Mr. Kucharski:** Is this something that you would typically see as lashing?

14 **WIT:** Yes.

15 **Mr. Kucharski:** Captain Hearn I want to talk about the buttons.

16 **WIT:** Yes, sir.

17 **Mr. Kucharski:** On the ship where the ROLOC boxes were secured to, is that correct?

18 **WIT:** Yes, sir.

19 **Mr. Kucharski:** When you're on the Alaskan run, let me back off on that question.

20 Was it difficult to determine if that button was working properly?

21 **WIT:** The difficulty with the button arrangement pin, and the pin in the – from the
22 ROLOC box into the button was – it was difficult to observe it that it was a secure,
23 perfectly secured device. Because the pin from the ROLOC box that was being

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1 inserted into the deck button could be torqued in the wrong direction. It was suspended
2 by a spring that could be twisted and you could torque it correctly or incorrectly to lock
3 into the device. So you would not know if it was incorrectly secured in the device that
4 way. It may also be difficult to observe that the lashing was tight enough for working.
5 Because it would be hand tight, but you would have to physically go down and shake it
6 and we would typically just pound it with a maul to make sure that it was tight.

7 **Mr. Kucharski:** So how did you know that the button was operating properly?

8 **WIT:** Well the first indication the button was operating properly was if the lashing was in
9 the button. If it was not in the button then of course you've got a problem there. The
10 other indication would be if you could see a physical defect or damage on the button
11 itself visually from the outside. You would not be able to inspect the inside visually at
12 all. There was a tool for it that – that's some of your difficulties with that arrangement.

13 **Mr. Kucharski:** So visually, let me rephrase that. Would it be important to be able to
14 look inside if you could inside of that button to see if the parts were working properly in
15 there or properly attached?

16 **WIT:** That wasn't a convenient thing to do and it was impossible to do visually.

17 **Mr. Kucharski:** Was there anything that was done on the Alaska run to go ahead and
18 test those buttons?

19 **WIT:** There was a testing tool that we used to measure the clearances inside to make
20 sure that there was no wear or tear or damage or obstructions inside the button so we
21 knew they were in good operating condition.

22 **Mr. Kucharski:** And was that carried through then on the Puerto Rican run?

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1 **WIT:** It was on the El Faro when I was aboard because the tool was on the ship. It was
2 in the Boatswain's locker.

3 **Mr. Kucharski:** So there was a formal program to go ahead and test those up until the
4 time you were on there?

5 **WIT:** I made sure it was done because I was involved with it. So you can call that
6 formal because it would be a direction from me.

7 **Mr. Kucharski:** Captain thank you. Captain Neubauer, Captain Hearn I'm finished with
8 my line of questions. Thank you.

9 **CAPT Neubauer:** Captain Hearn I just have a couple questions in regards to the safety
10 management system.

11 **WIT:** Yes, sir.

12 **CAPT Neubauer:** For the – specific for the Jacksonville to Puerto Rico run. Did you
13 personally conduct safety rounds on the El Faro and El Morro while conducting that
14 run?

15 **WIT:** What was the second part of your statement?

16 **CAPT Neubauer:** I was wondering if you personally conducted safety rounds on the
17 vessels in that service, Jacksonville to Puerto Rico.

18 **WIT:** Yes.

19 **CAPT Neubauer:** And if you found a safety issue during your rounds, did that ever
20 occur?

21 **WIT:** Yes. That's a broad perspective of things because everything is a safety issue for
22 a ship. But yes, that's correct.

23 **CAPT Neubauer:** What types of safety discrepancies would you report to shore?

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1 **WIT:** Anything structural, watertight integrity, certainly anything that could hurt
2 personnel including hazardous material cargo and things like that. Anything that was
3 safety and structural or a large project or damage to the ship or damaging. Also life
4 saving and fire fighting were concerns because you wanted to keep them in the best
5 condition possible. If it was a small hazard that we could manage ourselves on the ship
6 which could be a routine hazard I may not report that to the company. Although there
7 was a safety meeting every month and many safety items, if it was a near miss, we had
8 near miss reporting or other parameters that I could incorporate that into the lessons
9 learned for the voyage and for the crew it would make it into the safety meeting also and
10 be reported to the company.

11 **CAPT Neubauer:** Did you ever have any problems on either the El Morro or El Faro
12 with the primary life saving equipment including the davits?

13 **WIT:** The El Morro had a problem with some of the survival suits, were not well
14 maintained and they were in poor condition and we had to replace them. And there
15 may have been some problems with the El Morro life boats. I know we had to do some
16 repairs to the releasing gear on the life boats for the El Morro. And the propeller was in
17 very poor condition, the shafting of the motorized life – I think it was the motorized boat.
18 It could have been the Fleming gear boat, but it was in poor condition. We had to
19 replace that also when I was Captain on the ship. Without looking at records, I mean
20 some of these are routine inspections and I don't recall them because it's part of the
21 normal operating parameters to find difficulties and maintain the ship and correct them.
22 The falls themselves on the construction – the operation of them were normally in good
23 condition that I recall.

1 **CAPT Neubauer:** When you did have an issue to report to shore how was the
2 response from the company?

3 **WIT:** Normally good.

4 **CAPT Neubauer:** Did you ever sense a change in the level of service for your safety
5 concerns over time?

6 **WIT:** My last year with the El Morro it was more difficult to get changes – corrections
7 made to some of the systems and repairs.

8 **CAPT Neubauer:** Was that in the 2013 time frame, sir?

9 **WIT:** 2012 or '13, yes.

10 **CAPT Neubauer:** Can you give an example of any reports that you presented to the
11 company where you did not get good service back?

12 **WIT:** The most difficult one was when I first joined the ship within 24 hours we found
13 some holes in the cargo spaces on the second deck and the company – there was a
14 reluctance to report this to the Coast Guard.

15 **CAPT Neubauer:** When you say a reluctance who in the company did you report to
16 and who did you get push back from?

17 **WIT:** I reported to Lee Peterson, he contacted Cliff Hill on the West Coast. And Cliff
18 flew a Port Engineer out to the ship in San Juan and the Port Engineer was given
19 responsibility to report it to the Coast Guard. And we showed him the – the Chief
20 Engineer, I think the Chief Engineer showed him the damaged area and we anticipated
21 that he would report it to the Coast Guard.

22 **CAPT Neubauer:** Was the damaged area a part of the watertight envelope on the
23 vessel?

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1 **WIT:** Yes, sir.

2 **CAPT Neubauer:** And could you continue on what happened from that point on, sir?

3 **WIT:** Well the Port Engineer did not report it to the Coast Guard. And I was
4 disappointed of course because it was regulatory and part of my responsibility. Excuse
5 me, I contacted the Designated Person which was Harry Rogers, he wrote an email to
6 the company urging them to report the damaged area to the Coast Guard and American
7 Bureau of Shipping so that they were aware of the damage and the repair for it. By the
8 time we were in Jacksonville the Coast Guard was on board and the American Bureau
9 of Shipping was on board and the company was on board and they came to look at the
10 area.

11 **CAPT Neubauer:** So the vessel made one Northbound trip with that – with the deck
12 area damaged?

13 **WIT:** Yes.

14 **CAPT Neubauer:** Was the problem corrected in Jacksonville?

15 **WIT:** Corrective action was taken and a plan was put in place to make corrections to it
16 under ABS and Coast Guard supervision.

17 **CAPT Neubauer:** Did you ever sense any ramifications to you from taking that action,
18 sir?

19 **WIT:** It was a more strained relationship with me and the Port Engineers.

20 **CAPT Neubauer:** Can you talk about the end of your time with it was Sea Star Line at
21 the time, sir?

22 **WIT:** Yes, sir. What do you mean by that?

1 **CAPT Neubauer:** What happened to you from an employment standpoint? Did you
2 quit from the company or were you terminated?

3 **WIT:** I left the company, it was unplanned. The year on the El Morro was a difficult one
4 as we discussed. There was an incident on the ship with crew members and I felt, well
5 I'll put it this way, the company came on board following that incident, weeks following
6 that incident, and a Vice President from the company and he asked me to resign or I
7 would be terminated. And I – and if I resigned they gave me the opportunity to – they
8 would help me find other employment. I said that I would resign and try to work with
9 them. I wrote to the President of the company the following morning and withdrew my
10 resignation and asked for an investigation. But they responded with termination. I'm a
11 contract employee through the union, the union picked up the process for grievance.
12 And through a year and a half it was never resolved. And – but the company made me
13 an offer to resolve the opportunity to expunge any record of it and part ways which I
14 accepted.

15 **CAPT Neubauer:** Did you ever discuss that situation with other Masters that were
16 employed at the time?

17 **WIT:** Captain Davidson was on board the day that that happened. The same
18 conditions were given to Captain Villacamp [sic], the Captain opposite me. I didn't
19 discuss it with any other Captain.

20 **CAPT Neubauer:** Did you discuss it with Captain Davidson what was happening?

21 **WIT:** I had turned over to Captain Davidson when he came on board the ship. In fact I
22 asked to have him come up to the ship and I showed him all that I could within the hour
23 or so that I had left and tried to help him. I gave him my phone number to call me

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1 afterwards, said if you had any questions I could help him with, and he did call me twice
2 with some small questions and that was it.

3 **CAPT Neubauer:** Did you feel part of your termination was due to the fact that you
4 were pointing out safety concerns on the El Morro?

5 **WIT:** I really – I don't know why it happened.

6 **CAPT Neubauer:** Do you think – was there any conversations with Captain Davidson
7 or any other Master where it was brought up that they were concerned about what
8 happened to your employment status?

9 **WIT:** Not with me.

10 **CAPT Neubauer:** Are you aware of any concerns throughout the company of what
11 happened to your employment status?

12 **WIT:** I was not in touch with anybody from the ships again, so I don't know if they had
13 concerns. There's always a rumor mill and there's always things to be discussed that
14 would possibly influence or weigh upon them because they were present. Several of
15 the officers that was on the El Morro transferred to the El Faro and we had worked
16 together for a period of time. Some of them I knew longer.

17 **CAPT Neubauer:** Thank you Captain. Those are all the questions I have at this time. I
18 would like to go to the parties in interest. Tote.

19 **Tote Inc:** No questions, sir.

20 **CAPT Neubauer:** ABS do you have any questions?

21 **ABS:** No questions.

22 **CAPT Neubauer:** Mrs. Davidson do you have any questions?

23 **Ms. Davidson:** No, sir.

1 **CAPT Neubauer:** And Herbert Engineering do you have any questions?

2 **HEC:** Yes, sir, we do. Captain I'm Spencer Schilling with Herbert Engineering. And I
3 just had a quick question on active roll period. And just to quantify a little bit the
4 tenderness of the vessel or the stiffness. Did you have a chance to quantify the roll
5 period in any of your operating GM's by measuring the roll period?

6 **WIT:** Did I time it do you mean? I did time it but more out of professional interest with
7 the students. Not necessarily because I was concerned. And I may have, I don't recall
8 it because it can be. And it might be something to verify, you know the calculation that
9 you receive. But I don't recall double checking with a visual observation. Only that we
10 trusted the calculations that we had and it seemed to be close enough to be concerned
11 that we found. We looked for solutions to give more safety measures to the voyage and
12 that's what we did.

13 **HEC:** Okay, thanks. The – so but there was a noticeable difference in the actual roll
14 period between say departure and arrival that you noticed because you mentioned it – it
15 seemed a little more tender on arrival?

16 **WIT:** Well it felt more tender to me. And as you became sensitive to it you would look
17 for it at all times because it was a new condition. I have been so long with that class of
18 ship that when we started carrying the larger heavier loads it was a noticeable
19 difference. And that's when we got – we looked into all of the conditions in the load
20 conditions, the calculations and where we stood to make sure that we could preserve
21 that safety factor.

22 **HEC:** Thank you very much.

23 **WIT:** Yes, sir.

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1 **CAPT Neubauer:** At this time are there any final questions for Captain Hearn?

2 Commander Denning.

3 **CDR Denning:** Captain just a few quick follow up questions. You mentioned a tool that
4 had been used to test the buttons on board the ship.

5 **WIT:** Yes, sir.

6 **CDR Denning:** Was that tool something that was provided by a particular
7 manufacturer?

8 **WIT:** No, sir. It was – the tool was used a pin, a brand new pin from the manufacture
9 and it was only extended on a T-bar so that we could use the correct measurements
10 and expectations of the ROLOC box device. But it was simple so that we could go
11 around very quickly and check several hundred buttons to make sure that they were in
12 good condition.

13 **CDR Denning:** So is it correct to say that it was something that was developed on
14 board that ship?

15 **WIT:** It was developed on the ship by one of the Chief Mates.

16 **CDR Denning:** Was it only used on board that ship or was there a procedure to use
17 something similar on other ships?

18 **WIT:** In the Alaska service all the ships had that device and used it routinely.

19 **CDR Denning:** Which would have included the Northern Lights at the time?

20 **WIT:** The Northern Lights, Westward Venture and the Great Land, that's correct.

21 **CDR Denning:** And are you aware of whether it was also used when the vessels came
22 to the Puerto Rican run?

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1 **WIT:** I don't know if the El Yunque or the El Morro had it. I don't recall seeing it on
2 those ships. When I was on the El Morro there were other issues to deal with that were,
3 to me more important and I never got around to that device in using it. I would have.
4 But I'm not aware of it. But I do know it was on the El Morro, or excuse me the El Faro.

5 **CDR Denning:** At least as of the time that you departed?

6 **WIT:** I think it was there on the time I departed, yes.

7 **CDR Denning:** Did it ever reveal any damage – about how frequently did it show
8 damage that needed to be repaired?

9 **WIT:** It was becoming rare. There were damaged buttons. I think one of the last times
10 it was used I used it, to be quite honest. I was in layup in 2009 and inspected the ship
11 you know myself, almost everything around it.

12 **CDR Denning:** And then final couple of questions. Did you ever on the Alaskan run,
13 specific to the second deck, I know it was ro-ro cargo above decks as well before the
14 conversion to ro-con, did you ever – did any of the cargo on the ro-ro decks on second
15 deck or below ever break free on the Alaskan run?

16 **WIT:** On the Alaska run it was not uncommon to have damage and cargo breaking
17 free.

18 **CDR Denning:** Did you ever have similar issues on the Puerto Rican run?

19 **WIT:** No.

20 **CDR Denning:** That's because the weather was more calm?

21 **WIT:** Normally the weather was not only more calm, but also if you did have – the
22 voyages that I had where you had any motion or sea motion it was manageable by

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1 ship's heading and ship direction. So you could reduce the impact of ocean waves on
2 the ship by just turn the ship a little bit and taking that edge off.

3 **CDR Denning:** Thank you Captain. And then just my final question would be lashing is
4 a very important issue with cargo securing in particular. Are there any questions that
5 we haven't asked you that you might think might be a concern on these vessels?

6 **WIT:** No.

7 **CDR Denning:** Thank you Captain.

8 **WIT:** Yes, sir.

9 **CAPT Neubauer:** Mr. Kucharski.

10 **Mr. Kucharski:** Thank you Captain. Captain Hearn one last question.

11 **WIT:** Yes, sir.

12 **Mr. Kucharski:** Did you see a change in the experience level of the senior personnel
13 on board those ships, on the Puerto Rican run from when you started there to when you
14 left?

15 **WIT:** When I first transferred to Sea Star there was a tremendous amount of
16 experience on those ships. All the Captains were senior, had been there from the
17 beginning 10 years, more experience on that specific run. Many of the engineers same
18 thing. Well experienced, if they were new to their capacity they still had plenty of
19 background in the company moving up through the ranks which was pretty common.
20 And they carried – so they knew not only their new job but they knew their previous jobs
21 before them to help other people. So there was a good mentoring program on there.
22 By the time I was leaving that was changing. So there was less experience on the ships
23 and that does make a difference.

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1 **Mr. Kucharski:** Was that both deck and engine?

2 **WIT:** Both deck and engine.

3 **Mr. Kucharski:** Would that cause you any concern if you were in heavy weather or had
4 some kind of big problems going on?

5 **WIT:** Absolutely. Absolutely in all directions depending on the person and what they
6 were doing, with the Chief Mate, Second Mate, even the Third Mate, being able to help
7 observe things on deck whether they would recognize lose cargo or not. And
8 engineering if you're in rough weather and you have to make course changes or speed
9 changes and it can very fast and difficult especially with the weather, you would
10 normally get all your – all personnel down there for some of the maneuvers. They may
11 not – and with experience in rough weather especially they – an experienced person
12 may recognize problems much quicker and be able to react or get help down there soon
13 enough to make a difference and that can be a critical component. It's a critical
14 operation to be in rough weather.

15 **Mr. Kucharski:** Have you actually been in situations of where you've lost a plant or
16 something?

17 **WIT:** I've lost a plant, not in rough weather. I've been in many critical situations with
18 rough weather.

19 **Mr. Kucharski:** Thank you Captain.

20 **WIT:** Okay. Yes, sir.

21 **CAPT Neubauer:** Mr. Roth-Roffy.

22 **Mr. Roth-Roffy:** Good afternoon.

23 **WIT:** Yes, sir.

1 **Mr. Roth-Roffy:** Tom Roth-Roffy, NTSB. Captain we understand from previous
2 testimony that there was perhaps a flooding event in one of the holds and some
3 associated listing perhaps. Do you have any experience with any incidents in your
4 experience on these class of vessels you know with flooding events or listing or any
5 such sort of events that you perhaps shed some light on?

6 **WIT:** Yes, sir. I was the Chief Mate on the Westward Venture and we had significant
7 flooding in number 3 hold. Probably around 1987 or 8.

8 **Mr. Roth-Roffy:** And could you please in much detail as you can provide a description
9 of that event? The events leading up to it, you know the findings and the resolution that
10 you were all able to take from that event.

11 **WIT:** Yes, sir. I was – I lean towards actually 1986 or 7, early '87 I was Chief Mate. I
12 was new to the ships and I was on watch. It was around I would say 5 O'clock in the
13 morning or 6, I noticed a list to starboard of a few degrees that – and the ship was
14 staying to that in that direction while we were rolling in heavy seas. I reported it to the
15 Chief Engineer at breakfast and he thought maybe it was a – they needed to move
16 some fuel but at that moment the Boatswain came and said we had a lot of water in
17 number 3 hold. I went down to number 3 hold and we had 8 to 10 foot of water on the
18 starboard side rolling, moving, but it was basically on the starboard side but it was
19 moving across to the other side of the hold wall, so. And it also transferred from
20 number 3 hold into number 2A hold and into number 2 hold. The water had gone
21 through the watertight doors.

22 **Mr. Roth-Roffy:** So the water – water had transferred through a cargo hold?

23 **WIT:** Yes, sir.

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1 **Mr. Roth-Roffy:** That was ----

2 **WIT:** That's correct.

3 **Mr. Roth-Roffy:** That had been rated for watertight integrity?

4 **WIT:** Yes, it did. It leaked through.

5 **Mr. Roth-Roffy:** Did – were you able to determine how the leak or where that leak had
6 occurred on that door?

7 **WIT:** At the time there were two theories. One that the hatch was left open or had
8 popped open, and the other one was the possibility that water came in through the bilge
9 system, the fixed bilge system which is a system to pump water out. And they could
10 have been pumping water out and left it unsecured was a theory that water had backed
11 in through the ship, the ship's system.

12 **Mr. Roth-Roffy:** And how was that water eventually removed from the ship and how
13 long did that evolution take?

14 **WIT:** It was difficult. We had to go into the water, the First Engineer and I did it. And
15 we went into the rose box which is a very narrow small deep well with the suction line
16 into it and we had to clear it of small paint chips and rust and debris. Small scale that
17 had jammed up and obstructed the ability to suck the water out of it and dewater the
18 hold. So it took, by hand, hours and we probably didn't dewater that hold for about 8 to
19 12 hours. It took quite a while. It was a battle.

20 **Mr. Roth-Roffy:** And what was the vessel movements during that period? Was it
21 rolling or did it just assume a permanent list?

22 **WIT:** No it was rolling, we were in rough weather. And it was difficult and violent to
23 actually to work in those conditions because we were getting washed over. One guy

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1 would have to hold the other guy to keep him from getting hurt while we were trying to
2 clear out the rose box. It was an urgent situation. But the ship was not taking on more
3 water, or at least we didn't think we were, and we weren't. So that was just hard work
4 and difficult.

5 **Mr. Roth-Roffy:** Sir, do you recall if there was ever an investigation by the company on
6 this event and any lessons learned within the fleet?

7 **WIT:** There were lessons learned on the watertight integrity of the watertight doors.
8 And the hatches to double check and make sure they were secured. We knew better to
9 keep a good eye on the watertight integrity of the watertight doors to keep them
10 maintained and manage them and inspect them. But that's one of your most difficult
11 jobs is managing those big gaskets in those jobs. It's a hard thing to do. But it can be
12 [in audible] work.

13 **Mr. Roth-Roffy:** And if you recall what was the maximum angle of list that was
14 experienced during that event?

15 **WIT:** Approximately 3 to 5 degrees.

16 **Mr. Roth-Roffy:** And one final question, sir. Do you recall if there was some type of
17 safety bullet or alert or some sort of a documentation of that incident that was shared
18 with the other vessels in the fleet?

19 **WIT:** I don't remember that now, sir. It's 20 years ago now.

20 **Mr. Roth-Roffy:** Thank you Captain.

21 **WIT:** You're welcome, sir.

22 **CAPT Neubauer:** Captain are those large gaskets for those cargo doors, do you
23 remember those being maintained well for the Puerto Rico run?

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1 **WIT:** It's difficult to remember because I was not always with the ship in the shipyard to
2 see, and I wasn't present for those testing opportunities. My understanding was that
3 they were managed and of course there was supervising and the testing would be
4 required by the ABS to manage that. The Chief Mate would be present, but it may be
5 somebody else that would manage it. I wasn't in the shipyard periods. And normally
6 you couldn't do those test unless you were in an IO period when you weren't working
7 cargo. And I transferred from ship to ship several times to the El Yunque and back to
8 the El Morro over to the El Faro. So it was possibly I missed it completely. I don't
9 remember any problems with them. But I don't remember being present for any
10 maintenance or inspections.

11 **CAPT Neubauer:** Captain did you spend any time with the vessels while they were laid
12 up? Specifically the El Faro.

13 **WIT:** Yes I did.

14 **CAPT Neubauer:** What is your opinion on how the vessel was maintained while laid
15 up?

16 **WIT:** The first time I was laid up with the ship was in Baltimore. And there was a crew
17 of, it started with about 6 or 7 men, we reduced to 4 and we had a very specific
18 maintenance program, under company direction to rotate machinery, manage and
19 maintain all of the records, move all the doors, keep the spaces clean. And then we
20 were also doing an awful lot of work actually on corrosion prevention and maintenance
21 of the steel, steel preservation. And the engineers were doing a tremendous amount of
22 work equally to the boiler systems, the valves, not only inspecting them and operating,
23 but they were taking them apart, repacking them and putting them back together again.

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1 Things like that. And then there was a lot of welding and repair work going on like that if
2 it could be managed by the few of us that were there. And some of it was because we
3 could do it with a few guys, just get them together, do it and then break it down to
4 another man. After that period the ship went into an unmanned lay up so there was no
5 maintenance done to the ship.

6 **CAPT Neubauer:** Do you know how long that unmanned layup lasted for?

7 **WIT:** The first period we laid up the ship I think in August of 2011 and she reactivated
8 for 3 months in 2012. And then I never saw the ship again. I laid the ship up after those
9 3 months in 2012. I don't know when the ship reactivated or what her maintenance was
10 after I left the company in the middle of 2013.

11 **CAPT Neubauer:** Thank you Captain. Mr. Kucharski.

12 **Mr. Kucharski:** Captain one follow on question. You were talking about the Westward
13 Venture you went down, the vessel had 8 foot of water in the hold and you went into the
14 rose boxes there.

15 **WIT:** Yes, sir.

16 **Mr. Kucharski:** On the El Faro where would the rose boxes – do you remember where
17 they were located? Were they inboard, were they outboard, where aboard the ship?

18 **WIT:** Port and starboard aft. I would estimate about 20 feet inboard from the side shell.

19 **Mr. Kucharski:** Okay. Thank you.

20 **WIT:** Yes, sir.

21 **CAPT Neubauer:** Are there any final questions for Captain Hearn? Mr. Roth-Roffy.

22 **Mr. Roth-Roffy:** I apologize Captain.

23 **WIT:** Not at all, sir. Anytime.

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1 **Mr. Roth-Roffy:** During that event you described previously accumulation of 8 feet of
2 water was the vessel fitted with bilge alarms that perhaps could have indicated the
3 presence of water in the hold?

4 **WIT:** At that time they were not. Those alarms were installed on the ships later. There
5 was an alarm in the engine room for that.

6 **Mr. Roth-Roffy:** Okay. And on the El Faro was that vessel – did they have bilge
7 alarms in each of the holds or and where were they located?

8 **WIT:** My recollection is that they were in the holds, aft in each hold. And that the alarm
9 was in the engine room.

10 **Mr. Roth-Roffy:** Thank you Captain.

11 **WIT:** Yes, sir.

12 **CAPT Neubauer:** Are there any final questions for Captain?

13 **Tote Inc:** No, sir.

14 **ABS:** No, sir.

15 **Ms. Davidson:** No, sir.

16 **HEC:** Yes. A follow up question Captain. I – you were asked about the flooding of
17 hold 3 of the Westward Venture, correct?

18 **WIT:** Pardon me? Can you repeat that?

19 **HEC:** You were asked questions about flooding in hold 3.

20 **WIT:** Yes.

21 **HEC:** 8 to 10 feet of water.

22 **WIT:** Yes.

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1 **HEC:** I don't believe anyone asked you if there was ever a determination of the source
2 of the ingress of that water.

3 **WIT:** We discussed it. Maybe I wasn't clear. It was two possibilities, one was the
4 manhole above on second deck, because it was rough weather. And the other
5 possibility was the bilge system, it was not secured properly when – if they had pumped
6 bilges before. And those were the two possibilities, but we never resolved what the
7 problem was.

8 **HEC:** Thank you. That was unclear, thank you.

9 **WIT:** Thank you.

10 **CAPT Neubauer:** Tote?

11 **Tote Inc:** Sir, could we just take a brief 5 minute break and decide on if we have any
12 more questions?

13 **CAPT Neubauer:** Yes. The hearing will recess and reconvene at 2:20.

14 *The hearing recessed at 1413, 17 May 2016*

15 *The hearing was called to order at 1422, 17 May 2016*

16 **CAPT Neubauer:** The hearing is now back in session. Tote would you like to ask
17 questions?

18 **Tote Inc:** Tote has no questions, sir. I believe Captain Davidson's counsel has some
19 questions.

20 **CAPT Neubauer:** Mrs. Davidson.

21 **Ms. Davidson:** Yes, thank you Captain. Captain Hearn I want to discuss with you two
22 issues. One is about crew experience.

23 **WIT:** Yes, sir.

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1 **Ms. Davidson:** Are you aware that sitting here today that on the El Faro on it's voyage
2 it actually had two Masters aboard her? Are you aware of that?

3 **WIT:** Well, sir, I know Steve Schultz, I guess he had a Masters license. I wasn't aware
4 ----

5 **Ms. Davidson:** And he had spent 7 years on the Ponce Class vessels, correct?

6 **WIT:** I don't know, sir.

7 **Ms. Davidson:** He was a Chief Mate on the Ponce Class vessels for 7 years, correct?

8 **WIT:** I don't know, sir. Because I only met Steve once we worked for 2 weeks on the El
9 Morro.

10 **Ms. Davidson:** So you have no knowledge about his experience?

11 **WIT:** No I have some knowledge, but I don't know exactly his knowledge.

12 **Ms. Davidson:** Okay. What about the Chief Engineers? Do you have knowledge
13 about their experience?

14 **WIT:** Some, yes.

15 **Ms. Davidson:** Do you know that there were two Chief Engineers on the El Faro during
16 its last voyage?

17 **WIT:** Well Jeff Mathias had a Chief Engineers license and I had sailed with Jeff. And
18 Rich Pusatere was a Chief Engineer. And I had a – had been sailing first with me, you
19 know I was on the El Morro.

20 **Ms. Davidson:** They were both very experienced Chief Engineers weren't they?

21 **WIT:** No.

22 **Ms. Davidson:** Sir, you were terminated weren't you?

23 **WIT:** No, they tried to terminate me it went to arbitration.

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1 **Ms. Davidson:** Weren't you given a letter on July 15th, 2013 which states, Dear
2 Captain Hearn, quote recently the U.S. Customs and Border Protection arrested El
3 Morro crew members for smuggling 43 kilos of illegal drugs by the vessel. Do you recall
4 that letter?

5 **WIT:** Not completely because you're only reading part of it.

6 **Ms. Davidson:** Do you want me to read the full?

7 **WIT:** No.

8 **Ms. Davidson:** I didn't think so. I have no further questions for this witness.

9 **CAPT Neubauer:** Are there any further questions for Captain Hearn?

10 **ABS:** No questions.

11 **CAPT Neubauer:** Captain Hearn do you have anything that you would like to say to the
12 board at this point?

13 **WIT:** Thank you, sir, no.

14 **CAPT Neubauer:** Captain Hearn you are now released as a witness at this Marine
15 Board of Investigation. Thank you for your testimony and cooperation. I know it was a
16 long session. If I later determine that this board needs additional information from you I
17 will contact you through your counsel. Or I'll contact you directly. If you have any
18 questions about this investigation you may contact the Marine Board Recorder,
19 Lieutenant Commander Damian Yemma. The hearing is now recessed and we'll
20 reconvene at 2:30. And before – actually before we recess, do any of the PII's have
21 any concerns with the testimony provided by Captain Hearn?

22 **Tote Inc:** No, sir.

23 **ABS:** No, sir.

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1 **HEC:** No, sir.

2 **Ms. Davidson:** I question the reliability, but I have no concerns.

3 **CAPT Neubauer:** Yes, sir. Noted on the record. All right we'll now recess and
4 reconvene at 2:30 with Mr. James Franklin, the Branch Chief, Hurricane Special Unit –
5 Hurricane Specialist Unit National Hurricane Center.

6 *The hearing recessed at 1426, 17 May 2016*

7 *The hearing was called to order at 1438, 17 May 2016*

8 **CAPT Neubauer:** The hearing is now back in session. The board will now hear from
9 Mr. James Franklin, Branch Chief Hurricane Specialist Unit, National Hurricane Center.

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

15 **WIT:** Yes I do.

16 **LCDR Yemma:** Thank you, sir. Be seated please. Sir, can you start by stating your
17 full name and spelling your last name for the record?

18 **WIT:** James Lewis Franklin, F-R-A-N-K-L-I-N.

19 **LCDR Yemma:** And counsel can you also state your name and spell your last name for
20 the record please?

21 **COUNSEL:** Michael A. Cannon, C-A-N-N-O-N, Office of General Counsel, United
22 States Department of Commerce.

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1 **LCDR Yemma:** Thank you, sir. And Mr. Franklin can you state your place of
2 employment and your current position please?

3 **WIT:** National Hurricane Center, I'm the Branch Chief of the Hurricane Specialist Unit.

4 **LCDR Yemma:** Can you describe some of your general responsibilities in that
5 position?

6 **WIT:** I'm basically in charge of forecast operations for the hurricane side of NHC's
7 operations. Supervise the hurricane specialist who are the hurricane forecasters.

8 **LCDR Yemma:** And can you also describe some of your prior relevant work experience
9 please?

10 **WIT:** I was a hurricane forecaster, hurricane specialist at NHC for 10 years or so before
11 becoming a branch chief. Prior to that I flew research missions for NOAA into
12 hurricanes for 17 years on the P3 aircraft as a researcher.

13 **LCDR Yemma:** Thank you, sir. And what is your highest level of education
14 completed?

15 **WIT:** Master of Science in Meteorology from MIT.

16 **LCDR Yemma:** Thank you. The board will have questions for you now.

17 **CAPT Neubauer:** Lieutenant Comerford.

18 **LT Comerford:** Good afternoon Mr. Franklin. All of my questions today are going to be
19 related to the time frame prior to the loss of the crew in the El Faro unless otherwise
20 noted. Mr. Franklin we will explore these broad topics: function, roles and responsibility
21 of the National Hurricane Center. The National Hurricane Center's methods of
22 forecasting tropical cyclones, the day to day operations of the hurricane specialist
23 during a hurricane, the genesis and forecasting of Hurricane Joaquin and all seas or

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1 practices regarding public notification of forecasting analysis and forecaster input for the
2 forecast. After we finish the initial Coast Guard questions for these broad topics the
3 NTSB and the parties in interest will conduct questions in that area before we move on
4 to other broad topic areas. Please let me know if you would like to take a break at any
5 point during your testimony.

6 **COUNSEL:** Lieutenant one question. So basically we're going to go through say all the
7 responsibilities of the National Hurricane Center, you ask all the questions then the
8 parties will ask questions and then go to the next topic, is that's how it's going to go?

9 **LT Comerford:** Yes.

10 **COUNSEL:** All right, thank you.

11 **CAPT Neubauer:** Lieutenant Comerford could you speak a little closer to the
12 microphone?

13 **LT Comerford:** The first topic area I would like to explore is the function and roles and
14 responsibility of the National Hurricane Center. Mr. Franklin what is the National
15 Hurricane Center and what does it do?

16 **WIT:** The National Hurricane Center is part of the National Weather Service, part of
17 NOAA. It's our to forecast, mine in particular, forecast the formation evolution of tropical
18 disturbances in the Atlantic and the Eastern North Pacific. We are responsible for
19 forecasting tropical cyclones after they develop, track intensity, size and forecast. We
20 have responsibility for coastal warnings in the United States and for Haiti. And for
21 providing forecast guidance to the other countries of the Atlantic and the Eastern North
22 Pacific.

1 **LT Comerford:** In your own words what's the – what is the mission of the National
2 Hurricane Center?

3 **WIT:** We actually have a mission statement, which I'm not sure I can recall off the top
4 of my head, but it is to keep our users safe from tropical cyclones the quickest way of
5 raising it.

6 **LT Comerford:** Mr. Franklin, can you discuss the individual offices and branches that
7 make up the National Hurricane Center?

8 **WIT:** Sure. We have three branches, two operational branches minus the hurricane
9 specialist unit, we do the forecasting disturbances that have potential to become tropical
10 cyclones and then forecast for the tropical cyclones after they form. The tropical
11 analysis and forecast branch is the other operational branch at NHC and they do marine
12 forecasting year round. Then there is a third branch, the technology and science
13 branch which does operationally oriented development. They keep the trains running.
14 And then we have the front office which would not be one of those three branches, but.

15 **LT Comerford:** You quickly mentioned your position at the hurricane specialist unit.
16 Can you go in more depth on what your duties are on a day to day basis?

17 **WIT:** I put together the operational shift schedule for the hurricane forecasters.
18 Supervise forecast operations during the season. During an event either myself or a
19 director, Doctor McNab [sic] or Deputy Director Doctor Ed Ratherford [sic] will do many
20 briefings for it might be FEMA, it might be affected States, other leadership briefings for
21 NOAA folks, media interviews during an event. But largely my role is to supervise the
22 forecast process.

1 **LT Comerford:** With the understanding that the individuals on the hurricane specialist
2 unit have very diverse backgrounds, in general what are some of the qualifications of
3 hurricane specialist in the hurricane specialist unit?

4 **WIT:** Well they all will have either a bachelors or masters or PHD in meteorology or
5 closely related field. Many of the hurricane specialist previously worked in the tropical
6 analysis and forecast branch as marine forecasters. A number of them came through
7 there. A couple of us came from the research side of meteorology as I did. All of us
8 pretty much became interested in hurricanes as a young kid. And have had a lifelong
9 interest in hurricanes.

10 **LT Comerford:** The hurricane specialist unit is made up of, in general there is a
11 specialist, senior hurricane specialist and a hurricane specialist. What's the difference
12 between the senior and a regular hurricane specialist?

13 **WIT:** The hurricane specialist we have four hurricane specialist are GS-13 positions
14 and we have 6 senior hurricane specialist those are GS-14 forecaster positions. The
15 duties are largely similar although there is some differentiation of duties between the
16 two. When, well warning, coastal warnings are in effect those systems are almost
17 always worked by the senior hurricane specialist. It's the senior hurricane specialist
18 who will handle higher level briefings, major media briefings. The senior hurricane
19 specialist are responsible for the daily tasking of Air Force and NOAA reconnaissances
20 flights. But both the GS-13 and 14 forecasters have similar responsibilities on the
21 forecast floor when it comes to actually making hurricane forecast or forecast for
22 disturbances that are threatening to develop.

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1 **LT Comerford:** You mention it before, but again can you describe the geographic area
2 of responsibility for the hurricane specialist unit?

3 **WIT:** Yes. So we have the entirety of the North Atlantic Ocean and then the Eastern
4 North Pacific to the East of 140 degrees longitude.

5 **LT Comerford:** And the – can you discuss what each branch of the National Hurricane
6 Center is responsible for producing with regards to products intended for the general
7 public, specifically ships at sea?

8 **WIT:** The, well the HSU, my unit has a number of products relating to tropical cyclones.
9 We have a public advisory which is a plain language non-technical text product that
10 talks about the tropical cyclone forecast in a general way out to about 48 hours. We
11 have a tropical cyclone discussion which is 2 or 3 or 4 paragraphs with each tropical
12 cyclone advisory that provides forecast rational, why we did what we did, what are we
13 seeing with the models for example. Although that's intended primary for media
14 meteorologist and emergency managers, it's become pretty popular with the general
15 public as well. A forecast advisory which is a formatted listing of the actual 5 day
16 tropical cyclone forecast. And then there's a suite of graphics that go along with that.
17 There is a wind speed probability product which lists both in text and graphical form the
18 chances at any particular location on the map experiencing tropical storm force winds,
19 50 knot winds or hurricane force winds out to 5 days. Those are the primary products at
20 the hurricane specialist unit. The TAFB, tropical analysis and forecast branch products
21 I'm not as familiar with. There are a few that I can speak about briefly. The off shore
22 waters forecast, a text product is a product which would include any marine tropical
23 storm or hurricane warnings issued by TAFB. The high seas forecast out of TAFB is

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1 again it's a semi-formatted text product which is basically a largely a repackaging of the
2 HSU's forecast and the marine advisory, forecast advisory. It's repackaged in a
3 different form into which they add additional information on waves and sea conditions
4 which we don't do over on the HSU side. Some tropical weather discussion, another
5 product of TAFB which is more a – of a synopsis of current weather across their area of
6 responsibility. And they also have recently added a set of gridded forecast products.
7 Gridded forecast sea state wind and various atmospheric parameters.

8 **LT Comerford:** That concludes my first topic of discussion. Captain in the interest of
9 time request to move on to the next topic.

10 **CAPT Neubauer:** Let's move on.

11 **LT Comerford:** All right. Mr. Franklin, the next topic we'll be discussing will be the
12 methods of forecasting tropical cyclones. Please describe the steps involved in
13 producing the official tropical cyclone track and intensity forecast including who's
14 involved in the decision making.

15 **WIT:** Okay. It's a largely a 3 hour forecast cycle. So for the advisory package that
16 would come out at 11 a.m. for example, and we have 4 of these a day every six hours.
17 The process would begin at 8 a.m. roughly. Typically for a tropical cyclone that was
18 threatening land we would have scheduled an aircraft to go in there shortly before 8
19 a.m., 7:30 or so. The aircraft would locate the center of the tropical cyclone. It would
20 try and find the strongest winds, minimum pressure, give us a picture of how broad the
21 wind field is. The first 10 or 15 minutes or so of that 3 hour forecast cycle is then spent
22 by the hurricane specialist analyzing the data that come in from the reconnaissance
23 aircraft, anything else that may be available from ships, looking at the satellite imagery,

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1 any other observations and preparing what we call the compute which is basically our
2 analysis of the current location, current motion, current intensity, current pressure and
3 the size of the wind field. That initial analysis information is then used to initialize a
4 number of numerical models that are run. The – normally by about – in addition TAFB
5 one of their functions is to provide us with a satellite based analysis of the location and
6 the intensity of the tropical cyclone using something called the Dvorak technique.
7 That's basically an ink blot test for tropical cyclones. You look at a picture and you can
8 estimate the strength of the cyclone that way. So that's part of the information that
9 comes in during that first – first period. By 8:30, 8:45 or so we now have received our –
10 the set of model guidance back. And the next hour, hour and 15 minutes is spent
11 making forecasts. So we forecast the track, the tropical cyclone out to 5 days. The
12 intensity out to 5 days. The size out to 72 hours. And in doing that the forecaster will
13 not only look at the various tracks that are coming from the American models he will be
14 looking at various fields, three dimensional fields coming from a variety of models to try
15 and understand why the various models are doing what they're doing. We have a set of
16 intensity guidance models as well that come in. And by 10 O'clock the forecast needs
17 to be complete. We have a conference call at 10 O'clock, one hour prior to advisory
18 release with various other offices in the National Weather Service, local weather
19 forecast offices would be on there, the Navy, a number of offices in the Navy, DOD will
20 be on there. The weather prediction center in College Park. Storm prediction center on
21 there and we discuss the forecast. If it is a – if there's watches and warnings in effect
22 with land base hazards going on then we'll have discussions with WPC. They are the
23 rainfall experts and so they will provide us some information for use in a public advisory

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1 on rainfall. We'll discuss with storm predication center any statements we may want to
2 make on the tornado threat. We will coordinate with another – there's another group by
3 the way in the technology and science branch – science branch at HC, the storm surge
4 unit is located inside of TSB and they will provide the hurricane specialist guidance on
5 what we might want to say about storm surge. That conference call takes about, can
6 take, I remember a horrible one taking about 25 minutes trying to discuss warnings. But
7 normally it's 5 or 10 minutes. And then so by 10 after a quarter after the hurricane
8 specialist then turns his attention to actually preparing the advisory products. So the
9 public advisory is maybe 2/3rds preformatted for us and you know there's a template
10 and we'll go in and fill that in. The discussion is written from scratch each time. So
11 that's 2, 3, or 4 paragraphs of why we're doing what we're doing. The other products
12 are largely generated automatically based on the forecast that we made. And if all goes
13 well by 11 O'clock that's all kicked out.

14 **LT Comerford:** Sir, can you explain what the ensemble average product is?

15 **WIT:** Sure. So we have a number of forecast models that we use. Some of them you
16 might be familiar with the names. We had the GFS which is the National Weather
17 Service global model. We have the European Center for medium range weather
18 forecast, UCWF which is a global weather forecast model that provides us tracks. The
19 Navy has a model, the UK office has a model. Canadian meteorological service has a
20 model. Japanese has a model. And there are – there are a couple other regional
21 hurricane models the GFDL and the [in audible]. It's a pretty powerful rule in
22 meteorology that a consensus of relatively independent and strong performing models
23 routinely out performs even the best individual model. So for the last 15, 20 years or so

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1 we have formally computed what's known as a consensus. Which is an average of
2 some grouping of those models. And there are several consensusie [sic], consensuses
3 that we form. And the model consensus is very often a starting point for where we
4 would start thinking about where the forecast should go. It's on the only thing, we have
5 our previous forecast that's also very important that I expect you're going to ask me
6 about. But the model consensus is traditionally the best performing model year after
7 year. It's a way of – it's a way of compensating errors, generally get washed out when
8 you do that averaging processing.

9 **LT Comerford:** Does the consensus, sorry, does the consensuses change from year
10 to year? Is it a different flavor every year?

11 **WIT:** We evaluate it every year. Over the past several years it has remained pretty
12 fixed. We're actually adding a new model to the consensus this year, which is the first
13 time I think that we've done that in several. It's been pretty stable over the last 3 or 4.
14 The primary consensus would have the GFDL, it would have the HWARF of the
15 European, it would have the GFS and the UK MEP. Those are the 5, we're adding a 6th
16 this year. This is a Navy model called COAPPS TC. That's going to be added to
17 consensus this year. Each off season we do a variant sensitive verification. And part of
18 that verification effort is to look at whether we need to make changes to that primary
19 consensus. Excuse me. A few years ago we dropped the Navy NOGAPS out of the
20 consensus because it had performed poorly over a decade or so. And so we can do
21 test. We can go back and look and see whether the consensus would be improved by
22 adding this model and subtracting this model and so on. That's part of the off season
23 analysis that we do.

1 **LT Comerford:** You've been talking ad nauseum about the different models that are
2 available. Roughly speaking about how many models are there available?

3 **WIT:** I've only been up here for a few minutes. There are – there are about a half –
4 there's about a half dozen primary models. There may be another half dozen lesser
5 models, either they're based on simpler physics or they're older and have, you know
6 fallen out of favor. There are all kinds of simple aids in the decks that we make
7 available on the public FTPC site that range from something no more complicated than
8 taking the current motion and extrapolating it out 5 days in time so you just have this
9 one straight track. To very sophisticated models like the GFS or the European. But
10 about a half dozen primary track models and about 4 or 5 primary intensity models.

11 **LT Comerford:** I would like to draw your attention to Exhibit 149, page 5.

12 **WIT:** Okay.

13 **LT Comerford:** This exhibit shows the National Hurricane Center's model summaries.
14 On page 5 the document addresses early and late models. In your own words could
15 you describe what is meant by an early and late model?

16 **WIT:** Sure. The – when we sit down to make the forecast that's going to go out at 11
17 a.m. like I just talked about, we, as I said at the very beginning of that process at 8 a.m.
18 we analyze the location, strength, size, motion of the storm and I mentioned earlier that
19 we then use that information to initialize the models. So that information along with all
20 kinds of other observations collected around 8 O'clock, the balloon launches for example,
21 the [in audible], all the way up to 8 O'clock, but the model won't actually run until 2 or 3
22 hours later. So there's a data collection period. So the 8 a.m. run of the GFS for
23 example or the 8 a.m. run of the European model for example doesn't come back to the

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1 forecaster until about 1 in the afternoon. So that's obviously too late to use for the 11
2 a.m. advisory and that's why we call that a late model. It's too late for us to make use
3 of. So what we do is we go back 6 hours and we take the run of the GFS or the HWAR
4 for the GFDL, any of these dynamical models that take a long time to run, we would go
5 back to the one coming from 2 in the morning. And we use that forecast because it was
6 available around 7 in the morning. And it was early enough to be used. And we have a
7 process for making an adjustment to that 6 hour old run of the model to ensure that it's
8 starting off from where we said the storm was going to be at 8 O'clock. So the model
9 starts at 2 a.m., makes a 6 hour forecast, it may already have a – they would already be
10 off by 6 hours, both the track and the intensity could be off by then. We basically, you
11 can think of it as picking the model forecast off the map, sliding it 6 hours in time and
12 plunking it down on the spot where the storm actually was at 8 a.m. And that's what we
13 call the interpolated or early version of the previous run of that model. So whenever
14 we're working with the GFS or the European or any of those models we're really always
15 working from the one that was either 6 hours old 12 hours old. And that's the distinction
16 between early and late.

17 **LT Comerford:** In your analogy of interpolate, is that a computer doing that program or
18 is it a hurricane specialist physically plotting it on chart? So computer or man?

19 **WIT:** It's a computer, yeah, it's a program. A computer program that does that.

20 **LT Comerford:** There's a couple of different organizations you talked about developing
21 these models. Maybe European's, Japan, Canada. What are they doing in general to
22 develop those models or run the models over the course of the period? What are they
23 doing?

1 **WIT:** Not sure I understand the question.

2 **LT Comerford:** In other words, how are they processing the data to deliver to the
3 National Hurricane Center? Is it a large super computer model, or is it a lineup of
4 forecasters in the background? Please describe a little bit about ----

5 **WIT:** Oh, okay. Yeah, it's – I mean it's all an automated procedure. It's basically the
6 running of a global numerical weather prediction model. It involves the accumulation of
7 observations, which is why that occurs over a several hour period. Then there's a
8 process called data simulation which is a way of taking those observations and putting
9 them into a form that you can start the model running. You basically have to create an
10 initial depiction of the state of the atmosphere specifying pressure everywhere,
11 temperature everywhere, humidity everywhere, all of the various parameters so that you
12 – the model then can take the equations of motion that govern motions in the
13 atmosphere and calculate forward from that initial prediction. So there are some very
14 complicated software that takes in all the observations, it knows a lot about the various
15 error characteristics of all of the different observations. Produces a snapshot if you will
16 of the initial state of the atmosphere which then gets used to set the model off in motion.
17 It runs an hour or two later we start getting the information back, both in the form of
18 three dimensional fields of pressure, temperature, wind, whatever and the various
19 tracks of the tropical cyclone in that model. So it's a, you know there aren't people
20 doing this. There are people who have worked for years developing the techniques to
21 do data simulation and develop the physics that make up the various models. But the
22 process is automated at the end stage.

23 **LT Comerford:** Are all these models weighted evenly in the consensus?

1 **WIT:** In the, yes and no. We have what we call – we have equally weighted
2 consensus, we have a couple of things where we attempt to look at past performance of
3 the various models and make corrections for biases. And that would applying different
4 weights. There's a model called the Florida State super ensemble for example which is
5 what we call a bias correcting consensus or bias corrective ensemble. We've also
6 explored in the past couple of years doing things like creating a consensus where we
7 double weight the European model or we double weight the European and the GFS
8 model because we know that those two tend to outperform the others. But we also
9 have the simple equally weighted consensus models as well. We have both.

10 **LT Comerford:** Let me – official forecast for tracking intensity is generated or issued to
11 the public. Can that be different than the consensus?

12 **WIT:** It will almost always be different from the consensus. Not generally by a lot
13 because the consensus is usually where we start out thinking. But we also have to
14 consider what our previous forecast was. We have by philosophy for decades we've
15 had a philosophy of making only incremental changes to our forecast from one advisory
16 to the next. If there is a rapid change in the model guidance such that the new
17 consensus is very far off our old official forecast that might be a situation where we
18 would come part way to the new consensus but we might be some distance away from
19 it. So how far or not we're away from the consensus might depend on, again how big a
20 model change there's been, our assessment of the reliability of any particular outlier that
21 goes into the consensus. Sometimes we can look at a collection of models that are
22 very different and we can identify a reason why one model might be very different and
23 then either believe it or weight it or discount it. So it would be a combination of those

1 subjective judgements plus simply a reflection of how much has the guidance changed
2 since last time.

3 **LT Comerford:** In your perspective what value does the hurricane specialist provide to
4 adjusting an official forecast?

5 **WIT:** Say that again please.

6 **LT Comerford:** Sorry let me correct myself. So the official forecast is slightly adjusted
7 from the consensus. What part does the hurricane specialist have in that regard or
8 what process is he following? What value does he put into the modifications and
9 adjustments to the consensus for the official forecast?

10 **WIT:** A couple of things with touching on there. Number one it's gotten harder and
11 harder for the human forecaster to outperform the track models over the years. The
12 track models have been getting better and better. Track forecast accuracy now, the
13 errors are about half of what they were 10 or 15 years ago. There's been a lot of
14 improvement there. And that's not really because the forecaster is getting smarter, but
15 it's because the computers are getting faster and the observations in the atmosphere
16 are more dense and the models are getting better. So for track forecasting the primary
17 role of the forecaster, if we can, again to identify a model that seems to be out to lunch
18 or seems to really have a good handle on it, but more often than not the role in track is
19 to ensure consistency in the forecast maintaining continuity with what we had before.
20 Ensuring that we are not radically changing our advice every 6 hours going one
21 direction at 11 O'clock and off and threatening some other area at 5 in the afternoon
22 and then back to where we were before there. So that's – in some sense it's a little bit
23 mechanical on the track side. It's different on the intensity side. The intensity forecast

1 models are not nearly as advanced as the track forecast models are. And it's quite
2 common for the forecaster to add value over any of the guidance that we have for
3 intensity. So the forecaster plays more of a role in shaping the official forecast and
4 moving away from the guidance, from the model guidance for intensity. Because we
5 can see things sometimes that the models cannot in terms of structure and intensity.

6 **LT Comerford:** During a watch how many hurricane specialist are on duty running the
7 forecast and how long is each specialist watch?

8 **WIT:** You mean shift? Forecast shift?

9 **LT Comerford:** Yeah.

10 **WIT:** Okay, sorry. Watch has another meaning to us. So we normally staff 2
11 forecasters at a time. There's a senior hurricane specialist and a hurricane specialist
12 on. I'll work a hand full of shifts in the unit as well. So for some of those I would take
13 the place of the senior hurricane specialist. But we also have a couple of other folks in
14 the building, our science and operations officer and we also have a Navy officer there
15 who worked routine shifts as a hurricane specialist in the unit. But it's 2 at a time in
16 most cases. There are 3 shifts a day. And the day shift tends to be a little bit longer
17 because they have responsibility for the 11 a.m. advisory package and the 5 p.m.
18 advisory package. Whereas the other two shifts have only responsibility for a single
19 advisory package. When there is more weather going on than can be handled by 2 we
20 will staff up and add an additional person or an additional 2 if necessary. Because
21 we're responsible for both the Atlantic and East Pacific and we could have as many as 5
22 active tropical cyclones going on at a time. Plus disturbances that we're also making
23 internal forecast for as well.

1 **LT Comerford:** When you increase staffing is it primarily for the number of tropical
2 cyclone events or disturbances?

3 **WIT:** Either the number or the severity of the event. So a major U.S. land falling
4 hurricane for an example generates a tremendous amount of incoming phone calls,
5 media inquiries, briefings and the like. So even if we only had two systems going on
6 and so you had one person working and the other person working the other, the
7 pressure paws at other demands on the forecaster's time might be such that we would
8 put somebody else on just to answer the phone for an example. Or help monitor data or
9 other things so two forecasters could work. So it's very much workload specific. You
10 know what's the briefing load, what is the – now in general each forecaster is expected
11 to be able to do two advisory packages at once. So during that 8 a.m. to 11 a.m.
12 period he might – everything that I described to you earlier he might have to do twice if
13 he's working two storms at a time. I remember one shift where I actually had to do 3 at
14 once. Which was not fun.

15 **LT Comerford:** You stated for you may up the number of people on watch for U.S.
16 major hurricanes hitting U.S. land. Does that apply to any other countries?

17 **WIT:** It's driven by the amount of really incoming traffic. So for a major U.S. event
18 that's where the number of needed briefings gets larger or the number of phone calls.
19 We had a super major land falling event for Mexico last year, Patricia, the strongest
20 storm ever that we observed in either of our basins and yet it generated very little media
21 attention because it was Mexico. At least to the Hurricane Center. So you know it's not
22 that we're picking out the United States, it's driven by the amount of work that is – that
23 we're having to do for those kinds of events.

1 **LT Comerford:** For Hurricane Joaquin leading up to the time of 01 October, do you
2 recall if the staffing was normal or had been increased?

3 **WIT:** I don't recall. Well certainly early on staffing was normal. As it was approaching
4 the Bahamas I would actually have to look and see whether we ever staffed up for that.
5 There were no U.S. watches or warnings ever for Joaquin. And the other thing I don't
6 recall is how many other systems we had going at that time. So I would have to look at
7 the schedule to see how many folks were on at the time.

8 **CAPT Neubauer:** Sir, would we be able to get that data later from you?

9 **WIT:** Sorry? Oh.

10 **CAPT Neubauer:** Would we be able to get the numbers later, at a later time?

11 **WIT:** Yes, I have all the old schedules and I can go back and look and see who was on.

12 **CAPT Neubauer:** Thank you.

13 **LT Comerford:** Mr. Franklin, when the shift changes is there a procedure that the
14 specialist follow to transition the shift between the daytime, nighttime, etc.?

15 **WIT:** There's normally a short briefing between the incoming and outgoing forecaster.
16 Beginning last year or maybe very late the previous year we started keeping an
17 electronic shift log at the Hurricane Center and that's actually become very helpful in
18 sort of minimizing the need for a lengthy briefing because of events that occur on shift
19 gets captured in a log. But in general there's a discussion that will occur between the
20 incoming and outgoing forecaster.

21 **LT Comerford:** During that discussion can you describe some of the information that
22 talked – or discussed between the off going and on coming?

1 **WIT:** It would – it would mainly be a discussion of what – what the forecaster was
2 seeing in terms of the satellite imagery, what were the subjective nature, I mean we
3 don't talk about really what the models show because we – the next guy can look at
4 that. But any subjective insights that the forecaster might have had. Anything that
5 maybe he wished he had done differently during the shift, oh I wish I would have noticed
6 this or since the advisory has gone out I've seen this particular trend occurring in the
7 satellite imagery. So it's largely the intangibles that would get discussed. If he had
8 come to some opinion about the validity of a particular model he would relay that. Now
9 some of that is in the tropical cyclone discussion. You know that's the place where we
10 tell everybody what we think about the various models. But you know sometimes in the
11 rush of getting that product out not everything goes into the discussions. So any
12 subjective insights will get passed along with the briefing. There would also be
13 discussions of any equipment that wasn't working properly or any other issues that
14 might have arisen during the shift for example.

15 **LT Comerford:** That concludes my questions for this topic. I now turn it over to the
16 board members.

17 **CAPT Neubauer:** Does the NTSB have any questions?

18 **Mr. Richards:** Just a few. Good afternoon Mr. Franklin.

19 **WIT:** Good afternoon.

20 **Mr. Richards:** Just for clarification does TAFB issue warnings?

21 **WIT:** TAFB issues marine warnings. So there's something called a marine hurricane
22 warning which would appear in the off shore waters forecast. They will issue gale
23 warnings as well.

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1 **Mr. Richards:** And the hurricane specialist unit issues watches and warnings as well,
2 correct?

3 **WIT:** The hurricane specialist unit issues coastal warnings for the coastal strip of the
4 United States. We also make, and for Haiti. We also make recommendations on
5 coastal warnings for all the other countries of the Caribbean and Central America,
6 Canada, Bermuda, Azores and whatnot. But the actual warnings for all of those foreign
7 countries are decisions made by the respective countries based on our forecast and
8 hopefully our recommendations.

9 **Mr. Richards:** Okay. Would you say that between the products issued by the
10 hurricane special unit and TAFB that these products have different intended audiences?

11 **WIT:** Sure. TAFB products are primarily intended for the marine audience. Ours are
12 more geared towards emergency management, towards media, towards the general
13 public.

14 **Mr. Richards:** Do you incorporate any information from TAFB into the products that the
15 hurricane specialist unit issues?

16 **WIT:** TAFB contributes in a number of ways. I mentioned that they do the Dvorak
17 analysis for us which is a very important part of how we estimate storm strength.
18 Particularly for those storms in which we do not have aircraft reconnaissance. We only
19 have aircraft reconnaissance in about 1/3rd of all the Atlantic advisories. And almost
20 none of the Eastern North Pacific advisories. So their Dvorak analysis are very
21 important there. They also provide us the estimated 12 foot seas which is a parameter
22 in the forecast advisory coming out of the HSU. Those are generally – those are
23 generated by TAFB.

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1 **Mr. Richards:** One last question. And likewise does TAFB incorporate information that
2 your unit produces – generates in their products that they issue to marines?

3 **WIT:** Yes. They – so our official 5 day forecast basically gets translated into the high
4 seas forecast coming out of TAFB. The analysis information would appear in their
5 weather discussion. Which is not so much a forecast product as it is an overview.
6 That's a what's happening now kind of product. And similarly the forecast that would be
7 generated by the HSU would appear in there in their high seas and be the basis for the
8 warnings that appear in their off shore waters. The entirety of the National Weather
9 Service is obligated to use the tropical cyclone forecast from the National Hurricane
10 Center. So the local weather forecast office is, for example, would be basing their local
11 products on the official NHC forecast, so. So our forecast, the HSU forecast has
12 tremendous reach through various parts of the weather service. Not just TAFB.

13 **Mr. Richards:** That's all for now. Thank you.

14 **CAPT Neubauer:** Mr. Roth-Roffy.

15 **Mr. Roth-Roffy:** Good afternoon. Tom Roth-Roffy, NTSB. Just a few questions, sir.
16 Could you briefly describe the reasons why some of the models have forecasting errors
17 and why some models are better than others?

18 **WIT:** Well models have different levels of complexity to them. And a model is basically
19 an attempt to take a very complex physical system that involves thermodynamics, it
20 involves fluid, mechanics, it involves energy transfer from the ocean to the atmosphere
21 and a whole lot of physics. And various models will make different complexities of
22 assumptions about how those processes work. Models may have different resolutions.
23 And by that I mean the ability of a model to depict either a very fine scale features in the

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1 atmosphere or a poor resolution model would only be able to depict the coarser scale,
2 larger scale features that might be there. Different models will use different sources of
3 data. Certain types of observations are used in some models and not in others. The
4 method of, I mentioned data simulation earlier. Each modeling center has a different
5 technique that they will use to turn those observations into a picture of the initial state of
6 the atmosphere. And so even the initial depiction before even the model gets cranking
7 on calculation number 1 will be different because of how each model uses observations.
8 Those are a few.

9 **Mr. Roth-Roffy:** And the second part of the question, why are some models better than
10 others? Did you cover that in your first response?

11 **WIT:** Well higher resolution models all else being equal will tend to out perform poorer
12 resolution models. Models with more sophisticated physics will often, but not always
13 out perform models with simpler physics. It is often pretty complex to balance, for
14 example you can increase the resolution of a model, but if you don't have appropriate
15 data to then depict all of this detail that you're asking the model to produce, then having
16 additional resolution might not help you. But it goes to the complexity of the physics. It
17 goes to the speed of the computer that you're running on. It goes to the data that you're
18 using. It can all lead to either good forecast or poor forecast.

19 **Mr. Roth-Roffy:** And that was my next questions. Regarding the speed of the
20 computer, would you say that's a limitation of the amount of time that it takes to process
21 the inputs and generate an output from these models?

22 **WIT:** Sure. As, you know as computers have gotten faster, I mean normally the first
23 thing that happens anytime a modeling center gets a faster computer is they work to

1 increase the resolution of the model so they can cram more computations in that same
2 amount of time period. It's generally time management. We know that for that model
3 that's going to start running at 8 in the morning, you know it needs, or well actually it
4 starts more like 11 in the morning, you know it needs to finish it's run at, you know
5 within an hour, hour and a half. So as the computers get faster you now can see finer
6 and finer detail and you work on making the model faster. So now I lost track of your
7 question, I'm sorry.

8 **Mr. Roth-Roffy:** No I was just curious about the limitations of the processing of these
9 models and whether or not the horsepower of these computers that we have are
10 limitation that impact that?

11 **WIT:** Yes. So they're designed to do as much as they can given the resources that
12 they have and finish by an appropriate time.

13 **Mr. Roth-Roffy:** And can you describe the history of improvements in the U.S. at
14 computing power to process the forecast models?

15 **WIT:** Not in terms of numbers. There are – there have been, in fact I think just last
16 week there was an upgrade of the GFS for example made possible by you know a
17 computer upgrade. And they've been coming you know every few years. But I don't
18 have the numbers on teraflops or that.

19 **Mr. Roth-Roffy:** Is funding for upgrades and computer capability, has that been an
20 issue for you? Sorry I'll finish the question. Has that been a challenge for the National
21 Hurricane Center to provide the timely or rapid forecast?

22 **COUNSEL:** I'm sorry but my client's not in a position to discuss funding, sir.

23 **Mr. Roth-Roffy:** Understood.

1 **COUNSEL:** Thank you very much.

2 **Mr. Roth-Roffy:** Around the time of the Hurricane Joaquin, were there any equipment
3 problems? Any constraints on the center's ability to provide quality forecast? For
4 example a satellite, availability of satellites, aircraft or other computing systems?

5 **WIT:** Not that I recall. I don't recall any outages or issues that caused us any
6 difficulties.

7 **Mr. Roth-Roffy:** We've heard some information about other companies that take your
8 output products and develop a different product. Do you have any knowledge of these
9 sorts of things? For example the Bon Voyage system and others. You know what –
10 how you added these service providers provide to the customer.

11 **WIT:** I'm not familiar with that particular company or actually probably anybody's
12 because I'm usually pretty busy trying to get our products out. So I'm not seeing what
13 other folks are doing.

14 **Mr. Roth-Roffy:** So you don't do any type of benchmarking on the sorts of weather
15 information that's provided to mariners for example?

16 **WIT:** By others?

17 **Mr. Roth-Roffy:** In a way that you could perhaps improve roll product.

18 **WIT:** No I'm not familiar with what other people are doing. Now we have extensive
19 verification of our own products to help us improve our own products. But we don't
20 verify anybody else's. Now occasionally someone will come to us and say we've got
21 this really great something or another and then we may look into it and evaluate it. Or
22 we might become aware of something. But in general we're not out there to see what
23 private sector is providing to their customers.

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1 **Mr. Roth-Roffy:** And you mentioned during a forecast cycle the different models are
2 weighted, either equally weighted or you over weight some models. During the forecast
3 cycle do you dynamically shift the weight if you see that a particular model is behaving,
4 in this particular cycle, better than them?

5 **WIT:** It wouldn't be – yes and no. We have experimented at various times over the
6 past few years with something called the roll your own consensus. Which is an attempt
7 by the forecaster to you know look at the guidance, okay, here's model X out to sea I
8 don't believe it, let's create a consensus without that particular model. And we generally
9 found that our ability to improve upon the standard consensus models was pretty
10 limited. Last time I think we seriously did that was 3 or 4 years ago. Now that's done in
11 an informal way with every forecast cycle. Every forecast cycle we are looking at the
12 consensus whether it be an evenly weighted one or a biased corrected one. And then
13 trying to look at all of the other clues that are available to us and move from that. So
14 that is what you just described in a less formal way.

15 **Mr. Roth-Roffy:** Thank you very much. That's all I have. Captain.

16 **CAPT Neubauer:** Good afternoon Mr. Franklin. Sir, I just have couple additional
17 questions along the same lines as Mr. Roth-Roffy just asked. I'm curious how long the
18 6 hour forecasting cycle has been in place. Do you have an idea how long that's been
19 established?

20 **WIT:** I believe that goes back, certainly goes back into the 60's I would say. A long,
21 long time.

1 **CAPT Neubauer:** Sir, and my questions is, as computers become more advanced, has
2 there ever been discussion at the National Hurricane Center or the National Weather
3 Service about increasing the frequency of that forecasting cycle?

4 **WIT:** No. A number of things would have to happen for that to happen and none of
5 which I see happening anytime soon. Number one you – the radison [sic] network for
6 example is only twice a day, it's 12 hours. And the global radison [sic] network is a
7 pretty important part still of the data that goes into the numerical models now. You
8 know satellites are certainly providing much more data than they used to and that
9 happens fairly continuously. But the – all of the major global models that underpin our
10 forecast are run on a 6 hour cycle. And – now except the European model which is still
11 on a 12 hour cycle. So you know if we were going to consider going to something more
12 frequently than that there would have to be a pretty fundamental change in the way that
13 the world's modeling centers operate. And I'm not sure there's much pressure to redo a
14 forecast that may be going out to two weeks every 3 hours for example. Now that
15 doesn't stop us from issuing an advisory in between regular advisories and we do that
16 whenever we need to. It's called a special advisory. If something has change
17 significantly, maybe the storm has intensified more rapidly than we estimated 2 or 3
18 hours ago and the current forecast that's out there is obsolete or overtaken by events,
19 then we'll issue a special advisory. We can do that at any time in the forecast cycle. So
20 we do it already on an as needed basis.

21 **CAPT Neubauer:** When you issue a special advisory does that include a forecast
22 track?

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1 **WIT:** Yes. It's the same collection of products as the regular advisory. Forecast track,
2 intensity, size, full sweep of text products, full sweep of graphical products.

3 **CAPT Neubauer:** Thank you. At this time I would like to go to the parties in interest for
4 any questions. Mr. Richards.

5 **Mr. Richards:** Sorry just to clarify. When you're talking about issuing a forecast track
6 with a special advisory, is that a new forecast track or is that a reissuance of the
7 previous forecast track?

8 **WIT:** It might be one or the other. If the reason for the special advisory is that out
9 thinking about the track has changed significantly then it would be a new track. More
10 often than not though it's for to update the intensity forecast. It's pretty rare that in the
11 space of a few hours we would see a need to radically change a track forecast. But it's
12 unfortunately not all that uncommon because intensity forecasting is harder than track
13 forecasting that we have to reissue a forecast to update the intensity. So it's more
14 common for intensity.

15 **Mr. Richards:** Thank you. Thank you, Captain.

16 **CAPT Neubauer:** At this time I'll go to the parties in interest. Tote, do you have any
17 questions?

18 **Tote Inc:** No, sir.

19 **CAPT Neubauer:** ABS?

20 **ABS:** No, sir.

21 **CAPT Neubauer:** Mrs. Davidson?

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1 **Ms. Davidson:** Yes, Captain. Thank you. Sir, is there a difference, my name is Bill
2 Bennett I represent Teresa Davidson. Mr. Franklin, is there a difference between a
3 special advisory and an advisory?

4 **WIT:** Yes. A special advisory is what I was just discussing. So if we issue a – the
5 regular advisory goes out every 6 hours, 11 a.m., 11 p.m., 5 a.m., 5 p.m. If we need to
6 update that forecast in between, again generally it might be because a storm has
7 strengthened much more rapidly than we expected. Then we would issue a special
8 advisory package.

9 **Ms. Davidson:** And is that titled special advisory?

10 **WIT:** Yes. Yes, special advisory is in the header of the product.

11 **Ms. Davidson:** With respect to data collection, when does your office get notice of a
12 storm that they want to track?

13 **WIT:** We are constantly, well we're on shift now. We started our shifts on May 15th.
14 The East Pacific hurricane season starts on May 15th. We have forecasters on shift
15 from May 15th to November 30th. And TAFB by the way is there all the time even when
16 my unit is not. So it's the forecasters job to figure out when there is a system that needs
17 monitoring.

18 **Ms. Davidson:** And what source – sources are they referring to? Is it a satellite, is it
19 information from other parties? How does your office know that there is a tropical
20 depression or a tropical storm building?

21 **WIT:** That would be primarily through satellite. There are – satellite imagery and a
22 variety of satellite based observations.

1 **Ms. Davidson:** And then at what point and time would your office send a plane to do
2 some reconnaissance?

3 **WIT:** So the reconnaissance aircraft do a number of different types of missions. I think
4 when we have a disturbance that we think may be forming into a tropical cyclone we will
5 schedule what's called an invest mission. And there is a limited geographical area that
6 the aircraft have. Basically anything that's a potential threat to land that's West of about
7 52 degrees West in the Atlantic Basin, so that's a little bit East of the Lessor Antilles.
8 Once it gets within range there we will schedule an invest mission and that decision
9 would be based on what we're seeing in the satellite imagery. A plane will go out there,
10 they will fly at very low levels. They'll fly to 1000 feet or 600 feet so that they can
11 measure the winds near the surface. And that would usually be the way we would
12 determine, for systems close to land anyway, whether a tropical cyclone had formed.

13 **Ms. Davidson:** Is there a practice and procedure on how many passages a plane
14 would make?

15 **WIT:** What they generally do on an invest mission is fly a box pattern. The idea is to try
16 and identify that the system has a fully closed circulation and then it has a center of
17 circulation. So they're not doing passes through it, they're basically flying around it to
18 narrow down the area where a center might be. Once we have a well defined center
19 then the type of patterns that the airplanes fly is different and they make repeated
20 passes through the center.

21 **Ms. Davidson:** Typically when you have a well defined center is the system a tropical
22 storm or a tropical depression?

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1 **WIT:** So having a well defined center is one of the prerequisites for a system to be
2 classified as a tropical cyclone. A tropical cyclone includes depressions, storms and
3 hurricanes. That's the generic term for all three. If a system does not have a well
4 defined center then it is a disturbance of some type, but would not be a tropical cyclone.

5 **Ms. Davidson:** And how's the aircraft collecting data, the wind, the direction, etc.?

6 **WIT:** The aircraft – well in the old days when I was flying it was inertia navigation
7 systems. I am not sure precisely what advances in aircraft technology have occurred
8 since I got out of the aircraft business. I know that I am more familiar with some of the
9 other instrumentation on the plane. But that would generally not be used for this
10 particular purpose. The aircraft can measure wind speed, it can measure wind
11 direction, it can measure temperature, it can measure dew point temperature. It has
12 instruments that – a step frequency microwave radiometer that measures surface wind,
13 speed, not direction. It released dropsonde which is little instrumented packages on
14 parachutes that have a GPS chip in them. The sonde falls on the wind so it reports
15 back pressure, temperature and humidity as it falls from flight level to the surface.
16 Exactly how an aircraft measures wind though I would defer to an aircraft expert.

17 **Ms. Davidson:** And with respect to Hurricane Joaquin, or Tropical Storm Joaquin, did
18 you have any involvement?

19 **WIT:** I was supervising operations during most of that storm.

20 **Ms. Davidson:** And with respect to Joaquin that storm didn't have tropical origins,
21 right? It came out of the Canary Island?

22 **WIT:** Yes. It formed – there are a number of different kinds of disturbances which
23 tropical cyclones can form. Many of them form from tropical waves that move off the

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1 West Coast of Africa at low latitudes and develop. Tropical cyclones can form from the
2 cold fronts typically in the Gulf of Mexico or Caribbean Sea. Or they can form as
3 Joaquin did from areas of low pressure in the upper atmosphere and that was the origin
4 of Joaquin.

5 **Ms. Davidson:** I'm referring to Exhibit 197 and page 7.

6 **WIT:** Okay.

7 **Ms. Davidson:** And under Hurricane Joaquin in that first sentence it talks about it's
8 formation as tropical origins and then it says, quote which is rare for a major hurricane.
9 Do you see that?

10 **WIT:** Yes.

11 **Ms. Davidson:** And did the models that you were speaking about take into
12 consideration these sorts of anomalies?

13 **WIT:** The model is initialized with a representation of the current state of the
14 atmosphere. So it would – it would reflect as best the model and the data simulation
15 system can reflect the reality of that situation. So yes.

16 **Ms. Davidson:** Does any of the models take into consideration the origin of the
17 hurricane whether it's tropical or otherwise?

18 **WIT:** Again because the model is initialized with a current depiction of the temperature
19 field everywhere, the wind field everywhere, the humidity field everywhere again as best
20 we can measure it, so a model that would initialized with the precursor disturbance for
21 Joaquin for example would show a weak area of low pressure in the upper part of the
22 atmosphere that would more or less accurately reflect what was going on. So again the
23 answer is yes.

1 **Ms. Davidson:** Well you mentioned earlier that in your modeling it takes into
2 consideration energy absorbent, correct?

3 **WIT:** One of the physics in most of these models would be the energy exchange
4 between the ocean and the atmosphere, that's what I was talking about.

5 **Ms. Davidson:** And you will agree with me that a tropical origin hurricane the water
6 temperature is a lot warmer than if the hurricane or tropical storm was created out of the
7 Canary Islands, correct?

8 **WIT:** Well Joaquin didn't form near the Canary Islands. The originating disturbance
9 formed near the Canary Islands. Joaquin formed a week or longer later when it was
10 over, you know different water. So wherever the system evolves one of the physically
11 processes that is involved is energy transport from the ocean. In some systems it's
12 more important than others clearly.

13 **Ms. Davidson:** So the location of the formation of the storm is important for modeling?

14 **WIT:** The environment in which a storm forms and the accuracy in which that is
15 represented in a model is important, yes.

16 **Ms. Davidson:** And Joaquin formed in a location which was vastly different than the
17 majority of the hurricanes that you follow, i.e. it was not a storm that had tropical origins,
18 correct?

19 **WIT:** Umm yes. It's origin was somewhat unusual.

20 **Ms. Davidson:** Thank you very much.

21 **CAPT Neubauer:** For the record I just want to identify that Exhibit 197 is the National
22 Hurricane Center annual summary of the 2015 Atlantic season. At this time, oh I'm
23 sorry, does Herbert Engineering have any questions?

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1 **HEC:** No questions.

2 **CAPT Neubauer:** At this time I would like to take a 10 minute recess. The hearing is
3 recessed until a 4:05.

4 *The hearing recessed at 1554, 17 May 2016*

5 *The hearing was called to order at 1606, 17 May 2016*

6 **CAPT Neubauer:** The hearing is now back in session. Before we begin with a new line
7 of questioning we a couple of just follow ups from the board. Commander Denning.

8 **CDR Denning:** Good afternoon, sir. Just a couple quick follow ups. You mentioned –
9 you were talking about the track models and that they're continually improving getting
10 better and better each year. Quick question on that topic. You mentioned one of the
11 reasons was because the observations are getting quote unquote more dense was your
12 word. Does that mean simply more of the observations? If I were to look at a photo, a
13 map I would see more input? Or what does more dense mean?

14 **WIT:** Well both more in quantity and quality or type. As the number of satellites have
15 increased, now I'm really talking about going back 20 years, either a number of satellite
16 observations of the environment of tropical cyclones now that we didn't have before.
17 Looking at things like you can get winds from the motion of water vapor. You can track
18 water vapor in the environment and get winds out of that and use that information. You
19 can look at radiation of various frequencies. Or there are a number of satellites can
20 measure what we call radiances. And we've learned how to incorporate that kind of
21 information in numerical models. So – and as the resolution of the various satellites has
22 improved that's where you get more dense observations more frequent. So it's not only
23 the density but it's also the type and the quality that has improved over time. And our

1 ability to use the various types. Some of these satellite observations are not, radiation
2 for example is not your typical wind – wind observation. And it was customary in the
3 80's and 90's for example to try to turn everything into a radican and a weather balloon
4 type of observation. And so one of the things that got better was our ability to use these
5 different kinds of satellite observations in their raw form more natural form. So just
6 being able to use them more effectively increased too. So it's a combination of various
7 things including density.

8 **CDR Denning:** So do the track models rely primarily on satellite data? Or are there
9 other sensors that were used?

10 **WIT:** Oh there are all kinds of sensors. But the importance of the satellite observations
11 has really skyrocketed in the last decade. It used to be – it used to be that the radican
12 or the weather balloon network was the primary mechanism. And now it would certainly
13 be the case that satellite based observations are the primary input to these global
14 models. But there are other things too. We'll send airplanes out there to fly into the
15 environment to tropical cyclones too and release – take special soundings for example
16 in particular cases. So – and you have ocean observations. You have all kinds of
17 different observations.

18 **CDR Denning:** Can you describe the ocean observations for us in more detail?

19 **WIT:** Well there are buoy observations of temperature. We know of course that
20 hurricanes are essentially heat engines and they get their energy from the ocean. So
21 knowing what the sea surface temperature is and the depth of the warm, where it's not
22 just the sea surface temperature, but how much warm water there is below the surface
23 as well is important. Satellite altimeters for example can measure very small

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1 fluctuations in the height of the sea surface which you can relate to heat content for
2 example. That would be very important in some areas like the Gulf of Mexico which as
3 a very interesting sort of temperature. It's less important in other areas. But that would
4 be one.

5 **CDR Denning:** So the buoy operations is that solely temperature?

6 **WIT:** No. The buoys also measure pressure and temperature. And – but they're fairly
7 widely spaced so you have to be a little bit fortunate for a buoy observation for example
8 to help us decide whether a tropical wave has become a tropical depression. It would
9 have to be in the right place usually. We're using other things for that. But buoys
10 measure, you know wave height and swell and all of those things.

11 **CDR Denning:** Do you also use observations from ships that are transiting that report
12 to the National Weather Service?

13 **WIT:** Yes. They're often very important for estimating the size of the tropical cyclone.
14 Again it's more important for storms that we don't have reconnaissance aircraft flying in.
15 When a storm is close to land we have an aircraft, that's our number one data source
16 because we can pretty much direct the plane wherever we want it to go within reason.
17 And so they can get us what we need. But for those storms where we don't have
18 reconnaissance aircraft if we have a ship, you know a ship might give us as West wind
19 that would tell us that a tropical wave has closed off the circulation. So we might issue
20 advisories of the system based on a ship observation. Or it might help us establish the
21 34 knot, the tropical storm force wind radiant for example. We don't get too many ship
22 observations in the core of hurricanes.

23 **CDR Denning:** Thank you, sir. Mr. Fawcett will have some questions now.

1 **Mr. Fawcett:** Good afternoon, sir. Keith Fawcett, U.S. Coast Guard.

2 **WIT:** Afternoon.

3 **Mr. Fawcett:** So earlier in your testimony you talked about the policy of inter –
4 incremental adjustments based on the models and you also said that the models have
5 gotten better over time, is that correct?

6 **WIT:** Yes they have.

7 **Mr. Fawcett:** Have you departed at any time from those – as policy, those incremental
8 adjustments to your forecast?

9 **WIT:** As policy? Not as policy, but there are certainly occasions where you have to
10 make a fairly radical change in a forecast. When you have a situation where there's a
11 very large model spread for example, and I mean I think some of the forecast for
12 Joaquin probably exhibited that sort of after the time of interest here. But in the case of
13 Joaquin for example you have one model, the European Center model which was
14 initially, well initially it agreed with all the others that Joaquin was going to remain weak
15 and move West and Northwest and fall apart within a couple of days. But it was the first
16 for example that showed a more Southwest motion towards the Central Bahamas. It
17 was an outlier for several days. Eventually all the guidance came in line and in those
18 kinds of situations you sometimes get forced to make larger changes to a forecast than
19 you would like to when two very different eventualities get narrowed down and you
20 finally decide on one. That doesn't happen very often. Usually our changes are modest
21 from cycle to cycle.

22 **Mr. Fawcett:** So taking as an example the European model, are they in a sense pure?
23 In other words that the data that flows in to collect and build the model, are they pure

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1 and that they just use the data? Or do the people that design the model make them
2 conservative in nature? For example the European model.

3 **WIT:** The model is just a representation of certain – the basic physical equations that
4 govern atmospheric motion are the same regardless of whether it's the European
5 Center doing the implementation or the National Weather Service doing the
6 implementation. There's – there may be different levels of complexity or accuracy in
7 how some of those processes get represented in the various models and there are
8 certainly differences in how, you know which types of observations can be used as input
9 to the various models. But I can't think of anything that would inherently make one
10 model more conservative than another. Those kinds of changes might make a model
11 more accurate than another on average. But the changes in the European from cycle to
12 cycle I wouldn't say are particularly different then the changes that we would see in the
13 GFS or any of the other major ones.

14 **Mr. Fawcett:** And the reason I ask that questions is that, you know people basically
15 drive the decisions to make – the decisions to decide what inputs go into a particular
16 model, that's correct?

17 **WIT:** In terms of inputs you would be talking about how physics might get implemented
18 or which data might get input?

19 **Mr. Fawcett:** Yes. In other words the European, I mean why do we have the European
20 model? In other words we have the U.S. based models, you talked about the Navy
21 model, the Europeans have decided to construct their own model based on a variety of
22 inputs that may or may not be available to you as the National Hurricane Center.

23 **WIT:** If there are inputs, now you're talking about data I presume.

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1 **Mr. Fawcett:** Correct.

2 **WIT:** I'm not aware of any inputs they have that we're not seeing. Maybe there are
3 some. Data usually flows pretty freely from center to center. So if they have certain
4 kinds of observations that nobody else has I'm unaware of them.

5 **Mr. Fawcett:** So why would their model differ from a model that might be created by
6 the hurricane center or the Navy for example?

7 **WIT:** Well the hurricane center doesn't create models, but it would be the National
8 Centers for Environmental Prediction up in College Park. They would be different
9 because, again when you have to translate some of the physical equations that govern
10 say heat transport from the ocean to the atmosphere there's no necessarily unique way
11 to do that. There may be multiple ways of approaching that problem from a science
12 standpoint. Or there may be certain kinds of satellite observations that the ECMW, the
13 Europeans are comfortable with in putting into their model because maybe they've done
14 experiments to show that it improves their model. But those observations haven't been
15 shown to be helpful in the GFS for example. So there are a whole host of decisions that
16 would get made by people about how the model is going to be run, what data are going
17 to be use, how the data are going to be used that could all feed into the accuracy and
18 performance of the model.

19 **Mr. Fawcett:** When you describe the incremental approach to changes, would you say
20 that the National Hurricane Center takes a conservative approach to weather
21 prediction?

22 **WIT:** I would say that we try and make – that continuity from one forecast to the next is
23 a fundamental part of our forecast philosophy. Social Scientist have told us for decades

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1 that one of the key ways to get people to take action is to give them a consistent
2 message. That when people get contradictory messages it causes them to hesitate and
3 not take action. And partly for that reason, but also partly because if you look at these
4 models for any length of time you will see them from one cycle to the next swing by 3 or
5 400 miles in one direction at noon and then swing back 2 or 300 miles in the other
6 direction at 6 hours later. So we learned that we can't provide our customers with
7 consistent messaging if we react to every twist and turn in the numerical guidance. So
8 yes we think it's very important to try and provide a consistent message in our
9 forecasting. It's relatively easy to get folks attention when you introduce a threat to an
10 area. When you take the threat away and people start turning their attention to
11 something else, it's very hard to get it back again. So that's another reason why we
12 don't like to have forecast that go back and forth, windshield wiper is the term that we
13 use to describe that bad aspect of a forecast. But yes that's fundamental to how we
14 operate.

15 **Mr. Fawcett:** Is that defined in some kind of guidance or policy within your
16 organization?

17 **WIT:** It's so fundamental that I'm not even sure it's written down. In all of our outreach
18 presentations that we give to media and emergency managers we certainly teach it to
19 them in explaining how we operate. I was looking in our station duty manual last night
20 actually in anticipation of a question like this. And it's – continuity is mentioned really
21 only in passing as a reminder, it's so deeply engrained in everything that we do that it's
22 almost an unwritten rule. We do have some training materials for new forecasters that

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1 were written after I came to NHC and it's possible in some of those materials that kind
2 of instruction is there. But it's just basically what we teach when we bring somebody on.

3 **Mr. Fawcett:** So behind that message of continuity and consistency for you as a
4 forecaster hurricanes remain highly unpredictable?

5 **WIT:** I think track has gotten far more predictable than it was 10 years or 20 years ago.
6 I mentioned earlier that our average track error now is about half of what it was 10 or 15
7 years ago. So the predictability for track has improved greatly. Our average 5 day track
8 error is just a little over 200 nautical miles. I think that's a pretty good degree of
9 predictability. Now not every storm is forecast with that level of accuracy. Some far
10 more than that. But taken as a whole I think there's a great degree of predictability for
11 tropical cyclone track. There's less predictability for intensity. That remains a harder
12 problem for us. Particularly rapid intensification is very difficult for us to anticipate. So it
13 would vary depending on which parameter we're talking about.

14 **Mr. Fawcett:** Thank you, sir.

15 **CAPT Neubauer:** At this time we'll start the next line of questioning. Lieutenant
16 Comerford.

17 **LT Comerford:** Mr. Franklin, the next topic we'll focus on is the genesis of forecasting
18 of Joaquin. We've been talking about it in brief here, but we'll go a little bit more in
19 length, the depth on it. You had mentioned the 2015 North Atlantic tropical cyclone
20 season report. In your own words how would you characterize the over 2015 tropical
21 Atlantic season?

22 **WIT:** Well it was certainly below average in terms of activity. There were fewer tropical
23 storms than average, fewer hurricanes than average, fewer major hurricanes than

1 average. We have measure that we use it's called ACE, it basically accumulates the
2 square of the wind speed basically for each 6 hours of the tropical cyclones life. And by
3 that measure 2015 was only about 2/3^{rds} as active as a typical year. The basin as a
4 whole was unfavorable for tropical cyclone development in 2015 for a couple of
5 reasons. Number one there was an El Nino event ongoing in 2015. And El Nino events
6 in the Pacific tend to increase the strength of the upper level westerly winds over the
7 tropical Atlantic and upper level westerly winds in the tropical Atlantic to tear storms
8 apart and prevent tropical waves from developing into tropical cyclones. So that was
9 ongoing in the Western part of the basin. And then we also had over most of the
10 Atlantic for much of the season a very large scale sinking motion that was occurring in
11 the Atlantic. And that tends to dry out the atmosphere, it makes it hostile to the
12 development of thunderstorms and it's – you know that's the way hurricanes get their
13 energy released is through – through thunderstorms. So there were a number of
14 storms, but they almost all in 2015 encountered some sort of unfavorable conditions
15 that led them to weakening or falling apart.

16 **LT Comerford:** Can you discuss the number of Cat 3 and Cat 4 hurricanes of the 2015
17 season in relationship to other El Nino years? How did they compare for the number of
18 major hurricanes?

19 **WIT:** Well we had 2 major hurricanes in 2015 which is below the climatology of 3. I do
20 not have in front of me the statistics for other El Nino years. Certainly there's been El
21 Nino years that were more hostile than 2015 where activity was really shut down much
22 more so. In 2015 – in some El Nino years you have the upper level westerly's that just
23 blast all the way across the tropical Atlantic. In 2015 that was not quite the case. The

1 Western part of the basin, the Caribbean and the area in the vicinity of the Lessor
2 Antilles did have these upper level westerly. So you saw storms like Erika for example
3 dissipate on it's Western progression into the Caribbean. Or Danny which was I guess
4 the other major hurricane of the year other than Joaquin completely fall apart. In the
5 Eastern part of the basin though those upper level westerly's did not extend so you
6 know we had 11 storms in 2015 which is only 1 below normal. So in that sense it was
7 sort of like a half of an El Nino I guess.

8 **LT Comerford:** Specifically in relationship to Hurricane Joaquin, how did the observed
9 track compare to other storm's behaviors in an El Nino year?

10 **WIT:** I don't know the answer to that question. You know we've got folks in the office
11 who have an encyclopedic memory of every track of every storm they every worked. I
12 am not one of those people. Certainly the Southward motion of Joaquin is unusual.
13 One of the features of El Nino years though is that you often have more development in
14 the middle latitudes. In 2015 you did have high shear in the deep tropics, conditions
15 were somewhat more favorable further to the North of that including the area where
16 Joaquin formed. And when you do have mid-latitude formations, storms that form from
17 upper lows for example, and you get out of the deep tropics then you can get some
18 weird or unusual looping kinds of tracks. So without going back and refreshing my
19 memory on specific years I would say that the kind of behavior that you saw in Joaquin
20 was probably a little more typical of those kinds of seasons where the activity tends to
21 shift more Northward. Which would include many El Nino years.

1 **LT Comerford:** And El Nino year aside, how would you characterize the actual track
2 and intensity of Hurricane Joaquin for the location of genesis and the time of year that it
3 formed?

4 **WIT:** It's rare for storms to take a Southward component of motion. It's particularly rare
5 in sort of the heart of hurricane season. That sort of behavior is more common as you
6 get towards the tail end of the season in particular as the genesis areas tend to show up
7 further North. But having that Southward motion is unusual. Having a storm strengthen
8 when it's moving Southward is even more unusual. Southward moving storms rarely
9 strengthen in the way that we saw with Joaquin. Normally the kinds of conditions that
10 would lead to Southward moving storms are normally associated with higher levels of
11 vertical wind shear. They might also tend to be more associated with dryer
12 environmental air because of their location relative to the surrounding ridge that might
13 be driving them Southward. So it was unusual in many, many ways.

14 **LT Comerford:** As a supervisor for Joaquin can you discuss or explain your specific
15 roles during the actual event of Hurricane Joaquin?

16 **WIT:** Umm sure. The forecasters are making the forecast. As the supervisor I'm not
17 generally getting involved with you know where they're going to place the forecast track
18 or what intensity they're going to choose. I will on occasion get involved with that. But
19 that's pretty rare. The forecasters are the ones who are looking at the data most
20 closely, looking at the models most closely. And so they get the latitude to make the
21 forecast. If there's some sort of – if they're maybe breaking the norm in terms of
22 continuity or something like that I might get involved, but that's pretty rare. My
23 involvement in the forecast process comes in more for decisions of watches and

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1 warnings. And often in decisions about when we're going to start writing advisories on a
2 storm. When we might upgrade a storm to a hurricane or a depression to a storm,
3 some of those decisions can be sensitive and or subject to some judgement. So I'm
4 trying to ensure that similar standards get applied across the unit when those kinds of
5 decisions are being made. One other thing that happened in Joaquin that I was
6 involved with was the communication of some of the forecast uncertainties. There had
7 been a previous storm last year, Erika in which you know we were forecasting a
8 hurricane to be over or near Florida at the 5 day time period and it triggered a media
9 hype of immense proportions. Out of – definitely more than was warranted given the
10 uncertainties that were involved. And after that event we got some criticism for losing
11 the message, or not being in adequate control of the message and sort of letting the
12 media run off with this terrible threat that was coming to Florida. So one of the things
13 that we did in Joaquin after that was to introduce into the tropical cyclone discussion a
14 bulleted list of key messages. And it was an attempt to basically hand feed what we
15 thought the key points were to our media partners so they would know where to go. All
16 of that information was always in our discussions but we made it very easy to find, key
17 message 1, 2, 3, 4. So and folks actually gave us a lot of great feedback after that, that
18 boy that was really helpful. So I was writing a lot of those during Joaquin. Now in that
19 case it was mostly about potential impacts in the United States that we were trying to
20 get a hold of the message. It was sort of after the warnings that had gone out for the
21 Bahamas. But there was a lot of interest in the potential impacts of the United States,
22 so. So I play a pretty strong role in how our products get messaged. But not so much
23 in the actual forecast itself.

1 **LT Comerford:** So when you reference including forecaster uncertainty in the tropical
2 cyclone discussion, just for clarification, is that the AWEB Center TCDAT TSAT,
3 TCDAT?

4 **WIT:** Yes, the tropical cyclone discussion.

5 **LT Comerford:** Is the forecaster uncertainty publicized in any other formats?

6 **WIT:** In the forecast advisory which is that coded product there are some average
7 errors for days 4 and 5 that appear within the body of that particular message. Those
8 are just average errors. They're not situationally specific. But it's the tropical cyclone
9 discussion that really is our only place where we can express either confidence or lack
10 of confidence in a forecast.

11 **LT Comerford:** You also discussed interjecting on the forecast product on rare
12 occasions. Do you recall doing that for Hurricane Joaquin in any case?

13 **WIT:** Not specifically. I do recall working closely with the dayshift forecaster as we
14 were seeing Joaquin take tracks further to the South of our forecast for several cycles in
15 a row. And there were discussions about how far we should be moving a particular
16 forecast. But I don't believe at the end of any of those discussions that I dictated a
17 forecast. I think in each of those cases the forecaster made the decision after we had
18 talked about it. I won't say that there wasn't one, but I don't remember doing that during
19 Joaquin.

20 **LT Comerford:** And also in our previous discussion you had mentioned that you had
21 the phone conference or the meeting an hour prior to the forecast is released. And
22 typically these are brief in nature and every once in a while they extend longer. Do you
23 recall if any of these meetings for Joaquin were extended meetings?

1 **WIT:** I do not recall, but I would strongly doubt it because again what typically causes
2 those calls to go on at length is when we have a discussion about where to place U.S.
3 watches and warnings. And since that was never at issue here I strongly suspect that
4 all of those discussions were relatively brief. What would have taken the most time
5 there would have been discussion with WPC about how much rainfall to call for in the
6 Bahamas. But those discussions are rarely lengthy.

7 **LT Comerford:** In your own words could you discuss the overall challenges of
8 forecasting Joaquin's intensity?

9 **WIT:** I'm sorry, forecasting Joaquin's intensity?

10 **LT Comerford:** Yes. The intensity of the storm.

11 **WIT:** Sure. The – when there's a lot of wind shear and maybe I should define what that
12 is. Wind shear refers to a sit – wind shear refers to the difference in wind flow in the
13 lower part of the atmosphere relative to the upper part of the atmosphere. So if the
14 winds are blowing in roughly the same direction at roughly the same speed as you go
15 from the bottom of the hurricane to the top, then we say that's a low wind shear
16 environment. If there's high wind shear then either the wind speed is very different or
17 more commonly the wind direction at the top is blowing very differently than wind
18 direction at the bottom. We know that when there's a lot of wind shear that it's pretty
19 easy to predict the behavior of a tropical cyclone. The thunderstorms gets ripped off,
20 the storm becomes shallow, it tends to weaken, it tends to move with the lower layer of
21 flow. We also have a pretty good handle on things when the wind shear is very low.
22 When the wind shear is very low there's an opportunity for the storm to hold together
23 vertically if the moisture is right and the underlying sea surface is right, then you know

1 we can get lots of intensification. The – one of our biggest challenges is trying to sort
2 out what's going to happen at intermediate levels of shear. When you have the
3 thunderstorm activity and the tropical cyclone is trying to keep the storm vertically
4 coherent, wind shear is trying to tear it apart and the forecaster has to decide based on
5 the guidance that he has which of those two competing factors is going to win. And in
6 those situations the – getting the intensity forecast right and getting the track forecast
7 right really go hand and hand. If you don't get the intensity right you're probably not
8 going to get the track right because the storm is now going to be steered by a flow at a
9 different layer of the atmosphere. So that was certainly the problem in the first few
10 forecast for Joaquin where we were expecting very high levels of shear. We expected
11 that the storm was not going to handle that shear very well and basically become very
12 shallow and move off to the West and Northwest in the shallow flow. Joaquin didn't
13 cooperate with that particular line of thinking. It for whatever reason and to this day can't
14 really tell you why it did so, but that storm was particularly resistant to the wind shear.
15 Now maybe we – maybe there was less shear out there than we thought. Or perhaps
16 there was something about the dynamics of that particular storm that allowed it to resist.
17 But that was the basic challenge in trying to figure out how that storm was going to
18 respond to the shear that was being imposed on it. And that effected both the intensity
19 forecast and the track forecast.

20 **LT Comerford:** And real quick what you define as a rapid intensification event for a
21 hurricane?

22 **WIT:** The standard definition of that is a 30 knot increase of winds in 24 hours. That's
23 the standard definition of rapid intensification.

1 **LT Comerford:** Was that observed for Hurricane Joaquin?

2 **WIT:** Yes.

3 **LT Comerford:** If the rapid intensification event was forecasted, that the intensity was
4 more accurately forecasted would that have, in your opinion significantly improved the
5 forecast track, the track forecast for the National Hurricane Center?

6 **WIT:** The two forecast are tied together. The track forecast that we were making had
7 an implicit assumption of what we were expecting by way of intensity. If we had a
8 different – if we would have come to a different conclusion about the intensity we would
9 have had to forecast a different track. It would not have made any sense to forecast, for
10 example a rapidly intensifying storm moving West or Northwest into the face of upper
11 level Northwesterly winds. So yes this was definitely a case where the two forecast
12 were linked and failing to get one caused a problem for the other and getting one would
13 have helped us with the other.

14 **LT Comerford:** I would like to turn your attention to Exhibit 147. While you're getting it
15 out this will be the tropical cyclone report for Hurricane Joaquin published by the
16 National Hurricane Center. And we'll be looking at page 22.

17 **WIT:** Okay.

18 **LT Comerford:** On page 22 there's a table showing the forecasted track error for
19 Joaquin on a periodic basis. This track error is labeled in nautical miles. For the time
20 period leading up to October 1st how would you, in your own words characterize the
21 accuracy of the National Hurricane Center official forecast for Joaquin?

22 **WIT:** We must be looking at something different. The table I'm looking at on page 22 is
23 a summary of the forecast accuracy for the entire lifetime of Joaquin.

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1 **LT Comerford:** Yes. And I was – because the table is for the entire period. I was
2 wondering if you could address the accuracy leading up to October 1st. And we'll come
3 back to the table here through this line of questioning.

4 **WIT:** Oh okay. I have some numbers. The initial forecast for Joaquin had errors that
5 were much larger than normal. So for example the 3 day forecast that would have
6 verified the morning of October 1st had a track error it was 500 and some miles. Let's
7 see I have it exactly in my notes. It was 536 miles. So the 3 day forecast verifying it at
8 8 a.m. October 1st. That's an extraordinarily large area. That's really about 1 in 100
9 type of track error. The 48 hour track forecast that verified at the same time had an
10 error of 180 miles and that's something like a 90 or 95th percentile of error. So it's
11 certainly a very large error. By the time one day it was a 62 mile error, the 1 day
12 forecast was verified at 8 a.m. and that's more in line, at least close to what the average
13 was. So the earlier forecast, track forecast had errors that were much larger than
14 normal for us. The same was true with the intensity errors. The 3 day intensity error
15 that verified at that time was 80 knots too low. The 2 day forecast that verified at that
16 time was 60 knots too low. And the 1 day was 30 knots too low. So the forecast called
17 for a relatively weak system, the initial forecast called for a relatively weak system to
18 head off to the West and Northwest and this instead it moved West Southward and
19 Southward and strengthened.

20 **LT Comerford:** In the table in the exhibit, page 22 of the tropical cyclone report for
21 Hurricane Joaquin, is the European model, the EMXI model? Is that the European
22 model?

23 **WIT:** Yes.

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1 **LT Comerford:** Okay. Just confirming. The 5 day 120 hour error going through the
2 entire course of the storm was approximately 177 nautical miles roughly. How does that
3 compare to the European's model accuracy before October 1st?

4 **WIT:** The – that would – that would – that number would be an optimistic assessment
5 of the European model's performance prior to October 1st. The first two forecasts from
6 the European Center model after Joaquin became a tropical cyclone, became a Tropical
7 Depression were in line with all the others. So the first two European Center model
8 forecasts also went off to the West and Northwest. And so it had some very high errors
9 for those first couple of forecasts. Now the following day it was the first to show the
10 Southwestern motion. So from that point onward it was performing significantly better
11 than the others. But a good part of what you see in that table has to do with an
12 excellent job that the European Center did on the approach to Bermuda later in the
13 forecast period.

14 **LT Comerford:** Looking at these errors that are published in the overall time period for
15 Joaquin, would you describe the European model as still being the most accurate model
16 for this hurricane's unusual movement? Specifically for track.

17 **WIT:** For Joaquin it had – the European model had by far the best performance over
18 the lifetime of the storm. For this, you know for this particular storm. That's not always
19 the case. But it was the case for Joaquin.

20 **LT Comerford:** Now turning to intensity which model would you, in your opinion
21 provides the best accuracy for intensity forecasting?

22 **WIT:** Just like for track we don't rely on a single model for track we generally rely on a
23 consensus, because you know sometimes the European is not going to be the best

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1 model. I can recall a case for Debbie a couple of years ago where it was the worst
2 model. It was an outlier, it was the worst model. So the consensus is very important for
3 track. And it's even more important I think for intensity because we have 4, 4 intensity
4 models of two very, very different types. Two of our intensity models are what we call
5 dynamical models in the sense they are based on the equation of motion that govern
6 motions of the atmosphere. And the other two are statistical models. And they don't
7 know anything about the physics or the atmosphere but they simply look at past
8 behavior what other storms did in similar situations. So the consensus of those two
9 very different independent approaches for intensity is very, very powerful and we rely on
10 that a lot. There is no – I can't point to any one of the four main intensity models and
11 say that this is – nobody relies on any one of the 4 intensity models in the same way as
12 forecasters tend to like to look at the European Center or the GFS.

13 **LT Comerford:** Thanks, sir. Just for clarification. Are all these track error based off of
14 the best track from the post storm analysis?

15 **WIT:** Yes. After the storm we construct what's called the best track and we look at all
16 the available data and create what becomes the official history of the tropical cyclone.
17 And once that's done then all the forecast errors are computed, including our own,
18 relative to that best track.

19 **LT Comerford:** In the interest of time I'm going to bridge over to the next sub-topic
20 addressing a little bit more on some policies and how they relate to Hurricane Joaquin.
21 If you could – if I could draw your attention to Exhibit 159. While you're getting it out ----

22 **COUNSEL:** Excuse me. Could we take a break for just a couple of seconds?

23 **LT Comerford:** Yeah.

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1 **COUNSEL:** To confer, thank you.

2 **CAPT Neubauer:** Sir, the hearing will now recess and reconvene at 5 O'clock.

3 *The hearing recessed at 1653, 17 May 2016*

4 *The hearing was called to order at 1701, 17 May 2016*

5 **CAPT Neubauer:** The hearing is now back in session. Mr. Comerford can you
6 continue with the line of questioning please?

7 **LT Comerford:** Mr. Franklin where we left off we were going to visit Exhibit 159.

8 Exhibit, while you're getting it out, Exhibit 159 is a collection – is a collection of the
9 graphical forecast advisories for Hurricane Joaquin. And it includes the advis – forecast
10 advisories and the intermediate advisories. And we're going to focus on page 11 to 12.

11 Page 11 shows the graphical forecast advisory on Wednesday, September 30th of 2015
12 at 5 a.m. Eastern Daylight Savings Time – Eastern Daylight Time. This would be
13 advisory 10.

14 **WIT:** Okay, I'm there.

15 **LT Comerford:** Page 12 shows the intermediate advisory 10a. This was time stamped
16 8 a.m. Eastern Daylight Time on Wednesday, September 30th of 2015. First of all for
17 the record is the AWHIPS header for the textural product related to this forecast
18 advisory specifically the normal forecast advisory 10 that the AWHIPS header be
19 TCPAT or T-C-P-A-T? Or correction ----

20 **WIT:** TCM.

21 **LT Comerford:** TCM, correction.

22 **WIT:** TCMAT.

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1 **LT Comerford:** Yeah, okay. So TCMAT. And on page 12 just for the record is the
2 intermediate advisory the TCPAT, T-C-P-A-T?

3 **WIT:** Correct.

4 **LT Comerford:** The – on page 12 the intermediate advisory the forecasted position of
5 Hurricane Joaquin, or correction, the current information for Hurricane Joaquin as been
6 updated has the track been updated from the 5 a.m. forecast advisory on page 11?

7 **WIT:** No. The only thing that gets updated on an intermediate advisory is the current
8 position of the storm. The next forecast track would be released 3 hours after that time.

9 **LT Comerford:** And again the primary reason that this isn't – this is not updated is the
10 availability and timeliness of the models being released to the National Hurricane
11 Center?

12 **WIT:** About why we operate on a 6 hourly cycle as opposed to a 3 hour hourly cycle in
13 other words?

14 **LT Comerford:** Yes.

15 **WIT:** Yes. Now we – we don't get a new set of guidance, models every 6 hours. We
16 get new guidance, I'm sorry, we don't get new guidance every 3 hours, we get new
17 guidance every 6. We can issue a special as I've said and as you know if we feel that
18 the track that's out there is sufficiently inaccurate to warrant something sooner.

19 **LT Comerford:** What is the purpose and when is an intermediate advisory initiated?
20 When do they become part of the product schedule?

21 **WIT:** Once coastal warnings are in effect either for the U.S. or any of the other
22 countries we move to intermediate advisories.

1 **LT Comerford:** So the primary customer or primary focus of the intermediate
2 advisories is to land based persons?

3 **WIT:** Yeah, the purpose of the intermediate advisory is to provide more frequent
4 updates once watches and warning are in effect for land.

5 **LT Comerford:** Returning to a bit of your discussion on the windshield wiper effect. Do
6 you recall if this had any impact on the forecast for Hurricane Joaquin?

7 **WIT:** The philosophy sure. It played a pretty significant – significant role. We had a
8 very extreme divergence spread in the model guidance after the first two advisories.
9 Initially everything was in agreement and totally wrong. But after we got to the second
10 day we started to see a very big split in the guidance with the European model heading
11 Southwest and basically everything else continuing off to the West, not showing a threat
12 to the United States. Once you're in that situation it can be tempting to want to make a
13 decision on an outlier forecast or any one of the particular guidance models that you
14 might have. But we know from experience that if we react to an outlier model, in this
15 case that would have been the ECMWF or even if we had kind of gone all the way to
16 our right most model guidance. But the odds are pretty high that we're going to have to
17 change that forecast in another direction subsequently. Just you know having seen the
18 way these models behave over the years. So the desire to not risk moving all the way
19 to one end of the forecast guidance envelope and then perhaps having to make a
20 radical adjustment in the other direction was a very strong factor in our stepping the
21 forecast South bit by bit. You know advisory by advisory.

1 **LT Comerford:** You discussed earlier that there was one point where you had met with
2 another forecaster about how far you would shift regarding the repeated track

3 Southwest of this storm. Do you remember when that was, what day or what shift?

4 **WIT:** I can probably figure that out if you give me a moment. It would have been
5 Wednesday the 30th.

6 **LT Comerford:** Thank you. After this discussion did the practice of avoiding the
7 windshield wiper effect, was that minimized after the – as extreme in the consensus to
8 what the forecast track was in your recollection?

9 **WIT:** Can you try that again? I didn't quite get it.

10 **LT Comerford:** To rephrase the question, after that discussion do you recall if the
11 forecasters following at that time continued to avoid the windshield wiper effect in the
12 same sense before that point? Did it decrease in it's amount of impact of the official
13 forecast?

14 **WIT:** No I don't think so. We continued to make pretty incremental steps down. We
15 discussed whether we should make larger adjustments Southward. And as I recall the
16 forecaster was inclined to sort of follow sort of the typical kinds of adjustments that we
17 would make in stepping the forecasts out. We talked about making larger changes.

18 **LT Comerford:** Would you say that this practice of stepping the forecast, is it primarily
19 focused on land based customers of concerns of coastal watches?

20 **WIT:** That's an interesting question. And not one that I've really thought about very
21 much. We certainly hear about complaints or feedback, gripes, nasty tweets and the
22 like from land based customers, media in particular are not shy about going on the air
23 and telling us when they think we've done something wrong. And we don't get as much

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1 feedback directly from the marine community. It's possible that TAFB get some of that
2 feedback, but it doesn't normally come directly to us. But we really have the same
3 constraints in the handling of forecast that are entirely marine events. As we do for land
4 based events. We don't make large changes even for systems that are forecast to
5 remain entirely at sea. So I would say that there might be – there might be a little bit of,
6 you know in the back of our minds that we know we're going to hear about it more from
7 the land customers, but the philosophy doesn't appreciably change I don't believe.
8 Even for storms that are only forecasted to be at sea.

9 **LT Comerford:** So for the hurricane specialist working the forecasting would they be
10 more sensitive to that perspective during this practice for land based customers?

11 **WIT:** They might. But it would be something I think around the fringes. I mean I know
12 that when we have a storm, I mean I can remember conversations about storms that
13 are, where our 5 day point is sitting over Florida and were very near Florida and we will
14 agonize over 30 mile change in a 5 day forecast position. If it means something that's
15 going to be over the Peninsula in Florida as opposed to just off the Peninsula of Florida
16 and we would not have those kinds of conversations for a storm totally at sea. Whether
17 that – so there could be around the fringes perhaps slightly more wiggle room or room
18 to modify a forecast for storms that are not effecting land. But I think the difference
19 would be pretty small.

20 **LT Comerford:** In your opinion with that information would the tropical Atlantic
21 forecasting branch or TAFB primarily be focused on marine customers in their
22 products?

23 **WIT:** I'm sorry I lost the question.

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1 **LT Comerford:** Would TAFB, the tropical Atlantic forecast – sorry, tropical analysis
2 forecasting branch, are they primarily focused on marine customers in their products?

3 **WIT:** Yes, yes. But they would use the, in the case of a tropical cyclone forecast
4 they're bound by our forecast.

5 **LT Comerford:** So the TAFB would publish the forecasted track and intensity as it is
6 that comes from the hurricane specialist unit?

7 **WIT:** Correct. The weather – National Weather service only has one tropical cyclone
8 forecast.

9 **LT Comerford:** Thank you Mr. Franklin. I only have one other broad question. Is there
10 anything that you feel or believe could help the National Hurricane Center in it's
11 forecasters to improve forecasting on your day to day operations?

12 **WIT:** Um can you repeat the question?

13 **LT Comerford:** Sure. Is there anything that – is there anything that you feel or believe
14 could help the National Hurricane Center specifically that hurricane specialist unit in
15 helping it's forecasters to develop the tropical cyclone forecasts?

16 **WIT:** There's tons of things that could help. And it would go from improved basic
17 understanding of how tropical cyclones behave. In particular the physical problem that
18 we were dealing with in Joaquin was how was this particular tropical cyclone going to
19 respond to shear that was not too strong and not too weak but somewhere in the
20 middle. No meteorologist would ever turn down more observations. There's a lot of
21 what we do where we have to make some educated guesses. We can only estimate for
22 example the intensity of a tropical cyclone to within about 10 percent. We tell you it's a
23 100 knot hurricane it could easily be 110, it could easily be 90. That's the inherent

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1 uncertainty in our ability to estimate. Our uncertainty in estimating the size of a tropical
2 cyclone is only good, take the tropical storm force winds for example. That's probably
3 only good to within 25 percent. So we certainly could have better analysis of tropical
4 cyclones with more data. You know I'm not going to talk about prioritizing those needs
5 against all of the other needs that every other Federal agency has. But we could
6 certainly benefit from improved physical understanding how the tropical cyclones
7 worked and improved observations. We know because we've seen it over the past two
8 decades that as computers get faster and the models get better we made improvements
9 in track. And we've actually started to see now just in the past 3 or 4 years
10 improvements in intensity forecasts. We still have a long way to go to the intensity
11 forecast right. Joaquin's a real good example of how far we still have to go. But overall
12 the intensity errors are now starting to come down because of some of the efforts that
13 have been made in models like the HWARF model, which did poorly for Joaquin by the
14 way. But it has been doing much better over the past few years. So yes there are all
15 kinds of things from the modeling, from computers, to observations to basic research
16 that would help us do better.

17 **LT Comerford:** Thank you Mr. Franklin. At this time I'll turn it over to the board.

18 **CAPT Neubauer:** Mr. Franklin I have a follow up question on Exhibit 159 page 12. I
19 think it should be already open.

20 **WIT:** Oh unless that's it on the screen.

21 **CAPT Neubauer:** It is displayed on the screen.

22 **WIT:** Okay.

1 **CAPT Neubauer:** Sir, this is the intermediate advisory 10a issued at 8 a.m. on
2 September 30th for Hurricane Joaquin. My question is how would the user that the track
3 line hasn't been updated but the current information has?

4 **WIT:** The user would probably have to be aware of the fact that we issue forecast every
5 6 hours. There would be no way just from looking at this to know that the forecast was
6 issued at 5 a.m. I don't think – well a careful reader, a very careful reader would know
7 that the forecast positions that are labeled there 2 a.m. Saturday, 2 a.m. Sunday, 2 a.m.
8 Monday had not changed from the previous graphic. But it would – I think it would take
9 a fairly astute reader to figure that out.

10 **CAPT Neubauer:** Yes, sir. If the user was looking graphically the next hurricane
11 position appears to be off to the Northwest. But if they read the text the movement is
12 clearly labeled Southwest at 6 mile per hour.

13 **WIT:** And that would – that looks odd, I concede.

14 **CAPT Neubauer:** Sir. Mr. Franklin, do you know what the max rapid intensification
15 actual number was for Hurricane Joaquin for a 24 hour period? I think 30 knots is your
16 standard for a hurricane being labeled like that. But I was wondering if you know how
17 fast it actually intensified?

18 **WIT:** I can get that to you pretty quickly. The tropical cyclone report which is one of the
19 exhibits here has a table of the intensity every 6 hours. And it looks like I believe I see a
20 45 knot increase from 12Z on the 30th to 12Z on the 1st, 70 to 115 knots. At least by
21 quick eye that looks to me like it was the highest number.

22 **CAPT Neubauer:** Yes, sir. So you said 45 knots total?

23 **WIT:** Yes.

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1 **CAPT Neubauer:** Thank you. Can you give the page you just referenced, sir?

2 **WIT:** Page 11 of the tropical cyclone report for Joaquin. Table 1.

3 **CAPT Neubauer:** And that rapid intensification occurred around the 30th of September,
4 1 October time frame?

5 **WIT:** That particular period of rapid intensification, that particular 24 hour period started
6 at 1200 UTC on the 30th. But rapid intensification was already underway by that point.
7 That was just the fastest 24 hour change.

8 **CAPT Neubauer:** There was additional intensification.

9 **HEC:** Captain Neubauer.

10 **WIT:** Exhibit 147.

11 **HEC:** Thank you.

12 **CAPT Neubauer:** Are there any, before we go to the parties in interest does the board
13 members have any further questions for Mr. Franklin? Mr. Richards.

14 **Mr. Richards:** Sir, what's the difference between an intermediate advisory and a
15 special advisory package?

16 **WIT:** Intermediate advisory is a release of the public advisory only. It's not
17 accompanied by a new forecast. It is a more limited release meant to be given half way
18 through the regular advisories when coastal watches and warnings are in effect. The
19 special advisory is a issuance of every part of the advisory package, every text product,
20 every graphic that is issued when some important change to the storm needs to be
21 communicated before it's next scheduled release of the regular advisory.

22 **Mr. Richards:** Thank you. Was there a special advisory package issued for Joaquin
23 prior to October 2nd?

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1 **WIT:** I would have to look.

2 **Mr. Richards:** Do you have that information in front of you?

3 **WIT:** It appears there were none prior to 11 a.m. October 1st, which is the set of
4 advisories I have here.

5 **Mr. Richards:** Thank you. Are there other individual products aside from the
6 intermediate advisory that the National Hurricane Center, your unit, the hurricane
7 specialist unit can and do issue in between the 6 hourly forecast advisory products?

8 **WIT:** Yes. There's one other product called the tropical cyclone update which is a short
9 statement that is used, not to change a forecast, but simply to provide an update of
10 some significance in between regularly scheduled advisories. And there are a number
11 of reasons why we might send out an update. We could issue a, and they're called
12 TCU's, we might issue a TCU to upgrade a tropical storm to a hurricane for example,
13 the status of a tropical cyclone has changed. To mark a landfall, that's basically for the
14 media's benefit. Because they're always calling us when did it make landfall and how
15 strong was it. So we'll issue TCU's for that. Normally if the intensity is changing rapidly
16 it generally means that our forecast has become obsolete and in that case we generally
17 do a special advisory rather than a TCU. Another reason to issue a TCU would be to
18 announce the raising of watches and warnings by a foreign government. We can't U.S.
19 watches and warnings on a TCU but we can for international watches and warnings.

20 **Mr. Richards:** You may not be familiar with this in your position, but let me ask. Are
21 you – are you or your forecasters familiar with how – what products NOAA disseminates
22 to parties like INMARSAT for distribution on SAT-C or to the U.S. Coast Guard or high
23 frequency broadcast? Is that something you're familiar with?

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1 **WIT:** I am not and I suspect most of my forecasters are not.

2 **Mr. Richards:** Okay. So it's fair to say that those types of considerations don't factor
3 into determination of what products may be issued in between the 6 hourly forecast
4 advisories, is that a fair statement?

5 **WIT:** The only case that I can think of where that is – comes into play is the
6 requirement that, you know we can't raise U.S. watches and warnings without putting
7 out a full advisory package. And I believe the original rationale for that was that some
8 customers only got the forecast advisory, what used to be called the marine advisory.
9 And coastal watches and warnings are contained in that product. That was a policy that
10 goes back since before I came to the Hurricane Center. That's the only case that I can
11 think of off the top of my head where dissemination considerations effected what we
12 could do and what product.

13 **Mr. Richards:** Okay, thank you. Just one more question. Going back to best track
14 which you defined for Lieutenant Comerford, if you were to compare the after the fact
15 best track as determined by the National Hurricane Center and compare those positions
16 with the center positions of a storm that are issued through the forecast advisories,
17 would you expect those to be identical?

18 **WIT:** They're rarely identical. The real time positions are based on all of our real time
19 estimates, the positions, the intensity, the size, are based on information that we had up
20 to the point at which we made them. When we do the best track analysis we have the
21 luxury of knowing what came afterwards. And knowing what came afterwards often
22 colors the interpretation of the data that you had when you made the estimate to begin
23 with. So there are always changes to the final best track relative to the operational

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1 estimates. For position if you plot the operational positions they tend to be a little bit
2 jumpy particularly in cases where we don't have an aircraft there and we may have a
3 more uncertain estimate of where the storm really was. There is some smoothing that
4 goes on in the creation of the best track. There's some science reasons for not trying to
5 depict every little wobble that a hurricane might undergo in a – the best track is basically
6 a 6 hourly time series. And there's a sort of a nasty statistical thing that can happen
7 called aliasing when you try and represent too small of scale of motion in a time series.
8 And so in the best track we are trying to only show scales of motion that are
9 commencement with a 6 hourly time series. We cannot show – the storm makes a loop
10 over a 3 or 4 hour period, there's no way we can represent that in a 6 hourly best track
11 and we don't try. So they will be different.

12 **Mr. Richards:** Thank you. And one last question. This is just a clarification from
13 earlier, excuse me. You were – you brought up NCEP, National Center for Environment
14 Prediction, just to clarify, NCEP when we're talking about domestic global models these
15 are, such as GFS, these are run at NCEP not at the National Hurricane Center, is that
16 correct?

17 **WIT:** That's correct.

18 **Mr. Richards:** Thank you Captain.

19 **CAPT Neubauer:** Mr. Fawcett.

20 **Mr. Fawcett:** Mr. Franklin just a couple of follow up questions. Within in your office
21 where you work do you have any idea where either vessels are or concentrations of
22 vessels are on the high seas at any given time?

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1 **WIT:** We see ship observations plotted on our display. So if a ship is reporting an
2 observation we will see that. If a ship is not reporting weather observations then I think
3 it's extremely unlikely that any of the hurricane forecasters would know about it.

4 **Mr. Fawcett:** In your experience do you recall seeing the El Faro on your display?

5 **WIT:** I have no recollection of seeing it on the display. I'm not sure I would even know
6 it if I saw it by call sign.

7 **Mr. Fawcett:** So they use call signs, correct?

8 **WIT:** Yes. So what we see on the display would be the ship observation and then we
9 would see the four character call sign.

10 **Mr. Fawcett:** On the – during the time of Joaquin did you see any ships in close
11 proximity to the movement of the center of the eye of Joaquin?

12 **WIT:** I have no recollection of seeing any. The forecasters who worked on shift might,
13 but I don't.

14 **Mr. Fawcett:** Is it possible to get archive captures of the display of where the weather
15 models are for the reporting ships at sea?

16 **WIT:** You're talking about an archive of ship observations.

17 **Mr. Fawcett:** Correct.

18 **WIT:** The only archive of ship observations that we have would be those ships that
19 reported winds in excess of 34 knots. That is an archive that we keep and it's actually –
20 there's a table of that in the tropical cyclone report.

21 **Mr. Fawcett:** Okay. So there's no graphical product that we could advance and retard
22 to graphically see where vessels were around the time of Joaquin?

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1 **WIT:** We have – we keep – we archive a lot of data and we can replay some of it. I
2 believe the ship data is part of the archive that we keep for display purposes, apart from
3 this text archive that I just talked about. It would probably be possible to reload those
4 data and look for a particular call sign if we knew what to look for.

5 **Mr. Fawcett:** Yeah, we'll follow up on that if necessary. Just finally, my final question is
6 how, and particular for mariners using one of your products, how do you warn the
7 marine about the unpredictability of tropical cyclones?

8 **WIT:** The off shore waters of forecast that's issued by TAFB has marine hurricane
9 warnings in it. It did for Joaquin. We have on our web page a section on forecast
10 verification. It's been there for quite a while and the purpose of that page is to allow all
11 users to see what our forecast accuracy is and is not. So that's available to everyone.
12 We advertise it in most of our external engagements which are at least in my unit are
13 not primarily geared towards mariners. They're primarily geared towards the
14 emergency management community and the media. TAFB has their own outreach
15 effort that I'm not familiar with the details of. So I couldn't tell you how they attempt to
16 communicate forecast uncertainty. But certainly our verification page would be
17 available to anybody.

18 **Mr. Fawcett:** Thank you very much, sir.

19 **CAPT Neubauer:** Commander Denning.

20 **CDR Denning:** Sir, just a few follow ups.

21 **WIT:** Can I – can I elaborate on that?

22 **CAPT Neubauer:** Yes, sir.

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1 **WIT:** Just a little bit. Again it's not really directly to mariners specifically, but anytime
2 we have an opportunity to talk to users maybe the number one message that we're
3 always trying to convey is what forecast uncertainty is. I've got a slide on that
4 verification page that shows you know what percentage of the time the track error is
5 bigger than some distance. The entire distribution of our forecast error is out there. We
6 update that every year. For anybody who's making a decision we want people to know
7 what the problems with our forecast are and what the uncertainties are. So it's a major
8 part of what we do. We designed a whole product suite to deal with that question. The
9 wind speed probabilities, I mentioned it seems like days ago now, but that's to get
10 people away from looking at the forecast cone diagram that we were just looking at
11 which has a very deterministic looking forecast that says the hurricane is going to be
12 here in 3 days and 4 day and 5 days. So we developed a wind speed probability
13 product which is a graphic that shows what are the odds, of you can point to any point
14 on the map. What are the odds of having hurricane force winds at this particular spot in
15 the next 5 days or 3 days or 2 days? What are the chances you will encounter tropical
16 storm force at this particular location? It's an extremely valuable product because it
17 takes – it takes the attention away from the track forecast and explicitly considers what
18 our historical errors are and what are the odds of experiencing these conditions at what
19 could be great distances away from our forecast track. So we design products with that
20 kind of thing in mind. Again not specifically for mariners, but for all users.

21 **Mr. Fawcett:** Thank you, sir.

22 **CAPT Neubauer:** Commander Denning.

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1 **CDR Denning:** Sir, during Captain Hearn's, or during Captain Hearn's testimony earlier
2 today he mentioned a product that he uses called FTP mail. Are you familiar with that
3 particular product?

4 **WIT:** I am not.

5 **CDR Denning:** And my last question is back to Exhibit 59 if you wouldn't mind pulling
6 that back up one last time.

7 **WIT:** 59?

8 **CDR Denning:** 159. It's also on your screen.

9 **WIT:** Oh okay.

10 **CDR Denning:** So you don't have to flip to it if you don't need to. So if you wouldn't
11 mind turning to page 7 just for a different graphic than the one we've been discussing,
12 the white cone is that commonly referred to as the cone of uncertainty?

13 **WIT:** Yes. But both parts of the cone, the white part and the hatched are collectedly.
14 The white part is the 3 day forecast and the hatched part is the 5 day.

15 **CDR Denning:** So referring to that cone and it's border, there's a black border around
16 the cone. Just wanted to point that out on one slide and then we're going to refer back
17 to the one we were talking about earlier.

18 **CAPT Neubauer:** Just to clarify it was a black border around the 3 day portion of the
19 cone.

20 **CDR Denning:** Around the 3 day cone.

21 **WIT:** Correct.

22 **CDR Denning:** And then just to double back on Captain Neubauer's question earlier on
23 page 12, slide 12, he referred to the positions, and I just want to point out that the cone,

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1 the black border around the cone also appears to move in a Northwesterly direction.

2 Does that add to the uncertainty to the end user that in addition to, if you toggle

3 between page 11 and page 12 the cone itself changes, could that give the impression to

4 a user that the forecast has also changed?

5 **WIT:** I'm looking at page 11 and page 12.

6 **CDR Denning:** So 11 is advisory 10.

7 **WIT:** Yes.

8 **CDR Denning:** 12 is advisory 10a.

9 **WIT:** Yes.

10 **CDR Denning:** The cone remains consistent with the exception of after the position
11 moves the cone appears to move in the Northwesterly direction. Giving the appearance
12 that that's an updated forecast.

13 **WIT:** The cone looks the same to me except for the initial position. So I'm not quite
14 sure.

15 **CDR Denning:** That's what I'm getting at. The initial cone ----

16 **WIT:** Okay. The portion of the cone that's drawn from the advisory position.

17 **CDR Denning:** That very, very small sliver of the ----

18 **WIT:** Right.

19 **CDR Denning:** That's what I'm getting at. Doesn't that – wouldn't that be a little bit
20 more – even more misleading? Because it gives the impression that the forecast has
21 been updated even though it hasn't.

22 **CAPT Neubauer:** Sir, can you give an opinion on that?

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1 **WIT:** I think an unwary user might look at the intermediate cone and assume that
2 everything had changed. With or without that little motion of the initial point. I'm not
3 sure that changes that potential misinterpretation of it. But that's a misinterpretation
4 that's certainly possible.

5 **CDR Denning:** Thank you.

6 **CAPT Neubauer:** Mr. Richard.

7 **Mr. Richards:** Sir, are you familiar with a mariner's 1, 2, 3 rule?

8 **WIT:** Somewhat.

9 **Mr. Richards:** Okay. Is that a – does the National Hurricane Center issue a graphical
10 product based on the mariner's 1, 2, 3 rule?

11 **WIT:** It's about to discontinue that product.

12 **Mr. Richards:** Okay.

13 **WIT:** I'm sure of the exact date, I believe in June or July. A new technique is going to
14 be use to replace that. But I believe as of my speaking right now that it is still in place.

15 **Mr. Richards:** Okay. Are you aware of how, I'm trying to get a sense of perhaps what
16 the new technique is? What is provided to the user as opposed to traditional the
17 graphic for the mariner's 1, 2, 3 rule? Do you have the insight on that?

18 **WIT:** Sure I can describe the differences between the two procedures.

19 **Mr. Richards:** Briefly.

20 **WIT:** So the mariner's 1, 2, 3 rule basically involves taking the forecast area of tropical
21 storm force winds and applying a certain amount of buffer to that. 100 miles of buffer at
22 day 1, 200 miles of buffer at day 2 and 300 miles of buffer at day 3. So it highlights an
23 area that is supposed to be dangerous. And it was based on errors that were common

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1 to our forecast back in the 1990's, I think that was when the rule was developed. As
2 forecast track errors have come down over the years that area tended to overstate the
3 area that was at risk for tropical storm force winds. And so beginning next month or
4 July, again I'm not sure of the exact date TAFB is going to be using instead an area that
5 is based on the wind speed probability product that I just talked about. So we take the
6 official forecast and there are a thousand alternate tracks that are drawn about that
7 based on our historical errors and we compute the area that has, and now I'm not sure
8 I've got the detail, but I believe there are two areas that are going to be displayed. One
9 showing the 50 percent likelihood of tropical storm force winds, in other words
10 highlighting the likely area. And then a lower threshold which, if I recall is something
11 like 10 or 20 percent which is meant to display the area where tropical storm winds are
12 possible.

13 **Mr. Richards:** Is this new product intended for mariners specifically?

14 **WIT:** It's a TAFB product so yes.

15 **Mr. Richards:** Was the movement away from the product that graphically, you know
16 the mariner's 1, 2, 3 rule to this new product was that based on user feedback?

17 **WIT:** I don't know. Somebody in HUCOG [sic] would be the one to know what kind of
18 feedback they got. Sometimes we make changes based just because we know that
19 something isn't correct anymore.

20 **Mr. Richards:** Okay.

21 **WIT:** And the errors that were going into the 1,2,3 rule were too big on average. But I
22 don't know whether there was feedback on that or not.

23 **Mr. Richards:** I understand you don't ----

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1 **WIT:** I don't know if that was externally forced for internally driven, that particular
2 change.

3 **Mr. Richards:** Thank you.

4 **CAPT Neubauer:** At this time we'll go to the parties in interest. Tote do you have any
5 questions?

6 **Tote Inc:** Just a couple, sir. Mr. Franklin thank you for your testimony. Can you turn to
7 page, or Exhibit 152 in your exhibits? And it's page 30.

8 **WIT:** Okay.

9 **Tote Inc:** And this is Joaquin discussion number 13. Do you see that?

10 **WIT:** Yes, sir.

11 **Tote Inc:** And what is a discussion number? What do these – why are these
12 published?

13 **WIT:** Why is this product issued?

14 **Tote Inc:** Yes.

15 **WIT:** This is meant to provide users with information on how we came to make the
16 forecast that we came to. It is an opportunity for the forecaster to explain the rationale
17 behind the forecast, talk about his level of confidence, or lack of confidence in the
18 forecast. In fact that's really the only place, I think I said earlier, where the forecaster
19 has the opportunity to express uncertainty. It's also an opportunity for us to get any key
20 messages that we want the media to pick up on or emergency managers to pick up on.
21 To the point where a little later on in this storm we made it explicit by numbering them in
22 this particular product. It's the forecaster talking to his users.

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1 **Tote Inc:** Thank you. If you would if you would look down at around 9 lines down the
2 first paragraph and it says “note”.

3 **WIT:** Yes I see that.

4 **Tote Inc:** And could you just read that sentence please?

5 **WIT:** It says, note communication problems have delayed the public release of the Air
6 Force Reconnaissance data.

7 **Tote Inc:** And this was issued at 11 p.m. on September 30th?

8 **WIT:** Yes.

9 **Tote Inc:** Okay. Do you know anything about that?

10 **WIT:** That particular communications issue?

11 **Tote Inc:** Yes.

12 **WIT:** Not off hand. I know that in general sometimes there are issues in, well the data
13 comes from the aircraft via satellite link. They are then quality controlled by some Air
14 Force civilian folks at the Hurricane Center. And they are then transmitted out. If some
15 technical glitch arises in the outward transmission of those data then there could be a
16 delay in the posting, public posting of those observations. That happens from time to
17 time.

18 **Tote Inc:** In this particular instance do you know how long that delay would have been?

19 **WIT:** I do not. Not without researching it.

20 **Tote Inc:** Our information indicates that the vessel was receiving SAT-C weather but
21 there was a gap in the receipt of that SAT-C information for 4 hours approximately from
22 midnight to 4 a.m. Is it possible that this communication delay would have been
23 something that would have resulted in that sort of gap to help explain that?

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1 **WIT:** I don't know what kind of data goes over SAT-C, but I can tell you that the kind of
2 information that we're talking about here would be the flight level observations from the
3 reconnaissance aircraft.

4 **Tote Inc:** Okay. So but if there's a delay in information coming from the
5 reconnaissance aircraft would that necessarily result in a delay from INMARSAT
6 broadcasting the SAT-C weather to vessels?

7 **WIT:** I don't know what SAT-C is. So I can't say. As far as I know the only broadcast
8 of the reconnaissance data is – I don't know whether those data go over SAT-C. These
9 are the raw observations from the reconnaissance aircraft. They're not a product of the
10 Hurricane Center.

11 **Tote Inc:** Are you aware of any delays from your office of issuing a forecast due to
12 problems of any kind?

13 **WIT:** For Joaquin?

14 **Tote Inc:** Yes.

15 **WIT:** No I'm not.

16 **Tote Inc:** Thank you.

17 **CAPT Neubauer:** ABS?

18 **ABS:** No questions.

19 **CAPT Neubauer:** Mrs. Davidson?

20 **Ms. Davidson:** No questions.

21 **CAPT Neubauer:** Herbert Engineering?

22 **HEC:** No questions.

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1 **CAPT Neubauer:** Are there any final questions at this time? Mr. Franklin you are now
2 released as a witness at this Marine Board of Investigation. Thank you for your
3 testimony and cooperation. If I later determine that this board needs additional
4 information from you I will contact you through your counsel. If you have any questions
5 about this investigation you may contact the Marine Board Recorder, Lieutenant
6 Commander Damian Yemma. At this time do any of the PII's have any issues with the
7 testimony provided?

8 **Tote Inc:** No, sir.

9 **Ms. Davidson:** No, sir.

10 **ABS:** No, sir.

11 **HEC:** No, sir.

12 **CAPT Neubauer:** The hearing will now recess and reconvene at 9 a.m. tomorrow
13 morning.

14 *The hearing adjourned at 1753, 17 May 2016.*

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