avoid meeting a certain vessel at the bend, that sort of service by the watch supervisor will then be transmitted to the participant in vessel traffic service.

If the system is mandatory, and if the marine operator feels that he cannot, for some reason, obey the particular control advice that was given to him, he under the regulations has the privilege and option to take any action that he deems necessary for the safety of his vessel.

Initially, Mr. Chairman, such as in Houston, and such as is contemplated in New Orleans, these systems are voluntary systems, there is no mandatory requirement in these systems. Nor is there any mandatory requirement that the watch supervisor will control these vessels, as we were talking about a minute ago, to steer this way, or to steer that way. That is not contemplated in the system.

Mr. BIAGGI. There is one question, one area that I think we should get cleared away.

My experience has been that no matter what I say, after each one of the conferences that I have had with the representatives of the Coast Guard, nothing changes.

Recently the Coast Guard published an advance notice of proposed rulemaking concerning New Orleans vessel traffic service.

Can you tell the committee exactly where we are with regard to that advance notice, and when the proposed rules are expected?

Admiral FUGARO. Mr. Chairman, we issued that advance notice of proposed rulemaking, I believe on the 9th of June. We extended the deadline for comment once until—extended through to the third of September this year, and we have received quite a few comments concerning those proposed—advanced notice of proposed rulemaking.

Our present thinking at this time, Mr. Chairman, is that until such time as we make the system mandatory, there is a question as to whether or not we will have to come out with the proposed regulations, stemming from that advanced notice of proposed rulemaking.

If the system becomes voluntary, as we currently anticipate, we will not need to put out proposed rule makinguntil such time that we decide that there is a need to go mandatory under the system.

So at this time I cannot give a prognosis for when we intend to go out with proposed rulemaking.

In my statement, in attachment No. 5, concerning the New Orleans system, you will note in there, sir, at the bottom of that first page, I do refer to the fact that the system will be voluntary, and when we may issue the regulations concerning mandatory operation will depend upon our experience under a voluntary operation system.

Mr. BIAGGI. For the record, to refresh my memory, can you give me the detailed process, from the very beginning to the conclusion of the whole rulemaking and who participates?

Admiral FUGARO. Mr. Chairman, I think I would prefer, if it is agreeable with you, to submit this for the record. I think that would be a rather lengthy response, and I would have to check quite a few records to determine—as you mentioned earlier in your statement, I did take over in June in this office, and in order to adequately answer this question, I feel I would have to do a little research to answer that question.

Mr. BIAGGI. You may submit that for the record, but let me give you my thinking.

[The following was received for the record:]

VTS RULEMAKING

The Administrative Procedure Act, as it relates to VTS rulemaking, affords interested parties opportunity to review proposed actions and to submit recommendations, pro and con, during the development process. Section 104 of the PWSA requires that in preparing proposed regulations "adequate opportunity for consultation and comment to State and local governments, representatives of the marine industry, port and harbor authorities, environmental groups and other interested parties" be provided. While there is no specific requirement to hold public hearings on proposed rulemaking, it is the Coast Guard's policy to be as open as possible in the development of any regulatory package relating to vessel traffic services. We value the views of any interested party.

Consultation is accomplished by one or more of several means: through informal meetings with interested individuals or groups; through a formal industry advisory committee; and, through the process of an advance notice of proposed rulemaking (ANPRM), as was done in the case of VTS New Orleans.

Upon completion of the initial consultation process, the proposed regulations are published in the Federal Register as a Notice of Proposed Rulemaking. The Coast Guard customarily holds public hearings in connection with all proposed VTS regulations. We also allow at least a 45-day comment period.

All documents received by the Coast Guard are available for public examination in Coast Guard Headquarters. At the end of the comment period, the Coast Guard evaluates all responses and may revise the regulations in light of the comments received. If there are recommendations in the comments that the Coast Guard feels have merit, but need further consideration and additional input from the public, the Coast Guard may issue a Supplemental Notice of Proposed Rulemaking to solicit comments on the proposals not included in the Notice of Proposed Rulemaking. Again, the Coast Guard allows a 45-day comment period and all documents received are available for public examination in Coast Guard Headquarters. Another period of review, consideration and evaluation follows the comment deadline. The regulations are then published in the Federal Register as final rules.

Admiral FUGARO. Yes, sir.

Mr. BIAGGI. These thoughts are shared by many people in the industry.

The Coast Guard gets a notion that an area requires attention, rightly or wrongly, and then it proceeds to promulgate some rules, and the input from the industry is either limited or invited late so that in fact nothing really changes, and even when it is introduced, the contention is it is done more for appearance than effect.

I would like to believe that if we are going to have a process it must be meaningful, and there must be substantial participation, and participation that is to be recognized.

Now, that is not intended to mean that if industry submits something, the Coast Guard must submit itself to the industry's judgment.

What we are asking the Coast Guard to do is to give serious consideration to it, so that there can be accommodation where possible.

I have had any number of complaints from industry in various areas that the rulemaking process is perfunctory, and unilateral, and I would like you to know that the Chair does not think that is a valid process.

Of course, I would expect the Coast Guard to respond and say that it is not the fact—but obviously there is something awry in the process.

I am not satisfied as to a full democratic process in the sense that we intend it to be. That is why I asked for detailed record of the process.

As you do it, be aware where the industry comes in, at what stage of the game, has the regulation been that far developed, so that any input will have little or no effect?

Have the minds been set so that there will be resistance to any suggestion?

This is a matter of human frailty, if you will, to be sufficiently conversant with agencies, and institutional conduct, to know that it is a potential danger in consideration of rules and regulations.

Admiral FUGARO. Mr. Chairman, as I said, I would like to submit a reply for the record.

I would, however, at this time like to support you in the fact, that I agree that if the process is to be meaningful, that there must be two-way communication, and then the Coast Guard cannot operate unilaterally and hope to be meeting the needs of this two-way communication.

I would also indicate to you at this time that I have discussed the vessel traffic service, and the proposed rules which we are contemplating here today, in great detail, with both the commandant and vice commandant of the Coast Guard. Without any doubt, I can support that any process which we go through must be meaningful, and that we must consider the needs of the industry which we are regulating.

I would, without equivocation, assure you that this is the intention of the commandant, and certainly which I will follow, too.

Mr. BIAGGI. Thank you for your response.

To get back to the advance notice, can you tell me what the main substance of the comments on the advance notice were?

Admiral FUGARO. Essentially, Mr. Chairman, I think the main thrust of the comments received were that many people did not feel that the system was necessary. They were actually questioning some of the elements and components of the system as opposed to commenting upon the individual regulations which were indicated in that advance notice.

There were some very pertinent comments which were made by people concerning items such as the distance going down, I believe it was the Southwest Pass, where there should be clearance before another vessel enters the pass. There was some question about we had indicated, where a vessel must have sufficient horsepower when towing. These, of course, were rather general statements and needed to be clarified. And I would agree we do need to look at them. They were not simply specific enough.

I do have some—in my papers here some other comments which were made, and if I could just have about 30 seconds to look through them, maybe I could give you a better response to that question.

One of the complaints, Mr. Chairman, was the fact that we had based our system on old statistics and we did not consider bridge-to-bridge and operator-license requirements.

Actually, while the initial study I referred to earlier was based upon statistics back at the time of the study, analysis which was done subsequent to the bridge-to-bridge regulations indicated that there is even more favorable cost-to-benefit ratio in proceeding with the system, particularly in the New Orleans area.

As I mentioned before, there was some complaint about the components of the system. People felt that they should get into the actual planning for the hardware of the systems.

I submit that this would be rather difficult to do through a committee, and that the Coast Guard, through this analysis process, had done the best work we could in determining what specific equipment would be needed to perform the type of system which we envisioned.

Again going back to this advisory type system with surveillance being a key factor to the system, as well as communication being a key factor to the system, I think we have responded to these and will respond if and when we do put out a proposed rulemaking.

Mr. BIAGGI. Do you believe that the communications system, as proposed for the New Orleans area, is adequate, particularly in connection with the available channels for use in different sectors?

Admiral FUGARO. Mr. Chairman, yes, I do, and with your permission, sir, I have got a chart up here on the left, and I would like Commander Hickey, who is the project officer on vessel traffic services, to give you a very, very brief description, particularly at this point, of what is entailed in the system and what we envision with the communication work, with your permission, sir.

Mr. BIAGGI. Certainly.

Commander HICKEY. Mr. Chairman (referring to a display of the geographic area) in order to get the entire area of coverage on one display, we had to break the chart down. So these dashed lines will show where they connect and where it ends here. And it again starts here.

The system itself will start at the Gulf of Mexico, and the equipment that we have purchased, that we have awarded the contract for, will be delivered in June, gives us the capability to operate all the way up to mile 243 in Baton Rouge.

The communications are broken into four sectors. We will use three VHF–FM frequencies. That is channels 11, 12 and 14.

The first sector, which comes all the way up through the Passes to just before you get into the downtown New Orleans area, will be on one sector frequency.

When you get into the downtown New Orleans area, there is a change to another VHF–FM sector frequency. There will be another operator at the traffic center who will be coordinating vessel movements in that particular sector.

When you leave that area, you are in sector 3, and there is a third sector frequency there. When you get up into sector 4, we repeat the sector frequency we had in sector 2.

We designed the system from an engineering standpoint to physically separate our transceiver sites, our antennas, so that we feel that we will not have mutual interference from communications that are sent out from the antenna down in New Orleans and the area up in the vicinity of Baton Rouge.

There is sufficient geographical distance between the two so that there will not be mutual interference.

Also, in VHF–FM communications there is a "capture effect." Technically that just means that when an antenna receives a signal more than twice as powerful as another signal, the receiver will be captured.

So the only thing the receiver will hear is the strongest signal. During a silent period we may get communication from the Corps of Engineers lock up in the Algiers area, but as soon as a vessel in the vicinity of our antenna transmits to us, his signal will capture our

receiver so we will only hear him. The converse is true when we transmit from this local site down here, which will capture the receivers of all the vessels in its vicinity.

We have taken action through the Federal Communications Commission to reserve these sector frequencies for Coast Guard use in the vessel traffic service sectors. The licenses of the limited stations that are licensed to be on these frequencies at the present time will not be renewed. So there will be no new users on these frequencies. At the most, at the end of 5 years, there will be nothing except the Coast Guard and vessels participating with the Coast Guard in these sectors. Thus, we feel that we do have dedicated frequencies, and that we can adjust the "loading"—or the number of vessels that have to communicate with us—by changing the regulations or the operating manual to determine what size vessels we require to participate. We can narrow the scope of the regulations down to where we have sufficient time available in a 60-minute period to handle all the communications that we feel are necessary to get the information from the vessels to us, and to be able to turn around and take this information, convert it into something useful, and give it back out to the user. That is really the objective of the service. It cannot be a one-way system.

In addition to the four sectors, we also have surveillance of sector 2—basically the whole area from mile 89 to mile 112.

We estimate it will take about four locations, four separate camera sites to give the sector 2 operator in the traffic center the ability to actually see what is happening on the river.

Mr. BIAGGI. Is sector 2 the most highly congested area?

Commander HICKEY. Yes, sir; that is the most highly congested area. The cameras will be low-light level, which means they will have nighttime availability, and infrared illumination capability, so that they can illuminate the vessel close to them without hindering the night vision of the pilot. He will not be able to see the light.

We have a system that will be the optimum surveillance system for about 97 percent of the time. The only time it will not be effective is during periods of low visibility. When it is low visibility the traffic tends not to move.

We feel that we have designed a surveillance system that is the optimum for the area. Later we would hope to add radar surveillance to encompass the Pilottown area, including the general anchorage here. They experience a higher frequency of reduced visibility in this area, and we feel radar would be more applicable there.

That encompasses our plans for the present time.

We have no budgetary request for radar in at the present time.

Mr. BIAGGI. What happens to the radar?

Commander HICKEY. We have specified in our requirement to the contractor that we have 99.9 percent reliability; 99.9 percent reliability is provided with redundant equipment. In all sites we have redundant transceivers; we have diverse communication paths, so that if a microwave link is interrupted we have an alternate path.

We do not feel that communications or radio failure will be a failure on our part. It is possible on the vessel's part, in which case we go to dead reckoning the vessel to where he can contact us.

Mr. BIAGGI. How would you contemplate the use of radar?

Commander HICKEY. We would contemplate the use of radar in the Head of Passes, in the Pilot Town area, possibly as far north as

Venice. It would give us a 24-mile coverage from the site, both up and down river.

Mr. BIAGGI. Is all the information you get out of the systems run through a computer?

Commander HICKEY. Yes, sir, the computer is just simply a method for the operator to keep track of the information that he has.

He takes the information from the vessels on the radio, and enters it into the computer. The computer will keep track of the information for him. He will have a synthetic display upon which he can call up information that he needs for the various sectors of his operation. The computer will also generate a look ahead capability. It will be able to take the information as to the location and speed of the vessel, and predict the encounters that the vessel will have during its transit, Of course, that is the real service that we are attempting to provide, to tell the user who he may expect to encounter over the next period of time, say 15 minutes or half an hour; at what interval he will encounter them; and who they are, so that he can then arrange for safe passage on channel 13, which is the vessel bridge-to-bridge radio telephone frequency.

It is to enable the vessel operator to contact other vessels.

Mr. BIAGGI. You have radar in one area and you do not have it in other areas. How accurate would the information you receive from other areas be, as contrasted to that where you have radar?

Commander HICKEY. Well, in the television area, the information will be just about as accurate, because the operator will be able to observe what is happening, and he will have geographic reference points on the shoreline to correlate with the position of the vessel.

In the areas where we have no surveillance at all, our confidence level is lower. It is directly proportional to the information that we get from the mariner.

If he says he is at mile 73, then we enter that he is at mile 73. If he says that he is making 5 miles an hour, then we enter into the computer 5 miles an hour, until the information is verified or updated.

At any time we can call the vessel and ask him where he is.

If he now, in 15 minutes, says he is at mile 82, we enter that into the computer and we can calculate how fast he is actually moving.

Mr. BIAGGI. I get the impression that where you have television and radar, they would be more critical areas?

Commander HICKEY. That is correct. Our casualty analysis shows that it is the Pilot Town area, and the downtown New Orleans area where we feel we cannot operate without some form of surveillance.

However, we do not feel that it is that critical in the other areas that we can justify surveillance. Surveillance over long distances such as we have here is very expensive.

The microwave relay of the information is very expensive.

Mr. BIAGGI. In light of the disparity, the difference in the critical nature of the different sectors, have you contemplated the possibility of phasing in the system sector by sector?

Commander HICKEY. In effect, sir, that is what we have done. We have phased in the surveillance. We did not intend to phase in the surveillance in the sector of operations in Algiers in section 2.

The original project that we considered included surveillance. However, surveillance was separated for administrative purposes, and the

item was because we were not ready to operate the system as originally scheduled.

As far as implementing the entire system, we feel that surveillance gives us an incremental benefit, but we do have some benefit on our ability to communicate with the vessels and keep track of them on the computer.

Therefore, we have not phased in the communications part of it. We felt that we could start operations from the Gulf of Mexico to mile 243, based solely on the information that we get from the radio, and still prevent enough casualties to make it cost effective.

Mr. BIAGGI. One last question.

Does the Coast Guard contemplate engaging any new employees or advisors to inform them of the local peculiarities of an operation in these various areas?

Admiral FUGARO. Mr. Chairman, we are considering the hiring of local advisors. We are definitely considering the use of pilots for the traffic lights within the sector 2 zone at Algiers point, which the commander is pointing to now, and as we have done in other areas, we do intend to train our people before we put them as a sector watch.

And in this regard, yes, sir, we do anticipate that there will be local training and by locally qualified people.

Mr. BIAGGI. Thank you very much.

Mr. Treen.

Mr. TREEN. Thank you, Mr. Chairman.

I have not had a chance to read your full statement, Admiral, which I would like to have done prior to getting into this questioning. That would have helped me be a little more orderly in my questions, so I will probably be all over the subject because I have not had the time to correlate my questions with your statement.

You made reference to the system being voluntary. In your statement, on page 10, you say "While participation by vessels is currently voluntary in all VTS areas other than Puget Sound and Berwick Bay, the Coast Guard is considering issuing Federal regulations to require participation by vessels in every VTS."

When do you expect to move from a voluntary to a mandatory participation?

Admiral FUGARO. Mr. Treen, that will depend on each system.

Mr. TREEN. Let us talk about New Orleans.

I will base my questions on New Orleans.

Admiral FUGARO. Yes, sir. Thank you.

I would anticipate that we would have at least a 6-month period of voluntary operation and, in all probability, a lot longer than a 6-month period of operation of the systems before we considered going into a mandatory system.

We would use experience that would have a port such as Houston, which is perhaps similar to New Orleans, as opposed to San Francisco or the Puget Sound system, where we would try to achieve a high level of voluntary participation before we went into or considered going into a mandatory system.

At the current time, in Houston, we are achieving something like a 99-percent participation rate, and we are considering that once having achieved that high level that we should perhaps take the final step and make the system mandatory so that everybody participates in the system since, obviously the majority of operators are participating.

This is what we anticipate in New Orleans. There is no plan right now to require that this, a 3-month or 6-month period, that we will go mandatory in the New Orleans system, but rather wait and gain the experience and determine when we should progress further.

Mr. TREEN. Would you compare Houston and New Orleans in the types of vessels?

I am not that familiar with it, but is Houston a port that has much larger proportion of deep draft vessels, oceangoing vessels as opposed to tugs and tows?

Admiral FUGARO. I think Houston has more. I say that in the sense that while the percentage may vary, but I believe the two ports are very comparable. They both have deep draft vessels plus quite a bit of barge operations, plus quite a bit of petroleum products being shipped. I think Houston is more analogous to New Orleans than any other system we operate around the country.

Mr. TREEN. And you had 99-percent participation under voluntary participation?

Admiral FUGARO. Yes, sir.

Mr. TREEN. And you expect that you will get 99-percent participation in New Orleans as well?

Admiral FUGARO. We would hope so, yes, sir.

Mr. TREEN. Well, assuming you do, and you have 1 percent that do not cooperate. How do you manage this with 1 percent of the vessels not participating, not reporting, and you presumably then are unable to communicate?

What do you do when, as you indicate in your statement, you have to take over management of the traffic and issue directives and you have even the 1 percent not participating?

Admiral FUGARO. Where we do not have full participation, we would hope that when we got the surveillance system going, that we would be able to communicate this information by looking through the surveillance system and finding out what else is on the river system.

Mr. TREEN. What kind of system are you talking about, radar or television?

Admiral FUGARO. I am talking about television, which is primarily the system in Houston, and which we would use in sector 2 of the New Orleans system. This would provide us visual, whether or not they are voluntarily participating in the system.

We would also hope that through the communications system that we would be getting feedback from other participator vessels on those vessels nonparticipating.

Mr. TREEN. Well, I do not believe I know enough about the technology—I am certain I do not know enough about the technology.

But I wonder how a vessel that is participating will be able to visually determine that another vessel out there is not participating?

Admiral FUGARO. We would already advise the vessels based upon the system input, and based upon the automated vessel reporting system, by computer, which Commander Hickey referred to, what that vessel could anticipate.

We would assume that if the vessel ran into unanticipated traffic that was not participating in the system, which was not in the computer, that they would advise us of the fact that they passed or came upon a different vessel.

Mr. TREEN. In your proposed regulations, only when a vessel expects its estimated time of arrival at the reporting point to be more than 10 minutes off, must it then report back in.

That leaves a pretty wide margin, it seems to me, considering that you have estimated some 740 transits through the system per day.

Admiral FUGARO. Yes, sir.

Mr. TREEN. In a congested area that would be appreciably higher. If you got variations of 5, 6, or 7, 8 to 9 minutes which did not have to be reported, it seems to me that in that period of time, you are talking about a lot of vessel confrontations.

For a vessel that is participating to be able to identify vessels that are not participating, given that degree of unreported variation, presents a question to me as to the effectiveness of the system.

I am not now arguing for mandatory participation—I am just raising a question as to how you can have it voluntary, which would mean partial participation and partial nonparticipation, given some of these variables in reporting that you now have in your system.

In other words, a vessel arrives at a reporting point 9 minutes off from what it estimated before, and it has not reported back in to you because it is not a 10-minute variation. So that vessel is going to be confronting traffic that you did not anticipate, because that vessel arrived there 9 minutes off.

Admiral FUGARO. Yes, sir; I follow your question.

The requirements which were put forth in the rules, of rulemaking, were just that, proposed rules. We would hope that before we develop a final operator's manual for this system that we will have gotten sufficient input and feedback from the operators to be assured that they will come forward with a more realistic and effective system.

I appreciate what you are saying, the fact that someone who is 9 minutes late, he will be encountering traffic, or 9 minutes earlier that he will be encountering traffic that the computer might not have already given him.

We would hope that nothing would preclude operators from reporting into the system at any time. Depending upon the usefulness of the information, we would hope that the mariners would call upon the system as their positions change. There are several checkpoints which are required to check in.

Mr. TREEN. Well, I hope they can get through if they desire to participate more than required by the regulations. I am concerned about that.

One of the other persons who will be testifying before us has furnished us certain data, and we also have had counsel of this committee prepare some data which raises some questions about the amount of radio traffic one might have.

I think you have assumed, as I mentioned before, 740 daily vessel transits through the entire system, and you are going to have three VTS frequencies, and there are about 9 to 10 routine reports per vessel, so that the average vessel will have about 6 minutes to establish contact and will probably have a maximum of 36 in each port. And it seems to me a very short period of time.

We are probably going to have more transits than you anticipate here.

This is based upon a study of a couple of years ago, is it not? I am not certain. Then you have a spacing problem. This assumes that all of these reports are going to come into the VTC, spaced out in an idealistic way. The ideal of the point of management will probably not happen.

Then, of course, as you mentioned you have the competition by Corps of Engineers and other licensed users.

I understand what you are saying, Commander, about FCC agreeing not to issue licenses over 5 years. But, of course, you do have that problem in the meantime, and you do have the problem of the Corps of Engineers. And I will ask you to respond in a minute, but I will add one other concern, and that is that—the concern that in the pilothouse of a small vessel, where you have got the monitoring now of house channel, and then channels 16 and 13, and then they have to add one of these three channels, depending upon which of the three, four sectors they are in.

You have to four channels in a pilothouse, pretty noisy situation, I would imagine. They, with the requirement they report in, as I say, 9 or 10 times, the transit and maybe more if the ETA—well, no, I do not think—I do not think that increases the number if the ETA is off 10 minutes. But 9 or 10 reports by the mariner who is monitoring 4 channels raises lots of questions.

I have been all over the map on that, I would appreciate your response, particularly to the question of how we are going to manage all of these reports going into the vessel traffic centers.

Do we have enough time, considering the number of transits?

Admiral FUGARO. The placement of the communications system in the sector was based upon these various transits. As we have indicated, we will have four sectors and we will have four sector operators taking each of these messages.

You indicate that there will only be 30 seconds per report. Hopefully, 30 seconds would be an extremely long report.

We anticipate that most of the information will be transmitted in a very quick fashion. That it will not be necessary to make that long report each time that they are reporting in.

We have has this experience, as I mentioned, in other traffic services that were run. They do not have to feed in the entire information each time they are reporting in. Sometimes they just have to give their name and the fact that they are passing a certain checkpoint which could be just a matter of a couple of seconds.

Mr. TREEN. The minimum under your regulations would be named the vessel, position, type of passing, next reporting point, and ETA reporting point. Those are the five things required?

Admiral FUGARO. Yes, sir; I would anticipate that as long as the vessel is making that report, it can come across very quickly in just a matter of a few seconds.

Mr. TREEN. How about the spacing problem?

If the particular channel is in use in one of your sectors by a vessel reporting in from VTC, that precludes any other user at that particular time from using it, does it not?

Admiral FUGARO. Yes, sir.

Mr. TREEN. You can only get one report in a given period of time?

Admiral FUGARO. Yes, sir.

Mr. TREEN. In your most crowded sector, adjacent to New Orleans, I am concerned about the operator getting through in time when he passes his reported point.

Has there been a study of the kind of traffic flow study to determine whether it is realistic to expect that with 740 transits that the frequency channels will be open enough for these reports to get in reasonably on time?

Admiral FUGARO. The preliminary analysis, we do believe that there will be sufficient time to make these reports.

Again the initial operation of the system is to help us gain further experience within the particular area. In the case, again referring back to Houston, we seem to have enough time to make the communications and receive and transmit the communications if necessary.

I would anticipate that if the demand upon communication system became too great, particularly within the sector 2 of the New Orleans area, we would have to review that and determine whether we need to further split up that system or to eliminate the need for certain vessels reporting into the system.

Mr. TREEN. Well, I hope the other witnesses will address themselves to this. I think this is one of the major problem areas, as I see it.

Could you give us, on a fiscal year basis, what the costs are in participating in a program, in implementing your program as you further anticipate it?

Admiral FUGARO. Within the New Orleans system, sir?

Mr. TREEN. Yes, within the New Orleans system, sir.

Admiral FUGARO. In phase——

Mr. TREEN. Capital costs and operating costs if you have it broken down.

Admiral FUGARO. We have indicated the total initial in attachment 5, the last paragraph refers to the total initial system cost is $3.9 million, which has been funded by appropriations of $1.7 million in fiscal year 1974 and $2.2 million in fiscal year 1976.

It anticipates that the annual operating expenses for New Orleans will be $1.04 million.

Mr. TREEN. That is for what kind of system, including what kind of mechanisms?

Admiral FUGARO. That will be for the automated movement vessel system. The computerized systems with communication links that we referred to.

It will not include the television.

Mr. TREEN. It will include some radar?

Admiral FUGARO. No, sir, not at that point.

Mr. TREEN. No radar and no television?

Admiral FUGARO. That is right.

Mr. TREEN. Would radar be the next step?

Admiral FUGARO. No, sir.

The first step would be the computerized movement reports system with the communication link.

Mr. TREEN. These figures would be the same, all mandatory?

Admiral FUGARO. Yes, sir.

The second step will then be the installation of the low light level closed-circuit television within sector 2, within the New Orleans system.

Mr. TREEN. That is in three locations?

Admiral FUGARO. Well, we anticipate it will probably cover four locations within sector 2. However, we will not be putting out an end requirement for a specific number of televisions.

What we will be putting out is a bid with operating requirements. That is, we will determine what area we want of visual determination, visual detection of vessels, and then let the bidders come in and determine how they can best meet the operating requirement.

Mr. TREEN. Can you give me an estimate of that cost?

Admiral FUGARO. Yes, sir.

We are estimating that we will have about $1 million—$1 million for cost for the closed-circuit television.

Mr. TREEN. That is the outlay?

Admiral FUGARO. Yes, sir.

We are anticipating that that will be within the 1978 budget.

Mr. TREEN. All right.

Now, the radar addition?

Admiral FUGARO. The radar, currently we are planning this for fiscal year 1979, and we are anticipating that this will cost $1.5 million. That will be, as Commander Hickey mentioned, down in the Pilot-town area.

I would also like to make one qualification.

These, of course, are all Coast Guard present plans, and all of these figures will be subject to other budgetary considerations throughout future budgetary cycles.

Mr. TREEN. Now, how about additions to personnel required as you move in these new phases?

Admiral FUGARO. I do not think we will have much additional personnel requirements.

Based upon our experience in Houston, this will just be an adjunct and aid to the existing personnel in the system.

The one system operator will also have the television. Once we install the television, that will be a visual presentation that will be an adjunct and aid rather than requiring a separate operator.

Now, with the radar, of course, we will have the feedback again back to the centralized vessel traffic center, which will be up in the New Orleans area.

Mr. TREEN. And for $1 million in equipment, you expect to have television surveillance of that entire congested area in downtown New Orleans?

Admiral FUGARO. Yes, sir.

Mr. TREEN. In terms of the length of the river, what are we talking about, sir?

Admiral FUGARO. We are talking about mile 89 to mile 112, sir.

So it is 23 miles.

Mr. TREEN. With four television locations?

Admiral FUGARO. Yes, sir, that is our present estimate, that we will need four television sets.

Mr. TREEN. Do these receivers rotate so that they are sweeping?

Admiral FUGARO. Yes, sir, they sweep. Also you can change the lenses on these, to get a zoom effect, to narrow in. It will also have infrared, so that even at nighttime we will be able to see and actually pick out the names of the vessels.

Mr. TREEN. And those camera or receivers are operated from the VTC?

Admiral FUGARO. Yes, sir, with a switch the operator can move the television camera around to see wherever he wants to see.

Mr. TREEN. I have to say, aside from the question of the effectiveness of that, I am a little amazed that we can, for $1 million, get 23 miles of television surveillance.

I will be interested in seeing how that develops.

Admiral FUGARO. A lot of these estimates, Mr. Treen, are based upon the experience that we have had in other places, in installing them.

Mr. TREEN. I understand. I do not know a great deal about the technology, but I am surprised at that.

In your statement on page three, Admiral, you referred to demonstration projects in New York. You talk about a Coast Guard system known as ratan—Radio Television Aid to Navigation—and you say, "Technical problems led to a termination of this demonstration, although the concept may possibly have future application."

Just briefly, what was that? Radio television aid to navigation?

Admiral FUGARO. This was a system in which a radar transmitter was installed which showed a radar picture of the harbor. Then a television camera took a picture of this scope, and transmitted this picture over a television frequency. With the installation of a television aboard a vessel, an operator would see a centralized radarscope from the vessel traffic center.

Mr. TREEN. Now, that is not what you are talking about doing here?

Admiral FUGARO. No, sir. We are talking about visual surveillance by television, and the radar we are talking about will be centralized radar in the area where we indicated, Pilottown, which will have a range of approximately 24 miles, both up and down the river.

Mr. TREEN. Let me ask you a question about this training that you propose for your personnel.

How do you propose to do that, and for how long a tour of duty do you expect for personnel, once they have been trained, to remain in a vessel traffic system in a given area?

Admiral FUGARO. Well——

Mr. TREEN. Would the regular rotation apply?

Admiral FUGARO. Yes, sir, initially we anticipate that that will be military people, and rotated in the normal tours of duty.

We would anticipate a 3-year tour for these people, and we will of course, be rotating them.

In other words, they will not all be coming on the scene 1 day, or 1 month, or year. So there will be a movement through these operators to insure that we have qualified operators at all times, and a cadre at all times that will assist in the training.

As to initial training, as I mentioned before, we will have set up training programs in the area. Also we will call upon local, knowledgeable personnel, including pilots, to assist us in this training.

Mr. TREEN. Do you expect the personnel to actually gain firsthand experience by going on vessels, all the various types that will be——

Admiral FUGARO. That will be part of our training. We already indicated, I think, we anticipate that it is part of the ongoing training

that the people should have. Even though they are in the system, and already operating, that it will help them to go out and take a look at the other side. We intend to get them aboard vessels that are using the system, so they get a better feel of what it looks like from the other side.

Mr. TREEN. You do anticipate being on the vessels that will be using the system?

Admiral FUGARO. Yes, sir.

Mr. TREEN. Getting them trained?

Admiral FUGARO. Yes, sir.

Mr. TREEN. Let me get to a kind of basic question here.

What are we trying to do basically with this vessel traffic service.

Again, let us relate it to New Orleans. We are trying to avoid collisions, pollution from accidents, and things of that nature, is this correct?

Admiral FUGARO. Yes, sir.

Mr. TREEN. Well, again I am a little concerned, given the variance that is permitted under this system, in reporting on estimated times of arrival at different points prior to you getting into your television surveillance. That presumably would aid in the location of vessels, although there is some dispute, I think, about that.

But prior to getting to that, with having a requirement for reporting changes in ETA, reporting positions only if the variance is 10 minutes or more, that that is going to have significant effect on collisions. In my law practice I was not a maritime lawyer, but I have had enough exposure to know that collisions, especially on the river, occur as a result of events that are set in motion within a minute or 2 minutes.

So if you have got a variation here of 10 minutes, I fail to see how that is really going to help us avoid collisions, which is one of the primary purposes of this.

Could you address yourself to that?

Admiral FUGARO. Yes, sir.

Mr. TREEN. Just coming around a bend.

Admiral FUGARO. Hopefully, the type of system we are envisioning will be to advise that mariner what he can expect, on what he cannot see around a point, and give him a description of all the traffic that is coming toward him. For example, if he is proceeding up river, hopefully through this type of advice to him, will enable him to better plan how he is going to navigate around a particular bend. This will give him some insight as to what is coming down the river, and what he will be meeting at approximate time intervals.

We recognize that there will not be a fully—as I mentioned before, a positive control system, but rather provide advice, with which we hope that we will be able to better navigate.

The whole premise of our system is that the individual operator is still completely responsible for his vessel. We are not taking over the control of his vessel. We are trying to give him better advice than he has now, which in some cases is approaching a particular bend, without knowing what is coming down.

Mr. TREEN. Again, I do not know, but it seems to me most people transiting that river know that there is liable to be vessels around any bend, every bend.

Well, I hope other witnesses will address themselves to that particular point.

In that same area, do we have any studies of prior commissions, of accidents, that we feel the system, as we now envision it, would have prevented?

Admiral FUGARO. Yes, sir, we did in determining the need for a system. We reviewed the casualties, and on a case-by-case basis, we tried to make the determinations, within each of these casualties, which were preventable casualties, and which were not preventable casualties, and which casualties, which were preventable, by more passive means.

That is which could have been prevented by, say specific regulation requirements.

So this was the basis for the entire need for a system, and what we predicated the benefits on. We do not anticipate that we will prevent all the collisions that will occur in any one port area as a result of any massive traffic system. But we are hoping to achieve, that we will achieve a significant reduction in these collisions.

I think in the statement you will see what percentage we are estimating in various categories of casualties that occur.

Mr. TREEN. All right, I will study that when I get an opportunity.

Mr. BIAGGI. Captain Heyward?

Mr. HEYWARD. Admiral, in connection with a few of the points that have been raised, does the Coast Guard have any statistics which would indicate conclusions as to effective use of the bridge-to-bridge radiotelephone in casualty prevention?

Admiral FUGARO. I do not believe we have the specific study, based upon solely the bridge-to-bridge usage.

Mr. HEYWARD. Have you made any tentative conclusions as to whether that act has reduced accidents, or improved safety?

Admiral FUGARO. Our tentative conclusion is yes, that it has had a favorable effect. But to quantify that, we are not able to do that at this time.

Mr. HEYWARD. How would the coverage of participants in this system differ from the requirements now in bridge-to-bridge radiotelephone?

Admiral FUGARO. This would be an adjunct to the bridge-to-bridge.

After we have advised the mariner, he will still arrange for passage with individual vessels, hopefully having been warned ahead of time what is coming down, through the bridge-to-bridge. That is, through channel 13.

Mr. HEYWARD. You use channel 13 in the bridge-to-bridge communications?

Admlral FUGARO. Yes, sir.

Mr. HEYWARD. That is required to be initiated when a vessel is in sight?

Admiral FUGARO. Well, yes, sir. But they can do it at any time. Once they are advised about it.

Mr. HEYWARD. Once they know that another vessel is there, they can initiate?

Admiral FUGARO. Yes, sir.

Mr. HEYWARD. What kind of requirement on radio equipment would this new system put on the users that are in the system?

Admiral FUGARO. I am not quite sure.

Of course, again, initially the system will be voluntary. There will be no requirement placed upon anybody to put the equipment aboard.

Mr. HEYWARD. Change requirements to need. What will they need?

Admiral FUGARO. They will need the capacity to communicate on all four; 11, 12, 13, and 14. I believe most of the existing equipment already have this capability of switching from channel to channel.

Mr. HEYWARD. How about 16?

Admiral FUGARO. Yes, sir; and also 16.

Mr. HEYWARD. Are all these vessels required to maintain a watch on channel 16 now?

Admiral FUGARO. Thirteen.

Mr. HEYWARD. Thirteen?

Admiral FUGARO. Yes.

Commander HICKEY. Captain Heyward, the present FCC regulations exempt foreign-flag vessels from a channel 16 watch at the present time. The FCC has also exempted towing vessels under 1,600 gross tons from the channel 16 watch requirement while they are participating in a VTS, and in effect have a continuous listening watch on the VTS frequency.

Mr. HEYWARD. The VTS may take over some of their responsibilities on other channels?

Commander HICKEY. We are not taking over their responsibilities. It is just that they are being relieved of the responsibility.

We already have the responsibility, from a safety and distress standpoint. But we do not want to get in the public correspondence part.

Mr. HEYWARD. In connection with the sector channels that you refer to, you mention the fact that, in the future, licenses would not be renewed for some of the recent users of those channels.

How much congestion would there be until the time came when the present users were phased out, so to speak?

Admiral FUGARO. We are not sure of the amount of congestion. We would hope that as the Vessel Traffic Service utilizes the service there will be less and less confusion and conflict with our utilization of these channels. But it is hard to tell you exactly how much we anticipate will be interfered with our system.

Mr. HEYWARD. It is my understanding that, for instance, channel 12 will also be used in connection with lockage of vessels.

Admiral FUGARO. That is correct, by the corps.

Mr. HEYWARD. That will continue?

Admiral FUGARO. That will continue.

Mr. HEYWARD. In connection with the mandatory versus voluntary aspects, you say that the initial phase at least will be voluntary, and I understood that you do not therefore believe that it would be necessary to go forward with the proposed rules. Did I hear you correctly?

Admiral FUGARO. As long as we are only contemplating a voluntary system, the actual imposition of the rules will not be necessary.

One of the purposes of the advanced notice was to try to get some information, additional information, in respect to how we should proceed.

Mr. HEYWARD. Then how would you propose to publicize whatever you finally arrived at—through notices to mariners, or some other system outside——

Admiral FUGARO. The first step we are going to have to go through is the development and eventual promulgation of an operator's manual, which all voluntary participants will be required to have.

We will give this to them once we have the manual, and this will provide the instructions of how the individual operator will participate in the system.

Mr. HEYWARD. To be initiated next summer: Is that correct?

Admiral FUGARO. The system will be initiated next summer. We are already at work, and will be working in the development of the manual in the next coming months.

Mr. HEYWARD. When do you anticipate that the first television components will be in place, assuming that your present plans go forward, to get the funds?

Admiral FUGARO. We do not anticipate the television in the near future. It is in the 1978 budget. But by the time we put out contracts, once we get the budgetary authority, we are anticipating to be fiscal 1980 before we get to television surveillance.

Mr. HEYWARD. In effect, what you propose to do is to be operating a movement reporting system for about 3 years before you start surveillance?

Admiral FUGARO. Yes, sir.

Mr. HEYWARD. In connection with the personnel, you said "7 officers and 40 personnel." I assume these are divided into watches. What kind of watch system does this cover?

Admiral FUGARO. Well, we will have one watch supervisor, who will be an officer. Usually a lieutenant. Then we will have at least one sector operator for each of the sectors, and there will have to be some redundancy to provide for some break.

Mr. HEYWARD. The sector people are purely communications people, or do they make some sort of judgment as to what kind of critical conditions are developing?

Admiral FUGARO. To a degree they will have to be making the initial determination of hazardous conditions.

However, whether or not any control will have to be exercised, will have to be by the lieutenant on watch. These people will be trained within the automated system. They will be trained in the use of the automated system, and also trying to detect when hazardous conditions are occurring. So that they may advise the traffic supervisor.

Mr. HEYWARD. Is it fair to conclude that if local knowledge becomes critical, that it is perhaps critical only in the status of the individual who is making judgment as to what directive should be issued?

Admiral FUGARO. Local knowledge for making the decision, or any advice that he is going to give to the traffic supervisor, or to the vessel that is participating.

Mr. HEYWARD. I understand, but I was trying to find out whether you thought that that should be limited to him—whether the people simply handling the communications facilities need to know anything about local conditions, other than the fact that the river is there, and how it is convoluted.

Admiral FUGARO. No, we feel that each of the sector operators needs to have the information, too.

Mr. HEYWARD. So it would be the sector operators plus the duty officer himself?

Admiral FUGARO. It would be all the people involved in the watch, both the sector watch as well as the Vessel Traffic Center watch supervisor.

Mr. HEYWARD. In connection with your statement, you had at least considered the utilization of local knowledgeable people.

Would these be people standing watch?

Would these be hired by the Coast Guard as a watch stander, or what do you envision?

Admiral FUGARO. No, sir.

Initially, we are still anticipating the actual sector operators will be Coast Guard personnel.

What I was referring to was the utilization of these other people for training purposes.

Mr. HEYWARD. Well, they could still be Coast Guard personnel if you hired them as civilians, could they not?

What is so critical about whether they have on a uniform?

Admiral FUGARO. We are trying again to gain experience within the system to determine what should be our permanent needs.

Mr. HEYWARD. You do have civilian personnel who are expert in individual fields throughout the Coast Guard that are not rotated as are uniformed personnel.

I am just asking whether you consider that maybe one or two of those people at the vessel traffic center, might be an aid to the duty officer in performing his functions.

Admiral FUGARO. We consider these people as a training supervisor who would perhaps on a permanent basis provide for the training of the people involved in the system.

Mr. HEYWARD. You have not considered separate billets then?

Admiral FUGARO. We have not, not within the sector watch, no, sir.

Mr. HEYWARD. Mr. Treen asked you about RATAN.

Is RATAN rejected now?

Does this television setup that you contemplate, is it better, or is there still a possibility that RATAN might be used sometime in the system?

Admiral FUGARO. It could be used but, at the present time, we have no plans to reinstitute the system anywhere.

Mr. HEYWARD. Is that a cost factor for the participant?

I am just wondering, for instance, since you have a setup for the television surveillance, whether the television surveillance could be retransmitted to a television receiver onboard a vessel, if the individual wanted to buy it and put it on there?

Admiral FUGARO. Certainly it is a possibility, but we have to do an analysis to determine what the cost factors are in transmitting this information.

Another thing, of course, is the fact that these—the television system essentially, the cameras are set up from the viewpoint of sector operator, and he will be scanning with these televisions, and it might not be the type of information or usable to the particular vessel unless he knows exactly in which angle the camera is pointed.

Mr. HEYWARD. It would differ from the RATAN?

Admiral FUGARO. The RATAN was fixed.

Admiral FUGARO. The ratan was fixed.

Mr. HEYWARD. Stationary and the receivers are looking at a central radar picture?

Admiral FUGARO. That is right.

Every operator within the RATAN system was getting the same picture within the sector where he was. This would not be the case if we tried to retransmit the television pictures that we are talking about here.

Mr. BIAGGI. I would like to go back to one area, engaging local people who are familiar with the areas.

In pursuit of that, I do not think it has been sufficiently nailed down.

If I understand the Admiral, in response to a question of Captain Heyward, it is your contemplation to engage local people for supervisory training?

Admiral FUGARO. Yes, sir.

Mr. BIAGGI. Now, what that means to me is that you will have some rotating watch people who will always be in a position of being trained by the supervisory local person.

It occurs to me then that if you need supervisory local people 24 hours a day, or on all watches——

Admiral FUGARO. No, sir, we are anticipating that initially the training officer or training supervisor will be utilized to train all of the sector operators. He will not necessarily be on watch at all times.

This will be for training personnel as they come on the scene to insure that they are capable of handling the system. They will not necessarily be on watch. That is not what we are initially contemplating.

Mr. BIAGGI. Well, handling the system is one thing, but handling the system in relation to local conditions is precisely our concern at this point. And that would be the need for the local talent.

Admiral FUGARO. We are hoping, through training, to provide the people with that necessary level of local knowledge and local training which would permit them to operate within the system as we have defined it.

We do not anticipate that they will have the level of local knowledge that the pilot will have nor is it required that they are required to have that degree of knowledge that the pilot would have.

I would make an analogy to FAA traffic systems which perhaps you are more familiar with. Here again the particular operator is not necessarily a fully qualified pilot who runs the systems. He is merely someone trained within the capabilities of that particular control system. He is not a fully qualified pilot nor do we anticipate that our operators would be fully qualified nor is there a need for them to be fully qualified as a pilot.

Mr. BIAGGI. You raise an interesting point.

Would it not be better if you are a full qualified pilot?

Admiral FUGARO. I think that would be overqualification.

I do not think the man needs to have that degree of expertise.

Mr. Chairman, I have had personal experience with the vessel traffic service. I was the commanding officer of the Sault Sainte Marie base in 1971–72, and I found some benefit in the fact that these people were rotated through the vessel traffic service. These become a

rather routine function and, in a sense, if you get a highly qualified person for these jobs, you perhaps—it is not necessarily that the longer the man is on the job the better he becomes.

After awhile, the job becomes a routine function. And to avoid this, we keep rotating the men on the watch.

Mr. BIAGGI. Mr. Olney.

Mr. OLNEY. Thank you, Mr. Chairman.

I just have two questions.

Admiral Fugaro, there has been a lot of discussion about crowding of the frequencies that are going to be used in the vessel traffic service, bridge-to-bridge, and for emergency and distress.

Why are we so limited in the number of frequencies?

Why does the vessel traffic service system have to use frequencies that are already crowded or already being used by other licensed users?

Admiral FUGARO. Well, we are going to have a minimum of two dedicated channels that will be channel 11 and channel 14. Channel 12, which is the one currently used by the Corps of Engineers, I think, that is the one you are referring to.

Mr. OLNEY. That is right. That is used by the Corps.

But 11 and 14 are currently used by individuals holding 5-year licenses?

Admiral FUGARO. But essentially they will be totally dedicated to the vessel traffic service.

Mr. OLNEY. Why are you not able to get a frequency that is exclusively dedicated to vessel traffic service at this time?

Admiral FUGARO. That is because of channel frequency allocation.

Mr. OLNEY. That is the obstacle?

Admiral FUGARO. Yes, sir.

Mr. OLNEY. Does the FCC plan to dedicate more frequencies to—for marine use in the future?

Admiral FUGARO. Not at the present time.

I think these are the ones they have allocated to us. In order to achieve this, they will have to drop out or not renew the permits.

Mr. OLNEY. At some point the FCC is going to have to reallocate the frequency uses that exist today, is that correct?

Commander HICKEY. In a sense they have reallocated them to us, by not reissuing the licenses of some of the people using the channels.

Mr. OLNEY. They are not providing them with alternatives?

Commander HICKEY. Yes; they are.

Mr. OLNEY. On which frequencies?

Commander HICKEY. I do not know, sir, but they have stated that they are providing alternate frequencies.

Our primary concern is for a vessel going from one port to the next. He only has to be crystalized for channels 11, 12; and 14 in order to participate in any U.S. vessel traffic service.

Mr. OLNEY. As you may know, the FCC has come under some criticism for not giving the maritime interest enough frequencies to work on. That is the reason I raised the question.

Admiral Fugaro, I am confused as to what the policy of the Coast Guard is in relation to the role of the master when he is participating in the system.

In your statement on page 14, you state, and I am quoting:

"Keep in mind, we recognize the role of the master and pilot as the sole authority"——

In your advanced proposed notice of rulemaking in section 11, entitled "Vessel Traffic Service Directions," you have three paragraphs where you provide the vessel traffic service with authority to issue directives, specific times when vessels may enter or move in the system, and provide the VTC with authority to impose one-way traffic, and authority to establish vessel size limitations in any VTS area.

Finally, you state that the master or person in charge of the vessel participating in VTS area shall comply with each direction issued to him under the section.

I do not see how you can square that type of authority with your enunciated policy in your statement that the master and pilot are still the sole authority.

Admiral FUGARO. If you will notice on page 15 of my statement—Mr. Olney, we do at this point, and that is that while we are giving them this advice and direction, the ultimate control is still vested with the pilot, and I refer to the part of section 161.111, 33 CFR, which says, "in an emergency, any person may deviate from any section in this subpart to the extent necessary to avoid endangering persons, property, or the environment."

The idea being that the ultimate responsibility is still vested in the master.

Mr. OLNEY. I am glad you raised that point, because I think that on its face, the vessel traffic service regulations would appear to be in vesting more authority in vessel traffic service, than perhaps you intended with the other provisions, and perhaps in your next rulemaking that would be made clear.

Admiral FUGARO. I would hope so, too.

Mr. OLNEY. Thank you, Mr. Chairman.

Mr. TREEN. On that same line, this is an issue raised by one of the other witnesses we are probably going to hear from tomorrow, Admiral.

Take a situation in the absence of radar when we have a radio failure onboard a vessel, and when at the same time the vessel traffic service has taken control of the traffic. Let us say there are some large vessels that have radio failures. You are going to be directing only the vessels that you do have communications with in the system, which seems to me could present peril to both the vessels in communication, and those that are not, because of this blindness.

Have you decided how that particular problem is going to be resolved?

Is it a problem?

Admiral FUGARO. I would agree with you, under the circumstances which you have stated, that there could be a problem.

In response to your particular problem, this would hopefully be a part of the operator's manual, and how we will operate the system.

Again, I would not say that we have specifically addressed the point that you are talking about, because in order to completely be responsive to these situations, we would almost have to go into some sort of positive control system, which I do not feel we could justify.

Mr. TREEN. Radio failure is going to occur. I think we have to face that fact.

I will be interested in how you address yourself to that particular problem.

In other words, perhaps it gets back to something that I am harping on too much again, that is partial control, without having full control, perhaps making greater hazards.

This worries me a great deal.

Is there any problem with respect to communications if you are transmitting on a 50-watt output, and I think that is what you anticipate, is it not?

Admiral FUGARO. Yes, sir.

Mr. TREEN. From your tracking center in New Orleans, what effect would this have on the bridge-to-bridge communication channel within, let us say, 20 or 30 miles from the VTC?

Admiral FUGARO. While transmitting on channel 13?

Mr. TREEN. Yes, sir.

Admiral FUGARO. We would assume that there would be, if the Coast Guard was transmitting on 13; yes, sir, there could very well be interference with other transmissions on 13.

We would hope, through the utilization, the other dedicated channels, that communications by the Coast Guard on 13 would be at an absolute minimum, except we will be monitoring, listening on that channel.

Mr. TREEN. A couple of other questions.

I recognize you have not been involved with the VTS system very long. How long have you been involved with the New Orleans system, Admiral?

Admiral FUGARO. I assumed the particular office June 10.

Mr. TREEN. Did the studies initially support radar as far as the New Orleans vessel traffic service system?

Admiral FUGARO. No, sir. I do believe that the studies indicated the need for surveillance, but I do not think there was any initial justification for radar.

Our general policy with respect to radar versus television is, we feel that the positive identification aspects of television outweigh the benefits of radar, with the one benefit being that the radar can give you a more positive and exact location on an upriver, downriver basis.

At the same time, they also operate during the small percentage of the time while we are experiencing low visibility.

What we feel capability with television provides us with a more positive control than radar would.

Mr. TREEN. You are saying that there has not been any change in the position of the Coast Guard with respect to radar?

Admiral FUGARO. The initial studies did include radar, but again it was the surveillance that was the indicated factor, and not necessarily radar or television was the determination on the initial.

Mr. TREEN. Your change in position was not dictated by budgetary considerations?

Admiral FUGARO. No, sir. As a matter of fact, in reviewing the cost for both television and radar, the cost is comparable. It is not a question that we are trying to save money by putting in television.

Mr. TREEN. Who made the decision to use the computer without radar?

Use the system without radar?

Who is responsible for that decision?

Admiral FUGARO. That was part of the initial study of the system requirement, and I think, as Commander Hickey mentioned earlier, this system alone provides the greatest benefit of any of the components we are talking about, and that is to provide some automated system by which we can be giving out advice to the mariner in each location what the traffic situation in his particular area is.

To try to do this through mechanical means would be too cumbersome.

So we feel the greatest benefit would come through the computer system initially.

Mr. TREEN. Have you had discussions with the shallow draft interests about the deletion of radar from the system?

Admiral FUGARO. I know that Admiral Barrow in the Eighth District has had meetings and has discussed these systems with the interests down there, yes, sir.

Mr. TREEN. Is anybody here from the New Orleans Coast Guard District?

Admiral FUGARO. No, sir, not today.

Mr. TREEN. Do you expect to have anybody here today or tomorrow?

Admiral FUGARO. We did not anticipate to have somebody, Mr. Treen.

Mr. TREEN. Is there any particular reason why we do not have anybody?

Admiral FUGARO. No, sir, there is no reason why we do not have somebody.

Mr. TREEN. Thank you, Mr. Chairman.

Mr. BIAGGI. Thank you, gentlemen. You are excused.

The next witness is representing the American Waterways Operators, Inc., Mr. Frank T. Stegbauer, executive vice president, Southern Towing Co., accompanied by Mr. Robert Gardner, Alter Co., and Mr. Lloyd Eneix, Agri-Trans. Corp.

STATEMENT OF FRANK T. STEGBAUER, EXECUTIVE VICE PRESIDENT, SOUTHERN TOWING CO., REPRESENTING THE AMERICAN WATERWAYS OPERATORS, INC., ACCOMPANIED BY ROBERT GARDNER, ALTER CO., AND LLOYD ENEIX, AGRI-TRANS. CORP.

Mr. STEGBAUER. Good morning, gentlemen.

My name is Frank T. Stegbauer. I am executive vice president of Southern Towing Co., Memphis, Tenn. I appear here today on behalf of the American Waterways Operators, Inc., as do Mr. Gardner on my left and Mr. Eneix on my right.

I believe, following Admiral Fugaro's testimony, we could probably dispense with the formal statement. I believe you all have copies of it, and I do not see anything to be gained by reading it.

[The following was received for the record.]

STATEMENT OF FRANK T. STEGBAUER, EXECUTIVE VICE PRESIDENT, SOUTHERN TOWING CO., FOR THE AMERICAN WATERWAYS OPERATORS, INC.

Mr. Chairman: My name is Frank T. Stegbauer. I am Executive Vice President of Southern Towing Company, 1814 First National Bank Building, Memphis, Tennessee 38101.

I am speaking for The American Waterways Operators, Inc., the national trade association of the inland and coastal barge and towing industry. The industry is composed of approximately 1,800 companies operating 4,100 towboats and tugs, and 25,400 barges. The industry operates on 25,000 miles of the inland waterways system of the United States and is regarded as the safest, most fuel-efficient and lowest cost mode of transport available. A large majority of the towing and barge operators on the Lower Mississippi River in the area of New Orleans are members of The American Waterways Operators, Inc.

The members of our association are in favor of a service that would increase the safety of operations on the Lower Mississippi River and in the New Orleans Harbor area in particular. We believe that a properly designed and properly operated vessel traffic service would serve to improve safety in any port or harbor where restricted waters and high density traffic combine to create potentially unsafe conditions. A vessel traffic service will work not only to improve safety but, if it is properly designed and operated, it will assist the movement of waterborne commerce during periods of reduced visibility. This is being accomplished in European ports. Rotterdam is an excellent example.

In designing a vessel traffic service (VTS), it is incumbent upon the architects to develop data based on experience. This can only be done correctly by going to the individuals and organizations who possess that all-important experience. This certainly must have been in the minds of the Congress when the Ports and Waterways Safety Act of 1972 was enacted. The need for this type of investigative research is borne out by the wording in Sections 102 and 104 of the Act.

The U.S. Coast Guard has chosen to interpret Sections 102 and 104 in an extremely restricted manner. The members of the towing industry have expressed their dissatisfaction with the Coast Guard's reluctance to consult within the spirit and intent of the Act. However, the complaints have fallen upon unreceptive ears. The Coast Guard evidently feels that our industry has been given an adequate opportunity for input into the development of the VTS and they cannot be convinced otherwise by our association collectively, or by any of its individual members. Our association firmly believes that they have not carried out the mandates of the Act.

Our need for consultation centers on the basics of a vessel traffic service, namely, communications, surveillance, cooperation, and the absolute necessity for experienced vessel traffic control center operators. We are sure in our mind that the proposed system for the Lower Mississippi River falls far short in every one of the fore-mentioned categories.

Communications is recognized by all concerned as a vital part of the service. This requires little elaboration. Failure to communicate rapidly and clearly can endanger the vessel attempting to establish communications as well as other vessels in the vicinity. We know this to be true. The Coast Guard knows this to be true. Yet, the Coast Guard has refused to sit down with us and discuss this crucial problem to see what the safe communications minimums might be.

Radar surveillance is the real heart of a vessel traffic service. In the absence of radar surveillance, the VTS control center personnel must rely on voice communications to pinpoint locations of the large number of vessels within the confines of the vessel traffic service boundaries. Since all vessels are subject to variances in their predicted positions, constant position updating will be required. This will further burden the badly congested communications channels. Moreover, the accuracy of vessel positions at any given time will not be validated. This will lead to serious system errors in times of poor visibility and compound vessel movement reporting problems in the control center. In such cases, no information might well be better than misinformation.

We wish to quote the following observation made in respect to the proposed vessel traffic service for the Lower Mississippi River:

". . . There are too many areas where accident rates are high to attempt getting by with minimum radar/radio coverage. Full radar and communications must be provided if the high maritime accident rate in the New Orleans area is to be reduced".

Strange as it may seem, this observation was made by the Commander, Eighth Coast Guard District, New Orleans, Louisiana, in his Draft Environmental Impact Statement on the proposed Vessel Traffic Control System for the Lower Mississippi River area, on August 6, 1974.

Yet, in spite of the Coast Guard's apparent reversal from a position which coincided with that of our industry, they will not respond to our request for consultation on these fundamental issues.

The pilot or master of a vessel must not be subjected to a situation wherein he cannot place the utmost confidence in the information and guidance he receives from a vessel traffic control center. He is called upon to exercise his own experienced judgment time and time again in piloting his vessel in restricted waters. Any conflict between the plans and intentions of the pilot/master and the guidance or directions emanating from the control center will create a chaotic situation. The pilot/master must place complete trust in the control center. It is unreasonable to expect him to do so if the VTS has no radar surveillance, and the personnel manning the control center have no piloting experience. The maneuvering of tows and ocean-going ships in the Lower Mississippi River cannot be safely controlled by inexperienced personnel.

Another vital need then, is the employment of experienced and qualified personnel to man the vessel traffic control center. Again, we would appreciate an opportunity to discuss this with the U.S. Coast Guard.

The only reasonable and proper way to commence the much-needed two-way dialogue between the Coast Guard and the affected users of the VTS is through the formation of a joint industry/Coast Guard Committee. Without such a committee, we will see a continuation of the Coast Guard listening to, but not heeding the constructive comments and views of the waterways industry.

In short, Mr. Chairman, we only ask that they sit down and talk with us about the fundamentals which contribute to a good vessel traffic service. They must be made aware of the full reasoning behind our suggestions and we should be entitled to be apprised of the reasoning behind their differing views.

At a Board of Directors meeting on September 15, 1976, The American Waterways Operators, Inc. adopted the following resolution on the proposed Vessel Traffic Service for the Lower Mississippi River: Resolved:

Recognizing the necessity for the protection of life, property and the environment, and the necessity to provide for the expeditious movement of water-borne commerce, especially during periods of reduced visibility, The American Waterways Operators, Inc. will fully support the establishment of a fully implemented Vessel Traffic Service for those portions of the Lower Mississippi River, where it has been adequately determined there is a need, by measures in compliance with Sections 102(e) and 104 of the Ports and Waterways Safety Act of 1972.

AWO's definition of a fully implemented Vessel Traffic Service is as follows:

1. The VTS will open for service with constant radar surveillance of the areas encompassed by the VTS.
2. The VTS will open for service with adequate radio communications frequencies assigned to the VTS, solely for the use of vessels in the VTS and the Vessel Traffic Control Center.
3. The VTS will open for service with fully trained and qualified vessel traffic controllers.
4. The VTS will open for service with a permanent Coast Guard/Industry VTS Advisory Committee established so that a conduit is provided for the exchange of information between Coast Guard and Industry.

AWO recommends that only the following portions of the Lower Mississippi River be considered for installation of VTS:

1. From 5 miles seaward from Southwest Pass entrance buoy, and Southeast Pass entrance buoy, to mile 15 AHP—(This would control the restricted area of the Passes and the Pilottown Anchorage which becomes severely congested during periods of reduced visibility.)
2. From mile 75.0 AHP to mile 140.0—(This area encompasses the lower approaches to New Orleans Harbor, the general anchorage, and northward to include the barge fleeting areas and petro-chemical complexes above NORCO, LA.)

There appears to be little justification for such service outside these designated areas at this time, but AWO will support an expansion of the system if experience and increased shipping activity should dictate. Of paramount importance is the inclusion of the above-noted four necessary elements in the system.

Mr. Chairman, this concludes my presentation. I would be most pleased to answer any questions you or members of the Committee may have.

Thank you.

Mr. STEGBAUER. I would like to read to you a resolution that was passed last week, September the 15th, to a Board meeting in Chicago. It starts on page 4 of my statement:

Resolved: Recognizing the necessity for the protection of life, property and the environment, and the necessity to provide for the expeditious movement of waterborne commerce, especially during periods of reduced visibility, The American Waterways Operators, Inc. will fully support the establishment of a fully implemented Vessel Traffic Service for those portions of the Lower Mississippi River, where it has been adequately determined there is a need, by measures in compliance with Sections 102(e) and 104 of the Ports and Waterways Safety Act of 1972.

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There appears to be little justification for such service outside these designated areas at this time, but AWO will support an expansion of the system if experience and increased shipping activity should dictate. Of paramount importance is the inclusion of the above-noted four necessary elements in the system.

Now, I believe that in some respects I personally feel like Alice in Wonderland wandering through the maze, trying to get out through the garden wall. Some of the things that we have gone through in New Orleans, we had a group of us—had a conversation with the Coast Guard yesterday in which we were informed that the system would be voluntary. It was my impression that it would be for some time.

Today we are hearing 3 to 6 months.

Now, New Orleans vessel traffic service people had made a statement to us before that it would be voluntary for a 6-month period just merely for a shakedown. That was our understanding.

But, yesterday, we thought we had understood that it would be voluntary for some time. We do not call 6 months some time.

Mr. BIAGGI. Excuse me, Mr. Stegbauer.

I think with that the admiral responded—left me with the impression that it could be much longer; that the Coast Guard had not fixed a time.

What I will say is that, once the course of events has started, mandatory is almost inevitable. The question is, When?

Mr. STEGBAUER. I think we recognize this, Mr. Chairman.

What we do not give into is the way the system is being proposed. We recognize this

It would be difficult for the system to function on a voluntary basis because there would be too many people that would supposedly say, well, I am not going to check into it, and then the system becomes invalid.

But I did hear the 3 to 6 months somewhere this morning.

Mr. BIAGGI. You heard the 3 to 6 months, but you did not hear that as an absolute timeframe.

Mr. STEGBAUER. Well, voluntary versus mandatory is a big factor for us, because if it is voluntary, you can take it or leave it, but when it becomes mandatory it has to be fully equipped.

Now, Houston is voluntary, and the reports from our pilots, and from many other company pilots say that the information from the vessel traffic service at Houston is better than nothing. But it is not, because it does not have the surveillance, except for the television in certain strategic areas.

I understand radar surveillance is proposed sometime next year in the Galveston area, at which it is supposed to become mandatory.

The reason that the industry wanted some input into the components of the system, was because we did want to see that we get the best system that we can, one that will work, and one that will enable the controllers to pass on reliable information to the captains and pilots.

Now, I think one of the bases of success for the vessel traffic system is for the captains and the pilots to be able to put complete reliance on the system. If they cannot put complete reliance on the system, then it is not going to work.

Mr. BIAGGI. Let me interject at this point.

I imagine that the Coast Guard has the same concern.

By raising the question inferrentially, you are saying that the components that are being installed fail to measure up if they in fact——

Mr. STEGBAUER. I am saying that the computer, that the Coast Guard has been talking to us over a year, is nothing magical. It is a computer that does computations of time and motion, that is impossible to do by hand because of the volume of traffic. It does nothing more than that, and it is on a visual display.

But the age-old saying is garbage in and garbage out. If you do not have accurate information going in, then you do not have accurate information coming out.

Mr. BIAGGI. What do you propose as an alternative?

Mr. STEGBAUER. Surveillance.

Mr. BIAGGI. Well, the computer is not an alternative, from my understanding, if it is correct, it is an addition. They have not proposed surveillance yet.

They have radar, television, sonar.

Mr. STEGBAUER. We were told that there was no radar planned. I was told a matter of months ago by the eighth district that they were going to try to install one low light level television in the area of Algiers Point, period. That was the surveillance.

Mr. BIAGGI. You heard the admiral testify this morning that there is radar in this very section?

Mr. STEGBAUER. I did. That is why I feel like Alice in Wonderland.

What we heard this morning is not what we heard for the last year.

Mr. TREEN. What he said is that television is planned for the fiscal year 1978 request, and radar for 1980.

Mr. STEGBAUER. Well, we were told no later than yesterday that there was no radar planned.

Mr. TREEN. Well, the money has not been appropriated for it yet.

Mr. STEGBAUER. I understand funding, but it was not planned.

Mr. BIAGGI. Well, if that is what you were told, then there is a communication problem somewhere.

Mr. STEGBAUER. This is part of the whole problem.

What I heard today, we have had the most monumental communication breakdown between the industry and the Coast Guard that was ever involved.

Mr. BIAGGI. You were here when we opened this meeting, and I am sure you heard the remarks that were made. That is a very critical situation as far as I am concerned, with relation to the Coast Guard and industry, and we must have input and communication.

I mean total input, not just in symbolic communication. I am talking about meaningful relations, and I keep hearing about it, but I also keep getting criticisms from industry that this is not taking place in a proper and meansingful fashion.

Mr. STEGBAUER. Well, Mr. Chairman, most of the men in this room today attended a meeting after me in the eighth district in New Orleans, and I am sure in the letter that you received from Captain Woods, from the Coast Guard, he listed all the participating companies. In fact, he was short some companies. There were more companies than he listed.

But the meeting had been meaningless. The first meeting we ever had was in August of 1975, with a pseudoadvisory group, because it had been decided not to have a formal advisory group. It went under the guise of an ad hoc committee to the New Orleans Port Safety Committee.

We walked into a room of 150-some-odd people, and were given a set of regulations that said this is it, fellows. There is no change to be made. That is not what we call dialog, and this has been going on all the time, and we cannot have any input, we did make some input, none of it materially changed the first set of draft regulations that I believe were drafted sometime in the early part of 1975. They were a rough draft by the eighth district, not Washington, and they have basically changed since then.

Mr. BIAGGI. We have a quorum call. We will have a 10-minute recess, and then we will resume upon our return.

[Short recess.]

Mr. BIAGGI. The committee is called to order.

Before we start, I will state we will be required to leave the room at 1:30. There is another hearing scheduled at that time. We will continue with these hearings tomorrow morning.

Mr. Stegbauer.

Mr. STEGBAUER. Mr. Chairman, I believe we were talking about the reasons that the industry wanted some input into systems components.

One of the big differences we have with the Coast Guard is the lack of radar surveillance. We have, I think, a basic philosophic difference in the use of radar versus television.

Now, a number of us have experimented with low-light television and found that it had some definite limitations. It can be made to function according to light intensity that is available by the addition of infrared equipment.

Some of the drawbacks are it has no perspective, no depth perception at all to it. It does not have the ability to track vessels. It can only see what the eye can see or what the use of magnifying lenses, what the eye plus binoculars can see.

Therefore, you are limited to the field of vision of the lens just as you are limited to the field of vision of the eyeball. Radar does not have this drawback. It can see more area than the eyeball, and it can also allow VTC to track vessels and use it as a check against their projected or computer projected track of vessels in the VTC.

As stated before, there is some margin of error. As a matter of fact, there is quite a bit of margin of error on the computer projections.

We feel that radar is essential to check against the computer readout on the visual display.

Now, we understand and propose that television will be approximately 97 percent effective, which brings—you say, well, what about the other 3 percent, the other 3 percent cannot see in fog?

Radar can see in fog. Television cannot see in fog because your eye cannot see in fog either.

A number of us, most modern vessels are equipped with radar and other types of navigating equipment that will allow our vessels to navigate in nightfall, and we feel that the television will be of no assistance to the VTC in these periods.

I believe that New Orleans, contrary to some numbers kicked around, like 29 days out of the year, I believe that fog is rather prevalent in New Orleans, especially in the early morning hours.

Getting a little into this radar thing, the Coast Guard in their initial environmental impact statement which was out by the 8th District Coast Guard, under date of August 6, 1974, stated that radar and television would be both employed.

I quote from the drafted environmental impact statement, and by the way, we do not know whether this is the final impact statement or not—I do not believe any of our group have seen one, if there is one, so we do not know whether this has been changed or not, but this is the drafted environmental impact statement:

> The leasing of a sufficient number of radar and communications installations is planned to provide complete communications coverage of the system and radar surveillance of selected hazardous areas. Wherever possible, these installations will be constructed on existing structures on Federally owned or leased property.
>
> The purpose of the radar coverage is to provide an electronic presentation of all vessels in the Port of New Orleans to the Vessel Traffic Center. The purpose of the VHF-FM communications will be to provide direct communications between vessels within the geographic boundaries of the system and the Vessel Traffic Center. Television coverage of selected areas will allow the Vessel Traffic Center to visually monitor and identify vessel traffic.

The way we read this, really television was planned in addition to radar.

Going over a little further in the drafted environmental impact statement, where they discuss possible alternatives to the proposed VTS, one alternative is:

> Partial communications net only.

Their comment is:

> In view of the number of vessels on the river at any given moment, this was deemed unacceptable. The amount of traffic on a given radio frequency, each minute, would render the net useless. Many masters would be unable to forewarn others of their presence due to inability to "breakthrough." A fully implemented VTS would eliminate this danger.
>
> Partial radar and communications only. There are too many areas where accident rates are high to attempt getting by with minimum radar/radio coverage. Full radar and communications must be provided if the high maritime accident rate in the New Orleans area is to be reduced.

I believe that this document would show that the Coast Guard did consider quite in depth radar and the VTS system in New Orleans' VTS in January.

Mr. BIAGGI. Excuse me, Mr. Stegbauer. Let us talk about the 97-percent effectiveness, when TV can be operative. Would TV be superior during that period to radar, in the light of the congestion in the harbor?

Mr. STEGBAUER. This is where I think our basic difference is on the use of TV and radar.

Our group does not think it would, because TV cannot see around corners. Radar can see around corners. You could put a radar at one of the bends up there, and the radar will give you a picture around the bend. The TV will not—not any TV that we are familiar with.

Now, we have—a number of us have viewed the TV, and used the VTS at Morgan Point, which is the entrance to the old Buffalo Port, or what is now the Houston Ship Canal, as you come west on the Galveston Bay. It is fine—I mean, you look out there and as far as the TV camera can see, by swinging the camera, you can see just as if a man would be there, and sitting and looking both ways, but when it comes to a bend, you cannot see.

Also, when you are asking the TV, I think one of the sectors were given to be some 20 miles—23 miles, covered by four TV cameras. I think that figure is 4.6 miles per camera, which would be the camera in the middle, 2.3 miles each way, 4.6 each way, and I know of no equipment, and perhaps the Coast Guard could provide us with that, but we know of no equipment that will perform this satisfactorily.

Mr. BIAGGI. What you are talking about really is that there would be—it would be necessary to have strategic positioning of the different cameras so that if we do have a bend we should be able to see both sides of that bend.

Mr. STEGBAUER. Well, if you wanted to do that, yes. I would check that, and in order to gain proper perspective, because TV has no perspective, whereas radar does.

A number of us visited the Puget Sound VTS, where there was the radar coverage. It is very effective, you stand there and watch the blips of the ships moving down in the lane separation.

Mr. BIAGGI. Let us stay with that, because in my own experience in this area, I can see a congested harbor, where the blips may not be as distinguishable as the actual visual image of the scene, where you get that on television, and radar would not be fully reflective of the picture, so that it would be of benefit to the controller.

That is my own immediate reaction to this point.

I would say that, in other areas, other than congested areas, then radar would suffice, but in congested areas it is like being in Times Square, looking at Times Square through a camera, you know where all the cars are, and now if you look through radar, radar will tell you the number of cars there, but it would be difficult to distinguish and handle this.

That is my own immediate reaction.

Mr. STEGBAUER. Well, I think one thing that radar does that TV does not view, and I am sure, Mr. Chairman, you probably have seen radar pictures, the radar, even though this is confined to an area, we use it on all our boats, shows you, for instance, which side

a vessel is favored on the banks of the river, which TV—the TV that I have seen, will not do this, because it has no depth perception at all, and to me, to a controller, if he were able to see which side of the river side the vessel was favoring, he could be more abreast of the conditions existing of two vessels approaching each other.

Mr. BIAGGI. I am sure the Coast Guard has taken that into consideration, and I see where we have a difference of opinion.

I would appreciate it if the Coast Guard would submit to the committee their comments on this particular issue.

Admiral FUGARO. Be glad to, Mr. Chairman.

[The following was received for the record:]

A COMPARATIVE ANALYSIS OF THE ADVANTAGES AND DISADVANTAGES OF CLOSED CIRCUIT TELEVISION (CCTV) VERSUS RADAR FOR VTS USE IN A RIVER ENVIRONMENT, BASED ON EXPERIENCE IN THE OPERATION OF CCTV IN THE HOUSTON-GALVESTON VTS SINCE FEBRUARY 1975

ADVANTAGES OF CCTV

1. The primary advantages of CCTV are in actually being able to see:

(a) What the mariner sees or is trying to describe to the VTS.

(b) What a tow looks like (make up; number of barges; type of barges; how it's loaded; the size of the tow boat in relation to its tow; whether it has a bow steering unit or a tail boat; company marking, name and the barge numbers; load line and lights.)

(c) Whether a tug is aground or just pushed in for a crew change.

(d) When a two boat loses its coupling or is broken up by a passing ship, inclement weather, current, collision or grounding.

(e) Man overboard and recovery.

(f) Oil in the water, debris, a loose barge, a navigational hazard or channel obstruction.

(g) Tows swapping barges and when they've completed.

(h) A missed turn.

(i) Position of dredges and pipelines.

(j) Docking and undocking ships; heavy lifts; bunkering operations; special loadout operations; men working over the side; and, tow boats with long tows backing out into the channel.

2. Since commissioning the Houston-Galveston Vessel Traffic Service, in February 1975, there have been seven major fires on the Houston Ship Channel; three of the seven were within CCTV camera-range and the VTC was the first to report the fire to the proper agencies.

3. The CCTV requires very little operator training. The controls are few and simple and, as a result, have a low fatigue factor. The CCTV serves as a window that presents a changing scene. This helps the operator to identify with the mariner, see his environment and appreciate his problems.

ADVANTAGES OF RADAR

1. Radar Provides:

(a) Low visibility and heavy weather penetration ability; however, the torrential rains characteristic of the Houston-Galveston area can affect even radar.

(b) Surveillance of a large area.

(c) Bearing, range, course, speed, range-rate and movement of contacts.

(d) Position surveillance on aids to navigation.

(e) Capability of tracking weather fronts.

(f) Ability to effect intercepts, either vessel to vessel or vessel to terrestial points.

(g) Ability to compute the set and drift of a disabled tow or ship and determine the probable point of grounding.

DISADVANTAGES OF TELEVISION IN VTS

(a) Cannot see effectively long distances.

(b) Reduced capability during darkness, even using infrared illumination.

(c) During periods of fog or heavy rain, a total loss of capability is experienced.

(d) Very directional in nature.

(e) Low accuracy in vessel speed/direction detemination.

DISADVANTAGES OF RADAR IN VTS

(*a*) Radar is a time study and requires a series of marks to develop a surface picture.
(*b*) Radar is physically demanding on the operator, requiring manipulation to obtain the desired picture. Resultant fatigue and error factor is considerable.
(*c*) With every scale shift the time slot development procedure must start again.
(*d*) Small boats with radar reflectors can appear as large contacts; tows with hull-down barges can appear as boats.
(*e*) It is impossible to accurately determine size, type, owner markings or other characteristics important in traffic management.
(*f*) It takes many hours to train an effective operator.
(*g*) The geographic limitation of the area makes the radar useless for the higher scales. For example, the intracoastal waterway would appear as 1/32 of an inch on the sixteen mile scale. This can, however, be overcome with an offset feature on a lower scale, but then disadvantage (*c*) becomes the problem.

CONCLUSION

From a VTS point of view, considering that vessel traffic will be confined to the limits of a narrow channel, CCTV is preferable to radar because:
(*a*) Target (type) identification is immediate with CCTV.
(*b*) No target interpretation is required.
(*c*) Operator fatigue is less.
(*d*) Operator functions are significantly reduced.
(*e*) Operator interpretation error is greatly reduced with CCTV.
(*f*) Background clutter and adjacent land masses have no significant effect.
(*g*) Other factors affecting channel traffic such as fires on landside; oil spills; fog; overhanging booms on ships; vessels docking or undocking; and vessels bunkering or conducting heavy lifts are all visible on CCTV and not on radar.
(*h*) Most any visible problem can be detected on CCTV including flag and distress signals.

Mr. STEGBAUER. Also, one cannot help but wonder where you have limited surveillance, and this is one of the reasons why AWO was selected to remedy that, possibly, two sections of the proposed area be implemented, at this time.

Now, we could have the finest vessel traffic control system, rather than spending money for areas, so-called noncritical areas, we just have a communication network.

One then begins to wonder if maybe we have not got the cart before the horse, maybe we should have—if these areas are agreed to be critical, and we certainly agree with the Coast Guard on those two areas, that the radar should not be down, and certainly, in our opinion, the system should never be mandatory without full implementation, radar and the whole bit.

Now, in regard to the other critical areas, one must ask what is so much better with a communication network than rigid, enforced compliance with the bridge-to-bridge communication act which is not being done.

We have been to the Coast Guard and FCC for years, and asked for a cleanup of chit-chat, if you may, on channel 13, and confine it to what it is designated for, the exchange of navigation information, and we have gotten no relief from either agency.

This is one of the problems with 13, so crowded, particularly in the New Orleans area, that its usefulness is seriously hampered. We need cleanup on this area, and if we got cleanup plus rigid enforcement of the use of 13, we say, why even have the communication network in the noncritical areas, what is better about the communication center than normal bridge-to-bridge communication.

The statement was made by the Coast Guard that the industry was relieved from channel 16. This is what we had hoped for, but there was a catch in the FTC order. The catch was you are only relieved from channel 16 if you monitor a so-called house frequency.

So this will force you to have a minimum of three radios on your boat, whereas most people only carry two now.

So in order to comply with these regulations, and engage in VTS, we see everyone will have to add a new radio to his vessel.

Now, we are still talking with the FCC. We have gone back to ask them to reconsider their order and withdraw this release from channel 16 and the house frequency, and we feel that if a man wants to stand on a house frequency, that is his business, but it should not be mandatory.

That would enable people to navigate with two radios, one for 13, and one for VTS, separately.

Hopefully we will get some relief.

However, in dealing with FCC, our efforts have not been too successful in the past.

We also feel that the Coast Guard should request from FCC frequencies that would be dedicated to VTS, without taking them away from the public sector, which is what is being done. We are already short of a frequency area. Channel 11 is presently being used by a number of people in the New Orleans area. They will have to get off the channel within 5 years.

The FCC simply says they will phase them out, they will not renew their radio license to operate on this channel, so there will be a phaseout period of these people when they renew their licenses.

Channel 12 and channel 14, whereas the scheduled use of these frequencies over the various sectors is probably what I would say probably is the best visible traffic system you would probably have, but it still does have the propagation of some radio waves over the possibility of some interference.

We feel that these frequencies should be totally dedicated to VTS. There should not be extraneous conversations on them, and that the Coast Guard would be the center, and would be better off in this area, as would our vessels, but we feel the Coast Guard should stand up to FCC and insist on these channels.

Now, channel 14 and channel 12——

Mr. TREEN. May I ask a question on that point?

Mr. BIAGGI. Yes.

Mr. TREEN. You have expressed some concern for the public that use these channels having to give up their license. You are also saying the Coast Guard should stand up to the FCC, and demand they have clear channels.

What are the other channels that would be available? I mean, we cannot serve both of these purposes, or can we?

Do you have a proposal for solving that particular problem?

Mr. STEGBAUER. We have some channels—I am not an expert in this area, and probably some more witnesses will brief you a little bit better, but there are some channels that are dedicated to international use by treaty, but there is a provision in the treaty that you may use these frequencies on a condition they do not cause interference with international use of these channels.

The FCC has been extremely reluctant to allow these frequencies to be used by U.S. maritime interests. We feel that they could be used, and that they should be used, as long as we do not interfere with any international treaties.

This is an area where some additional frequencies are available; 12 and 14 were not dedicated solely to the engineers. They are listed in the FCC usage chart as port operation frequencies. They are available to the general public also, not just the Corps of Engineers.

So the general public, in effect, is losing three frequencies to this VTS in the New Orleans area, and as strapped as we are for frequencies now, because of the increasing use of VHF, and the increase in the growth of traffic, it does present a problem to us.

I believe this is about all I have.

Bob, would you have some——

Mr. GARDNER. I will just make myself available for questions, Mr. Chairman.

Mr. STEGBAUER. Lloyd?

Mr. ENEIX. I have nothing.

Mr. BIAGGI. Will you gentlemen be in town tomorrow?

Mr. STEGBAUER. Yes, sir.

Mr. TREEN. We have heard so much on this committee about lack of communication, and so forth. You have indicated that your attempts to communicate with the Coast Guard have fallen on deaf ears.

Could you be specific? What have they refused to consider? I am not talking about what they may have refused to do, but when have they failed to listen, in what respect?

Mr. STEGBAUER. In one respect they have failed to listen to our pleas to, "let us implement the system to a graduated basis."

Now, yesterday, for the first time——

Mr. TREEN. Have you been able to communicate your thoughts as to why, such as you have done in your statement here?

The four points that you mentioned on page 5 are an excellent summary, I think, of your position. Essentially your position is you should not put this system in operation until you have all the things you need: trained personnel, good communications, and the radar surveillance that you want.

Have you not been able to make these points to the Coast Guard?

Is that the problem, they have not sat down and listened to you? Or is the problem that they do not agree with you?

Mr. STEGBAUER. The problem is they do not agree with us. We have sat down with their project officers in New Orleans. We have a small group of us that do sit down in the District Commander's office, and they just do not change at all.

Mr. TREEN. Then the next question would be, how would the formal adoption of an advisory committee change that? The idea of a committee is not to dictate policy, but to communicate.

Mr. STEGBAUER. May I be very honest?

Mr. TREEN. Yes, sir.

Mr. STEGBAUER. I think some of you gentlemen have been snowed by the Coast Guard, by the amount of conversations that have been going on with industry, because there are no minutes, there are very little records of the conversations, so particularly in the letter from

Captain Woods, for instance, where he gives this broad view of all these people they have talked to.

Sure, we have been called in.

Mr. TREEN. In view of the transcript of the hearings we had in New Orleans, I was pretty vocal about the establishing of better communications at that time.

I agree with you, but I was trying to get to the point of whether or not the problem is really that they have not listened to your arguments, and to the points that you make. Or is it that they have listened, but they simply have not been responsive in the fashion that you would wish them to be?

I think you have more or less answered, but if you have got something else to say——

Mr. STEGBAUER. Well, Congressman Treen, I believe you are addressing this situation in the hearings in New Orleans probably had about the same results as our endeavors.

They will talk to us, but we make no headway whatsoever, now. I do not think—I should say, we do not think—our whole group does not think it is unreasonable to ask that this thing be implemented on a smaller size basis, and let us all get in and get our feet wet.

Now, 243 miles, one crack right out of the box, will go 243 miles, has a lot of area to cover. I am not familiar with how many—how the worldwide VTS system, how big they are, but I venture to say that is probably the biggest one in the world.

Mr. TREEN. Essentially what you are saying is, let us narrow the geographical scope of what we are trying to do, and implement that with radar and trained personnel—there is no quarrel about whether you are supposed to have trained personnel.

We agree with that. You may have quarrel as to what is going to be necessary to train them, but essentially what you are saying is, Let us narrow the scope to the two sectors you mention in your statement as a possible narrowing of geographical scope, and not open until you have four things that you outlined in your statement. That is essentially your position?

Mr. STEGBAUER. Yes, sir.

Mr. TREEN. And that has been communicated to the Coast Guard, certainly if not before, it has been communicated today. I think from my knowledge of it, it has been communicated to the Coast Guard prior to this time.

Mr. STEGBAUER. Yes, sir.

Mr. BIAGGI. Let me ask you—you have no quarrel with the whole system, implementation of the system, and its objectives, if I understand correctly, but it is a question of——

Mr. STEGBAUER. Well, I would have to be very candid with you.

There are a number of us who have some reservation about how many benefits would derive to the industry or the general public from the expenditure of this money, and a number of us think the Bridge-to-Bridge Communication Act with the cleaned up channel, and rigid enforcement, would contribute in large measure to helping avoid accidents.

Of course, it would not have the radar, just the communication network, but the bridge-to-bridge communication requirement, when they became law, they did not even affect most of the people running

the upper river, because they had been doing it for years on their own volition, but they recognized how much of an assist it was to them.

The question is, When you talk about money, talk about cost benefits, one has to wonder whether they are really going to be this many cost benefits derived from a VTS.

I think most of us are reconciled we are going to get VTS, and in the end we are going to get it mandatory, but there are some reservations about the cost benefits that we as taxpayers have.

Mr. BIAGGI. Well, that is always a concern of ours, too, Mr. Stegbauer.

With relation to the question you raised on the sector-to-sector application, it has been touched on several times, and rather than an overall application in this particular area, I think it was the testimony of the admiral that there has been substantial reduction in accidents, or virtual improvement in safety records in the areas where the system has already been installed, and it would seem to me that that would be the basis for their installation over this extended area.

Mr. STEGBAUER. We would be very interested in seeing this type of numbers.

We have never seen this, to our knowledge.

Mr. BIAGGI. I am sure that can be made available to you. They were made available to me.

Mr. STEGBAUER. Well, the reason we do not know is we do not have the figures.

Mr. BIAGGI. We will make them available to you.

Mr. STEGBAUER. If we could have the figures, we could look at it, too.

We are not in this thing with closed minds. We are interested in safety as much as anybody else. After all, if you want to look at it just from a cold, hard money standpoint, we are the ones that pay for the bills after these collisions.

Mr. BIAGGI. We are aware of that, Mr. Stegbauer.

Mr. STEGBAUER. We are interested also if the thing will materially decrease casualties, both in property and in lives.

Now, nobody could fail to support that.

Mr. BIAGGI. It is now 1:32, beyond our tenancy, and we will be dispossessed, if you like. You will appear tomorrow if you have further comments to make, and we would appreciate them.

Thank you very much.

Mr. STEGBAUER. Thank you.

[Whereupon, at 1:32 p.m., the subcommittee recessed, to reconvene at 9:30 a.m., Wednesday, September 22, 1976.]

VESSEL TRAFFIC CONTROL

WEDNESDAY, SEPTEMBER 22, 1976

HOUSE OF REPRESENTATIVES,
COMMITTEE ON MERCHANT MARINE AND FISHERIES,
SUBCOMMITTEE ON COAST GUARD AND NAVIGATION,
Washington, D.C.

The subcommittee met at 10:10 a.m., in room 1334, Longworth House Office Building, Hon. Mario Biaggi, chairman of the subcommittee, presiding.

Mr. BIAGGI. The meeting is called to order.

When we recessed yesterday, Mr. Stegbauer, Mr. Eneix and Mr. Gardner were at the witness table. Will you please come forward?

CONTINUING TESTIMONY OF FRANK T. STEGBAUER, EXECUTIVE VICE PRESIDENT, SOUTHERN TOWING CO., REPRESENTING THE AMERICAN WATERWAYS OPERATORS, INC., ACCOMPANIED BY ROBERT GARDNER, ALTER CO., AND LLOYD ENEIX, AGRI-TRANS. CORP.

Mr. BIAGGI. Do you have a statement, Mr. Eneix?

Mr. ENEIX. I do have a statement, but in the essence of time, I will more or less reiterate our concern, and we would just like to basically highlight the statement that I have.

Our prime concern is, of course, the communication of the VTS.

And, of course, the incorporation of radar into the system, and I think the basic functional thing dictates that they be incorporated, and it is the concern of our industry, a number of systems without incorporation of clear-cut communication and radar, and I think I would like to leave it at that, in the essence of time.

Mr. TREEN. I just want to ask one question.

Mr. BIAGGI. Mr. Treen.

Mr. TREEN. On page 2 you state, "the use of VTS systems is grossly misrepresented."

Please briefly say who did the misrepresentation, and misrepresenting, and what specifics are you referring to?

Mr. ENEIX. We specifically refer to the type of research, which in our opinion has been gleaned from the Coast Guard form 2692.

Mr. TREEN. I am still having trouble hearing you. Can you bring the mike a little closer, please?

I do not know if the volume is up.

Mr. ENEIX. The Coast Guard form 2692, having been presented to us, was the vehicle which the information was gleaned from to justify a VTS system, accident reporting.

A form 2692, for example, has to be produced for each barge of a tow, even though one barge may be the only piece of equipment that is involved. That also includes a 2692 for the towboat itself.

The only information, of course, that is available has been Coast Guard records, and we in the industry have not kept records, although we have been the producers of the 2692's, and it was explained to us that this was the method of justifying a VTS system.

Basically, accident prevention, and the number of accidents were gleaned from the 2692's, was an astronomical number, but not valid.

Mr. TREEN. Well, what you are saying is that the Coast Guard has misrepresented the numbers, or misinterpreted, or deliberately——

Mr. ENEIX. I would suggest——

Mr. TREEN. Or falsified records, or what?

Mr. ENEIX. I would suggest to you that that is probably a combination. Determinations were made from 2692's as to what type of accident could have been prevented with a VTS system.

Now, we have no way of knowing who made this determination.

Mr. TREEN. All right. Sir, if you would care to submit something in addition for the record as to where you think the misrepresentation specifically has occurred, I would be most interested.

I have nothing further to ask at this time.

Mr. HEYWARD. Mr. Stegbauer, I want to go back again to your proposal for a sector implementation rather than an overall implementation. I believe that you are suggesting in your testimony that the Coast Guard, rather than covering the entire sector, should initiate the program, if any, only in two sectors in the beginning, and from experience determine what to do in the two other sectors. Is that correct?

Mr. STEGBAUER. Yes, sir, that is correct.

Mr. HEYWARD. Would it not create a problem if you are going to have a gap in the system for vessels that are moving in the river system, or going into the blind areas, so to speak?

What is the problem, or difficulty for the industry in participating in that blind sector, in between sectors one and three—whatever the proper numbers are?

Mr. STEGBAUER. Well, there are two. One, we do no think it is needed from a navigational standpoint. Our groups do not feel it would be any problem at all.

Mr. HEYWARD. I beg your pardon, without any——

Mr. STEGBAUER. Without any problem at all, from going to a non-controlled sector to a controlled sector. In large measure we do it quite often, even when you go into a lock, in a sense this is a controlled sector, because you come under the control of the lockmaster.

So it is no problem as far as the navigational problems. We do not believe that the money spent in the other systems would have good cost-benefit ratio.

Also, the Coast Guard has told us they are constrained by lack of funds, and we would like to see the funds spent in the most productive area, since they are limited funds.

We certainly understand that, and these are the areas we feel would be most productive.

Mr. HEYWARD. But initially, the expenditure, as I understand it, is for the computer and the vessel traffic center. If it is there, and has

the capability of receiving and analyzing your reports from that midsector, what is the problem of funding?

Mr. STEGBAUER. This goes to the heart of our argument. The information received by the VTS has no validity without the ability to cross-check the computer with radar surveillance.

Mr. HEYWARD. I can understand that, but there is a report by GAO on this matter, criticizing the Coast Guard for going too sophisticated in the system, and proposing that they have basics, that is, communication systems only in all the ports, before they go into the surveillance aspect.

They are getting advice and recommendations from more than one direction.

Mr. STEGBAUER. Well, I am familiar with the GAO's report, but I have not known GAO to be experienced in the maritime navigation field.

Mr. HEYWARD. I do not know that that is a particularly critical answer.

We are talking about the expenditure of Government funds, and GAO should be an expert on that aspect.

Now, the real question is—what burden is placed on industry to make vessel reports in this middle sector, if the other two sectors are going to be put into effect?

Mr. STEGBAUER. I do not see the necessity for it. The information that goes into the nonsurveillance sectors, in our opinion, will not be valid information, and could seriously——

Mr. HEYWARD. I guess what you are really saying, you do not think one or two or three ought to be into effect without the radar surveillance in the beginning. That is really the answer; is it not?

Mr. STEGBAUER. Absolutely.

Mr. HEYWARD. But if they are going to put it on a voluntary basis for vessel movement reporting systems despite your argument that it should be an overall surveillance, then the midsector is equally warranted as the two sectors surrounding it; would that not be correct?

This is not a separate objection on your part, as I understand it.

You are saying that there should be radar surveillance, and it should be radar surveillance in the two critical sectors, leaving the other two alone, because there is not really a problem demonstrated there. Is that fair to state?

Mr. STEGBAUER. Yes, sir.

Mr. HEYWARD. But despite your position, if they go ahead and put in a vessel movement reporting system on a voluntary, not mandatory basis whether you can consider it cost beneficial or otherwise, the same objection would exist with the midsector as those other two. Is that not right?

Mr. STEGBAUER. The objection to the nonradar sector is the fact the information is not valid, and we feel that our captains and pilots will not be able to place reliability on it.

Now, in light of that, I guess, you all perfectly figured out we spent a lot of time yesterday afternoon, I believe the word is caucusing up here, and we have come forth with a little statement from AWO, and and if I may read it to you:

After listening to the Coast Guard's comments yesterday, and studying their prepared statement, the members of AWO who are

concerned with New Orleans' VTS will recommend, with great reluctance, to the board of directors of AWO that due to the following facts:

1. The Coast Guard's refusal to consider the installation of radar surveillance in the New Orleans' VTS.

2. The Coast Guard's unwillingness to provide clean VHF channels for VTS communication that will not interfere and/or deprive the maritime industry of presently used VHF frequencies.

3. The Coast Guard's failure to provide industry with a comprehensive plan for the proper training of VTC personnel.

4. The Coast Guard's failure to provide a vehicle for ongoing dialog between the Coast Guard and industry.

The New Orleans VTS as presently proposed, will have the potential to provide mariners in the system with unrealiable and erroneous information, that will make the system unsafe, and will be a contributing factor to the possibility of accidents to those mariners using and relying on the system.

Therefore, the AWO board of directors should advise our membership not to use the New Orleans VTS as presently proposed on a voluntary basis, and that AWO work against the mandatory imposition of New Orleans VTS in its present form, with all measures available to AWO.

Now, most of the people that are members of AWO, who are here today are not administrative people. These are all operational people, and we feel this very, very strongly.

Mr. HEYWARD. You do not want a voluntary system. You do not want a mandatory system unless it has radar, and you do not want a mandatory system except in two sectors, and that is what it boils down to.

Mr. STEGBAUER. We did not accept mandatory systems, but if you have got radar surveillance for the full length of the system, and the Coast Guard sees fit to spend the money, and the Congress——

Mr. HEYWARD. So you do not want a voluntary system. You want it mandatory. Is that correct?

Mr. STEGBAUER. We do not want a voluntary system that is not radar surveilled.

Mr. HEYWARD. Suppose they had radar, would you be in favor of voluntary or a mandatory system?

Mr. STEGBAUER. Well, we are on record either way would be fine with us.

Mr. HEYWARD. You do not care?

Mr. STEGBAUER. No, as long as you have the radar system and proper communication. That is what we are working for.

We realize that it will go mandatory, and we are not sticking our head in the sand. We realize this and only want the best for the system.

Mr. HEYWARD. There is another question in connection with input, and I can understand the problem which you have had in connection with your dealings with the 8th District Coast Guard.

As you recall, there was a meeting in the chairman's office and the commandant of the Coast Guard and your group, AWO of which you were a member——

Mr. STEGBAUER. Yes, sir.

Mr. HEYWARD. At that time the complaint was made that the Coast Guard was not keeping the industry advised of their proposal. And as I recall, the basic thrust was that you wanted to know exactly where the Coast Guard was at that point in their planning, if any. Is this a fair statement?

Mr. STEGBAUER. Yes, sir.

Mr. HEYWARD. And as a result of that the Commandant agreed to issue an advance notice of proposed rulemaking—not proposed rules, but an advance notice—so that everybody would have notice, not only the industry, but any other interested people, including the public who were not involved in transportation by water.

He did that shortly thereafter, and now we hear that, presumably, the Coast Guard has now changed its mind on going forward with proposed rules and wants to put this thing in on a step-by-step basis beginning with a voluntary system. And yet you say you have no input. I think the result indicates that somebody has a hell of a lot of input.

Mr. STEGBAUER. I have to agree with you there. The Coast Guard also told us they intended to put this system in on a voluntary basis all the time.

Now, this is the Coast Guard in Washington, but the Coast Guard in the 8th District in New Orleans has told us this is not so.

I have a letter here from the project officer that says it will go in on a 2-month voluntary basis at which time he will train his VTC people on using our vessels as a guinea pig, and at the end of the 3-month period they will go mandatory.

Mr. HEYWARD. That is not what we were told yesterday, and apparently there are no present plans to go mandatory in 3 months.

Mr. STEGBAUER. This is reading a letter of February 13, 1976, from the 8th District.

Mr. BIAGGI. Excuse me.

I notice Admiral Fugaro is in the room, and it appears he is listening as we are. There seems to be some discrepancy here.

Mr. Stegbauer has a letter indicating 3 months and then mandatory, and your testimony is at variance with that letter.

We would appreciate a firm position and a clear one.

Admiral FUGARO. Thank you, Mr. Chairman.

Mr. Chairman, I can only reaffirm what I said yesterday, that our intentions are not to go mandatory, and there was no fixed period of any 3 months or 6 months. I believe I testified yesterday that our intention was to go for a reasonable period of time, and I believe I did indicate that I would estimate a minimum of, say, a 6-month period before we would even consider, and probably longer than that.

While Captain Stegbauer has some letter from the project officer down there, the ultimate control of the project is still here in headquarters. And I can assure you that what I told you yesterday what will come about, that is that initially it will be a voluntary system. There is no fixed voluntary period that we are imposing now.

Mr. BIAGGI. Thank you.

Admiral FUGARO. While I am here, I would like to make perhaps one clarification to other testimony that was given this morning with respect to the Coast Guard form 2692, which is now our accident reporting form for reportable marine casualties.

What Captain Eneix said was correct with respect to the fact when there was a casualty, each barge involved in the casualty has to be

reported on a separate 2692 form inasmuch as each of the vessels is a registered vessel. But when we consider casualties, we only consider the casualty as a whole, whether there is 1 or more than 1, or 10 barges, is 1 accident.

Thank you, Mr. Chairman.

Mr. TREEN. May I just ask for clarity, do you mean that if there are eight barges and one tow, a 2692 is filed on each of the eight barges?

Admiral FUGARO. Yes.

Mr. TREEN. But in your computation you are saying that you would count that as one casualty if that tow is involved in a collision?

Admiral FUGARO. That is right, sir.

Mr. TREEN. OK. Thank you.

Mr. STEGBAUER. Mr. Chairman, this is a problem that we have had over and over and over again. New Orleans tell us one thing, and we have conducted our dealings with New Orleans up until the time of the advanced proposed rulemaking.

We base our replies to the advanced proposed rulemaking on what we have been told in the 8th District. We have had no knowledge of these items until the day before yesterday.

If I remember correctly, and you can correct me, Mr. Heyward, Admiral Price said the same thing in the meeting with Mr. Biaggi's office that we had with the Commandant.

Mr. HEYWARD. I think there was an agreement in Mr. Biaggi's office that there had been a lack of communication which was unfortunate. But it seems to me that you have taken a position that anything the project officer said was something that had been established, and that is simply not so.

The only way under the law that the Coast Guard can establish this system and require rules to be followed by the maritime industry is by publishing rules which apply.

Now, the Administrative Procedures Act requires them to go through a certain format to do that.

Each time any form of paper has come out, you have said, in effect, at least this is my impression, that they have put this in concrete and we have not had a chance to do anything with it.

I think the result has demonstrated that nothing has been in concrete, and then you criticize them because there has been a change which, in many cases, I am sure, has been caused by the comments that you have made which, to me, demonstrates that you have had input, whether or not what you have recommended is exactly what comes out or not. I think if right now we were to address ourselves to what the future role should be of this vessel traffic system, and what the proposed rules are going to contain, this is the way that all of us should see that it goes.

Now, in the proposed rules, Admiral Fugaro said yesterday it was a voluntary system, that they would not issue proposed rules because it would not be mandatory. They are not required. They would do it by a manual which would be issued.

If they decided at the time they deemed it required to go mandatory, they cannot go mandatory without issuing a proposed rule, giving the public the opportunity to comment.

So they are not going to be able to one day say, Mr. Stegbauer, tomorrow morning this is mandatory. They cannot do that, whether they want to or not.

Mr. BIAGGI. Before you respond, if you will forgive us, we are subservient to those bells. There will be a 10-minute recess.

[Short recess.]

Mr. BIAGGI. The meeting is called to order.

Mr. Stegbauer, you were about to respond.

Mr. STEGBAUER. Could I have the question again, please?

Mr. BIAGGI. It was not a question. You were responding to a comment made by Mr. Heyward.

Mr. STEGBAUER. Well, the basis of our problem has been the difference in what we are told in the 8th District and what we have now been told since Sunday night by Washington.

Evidently there is some breakdown in communication between Washington and the 8th District. But in our prior dealings we have been confined to dealing with the 8th District, and we had no way of knowing what the Washington area was speaking about.

Mr. BIAGGI. Well, I am inclined to agree with you. There seems to be some confusion, and I think the result of the testimony today on both your part and all the hearings on the part of Admiral Fugaro of the Coast Guard, will possibly clear that up. Communication obviously is a problem, and has always been a problem with a large institution. And I guess that is one of the reasons we have hearings, to resolve them.

But one question I would like to put to you is do you believe an advisory committee would help resolve our problems?

Mr. STEGBAUER. If we could get an advisory committee where we could have an exchange of information and not a briefing by the Coast Guard is really what we have been going to when we to the meetings in the 8th District, we get a briefing.

I believe we could make some progress, and both parties go into it with an open mind. And we certainly stand ready to. I believe progress can be made.

Now, whether it is a formal advisory committee, I realize this is a rather ponderous mode of operation, and I do not think we have any objection to an informal advisory committee, which I am not sure whether that is in compliance with the law or not as regards advisory committees. There has been some condemnation of these about anything we can have in a group and meet and make records of the dialog that goes on in the meetings. We would welcome the opportunity to try it.

Mr. BIAGGI. Why could you not use those records or recordings of informal meetings?

Mr. STEGBAUER. That would be perfectly all right with us. That is no problem at all. We have got into this thing really and did not realize what we were getting into, and we did not make arrangements to keep recordings. And we learned rather slowly, but we have learned in the future that we will do so.

Mr. BIAGGI. I would like to think that, when you sit down with the Coast Guard, all parties concerned, in good faith, will have an honest

exchange with one purpose in mind, and that is to resolve the immediate or anticipated problems. Whether it is formal or informal is another question.

Certainly there should be these meetings. I could not contemplate the Coast Guard operating in a vacuum and, conversely, I could not expect that industry would be functioning within its own parameters without having some input into the Coast Guard and in its deliberations.

Mr. STEGBAUER. We have always been able to do it before on many other bills that affected our industry, the writing of the subchapter on hazardous cargo regulations, all pollution prevention regulations, many other regulations, we have had input, and we have worked with the Coast Guard and got something they could live with, the Congress could live with, and we could live with.

We see no reason why we could not work this out, talk and be listened to.

Mr. BIAGGI. I think we are in the process of doing that and have been doing that for the past number of months. I think the conclusions may not always be compatible with your thinking, but somewhere along the line you have to fish or cut bait, and the decisions are made, and some you like and some you do not like. But I always believe that the decisions are made for the benefit of the total picture.

As far as this committee is concerned, it is our policy to have an honest exchange and prolific exchange because we are as much interested in the industry as we are in the policing of it by the Coast Guard. And I know that reflects the views of Chairman Sullivan.

It is important that all components work together. We like to help rather than impede. We have enough problems under our roof created through the bureaucracy.

Mr. STEGBAUER. We appreciate this attitude, and that is why we are here to ask your help.

Mr. BIAGGI. Madam Chairman.

Mrs. SULLIVAN. I have no questions at this time. I am sorry I was not able to come over here and hear the testimony, because I am extremely interested in some kind of a system that can work. And I feel as Chairman Biaggi feels, that there needs to be, and we hope there will be, a communication and general discussion, so you can give the benefit of your experience. You know the river, you know it well, you know your tugboats and the vessels that you operate, and possibly in that connection better than the people who are going to be responsible for administering any rules or regulations that are set up.

If there is not a free exchange, so that we understand each other, it is just that much more difficult, So I hope that the Coast Guard will adhere to this and work with the men on the river.

I have no questions at this time.

Mr. BIAGGI. Thank you, Madam Chairman.

Thank you, Mr. Stegbauer, Mr. Eneix, and Mr. Gardner.

Mr. BIAGGI. Representing the Ad Hoc Committee for Ports and Waterways, Capt. Ed Conrad, Compass Marine Services; Capt. Jack R. Bullard, American Commercial Barge Line Co.; and Dr. Robert L. Brite, statistical consultant, accompanied by William E. O'Neil, counsel.

STATEMENT OF CAPT. ED CONRAD, COMPASS MARINE SERVICES; CAPT. JACK R. BULLARD, AMERICAN COMMERCIAL BARGE LINE CO.; AND DR. ROBERT L. BRITE, STATISTICAL CONSULTANT, ACCOMPANIED BY WILLIAM E. O'NEIL, COUNSEL

Mr. O'NEIL. Thank you.

We have consumed a great deal of time yesterday and today talking about communications and vessel traffic systems. It is the objective of this committee, which was formed on the 15th of July primarily to evaluate the problems that have existed in the past between the Coast Guard and the barge-towing industry, to look at it from a legal point of view, and from a statistical point of view, and from a practical point of view to find out exactly where their problems are, to point them out and hope for some sort of relief.

We have filed with the Coast Guard our comments—19 pages of which relate to what has gone by the boards. I do not see any point in reiterating anything that has been said in the past 2 days about communications. I think that this committee recognizes that there is a problem. I would hope that at the end of the testimony of Dr. Brite, Captain Conrad and Captain Bullard both, that I would be allowed again to make some comments and some constructive thoughts—set forth some constructive thoughts on how perhaps we can proceed and get off center in this matter.

We have two statements—one which will be given by Captain Conrad, which specifically relates to the communications part of the planned vessel traffic system. This is the nerve center of the New Orleans vessel traffic system.

The statement by Captain Bullard will relate to management problems in that system; and I hope that we can now address ourselves to the problems that we have so diligently tried to convey to the Coast Guard and show you why we are so concerned about what is going on in New Orleans from a tower's point of view, and the river operators' point of view; and I would like to turn this now to Captain Conrad, and if permissible, Mr. Chairman, and other members, I would like to not have his comments read into the record, but rather just go right to the heart of the problem and have him summarize basically what he is going to say, and this will be done in his presentation.

Mr. BIAGGI. We will accept his entire statement to be included in the record, and he can summarize.

[The statement referred to follows:]

STATEMENT NO. 1 OF AD HOC COMMITTEE FOR PORTS AND WATERWAYS

On behalf of the Ad Hoc Committee for Ports and Waterways, we submit herewith our comments which will be presented by Captain Ed Conrad on the communications problems in the proposed Lower Mississippi River VTS system.

I am here on behalf of the Ad Hoc Committee for Ports and Waterways to testify in connection with the Coast Guard's proposed regulations dealing with a VTS system on the Lower Mississippi River. Specifically, I would like to address my comments to what we feel are the weaknesses of the system's communication net and what we think is required for its proper functioning.

Briefly, the proposed regulations provide that each vessel participating in the system must make an initial report 30 minutes or more before entering the system, a movement report upon actually entering the system and each time the vessel passes a reporting point, and a final report whenever the vessel anchors, moors, or leaves the system. The initial report must give the following information: name of vessel, position of vessel, estimated entry time, point of entry, destination

and route, ETA, draft, number of barges, length of tow, dangerous cargoes, and notice of any handling defects.

The movement report must provide the vessel name, position, time of passing reporting point, next reporting point and ETA at next reporting point. The final report will consist of the time and place of mooring, anchoring or leaving the system. Additionally, a vessel must make supplementary reports whenever any of the information it has furnished to the Vessel Control Center changes. This will include ETA changes of more than 10 minutes.

Three VHF channels have been assigned to the VTS system: 11, 12 and 14. Communications in each of the geographical sectors of the VTS system will be assigned to one of these channels as specified in an operations manual which has not yet been developed by the Coast Guard.

Our reservations about the communications aspect of the VTS system center around the problems of an insufficient number of frequencies, ineffective policing of the frequencies, the monitoring of three frequencies, the effect of equipment failures, and the accuracy of reported information.

At present, the frequencies assigned to the VTS seem totally inadequate for the job. The Coast Guard in the preamble to its proposed regulations estimates a total of 270,000 vessel transits yearly in the VTS area. It is noteworthy that this figure is taken from data which is over three years old. Since that time, cargo tonnage has increased so presumably vessel transits have likewise increased. However, for the sake of argument, we will use the Coast Guard's old figures for a simple example illustrating the likelihood of overloading the VTS communication network:

Assuming there are 270,000 vessel transits of the area yearly, there will be an average of 740 daily vessel transits of the area. The three channels assigned to the VTS will provide 72 hours of air time each day during which communication may take place. Thus, the average vessel in the system will have approximately six minutes each day in which it must establish contact with the vessel Control Center, give its required reports, and receive whatever information or instructions which the Center wishes to transmit. Experienced vessel operators have, after having reviewed the reporting requirements, conservatively estimated that they will have to make 9 or 10 routine reports per transit. This works out to a maximum of about 30 seconds for each routine report, during which time the vessel operator must confirm contact with the Vessel Traffic Center, give his report, and receive acknowledgment of his report along with any communication the Vessel Traffic Center wishes to relay to him. This time limit may be possible to meet under the best of circumstances, but the Coast Guard has not shown this to be the case, and our simple example has not taken into consideration several other important factors.

First of all, channels 11 and 12 are not dedicated to the exclusive use of the VTS system. Channel 11 is presently still being used for commercial marine operations. While the F.C.C. has promised to grant no new commercial licenses on this channel, it will be several years before all the presently outstanding licenses expire and the channel becomes fully usable by the VTS.

Until that future date, an unknown quantity of air time will continue to be used for non-VTS purposes. More importantly, channel 12 is shared with the Corps of Engineers for communications at their locks within the VTS area. At the present time, there are no plans to change this situation which obviously reduces VTS utilization of channel 12. Both of these facts will, for the foreseeable future, significantly cut down on the maximum of 30 seconds which the average vessel will have to complete a routine report.

In addition, all of this has assumed that vessel reports will be evenly scattered throughout the day. What will happen if there is a peak of vessel traffic during the day? This will obviously bunch the routine reports into a shorter time span and could easily prevent many vessels from making contact with the VTC at all. What are these vessels to do then? If they proceed anyway and report later, will this be a statutory fault making them liable in case of an accident? Or are they to wait until they can make contact with the VTC and be forced to suffer the economic consequences of delay? As far as we know, the Coast Guard has not even considered these possibilities in assessing the economic impact of its regulations. Interestingly enough, under the regulations proposed by the Coast Guard, such a communication tie-up could, and probably will be, considered a hazardous circumstance sufficient to authorize the VTC to take direct control of vessel movements. This control will undoubtedly consist of making the vessels wait for instructions from the VTC.

The Coast Guard has yet to make any determination whether such foul-ups are possible during times of peak radio traffic, nor has it given any indication of how it will meet such a crisis. We in the industry feel that the most likely result of the inadequate communication facilities of the VTS will be to make the vessel traffic slow down and wait for the government to catch up, regardless of what actual traffic conditions are.

There are 300 frequencies available for aircraft communications and additional private channels are available to airlines. The marine industry must rely on a tenth of that number of channels for all of its communications. We cannot understand why the Coast Guard has not attempted to get clear channels for its VTS system rather than taking over channels already in heavy use. We can only surmise that the Coast Guard feels it is more expedient to impose on the maritime industry than to work with the F.C.C. in getting additional channels.

The Coast Guard has also not considered the problem resulting from the significant override of the VTS channels by improperly adjusted signals from taxicabs, paging companies, and security guards' walkie-talkies in the New Orleans area.

This problem, which is well documented by the industry's complaints to the F.C.C., has caused great difficulty in the communications on channels 13 and 16 mandated by the Bridge to Bridge Radio Communications Act and the F.C.C. Whatever attempts have been made to police channels 13 and 16 have been totally unsuccessful from the industry's viewpoint, and we see no reason why the situation will be any different on the VTS channels. This kind of interference will hamper VTS communications in some of the most heavily traveled areas in the VTS. As far as we know, this problem has not even been recognized by the Coast Guard.

Another area of our concern is in the fact that vessel operators will be required to maintain a 24 hour radio watch on channels 13, 16 and a VTS or in-house channel. The first is required by the Bridge to Bridge Radio Communications Act and the second by the F.C.C. for distress, safety and calling. The third will also be required if these regulations are adopted. Beyond the fact that monitoring the additional channel will require the industry to incur the cost of additional equipment, we will now have the situation where a vessel operator must try to listen to three radios at the same time he is trying to run his boat. This is obviously nearly impossible and is bound to result in confusion. It is hard to see how such a requirement is consistent with the safety which the VTS system is supposed to promote.

Equipment failure is another area of considerable concern on our part. The Coast Guard informs us that radio failures should not prevent vessels from entering the system. In the normal situation, this may create no greater difficulties to shipping than are presently encountered under the Bridge to Bridge Radio Communications Act. What worries us is what will happen during times when the Vessel Traffic Center has taken control of traffic and there are large vessels with radio failures navigating the system. The VTS system, in the absence of radar, will be completely blind to these vessels and may inadvertently put participating vessels in positions of extreme peril as a result of this blindness. We are informed that the Coast Guard is undecided as to how this will be resolved, and we submit that this is just the sort of thing which must be resolved prior to implementation of the VTS system.

Other questions concerning the accuracy of the picture perceived by the Vessel Traffic Center arise. From what we have been given to understand, the information received from participating vessels will be fed into a computer which will generate an artificial display representing the projected positions of vessels in the VTS area. Certainly, the reliability of this picture is very suspect. There are possible, indeed probable, inaccuracies every step of the way.

In addition to the fact that vessels with radio failures will not be tracked by the computer, there are numerous other vessels which will be invisible in a practical sense. Vessels working in barge fleets will not be pictured nor will non-towing vessels under 65 feet. It is readily apparent that vessels falling within both of these classifications are capable of inflicting serious damage in a collision, but the computer will not know where they are.

Furthermore, there is a serious question of how errors will be found which are introduced by the traffic controllers into otherwise accurate vessel reports. Given the speed at which these controllers will have to work, the possibility of human error seems significant. In a system with radar surveillance of traffic this problem is done away with, but in the Coast Guard's proposed system such errors are bound

to occur, and it is simply a matter of time before some unnoticed error becomes the basis of a serious miscalculation during hazardous conditions. It may well be that there is no way to eliminate such errors, but in that case, it would seem wise to reevaluate the benefits which are claimed for this proposed VTS system.

Finally, there is the problem of the accuracy of the vessel's reports themeselves. Even assuming the best efforts on the part of our vessel operators, we feel that the Coast Guard is imposing an impossible burden upon them to produce accurate reports. A couple of examples will illustrate this.

The VTS sectors will be approximately 20 miles long and a vessel transiting a sector will, upon entry, be required to estimate his ETA at the end of the sector. After this report, he will be required to give a supplemental report whenever his ETA changes by more than 10 minutes. Presumably, this means that reported ETA's are to be within an accuracy of 10 minutes. For a vessel travelling 4 mph. a change in speed of less than 0.1 mph. will result in an ETA change of more than 10 minutes. There is absolutely no way that the present level of technology on most vessels can measure such slight increments of speed. To do so would require an enormous investment in radar-operated speedometers. Furthermore, the use of such equipment would not solve the problem because the vessels are constantly encountering current variations of more than 0.1 mph. and the vessels must of necessity change speed in negotiating bends in the river and upon encountering other vessels. As a result, the captain of a vessel will have to make an estimate of his ETA based upon these variables. Since there is no way he can reliably estimate his ETA within 10 minutes, it is a foregone conclusion that he will be forced by the regulations to make amended reports whenever he can make a better estimate. As it is a foregone conclusion that such supplemental reports will be necessary, he will not be able to simply proceed in the customary manner, but will have to continually revise his ETA due to constant variations from his estimate. We understand that accurate reporting is necessary in order for the computer to plot an accurate picture, but we are afraid that an on-board computer will be necessary to provide information of the precision demanded by the Coast Guard.

Let us assume for the sake of argument, however, that the captains of the vessels in the VTS system are paragons of navigational ability, and that they are able to reliably estimate their ETA at a point 20 miles distant based upon their knowledge of river currents and the various speeds that they will make on bends, etc. When this information is given to the VTS computer, unless it can read the captain's mind, it will project on its display a dot moving at the constant speed necessary to arrive at the next reporting point on the captain's ETA. The computer will accurately show this vessel's position at the time it enters the sector and at the time it leaves. Whether the vessel is where the computer thinks it is in the meantime is simply a matter of chance. This is because the captain in estimating his ETA took into account such things as slowing down for bends and speeding up in between. Suppose the vessel loses 10 minutes at each of 3 bends, intending to make up the time on a straighter stretch of river. The vessel will be ½ mile behind the position the computer has plotted for it but its ETA will not necessarily have changed. How such inaccurate information can be used in a VTS system is beyond us, but this is what will be used unless radar surveillance is incorporated to show the true positions of all vessels.

Such inaccuracies in the computer picture could cause serious safety and economic detriment to the industry, especially during hazardous conditions when traffic control has been taken over by the VTC. In fog or rain or other conditions of low visibility for example, any traffic information which the VTC can give will be more than useless if it contains such large errors. This has been the case in the Houston VTS system where vessel operators unanimously report that VTS supplied information is of no assistance to them. Vessels will have to proceed as they do now, relying on their radar and bridge to bridge communications. The VTS will be of no help whatever, and the VTC will more than likely simply shut down traffic in the VTS area rather than allow it to continue on its own devices.

In summary, the Ad Hoc Committee recommends that the proposed VTS regulations not be implemented until the Coast Guard satisfactorily resolves the problems of overloading the communication channels due to insufficient available airtime, sharing of frequencies with other interests and land-based radio interference. Also to be resolved are the problems of equipment failure, the numerous channels which must be monitored simultaneously, and the inaccuracies inherent in the computer's visual display. It may well be that these problems cannot be resolved, or that the incorporation of radar surveillance into the system will be necessary for satisfactory results. In any case, the existing problems in the communications area are so great as to require a satisfactory solution prior to putting

the VTS into operation. To do otherwise will be counter-productive to achieving the desired results from the VTS.

Mr. O'NEIL. And therefore I would like to submit his entire record to be studied as well as Captain Bullard's statement; and Captain Conrad can now be allowed to go ahead and make his statement.

Mr. CONRAD. Mr. Chairman, Mrs. Sullivan, gentlemen, my name. is Edward Conrad. I am a towboat operator in the New Orleans area. I would like to limit my remarks to the communications portion of the VTS.

Let me explain the problems as we see it, being the heart of the VTS—communications.

I would like to take a look at the sector channels one by one and we would like to say what the Coast Guard did not say. I would like to give a brief explanation if I may on the channels, and the uses of those specific channels.

The first thing I would like to address myself to is the channel 11, which is——

Mr. BIAGGI. Captain, if you would for a minute, we had a chart up there yesterday, which the Coast Guard put up. Reference was made to the sectors; and I wonder if we could have that so that I can see it.

Mr. O'NEIL. Mr. Chairman, the other chart was super-imposed on the Coast Guard chart because the Coast Guard chart deleted what we considered to be a very significant portion of the waterways of New Orleans and which have a direct bearing on communications. That is why we put it on top.

Mr. CONRAD. When I need that chart I will ask them to turn it over.

Mr. BIAGGI. Continue, please.

Mr. CONRAD. Channel 11, from what I was able to understand from yesterday's comments, is the channel to be used for VTS in the sector of the New Orleans Metropolitan Area.

Channel 11 is classified as a commercial channel, operates on 156.550. It functions, as specified, by the FCC's Intership, meaning vessel-to-vessel, and ship-to-ship; meaning a commercial, duly licensed FCC holder may use this channel to speak to his vessels.

There are only eight channels of that classification available to our industry, which we all must have and live with.

Commercial channels are used for the purpose of exchanging payrolls, taking orders for groceries, supplies, and so forth. It is the activity of operating a business of a land-based station, trying to communicate with the vessel which is always mobile.

If we lose one of these eight channels, which are already desperately crowded in our New Orleans area, it would put a tremendous burden on our industry.

Remember, now, that I specified it is only one of eight available channels and I submit to you an exhibit showing the breakdown of the channels, that you may refer to.

If the Coast Guard gets on that channel and uses it for VTS, there is no such thing as sharing the channel. The Coast Guard will monopolize it. We will be moved off. The license-holder will have to find another place. The FCC will give him, assumingly, one of the existing seven channels.

Channels 12 and 14 I would like to approach next. The other two VTS channels that the Coast Guard is going to use in their sector operations is 156.60146.700.

These channels are classified as port operations. These are the channels that we must use in communicating with our vessels.

Their change of orders, their tow makeup instructions, fleeting operations, and the entire operation of a tremendously busy harbor are all communications done on VHF channels designated as port operations.

These port operation channels seem to have led one to believe one had an exclusion or an exclusive right of the Corps of Engineers. This is not so. The Corps of Engineers by local custom in the New Orleans area uses channel 12 or 14 as a switchover channel to communicate to the vessels their intentions of locking, and their position of locking; and their position of locking; and it is a tremendously busy channel; and the reason for the use of these channels is because these are two of the most popular channels aboard all vessels for port operation.

The removal of these two channels from our sector would greatly—greatly hurt port operations. These two channels would be removed from a total of only seven port operation channels issued to this industry; and I am not referring only to the towing industry; I am referring to the Maritime industry; I am talking about dredging; I am talking about pipe-laying; I am talking about marine construction and contractors; and I am talking about vessels that are licensed to have these channels.

We have a tremendous amount of people that are demanding the use of these channels. People have a lot of money invested in antenna and radio equipment for communication. These people, it is true, they will move elsewhere and they will get off the 12 and off the 14 and they will be run off, but what will they have left? They will have only five port operation channels to use for the entire area. I find that this would be an impossibility for us to live with.

I wonder if the Coast Guard has also considered the licenseholders of these channels, both 11, 12, and 14, that are not directly in the New Orleans area, but are in places like Morgan City, Homer, Dulac, all of the Bayou country. There are many, many licensed people in these areas that have these channels that use them also for port operations.

There will definitely be a bleeding through a communication. You need clear channels; you need perfectly clear channels to dispatch information as VTS presumes they are going to dispatch to us.

I would like to now approach channel 13, which seems to be a channel with quite a bit of misunderstanding.

Channel 13 is 156.650. Its classification is navigational. It is the only navigational channel for the use of all vessels on the waterways of the United States. Every bridge-to-bridge communication is to take place on this channel. Every vessel seeing an approaching vessel planning to make a passing, a landing or relay, whatever his intentions are to the vessels in his immediate area must by law be communicated on channel 13.

The Coast Guard has informed us that they will use channel 13 in emergencies to communicate with vessels in the VTS. I cannot see that. I would like to get onto that a little further on in my discussion; but we do have the communication from the Coast Guard that they will be able to operate on 13.

Channel 16 is 156.800. This is a channel that we are told we do not have to monitor any more if all this goes into effect. I find that hard to believe. The classification is to stress safety in calling. They say if we do not monitor 16, we can monitor the house channel. It is still another channel that you have to monitor.

We do not have any such thing as a house channel. No one has an exclusive channel. When you monitor a house channel, you are monitoring all of the dispatching of commercial activities of numerous vessels, not just a house. It does not stay blank until somebody wants you. It is in constant and continuous use.

I would like to explain the FCC's procedure on the use of 16.

A licensee on a channel of land-based channel is obligated by law to monitor 16, and any other frequency that he has as a working frequency simultaneously. He is supposed to make all communication contacts, the initial contact, on channel 16. If you tell the vessels where you do not have to monitor 16 any more because you know we are going to relieve you of that burden that that means the port operation must try to make contact some other way.

The relief of 16 may sound like it is a monitoring and may seem like it gives us some relief of our burden; but the only thing it does is add to the confusion of, where do you find the vessel when you want him? Where is he heading? What frequency is he on?

We cannot transmit on a VTS frequency, which he must be on. We cannot transmit on 13; so you cannot find him there. He is relieved of the obligation of watching 16. You may have a lot of difficulty in making changes of orders on emergency—all kinds of things that happen on the bank that must be relayed to the vessels.

So I find this is not any relief of our obligation. It is also necessary to monitor channel 16 so that you can make use of the public correspondence channels that the telephone company operates because they also make their initial contact on channel 16, if you change from one of their sectors to another.

So the relief of monitoring channel 16 to me sounds like it is just another way of making us have a little bit more difficulty in our communications on a day-to-day basis.

So I think the Coast Guard again is somewhat a little bit misled on this because of the September 3 regulation of the FCC, telling the base station they must monitor 16, must use 16 to make the initial contact.

So the relief of that obligation does not seem like it is going to help us too much.

I would like to refer to this chart that I brought along today, and you gentlemen have a copy up there; because I think the geography of the area is very important to fully understand.

The chart supplied by the Coast Guard is showing the implementation of the vessel traffic system with the Mississippi River in the appearance like it is indicates it exists in its own world. This is not the case. We live in an area that is completely covered by havigable waterways. They are actively and completely surrounding us on all sides. VTS may—and I say "may"—help control traffic on the Mississippi River, but what it would do in outlying areas may cause complete and total disaster to the commerce in these areas.

If I may, I would like to refer to the map.

The red line that I have indicated on the map shows the paralleling and corresponding waterways of the Gulf Intercoastal Canal. I have outlined it as far as Morgan City, which is only about 80-some airplane miles from New Orleans.

The route running north and south is a portal route. The Mississippi River is shown right along there, running almost totally parallel to these two waterways.

The commerce—the traffic on these waterways is literally bumper-to-bumper. The intersection is the intersection of Harvey Canal and Algiers Canal, with one tremendous amount of traffic. People are making decisions to go from one canal to another, to locks out in the Mississippi River. It is an area of total congestion.

The red lines on the east side of the Mississippi River indicate the Gulf Intercoastal Canal, to the east, across the Mississippi Sound, Mobile, and so forth.

The red line running south and parallel to the Mississippi River indicates the ship channel known as Moregood.

There is also a tremendous amount of marine commerce in Lake Pontchartrain, shell dredging, yachts, pleasure boats; all of these are licensed and operating on our frequency.

There is also a tremendous amount of oilfields and connecting waterways that we did not even bother to try to outline all through the south of there—sulfur mining, the oil industry, drilling platform contractors, and so forth, all relying on VHF radio as their means of communication.

Transmitting on VHF on the sectors, as I have indicated, will only cause problems to a tremendous amount of people in an awfully large area.

The type of transmitter—and just as we were told yesterday by the Coast Guard, which is absolutely fact—the most powerful transmitter takes over; the rest of them just blank out. They do not even exist. So when you have a communication going on an area, and the Coast Guard keys one of these transmitters, everyone else is wiped out; everyone else having any commerce or communication on any of the channels that they expected to work on will be eliminated off the air; but the people monitoring will be monitoring not only the Coast Guard's conversations, but they will be monitoring people in these areas who are still duly licensed to operate on these channels.

I would also like to explain what I feel is a tremendous hazard to our industry, with the Coast Guard having the permission or authority to transmit on channel 13. I think it is horrendous that they could even consider it. If a vessel were approaching the Harvey-Algiers intersection and he met a boat with a tow coming out of each of those canals, and he was just about in the situation in which he was exchanging information, getting an agreement with these two vessels as to how they would meet and pass, if the key was pressed—if a button was touched by the Coast Guard on channel 13, these people would not even exist. They would be blasted off the map. They are limited to 1 watt of power—1 watt of power on an antenna monitored on the top of a boat; and the Coast Guard will have an antenna—I do not know where or how large or what—but I am sure

it would be of sufficient size to completely and totally eliminate any communication on channel 13.

This I make as an example of only one vessel, but what could happen is, there could be at the same time, simultaneously, some 15—some innumerable number of vessels meeting each other in this broad area, all sharing one channel and not conflicting with each other because of the 1-watt power requirement; and the Coast Guard could eliminate these people from getting an understanding and putting themselves in a position that could really be disastrous.

What, therefore, could be the solution of the VTS problem?

I suggest that the first channels, 11, 14, and 12, should remain in the control and used exclusively by commercial marine interests. Alternatively, the Coast Guard could and should procure from the FCC the necessary frequencies for their VTS and they still could do this. We are limited to what channels are available to us. There are many channels that are available, that fit into this band spectrum that could be used for this purpose; but that consideration apparently was not even given.

May I also refer to the chart that I gave to you gentlemen showing VHF channel selections.

There are channels that are classified as noncommercial, which we have no ability to use—channels 9, 68, 69, 70, 71, and 78, for instance. The Coast Guard has at their disposal channel 21, 23, 81, 82, and 83. We do not know what these channels are used for; but possibly they could be used for this purpose.

There are also numerous other channels that are excluded by international agreement. These channels are available or could be made available for this purpose but these channels are not available for our use. This is a copy of the card that I am referring to and, as you can see, the things that are colored in blue are the ones limited from our use by international agreement.

It far surpasses the ones lined off in green that are available for commercial interests.

Second, I would like to summarize channel 13.

Channel 13 should remain exclusively for bridge-to-bridge with 1-watt transmission power, as specified by the FCC requirement. Utilization of that channel for purposes other than direct, bridge-to-bridge vessel communication should be considered a potential hazard of such magnitude that even the consideration of a shore-based station, especially one operated by people whose object is to protect life, property, and environment, astounds and frightens me. The Coast Guard could even consider that they should have the capacity to contact someone and to ask them to switch over to VTS and to press a button on 13 with a shore-based station is criminal, and the consideration of such astounds me, that the Coast Guard would even think they should have the ability to do this.

I was told, "Well, this will only be done in case of an emergency." Who determines what is an emergency? Is an emergency a vessel that has the audacity to pass through the system without reporting? He knows he can be contacted on 13, so the radio operator switches on 13 and says, "Come on over to 11. I want to talk to you." I cannot visualize this as an emergency; and I think the capacity to even be able to transmit on 13 should be left—I state these things not with just theory; I say this might happen or it could happen.

I am saying this, that with personal knowledge that it is happening. It is happening in the Morgan City area. There is the Morgan City VTS that has not been brought up. It is a control and it is a control that was needed. I cannot argue with that, of vessels in a one-way traffic situation through a very hazardous situation in which what is known as the Burwick Bay Ring and highway bridge, and this control is necessary but, again, transmissions are taking place on channel 13 from a shore-based operation.

When that key is pressed—and I am certain this station on that bridge does not have the power output nor the antenna that is proposed for the VTS system—when that button is pressed, it wipes out all bridge-to-bridge communication in an area of approximately 30 miles around the Morgan City area.

So we feel that—we know that this is something that is being done and we know that it could be done again if it were implemented in the New Orleans area.

I would like to quote yesterday from the record by Mr. Heyward to the admiral on bridge-to-bridge communication.

Mr. Heyward asked the admiral, "Does the Coast Guard have any statistics which would indicate conclusions as to effective use of bridge-to-bridge radio telephone in casualty prevention?"

And the admiral's reply was, "I do not believe we have a specific study, based upon solely the bridge-to-bridge; no."

This has been an act that has been in force since 1973. If there are no studies based on whether bridge-to-bridge has helped the industry, a direct communication from vessel-to-vessel; if we do not know whether there is any good or isn't any good, then what basis are we using to implement a VTS?

VTS as proposed is nothing more than another bridge-to-bridge with somebody standing in the middle and telling you where the people are supposed to be. We have VTS right now; bridge-to-bridge is VTS.

When we meet a boat, if the channel is available and clear to us, that vessel tells us who is behind him; he tells us everything that is in the immediate area that he has just recently passed.

This is passed on to the captain of boats for him to evaluate. We are not interested in what is going on at the head of the path or 20 miles or 30 miles or 50 miles down the way. It only adds confusion to the situation.

Our interest in making our decisions in navigation are based strictly on what is immediate; what is immediate. You do not want to know what is happening 15 or 20 miles down the highway when you are driving a car. You are interested in what is in your view, who is going to come out from a side street, who is approaching you.

You cannot make a decision 15 or 20 miles away or even need that knowledge to safely operate your vehicle nor do you need it to operate a vessel.

In closing I would like to make an example as to how we visualize the time consumption at VTS.

What we did is try to make as honest an evaluation as possible in making a contact and hypothetical situation in which a vessel wants to leave a dock; and we made it simple because the vessel was leaving the dock within one VTS zone. He is not crossing into or coming from

another one and we would like to try to show the amount of time that is consumed just for one vessel merely to report in, just to report in, and then he has to be given back all the information VTS can make available to him.

At 0100, the vessel is tied to the dock and he is preparing himself to leave; I mean 1 minute after midnight, he calls the Coast Guard. He is in sector 3, which is the New Orleans sector, which starts out about mile 129 as the chart indicates.

He is at dock mile 122; the vessel calls as prescribed. "This is the tow vessel, *Big Tow* WXZ–5729, calling Coast Guard vessel traffic control sector 3. Come in, please."

The Coast Guard answers, "This is sector 3, Coast Guard, New Orleans, come in."

"This is tow vessel *Big Tow* WXZ–5729. Our position is mile 122-at the ABC chemical dock. We presume we will be able to get underway within 30 minutes. That would be 03100, please. Our destination is southbound in the Mississippi River to our chemical dock down on Venice mile 10. Our ETA of our destination is approximately 12 noon tomorrow. Our deep draft is 9 feet. The number of barges that we have in tow, sir, are four. Our dimensions are 175 feet long by 104 feet wide. Yes, sir, we do have Danish cargo on board, ethyldichlorene. No; there was no phone available here. We could not call in. That is why we had to come in on channel 11. We will be getting underway in approximately 20 to 30 minutes. We will call you at that time."

Then before you can leave the dock, he must make his contact again. Of course, he does not have to give all this information, but still another contact is made.

At this time, the Coast Guard would relay to him all of the vessels that should or could affect him in the VTS area. That means not only vessels approaching him from the south because he will be southbound, but he has to know of the vessel that are coming from the next sector so he will have to talk to sector 4 as well as sector 3, because sector 3 could not give him the southbound information coming from Baton Rouge, so sector 3 would fill him in on what is northbound. Sector 4 would have to fill him in on what is southbound, and by this time, the guy is already behind 10-minutes on his schedule, so he will have to update his thing because it was a quarter to 11—a quarter to 2 before he finally got away from the dock.

If this would end, that would not be so bad; but if as the Coast Guard proposes every 10 or 15 minutes, and I am quoting from the record of yesterday. "This man would be updated." This sounds really fine, if this guy was the only person on the river in this sector coming down, but he is having to listen to everyone else update everyone else's traffic.

I cannot visualize how this channel could have a minute of free time in sector 3 area.

I think it would just have to be total dialog to relay all this information and for the VTS to relay this information back.

The only thing that I can see here that would help, you know, is what we would put in before. We feel the bridge to bridge should be limited to vessel traffic only. I am in strong favor and feel that if a bridge-to-bridge investigation had been made to evaluate the use of bridge to bridge, we would have a system now that could be maybe

in operation but, if not, at least proposed and which we would have sector bridge-to-bridge.

This, gentlemen, is what I feel is the answer to our communications problem in the New Orleans area, the area in which the traffic situation is the greatest, and everyone is having to share one channel for all contacts. You must listen to vessels on Lake Pontchartrain, listen to vessels on the Gulf Intercoastal Canal; you must listen to vessels negotiating the locks. All of this traffic takes place on channel 13.

If there is a sector bridge-to-bridge service available to us in which the operator would know that he would change his bridge-to-bridge channel at certain locations so that there would not be an intermixing or a crossing of bridge-to-bridge communications; that the only traffic that you would hear would be traffic that interests you in your immediate area, and I think we would have the best VTS that could be offered to us.

And with that type of a bridge-to-bridge communication there is no reason that I can see—that I speak again for my industry—that they can see there is any necessity to go through a third party to get the information that we have readily at hand from oncoming vessels, from vessels behind us, vessels we approach, and the information that we relay to our fellow people in the industry.

Going through a third party can do nothing but confuse the issue, because we are having to try to decipher that which pertains to us and weed this out through a tremendous amount of other stuff.

If you would try to visualize the root that you are probably best familiar with from your home to your office that you take each morning and each evening, you know that route like the back of your hand. You know without even thinking where you are going to turn, where the top signs are, et cetera. If someone were to ask you at what time do you cross Main and 7th, could you tell us? Even though you do it each day? It is just one-third or two-thirds of the way down from your office to your house. You do not time that. You do not try to predict an ETA in the middle of a voyage. It is not necessary, just as it is not necessary in an automobile.

I find that this would be a perfect example of trying to drive to work with two citizen band radios going in your car at one time, and your wife and your mother-in-law shouting orders at you, trying to concentrate on the job at hand of trying to prevent someone from getting run over by some damned fool coming out of an intersection; and this is how we evaluate what bridge-to-bridge would do to our industry, based strictly on a voice communication as set up at the present time.

Thank you, gentlemen.

Mr. BIAGGI. Thank you very much, Captain Conrad. Yours was a very vivid description of the conditions. You pose some very interesting questions, the answers to which we certainly will obtain; and I suggest the Coast Guard be in a position to respond to them.

As I see it, there are some very real problems here. I do not know that everything you say is accurate or is as critical and crucial as you make it appear; but until we get a response from the Coast Guard, that is the picture that is in my mind.

We have always had a question, frankly, of whether or not we have sufficient channels, and I have heard witness after witness, in hearing

after hearing, make reference to the same problem. What we contemplate doing is bringing representatives of the Federal Communications Commission to provide some answers; and we will inquire of them in connection with the problems of communication.

Mrs. SULLIVAN. Mr. Chairman, would you yield for just a moment?

I do not want to upset your hearing schedule, but I just wonder if there are any Coast Guard officials here now who might briefly explain to us why these changes are made in the channels, as the captain has explained it.

Mr. BIAGGI. Admiral Fugaro, could you answer briefly, so that those who were not here yesterday——

Admiral FUGARO. I would be glad to, Mr. Chairman.

With respect to the channel which we have selected, these are the channels for VTS all over the country, 11, 12, and 14. So part of our thinking in assigning these channels to the various port areas is to assume or achieve some degree of standardization, not only for river traffic, but for all vessels which are using VTS.

So this is why these channels have been allocated for just VTS.

Going back to the point the captain was making—Captain Conrad was making with respect to channel 13, the law does authorize the use of channel 13 for navigation, taking information, and also, as he stated, with respect to locks and bridges; it is authorized for the passage of navigation and safety information.

One thing, though, I think needs to be clarified. The Coast Guard transmitter on channel 13 will be a 1-watt transmitter, which is the maximum allowed by law so that we will not be blocking out other people as he indicated. I think again perhaps he had misinformation on that point.

The blockage that he was talking about or the frequency capture that he was talking about was really for the VTS channels that we are talking about, 11, 12, and 14, and the various sectors.

Mr. TREEN. That would be the 50 watt?

Admiral FUGARO. Maximum is 50 watt. We do not intend to go up that high.

Mrs. SULLIVAN. May I just comment on that.

I can see the reasoning of designating certain channels for certain uses; but would that channel be used in the same manner in other areas as it would be where these towboats are running in a particular part of the river?

Admiral FUGARO. Again, we have got experience in this area, Mrs. Sullivan, which indicates that we are able to work within the channels under the system as we contemplate for New Orleans.

Mrs. SULLIVAN. Now, your men, captain, your men who use these channels, what is your answer to this? Do you think that could be worked out, that others using that channel only use it for the same thing you would, or is it going to be too crowded for everyone to use that channel for that same information?

Captain CONRAD. There is no guarantee that channels 11 and 14 and 12 would be aboard any vessel that would come into the New Orleans area. Probably our biggest vessels to control are tankers and large grain ships that come through the area. There is no guarantee these vessels would be equipped with these channels.

I feel that the harm of taking these channels away from our industry, leaving us nowhere to go except to be pushed over and be further

crowded in trying to dispatch and operate our industry provides a burden on us far greater than a specific additional channel that would be specifically for VTS use, and I think with New Orleans, you know, I am in agreement that it is nice to have everything uniform; but the kind of vessels that we are interested in, kinds of vessels we have are limited by design and style and so forth, to the inland waterway, which is known as the Western River and goes up the Mississippi; and these vessels are not going to be going to Seattle or some place like that; and I just feel the taking of these channels away from us will really cause us a lot of grief.

Mrs. SULLIVAN. Admiral, is it your idea to unify all vessels that come up and down in these areas to use, regardless of whether it is a ship, towboat, or whatever else, runs—

Admiral FUGARO. Mrs. Sullivan, if and when a VTS system does become a mandatory system, then, yes, there would be complete standardization within communications. The vessels which would come into the port would be required to have these channels to communicate with the VTS.

Mrs. SULLIVAN. How would you make it mandatory, by law or regulation?

Admiral FUGARO. By regulation. The law providing for the establishment of VTS has already been passed, of course, as you know, through the Ports and Waterways Safety Act. The regulation which would then have to be promulgated under this act could then require these particular channels under the regulations be required in order to participate in the system.

Mrs. SULLIVAN. Is it possible to limit what can come over these particular channels within an area, or would there be a jumbling of various orders and instructions coming through at the same time to really mystify the person who is receiving it?

Admiral FUGARO. We do anticipate dedicating the channels for just VTS, as Captain Conrad just stated; and, in effect, they have to go—leave the 11, 12 and 14 channels. We will be facing that; and there is approximately a five-year period during which already-existing permits will not be reissued on these channels. So we do expect some problems during this phaseout period, hopefully less and less, to the point where we would have a totally dedicated channel for VTS.

Captain CONRAD. I can confirm that my channel 11 was taken away from me.

Mrs. SULLIVAN. That is why I wanted it answered now, not when we read it some time later, because you are the people who are involved and, you know a lot more than we will ever pretend to know. We cannot just decide who is right and what is right without a good discussion among all those who are involved; and it just seems to me that there has to be a meeting of the minds; because when you need information you need it now; and they cannot wait 10 or 20 minutes, if the channel is cluttered up with other messages.

So these are the things that I think we are all trying to accomplish to try to help work this out and get a system; but I would like to see you argue this out in the open so that you can come to some kind of a satisfactory solution.

Thank you, Mr. Chairman.

Mr. BIAGGI. Thank you, Madam Chairman.

Captain Conrad contended that when the Coast Guard, with its antenna power got involved, everything else would be blocked out because they are limited to 1 watt.

Admiral, to respond, they could only have 1 watt, and that would be a fact that that would not happen on 13?

Admiral FUGARO. On 13?

Captain CONRAD. Sir, if he had, as he first stated, I find it hard to believe that Morgan City blankets the area with 1 watt, but we will leave that up for discussion; but if this is so, if the Coast Guard has only the capacity to transmit on 1 watt on channel 13, sir, they have no reason to transmit. They cannot cover their VTS area. They could only cover a vessel that was in sight of the antenna, so there is no reason for them to transmit.

The reasoning that I was giving today and yesterday for having the capacity to transmit on channel 13 was that they could blanket the industry with necessary information if it became an emergency, or they could communicate with a vessel that did not have the capacity to communicate in VTS and give them instructions, pass on messages on something that was necessary; but if they have the capacity to transmit on only 1 watt, that means they can only talk to vessels that are in sight of their antenna.

Admiral FUGARO. That is correct, Mr. Chairman; but as I think we pointed out yesterday, we will have multiple transmission sites which are planned to cover the entire area. I believe that on our chart we point out the four transmission sites, one down river, one in each sector; but Captain Conrad is correct that these will cover the entire area. The 1 watt will be with the channel 13 only. The other channels will be on a higher wattage.

Mr. BIAGGI. I want to stay with his response that it would be a 1 watt.

When you are on a 1-watt transmission——

Admiral FUGARO. Yes, sir; on channel 13; right, sir.

Mr. BIAGGI. Captain Conrad contends that it would be limited. He could only transmit to ships that are in sight.

Now, I think you responded, if I understood you correctly, that you have four transmission sites.

Are they 1 wattage, or——

Admiral FUGARO. Let me verify this, Mr. Chairman, if I may.

Mr. Chairman, that is correct. There are five, not four, transmission sites, represented by the red triangles shown on that chart there, and these will be the transmission sites for all of the channels which will be transmitting within any one sector.

The operator at the VTC will control which channel and in which area he will be transmitting.

Mr. BIAGGI. All right.

Now, let us go back to 13.

Thirteen, I assume, is one of those channels which the operator will be functioning.

Admiral FUGARO. Yes, sir.

Mr. BIAGGI. Now, we get on 13, they are all 1-watters.

Admiral FUGARO. Yes, sir, wherever the 13 will be a 1-watt transmission.

Mr. TREEN. Where will they be?

Admiral FUGARO. There will be five different sites.

The CHAIRMAN. How many miles away? How far is one watt?

Captain CONRAD. Theoretically, just strictly at a line of sight.

Mr. BIAGGI. Will those five transmission sites and the 1-watt power, will that be adequate to deal with the problem?

Admiral FUGARO. Yes, sir. They will cover the entire VTS area with the channel 13.

Mr. BIAGGI. Only on the 1 watt?

Admiral FUGARO. On the 1 watt; yes, sir.

Captain CONRAD. Sir, I beg to differ. If you have a transmission of 1 watt coming out of this antenna and sector 1, looking at the Gulf of Mexico, 15 miles out into the sea buoy, you are looking above mile 10 Venice, mile 15, VHF at 50-watt transmission will cover this area nicely. One watt from this transmission site may have a transmitting power if no one else is using the facility or the chnanel as far as possibly the head of the passes, certainly not down these passes. There is no way that 1-watt transmitters from these sector sites could cover a sector. You would have to switch over to more wattage or you have nothing really to transmit; but even a 1-watt transmission from this sector site would interfere greatly with innumerable vessels trying to negotiate locks, bridges, meetings, crossings, and in a highly congested area right here because their antenna which is an important factor will be higher than anybody else's antenna, so it will blanket an area far greater than a lower antenna; but with one watt, it probably could cover the metropolitan area; but that would probably be all.

But certainly no 1-watt sector antenna from this area here could cover this sector and especially these bigger sectors.

Mr. TREEN. May I ask a question?

Captain Conrad, a minute ago you said 1-watt power would only permit you to communicate on a line of sight.

Captain CONRAD. Theoretically; that is, supposedly; but the higher the antenna, sir, the longer the line of sight. If you are standing on the ground on a flat surface you can see less; with your eyes 6 feet off the ground, you might see about 10 or 14 miles; but if you put yourself up on a mast of a ship, your vision increases, generally speaking, you know; and a line of sight is pased on the height of the two antennas; and so if you have one antenna that is more greatly raised than the other, naturally, his line of sight will increase.

Mr. TREEN. The question I specifically had was that transmitter located, it is about at the Algiers point, is it?

Captain CONRAD. On top of Governor Nichols Street, I assume.

Mr. TREEN. Would you be able to communicate down river there, past that large crossing there; in other words, toward the end of the sector?

Captain CONRAD. To the end of the sector.

Mr. TREEN. Your response is, if that antenna were high enough, yes, it probably could?

Captain CONRAD. Yes, sir.

Mr. TREEN. Thank you.

Admiral FUGARO. Mr. Chairman, Mr. Treen, these antennas will be approximately 100 feet high; so they will be fairly high antennas for these purposes, as Captain Conrad stated. They will extend a line of sight by this height.

Mr. BIAGGI. So what Captain Conrad has said, as a matter of fact, as far as the limitation on 1-watt power transmitters is not accurate?

Admiral FUGARO. We believe with the antenna height, we will be covering this area.

Mr. BIAGGI. You have certainly taken that into consideration, the distance?

Admiral FUGARO. Yes, sir.

Mr. BIAGGI. The committee will be going to vote now. It is 11:45.

We will stand in recess until 1:30, and then we will return, and hopefully complete the testimony of the various witnesses.

Mr. O'NEIL. Mr. Chairman, in view of the fact that Mr. Treen may not be able to be back, may I just make one statement which I think——

Mr. TREEN. I just will not be here at 1:30. I have got another meeting at 1:30 and I have got to take 15 or 20 minutes.

Mr. O'NEIL. If I may say one thing that I think will focus the problem that this industry has had with the Coast Guard from the inception of this project, it is apparent right here at this moment, based on what has happened in the last 5 or 10 minutes.

Yesterday, upon questioning from Mr. Treen about the 50-watt antenna, the question I have in front of me was put to Admiral Fugaro in this fashion:

> Is there any problem with respect to communications if you are transmitting on a 50-watt output; and I think that is what you anticipate; is it not?
>
> Admiral FUGARO. Yes, sir.
>
> Mr. TREEN. From your tracking center in New Orleans, what affect would this have on the bridge-to-bridge communication channel within, let us say, 20 or 30 miles from the VTC?
>
> Admiral FUGARO. While transmitting on channel 13?
>
> Mr. TREEN. Yes, sir.
>
> Admiral FUGARO. We would assume that there would be, if the Coast Guard was transmitting on 13, yes, sir, there could very well be interference with other transmissions on 13.

Now, we go from 50 watt back to 1 watt to a tower, and this is where the frustration that this group has where the Coast Guard comes into play. There is no firm footing on what is going on, and I do not wish to fault Admiral Fugaro—I know he has just gotten into this—but this has been the cause of some of the frustration that this industry has encountered in the past year.

Thank you.

Mrs. SULLIVAN. Mr. Chairman, could I suggest they have a friendly discussion before they go out and eat and see if we can come to some agreement here?

Mr. BIAGGI. I think it is more friendly after they eat.

We will recess now.

[Whereupon, at 11:45 a.m., the subcommittee recessed, to reconvene at 1:30 p.m. this same day.]

AFTERNOON SESSION

Mr. BIAGGI. Admiral, would you come and sit at the witness table, please, so we can continue this dialog?

Admiral FUGARO. Surely.

Mr. BIAGGI. I believe when we left off, Mr. O'Neil was making a comment.

Mr. O'NEIL. Mr. Chairman, the comment I was making was in reference to highlighting what we feel has happened before about switching of positions and communication and I just used that as an example of what this industry has been confronted with for some period of time.

This is the sort of thing that makes it so frustrating at times to deal with the people who want to put the system in because sometimes we think the Eighth District Coast Guard says one thing and then we are confronted and faced off with Washington; and when Washington is confronted, they have no knowledge of what is going on in the Eighth Coast Guard District; and I used that as a reference point. That was all.

Mr. BIAGGI. Captain Conrad, let us get back to 1-watt power transmitter.

Are you satisfied with Admiral Fugaro's response?

Captain CONRAD. I am satisfied with, you know, with the understanding that the wattage will not be in excess of 1 watt; but I am not satisfied in the response that it will be used without really making that clarification as to how and when, because even if 1 watt of power in the line of sight and antenna, as we explained, on a high tower, as they envision, would still knock out a tremendous amount of bridge-to-bridge communication in New Orleans Harbor, by utilizing 13.

I think that should be of the utmost discretion, whenever that would ever be implemented.

Mr. BIAGGI. If I understood you correctly, you say initially about the 50-watt now we have reduced it to 1 watt because you have a high antenna of saying we transmit with a high antenna 1 watt and it will still have the same effect?

Captain CONRAD. No, sir, it will not have the same effect—will not have broad coverage, but in the New Orleans area, with the converting of the canals coming from the west and the east, ship channel running parallel, and so forth, it is a tremendous amount of vessels that are, even outside of the system, not counting the ones that are in the system that would be affected by transmission even of the 1 watt on channel 13, and channel 13 is designated to be specifically a bridge-to-bridge voice communication in making and understanding of passing and meeting and so forth.

Mr. BIAGGI. Admiral Fugaro.

Admiral FUGARO. Mr. Chairman, I think both of these points are the points that Mr. O'Neil made and Captain Conrad made and are tied together.

Yesterday in my testimony, when I referred to the fact that we anticipated there would be some level of interference for channel 13, it was the fact that Captain Conrad is saying when we do come on other frequencies, somebody else will be working on that, that is when the Coast Guard will provide a level of interference.

But getting back to his point about the utilization of this channel and the control of the Coast Guard's utilization of this channel, we would have specific instructions certainly within the operating manual that will be developed so that there will be strict limitations placed upon the Coast Guard VTC when it is actually utilizing the channel.

It is not a blanket taking or utilizing any time you have any trouble with anybody else. That is not the intention of our use of channel 13.

Mr. BIAGGI. What is the intention?

Admiral FUGARO. It is our intention with the use of channel 13 as an emergency backup in the event there is some reason for us to get some particular information of a rather emergency nature to a vessel. Perhaps if we see a couple of vessels together and have only been able to communicate with one; that is the sort of thing where we feel it is imperative that we do communicate something to vessels within the system.

Mr. BIAGGI. If you could estimate on the basis of your experience, how frequently do you estimate that would occur?

Admiral FUGARO. Mr. Chairman, I really do not have any personal information on the utilization of this; but, say, within the Houston area, however, I will be happy to get this estimate from Houston and submit it for the record.

Mr. BIAGGI. Thank you, sir.

[The following was received:]

USE OF CHANNEL 13

It cannot be determined from experience in the operation of existing vessel traffic services how often we may expect to resort to the use of the vessel bridge-to-bridge radiotelephone frequency, channel 13, to contact a vessel that cannot be reached immediately on the VTS sector frequency. The Coast Guard does not yet operate a VTS wherein vessels are required to maintain a continuous listening watch on a frequency other than channel 13. It is estimated that when all participating vessels are maintaining a continuous listening watch on the VTS sector frequencies in the New Orleans VTS, the vessel traffic center's use of channel 13 will be minimal (i.e., less than one transmission per hour).

Experience in the operation of VTS Houston-Galveston has shown that, because of Coast Guard presence on channel 13, the efficiency of usage of that frequency has risen from 56.2 percent, in the pre-VTS month of June 1974, to 97.0 percent during August–September 1976. Channel efficiency is the ratio of valid messages (i.e., conforming to the intended purpose of the Act) to total messages on that frequency. It is expected that the establishment of VTS New Orleans will have a similar beneficial effect.

Captain CONRAD. The designation by the FCC for safety, Mayday calls and distress is channel 16, not channel 13. Everyone is supposed to be monitoring 16. That channel should be adequate with 50 watts of output to get across any message necessary.

Mr. BIAGGI. Admiral?

Admiral FUGARO. I think though we want to save channel 16 for the very intended purpose that Captain Conrad said, as a distress frequency; and I do not think necessarily we are talking about distress in high frequency when we are talking about passing navigation safety information. I think we would be better to leave channel 16 clear for its intended purpose and utilize channel 13 for this purpose, of course, within the limited utilizations and controls as I mentioned before.

Mr. BIAGGI. Let me ask you this question.

What experience do you have on the frequency of the distress calls, Mayday calls?

Admiral FUGARO. I know in all distress frequencies, part of the problem has been unauthorized utilization sometimes, interfering with distress situations. For this reason, I would advocate that the utilization of any distress frequency should be kept completely clear of any extraneous communication.

Mr. BIAGGI. I can appreciate if you do not have the answer to my question; but notwithstanding that, I would appreciate if you could submit for the record the experience you have had with distress calls.

Admiral FUGARO. Yes; be glad to, Mr. Chairman.

[The following was received:]

DISTRESS CALLS

During fiscal year 1975, the Coast Guard received 14,446 distress calls from vessels on VHF–FM frequency 156.800 MHz (channel 16).

Mr. BIAGGI. Thank you.

Mr. Heyward.

Mr. HEYWARD. In connection with the channel 13 usage, this is no change from the present use of the channel; is that correct, the proposed change?

Admiral FUGARO. No, sir.

The utilization we are contemplating is within—in accordance with the law.

Mr. HEYWARD. And if the Coast Guard transmissions are at the same level of power as the transmissions from the ships, it would really mean one more "ship" on the channel. Is that not so?

Admiral FUGARO. That is right; and that is the level of interference I am referring to, the fact that one more——

Mr. HEYWARD. And also I would assume that any rules you have in the use of that channel would restrict its use, at least, except in a dire emergency, to a situation where you would not interfere with information being exchanged by two passing vessels at the time you wanted to send transmissions?

Admiral FUGARO. Yes, sir.

Mr. HEYWARD. Frankly, I think that while it is entirely proper to keep the channel restricted, that the use by the Coast Guard, in special situations, would not create a tremendous impact on the use of the channel.

Is not that channel used by more than two ships in the same area at times?

Admiral FUGARO. This is channel 13 you are referring to?

Mr. HEYWARD. Yes; I mean, there are passing situations between ships now that are potential interferers with other conversations going on?

Admiral FUGARO. Definitely; yes. It is being used by more than one ship.

Mr. HEYWARD. Improperly used? And one should not be using it to interfere with somebody else's use of it at that time?

Admiral FUGARO. That's right.

Mr. HEYWARD. Is it not really a question of monitoring the system to see that it is properly utilized and not being used for purposes other than it was designed to be used for?

Admiral FUGARO. Yes, sir.

Mr. HEYWARD. Does the Coast Guard have any responsibility in that regard?

Admiral FUGARO. With respect to channel 13, and the bridge-to-bridge, these are promulgated under Coast Guard regulations which require the equipment to be aboard and which require or state the situation under which the equipment would be utilized.

Our experience in the Houston area with channel 13 is the fact that the Coast Guard is on the system and has helped to clear up extraneous communication on the system.

With respect to monitoring the system, the Coast Guard has promulgated regulations, as I mentioned, with respect to the equipment and the utilization of the equipment; but the actual monitoring of a particular frequency usage I believe is a province of the FCC.

We have occasion when we have heard unauthorized transmissions on channel 13; have been able to identify the particular unauthorized user and have communicated to this user and found this somewhat of a beneficial effect, even though it is not strictly an enforcement procedure. It is sort of an acknowledgement to that user that he should not have been using the system at that particular time.

Mr. HEYWARD. Does the FCC have adequate monitoring of that system, in your opinion?

Admiral FUGARO. I would defer to the FCC to comment on that. It is apparent, though, that channel 13 is not serving its purpose in the sense of there is more communication on there than there should be.

Mr. HEYWARD. How about the wattage, Captain Conrad; in connection with the wattage, are the vessels and their equipment limited to the use of 1 watt, or do they have the possibility of using higher power on their equipment?

Captain CONRAD. Sir, they are limited legally but, of course, you have equipment that could be in service that would have been built prior to the enactment in 1973; and it seems it is just general policy to let the stuff wear out before you have to replace it, and we also have the condition of many foreign vessels coming into our system.

These foreign vessels, when they are clipped with the use of VHF channels in the area, pilots tend to use them when they are not using their hand-held sets; so the strength of the signal coming from a channel 13 user could vary tremendously.

In theory, the signal should be the strongest signal that is being put out from the closest vessel, but that is not always the case.

Mr. HEYWARD. Is one of the problems presently on 13 that, perhaps on occasion, the people who are using it are using more power and therefore interfering?

Captain CONRAD. Yes, sir, that is right; definitely so.

Mr. HEYWARD. Do you know whether the FCC has done anything about correcting that or attempting to correct it?

Captain CONRAD. Do I personally know?

Mr. HEYWARD. Yes; I wonder whether you were familiar with any complaints that had been made to the FCC.

Captain CONRAD. No. Personally, I don't think there that FCC is monitoring as such. They do on channel 16 and issue citations. I think the reason for this is because of the very limited scope of the channel that they do not pick up as much citations about.

They have listening posts, we know of, down in Texas, near the border, near Mexico; and most of the citations orginated in our area come from there; so unless there is some kind of an alarm they would not be able to receive a channel 13 communication.

Mr. HEYWARD. Well, in your opinion, is channel 13 being abused now, without regard to this VTC?

Captain CONRAD. Channel 13 is being abused, sir, only because it is being overworked. I think overwork is a form of abuse. It is not serving our purposes because there are too many people having to share too little space.

Mr. HEYWARD. When you say "sharing," are they restricting their transmissions to the legitimate use of the channel?

Captain CONRAD. Well, I do not think that you could say that with a blanket "Yes." I think the average boat operator follows the law. He makes his initial contact; if he has nothing more, makes a passing-on agreement; and they generally do it right on 13.

If the conversation is going to be extended past that they are supposed to agree on a mutual channel that they can both switch over to if they have more to discuss than just the normal passing or meeting situation, and the agreement.

Of course, it is abused. I think everything is abused; and policing would definitely help; but we have too much overriding characteristics of the channel because of the close proximity of too many waterways in one area, all running parallel, nothing stopping.

This is not mountainous area. Ther is nothing going to stop a transmission from coming across the flat on the land down there; and so you can receive a strong channel signal, you might be receiving out of the middle of the Mississippi Sound, maybe a ship coming up the Mississippi River down at Pilottown, which is definitely no distress; and we have experienced that, continuously.

Mr. HEYWARD. Now, as to 11, 12, and 14, and the fact that these will be dedicated to VTC use, during the overlap period, obviously there is going to be a tremendous problem on this same type of thing.

Ultimately, in terminating present uses on those channels over a period of time and forcing those people, including you, to shift to some other channel, has the FCC indicated any plans at all for alternative channels for usage to replace these channels?

Captain CONRAD. No, sir, they have not. They have not. We have not been able to get any assurance whatsoever that anything else will be made available.

At the expiration of my license, I was just to pick out another channel. I selected the channel that was overcrowded 10 years ago.

Mr. HEYWARD. That is an existing channel for the same type of usage?

Captain CONRAD. Yes, sir. I had to select a channel that I passed up when I got my initial license on this 5 years ago.

Mr. HEYWARD. How were these choices made originally? Why did you pick one of these three, because the others were saturated?

Captain CONRAD. Yes, sir. You can only, depending on your business and the situation you are in, you are normally licensed only on two channels, 16, which everyone must have a license on, and a working channel.

The working channel could be either a port operation channel or it could be a commercial channel. They will not issue two commercial channel licenses simultaneously.

Mr. HEYWARD. You have to make a choice?

Captain CONRAD. You have to make a choice. If you can prove need, you can go back to the FCC with this application and get one port operation channel and one commercial channel, so that we had an alternate; but normally they will not give you that alternate.

Mr. HEYWARD. How about the port operation channels; are they being saturated with nonessential usage? Is that one of the problems?

Captain CONRAD. I think you have so much business being conducted on so few channels that I cannot say that, you know, you could

clean it up just by removing the nonsense; because with the Corps of Engineers using those channels 12 and 14, it is both 12 and 14, the Corps of Engineers switches over to make their agreement with you and giving you your position at the locks——

Mr. BIAGGI. When the Corps of Engineers injects itself onto the channel, do they block out everybody else?

Captain CONRAD. No, sir. The Corps of Engineers has transmitting capacity on those particular channels about equal to that of the vessels; because on those channels everyone is allowed to have either 25 or some stations have up to 50-watt sets; but the corps has no more power than ABC; and so they are just sharing those channels. They have no control over them with all kinds of other port operations that are going on, blasting ships loading, just the whole gamut—the whole facet of operating the port and surrounding area, dispatching grain barges to elevators, et cetera.

Mr. HEYWARD. In connection with your statement on page 3 of your statement—and it was the basis for one of Mr. Treen's questions—you referred to 270,000 vessels transiting earlier.

Is that the total vessels transiting?

Is that including——

Captain CONRAD. Sir, the admiral is in a better position to answer that. We said we got this information from them.

Mr. HEYWARD. I would assume that that would include, for instance, all the barges in tow, rather than those that are reporting.

Admiral FUGARO. That is correct. The number that is cited there, 270,000, represents total vessel transit; so it includes the figures of barges.

I think within that figure, the 270,000, we are really talking about 70,000 communicating vessels. The rest would be the other 200,000, which would represent barges which, of course, are not manned.

Mr. HEYWARD. 70,000.

What does that work out to, approximately 200 daily?

Admiral FUGARO. About one-quarter of the total.

Captain CONRAD. On a daily basis.

Admiral FUGARO. Yes; on a daily basis.

Captain CONRAD. But you see you are only counting vessels in the system. You have to count the vessels that are in the adjacent system. This is the crux of my situation, and I am trying to put us into—you cannot look at the Mississippi as an entity in itself. It is only the mainstream of so many branches coming off and, after all, having to share the same communications network, and so even if there were 70,000 vessels in the system and the VTS system, that still does not answer the question of all of the vessels, port operations, land-based stations, et cetera, that are sharing this net of communictions; because you must take into consideration the whole picture; and not just the VTS system.

Mr. HEYWARD. At such times as these channels became dedicated to VTC, these other transmissions in the area outside of the VTC are not going to be conducted; is that not correct? So that aside from your other problem of getting adequate channels for your own use, this interference problem you are talking about is in the overlap period.

Captain CONRAD. And how far is the control that the FCC has placed on not renewing licenses? The FCC gets a license renewal from

a station, a shell operator on Lake Pontchartrain with a very high antenna, using channel 14 for a number of years.

Is the FCC clear enough to be able to determine that this would interfere with the VTS net, or do they just eliminate people who have an address of New Orleans?

Mr. HEYWARD. It is my understanding that this would be dedicated to vessel traffic control, not only in New Orleans, but elsewhere; is that correct, Captain?

Admiral FUGARO. I believe that is correct, Mr. Heyward. And I believe certainly within the New Orleans area, when and if the system comes into existence, utilization of 11, 12, and 14, that the issuance of permits will be ceased in the surrounding areas also, and exactly what the geographical limits of ceasing these issues, I am not sure.

As I say, I think it is the intention to dedicate these frequencies to VTS.

Mr. HEYWARD. Well, I think Captain Conrad has done the committee a great service in bringing his viewpoint here, and I think a lot of the problems are problems that are beyond this committee's purview, but nevertheless, as the chairman indicated, we are going to have the FCC come up here and we will discuss with them these problem areas and see what kind of assistance we can get from them in resolving some of these issues.

Captain CONRAD. Does he give latitude and longitudes of what he can serve, the area that would be served?

Mr. TREEN. Before we go to vote, I just want to have Captain Conrad touch on this question of the regulation requiring that the communication be in the English language. I represent a lot of people who only speak French down there.

What is it going to do to these people? And is this a significant problem or not?

Captain CONRAD. I think that that is the—kind of an oversimplification, sir. I think that it would not be necessary, however, for a real "Cajun" to stand by the radio, but I think what this situation does call for is to have the person who is capable of understanding the local knowledge and customs.

We look at this thing as if we were running a railroad track or an interstate that is conveniently marked along the side of the road every mile is a little number which comes up and shows you practically where you are. This is not the case.

These people have engrained in their own minds local names, and some of these names are in French and some versions of French; but they have called these areas for years and years and these people that operate in this system are not capable and exceptions were made, realizing these capacities in the licensing.

These people are not capable of reading a mile chart that would designate that such and such a place is exactly so many miles.

Mr. TREEN. All right.

That part of the proposed regulation which requires communication in the English language is not a problem then?

Captain CONRAD. I think that most of the people can get by on the English. I would not say they would be non-English speaking, but I would say they are—there are many that their English is very, very limited.

Mr. TREEN. Has there been any problem under the Bridge-to-Bridge Act with respect to local color and local language?

Captain CONRAD. I think people who are in a better position would be some of your Yankee friends that come through the area.

Mr. BIAGGI. The Civil War is still on.

I think we will recess for 10 minutes.

[Short recess.]

Mr. BIAGGI. The meeting is called to order.

Mr. O'Neil.

Mr. O'NEIL. Mr. Chairman, if I could make one comment on the French language, to put that to rest.

The only point we had in raising that is the fact that some of the transmissions in the New Orleans area, particularly the Morgan City area and the canal, are not in French, but they are not in English, either. They are in something between; and our own purpose was perhaps some consideration to be given to having someone on watch in case you get a critical situation where the transmission back and forth between the vessels cannot be understood because of that problem, which does in fact occur.

But it is not to be misunderstood as a requirement that transmission be made in French. That is not what we pointed out as the local custom that has given rise to potential companies.

Mr. BIAGGI. It comes back to the question of whether we engage local people—employees.

Mr. O'NEIL. Precisely.

Mr. BIAGGI. I am sure the Coast Guard will take that into consideration. And that is an important factor. Mr. Treen.

Mr. TREEN. One other question. In your statement on page 4, Captain Conrad, you talk about training. You said:

> * * * it is uncontestible, we believe, that there is no position in the Coast Guard where a person may gain practical knowledge concerning the day-to-day operation of a large seagoing vessel and river tows navigating the proposed VTS area.

As I understand from Admiral Fugaro, there will be on-the-job training, so to speak, on the various types of vessels which will be transiting this area.

Mr. O'NEIL. Mr. Treen, that was Captain Bullard's statement, which we will get into, that you read into this proceeding in that direction, and perhaps you can address that directly.

Mr. TREEN. Maybe you can answer that now.

One of the issues you have raised here is that you do not think the people in the VTC will have the knowledge necessary to understand what is going on in the river. What kind of training do you think is going to be required? I would like to have that answered while the Coast Guard representative is here and perhaps can respond to your response.

Captain BULLARD. Congressman Treen, the Coast Guard insists that we have a minimum of 3 years' service in on-the-job training before we can set a pilot license under the new license program and operators license; even after we have obtained this license, that does not necessarily prove that we are capable pilots.

It is up to the individual companies to review and see if you are capable by putting you on the job and seeing if you are capable.

My group contends that the Coast Guard should not let a yeoman or a seasoned lieutenant, as they so refer, direct traffic over this 243-mile stretch of river.

Mr. TREEN. Does one who would be operating in the vessel traffic center have to have the same knowledge as one who would have to have to actually be operating a vessel?

There are many things you have to learn as a pilot or as a seaman that do not really apply to the movement of the vessels.

Captain BULLARD. We contend that the vessel traffic center officer should be familiar with the river, should be familiar with boats, barges, river stages, currents at different stages.

We run from 0 to 54—15 feet, and you are well aware of the conditions that are created during these stages of the river, and you cannot take a 3-foot stage in New Orleans and pilot the boat the same way you do when you are 55 feet; and we have been, and I am sure we have a consensus of opinion, it is going to be somebody with more of a qualification than a man who rotates from one job to another every 3 years, spends 3 or 4 months training himself under the previous VTC officer to do his job.

We will have to have enough confidence in this officer to tell us what to do in case of emergency or how to meet a vessel or where to hold up or where to turn the tow around or what to do.

Mr. TREEN. Does the Coast Guard want to respond?

Admiral FUGARO. Yes, Mr. Treen.

We have established within the existing VTC's very strict qualifications, training requirements before we certify a man as capable of taking the watch.

I go back to the point I made, too, sir, that the qualifications that this man needs is not the full qualification of a pilot. He is at entirely different purposes; and we are going back to the very basic philosophy, the essentials of the VTS.

The essentials of the VTS is not to literally guide an individual vessel through this maze of other vessels which it will meet. The purpose of the VTS is to provide the maximum amount of safety information to that operator to enable that master or that pilot to safely guide the vessel through whatever hazard he may be meeting.

In other words, our operator must be capable of operating this particular equipment, the TV or radar in other areas, or the communications equipment.

He must be familiar with the operation of the computer system; how to get in and get out; how that works, as well as the procedures on passing this information.

Mr. TREEN. In other words, you are talking about this man just locating the vessels. You are not going to be telling him how to maneuver it?

Admiral FUGARO. Exactly.

Mr. TREEN. What to do if he encounters——

Admiral FUGARO. No, sir, that is not the essentials. If we expect a man to be able to do that; I would agree with Captain Bullard that we do need to have fully qualified pilots. When you direct a vessel with a pilot he should have the same qualifications; but this is not what we are intending to do.

Mr. TREEN. Mr. O'Neil, you wanted to comment?

Mr. O'NEIL. Congressman Treen, I think you have posed what is a very serious problem and a very difficult one to answer.

I think that any pilot or the admiral and myself certainly cannot tell you how long a man must be trained to learn the river, its bends, its currents, its bars, and how to navigate it, although——

Mr. TREEN. Let me stop you there.

Does the fellow in the traffic center have to know where the bars are?

Mr. O'NEIL. I do not think he needs to know and have the exact knowledge as the pilot has in the pilothouse.

I do have one area of concern, and that is the Vessel Traffic Center operator has, under rule 11, the power to determine what is a hazardous situation and stop traffic.

Now, I do not know under those circumstances what the degree of knowledge is that one must have to make that determination.

For example, let us assume we have a situation where we have a setout fog, and we have vessels jammed up in the area of the head of pass on the lower Mississippi River. I do not know how someone in the Vessel Traffic Center, perhaps, can make the determination on who should go first or what vessel should move where, this sort of thing.

Obviously, if all the employee of the Vessel Traffic Center has to do is to accumulate statistical knowledge and put that into a device and then record it back, you do not need anything more than a techniicna. a computer technician.

I do not think that is the minimum and that certainly is not enough for what we are talking about.

Somewhere between that point and a master is a neutral ground that is going to be necessary for training. I do not know how and to what degree that training will be necessary. I do not know what the Coast Guard's training manual is, but I think this entire industry would like to see how they have trained their VTC people in other areas, particularly Houston, so we could make some sort of comparison of what is necessary.

Mr. TREEN. I think then we are narrowing it down. Except in those cases where some control would be issued directly by the Vessel Traffic Center, all that is is a reporting system. Individual decisions with respect to management of the vessel are made by the people in charge of these vessels. So it gets down to what kind of directives and controls.

Admiral FUGARO. Precisely.

Mr. TREEN. Is everybody shut out and to stay put and may be that does not—Admiral Fugaro, you do not want to get into the position where you have a technician holding up the river and making decisions something like that.

Captain CONRAD. Mr. Treen, I think, too, what troubles us, though, in this ability of being a pilot and being the computer operator is that what we have a fear of is the lack of local—not piloting ability, but the local knowledge of the local terminology which is going back to the same thing about the same thing about the language problem in that it probably could be worked out; but we have a feeling of a little bit of unease about this.

If you are familar with a route and the other guy is familiar with a route and y'all talk to each other and say, "I just passed farmer

Brown's house," you will have a mental picture where you are; but if you pass the same thing on to another guy who has got a road map, and he looks at the map and he says, "Well, farmer Brown's house is not on this map, where are you?"

The guy says, "I am about halfway between here and there, and I just do not know farmer Brown's house and I am lost. I do not know where I am."

Mr. TREEN. I guess we will have a glossary of terms.

Captain CONRAD. That is correct.

But what has happened, sir, is that these terms that are in everyday use in piloting, which is a part of piloting, are not on charts and they are not on maps. They are just common knowledge of an area. It is something that is called local custom, local situation, that you cannot exactly put down on a piece of paper and say, this point is this place, and this mile 103 has got maybe a half dozen different names that are known locally; and some of these things have not existed for 10, 15, 20 years, but they are still called by the name of what may have been there years ago, a farm or a plantation or a dock.

It does not exist; but we are not lost. We know where we are. It is—you just cannot put a finger on it and put it in exact mile points, what that is, all the time.

Mr. TREEN. Do you want to comment?

Admiral FUGARO. Yes.

Mr. TREEN. In commenting, would you cover the question of the reporting points? I understand you have a number of reporting points in the system.

Admiral FUGARO. I believe we have indicated those on the chart, have we not? Those are the red diamonds. We will point them out.

Commander HICKEY. Red are down and green are up.

Mr. TREEN. Red are the reporting points. You have to agree upon what you are going to call them.

Admiral FUGARO. Yes, sir.

Mr. TREEN. Whether you number them or call them Farmer Brown's house, or whatever, you must agree on the names. You've got no more than 20 or maybe 30 reporting points in all.

Admiral FUGARO. Approximately about 20.

So I would agree that the names——

Mr. TREEN. You expect they will be reporting in between the specific points?

Admiral FUGARO. Some degree of reporting in between them, I would believe would be occurring between some of these points. If there is a bend between two points and I am looking, say, just below Belle Chasse, where there is a bend, we would possibly be reporting to the vessel that he can expect to be meeting a vessel coming around that bend; that would be part of the VTC information for that vessel.

With respect to the local knowledge, that these people should have, we recognize that there is a requirement for local knowledge in anybody who is going to be a section operator, much less the watch supervisor.

We definitely intend to include knowledge and training through the utilization of local knowledge instructors, perhaps pilots themselves, to instruct these people. In addition to that, a requirement will be these people take trips to these sectors in which they will be operating and not only before they take over a section of operation. After

they become a sector operator they will still be required to periodically to go tour these areas to see what problems there are and to continue familiarization with that area.

I think we are looking for a minimum level of local knowledge before we qualify the sector operator. We cannot hope to make him a fully qualified pilot, but then again we do not feel that that is necessary.

We recognize, however, as it has been stated, there is a need for some level of local knowledge in these sector operators.

Mr. TREEN. Thank you.

I know there is more that could be said. I guess we have to move on.

Mr. BIAGGI. Any other statements to be made?

I might caution you we will continue until 3 p.m. We do have time constraints.

Mr. O'NEILL. Mr. Chairman, I think we have covered many of the points in Captain Bullard's statement and I do not see any reason to pursue as Congressman Treen has centered on those particular problems.

We would like to make Captain Bullard's statement a part of the record, however.

Mr. BIAGGI. Without objection, all of these statements will be in their entirety made a part of the record.

[The statements referred to follow:]

STATEMENT NO. 2 OF AD HOC COMMITTEE FOR PORTS AND WATERWAYS

On behalf of the Ad Hoc Committee for Ports and Waterways, we submit herewith our comments which will be presented by Captain Jack R. Bullard on the manning problems which we foresee in the proposed New Orleans VTS system.

I am appearing on behalf of the Ad Hoc Committee for Ports and Waterways, an association of numerous companies operating on the inland waterways who are concerned with the Coast Guard's proposed Vessel Traffic System on the Lower Mississippi River.

The Ad Hoc Committee objects to numerous aspects of the proposed Vessel Traffic Service (VTS), but we shall confine our comments to the lack of a responsible plan for the manning of the System.

The Vessel Traffic Center has been delegated enormous power in the proposed regulations. It will be the nerve center of the entire system. All of the information given and received by the Service will pass through this Center and the Coast Guard's computer will be located there. Presumably, all the orders that the regulations authorize the Coast Guard to give to vessels in the VTS will emanate from this Center and from the persons operating the Center. These orders may include speed limits, vessel size, limitations, one way traffic requirements, and control of the movement of nearly every vessel on 259 miles of the Mississippi River. In fact, the Vessel Traffic Center could conceivably completely shut down the 2nd and 8th largest ports in the country without exceeding the power delegated to it under the proposed regulations.

Incredibly, however, there are absolutely no provisions in the regulations establishing the qualifications or ability of those who will man the Vessel Traffic Center and who will exercise these broad powers. The only reference at all to personnel is contained in Proposal Rule 2 which indicates that the Vessel Traffic Center will be manned by the Coast Guard. In connection with questions posed to them by the Ad Hoc Committee, the Coast Guard has indicated that its intention is to place the Vessel Traffic Center under the supervision of a "seasoned duty officer" with communications and the monitoring of computer visual displays to be performed by personnel of lower grades. They have not indicated, however, the criteria by which an officer is considered "seasoned" nor have they shown what qualifications the lower grade personnel will have or how they will be trained.

Considering that the proposed VTS is simply an adaptation of existing Federal Aviation Authority systems minus the radar, we cannot understand why the Coast Guard persists in ignoring the maritime community's plea for the establishment of some minimum standards of competence similar to those promulgated by

the FAA for the certification of air traffic controllers. Among other things, the FAA regulations require that its traffic controllers pass a written test demonstrating knowledge of flight rules, traffic control procedures, communications procedures, air navigation, and weather. In addition, these traffic controllers must pass a practical test to demonstrate proficiency with control tower equipment and knowledge of the geographical area in which he will work. In particular, he must demonstrate knowledge of the physical features of the airport and the control zone, traffic patterns and holding procedures, and search and rescue. Even after passing these tests, the air traffic controller must work as a trainee for 6 months under the supervision of a senior controller before he is allowed to work on his own.

Obviously, all of the areas in which an air traffic controller must demonstrate expertise are directly analogous to inland water transportation within a VTS system. Such a system is, by definition, heavily traveled and governed by rules and procedures concerning navigation and communication. Nowhere in the proposed regulations, however, do we find any assurance that the Coast Guard personnel operating the VTS will have the knowledge necessary to promote safety and expedite the movement of traffic in the affected area.

Within the 259 mile length of proposed VTS system, there are two different sets of navigational rules including the inland rules and the western rivers rules. There are a multitude of buoys, lights and other navigational aids in this area, not to mention submerged wrecks, pipelines, cable crossings and constantly shifting sand bars. As everyone involved with water transportation well knows, a detailed knoweldge of all of these things is required for successful navigation of large vessels but the proposed regulations do not require the slightest familiarity with them on the part of the Coast Guard personnel who will operate the system.

Other countries give credence to our insistence on experienced and qualified controllers. Of the 12 VTS systems operating in 1973, including Liverpool, three systems in London, Southhampton, Rotterdam, Hamburg, Montreal, two systems in Japan, and the Elbe and Weser River system, all are manned or supervised by Master Pilots familiar with the areas under control and and who, in addition, have the benefit of radar surveillance. Since the proposed VTS system does not incorporate radar surveillance, and to our knowledge, the Coast Guard has no river pilots in uniform, it is difficult to see how the system could be anything but inferior in operation to every foreign system on which information is available.

This is not to say that the Coast Guard does not possess intelligent and competent personnel. They are undoubtedly well qualified for the traditional duties undertaken by the Coast Guard, but it is uncontestible, we believe, that there is no position in the Coast Guard where a person may gain practical knowledge concerning the day-to-day operation of the large seagoing vessels and river tows navigating the proposed VTS area. Such knowledge and expertise will obvisouly be necessary to avoid confusion and disruption of traffic under any type of VTS operation. It may well be that given sufficient time and on the job training, the Coast Guard could develop a corps of operators trained for this VTS area, but the point is that the Coast Guard presently has no such trained operators and has established no qualifications whatever for the persons they intend to use. Furthermore. it is well known that the Coast Guard rotates its personnel every 2 or 3 years, often to positions completely unrelated to the past positions held. While this may encourage versatility among the Coast Guard's people, it seems to us that this practice will insure that the VTS system will be regularly deprived of its most experienced operators and that the industry will be continually subjected to untried and unfamiliar VTS operators. The Coast Guard cannot, moreover, simply transfer operations from other VTS systems to the proposed sytem. There are several reasons for this. First, the Mississippi River and the connecting waterways in this proposed system are totally different from a physical standpoint from every other VTS system operating in the U.S. None of these include a major river of the Mississippi's dimensions. Secondly, no other system uses the variety of navigating rules found in the proposed system. Lastly, probably no other port in the country except New York has anywhere near the traffic found in this system and none whatsoever have a similar mixture of vessels, including oceangoing ships, tugs, ferries, large river towboats and tows, canal towboats and their tows, fishing vessels, water taxis, floating oil rigs, pleasure craft, and old fashioned river steamboats. There is simply no VTS area in the country where experience in dealing with this melange of vessels can be obtained other than in the proposed VTS area itself.

There is also no provision in the regulations for communication capabilities in the French language. Such capability is absolutely essential in Southern Louisiana with its large population of persons of French descent, many of whom still depend upon their native tongue, a situation which is officially encouraged by

the State of Louisiana, and who depend upon maritime pursuits for their livelihood. Their maritime heritage goes back generations and as a group, they have achieved worldwide recognition of their masterful and intrepid seamanship. This is demonstrated by the fact that when oil companies exploring the North Sea needed seamen to insure the regular operation of their supply vessels under some of the worst weather conditions in the world, they brought these French-Americans to Europe to run the boats and to re-train English sailors and captains for this hazardous duty.

Unfortunately, the proposed regulations require that each vessel under control of the VTS have a person proficient in English to stand radio watch at all times. This will impose an impossible burden on the shipping and fishing industries in South Louisiana who depend upon these French speaking personnel for a significant portion of their manpower. Many vessels are run as small family operations which will now have to hire additional crew members to meet the requirement of the proposed regulation. This may seem simple enough, but for many the costs involved will mean the difference between earning a living and going out of business. Similarly, many of the larger companies hire these French speaking people in all positions from deckhand on up and are glad to have them. The proposed regulation will end this practice since these people will not be able to meet the language requirement which the Coast Guard wishes to add to their jobs, and their employers will not wish to break the law by hiring them. This creates a double burden on the public. First, the people will lose their jobs and be forced to look for employment which does not take them through VTS areas. This will not be so easy to do. Second, their employers will suddenly be faced with a drastic reduction in the number of qualified personnel to man their vessels. They will have to rely on less qualified applicants because in this hotly competitive industry, it is not possible to just increase crew size to insure that a person proficient in English is on the radio at all times. The additional crewmen are not available, and the increased labor cost would be prohibitive.

These problem areas which I have just discussed are so basic to the safety of this system and can be so easily rectified that it is hard to understand how the Coast Guard can continue to ignore them. If the problems are not solved now, it is likely they will be solved later on a collision by collision basis after unjustified damage to the economic position of the industry has been done.

The Coast Guard should staff its control center with Master Pilots working on rotation basis from area pilot associations and transportation companies. The savings which the Coast Guard can make in training expenses by hiring experienced civilians will offset the increased labor costs, and the safety benefits are obvious. Failing this, Coast Guard supplied VTS operators should work under the 24 hour supervision of Master Pilots from the area and the Coast Guard should establish by regulation the qualifications and training necessary for its personnel to become operators of the system. Otherwise, the Coast Guard's job rotation system will result in regularly staffing the VTS system with cooks and quartermasters. If the Coast Guard refuses to accept the experience and ability of civilian pilots, and if they are able to justify this position, which they have not yet done, then it will be absolutely necessary that their personnel who are assigned to the VTS system be exempted by regulation from the present job rotation system undertaken by the Coast Guard. This will be needed in addition to regulations establishing their training and qualifications. These regulations will preferably require service as observers on commercial vessels in the area. Otherwise, there is no way that the VTS system will be staffed with persons with the level of ability necessary to promote the system's objectives of safety and facilitation of commerce.

Finally, the regulations should provide for French language communication capability at the Vessel Control Center. This would require little effort on the Coast Guard's part and would be much cheaper to the taxpayer and consumer than requiring all the vessels passing through the system to have English language communication capability. Such a simple step would prevent the confusion and dislocation in the maritime industry which will otherwise result.

Report to the Ad Hoc Committee for Ports and Waterways: A Statistical Analysis of the United States Coast Guard Vessel Traffic System

My name is Robert L. Brite and I have been asked to testify on behalf of the Ad Hoc Committee for Ports and Waterways concerning the statistical validity of studies which have been performed by the United States Coast Guard and the conclusions relative to the presently proposed Vessel Traffic System.

I. INTRODUCTION

During the past three to five years, the United States Coast Guard has conducted a number of studies on the establishment of a Vessel Traffic System (VTS) for various ports in the United States, including the Mississippi and the port of New Orleans. These studies have involved a minimum of 9,300 man hours and have been performed for the purpose of:

1. determining the need for a vessel traffic system in the various ports, and
2. determining the level of vessel traffic system needed.

Essentially, these systems are divided into basic (non-surveillance) systems and sophisticated (surveillance including radar and/or television) systems.

During the course of the Coast Guard study, a great deal of data analysis was performed with the intent of computing the probability of an accident of a given type occurring to a particular type ship in a certain port. This probability was then used to compute expected damages from such accidents. These accidents were individually analyzed in order to determine the level of VTS necessary to prevent such an accident. A revised probability was then computed and an expected damage reduction was calculated.

There are many problems with the data and with the procedure used. Although the result of this analysis is the presently proposed Vessel Traffic System, New Orleans data were not included in the development of the initial algorithm upon which the calculation of the probabilities is based. The United States Coast Guard Study Report "Vessel Traffic Systems: Issue Study," Volume 3, written by Computer Science Corporation, March, 1973 (hereafter referred to as Issue Study) concludes that the algorithm must determine the expected casualty losses as a result of the accidents and determine the effect that a proposed VTS will have on the probability of accidents and recalculate the expected casualty loss. They note that "an accident-by-accident analysis, as indicated in the algorithm, should be used to evaluate the effectiveness of various levels of Vessel Traffic Systems." (Issue Study, p. 2–15.) The report also notes the expected effect of VTS:

"The data suggests that a VTS may also reduce the expected damage either through prevention of some of the more serious accidents or thorugh reduction to the severity of those that do occur. However, we were not able to quantify this reduction sufficiently to justify a revision in the expected damage per accident." (Issue Study, pp. 6–8.)

Based on these statements from the Issue Study, I would have to conclude that the New Orleans area is sufficiently different from those ports studied and sufficiently unique in its geographic configuration to require its inclusion in the development of the algorithm. It is very difficult to take into account the unique characteristics and requirements of an individual port unless the algorithm is specifically designed for that port.

Based on my statistical analysis of the Issue Study and the United States Coast Guard Study Report "Vessel Traffic Systems: Analysis of Port Needs" (August, 1973) and other related publications including the background data supporting these studies, I have come to the following conclusions:

1. The data base used in the analysis is very poor and requires a great deal of judgment in drawing any conclusions;
2. There are a number of problems with the statistical techniques used in the algorithm and its application to studies of individual ports; and
3. Nothing I have seen in the data, the statistical analysis, or the studies of the Coast Guard in any way supports the presently proposed Vessel Traffic System based solely on a voice communication network.

I would now like to elaborate on these points.

II. PROBLEMS WITH DATA BASE

There are a number of problems with the data which lead me to believe that it is virtually impossible to draw reliable conclusions from this data. In the Issue Study, it is noted that:

"The method chosen uses recent empirical data to estimate the expected casualty losses in a port which are caused by the types of accidents that may be prevented by a vessel traffic system and then uses a combination of empirical data and judgment to determine the expected reduction in casualty losses if a vessel traffic system is implemented or improved." (Issue Study, p. 6–2.)

"This evaluation must quantify the effect of VTS on the probability of an accident. Present experience with VTS is so limited that a rigorous mathematical

formulation cannot be developed from existing data with sufficient reliability to justify its use." (Issue Study, p. 6–7.)

Data deficiencies were noted to be a significant problem in the Issue Study. They include problems with correlation of accident locations to port areas covered by VTS. The statistics on vessel transits available from the Department of the Army, Corps of Engineers "Waterborne Commerce of the United States," 1969–1974, are difficult to correlate with information available from the Coast Guard concerning the location of accidents. The Issue Study also concludes that it is difficult to correlate the effect of a specific Vessel Traffic System to casualty cause. Thus, the data is difficult to use in the support of any conclusion according to their own statements.

Another significant problem is the reporting of accidents. It is clear that a large number of accidents go unreported for a variety of reasons. It also appears that the percentage of accidents actually reported varies over the period 1969–1972 (the Coast Guard study period). This would of course lead to erroneous conclusions concerning the accident probabilities in given port areas. The four-year time period used was very brief. This problem could not have been overcome at the time of the study; however, data are now available through 1974 and show some significantly different patterns from those of the 1969–1972 period.

Other data problems include errors in the Marine Vessel Casualty Reports (MVCR CG–2692). "The information called for in the 'Report of Vessel Casualty or Accident' Form 2692 . . . lacks adequate detail in several areas, especially on factors related to the cause of the accident, vessel movement and specific location." (Issue Study, p. 6–61.)

"The data which is transcribed to punch cards . . . omit some valuable data on the report form. The associated coding instructions leave too much room for judgment in assigning codes to the data in the reports with a resulting lack of consistency." (Issue Study, p. 6–61.)

The Issue Study would thus lead us to believe that the information available concerning the number of accidents, the cause of accidents, and the coding of information reported is totally unreliable. It is difficult to see how any conclusions based on such data could be given much weight. It is therefore quite apparent that the data base is very inadequate for decision making purposes. The conclusion that a particular level of VTS should be installed in the New Orleans area must therefore be based on something other than statistically factual information.

This conclusion is probably best supported by the Issue Study:

"The information contained in the Vessel Casualty Report Form CG–2692 provides very little to establish the cause of the accident and even less to determine what might have prevented it. This is presumably left up to the Marine Inspector, since to require such information from the vessel master or the owner might involve self-incrimination in some cases." (Issue Study, p. 6–68.)

This is the data set upon which the decision for the presently proposed system is supposedly based.

III. PROBLEMS WITH STATISTICAL TECHNIQUES USED

The development of the algorithm is fairly straightforward but does include a number of assumptions which may or may not be applicable to the New Orleans area. My major reservation, however, is not with the logic of the algorithm but with the application of the algorithm to the New Orleans port area. Since the original Issue Study did not include any New Orleans data, it is impossible to determine whether or not such information would have affected the construction of the algorithm. It is not difficult, however, to see that the algorithm must use a combination of empirical data and judgment to determine the effect through the expected reduction in casualty losses. The method used in the Issue Study was analysis on a case-by-case basis of each reported accident.

"The method presented here is based on estimating separately the effects of various VTS levels in reducing each type of casualty . . . It has the disadvantage, however, of requiring a considerable amount of judgment when estimating VTS effects." (Issue Study, p. 6–109.)

Thus, we see that the method used was to analyze each accident case chosen for analysis in order to determine the level of VTS necessary to prevent the accident. Because of problems with the data base noted earlier, such a decision would require a great deal of judgment and could of course be influenced by any biases of the reviewer. The general guidelines used were: "any collision, ramming, or grounding involving a participating vessel is potentially preventable,

but only if the VTS would actually affect the vessel's movement or its location given the same circumstances causing the accident . . . The estimated accident prevention rate for any level of VTS at a specific port should properly take into account the causes of different types of accidents in that port in determining the degree to which they would be affected by the proposed VTS." (Issue Study, pp. 111–112.)

The classification of a given accident into preventable or not preventable is obviously extremely subjective and requires knowledge of the individual port conditions.

"Application of the case-by-case analysis method requires not only a consideration of the factors cited for the previously discussed method, but also a detailed examination of the causes and circumstances of each casualty for contributing factors such as qualifications of person(s) in charge, currents, location in the port, traffic congestion, etc. For this reason, this method can best be applied by personnel at the port who are familiar with conditions there and have access to the original casualty reports." (Issue Study, pp. 113–114.)

We again see that conclusions must, for the most part, be based on subjective judgment rather than on hard statistical facts. Recall that the Issue Study points out that the MVCR Form 2692 "provides very little to establish the cause of the accident and even less to determine what might have prevented it."

In the application of the algorithm to the New Orleans area, a great deal of such subjectivity entered the analysis. The United States Coast Guard Study Report "VTS: Analysis of Port Needs," August, 1973, (hereafter referred to as Coast Guard Study Report) concludes that: "at present, it is estimated that accident reports are filed on only 30% of the reportable casualties . . . For purposes of this analysis, it was estimated that casualty reports were completed on accidents accounting for approximately 50% of the total cargo and vessel damage;" (P. 5.) Amazingly, the analyst chose to adjust for this factor arbitrarily. "Therefore, the total, annual vessel and cargo loss values calculated using the algorithm were multiplied by a factor of 2." (P. 5.)

Statistically, such a procedure cannot be justified. To further complicate the problem, they concluded that the damage reported on the casualty reports were only about half of the actual damage and "therefore, to compensate for inaccurate loss estimates, a second factor of 2 was applied to the vessel and cargo figures calculated by the algorithm . . . In summary, the vessel and cargo loss values were multiplied by a factor of 4 to compensate for unreported accidents and inaccurate vessel and cargo damage estimates." (Coast Guard Study Report, p. 6.) Again, such a procedure is statistically totally unjustifiable. There is little more justification for multiplying the data by a factor of 4 than for multiplying by 3, 5, or 2.6. Such a procedure would allow the analyst to come to any conclusion by simply deciding what the conclusion should be and choosing the data adjustment factor accordingly.

Other problems with the statistical analysis were apparent. The size of a ship was not considered as a separate factor in the analysis. This may or may not be justifiable. Only analysis of accurate data could determine this factor. Unfortunately, in the development of the algorithm in the original form, the researchers found that "the appropriate level of VTS for any given port can only be properly determined from a cost-effectiveness analysis of the various VTS options available to the given port, and this is beyond the scope of the current study." (Issue Study, pp. 6–39, 40.)

The damage reduction figures for the New Orleans port were therefore based upon the analysis in the Coast Guard Study Report of August, 1973. This is the same data base which has been described as being unreliable for determining necessary VTS levels for accident prevention.

Although ports comparable to the New Orleans area with radar-based vessel traffic systems are available, no analysis of such ports has been performed, to my knowledge. I am specifically referring to the port of Rotterdam, which has for a number of years had a Vessel Traffic System including surveillance. A thorough analysis of such a system should be deemed essential prior to the implementation of a working system in the New Orleans-Mississippi River area. It would seem to me to be much more cost-effective to analyze an existing situation rather to install a Vessel Traffic System such as the one which has been proposed and which existing data does not support. I have begun to collect information concerning the port of Rotterdam. However, the collection and analysis of this information will be very time consuming.

IV. PRESENTLY PROPOSED VESSEL TRAFFIC SYSTEM

The Coast Guard has proposed a Vessel Traffic System which would include only a voice communication network and would not include surveillance in the form of radar or television cameras. It is my feeling that statistically this proposal is without any support. This view was shared in the original Coast Guard Study Report recommendations: "Algorithm results indicate some form of surveillance is necessary from Mile 75 to Mile 109." (P. B–5). Thus, the original Coast Guard Study Report concluded that New Orleans ranked very high in need for a VTS. The report shows that New Orleans was divided into three sectors. L_3 was recommended for two of these sectors and L_3 for one of the sectors. Thus they concluded that the statistics available indicated that L_3 (radar and/or television surveillance) was desirable in the most heavily trafficked area of the New Orleans port. It is easy to see how this conclusion came about. Chart I shows that level L_2 reduces Type 1 accidents by approximately 52 percent while L_3 reduces it by approximately 72 percent. Total accidents with L_2 are reduced by about 19 percent while L_3 reduces total accidents by about 29 percent. In dollar terms, the reduction in damage by L_2 is about $520,000 as estimated while level L_3 reduces dollar damage by about $800,000. The Coast Guard Study Report on pages B–8–10 therefore presents a very strong argument for some form of radar and/or television surveillance in this particular sector of the Mississippi River.

This follows the conclusion in the Issue Study that "in most ports different levels of VTS would be indicated for different sectors of the port." (P. 6–109.) This Issue Study also concluded that the preventable accidents indicate the expected savings that would result from a Vessel Traffic System and thus are very useful in a cost-benefit analysis of various levels of Vessel Traffic Systems.

The Coast Guard Study Report ran into a number of problems in analyzing the New Orleans port area. The problems with the data and the manipulation of data have already been noted. They found it difficult to determine the effect of various levels of VTS.

"The basic surveillance mode does not include sufficient features for positive control, but does considerably improve the shore-based center's knowledge of the presence and movement of vessels in the area.

"In a case-by-case study, it was difficult to determine whether surveillance would have been necessary to prevent any particular accident." (Coast Guard Study Report, p. 14.)

Thus, the Coast Guard Study Report concluded that it was difficult to determine the level of Vessel Traffic System necessary to prevent the accident on a case-by-case basis, but that surveillance in some form does improve knowledge of ship movement. This would be particularly true of the New Orleans area. The Coast Guard Study Report also concludes that: "it was difficult to determine whether this level would be required to prevent any particular casualty. It was evident from plotting accidents on charts and from reviewing transit data, that some port areas were extremely congested and dangerous. Collision avoidance radar and computer-interfaced equipment was considered to be necessary to prevent many of the casualties which occurred in relatively open water where traffic density was high, and traffic patterns diverse and complicated." (P. 15.)

While their conclusions do support implementation of a Vessel Traffic System with surveillance, they note:

"It must be kept in mind that the estimated reduction in accidents based on this lengthy analysis is subjective. The actual effectiveness will be determined by evaluating the results obtained from operating systems." (Coast Guard Study Report, p. 23.)

Although the Coast Guard recommends that the actual effectiveness should be determined by evaluating an operating system, it is my understanding that the computer configuration currently on order does not include data collection capabilities and will not be able to provide any information concerning the amount of use of the system, the effectiveness of the system, or any basis upon which to decide whether the system is in fact desirable or not. I find it incredible that the Coast Guard would install a system which is unable to supply such statistical information for future analysis.

Various other reports were also enlightening on this issue. The United States Coast Guard, Department of Transportation, "Vessel Traffic System—What Is Needed to Prevent and Reduce Vessel Accidents," by the Comptroller General of the United States, noted that the sophisticated systems were installed in San Francisco and Puget Sound because ". . . in some cases, maritime interests had

expressed preference for the more sophisticated systems." (P. iii.) Thus local views were instrumental in the types of systems installed. This is not true of the New Orleans experience. The study further concludes that "the instrumental benefits of using sophisticated systems are not really known and that the actual effectiveness would have to be determined by evaluating operating systems." (P. 5.) Again, such a system is operational in the port of Rotterdam. The concern that many have with the presently proposed system is the voice communication effectiveness and as noted in the United States Coast Guard Study "VTS Issues Study, Final Report," Volume I, Executive Summary, March, 1973, "the effectiveness of the system can be no better than the weakest component." (P. 6.) The weakest component of said system is the communication network.

Other data indicate that the need for a system above New Orleans (between the Huey P. Long Bridge and Baton Rouge) is actually not great. The problems in this area certainly could be handled without surveillance.

The report by the Department of Transportation, United States Coast Guard Draft, "Vessel Traffic System New Orleans," Environmental Impact Statement, August, 1974, concluded that there were too many vessels for a partial communication network.

"The amount of traffic on a given radio frequency each minute would render the net useless. Many masters would be unable to forewarn others of their presence due to their inability to break through. A fully implemented VTS would eliminate this danger." (Vessel Traffic System New Orleans, p. 7.)

Of a partial radar and communication only, they conclude that: "there are too many areas where accident rates are high to attempt to get by with minimum radar and radio coverage. Full radar and communications must be provided if the high maritime accident rate in the New Orleans area is to be reduced." (Vessel Traffic System New Orleans, p. 7.)

They further state that: "consideration to using other combinations was considered, and on a partial implementation basis, was deemed unacceptable and unreasonable. A VTS does, in fact, have all the combinations of the above. However, it is the use of all combinations at maximum efficiency that makes the VTS useful and effective." (Vessel Traffic System New Orleans, p. 7.)

Thus conclusions of studies commissioned by the Coast Guard and performed by the Coast Guard indicate that a full radar surveillance system is essential for the safe operation of the port of New Orleans. No factual information supports the presently proposed system.

TABLES I–VIII

Tables I–VI represent the number of accidents, the number of vessel transits, and the calculated probability of an accident occurring for the fiscal years 1969 through 1974, respctively. These data are divided into ship type (k) and accident type (j). We are therefore able to determine the probability of ship type k having accident type j in year t. $A_{j,k}$ represents the number of vessels in accidents by ship type k and accident type j. N_k represents the number of vessel transits by ship type k and $P(A)_{j,k}$ indicates the probability of ship type k having accident type j. The probability of an accident by each ship type for all accident types is also computed and shown as a total within each of the ship type cells. At the bottom of each table are probabilities of accidents by accident type; thus, $P(A)_j$ represents the probability of accident type j for all ship types. The figure at the bottom of the probability column represents the probability of an accident of any type occurring to any ship type. In 1969, this figure was 31.83×10^{-5}. In scanning the tables, we see that the probability of an accident occurring has increased significantly between 1969 and 1974 based on the number of accident reports filed.

Table VII shows the total accidents ,vessel transits, and probability of accident by ship type for the years 1969 through 1974. The total for all ship types for the 1969–1974 preiod is represented by a probability of 92.46×10^{-5}.

Table VIII shows the number of accidents, vessel transits, and probability of an accident by accident type for the period 1969–1974.

Following is a description of the accident types by number as they appear in the tables:

1. Collisions in meeting, crossing, or overtaking situations;
2. Collisions in docking, mooring, or anchoring situations;
3. Rammings of fixed objects;
4. Rammings of non-fixed objects;
5. Groundings.

ACCIDENTS, TRANSITS AND PROBABILITY OF ACCIDENT, NEW ORLEANS, FISCAL YEAR 1969-74

TABLE I.—FISCAL YEAR 1969

Ship type k	Accident type j	Number of vessels in accidents, $A_{j,k}$	Total number of transits, N_k	Probability of accident × 10^{-5}, $P(A)_{j,k}$
Tanker	1	0		0
	2	1		20.73
	3	0		0
	4	0		0
	5	2		41.45
Total		3	4,825	62.18
Cargo ships and passenger vessels	1	11		33.15
	2	5		15.07
	3	0		0
	4	0		0
	5	2		6.03
Total		18	33,180	54.25
Tank barge	1	10		13.02
	2	6		7.81
	3	0		0
	4	0		0
	5	2		2.60
Total		18	76,790	23.44
Cargo barge	1	6		6.24
	2	13		13.52
	3	2		2.08
	4	0		0
	5	0		0
Total		21	996,158	21.84
Two, tug	1	15		26.73
	2	6		10.69
	3	3		5.35
	4	0		0
	5	1		1.78
Total		25	56,111	44.55
	j	A_j	N	$P(A)_j$
	1	42		15.73
	2	31		11.61
	3	5		1.78
	4	0		0
	5	7		2.62
Total		85	267,064	31.83

TABLE II.—FISCAL YEAR 1970

Ship type k	Accident type j	Number of vessels in accidents, $A_{j,k}$	Total number of transits, N_k	Probability of accident $\times 10^{-6}$ $P(A)_{j,k}$
Tanker	1	2		36.25
	2	9		163.13
	3	2		36.25
	4	3		54.38
	5	5		90.63
Total		21	5,517	380.64
Cargo ships and passenger vessels	1	18		52.11
	2	19		55.01
	3	2		5.79
	4	2		5.79
	5	17		49.22
Total		58	34,540	167.92
Tank barge	1	18		23.68
	2	15		19.73
	3	2		2.63
	4	4		5.26
	5	2		2.63
Total		41	76,028	53.93
Cargo barge	1	12		11.56
	2	10		9.63
	3	7		6.74
	4	1		.96
	5	4		3.85
Total		34	103,807	32.75
Tow, tug	1	30		55.15
	2	18		33.09
	3	10		18.38
	4	4		7.35
	5	3		5.12
Total		65	54,393	119.50
	j	A_j	N	$P(A)_j$
	1	80		29.17
	2	71		25.89
	3	23		8.39
	4	14		5.10
	5	31		11.30
Total		219	274,285	79.84

TABLE III.—FISCAL YEAR 1971

Ship type k	Accident type j	Number of vessels in accidents, $A_{j,k}$	Total number of transits, N_k	Probability of accident $\times 10^{-5}$ $P(A)_{j,k}$
Tanker	1	3		53.70
	2	1		17.90
	3	2		35.80
	4	0		0
	5	5		89.49
Total		11	5,587	196.89
Cargo ships and passenger vessels	1	18		63.92
	2	12		42.62
	3	8		28.41
	4	5		17.76
	5	13		46.17
Total		56	28,159	198.87
Tank barge	1	10		12.60
	2	12		15.11
	3	2		2.52
	4	4		5.04
	5	3		3.78
Total		31	79,395	39.05
Cargo barge	1	8		7.30
	2	38		34.70
	3	9		8.22
	4	0		0
	5	5		4.57
Total		60	109,524	54.78
Tow, tug	1	19		34.26
	2	27		48.68
	3	11		19.83
	4	2		3.61
	5	10		18.03
Total		69	55,465	124.40
	j	A_j	N	$P(A)_j$
	1	58		20.85
	2	90		32.36
	3	32		11.51
	4	11		3.95
	5	36		12.94
Total		227	278,130	81.6 2

TABLE IV.—FISCAL YEAR 1972

Ship type k	Accident type j	Number of vessels in accidents, $A_{j,k}$	Total number of transits, N_k	Probability of accident $\times 10^{-4}$ $P(A)_{j,k}$
Tanker	1	5		95.82
	2	3		57.49
	3	1		19.16
	4	0		0
	5	8		153.32
Total		17	5,218	325.80
Cargo ships and passenger vessels	1	15		50.21
	2	16		53.55
	3	22		73.64
	4	2		6.69
	5	9		30.12
Total		64	29,876	214.22
Tank barge	1	15		17.62
	2	7		8.22
	3	4		4.70
	4	1		1.17
	5	4		4.70
Total		31	85,108	36.42
Cargo barge	1	20		14.99
	2	15		11.24
	3	8		6.00
	4	0		0
	5	0		0
Total		43	133,440	32.22
Tow, tug	1	22		35.23
	2	16		25.62
	3	12		19.22
	4	1		1.60
	5	2		3.20
Total		53	62,451	84.87
	j	A_j	N	$P(A)_j$
	1	77		24.36
	2	57		18.03
	3	47		14.87
	4	4		1.27
	5	23		7.28
Total		208	316,093	65.80

TABLE V.—FISCAL YEAR 1973

Ship type k	Accident type j	Number of vessels in accidents, $A_{j,k}$	Total number of transits, N_k	Probability of accident $\times 10^{-6}$ $P(A)_{j,k}$
Tanker	1	1		17.89
	2	4		71.61
	3	4		71.61
	4	0		0
	5	10		179.02
Total		19	5,586	340.14
Cargo ships and passenger vessels	1	18		61.05
	2	54		183.15
	3	15		50.88
	4	4		13.57
	5	19		64.44
Total		110	29,484	373.08
Tank barge	1	14		16.15
	2	32		36.92
	3	3		3.46
	4	1		1.15
	5	1		1.15
Total		51	86,672	58.84
Cargo barge	1	12		9.24
	2	60		46.21
	3	27		20.79
	4	0		0
	5	4		3.08
Total		103	129,847	79.32
Tow, tug	1	26		42.11
	2	45		72.88
	3	25		40.49
	4	2		3.24
	5	5		8.10
Total		103	61,743	166.82
	j	A_j	N	$P(A)_j$
	1	71		22.66
	2	195		62.23
	3	74		23.62
	4	7		2.23
	5	39		12.45
Total		386	313,332	132.19

TABLE VI.—FISCAL YEAR 1974 NEW ORLEANS ACCIDENTS, TRANSITS AND PROBABILITY OF ACCIDENT

Ship type k	Accident type j	Number of vessels in accidents, $A_{j,k}$	Total number of transits, N_k	Probability of accident $\times 10^{-5}$, $P(A)_{j,k}$
Tanker	1	2		29.27
	2	9		131.71
	3	0		0
	4	2		29.27
	5	32		468.32
Total		45	6,833	658.57
Cargo ships and passenger vessels	1	17		58.25
	2	44		150.76
	3	10		34.26
	4	1		3.43
	5	45		154.18
Total		117	29,186	400.88
Tank barge	1	19		22.86
	2	34		40.92
	3	5		6.02
	4	5		6.02
	5	6		7.22
Total		69	83,098	83.03
Cargo barge	1	17		12.20
	2	110		78.95
	3	7		5.02
	4	4		2.87
	5	15		10.77
Total		153	139,334	109.81
Two, tug	1	44		70.79
	2	42		67.57
	3	14		22.52
	4	9		14.48
	5	18		28.96
Total		127	62.154	204.33
	j	A_j	N	$P(A)_j$
	1	99		30.88
	2	239		74.55
	3	36		11.23
	4	21		6.55
	5	116		36.18
Total		511	320,605	159.3

TABLE VII.—ACCIDENTS, TRANSITS, AND PROBABILITY OF ACCIDENT BY SHIP TYPE—NEW ORLEANS, FISCAL YEAR 1969–74

Ship type k	Number of vessels in accidents A_k	Total number of transits N_k	Probability of accident $\times 10^{-5}$ $P(A)_k$
Tanker	116	33,566	345.59
Cargo ships and passenger vessels	423	184,425	229.36
Tank barge	241	487,091	49.48
Cargo barge	414	712,110	58.14
Tow, tug	442	352,317	125.46
Total	1,636	1,769,509	92.46

TABLE VIII.—ACCIDENTS, TRANSITS, AND PROBABILITY OF ACCIDENT BY ACCIDENT TYPE—NEW ORLEANS, FISCAL YEARS 1969-74

Accident type j	Number of vessels in accidents A_j	Total number of transits N_j	Probability of accident $\times 10^{-5}$ $P(A)_j$
1	427	----------	24.13
2	683	----------	38.60
3	217	----------	12.26
4	57	----------	3.22
5	252	----------	14.24
Total	1,636	1,769,509	92.46

Mr. O'NEIL. I would, if the committee would allow me a few minutes, like to perhaps try to put this in perspective and make some suggestion on where we could go from here.

I think I speak for everybody who is a member of the Ad Hoc Committee for Ports and Waterways and AWO, and in saying we are gratified that this committee presented itself and listened to what we have had to say today.

We hope we have impressed the committee on our concerns, particularly with what is going on in New Orleans.

Most of the people whom I represent have been on the river for at least 50 years. They know every bend, every turn, every sand bar and other bars, I am sure.

They have been in the wheelhouses of the boats. They are realists, not obstructionists, and I hope we have not conveyed to anybody that we are trying to obstruct the implementation of this system.

They foresee very real problems in what has been developed so far, and only want the opportunity to give the Coast Guard what they feel is safe methods of operation.

They are very concerned with the hazardous materials regulation and the pollution statute. If a system is put out on the Lower Mississippi River which is in the least bit unsafe or unworkable or unfeasible, many of these people could well go out of business with the penalties under those statutes.

They carry a great deal of chlorine; they carry dangerous cargo, hazardous cargo in great quantities, and for those reasons they are so vitally concerned.

The Ports and Waterways Safety Act in section 122(e) sets forth the criteria that must be followed in implementing that and I think we have illustrated today many of these have not been met.

There is said much as to the scope and the degree of hazardous material, and I am sure that is appreciated. I do not know of any study—and Dr. Brite will make just a few comments on that—on whether or not the intercoastal waterway overlapping areas were ever considered.

The economic impact and effect on these people from their point of view of licensing and their radios, I do not believe that it has been given serious consideration.

The local practice, knowledge, and custom, to which Congressman Treen referred to again is another area that all of these set forth as criterion must be considered by a wide variety of interests. Perhaps this will be considered in the future. It certainly to our knowledge has not been considered in the past, although we have had a sounding board and there has been no response.

We would suggest therefore that perhaps the following procedure should be followed in this matter; and that is that, subject to, again, Dr. Brite's comments, I think I preempted him, but I myself might as well go ahead and finish, for the committee whom I represent discussed this last night and we would like to suggest these procedures and perhaps have them endorsed by this committee.

We think that it is absolutely essential that advance notice of proposed regulation be withdrawn. These regulations in their present form are unworkable and they do not represent the comments certainly which this industry has made.

Mr. TREEN. Are you going to file, or do you have one filed now under the procedure, under the advance notice, or are you going to file comments in the record?

Mr. O'NEIL. Congressman, we have filed as of September 3 over 30 comments to those and we are cut off procedurally from doing anything else, and it sits with the Coast Guard to determine what they will do. That has been done.

The second point is, I do not see personally any need for a formal advisory committee at this time, although I do not want to waive that right if in fact that exists. I would hope that an informal committee could be established composed of eight people from the barge towing industry, representing a cross-section of their interests to deal with the Coast Guard.

Now, this committee must deal both with Washington and New Orleans because the reason we have to put a stop on the 8th Coast Guard District blaming Washington and Washington blaming the 8th Coast Guard District, we cannot afford to have this any more and we are not responsible and we do not know what is happening.

We submit that all of the meetings that this committee to treat the problems which have arisen today be recorded with testimony, with a court reporter so that there will be no misunderstanding what has been said and what has transpired.

We suggest that these meetings take place in New Orleans and that, subsequent to these meetings, perhaps on April 1, 1977, if that time span is adequate, that that joint committee report be resubmitted to this committee, resubmitted to this committee on what progress has been made.

This will, I think, give us an opportunity to insure this committee that the system which will be put into New Orleans will be rational and reflective of our needs and that the funding that you have authorized will be utilized effectively.

We are not sure that that will happen right now.

We think that no system could go in on a volunatry basis at all until these critical questions are resolved, and that is the position I think that we take.

Dr. Brite has done a thorough analysis of the statistics which the Coast Guard initially used to design this system for New Orleans; and I would like now to defer to him for one moment so that he can summarize those things because there are some problems that have been raised and we have done our homework.

We have looked at the statistics. We have tried to find out how we got to where we are and we are not sure how we got to where we are; and we are afraid—we hope this is not the case, that we may have been pushed into an embarrassing situation that we may have a system that perhaps is not the right one for New Orleans, and if that is the case, we ought to know right now before we go one step further; and I think Dr. Brite could make some comments.

Mr. BIAGGI. Yes, brief comments.

Mr. BRITE. Mr. Chairman, Mr. Treen, gentlemen:

I have been asked to testify for the ad hoc committee and my complete report will be available for the record, but for time considerations, I will just make some very quick comments.

The analysis that I did was for the purpose of determining what statistical procedure was used by the Coast Gurad in proposing the present system. Basically, what I found was that there were a number of problems with the data, a number of problems with the statistical analysis; that is, the statistical techniques used, and a number of problems with the presently proposed system.

The first problem was that in the development of the methodology for analyzing the various ports in determining what type of system was necessary, New Orleans was not included in the development of what we call algorithm; that is, the New Orleans area, which is a particularly unique—unlike Houston, Puget Sound, and various other areas, was not included in the development of this algorithm.

The conclusion that I have come to after looking over these reports and studying them in great detail is that the data base used is very poor; that is, the data deals with reported accidents which varies considerably from one time period to the next.

One statement of the Coast Guard report was that only about 30 percent of actual accidents are in fact reported. The statistical techniques they used were questionable in one particular case.

The data concerning the number of accidents was doubled in order to adjust for this lack of reporting, and then in order to estimate the damage that was done, the data was again doubled; therefore, we have a multiple of 4 used in determining the outcome.

Mr. TREEN. How do you know that that is inaccurate?

Mr. BRITE. The multiple of 4?

Mr. TREEN. Yes.

Mr. BRITE. I have no way of knowing that it is not accurate, but there was nothing to justify it, either. What I am saying is one could choose any multiple and come to any conclusion that anyone could wish. Statistically it is just not justified without more justification than I have seen.

The analysis of the data was based on a case-by-case analysis of the 2,692 forms. The result is that a great deal of judgment is necessary in determining whether or not an accident can in fact be prevented; and I will not go into the quotes, but they are available in the report—quotes from the Coast Guard report; and I am specifically referring to the issue study that was completed in March of

1973, indicating that in fact someone familiar with that particular port, someone knowledgeable at that port should be available when analyzing the 2,692 forms to determine whether or not the accident could have been prevented.

So there is a great deal of judgment involved in the analysis.

The present proposed change, which is based on the Coast Guard's analysis of these reports, however, does recommend that, and I quote, "Results indicate some form of surveillance is necessary for mile 75 to mile 109. That is the most heavy congestion of the New Orleans Port."

The conclusion of the Coast Guard report and the conclusion of the report that I have seen is that there must be some form of surveillance in order for the system to be workable, particularly in the section which is designed sector 3; and I did have some charts to verify this but I do not think I have time to go into those conclusions but again, my conclusion was that the reduction in accidents was approximately 52 percent, using the voice communication, network only, and approximately 72 percent using the more sophisticated radar system.

Now, I do not know that these figures are accurate. I have no way of knowing because, as I said, whether or not a particular accident could have been prevented is based to a great extent on judgment.

In any case, the conclusions based on the statistics that the Coast Guard has was that there needed to be some form of surveillance, and I have seen no statistics, no data at all to indicate that the presently proposed system, not including surveillance, would be the appropriate one.

So in conclusion, available data——

Mr. TREEN. If you don't mind, Mr. Chairman, we are getting into the horrible question thing as far as I am concerned, and what I raised yesterday, and that is applying this system to the accidents that we have had using that as the basis on which we proceed with these things that are proposed to be implemented in the first phase, second phase, will they prevent the things that have happened on the river. That is the big issue as far as I am concerned.

Mr. BRITE. No, sir.

Congressman Treen, I have not seen in any of the statistical studies indicated that the presently proposed system of voice communication only will prevent a significant portion of accidents. There has been no study.

Mr. TREEN. How about with radar added?

How about with the full radar net?

Mr. BRITE. The estimates of the Coast Guard are in their reports, are available in their reports; as I said, they are based on a very poor data base, and some questionable statistical techniques.

Various studies have shown that in one case, 72 percent of the accidents could have——

Mr. TREEN. I understood that; but what I want is your opinion as a statistician.

Mr. BRITE. Statistically, I would have to go back to the original reports, the 2,692 forms and analyze them with the knowledge of the people in the industry; that is, I would develop an algorithm specifically based on the New Orleans port and determine whether or not their conclusions were verifiable based on present data.

Mr. TREEN. You are not able to say here that their conclusion is incorrect? You are just saying you do not believe scientifically that——

Mr. BRITE. Statistically, it is not.

Mr. TREEN. And they contend that it is correct.

Mr. BRITE. Yes, sir; that is correct.

Statistically, it has not been verified.

Mr. TREEN. From your point of view, we do not know the answer to that basic question of how much——

Mr. BRITE. That is true.

Mr. TREEN [continuing]. Reduction in accidents we could receive from the proposed system in any of its stages, and you are not saying we do not have the answer to that?

Mr. BRITE. Yes; that is correct.

However, the Coast Guard does conclude that the New Orleans radar surveillance and TV is essential for the safe operation of this system; and that is—I have the quotes in the report; what I was going to suggest is the logical next step would be to actually look into the effect of the presently proposed system; that is, does a study based on the presently proposed system in order to try to determine what effect would there be because all other studies have come to the conclusion that this is not the correct system.

Mr. TREEN. What other studies?

Mr. BRITE. Studies of—all of the studies of the Coast Guard that I am including there, the issue study, which is a four-volume study done by the Coast Guard that came out in March of 1973, the analysis for the Fort Meade study, which is the basic document for, I assume, this recommendation.

There was an environmental impact study in 1974; again, a conclusion of all of these was that a full VTS system was essential for the safe operation of the New Orleans port.

Mr. TREEN. Well, then, your contention is not the full system will not work. Your contention is that the initial phases of it would not work; is that correct?

Mr. BRITE. What I am speaking to is the general proposed system is the one, including radio communication only; that is correct.

Mr. TREEN. OK.

Go ahead.

Mr. BRITE. Well, as a final statement, I just want to indicate, or to reiterate, I suppose, that the projection is based on the data from 1969 through 1974; indicate that there will be a tremendous increase in traffic, as we all suspect, through 1980; and I have projected through 1980 and we would also expect that accidents would increase at least as rapidly, with no VTS.

There is nothing which I have seen which statistically supports the presently-proposed system and therefore I suggest that we need some justification of that system, statistical analysis, which does speak to the presently-proposed system and reduction that we could expect from it.

Thank you.

Mr. BIAGGI. Admiral Fugaro?

Admiral FUGARO. Mr. Chairman, I would like to make a couple of points.

I am not familiar with the points that Dr. Brite was making with respect to New Orleans not being included in the algorithm and I would have to check that. But I believe the algorithm was developed to try and permit us to make a relative rating between the individual ports to give them a priority rating as to which ports should we go to first.

I am not sure exactly which points Dr. Brite is referring to in that case, but as I think we have indicated, New Orleans came out as one of the prime priority ports, which should be addressed if and when we put VTS into existence.

I believe the point he is making with respect to the case-by-case analysis of accidents is correct. We did this on an individual, case-by-case basis, and if anything, we were extremely conservative in the subjective judgment which we made on each of these cases. That is, if there was any doubt as to whether or not this was in effect or in fact a preventable accident, we did not include that in the category of preventable accidents.

We were just looking for accidents which there was no question about, that if a VTS had been in existence, there was a possibility that the information provided through the VTS might have assisted in preventing that casualty.

Again, in no case have we made the statement or indicated that all accidents are going to be prevented. That is not, I think, what the situation would be.

What we are hoping to do is to reduce the number of accidents and, again, going back to existing systems, I think we have shown that these have provided a benefit and reduced the number of accidents that have occurred in ports where the VTS's are in existence. Within this category we also do feel that while we think surveillance is necessary, and we definitely want it, especially in the congested areas, as we have referred to, that while we consider surveillance necessary to complete the system, communication is really the heart of the system. The communication and the passing of the advisory information, as I mentioned before, is going to be really the meat of the system and hopefully will achieve the maximum benefit of any part of the system. The most cost beneficial part of any VTS is the communications aspect.

So while we love to have the complete system in all at once, and turn a switch, we still do feel that it is essential that we take this phase in operation, the first step of communication which is very vital, and will be very beneficial——

Mr. TREEN. Was your analysis of your judgment as to which accidents were avoidable based solely upon your review of the 2692 form?

Admiral FUGARO. Yes. We took it case by case.

Mr. TREEN. It is a matter of record which ones you judged could be prevented and which ones could not be?

Admiral FUGARO. Yes, sir.

Mr. TREEN. Is there any reason that information could not be made available to those who wish to look at it?

Admiral FUGARO. Yes, sir. It can be made available.

Mr. TREEN. Well, it seems to me you ought to look at the 2692's and see how the Coast Guard analyzed them and——

Mr. O'NEIL. I tried to get that information, Congressman. We did not meet with any success in New Orleans. Dr. Brite went out to the vessel traffic center and got some statistics but by no means complete.

One thing I think that should be emphasized is that the statement by Admiral Fugaro leads me to believe when they made the judgment—my question is when they made the judgment on preventable accidents under a VTS, were they talking about a fully-implemented VTS or the system with which we must live until 1980?

Mr. TREEN. I understood thee was one figure of 52 percent reduction during the early part of this and a 72 percent in the full implementation; so you had two judgments on each accident.

Mr. O'NEIL. But that included some sort of surveillance that we would be operating, at least, to 1980 without any——

Mr. TREEN. All I am saying is the Coast Guard has offered to make that information available.

Since you contest, Dr. Brite, on a statistical basis, the justification for a system on which we are going to spend millions of dollars to taxpayer money, I think that if the Coast Guard is willing to let you into this, this committee would be interested in your analysis.

Mr. BRITE. Mr. Treen, quoting from the report of the Coast Guard's Issue Study, form 2692, lacks adequate detail in several areas, especially on factors relating to the cause of accidents, vessel movements, and specific locations. That is, by admission of the Coast Guard studies, these forms lack a great deal of information. And in fact it is very, very difficult to determine the cause of an accident and whether or not it could have been prevented.

Somehow, this needs to be statistically justifiable; that is, we need to—one thing I would suggest is that we need some local input on determining whether or not an accident could have been prevented, someone who is thoroughly familiar with the local area.

Mr. TREEN. I understand the Coast Guard is now saying those records on which they based their judgment would be made available to representatives of your group. I do not want to push you, Admiral, but—if it is not against your regulation or your authority, but if you are agreeable to do something about this——

Admiral FUGARO. Yes, sir.

Mr. TREEN [continuing]. Then, you have a chance to look at them, and you can conclude that there is not sufficient information to make a determination, and so forth.

Mr. BIAGGI. I have one question, Captain Conrad.

I think it was estimated 200 vessels in the main stream—you responded there were many others and other channels in other areas.

How would you estimate that?

Captain CONRAD. I would say probably within the area, general area of New Orleans, there are many vessels in the adjacent waterways that would be in the main streams of the Mississippi; probably more, because generally speaking, vessels that negotiate the Mississippi River have many, many barges in larges groupings handled by one boat but those same barges, when they are broken down for distribution throughout the canal network; whereas, arriving in New Orleans under the power of 1 vessel with 30 barges are now under

a number of vessels which from 1 to 4 barges, in each tow, there is a multiplication that happens in New Orleans.

Mr. BIAGGI. Thank you, captain.

Once again the bells are ringing. We have two other witnesses and, in deference to their patience and convenience, we will return to listen to their testimony, but first, I would like to assure Mr. O'Neil and his group that the testimony collectively was more than informative. I am sure by this time you gather the intention of the committee is to obtain the best possible resolution to what seems to be a very complex problem in an area that has multiple problems.

Once again, I address myself to the Coast Guard.

I think that a very sincere, cooperative effort should be manifested. I do not mean just a facade, not just a token effort, but a very sincere, cooperative effort. I do not intend to substitute our judgment for your professional judgment, but on the other side of that coin, we have professionals who have been in the business for a lot longer, in most cases, than the members of the Coast Guard, and who have intimate knowledge of many of the problems.

I am sure you have a common interest, at least in defining and providing safety, and let us assure ourselves that the Coast Guard and the industry are on "all fours" in seeking the optimum system to follow. In the end, we would like to be satisfied that there has been substantial input and very serious consideration—very serious consideration to the total picture.

Any doctrinaire position adopted by one side or the other should be given short shift. This committee feels very strongly about that.

So, at this point, we will recess again for 10 minutes——

Mr. O'NEIL. Mr. Chairman, the final two witnesses have indicated that we have touched all of the bases and that they have waived their right to oral comment; and we thank you very much for your indulgence; and we would like to have their statements made a part of the record.

Mr. BIAGGI. Without objection, is ordered.

[The statements referred to follow:]

STATEMENT OF DAVID CARLTON, VICE PRESIDENT, MARINE OPERATIONS, FEDERAL BARGE LINES, INC.

Mr. Chairman—members of the committee—my name is David Carlton. I am vice-president of marine operations of Federal Barge Lines, Inc. The company I represent was founded by the U.S. Government as the Inland Waterways Corp. during World War I, to pioneer barge line service on this Nation's waterways. The corporation was operated and expanded by public demand until 1953, when in its wisdom, Congress decided that a sufficient number of privately funded barge lines were in operation to serve the needs of the shipping public. At that time, the Government divested itself of the Inland Waterways Corp. and all of the equipment was purchased by the present owner, Pott Industries, Inc.

As a private concern, Federal Barge Lines has continued as a leader in the inland waterways transportation field, serving the shipping public throughout the entire Mississippi River system. Federal Barge Lines is one of many barge lines serving this Nation, providing the service that transports 16 percent of this Nation's freight. A great portion of that freight is farm products, produced in the bread basket of the Nation—the Midwest.

As you are well aware, it is farm products and farm products alone, that keeps this Nation's balance of payments in proportion in the world market.

The Port of New Orleans exports more farm products to world markets than any other port in the country, and the major part of that grain is brought to New Orleans by barge. Those barges are towed by towboats owned by companies

who employ men of great expertise in the towing industry—expertise that has been gained by many years of practical experience. Many of the top operating personnel of all barge lines are men who came up through the ranks from an assignment as deckhand—mate—pilot—captain and on into management positions. Men who know every facet of barge line operations.

The barge line industry has, without a doubt, the finest safety record of any mode of transportation. This record has been accomplished and is maintained today by the facts I just stated. Men of great expertise are responsible for day-to-day operations of the towing industry and they are constantly striving to improve their safety record. That is one of the reasons you will always find barge line industry representatives willing to discuss any plan that will enhance their operations to a greater degree of safety and efficiency.

On August 6, 1975, a notice to mariners from the 8th Coast Guard District in New Orleans, dated July 29, 1975, was received in the St. Louis office of Federal Barge Lines. The contents of that notice was to notify all interested parties that a committee had been appointed to advise the Coast Guard of the industries' viewpoints on a proposed vessel traffic system, from the sea buoy to mile 243, Lower Mississippi River. The rationale behind the selection of this committee has never been fully understood. The notice indicated that the industry committee would be chaired by the president of the Crescent River Port Pilot's Association, who, at that time, was Captain David C. Wheat, Jr. The committee list I received was composed of many ship pilots belonging to various associations, several deep-draft shipping companies, and only a token amount of shallow draft operators, who were local in nature. There were no barge line representatives on the committee.

After a hurried meeting among a number of barge line operating personnel, I contacted our American waterways operators representative in New Orleans, Captain Merle Harbourt. I expressed to him our grave concern that the segment of the industry that would be most affected, was not represented on this committee. Through his efforts, we were successful in having 12 major barge lines added to the list—Federal Barge Lines being included. It appeared to all of the barge line representatives that we had been purposly deleted. However, we were assured by the Coast Guard that this was not their intention.

The revised advisory committee first met in New Orleans on August 19, 1975 at Coast Guard headquarters.

We were under the impression that this would be the first step of industry input to the Coast Guard, to determine what type of system, if any, was needed in the New Orleans area. That illusion was soon shattered when a draft proposal was passed out to the members of the committee, outlining in detail the system proposed by the Coast Guard. We were informed by the commanding officer of New Orleans vessel traffic system that 18 days prior to this time, he had no knowledge of VTS systems whatsoever. He was, however, now the commanding officer of this proposed new system. Numerous Coast Guard officers advised the committee repeatedly that it was imperative we make a fast decision and recommendation because there was a contract on the street for the purchase of a $4.2 million computer.

This astounded the entire committee, barge line operators, deep draft interests, and pilot associations alike! There was no question in industry representatives' mind that the dye had been cast for a computerized system and in fact, all items in the draft proposal were, in essence, really not negotiable. There was no question that all of this had been decided before any conversation had taken place with the affected parties. We did, however, agree that the industry should form several subcommittees to study different aspects of the Coast Guard's proposal. The subcommittees were broken down as follows:

(1) A feasibility committee.
(2) An "area to be covered" committee.
(3) A mandatory voluntary participation committee.
(4) A communications committee.
(5) An operations committee.

I was selected to chair the "area" committee. Members of my committee represented barge lines, ship pilot associations and Coast Guard. My committee met on September 17, 1975 and all of the affected parties, i.e., industry and pilots associations, agreed that the area the Coast Guard desired to implement a VTS over, was entirely without merit. Our recommendations were that an area covering New Orleans Harbor proper, a distance of approximately 30 miles, be used

as a starting base with radar surveillance, which could be instituted much more economically and more effectively than the elaborate computerized system, as proposed by the Coast Guard. During that committee meeting, Captain Henry Durham, president of the New Orleans-Baton Rouge Pilot Association, furnished data covering the prior 10-year period, which illustrated that his association had been involved in 55,622 ship movements and there had been, during that time, 24 collisions that could have conceivably been prevented by some type of vessel traffic control system; however, as he pointed out, there was no guarantee that the collisions would not have occurred had there been a system. He pointed out that percentage-wise, this amounted to only .0004 of 1 percent accident ratio. A figure so minute that there was certainly no justification of any expenditures of the taxpayers money to institute a VTS system.

The other committees also reported back to the Coast Guard, as we did in the "area committee," that the system as proposed by the Coast Guard, was not justified or workable for many reasons. Two of the outstanding reasons were: lack of radar surveillance and a totally unacceptable radio communications system. Other testimony will be given at this hearing in greater detail of specific problem areas, that I will not endeavor to go into in my testimony.

After all reports of the subcommittee had been turned in to the Coast Guard at a meeting held September 24, no further meetings were held until April of 1976. However, communications were received from Commander Boyce in February, 1976, saying in effect, that he thanked us for our time and efforts as subcommittee chairmen and for all of the input we had contributed. He said, however, that he was recommending the Coast Guard implement the system in its entirety, as originally proposed in the draft proposal we received on August 19, 1975.

The maritime industry representatives that have attended meetings conducted by the 8th Coast Guard District concerning this matter, feel unanimously, that their attempted input into the development of the proposed system has been completely and totally ignored. It seems apparent to all concerned that the course of events had been predetermined by the Coast Guard. Also, the high-handed and dictatorial manner in which the meetings were conducted, was certainly not conducive to a meaningful cooperative effort by the two parties to arrive at a constructive conclusion, or to correct any problems in navigation, if indeed, such problems do exist.

Without open-minded dialogue between the maritime industry and the U.S. Coast Guard, in this and in future matters, we will be left with no other choice but to believe that the proposed vessel traffic system, and other programs, are nothing more than a scheme of empire building on the part of the Coast Guard, at the expense of the maritime industry and the American public.

There is grave concern that the lack of expertise, knowledge and understanding of the shallow draft towing industry, by the U.S. Coast Guard, no matter how noble their intentions, could lead to a serious impairment of this Nation's inland waterways.

The Coast Guard does not have among its ranks, to my knowledge, one man who has the practical experience or capabilties of operating a towboat and barges of the type used on the Lower Mississippi River. It is apparent that they have chosen to ignore the real experts of this industry and would like for the industry to conform to their manner of thinking, regardless of the cost. As I was told at one meeting in New Orleans, "We (the U.S. Coast Guard) have been mandated by Congress through the Ports and Waterways Safety Act of 1972 to embark on a vessel management program." I find it hard to believe that the Congress ever intended to place in the hands of the military the power to restrict, interfere with and dictate programs and policies to private industry, as they so choose.

I would like to assure the members of this committee that the barge line industry will always be willing to work with Government agencies in order to promote the safety and efficiency of our operations that are so vital to the economic well-being and defense of this Nation. We do, however, feel that it is imperative that officers of the Coast Guard be directed to heed the advice of the experts before attempting to implement regulations that have such a far-reaching effect.

In closing, I would like to state that throughout this industry, after our experience in this matter, we are cognizant of the meaning of the statement of Justice Brandeis, and I quote: "Experience should teach us to be on guard, to protect liberty when the Government's purposes are beneficent. The greatest dangers to liberty lurk in insidious encroachments by men of zeal, well-meaning but without understanding."

This concludes my testimony. I will be more than happy to answer any questions on what I have stated or on technical matters that will be discussed.

WISCONSIN BARGE LINE, INC.
Hartford, Ill., September 14, 1976.

Hon. MARIO BIAGGI,
Chairman, Subcommittee on Coast Guard and Navigation, Room 1334, Longworth House Office Building, Washington, D.C. 20515

DEAR CONGRESSMAN BIAGGI: I am in receipt of your letter of September 10, 1976, wherein you invite me to appear before the Subcommittee on Coast Guard and Navigation in regards to the Proposed Vessel Traffic Service to be instituted by the U.S. Coast Guard as proposed in Volume 41 of the Federal Register, No. 18 (Thursday, June 17, 1976), at Pages 24604 to 24670.

I am opposed to the institution of the Vessel Traffic Service by the U.S. Coast Guard on the Lower Mississippi River embracing the Mississippi River from its gulf outlet to Mile 243, AHP, Lower Mississippi River. In the following paragraphs I list some of my objections.

My first objection to the proposal that have been given in this Advance Notice is the fact that the system as proposed is not a complete system that would bring about the reduction of accidents in what is commonly known as the New Orleans-Baton Rouge port area. A system such as proposed in the Advance Notice wherein you have a radio or audio system use in conjunction with a computer is not practical in being able to determine at any given time where a vessel and its tow would be situated in this area. I feel that any vessel traffic system along with the rzdio communication set up within it, and along with the computer into which the radio communications set up within it, and along with the computer into which the vessels within the area would contribute input; must also have a radar surveillance incorporated in the system. With a radar surveillance component in the system you would not only have the audial information to which the computer could produce projections on traffic, but you would also have a visual check that would verify and show any discrepancy that the computer might make with the information that had been supplied it. In my estimation, you cannot have one without the other, to have the system that is needed to produce the results that are projected.

Originally as I had understood it and according to comments made by the Coast Guard in explaining to us the proposed vessel traffic control system, the Coast Guard had taken a position at that time that a system would not be satisfactory without radar surveillance. Now I find that in an Advance Notice of Proposed Rulemaking that a system will be installed that does not have radar surveillance and in my opinion I concur with the Coast Guard's previous statement that it would not be sufficient or practical.

Looking through the different sections of the Advance Notice I see nowhere in the Advance Notice where there will be employment of civilian professional pilot personnel to help in the operation of the VTS. I am aware that the Coast Guard is a military organization and that one of the doctrines within this military organization is the transferring of its personnel throughout its military locations anywhere from two to four years. Therefore, if this VTS system as proposed is put into operation, we could have personnel directing the movement of towboats and ships within the VTS area, individuals who have never seen the Mississippi River and who do not have any degree of expertise in the art of piloting tows in the VTS area.

At this point, I would also like to bring out that the U.S. Army Corps of Engineers, another military organization, does have operations on the Mississippi River and its tributaries. They differ in their methods of operation in comparison with the Coast Guard, in the fact that they employ civilians who do have expertise in regards to the river and who have the ability to develop themselves and their career in the Corps of Engineers due to the fact that they are not transferred from one location within the Army Corps of Engineers operation to another. I am aware that in some of the districts the gentlemen who are civilians in the Army Corps of Engineers have been employed for ten to 20 years and have become experts over the specialized area in which they have contributed their time and talents. This is not true of the Coast Guard and their method of operating within the Inland Waterways in the United States. It seems just about the time that we have an officer of the Coast Guard who is in charge of some particular function pertaining to navigation on the Mississippi River and its tributaries; and who has developed a knowledge and expertise over a period of three years, that at that time he is transferred our of the district into another district of the Coast Guard. The man who replaces him comes in as a man who is not aware of the problems that he is assuming in regards to river navigation.

I feel that professional licensed pilots who have been engaged in piloting ships and towboats in the VTS area should be employed on a permanent basis with the incentive to make a career of employment in the VTS. These men have been employed in the movement of towboats or ships in the VTS area. This would remove the objection that so many of the members of the towing industries have in regards to the Coast Guard personnel that would be operating this VTS. I feel that we should have Coast Guard officers in charge of the VTS but the actual operation of the system should be in the hands of professional licensed pilots.

I also find in the Advance Notice of Proposed Rulemaking that the requirements that we will have to comply with in the operation of the VTS system; in that we must monitor three channels; will lead to confusion to the master and pilot on watch on board the towboat or ship. In some cases I doubt where we are going to be sharing a channel with another government agency in regards to one of the VTS sectors, that the volume of transmission that would be made on that channel will be such that we will have nothing but a garble of noise and interference. My thoughts in regards to using the VHF channels for each individual sector should be that there would be a clear VHF channel for each VTS sector. Even with a clear channel to each VTS sector, depending on the density of ships and towboats in that individual sector, a pilot might find great difficulty in breaking through the traffic that would already be transmitting on that clear channel assigned to that VTS sector.

Another point that I wish to bring up at this time is that I feel the total area covered in the VTS is too big. Some months previous when the Coast Guard was conferring with an Ad Hoc Committee of better than 50 members in the towing industry; the Ad Hoc Committee had brought up the point that they felt it would be more advisable to have a selected area possibly from Mile 85, AHP, Lower Mississippi River, to Mile 120, AHP, Lower Mississippi River. The Ad Hoc Committee pointed out as a specific instance that a VTS in the area of Algiers Point would be a good practical installation to try the system. This would enable the experience gained in operating such a VTS system and would provide an area where there are many ships and towboats going through such an area. At that time the Coast Guard took this information that had been offered by the Ad Hoc Committee and said they would take it under advisement.

In a subsequent letter the commanding officer of the VTS system politely thanked the Ad Hoc Committee members for their suggestion, but that he had decided that they would install the complete VTS system from the sea buoy at the mouth of the Lower Mississippi River to Mile 243, AHP, Lower Mississippi River. As I expressed to the gentlemen in a letter I felt that our participation in that Ad Hoc Committee was purely for the mechanics of complying with the requirement that the towing industry be consulted. I still feel that a good area to use as the initial area in which a VTS system would be installed and operated therein; would be an area which would encompass 15 miles south of Algiers Point and 15 miles north of Algiers Point. This would give one of the best opportunities to observe and determine the efficiency of a VTS system in the New Orleans port area.

There are many other points that raise questions in regards to the proposed VTS for New Orleans. I am in complete agreement with all comments that are being submitted by the Ad Hoc Committee for ports and waterways, to the Coast Guard in regards to this Advance Notice of Proposed Rulemaking.

Yours truly,

THOMAS E. KENNY,
Vice-President, Administrative.

Mr. BIAGGI. I want to tell Capt. David Carlton, vice president of marine operations of the Federal Barge Lines, and Mr. Thomas E. Kenny, vice president, administrative, of the Wisconsin Barge Line, Inc.—let me extend on behalf of the entire committee and myself our sincere thanks.

The meeting is adjourned.

[Whereupon, at 3 p.m., the subcommittee was recessed, to reconvene at the call of the Chair.]

U.S. COAST GUARD ACTIVITIES IN UPPER GREAT LAKES

FRIDAY, JULY 16, 1976

HOUSE OF REPRESENTATIVES,
SUBCOMMITTEE ON COAST GUARD AND NAVIGATION OF THE
COMMITTEE ON MERCHANT MARINE AND FISHERIES,
Sault Sainte Marie, Mich.

The subcommittee met at the Cisler College Center, Lake Superior State College, pursuant to notice, at 9:10 a.m., Hon. Eligio de la Garza, acting chairman, presiding.

Mr. DE LA GARZA. The subcommittee will be in order.

I bid all of you good morning.

This subcommittee is the Subcommittee on Coast Guard and Navigation, a subcommittee of the House Committee on Merchant Marine and Fisheries and we are meeting this morning here as part of the general responsibility of this subcommittee for the oversight responsibility over the operations of the U.S. Coast Guard.

For some time the subcommittee has been trying to get up here at the insistence of Congressman Ruppe. Unfortunately, there is always a problem with one member or another of the committee and we have finally managed to select a date at which at least three of the members of the committee are here.

Unfortunately, our subcommittee chairman and colleague, the Honorable Mario Biaggi of New York has been engaged this week in the activities of the Democratic Convention in New York City and he found it impossible to be here.

I might add he was one of the leaders in having our colleague, Mr. Rodino, made the Vice Presidential nominee and he wasn't too successful in that endeavor.

He has asked me to serve as chairman in his absence and he, along with all the other members of the committee, look forward to hearing and receiving our personal impressions and information derived from this hearing.

I might add that I represent a district—if you went south from here, and you hit the other border, that is where I live.

We also have a bridge that crosses into Mexico and we cross the Rio Grande River, so I represent a very similar area, but at the opposite extreme of our country. Brownsville is probably the southernmost part of the continental United States. Hawaii is lower, but Brownsville is the southernmost part. Well, sometimes the people from Key West argue. [Laughter.]

But at this time this morning I might mention to you that we are trying to listen to you and have all the information that we can and still we would like to get to the locks on one of the boats on the lake,

and so on, so we are going to ask your indulgence that you limit your testimony as brief as possible without cutting anyone off, but you have the availability, as I'm sure all of you know, of inserting into the record any information you would like. It doesn't necessarily have to be mentioned here. For that purpose, the record will remain open until August 2, 1976, for any inclusions or enclosures or additional views that anyone here might wish to submit.

Our primary purpose in coming to the Soo, of course, is to review the vessel traffic movement in the area and any associated problems, including navigational equipment and applications for improving traffic movements generally and for promoting marine safety. In the latter connection, of course, we are also interested in the adequacy of Coast Guard search and rescue facilities in this area and in the upper Great Lakes generally.

As I said before, if you would address yourselves to the pertinent parts of your testimony and if you would cooperate with us, it would help us to be able to conclude the hearings as early as possible, we are hoping by 1 p.m., in order that we might have an opportunity to visit and see as much as we can see that we can coordinate your testimony with our actual perusal of the geography here.

With that, I would like to inform you that we have to my right our colleague, Mr. Jim Oberstar, who, while not a member of this particular subcommittee, is a member of the full committee and he is your neighbor—what are you, west?—to the west, and of course, Congressman Ruppe, who is not only a ranking minority member of the full committee, but represents you here in this area.

Before we start with the witnesses, Mr. Ruppe, do you have a statement or would you like to say something?

Mr. RUPPE. Thank you very much, Mr. Chairman. I do have a statement. However, I would like to paraphrase a portion of it at this particular time.

I also would like to extend greetings to you and Congressman Oberstar on behalf of the people in Sault Ste. Marie, and all those present in this room.

I realize between your official duties in Washington, Texas and Minnesota and your necessary and I am sure enthusiastic interest in the convention that it is difficult for you to take time to come here to northern Michigan, so I am very pleased that you would see fit to do so.

I would like to make a few further comments concerning these hearings here today.

Long before the sinking of the steamer *Edmund Fitzgerald*, in 1975, I had indicated an interest in a public hearing into the adequacy of Coast Guard search-and-rescue facilities on the Great Lakes. That interest has expanded into concern for vessel traffic control systems, for associated and improved navigational systems as well as for vessel and crew safety.

The *Fitzgerald* incident seems to highlight deficiencies in rescue forces. These deficiencies are in no way the fault of the selfless and heroic individual Coast Guardsmen who are as dedicated today to the saving of life as were their predecessors of the old days. They reflect rather upon those of us in a position to see that there are enough of these dedicated individuals and that they are adequately supported by the lifesaving technology available to us today.

Changes at one time may have been justified. They may have justified closing of stations and the reduction of rescue cutters. Circumstances today, however, warrant a reappraisal of needs.

More winter sailing, for instance, is taking place than in the past. Even if this traffic is not into ice-clogged channels, the traditional November and December weather on the lakes subjects men and their vessels to the curelest of taskmasters: The vagaries of nature in a northern winter. I submit that these vagaries demand innovation from the safety point of view which perhaps surpass what a rescue station alone can provide; they suggest, rather a need for a greater rescue cutter presence.

A further need becomes evident for a preventative vessel traffic control system including winter advisory services that will lessen the need for on-scene assistance. Innovative navigational aids such as LORAN might lessen a dependence on other manned aids. An automated vessel reporting system will trigger assistance when needed. This is a system that was not available to the *Bradley*, the *Morrell*, or the *Fitzgerald*, but which would be feasible once LORAN is fully implemented in the lakes.

While acting upon shoreside innovations, however, attention in my opinion must also be focused on ship and crew safety, and these must be especially tailored for Great Lakes vessels. Crewmen on these lakes are keenly aware that November is the crueliest month and Lake Superior the most treacherous of all the lakes.

Out of adversity often comes accomplishment or, as some would say, even with failure there can be achievement, Already since the *Fitzgerald* tragedy, Admiral Gracey has redeployed a modern 44-foot motor lifeboat to Marquette. I have also secured funding for the construction of a similar craft for Grand Marais, Mich. The Coast Guard, through Admiral Gracey's persistence, has established and is perfecting a Mini-LORAN system for the St. Mary's River and has published proposed safety equipment regulations for Great Lakes vessels. These regulations are similar to what the industry has proposed for itself.

There is one need that we may be unable to explore today but which we must consider in the near future. This is the need for better overwater weather forecasting for the Great Lakes. The *Fitzgerald* sinking and Dr. Wolff's subsequent article in the summer 1976 issue of Inland Seas establish that there was nothing to indicate that Lake Superior skippers had any inkling that a November 9 storm warning would involve "hurricane" winds such as developed on November 10. In that same fateful November, I asked the National Advisory Committee on Oceans and Atmosphere to consider the use of weather buoys on the lakes to improve forecasting. This may not be the answer to the weather advisory problem, but some solution seems to be imperative.

Mr. Chairman, thank you again for the opportunity this hearing affords to air many pent-up feelings perhaps of frustration, and for this singular attention to the perils and needs of the Nation's fourth seacoast. These needs are not merely those of a region. We must never forget, in this space age, that all of us in these 50 United States in our third century are still ultimately dependent in large measure on the men who—as did those who first discovered and settled our magnificent land—go to the sea in ships, even if these "seas" are five great inland "ponds."

Mr. Chairman, I again want to thank you and my colleague from Minnesota for being here this morning and participating and leading these hearings.

[The statement follows:]

STATEMENT OF HON. PHILIP E. RUPPE, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF MICHIGAN

Mr. Chairman: I appreciate your consideration and the Committee's indulgence in taking the time at the heels of one busy convention and just before another to visit what many seem to consider the hinterland of the United States.

In reality, however, this is one of the great manufacturing regions of our country, containing some 14 percent of its population. This area produces the goods and raw materials involved in the more than 100 billion ton-miles of water-borne commerce that move over the Great Lakes-St. Lawrence Seaway system each year. The misconception in the minds of much of our nation of our region as a hinterland reminds me of a distorted chart I have seen that pictures a Bostonian's Idea of the United States. By that view, we of the Midwest live beside ponds in the western prairies. A footnote to that chart warns that it should "Not be used for navigational purposes".

Perhaps it is because of such misconceptions, in addition to our concern for maritime safety that we meet here today, a first for the Subcommittee. We are also motivated by an important concern for "Government in the sunshine," and by a need to get a feel for things, to feel the pulse of concern that throbs in this community for the safety of its mariners and vessels. As long as men have gone to sea, the communities who have sent them out have watched the horison, anxiously awaiting their safe return. These great "ponds," especially with their ferocious northern winters, have claimed more than their share of seafarers in spite of an historical concern with maritime safety. There was once a time when all major lights were manned and when a host of Lifesaving Stations ringed the shores of the Great Lakes. I am reminded of the search-and-rescue stations that served the Lake Superior mariner from Whitefish Point, Vermilion Point, Crisp Point, Big Two Hearted River of Hemingway fame, Deer Park or Muskalonge Lake, Munising, Ship Canal or Portage, Eagle Harbor, and Grand Marais (Minnesota). All that remains now are the Grand Marais (Michigan), Marquette, Bayfield, and Duluth Stations. Additionally, a Coast Guard cutter was once stationed at Two Harbors as well as at Duluth. Now only the Cutter Woodrush remains at Duluth. Sault Ste. Marie at one time had additional cutter resources than those which presently exist, including a 180-foot buoy tender.

Leafing of the pages of history would reflect similar reductions but to a far lesser degree in the lower lakes. The northern reaches of Lake Huron would seem to warrant attention where no station exists between Tawas and St. Ignace—at one time the Hammond Bay and Walker's Point Stations filled this gap.

I realize that changing traffic patterns, automation, mechanically propelled ships of higher horsepower and related innovations have mandated that changes occur. It is well, however, to sit back at this point and reevaluate trends, to appraise the degree of essential statutory services being provided the mariner in this vast Great Lakes region. There is no way to do so without input from the affected segments of the community. I have long felt that, with the shutdown of community field services of the kind referred to, an administering but remote agency runs the danger of losing touch with the public it was established to serve. Government must, therefore, meet the public as we are doing today to provide some balance and avoid becoming a detached administration.

Long before the sinking of the Steamer *Edmund Fitzgerald* in 1975, I had indicated an interest in a public hearing into the adequacy of Coast Guard search-and-rescue facilities on the Great Lakes. That interest has expanded into concern for vessel traffic control systems, for associated and improved navigational systems as well as for vessel and crew safety.

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Changes at one time may have been justified. They may have justified closing of stations and the reduction of rescue cutters. Circumstances today, however, warrant a reappraisal of needs. More winter sailing, for instance, is talking place than in the past. Even if this traffic is not into ice-clogged channels, the traditional November and December weather on the Lakes subjects men and their vessels to the cruelest of taskmasters: The vagaries of nature in a northern winter. I submit that these vagaries demand innovation from the safety point of view which perhaps surpass what a rescue station alone can provide; they suggest, rather a need for a greater rescue cutter presence.

A further need becomes evident for a preventative vessel traffic control system including winter advisory services that will lessen the need for on-scene assistance. Innovative navigational aids such as Loran might lessen a dependence on other manned aids. An automated vessel reporting system will trigger assistance when needed. This is a system that was not available to the *Bradley*, the *Morrell*, or the *Fitzgerald*, but which would be feasible once Loran is fully implemented in the Lakes.

While acting upon shoreside innovations, however, attention in my opinion must also be focused on ship and crew safety, and these must be especially tailored for Great Lakes vessels. Crewmen on these Lakes are keenly aware that November is the cruelest month and Lake Superior the most treacherous of all the Lakes.

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Mr. DE LA GARZA. Thank you very much.

Mr. Oberstar.

Mr. OBERSTAR. Thank you very much, Mr. Chairman.

I have a statement which I will submit for the record. I merely want to summarize by saying that my area is Lake Superior, but the Great Lakes are really not divisible. They must be considered as a unit and that the problems of one are the problems of the others and your problems are our problems here in the Soo, around Lake Michigan or farther down in the lower lakes, and I believe that together we must work for lasting solutions for the problems that affect all of the lakes as I said as a unit, so we must work together on our common interests and that is why we are very pleased to be here this morning to join with you in looking at the needs of the extended season and the problems that all the men who go down to the sea in ships face as they brave these enormous bodies of water.

78-280—76——20

[The statement follows:]

STATEMENT OF HON. JAMES L. OBERSTAR, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF MINNESOTA

Mr. Chairman, on behalf of all those who risk their lives on Lake Superior and the other Great Lakes, and on behalf of the Lake Carriers and other Carriers who send their vessels out on these vast waters, I thank you for making these hearings possible.

The sinking of the S.S. Fitzgerald last November brought to the surface of our consciousness what we all acknowledge, constantly and subconsciously: that these waters are treacherous, dangerous; and that the men who sail them lead very precarious lives at the mercy of nature.

These hearings are designed to touch all aspects of safety: on-board equipment for the men; the Coast Guard's Search and Rescue capability; new communications and aids to navigation; and other features of water safety.

We want to know what precautions are needed to protect the Longshoremen and others who brave the elements on icy docks to service ships while they are in harbor.

We also want to know specifically what caused the Fitzgerald disaster: why did the vessel break up; why did it sink as fast as it did; why were no rescue efforts possible.

In addition, I hope we can focus in, for at least part of the time, on safety aspects of late season sailing.

For five years now the Coast Guard, the Corps, 8 other Federal agencies, labor and private industry have been investigating the feasibility of extending the winter navigation season.

But all economic benefit studies are in vain, if we cannot assure the safety of the men involved, during the worst part of the year.

Until doubts about safety during winter sailing are answered, we cannot, I feel, proceed with further Federal involvement in the program.

I would point out, for the record, that this Subcommittee, under the distinguished leadership of its chairman, Mr. Biaggi of New York, and with the strong and necessary support of today's chairman, Mr. de la Garza of Texas, authorized the reopening of the Coast Guard SAR station at Grand Marais, Minnesota, and strengthening of the SAR mission of the Coast Guard station at Grand Marais, Michigan.

This Committee also authorized the procurement of 7 new icebreakers for the lakes. These vessels, in addition to keeping the lanes open during winter will be able to serve SAR missions during the ice-free months of the year.

Both the authorizing and funding legislation are awaiting final action by the Congress and, I hope, prompt signature by the President. And while the authorization does not provide all the icebreaking capability we need, I believe we have established the record of need, and can build on this year's progress in the years ahead.

In conclusion, I hope that these hearings can help resolve the doubts we now have regarding safety at sea; that they will pinpoint where safety is still lacking; and establish what can be done in the short term as well as what should be done in the long term to make year-round sailing safe and, particularly, to prevent in the future disasters of the magnitude of the Fitzgerald.

Thank you.

Mr. DE LA GARZA. The first witness this morning is Rear Adm. James S. Gracey, commander of the 9th Coast Guard District, U.S. Coast Guard, Cleveland, Ohio.

Admiral, I will be very happy to hear from you at this time.

You might identify for the record those that accompany you.

STATEMENT OF REAR ADM. JAMES S. GRACEY, COMMANDER, 9TH COAST GUARD DISTRICT, U.S. COAST GUARD, CLEVELAND, OHIO, ACCOMPANIED BY COMDR. JOHN DECK III, CHIEF, SHIP DESIGN BRANCH, OFFICE OF MERCHANT MARINE SAFETY, U.S. COAST GUARD HEADQUARTERS, WASHINGTON, D.C.; CAPT. THOMAS H. RUTLEDGE, CHIEF, CONGRESSIONAL AFFAIRS STAFF, U.S. COAST GUARD HEADQUARTERS, WASHINGTON, D.C.; AND CAPT. CHARLES MILRADT, COMMANDER, GROUP, SAULT STE. MARIE

Admiral GRACEY. Yes. Good morning. I have with me Capt. Thomas Rutledge, who is from headquarters in the congressional liaison staff, whom you all know very well, and Comdr. John Deck from the Headquarters Merchant Marine Technical Division, Ship Design Branch, who has done a great deal of work on lifesaving improvement; and also with me is Capt. Charles Milradt, who is commander of the group here at the Soo.

Mr. Chairman and members of the subcommittee, I welcome this opportunity to appear before you and your colleagues to talk about Coast Guard activities on the Great Lakes. I have been in command of the 9th Coast Guard District—the Great Lakes District—for almost 2 years. In that time I have come to realize as never before what a vast, beautiful, and challenging part of our country this is, with its extremes of weather, its richness of natural resources, its great public interest in the waters and water quality and the extensive use of those waters for recreation, its colorful marine traditions, rife with dramatic tales of heroism and skill, its impressive record of contributions in all aspects of marine transportation, and its great significance to the economic well-being of the United States.

The Coast Guard and its predecessor agencies have long been a part of this vibrant and challenging Great Lakes history—this year marks the 100th anniversary of lifesaving stations here, for example. And we continue to have a major role, its aspects expanding in scope and volume of activity. I would like to give you a broad overview this morning of what we are doing to meet the challenges facing us. There is not time to speak in detail of all our missions, so I will concentrate on safety, which is your primary interest here today.

Coast Guard efforts to enhance the safe use of the waters of the Great Lakes really fall under two broad headings—rescue and prevention. The term "rescue" incorporates such activities as search, location, self-survival, and communications. "Prevention" includes such activities as education, communications, enforcement of laws and regulations, aids to navigation, and insuring personnel qualifications. Some of these fall into specific Coast Guard program categories and some cross several programs. To stay consistent with the subject of this hearing I will speak in terms of the broad hearings of rescue and prevention instead of specific programs.

RESCUE

In fiscal year 1975 Coast Guard forces on the Great Lakes and the St. Lawrence River responded to over 8,000 calls for assistance. Of those 278 were in Lake Superior and 352 were in the area for which Coast Guard Group, Sault Ste. Marie is responsible, viz, extreme northern Lake Michigan, the Straits of Mackinac, northern Lake Huron, the St. Mary's River, and eastern Lake Superior. Please note that there is some overlap where I speak of group Soo statistics versus Lake Superior. I will try to clarify it, if it is confusing. We saved 450 lives and $10 million worth of property throughout the district. Some 19 persons and $92,000 in property were saved in Lake Superior while in group Soo we saved 22 persons and $1,203,000 in property.

We do not yet have detailed figures for this year, but our total district response figure should be about 9,200, with 520 lives saved and $10,200,000 worth of property saved.

By far our heaviest workload is in the area of western Lake Erie, Lake St. Clair, and the connecting rivers—part of our group Detroit, which has about 53 percent of the cases in the district. By comparison, all of Lake Superior plus the rest of group Soo combined have about 6 percent of our cases.

Our primary SAR response comes from 3 air stations and 46 stations, 9 of which are seasonal. Of the seasonal stations, 3 are manned primarily by Reservists and 6 are manned during peak boating periods by Auxiliarists. In the Lake Superior/group Soo area we have 9 stations, 3 of which are Auxiliary operated.

To permit our regular personnel some relief during the heavy workload season and to increase our ability to respond when needed, we rely on the special help of about 1,000 Reservists, who assist at many of our stations, especially on weekends. We also rely heavily throughout the district on our 5,500 Auxiliarists, with their privately owned facilities—some 1,713 vessels, 40 aircraft and 105 radio stations. In 1975 they provided 2,222 SAR responses, saving 163 lives and $1,323,000 worth of property.

Our five 180-foot buoy tenders, five 110-foot harbor tugs, two major icebreakers, and one 82-foot patrol boat also provide some SAR capability to add to the boats of the stations and the aging HH–52A helicopters and the venerable HU16E fixed wing aircraft.

To improve our response capability from stations we have started to replace our 40-foot utility boat—the workhorse of SAR in recent years—with the new 41-foot boat, which has greater speed, range, crew endurance, and electronic navigation and search capability. Three of the nine we have so far are in the Lake Superior/group Soo area. As these boats arrive we are rearranging our fleet to upgrade capability in as many areas as possible. We have also relocated the 44-foot motor surf boats to areas having the greatest need for heavy weather capability. Of the 22 we have, 4 are in the Lake Superior/group Soo area. One more is in the fiscal year 1977 budget and it will go to Grand Marais, Mich. to replace our last 36-foot lifeboat.

We also make extensive use of other resources such as our own C–130's from North Carolina and H–3 helos from New York, the Air Force, CAP, Army, National Guard, State, county and local police, park rangers, and a cooperative agreement with Canada, not

to mention vessels of opportunity when in the vicinity of a case, and this is a very real benefit.

We now have VHF–FM communications coverage for the entire U.S. portion of the Great Lakes except for a few "shadow areas" we have discovered. I expect those minor voids to be covered this year.

In addition to the things I've mentioned above and the rather extensive prevention effort that I am going to discuss in a moment, there are some other things the Coast Guard is doing to improve our rescue capability. One major contribution will be the replacement of our 110-foot icebreaking tugs. Not only will these vessels greatly enhance our efforts to assist winter navigation, but they will have a year-round utility the 110 footers do not have. The 110 footers were built as harbor tugs, and consequently are subject to severe operating limitations in heavy weather. They are very sensitive to high winds and become unstable and unsafe in winds above 45 to 55 knots, depending on loading and vessel class. They take on water very readily and their freeing ports are not adequate to permit it to run off.

In cold weather they also ice up badly in a storm and become unstable. Obviously these characteristics severely impede their usefulness in the vicious sea and wind conditions that occur so often on the Great Lakes. The new vessels have been designed with this in mind and thus should greatly enhance our heavy weather capability. One will be located at Sault Ste. Marie, the first one.

We are encouraging boaters to make out a "float plan" and leave it with their marina operator, family or friends so we can get prompt notification when they do not return as planned and so we will know where to start looking for them. Following the loss of their son in a boating accident a family recently erected a memorial at Grand Marais, Mich., city dock. It includes a booth much like a phone booth with a float plan notebook in it that boaters can fill out when they depart. There is also space for boaters to log in when they return, so interested or concerned people who check the book, can readily detect a potential problem and advise the Coast Guard—before the situation becomes a 2 a.m. emergency.

A similar type of effort consists of sunset patrols, primarily by Auxiliary surface and aircraft. The purpose, of course, is to locate boaters who may be in trouble and thus preclude difficult, often futile, night searches—or any search at all for that matter—or at the least save the boater the anguish of a helpless night on the lake. This has paid considerable dividends in some areas.

An FM emergency position indicating radio beacon (EPIRB) is being developed as are detection devices such as a special forward-looking radar for fixed-wing aircraft, application of our oil-detection side-looking radar, an infra-red system for helicopters, and an improved illuminating system for helicopters.

People caught in an emergency must have ways to take care of themselves—to survive—until we or some other rescuer can reach them. They also need to have ways to help us find them. Efforts to improve survivability must per force include the means to deal with a wide range of situations—and so they do, ranging from simple flotation devices for water skiers to self-launching survival craft for ore boats. They include such things as exposure suits, positive flotation for recreational boats, radar transponders to aid detection, a "mayday

streamer", radios, cold water survival techniques, strobe lights, et cetera. This spring a team of Coast Guard personnel, ships, boats and aircraft conducted some in-water tests of several of these items. The results ranged from successful to promising to surprisingly disappointing. The work continues.

Meanwhile, commercial operators and the water-sport industry are also working on developing ideas and equipment to meet the various needs. And we have published advance notice of proposed new regulations which would provide for more extensive and improved equipment aboard lakes vessels. They include lifeboat exposure protection, lifeboat maneuverability, survival craft availability, launching of survival craft, ability of lifeboats to float free automatically, personnel exposure protection, communications equipment on survival craft, lights and reflectorized materials, and standards for substitute equipment.

Of course the best way to solve a problem is preventing it from coming up in the first place—the old saw about "an ounce of prevention being worth a pound of cure." That is what most of the rest of our safety effort is all about. You are aware of the basics of our commercial vessel safety, port safety and security, short-range aids to navigation, and radio navigational aids programs, which are the heart of our preventive effort, so I will discuss only new developments and specifics that affect the Great Lakes.

Efforts to help the recreational boater enjoy his chosen sport more but with less risk are particularly significant on the waters of the Great Lakes region because 35 percent of the boats in the entire country are in use here—that's more than 2,550,000 boats.

To help the boater understand how to use his boat safely we are pursuing an aggressive public education program. Last year we provided lectures for 36,000 people. We had over 1,500,000 people visit our exhibits at boat shows, et cetera. We had 13,000 radio and TV spots, and we gave over 2,000 boating safety courses to 120,000 people. We also gave over 41,800 courtesy exams to check boat equipment, patrolled almost 400 regattas, and we made 5,000 safety patrols. These activities were done, primarily, by our 5,500 Auxiliarists and our seven Boating Safety Detachments (BOSDET). BOSDET personnel also conducted extensive training programs for State, county and local marine law enforcement personnel.

I might add that it is a point of great pride that two of the States in my district have had all the marine law enforcement personnel in the State trained now by Coast Guard Boating Safety Team Personnel and we are expecting the third State to make it this year. The fourth State that has been primarily in our responsibility has been two-thirds trained.

I should note that we also have an aggressive enforcement effort in areas where our statistics showed the greatest need.

To illustrate how effective this overall program can be I should like to tell you about one particular case. In the early months of the 1974 season we were horrified by an appalling rate of carnage in the Fox Chain of Lakes in Illinois. By August, 20 people had died in this area alone. Our BOSDET moved in and started an aggressive enforcement program. They also worked with local and State officials, providing training and setting a positive example. The results began to show in

the latter months of 1974, but were really evident in 1975, when not a single life was lost in that area.

To help the navigator, particularly on large commercial vessels, two developments in aids to navigation are significant. First is extension of LORAN C coverage to the Great Lakes. The first station will be built in Seneca, N.Y., and should be on the air in 1979. The second, which will complete coverage, will be built in upper Minnesota and is planned to be on the air in 1980.

The other major development in aids to navigation, we call Mini LORAN C. It is a low-power, specifically configured LORAN-C chain we've built for the St. Mary's River. It is now on the air in a demonstration phase, and we are developing special user equipment. When done, we expect it will provide accuracies as fine as 25 feet. In some areas we have already had demonstrated accuracies down to 10 feet and in some cases even better, like zero, but that is special.

Even more exciting are some features of the user equipment being developed. These will provide, on a continuous read-out, such information as speed over the ground, time and distance to next turn, course to next turn, vessel position and attitude with relation to the desired track, et cetera. We hope to demonstrate this second generation user equipment this August. Later we expect to install a set on a commercial vessel for a trial.

In other actions to improve safety of Great Lakes commercial operation, we are continuing our long standing vessel traffic service on the St. Mary's River, but we are now monitoring meeting situations at the critical turn at the lower end of Soo Harbor and asking vessels to adjust speed to avoid arriving simultaneously at that turn. We are also providing more complete information on rates of flow through the Soo control gates so masters can better control their vessels.

We have developed, with Canada, a joint contingency plan for traffic control in case of emergency in the critical Detroit and St. Clair Rivers, and we have installed a "hot line" between the District and Sarnia control centers to insure immediate positive communications.

New regulations last year provide increased authority for Coast Guard captains of the port to take prompt affirmative action to deal with a range of possible hazards. Finally, on a grim note, this report to you really would not be complete if I didn't talk a little bit about the tragedy last November which shocked and saddened the entire Great Lakes maritime community. The investigation of the *Fitzgerald* sinking continues, with the 19 hours of TV tape and 1,000 pictures taken during this spring's underwater survey still being analyzed. That survey, you may recall, was made by the Coast Guard from the Coast Guard cutter *Woodrush*. In selecting a method for conducting the survey the Board considered many different possibilities. Since the depth of water precluded divers, the Board ultimately chose to contract with the Navy for use of its CURV, a sophisticated, remote-controlled underwater vehicle. CURV and its associated people and equipment were flown from the west coast in Coast Guard C–130 aircraft. Like all who sail in or otherwise care about Great Lakes shipping, I certainly hope the Board will be able to find, in the meager information available, enough to permit them to reach some conclusion about what happened that fateful night.

Thank you for this opportunity to appear before you this morning and to talk about two topics which are very much in my mind and heart—the Great Lakes and the U.S. Coast Guard.

I will be glad to answer any questions that you have.

Mr. DE LA GARZA .Thank you very much, Admiral.

Any questions?

Mr. OBERSTAR. Thank you, Mr. Chairman. I will be very brief because we have so many witnesses.

The portion of your testimony that refers to the——

[Microphone noise.]

Admiral GRACEY. I must be radiating personal magnetism or something.

Mr. OBERSTAR. With all that sophisticated LORAN C and all the rest we have on the lakes, the microphone doesn't work. Where you talked about the safety aids, I was interested in the exposure suits; are those being especially developed for winter navigation and available for seamen that serve on those vessels?

Admiral GRACEY. There are a number of suits that are being developed by different people, and we tested two types this spring. Commander Deck put on one suit and Commander Mason from my staff put on another one and went into the 42 degree water this spring to see how the suits work. One of them was relatively successful and the other was surprisingly disappointing. Those are one of the things I referred to in my statement. I don't know it we approved the suit, but there is considerable work going on.

There were suits recommended before, but our tests indicated they didn't do the job and perhaps would create some false sense of security.

To answer you briefly, yes, the work is going on.

Mr. OBERSTAR. This is something of concern to me. It has been expressed by longshoremen, and seamen as well, who are exposed to the elements in these increasingly longer voyages in the winter months. I strongly encourage the Coast Guard to intensify its efforts in providing the kind of research necessary for the personal protection of individuals, and we would be glad to have any recommendations and reports in more depth as the Congress and certainly the House Public Works Committee later this summer will consider extensions to the demonstration programs for the winter navigation season, and we would like to be able to focus more on measures to protect the individual. One last question about the *Fitzgerald.*

Do you have any information beyond what is stated in your statement that you could provide for the committee, any indications now of what might have happened? What does the vessel look like down there at the bottom of the lake and is it possible for the subcommittee later on to look at some photographs that the Coast Guard might have had as a result of those deep water investigations?

Admiral GRACEY. I think, Mr. Oberstar, it would be—I'm sure there are a lot of opinions as to what happened and I am sure that the Board has probably started to form some. I don't know what they are. I very carefully avoided trying to find out what they are because I think it would be inappropriate to discuss until the Board has reached its final conclusions.

I am not hiding anything, I just don't know. I can tell you what they found essentially on the bottom was the vessel in two pieces

with one of the two pieces badly broken. They were hoping to be able to get a good total look at the hull with a view to trying to get some idea of what might have caused the wreck or the sinking.

What we found was that the stern section was upside down and separated from the forward section, the forward section broken, and with the bow buried in 27 feet of mud. It was a very soft bottom so that as the curve device went down, it tended to stir up the bottom. We didn't get the same quality pictures we were hoping to get. Of course we were most hoping to get some evidence from near the bottom and that is buried in the mud. So whether they will be able to interpret the pictures, whether they get it or not, I don't know, but it is going to be a very difficult job.

Mr. OBERSTAR. Your statement made a very commendable outline for the extensive SAR, prevention and protection. What puzzles was there was a Coast Guard station relatively near, and yet the Coast Guard either couldn't or for some reason did not send a rescue vessel out and there are some who say, even if the weather had been such that a vessel could have been ordered out, they didn't have one capable of providing the rescue mission that would have been necessary.

Could you respond to that?

Admiral GRACEY. Let me see, where do I start.

I think if you look at the chart of where the *Fitzgerald* sank—John, would you point out on the chart where that is, please?

Mr. BRUCE. Just this point, just over the international line.

Admiral GRACEY. And would you run to Sault Ste. Marie and Grand Marais?

Mr. BRUCE. [Indicating.]

Admiral GRACEY. If it were possible to predict where a sinking would take place and where you would put a station to be reasonably available to handle it, the only place that would be better so far as the location is concerned, would be on White Fish Point. You have to select your sites in places where you have support and some community capability for your people unless you have some particular reason to believe that the investment ought to be out there. That is an isolated event.

We did not have capability for vessels—the vessels we had were not capable of going out in that weather.

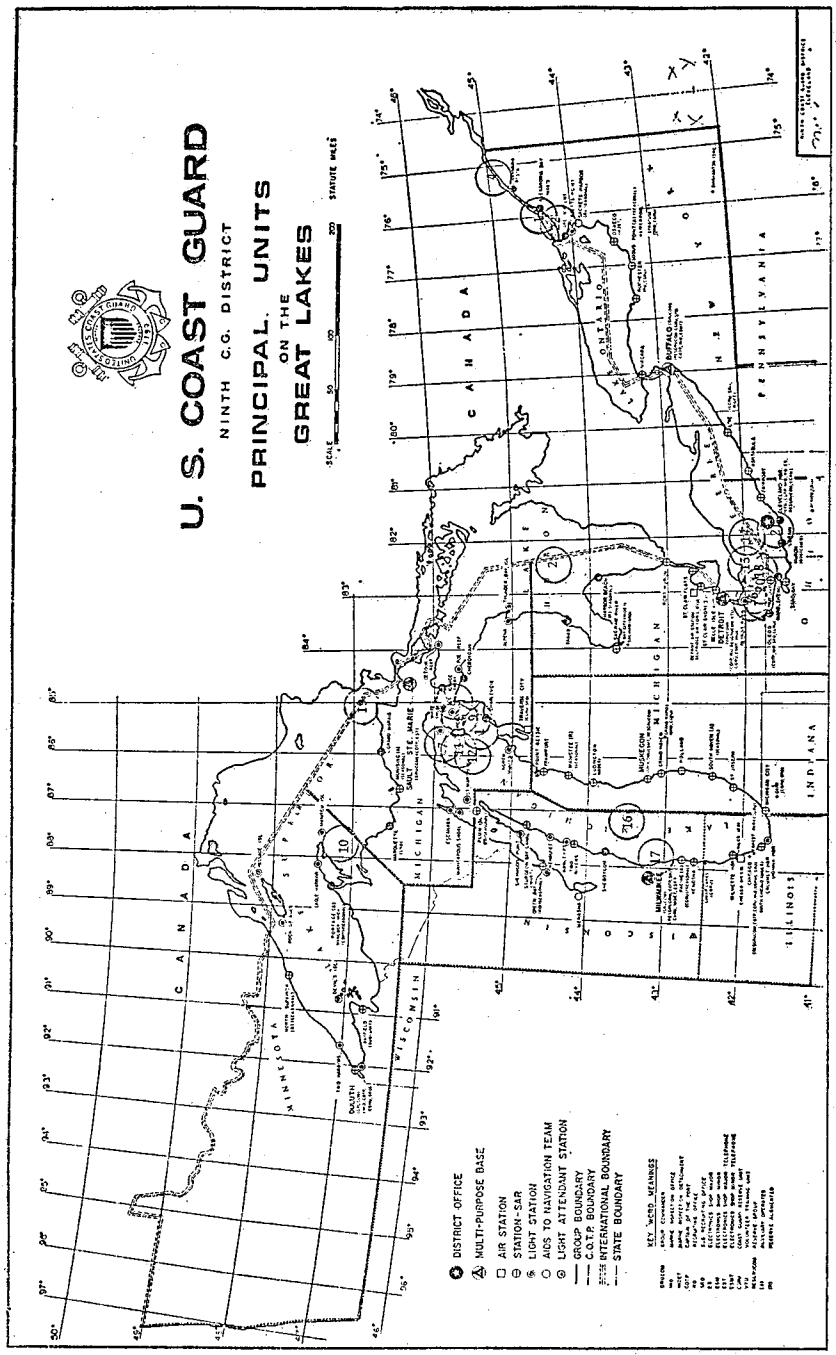
Mr. OBERSTAR. That is the thing that concerns people.

Admiral GRACEY. As I said, the 144-foot tug which will replace *Naugatuck* will have this heavy weather capability. When we get the five 110's replaced with the 140's, we will have reasonably heavy weather capability.

I did an analysis of where the major disasters have occurred on the Great Lakes since 1958 and if the committee would be interested, I can show you a chart to show you how that is configured. I was rather interested to see how they spread out. Would you be interested in such a thing?

Mr. OBERSTAR. I don't know whether we have the time now, Mr. Chairman.

Admiral GRACEY. I can do it very quickly. See the red circles? [Indicating chart.]


U. S. COAST GUARD
NINTH C.G. DISTRICT
PRINCIPAL UNITS
ON THE
GREAT LAKES
SCALE
STATUTE MILES
DISTRICT OFFICE
MULTI-PURPOSE BASE
AIR STATION
STATION - SAR
LIGHT STATION
AIDS TO NAVIGATION TEAM
LIGHT ATTENDANT STATION
GROUP BOUNDARY
C.G.T.P. BOUNDARY
INTERNATIONAL BOUNDARY
STATE BOUNDARY
KEY WORD MEANINGS
CANADA
MINNESOTA
WISCONSIN
MICHIGAN
ILLINOIS
INDIANA
OHIO
PENNSYLVANIA
NEW YORK
ONTARIO
LAKE SUPERIOR
LAKE MICHIGAN
LAKE HURON
LAKE ERIE
LAKE ONTARIO

[The following was submitted:]

RECENT MAJOR SAR CASES

These are cases which involved large vessels and/or considerable damage, loss of life or public concern. Medevacs, cases occurring in restricted waters where tugs would normally not present an improvement in SAR response, and cases where Coast Guard assistance was not required nor used have not been included. There are innumerable groundings and collisions in the lakes, most of which are minor and most of which occur in harbors, rivers, bays, etc.

1. 18 November 1958—*Bradley* sank south of Beaver Island, Lake Michigan. Thirty-one loss of life. Cause, material failure and weather. Major search effort by several Coast Guard units.

2. November 1966—*Morecl* sank off Alpena, Lake Michigan with approximately 30 loss of life. Cause, material failure and weather. Major search effort by several Coast Guard units.

3. 30 April 1970—*Fitzgerald* and *Hochelaga* collided just south of Detroit River light causing considerable damage to both. Cause, suction from passing close while overtaking. No loss of life. No Coast Guard assistance required, both vessels proceeded to port.

4. 14 July 1970—*Eastcliffe Hall* grounded and sank in St. Lawrence River at Chrysler Shoal. Nine lives lost. Cause, poor navigation and weather. *Maple* responded.

5. 12 August 1971—*Ethel Marie, Patriciar* and *Mein Kapitan* all experienced heavy storm damage during severe weather in the Straits of Mackinac. No loss of life. No Coast Guard assistance required.

6. 4 October 1971—*Maplecliffe Hall* and *Wieldrecht* collided near Detroit River light causing considerable damage to both. No lives lost. Cause, steering failure on *Maplecliffe Hall.* No Coast Guard assistance required.

7. 13 April 1972, *Nicolet* sustained heavy ice damage in position 45–50N/85–50W, Lake Michigan when caught between shifting ice fields. No loss of life. *Mesquite* escorted vessel to port.

8. 27 November 1972, *Stolt Falcon* sustained heavy damage from fire 15 miles north of Manitou Island, Lake Michigan. No loss of life. A helicopter from air station Traverse City evacuated four injured crewmen, the vessel proceeded to port.

9. 10 June 1973, barge *Oil Queen* capsized and sank in position 45–35N/85–20W, Lake Michigan when her cargo shifted in heavy weather. No loss of life. No Coast Guard assistance required, barge was unmanned.

10. 26 September 1973, fishing boat *Viking II* exploded and sank 7 miles northwest of Big Bay Point in Lake Superior. No loss of life. Cause, explosive vapors. Survivors picked up another fishing boat. Operator claimed he radioed for help, but transmission was not received.

11. 2 October 1973, *ROLW I* and *Marathonian* collided in fog in position 45–46N/85–53W, Lake Michigan. No loss of life. Cause, poor navigation and weather. Extensive damage to both. No Coast Guard assistance required, both vessels proceeded to port.

12. 30 March 1974, tug *Castel* started to flood while towing the *Crapo.* Position 45–43N/85–57W, Lake Michigan. Two men lost overboard. Cause, material failure and weather. Helicopters from air station Traverse City and *Sundew* responded.

13. 23 May 1974, *Steinbrenner* and *Cardinal* collided in Lake Erie, position 41–51/82–34. Extensive damage to both. No loss of life. Cause, poor seamanship. Injured were evacuated by air station Detroit helicopters and *Bramble* escorted the *Cardinal* in. *Steinbrenner* required no assistance.

14. 12 September 1974, tug *Killarney* sank in Lake Erie, position 42–06N/81–11W. No loss of life. Cause, material failure. Another tug picked up survivors.

15. 20 November 1974, *Jodrey* grounded and sank in St. Lawrence River at Alexandria Bay. No loss of life. Cause, poor navigation. Station *Alexandria Bay* removed crew before sinking.

16. December 1974, *Jennifer* sank in Lake Michigan, position 43–32N/87–08W. No loss of life. Cause, material failure and weather. Two merchant vessels and several Coast Guard units responded.[4] Crew taken-off by air station helicopters. . . Rest picked up by *Fortuna* (UK).

17. 23 February 1975, *Hannah Barge 291* grounded on Milwaukee breakwall causing major oil spill. No loss of life. Cause, material failure and weather. Station Milwaukee saved barge from sinking, no persons on board. Major cleanup.

18. 26 July 1975, tug *Sachem* and barge collided with a cabin cruiser 1½ miles north of Marblehead. Four lives lost. Cause, poor seamanship. Station *Marblehead*, station *Sandusky* and air station *Detroit* responded, two survivors.

19. 10 November 1975, *Fitzgerald* sank in Lake Superior 15 miles north of Whitefish Point. Twenty-nine loss of life. Cause, weather and material failure. Massive search effort by Coast Guard, Canadian, Air Force, Navy and civilian forces.

20. 10 December 1975, *Thayer* grounded hard in Lake Erie position 41–51N/82–35W. No loss of life. Cause, apparently poor seamanship. *Kaw* stood by until refloating.

21. 19 May 1976, *Gaelic Barge 117* grounded on Cleveland breakwall after towing tug became disabled. No loss of life. Major oil spill resulted. Cause, weather and material failure. *Kaw* and station *Cleveland Harbor* responded. Major cleanup.

22. 22 June 1976, *Nepco Barge 140* grounded in St. Lawrence River near Alexandria Bay. Major oil spill resulted. No loss of life. Cause, poor seamanship. No *SAR* assistance necessary. Major cleanup.

Mr. OBERSTAR. Yes.

Admiral GRACEY. They group here in the Straits of Mackinac and down here in the west end of Lake Erie. We have one here in Lake Huron which was *Morrell*, and you have the *Fitzgerald*, of course, here and you have one over here by Whitefish Point—*Keweenaw*.

You have a couple in Lake Michigan, but they are near rescue stations and near heavy weather capability. The *Jennifer* occurred off the port where we have the *Westwind* and the *Westwind* was underway in less than 2 hours. We got two survivors off with helicopters and the vessel sank before we could get anybody else out.

Fortunately the British vessel, the *Fortuna*, was nearby. The master of the abandoned ship 4 minutes before she went down and the

Fortunately the British vessel, the *Fortuna*, was nearby. The master of the *Jennifer* abandoned ship 4 minutes before she went down and the *Fortuna* picked up the rest of the survivors. That is what I mean by ships of "opportunity." We could not have been better located, but we just didn't have time.

I really believe the statistics show that we are properly located. We do have plans to improve our heavy weather capability with the 140-footers and any statistical analysis that I am able to make and a review indicates we are in the right place and we will have the right equipment.

Mr. OBERSTAR. The location I have no quarrel with. The equipment capability, I am glad that is being upgraded.

Thank you, Mr. Chairman.

Mr. DE LA GARZA. Mr. Ruppe?

Mr. RUPPE. Thank you.

First of all, does the Coast Guard maintain any facility plan based on some kind of established time and distance criteria?

Admiral GRACEY. Well, we do have facility plans that are of relatively recent origin, meaning within the last 4 or 5 years, and part of the criteria on which the needs are determined is time and distance from high workload areas. I cannot tell you what the standards are offhand.

Mr. RUPPE. Could you supply whatever plan or plans you have for the record here?

Admiral GRACEY. That portion that is pertinent, yes, sir.

[See p. 372 for information.]

Mr. RUPPE. Admiral, is there any particular or specialized detection equipment that is carried aboard Guard search aircraft assigned to the Great Lakes region?

Admiral GRACEY. No. Just the standard radar and so forth. No, there is no particular detection.

Mr. RUPPE. I had reference to night-sun illumination equipment.

Admiral GRACEY. Yes; we do have night-sun, but not on all our helicopers.

Mr. RUPPE. Is it the intent of the Coast Guard through the appropriation process to equip all your aircraft in that regard?

Admiral GRACEY. I might note that while the night-sun is not on all helicopters, they all have mounts and it is relatively easy to shift the equipment from one to another. It is about a 5-minute job. In theory, any aircraft that is in the air at night would have the capability. If there were two or three helos aloft as on the night of the *Fitzgerald*, we would not have enough.

Mr. RUPPE. I understand the Coast Guard has a detection package ready to go aboard its proposed new medium surveillance craft. Could you give us a description of the equipment and possibly its expected effectiveness and, of course, its availability?

Admiral GRACEY. I can give you a general rundown from some notes I might have, but it might be more helpful to provide it for the record. I think it would give you a better rundown on the specifics.

[See p. 372 for information.]

Mr. RUPPE. Does the Coast Guard have some pretty specific plans for replacing the HH52's presently assigned to your district?

Admiral GRACEY. All the HH52s we have will be replaced when the new short-range recovery aircraft that the Coast Guard hopes to buy one day are bought. We are not in the buying phase; there has been no money appropriated for that helicopter as yet.

When it is, all the ones in this district will be replaced in the same numbers that we have now.

Mr. RUPPE. All right, a couple of questions on the survival factor. Could you tell me what the status is of studies relating, and I understand there are studies underway or studies have been completed, relating to survival of vessel crews? I was referring to exposure protection, man-overboard alarms, et cetera.

Admiral GRACEY. I will ask Commander Deck to answer. He is the man who is working with that, Mr. Ruppe.

Commander DECK. Through the extended season program, we got our start in the cold water survival problem. We developed a program very early in the game, had some initial studies that were done by Battell which indicated that in order to improve our survival capability, we had to make improvements on a number of fronts, We couldn't just optimize one particular facet. We couldn't come up with a super lifeboat and expect that was going to solve all our problems, so we had to work on activities which looked at personal protection, group protection, early distress alert, distress detection enhancement, as well as man-overboard, which, surprisingly man-overboard statistics account for half of the lives that are lost off of commercial vessels.

We have made, I think, a considerable amount of progress. We have underway now an engineering study based on a feasibility study looking at a physical system for a man-overboard alarm. This engineering development should be completed sometime by the end of this year.

We had made improvements of cold water capability of inflatable life rafts. We have looked at a number of different types of personnel exposure equipment, survival suits, different kinds of jackets—some of it is Rube Goldberg type of activity, but I think we have looked at a considerable number of pieces of equipment. We have actively under test and evaluation by Underwriters Laboratory two different types of exposure equipment to be qualified, certified and approved by the Coast Guard as personnel flotation devices.

These tests and evaluation are underway now. It probably will be 6 weeks or better before the final results and approval of those particular pieces of equipment are out. We have been working in the training and education phase. We have had a number of studies on personnel survival. We have a survival pamphlet that speaks to cold water survival, survival techniques and clothing protection that has been published.

A limited number of copies have been distributed. We are in our second printing in which a very significant number, somewhere in the neighborhood of about 50,000 copies will be printed and there will be a very large distribution made this fall prior to this year's winter season.

Mr. RUPPE. Congressman Oberstar and I have introduced legislation to extend the studies and the demonstration program involving the winter navigation season for an additional 2 years. Do you think that legislation, if indeed it passes, will be of some help in giving you the direction and possibly the financial wherewithal to carry on additional studies of the nature you have suggested, to completion?

Commander DECK. Yes, sir, we do.

Mr. RUPPE. Commander, were you involved in the develpoment of cold water and heavy winter clothing?

Commander DECK. Yes, I was. I essentially developed the contract with Dr. Hayward from the University of Victoria.

Mr. RUPPE. With unanimous consent, perhaps I could place this in the record. It would be an interesting observation.

Mr. DE LA GARZA. Is it a statement or graph?

Mr. RUPPE. A study, really.

Mr. DE LA GARZA. Very well.

[The document follows:]

MAN IN COLD WATER: COOLING RATE IN HEAVY WINTER CLOTHING AND TREATMENT OF ACCIDENTAL HYPOTHERMIA: AN EXPERIMENTAL STUDY OF INHALATION REWARMING

UNIVERSITY OF VICTORIA

These two reports are the results of a study funded by the U.S. Coast Guard, Ninth Coast Guard District, 1240 East Ninth Street, Cleveland, Ohio, 44199. Contract reference No. 09-7025-75.

DISCUSSION

These results show that the survival time of average men in cold water can be significantly increased by a combination of two factors: 1) wearing "heavy winter clothing"; and 2) adopting a behaviour in the water which reduces heat loss (H.E.L.P.). The 68% increase in predicted survival time over that predicted for lightly-clothed subjects who did not adopt the thermally-protective behaviour (7) is a consequence of both the above factors. The relative importance of each can be estimated as follows. Data available in two previous studies (6, 7) permit the calculation that adoption of the H.E.L.P. behaviour would increase survival time approximately 35%. The remaining 33% increase would be attributable to

the heavier clothing. Therefore, the generalization seems warranted that survival time in typical heavy clothing is about one-third greater than that of lightly-clothed man in cold water.

Previous data on the effect of heavy clothing on cooling rate of man in cold water was available from a study by Keatinge (2). He compared the cooling rates of 5 men, wearing either bathing trunks or heavy clothing, while holding still in 5°C water. The mean falls in rectal temperature during the 20 minutes of immersion were 1.23 and 0.29°C for the unclothed and clothed situations respectively. The rate of cooling with heavy clothing is only 24% of that of the unclothed subjects. The difference seems much larger than might be expected. Also, the cooling rate of the heavily-clothed subjects in Keatinge's study would equal 0.87° C/hr, a value which is less than one-half the 1.85° C/hr cooling rate for similarly-clothed subjects in our study. The difference of only 2°C in water temperature could not account for this large discrepancy. The reason, we feel, is that cooling rates of the body core which are based on only 20 minutes of immersion in cold water are invalid. This is because uniform cooling rates of rectal and tympanic temperatures are not established until after 20 minutes of immersion. Including temperatures before this time underestimates cooling rate and cannot be used to predict survival time.

The survival and tolerance time predictions of this study seem as valid as it is possible to obtain experimentally. If this is so, then on the basis of Fig. 4, the following generalizations can be made regarding the situation on the Great Lakes. At the average temperature of the surface water in November (7.8°C), a heavily-clothed seaman, who adopts the H.E.L.P. behaviour, can be expected to reach a degree of hypothermia at which unconsciousness is likely and death impends, in about 4 hours. He may be almost incapacitated with regard to assisting with his own rescue in about 2½ hours. Without the H.E.L.P. behaviour, survival time would decrese by about 25%, and by another 25% if the victim was swimming or treading water. Similar generalizations can be made for other water temperatures from inspection of Fig. 4.

It seems worthwhile to mention that from our experience, significant curtailment of peripheral neuromuscular function occurs within the first 15-30 minutes of immersion, even before significant core hypothermia results. However, this does not mean the person is incapacitated, for we find that "useful activity" of the limbs, although slowed, is still possible for much longer periods. This early loss of dexterity, onset of stiffness, and decrease in skin sensitivity, may be one reason for the tendency of many survivors of brief immersions in cold water to overestimate their degree of hypothermia, and to spread the "lore" of hopelessness regarding attempts to improve survival time in cold water.

It must be emphasized that the predictions in Fig. 4 are for the "average" individual. From the variation in cooling rates among individuals in this study, it is to be expected that approximately two-thirds of accidental immersees would have survival times within the range of 25% more or less than the predictions of Fig. 4. Regarding the example given for 7.8° C water temperature, this would mean that two-thirds of the immersees would have survival times between 3 and 5 hours. If the water temperature was approaching freezing, survival times would be 2–3.5 hours for two-thirds of the immersees. This duration may seem longer than is conventionally assumed, but it must be remembered that it applies to the victim who is heavily-clothed, and who does adopt a thermally-protective behavior.

This study has shown that even for immersees that have the thermal benefit of heavy clothing and the H.E.L.P. behavior, a further doubling of predicted survival time can be achieved by wearing a UVic Thermofloat Jacket. This concept of a work or casual jacket which also provides bouyancy and significant thermal protection deserves consideration as a compromise between the insignificant thermal protection of most standard flotation devices (5), and the more insulative, but less wearable, survival suits.[1]

In summary, it is hoped that the experimental data and predictions of this study will assist in educational programs on cold water safety, and will be useful in providing a time base for rescue services concerned with man in cold water.

[1] An estimate from our findings of the survival time of an average seaman, who was wearing an Imperial Survival Suit in the Great Lakes in November (mean temperature of 7.8°C), would be 15–16 hours.

PART 2

TREATMENT OF ACCIDENTAL HYPOTHERMIA: AN EXPERIMENTAL STUDY OF INHALATION REWARMING

By John S. Hayward and Alan M. Steinman, Department of Biology, University of Victoria, Victoria, British Columbia, and U.S. Coast Guard Air Station, Port Angeles, Washington 98362

ABSTRACT

Ten men were immersed in the sea at a temperature of 7° C to determine the effect of heavy winter clothing on body cooling rate and predicted survival time. Mean body cooling rate in heavy clothing was 1.85° C/hr. This cooling rate corresponds to predicted survival times at different water temperatures which are one-third greater than for lightly-clothed subjects. When subjects wearing heavy clothing adopted a thermally-protective behavior in the water (H.E.L.P.), a 68% increase in predicted survival time over lightly clothed subjects was observed. When the subjects also wore a thermally-protective flotation device (UVic Thermofloat Jacket) their predicted survival time was doubled, to a duration 3.5 times that of lightly-clothed persons. The relevance of these findings to the situation of seamen on the Great Lakes is discussed.

INTRODUCTION

Survival time of man accidently immersed in cold water is determined by a variety of factors: body size and fatness; activity and posture in the water; individual variations in control of shivering and circulation; and the thermal protection capabilities of the clothing and flotation device being worn (3, 6, 7). Recent findings (7) have provided a prediction equation for the survival time of an average adult in cold water of various temperatures, which is based upon cooling rate in light clothing, such as that often worn by recreational boaters. The question arises: to what extent would "heavy clothing", such as that worn by seamen during winter, slow cooling rate and extend survival time? This question has obvious relevance to many occupational groups who must work on water at the colder times of the year. The situation for seamen on the Great Lakes is typical of this concern. The average temperature of the surface waters of the Great Lakes exceeds 15°C (59°F) for only 3 months (July-Sept.) of the year and is lower than 10°C (50°F) for 8 months of the year (8). For example, in November, which is typically a month with bad storms that have resulted in ship casualties (8), the average surface temperature of the Lakes is down to 7.8°C (46°F). With such a prevalence of cold water, it is essential that those responsible for regulating the safety of seamen on the Great Lakes, those charged with rescue operations, and the seamen themselves, should all have the maximum information available that is relevant to their fate, if mishap should put a man or men in such cold water.

It was the object of this study to increase the knowledge of cooling rate in cold water of man wearing heavy winter clothing, and to use this to improve predictions of survival time in cold waters such as those of the Great Lakes.

METHODS

Immersions were conducted in the sea (7°C, 45°F) near Victoria, B.C., from on board a research ship. Ten adult male subjects were studied whose characteristics were: age, 29 ± 9.0 years; weight, 83 ± 10.8 kg (188 lbs); height, 184 cm (6′0″); body fat, 16.1% (by skinfold thickness method of determination). Subjects passed medical screening according to procedures outlined elsewhere (7).

Clothing variables

The definition of "typical seaman's winter clothing" is extremely difficult, even if one delimits to a region such as the Great Lakes. In an attempt to aid such a definition, Dr. Eckerson, of this research team, spent two days on an ore carrier, the "Stanley" which travelled across Lake Superior early in April, 1975. This was a time when "winter clothing" was still necessary for those exposed to the 10–20°F air temperature which prevailed. His conclusion regarding clothing worn by the men on board was that it was impossible to generalize on any particular style of typical winter clothing. In fact, most of the 26 men, including the officers and engineers, had little direct exposure to the environment and wore light clothing similar to that of "indoor" workers anywhere. The "deck crew" consisting

of about 11 seamen, were most exposed, especially during loading and unloading procedures at dockside. There was no uniformity in their particular clothing. Some wore long, woolen underwear. Both denim and wool pants were evident. A great variety of jackets and sweaters were worn. Gloves and head-coverings were consistently present. Occasional "snowmobile" suits were seen.

It was necessary to come to some decision as to one or two forms of "typical seaman's winter clothing". The clothing should adequately represent that being used by the seamen of the Great Lakes, and at the same time, be relevant to professional seamen, offshore oil-rig workers, and coastal fishermen, wherever cold water occurs.

The array of clothing which was chosen is shown in Figs. 1 and 2. In Fig. 1, two styles of "heavy clothing" are shown which vary only in the nature of the outer coat or jacket being worn. In Fig. 1, the layers of clothing are:

(*a*) "Long-john" woolen underwear, and woolen socks
(*b*) cotton shirt, heavy wool pants, and ankle height, work boots
(*c*) down jacket, wool cap, and waterproof gloves
(*d*) standard foam flotation device (lifejacket) of the vest type
(*e*) down vest (no sleeves) and wool jacket (alternative to the down jacket of illustration c)
(*f*) standard foam flotation device with clothing alternative (e).

Therefore, the two "heavy clothing" styles which were worn in the water are shown in Fig. 1d and 1f. Five individuals were tested in each of these two clothing variations. These two variations were not chosen with the *a priori* expectation that they would cause significant differences in cooling rate, but to avoid being too narrow in the definition of heavy winter clothing. Obviously, many further variations of heavy clothing could be tested, but with the likelihood of being insignificantly different from the forms chosen here.

One other format of heavy winter clothing was considered to be worthy of study for its effect on cooling rate of seamen in cold water. A wearable windbreaker-type jacket *(the UVic Thermofloat jacket*[1]*)*, which provides significant thermal protection (5) in addition to flotation and visibility, has been developed in our laboratory. It replaced the wool jacket and standard flotation vest of Fig. 1f, and is shown in Fig. 2a. When the "convertible shorts", which are attached inside the back, are deployed, this flotation device appears as in Fig. 2b and 2c (the fluorescent red hood with retroreflective tape is also deployed). This jacket provides more than 15.5 lbs of buoyancy with good flotation position, so that an extra "lifejacket" is not required. Each of the ten subjects was immersed a second time wearing the UVic Thermofloat Jacket as is shown in Fig. 2b and c.

Single immersions of one subject (J.H.) were also conducted with two forms of "survival suits". Fig. 2d illustrates the Mustang Survival Suit (Mustang Sportswear, Vancouver, B.C.) which is a nylon coverall with buoyant and thermally protective, closed-cell foam (⅛") between the layers. It was worn over the clothing in Fig. 1e without the wool jacket. The other survival suit (Imperial Industries, Bremerton, Washington) consists of ¼-inch, closed cell foam that can be tightened over the clothing by closure of zippers on arms, legs, and trunk (Fig. 2e). It was worn over the same clothing as the UVic Thermofloat and Mustang Survival Suit. These single tests on the thermal protection capability of the two survival suits were considered a worthy comparison within this study, since both models are currently used for cold water safety, despite lack of experimental data on their effectiveness in reducing body cooling rate.

Temperature measurements

Core body temperatures were measured at the tympanic and rectal sites. Tympanic temperature was monitored with a small, padded thermocouple placed gently against the tympanum. The ear canal was then sealed with a wax plug. Rectal temperature was recorded with a thermistor inserted 15 cm beyond the anus. Temperatures were monitored continuously throughout pre-immersion, cooling, and rewarming phases.

Immersion precedure

Body temperatures were monitored for 10 minutes prior to immersion, during which time the subject sat in an air temperature of 8–10°C. The subject then walked a few meters to a ladder which he descended into the sea (7°C). The subject was instructed not to swim or make gross movements since these have been

[1] Manufactured by Mustang Sportswear, 540 Beatty Street, Vancouver, B.C.

shown to increase cooling rate (7). Instead, he remained still and adopted a thermally-protective behaviour, H.E.L.P. (Heat Escape Lessening Posture) which reduces cooling rate (6). The posture entails curling up in a "foetal-like" position, which results in decreased rate of heat loss from critical areas of the body surface (6). Therefore, the behaviour in the water was designed to minimize cooling rate, and thereby complement the potential of the heavy clothing to extend predicted survival time. The results would then represent the situation of a heavily clothed man attempting to take best advantage of all his insulative capacity.

Immersions were terminated when the deep body temperature reached 35°C (95°F), or when sufficient hypothermia had occurred to yield a uniform cooling rate. Immersion time varied from 45–120 min depending on clothing variables and individuals differences in cooling rate. Subjects were rewarmed by either hot bath or inhalation techniques as described elsewhere (see Part II).

RESULTS

Cooling curves

Fig. 3 presents cooling curves of tympanic and rectal temperature of an individual who showed typical responses. It is important to note that a fairly uniform cooling rate of the body core was no testablished until approximately 20 minutes of immersion. Therefore, cooling rate determinations were based upon temperature decreases from 20 minutes onward (mean immersion time was 85 min).

Analysis of cooling rates

Table 1 summarizes the cooling rate findings for the different clothing variables. There were no significant differences between the cooling rates of the tympanic and rectal temperatures. Hence, the cooling rates of these two sites can be averaged to provide a single measure of cooling rate of the body core. Using this measure, no significant difference occurred between the cooling rates with the two forms of heavy clothing while wearing the standard flotation device (1.78 and 1.92°C/hr). Therefore, these two values can be combined to yield a single, mean value for cooling rate of 1.85°C/hr for subjects wearing heavy clothing and a standard flotation device. In comparison to this value, the UVic Thermofloat Jacket caused a highly significant ($p<0.01$) reduction of mean cooling rate to 0.89°C/hr.

Analysis of the cooling rates in Table 1 shows the degree of variation between individuals in this study. The standard deviations of the cooling rates were often about 25% of the means.

ABSTRACT

Inhalation rewarming of hypothermic humans with heated, humidified oxygen was compared to rewarming by immersion in a hot bath. In ten subjects cooled to approximately 35°C core temperature, there was no significant difference in the amount of temperature "afterdrop" with the two rewarming procedures. Inhalation rewarming provided rapid commencement of increase in tympanic and esophageal temperatures, indicating effective rewarming of critical core regions, especially heart and brain. This method of core rewarming avoids the physiological hazards associated with the peripheral vasodilation which accompanies external rewarming. Moreover, the simplicity of application of this method suggests its greater use in both first-aid or hospital treatment of accidental hypothermia.

INTRODUCTION

Accidental hypothermia in man is a common, but serious problem in cold air and water environments. The rapid rate of cooling which occurs in cold water immersion (12) and in mountain accidents (10, 23) can readily progress to a medical emergency. Hence immediate recognition and therapy of this condition are necessary to overcome its high mortality (6, 22).

Many current articles (9, 10, 16), medical texts (2) and military survival publications (8, 32) recommend rapid peripheral rewarming as the treatment of first choice for hypothermia. Indeed, this has been shown to be effective even in the profoundly hypothermic victim (1). Many modalities are used to accomplish this, including immersion in hot water baths, wrapping in electric blankets, application of heated objects to the skin surface (3), and recently, circulation of warm water through special garments fitted to the victim (33).

These methods are all effective in treatment of rapid-onset hypothermia, but certain physiological problems may arise with active, peripheral rewarming of the

slow-onset, unconscious, profoundly-hypothermic victim. The well-described "after-drop" of the core body temperature following removal of the cold stress can be increased in magnitude by peripheral rewarming. This occurs through vasodilation in the cold periphery and subsequent return of cooled blood to the body core, further chilling the myocardium (33) and potentiating the possibility of ventricular fibrillation (1, 17, 33). Furthermore, in hypothermia of long duration, in which intravascular volume is decreased secondary to fluid shifts, rapid rewarming may precipitate hypovolemic shock as peripheral vasodilation further diminishes central blood volume (17, 33). To obviate these problems, some authorities (17, 31) recommend rapid rewarming for rapid-onset hypothermia, and slow rewarming for slow-onset hypothermia. The difficulty in many accident situations of ascertaining the degree of hypothermia and its duration, complicates the decision of which type of therapy to apply, at a time when delay decreases the chance of successful resuscitation.

Theoretically, core rewarming of the hypothermic victim avoids the physiological hazards mentioned above, through delivery of heat directly to the central circulation and tissues, leaving the limbs and peripheral tissues to warm more slowly. Several core rewarming methods have been used including extracorporeal circulation (7, 30); warm, peritoneal dialysis (18); direct warming of the heart after thoracotomy (19); endotracheal administration of warm air alone (28) and in combination with heated, intravenous fluids (27). Although all of these techniques have proven successful in many instances, they are clearly limited to the hospital environment.

Recently, Lloyd (20) has described a means of core rewarming through the airway using warmed oxygen. He presents case histories showing its effectiveness in the hospital treatment of hypothermic patients, and in addition, describes a portable apparatus based on this principle (21). Inhalation rewarming is also receiving the interest of mountain rescue organizations (26) and of physicians associated with mountaineering medicine (15, 29). Therefore, inhalation of heated, water-saturated gas (such as oxygen) by the hypothermia victim may best combine the merits of core rewarming and first-aid applicability at the accident site.

The purpose of this experiment was to compare the effectiveness of inhalation rewarming (using heated, humidified oxygen) to peripheral rewarming in a hot whirlpool bath. In other that the results be most relevant to accidental situations, immersions were conducted in the sea using persons of average build, who wore standardized clothing and lifejackets. In addition, the rewarming apparatus was selected so as to be compatible with rescue aircraft and vessels, such as those of the U.S. Coast Guard.

MATERIALS AND METHODS

Immersions were conducted in the sea near Victoria, British Columbia, from on board a research ship which provided laboratory space for recordings and rewarming procedures. Sea temperatures were between 7 and 8°C and a slight current and small waves prevailed for the 4 days of immersions.

Ten healthy male subjects (all athletically active) volunteered for the study and satisfied rigid medical selection criteria described elsewhere (12). Their characteristics (means and ranges) were: age 29 (20–48); weight 83 kg (75–105); height 1.84 m (177–191); and percent body fat 15.4 (9.3–25.7) based on standard measures of skinfold thickness.

Core temperature was measured as follows. A fine, padded thermocouple was placed gently against the tympanum, and the auditory meatus sealed with a wax plug. Rectal temperature was monitored with a thermistor inserted 15 cm beyond the anus. In one subject only, esophageal temperature was obtained using a thermistor inserted nasally and positioned to lie at about the level of the cardiac atria.

Production of hypothermia.—Each subject wore an outfit of typical seaman's clothing and a personal flotation device. With tympanic and rectal temperature being continuously monitored, 10-minutes of pre-immersion values were recorded. The subject then entered the cold sea water and remained motionless beside the ship while clinging to a life-ring. Constant visual surveillance of the subject was maintained. The immersion was terminated when the core temperature declined to 35°C or when the subject became too uncomfortable to continue. The range of immersion times was 45–120 min. The subject then climbed out of the water up a 3 meter ladder to the deck, removed his wet garments with assistance, and walked 20 meters to the rewarming site in the laboratory of the ship. The time interval from leaving the water to initiation of rewarming was 3–4 min.

Rewarming procedures.—Each subject was cooled twice (on separate days) and rewarmed once by each of the two procedures. The order of use of the two rewarming procedures was randomized for the different subjects.

Fig. 1 shows the inhalation rewarming apparatus. Oxygen from the cylinder was passed at a variable rate through the heating and humidifying apparatus. It was a standard Bennett model heater and vaporizer commonly used on hospital respirators. It consisted of a 1-liter water bath with a thermostatically-controlled, electric, immersion-heater element. The oxygen was bubbled through the water and delivered to the subject via a loosely-fitted, ventilation mask. The mask was fitted with a rebreathing bag to act as a reservoir which helped conform the variable ventilation flow rate of the subject to the uniform flow of the oxygen. The water was heated to about 70° C such that the water-saturated oxygen flowed from the Bennett heater at about 55° C and arrived at the subject's mask at 40–45° C. This was the maximum temperature of inhaled oxygen that the subjects found to be comfortable. The flow rate of oxygen was regulated to maintain the 40–45° C temperature of the inhaled gas. This required high flow rates for the first 5–10 minutes, because the subjects had high ventilation rates associated with vigorous shivering thermogenesis. As shivering subsided, oxygen flow rates were reduced to 10–12 liters/min for the remainder of the rewarming. Inhalation rewarming was discontinued when the subjects had rewarmed about 1.5° C by tympanic recordings, involving a total period of about 45 min from initiation of the treatment. During the inhalation rewarming, the subjects lay prone on a foam mattress. Room temperatures wa 24–26° C. The subjects were exposed to the air until their skin temperatures in the trunk region reached air temperature, requiring 7–10 minutes. They were then covered with an unwarmed blanket for the remainder of the rewarming period.

Bath rewarming was accomplished using a 5 ft long, whirlpool bath. The subject reclined in the bath so that the water was at neck level. Initial water temperature was about 26° C and was then raised steadily to 42° C over the first 7–8 min. Vigorous stirring continued at this temperature for the remainder of the rewarming. The lower initial water temperature was required due to the severe discomfort to conscious, hypothermic subjects if suddenly immersed at the higher temperature.

RESULTS

A typical recording of core temperature changes during cooling and inhalation rewarming of one individual is shown in Fig. 2. A fairly uniform cooling rate was established by approximately 20 min of immersion and the subject exited the cold water when the core temperatures were near 35 °C. Temperatures continued to decline during the period before inhalation rewarming began, and this "afterdrop" continued for another 0.3° C over the first 10 min of rewarming before being arrested. Temperature increase of the tympanic site proceeded at a faster rate than the rectal site.

For the ten subjects, comparison of the effectiveness of the inhalation and bath rewarming techniques is presented for the tympanic and rectal sites in Figs. 3 and 4 respectively Change in temperature before and after the onset of rewarming is shown. Tympanic temperature exhibited marked acceleration of cooling during the interval of physical activity that was associated with movement from the cold water to the rewarming laboratory. In this 3–4 minute period, tympanic temperature declined an average of 0.4° C. For the tympanic site, there was no significant difference in the amount of continued cooling with the two rewarming methods.

Inhalation rewarming had a mean afterdrop from commencement of rewarming of 0.38° C compared to 0.48° C for bath rewarming. The inhalation technique appeared to provide a slightly more rapid onset of increase in tympanic temperature. By 15 min of rewarming with each method, uniform rates of temperature increase were established, such that by 30 min of rewarming a temperature rise of 1.3°C above the minimum was achieved. Rectal temperature (Fig. 4) showed less response to the physical activity during the transition from the cold water to the rewarming site (only a 0.1°C drop). Again, no significant difference occurred in the amount of afterdrop between the two rewarming methods. With inhalation rewarming, there was a further mean afterdrop of 0.40°C compared to 0.33°C with bath rewarming. At the rectal site, inhalation rewarming appeared to provide a slightly slower rate of temperature increase than bath rewarming. Approximately 20 min was required to establish a steady rate of temperature increase, such that at 30 min of rewarming, temperature rises above minimum of about 0.6° C and 0.4C occurred for the bath and inhalation techniques respectively.

In comparing the rate of temperature increase of the tympanic and rectal sites during inhalation rewarming (Figs. 3 and 4), rectal temperature increase was significantly lower than tympanic from 15 min of rewarming onward.

Fig. 5 presents the temperature change curves for the one subject who had esophageal temperature recording in addition to tympanic and rectal measurements. Esophageal temperature showed essentially no afterdrop once inhalation rewarming began. Furthermore, this site showed a rapid rate of increase in temperature, gaining 2.1°C in the first 5 min. Tympanic temperature showed a small afterdrop of 0.3°C and onset of temperature increase in less than 10 minutes (similar to the pattern in Fig. 3). Again, rectal temperature had a greater afterdrop and slower onset of increase than tympanic when treated with the inhalation technique.

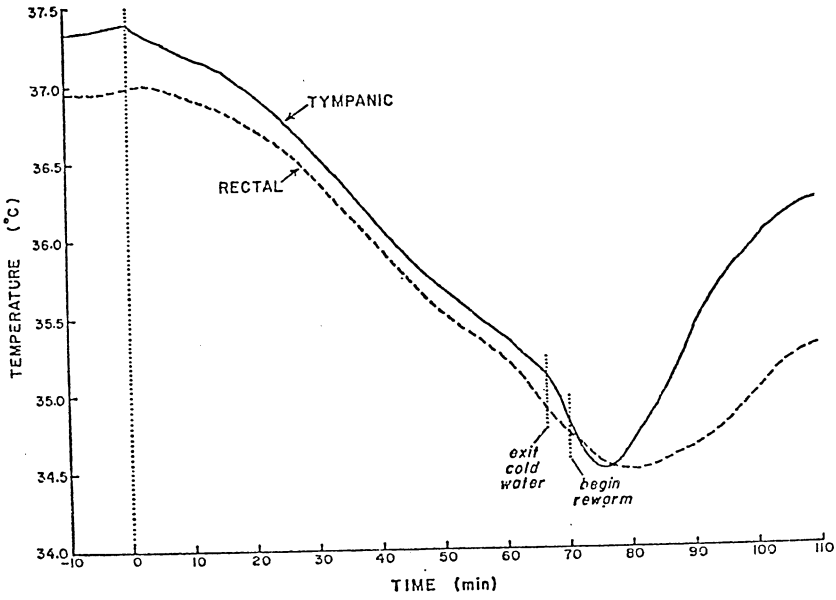


FIGURE 2.—Typical recording of core body temperatures during cooling in 7°C water and subsequent inhalation rewarming.

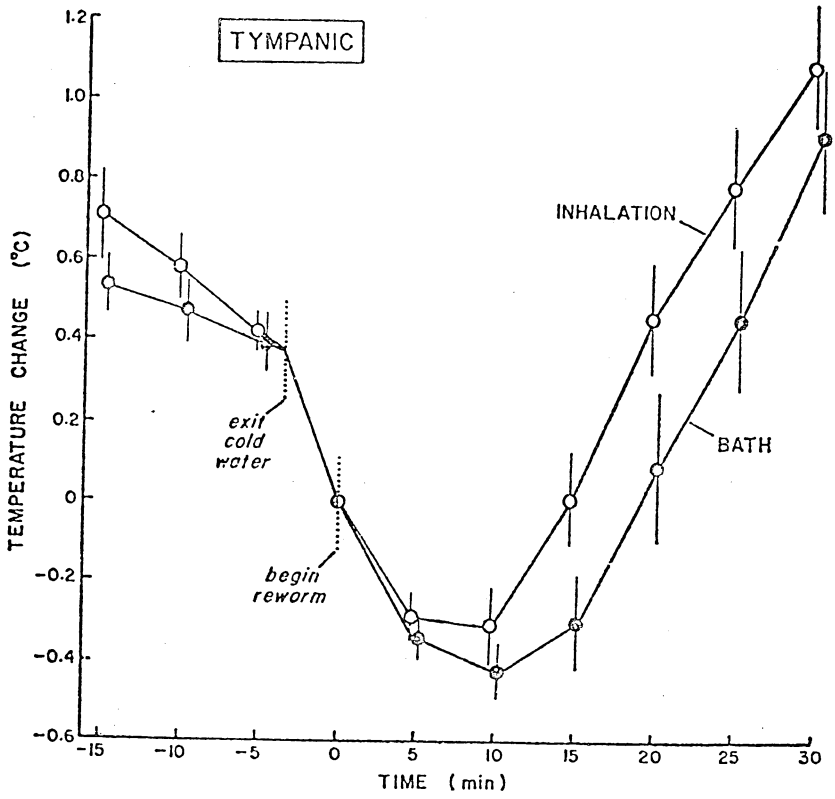


FIGURE 3.—Comparison of tympanic temperature changes occurring with inhalation and bath rewarming. Changes were calculated from the temperature at the beginning of rewarming (time 0). The mean tympanic temperature at time 0 was 34.5°C. The difference in cooling curves from 15 to 5 minutes before rewarming was due to clothing differences (being studied separately), and had no bearing on the afterdrop findings. Vertical lines denote standard errors of the means.

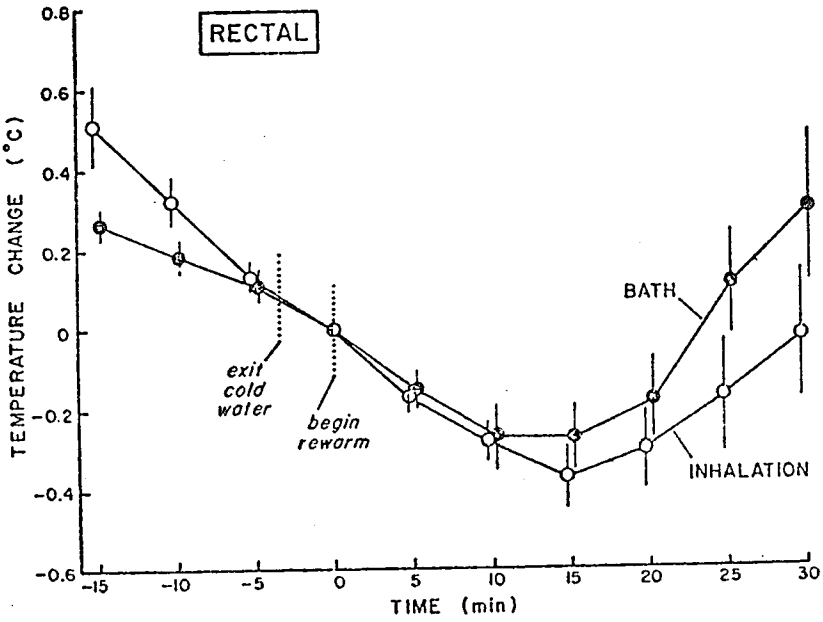


FIGURE 4.—Comparison of rectal temperature changes occurring with inhalation and bath rewarming. The mean rectal temperature at time 0 was 35.3°C. Other conditions as in Fig. 3.

DISCUSSION

These experimental results confirm the theoretical expectation that inhalation rewarming can be an effective treatment for hypothermia in humans. The lack of difference in core temperature afterdrop and rewarming rate between inhalation and bath rewarming allows the inhalation technique to be considered an "active" or "aggressive" therapy. Although cardiovascular variables were not measured, the lower rectal and skin temperatures, and the more persistent shivering with the inhalation method testify to less warming and consequently less vasodilation of the peripheral regions. Hence, the further advantage results that rewarming shock and induction of ventricular fibrillation by cold and acidotic venous return are minimized, despite rapid rewarming of the "critical core". With the inhalation method, direct warming of the grain would occur by conduction from the nasopharynx, and by circulation of warmed vertebral and carotid arterial blood. The more rapid rewarming of the brain would both reverse cold-induced depression of the respiratory centers and more rapidly stimulate regaining of consciousness of the severely hypothermic victim.

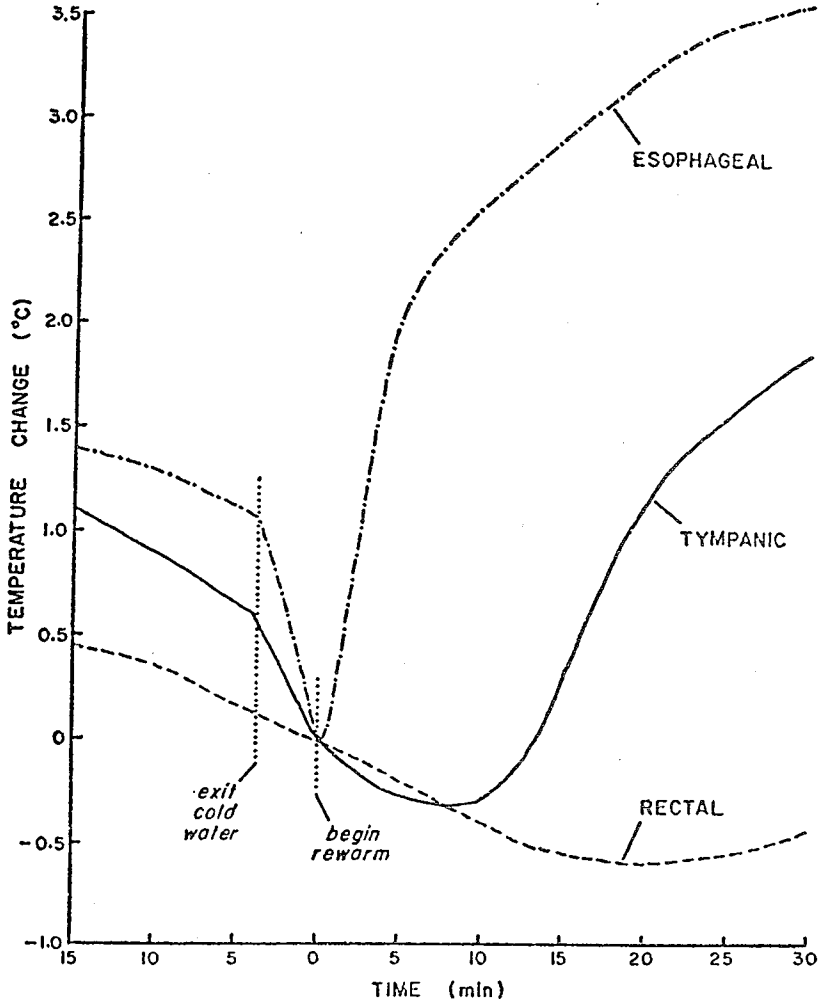


FIGURE 5.—Changes in esophageal temperature in comparison to tympanic and rectal temperatures in an individual being rewarmed by the inhalation method. The mean temperature of the three sites at time 0 was 34.1°C

With regard to the need to stop further cooling of the heart and begin its rewarming, the extremely rapid response of the esophageal temperature to inhalation rewarming deserves emphasis. Previous studies have shown that a close parallel exists between esophageal temperature and the temperature of the heart and great vessels (5). The esophageal recording would therefore indicate that inhalation rewarming facilitates rapid myocardial rewarming. Transfer of heat from warm, humidified gases to the airways is rapid (34); and heat may then flow from the airways to other structures of the mediastinum. The heart would be warmed from the pericardium inward. Probably of greater significance, however, is the return to the heart of warmed blood from the lungs, leading to myocardial warming both through direct heating of the endocardium and through coronary perfusion. Rapid rewarming of the heart in this manner would minimize the possibility of ventricular fibrillation and would potentiate increased cardiac output (24, 25).

A further advantage of inhalation rewarming with heated, humidified oxygen can be anticipated. Since the oxygen supply to the myocardium is decreased in hypothermia, both from decreased coronary vascular flow (13) and decreased oxyhemoglobin dissociation (4), the possibility of ventricular fibrillation from a limitation of myocardial energetics is enhanced (14). The inhalation of heated oxygen in the treatment of hypothermia would not only be therapeutic in terms of warming of the myocardium, but also from a concurrent increase in coronary arterial oxygenation. Nevertheless, one report (31) recommends against the use of 100% oxygen for respiratory support of severely hypothermic subjects, on the assumption that oxyhemoglobin is not dissociated, CO_2 transport is consequently impaired, and CO^2 narcosis results. However, this assumption needs verification and most authorities (10, 16, 20, 21, 22) recommend oxygen therapy to counteract hypoxia in severe hypothermia. In fact, the use of heated oxygen has been used successfully in actual case histories of hypothermia (20, 21). Finally, a practical reason for use of oxygen for rewarming is its easy availability through widespread use in emergency medicine.

In the context of minimizing the amount of afterdrop of core temperature and maximizing its rate of increase, some combination of inhalation rewarming and peripheral rewarming may be optimal. Peripheral rewarming should omit the limbs and concentrate on transfer of heat into the trunk. The most effective surface areas for application of heat to the trunk, while avoiding peripheral vasodilation, would be the neck, lateral thorax, and groin regions. These have been shown thermographically (11) to have high heat transfer with the "core".

Another aspect of the results of this study deserves note. Tympanic and esophageal temperatures showed sharp temperature declines during the period of physical activity involved in climbing out of the cold water, removing outer clothing, and walking to ths ship's laboratory. The significance of these findings for those involved in rescue operations is clear: hypothermia victims should be recovered with as little physical exertion on their part as possible, so as to minimize the post-rescue afterdrop in core temperature (32).

In conclusion, the simplicity, effectiveness, and safety of the inhalation rewarming technique warrants its adoption on a larger scale for both rescue and hospital treatment of all levels of hypothermia.

Mr. RUPPE. I understand the American Bureau of Shipping increased draft marks for lake vessels in 1973 with a reduction in freeboard. Do you feel that there are any adverse effects that may have come about on vessel structural integrity because of these changes in draught?

Admiral GRACEY. I am going to ask Commander Deck to respond in a little more detail, sir, but I have looked at that question, and my understanding is that it was done under the auspices of a joint Canadian-U.S. Coast Guard Committee. It was not a carte blanch approval to increase draft. It was done only on certain vessels under certain conditions. The people that I have talked to have not indicated to me that there is any increased safety hazard to this, but I will ask Commander Deck to give you some more details.

Commander DECK. I probably should point out, I think, one slight inaccuracy. The American Bureau of Shipping didn't bring this about themselves. They are acting as agent for the Coast Guard and they essentially do the physical work in making the calculations and the inspections and placement of the Plimson marks on the vessels.

The change in 1973 to the Great Lakes load lines was only for a very limited particular class of vessels. These were vessels which were of fairly recent vintage that had a number of safety features, such things as watertight hatch covers, certain kinds of enclosures over portholes, watertight doors on house fronts, different kinds of closures for their vent systems. So far as the structural adequacy of these vessels, each was analyzed in depth prior to giving this deeper load line draft.

One of the, I guess, anomalies of naval architecture is that the deeper the draft in its deeper loading, the vessels in the loading condition did not really increase the stress of the vessel to any significant degree. As a matter of fact, in the analysis, it is shown that, the vessel suffers greater stress when she is in the ballast condition than in the loaded condition. As an example, we use a figure of four tons per square inch being the limit.

Deeply loaded vessels, that is the summer load line vessels, their stress may be somewhere in the neighborhood of one and a quarter tons per square inch, whereas the vessel in the ballast condition may be two and a half to three, perhaps three and a half tons per square inch. So the deeper loading really did not have a significant impact as far as the stress loadings were concerned and, therefore, did not have a significant impact as far as the structural capability of the vessel was concerned.

Admiral GRACEY. Of the three major lake vessel casualties we talked about, two of them were in ballast at the time they broke up.

Mr. RUPPE. In your opinion, has the Mini-LORAN-C been an effective navigation tool and, if so, do you foresee the possibility or likelihood of extending its use to other areas of the Great Lakes?

Admiral GRACEY. We cannot say it has been an effective tool yet, Mr. Ruppe, because we really haven't had a chance to put it into operational practice. I think it has great promise. The success we have seen is with a very primitive piece of user equipment. And if the designer who I think is here will forgive me for those words, we have got great hopes for the future for equipment that is being developed now. But even that will show great promise.

Mr. RUPPE. You indicated in your statement—you referred to my persistence on this and I have been persistent, and of course the Coast Guard itself is very interested and excited about this because we think it has great prospects.

Admiral GRACEY. One of the reasons that we think it has prospects, we figure if it will work in the St. Mary's River, it will work anyplace. We thought it was a marvelous opportunity to have a go at it. As far as the Great Lakes are concerned, I think there might be some other areas, for example the Detroit-St. Clair area, but the expense there probably isn't warranted. I know the St. Lawrence Seaway people are watching our development very interestedly.

There are some parts of the country where we have some thoughts of using this—for example, in some of the lower regions of the Mississippi.

Mr. RUPPE. Thank you, sir.

Mr. DE LA GARZA. Admiral, you mentioned that we have a cooperative agreement with Canada. Does Canada have a cooperative part of our Coast Guard in the lakes?

Admiral GRACEY. No, they really don't. There is a Canadian Coast Guard and it does do a lot of the things that we do, but law enforcement is handled by the Canadian police and search and rescue is handled by another group, so no, there is no country in the world that has an agency that does all the things that your Coast Guard does.

Mr. DE LA GARZA. Do you limit your activities solely to our jurisdiction, or do you go across the line?

Admiral GRACEY. We have cooperative agreements with Canada on icebreaking, SAR and pollution surveillance. The pollution surveillance agreement was worked out and has since been approved by the State Department. It was worked out on the basis of efficiency. Instead of our flying down one side of the border and their flying over the other, we said, "Why don't you fly over Erie and Ontario and we fly over Superior and Huron and we can exchange information on what we see." That is being done. There is a law that permitted us to join in icebreaking with foreign countries.

That was subject to agreement. There is an agreement being worked out now. However, for years and years icebreaking has been shared on the Lakes and that has been continuing. The Canadians helped on the St. Clair and Detroit Rivers.

Mr. DE LA GARZA. The icebreaking is normally limited to geographic limitations of the two countries?

Admiral GRACEY. No, as you go across the lakes, you go in and out of Canada all the time. The natural tracks of vessels do not follow the border at all. In fact, the *Fitzgerald* is just barely in U.S. waters. It is just about on the Canadian border and had been coming down from Canadian waters.

Mr. DE LA GARZA. So if someone is in distress in Canadian waters, you nonetheless go out and assist him?

Admiral GRACEY. Only if we have a request for help from Canada and vice versa, but it is a very frequent event. Of course, usually with the rescue case, if you hear it, you don't wait for a lot of formalities, you go.

Basically, we are so busy responding to our calls, we only respond to Canada on request of the Canada Rescue Agent.

Mr. DE LA GARZA. You mentioned about 1,000 auxiliary service assists on weekends. Do you pay those? Are they doing volunteer service, or how is that, Admiral?

Admiral GRACEY. I think I have kind of confused things a little with my statement. The 1,000 figure referred to Reservists. We don't have 1,000 who are on duty every weekend. We draw from a pool of 1,000 to derive the number who come in on weekends.

Yes, they are paid. The volunteers are the Auxiliarists. Some are paid for fuel and damage to their boat when they are on the job.

Mr. DE LA GARZA. You provide them fuel for the boat?

Admiral GRACEY. If they are under orders. A large portion of what they do, they do on their own time.

Mr. DE LA GARZA. On their own?

Admiral GRACEY. On their own time. Marvelous organization.

Mr. DE LA GARZA. Yes, I know, I have been hauled in by one of them.

[Laughter.]

Admiral, thank you very much.

We appreciate your testimony and your cooperation, and we look forward to working with you and having continued oversight.

I might mention that many times people associate congressional oversight responsibility with trouble, but that is not the case. Oversight means that we work with you and we oversee the good and the bad, so when we say oversight, it doesn't mean we are only having oversight hearings where there are problems or trouble, but there are

many oversight hearings in which everything worked right and is fine and we just want to come out in the field and take a look at it and look at the people who have done the work.

In this case we have a little of both. We appreciate your cooperation and your testimony.

Admiral GRACEY. Thank you, Mr. Chairman.

Mr. DE LA GARZA. Now, I might add mostly for the benefit of my colleagues, if my two colleagues would bear with me, I would like to follow the procedure of having the testimony of each witness and then deferring any question and then inviting all the witnesses together at the end for questions, if that would be agreeable.

The next witness is Vice Admiral Paul E. Trimble, USCG (retired,) president, Lake Carriers' Association, Cleveland, Ohio. And we will be very happy to hear from you, Admiral.

STATEMENT OF VICE ADM. PAUL E. TRIMBLE, U.S. COAST GUARD (RETIRED), PRESIDENT, LAKE CARRIERS' ASSOCIATION, CLEVELAND, OHIO

Admiral TRIMBLE. Thank you, Mr. Chairman and members of the subcommittee and welcome to the Fourth Seacoast. We are very pleased that you have chosen this locale for your look at the facilities in the Great Lakes area.

At the outset, as far as lake shipping is concerned, the Coast Guard here on the lakes does a fine job of carrying out its public responsibilities and managing its available resources. Its personnel, headed by an outstandingly capable District Commander, by and large are completely dedicated to their tasks round the clock, round the calendar, and without regard to weather conditions. To the extent that there is a weakness or a problem it is in available resources which I will touch on subsequently.

Mr. Chairman, in the interests of time, I would like to introduce my statement for the record and then just touch on parts of it.

Mr. DE LA GARZA. Without objection, your full statement will appear in the record as if delivered and you may quote from it as seen fit.

[The statement follows:]

STATEMENT OF VICE ADM. PAUL E. TRIMBLE, PRESIDENT, LAKE CARRIERS' ASSOCIATION

Mr. Chairman and members of the subcommittee, welcome to the Fourth Seacoast! We in the lake shipping industry are pleased that you are holding hearings at the Soo on the adequancy of Coast Guard facilities in this area.

We do have more important ports in terms of tonnage but this is really the hub of the Great Lakes navigation system. This locale presents more marine problems than any other section, such as aids to navigation, ice obstruction, vessel traffic control, and variable weather. Consequently, Coast Guard operations here are correspondingly more extensive.

I represent the domestic bulk vessel fleets on the lakes so my comments on Coast Guard facilities will reflect that point of view. As this Committee is particularly aware Coast Guard activities and capabilities impact heavily on the shipping industry. Coast Guard responsibilities start with approval of plans for construction or modification of merchant vessels, approval of safety equipment, licensing of personnel, and annual inspection of the vessel and safety equipment. The Coast Guard is responsible for aids to navigation, including electronic, such as Loran-C and vessel traffic control. Its multi-purpose vessels perform search and

rescue missions, break ice to meet the reasonable needs of commerce, and are available for marine law enforcement work, including enforcement of marine pollution regulations. In addition to vessels, both fixed and rotary wing aircraft are used in support of its missions, especially search and rescue, law enforcement and ice surveillance. The Coast Guard is also responsible for research and development in support and furtherance of its activities.

At the outset I will state for the record that the Coast Guard here on the lakes does a fine job of carrying out its public responsibilities and managing its available resources. Its personnel, headed by an outstandingly capable District Commander, by and large are completely dedicated to their tasks round-the-clock, round-the-calendar, and without regard to weather conditions. To the extent that there is a weakness or a problem, it is in available resources which I will touch on subsequently.

Since your committee, Mr. Chairman, is responsible for Coast Guard legislation and authorization, as well as oversight, your activities and performance are also important to shipping and the Great Lakes. The authorization process for Coast Guard capital improvement items was instituted by your Committee during the early sixties. It is a fact that Coast Guard facilities during the intervening period have become steadily more adequate for the statutory tasks assigned. At the same time some of those tasks have been broadened in the area of fisheries surveillance, pollution abatement, and Loran-C coverage under the national navigation plan. Recent extension of our fisheries zone to 200 miles will further tax Coast Guard resources, perhaps even coming ahead of those needed in the Great Lakes.

Before looking at the adequacy of Coast Guard facilities here, please bear with me very briefly on the what and why of domestic bulk lake shipping, its importance to the national economy, and effect on the Coast Guard. As has been well publicized, water transportation takes pride in being the lowest cost mode of transportation, the lowest energy consumer per ton-mile of cargo moved and in having the least environmental impact.

We are down to 137 vessels compared to 240 in 1970 when the average age of the bulk fleet was over 45 years. Extension of benefits to the lakes that was provided for in the Merchant Marine Act Amendments of 1970 has given considerable impetus to replacement of the smaller and older vessels with larger, safer and more productive vessels that the improved navigation system and the Poe Lock will now accommodate.

Why is lake shipping important to the Great Lakes and the nation?

Improvement in vessel productivity is helping to keep shipping costs down, which in turn affect utility costs to the consumer; what the farmer gets for his grain; and what the consumer pays for products containing steel. It also helps to keep domestic steel production costs competitive with foreign supplies, and this impacts on employment, our economy, and the balance of payments.

In 1974, imports of foreign steel exceeded our exports by $3.4 billion. In 1975 the world-wide slump reduced steel demand and the deficit to less than $3.0 billion, still a significant figure when we think of lost business and employment in our own country. This is especially important to the Great Lakes area, the industrial heartland of the Nation.

Looking ahead from the slump we are emerging from, economists are forecasting steel expansion requirements of 25 to 30 million tons by 1980–81, with increased employment from the mines to the mills of 90,000. Planning towards that goal is well under way with specific expansions announced by most of the major steel companies.

On the raw material side to meet that demand, and that is where lake shipping is directly involved, construction is already under way to increase domestic taconite pellet production from 55 million tons annually to 85 million tons by 1980, over a 50 percent increase. Dockside ore handling facilities are being modernized or replaced at the head of the lakes to handle the expanded raw material movement.

An ultra-modern dockside facility has just been completed at Superior, Wisconsin to handle up to 20 million tons annually of western coal for Great Lakes utility plants.

With the bulk cargoes projected, over a dozen new vessels are under construction or contract through 1982, and others are in the design stage, each with winter navigation capability. Still others are being lengthened or modernized as yard capacity permits. Under the Congressional authorized and funded season extension program during the past five years we have successfully demonstrated that appropriately designed or modified vessels can safely and economically operate on the lakes from 10 to 12 months, instead of the normal 8½ months' season.

This substantial improvement in lake shipping productivity, along with newer, larger and self-unloading vessels, has been accomplished with our existing Great Lakes waterway, and has involved little additional public investment.

Forecasted stockpiling savings can only occur if stockpiling is reduced and land use planned accordingly, Vessel use for the year must also be planned ahead for optimum productivity. Carefully coordinated long-range planning in connection with expanded steel production, the supporting pellet production and loading facilities, western coal movement and handling facilities, and shipping is necessary to achieve those savings. Huge capital outlays are involved, so the planning is not something that can be turned off and on each year.

A good example of the situation and problem is the expanded pellet production in Upper Michigan that has been going on during the past few years, with a further substantial increase just announced this past month that will create an additional 1,000 jobs in this depressed area. The capacity of the rail systems to Escanaba and Marquette are limited, as well as the dock loading facilities, so the only way, without building new facilities at added capital costs and construction time, to move this added capacity is by operating during the winter. This certainly makes sense as a flexible step that should be taken before going to the expense of new construction. It should be noted that it has even been necessary to operate ships into the winter the past two years to move needed pellets. That situation is expected to continue this coming winter.

The expanded bulk shipping under way and other changes described have a significant effect on the Coast Guard in the Soo area, especially the following programs:

Aids to navigation.
Vessel assistance, both search and rescue, and ice breaking.
Vessel traffic control.
R. & D. in support of Coast Guard responsibilities, especially marine safety.

In the aids to navigation field, the Coast Guard has under way two important improvements in facilities. Loran-C coverage, as recently announced under the national navigation plan, is being extended to the Great Lakes with completion by 1980. This will provide a much more accurate position keeping capability for vessels equipped to use the system. It will be especially helpful in Lake Superior, but will also enhance safety in other lakes.

A mini Loran-C system, affording an accuracy of 25 feet in critical locations in the St. Marys River, should be ready for testing on a commercial vessel later this year. This system will minimize lost time resulting from poor visibility, will improve navigation safety and should minimize groundings. I credit Rear Admiral Gracey, the Great Lakes Commander of the Coast Guard for recognizing this requirement and pushing the development to the stage of success currently in sight. It has other interesting potential uses that the Coast Guard is exploring separately.

The picture is not nearly so rosy when it comes to the Coast Guard's general purpose vessel fleet available for Great Lakes service. None of these vessels were designed specifically for Fourth Seacoast duties. In fact, no vessel has been built for Great Lakes service since the World War II era. The duties, the operating environment and the available technology have changed considerably since then. As might be expected, the Coast Guard vessel fleet has grown exceedingly tired in the intervening years and is increasingly difficult to provide parts-support for, and assure the traditional Coast Guard reliability.

I refer primarily to the five harbor vessels, such as the Naugatuck here at the Soo, the winter-time work horses of the fleet. These vessels are not only assigned for rescue and law enforcement, but also for ice breaking. If replacements were so designed, they could also tend aids to navigation. Today these vessels are of marginal value for rescue services in severe weather.

While in service these vessels have performed yeoman duty helping to keep the St. Marys River channels open during the winter. Such ice breaking responsibilities of the Coast Guard stem from 14 U.S.C. 2 and also Executive Order 7521 issued December 21, 1936 that provides in substance that:

"The Coast Guard is directed to assist in keeping open to navigation by means of ice breaking operations, insofar as practicable and as the exigencies may require, channels and harbors, in accordance with the reasonable demands of commerce."

Through the dedicated maximum efforts of its crews using World War II vintage vessels with varying ice breaking effectiveness, ice breaking has kept up with the limited level of winter demonstration effort, the proving period, so to speak. Except for the MACKINAW, the vessels were not designed for extended season

operations nor for the super-size carriers that have already started to make up the fleet. With more vessels and more ports involved in winter operations, superimposed on normal Coast Guard winter operations, the needed ice breaking capability is just not there.

Lead time for authorization, design and funding for vessel procurement is 3 to 6 years, depending upon whether a satisfactory, already designed and operationally tested vessel is available. I am not proposing additional vessels nor personnel for the lakes, just faster replacement of present overage multi-function vessels than is included in current Administration planning to be ready for increased cargo movements by 1980 . . . so as not to be a drag on this phase of the economy and employment. Without such action, the Coast Guard is not going to be ready, ice breaking-wise, for lake shipping of 1980, and probably not even that of 1977, 1978 and 1979.

Your committee is aware of this deficiency, Mr. Chairman, and its action on the Coast Guard Authorization Bill for fiscal year 1977 speaks for itself. On the House side, Congressmen Ruppe and Oberstar were especially aggressive in developing and presenting the facts, and supporting a more adequate program, as reflected in H.R. 11670 passed by the House earlier this year.

With respect to vessel traffic control in the Soo area, the Coast Guard has been exercising its authority since the turn of the century. We in industry feel that the program has been successful in the interest of safety and minimum traffic delays. To minimize shore erosion and property damage, speed control zones have also been established. We agree with the objective but have had difficulty complying to the gnat's eyebrow. The problem is the varying current through the speed zones resulting from changes in the number of Soo compensating gates in operation, weather conditions and water level changes. I see improvment ahead for two reasons: First is the furnishing to masters of current change data by the Coast Guard here at the Soo as the vessel passes, a procedure instituted this season. Secondly, the mini Loran-C vessel equipment is expected to provide an accurate speed measuring capability as a dividend to its other benefits.

As to Research and Development in support of its Great Lakes responsibilities, I feel the Coast Guard has not been sufficiently aggressive, especially in marine safety. That service does have regulatory responsibility and has to approve each item of safety equipment used on a merchant vessel. Safety regulations and equipment required is largely evolutionary and for the most part stems from casualty experience rather than a systematic approach, technological developments or development of equipment to meet a specified marine safety objective.

Since Coast Guard approval is required before safety equipment can be used, there is not much incentive for nongovernment research unless the Coast Guard is involved or shows interest. Incidentally, the Coast Guard has recently published proposed regulations in the Federal Register of June 7, 1976 to facilitate the development and use of more effective lifesaving safety equipment on Great Lakes vessels.

The Coast Guard's Research and Development program is of such national importance that I urge oversight by your committee. I recommend that it be added to the programs requiring authorization, as well as to having an annual progress report filed with the committee, or such a report included in scheduled oversight hearings. This action will permit review as to the adequacy of the annual program and also long-range objectives.

The Coast Guard investigation into the tragic sinking of the *Edmund Fitzgerald* last November in nearby Lake Superior waters, with the loss of all hands, has not been completed * * * and Admiral Gracey has commented on it. Because of the safety implications the shipping industry is very interested in the results. According to a statement attributed to the Chairman of the Board of Inquiry appointed to investigate this casualty, something happened to the *Fitzgerald* between three and three-thirty in the afternoon of November 10 north of Caribou Island. At that time the ship started taking on water and taking a list, and her master reported that, by radio. And subsequently the hull suffered a rather sudden failure * * *. However, it appears that the master was unaware that his vessel was in jeopardy until it was too late. * * * Consequently, no S.O.S. was broadcasted nor was Coast Guard assistance requested. Result: Loss of the entire crew, 29 valued and experienced men; a fine vessel; and her cargo of pellets.

Tragedies such as this are most infrequent on the lakes . . . and with the technology available today in our great country, we should not have any more.

Here are some steps, all within the current state of the art, that are being undertaken and others that need to be undertaken to accomplish that result. I think our lake fleet is the safest in the world, and construction and design reflects that objective, but these additional steps, with Coast Guard or appropriate federal agency taking the lead with industry cooperation, will be a quantum step forward.

(1) Develop a computerized hull monitoring system with an appropriate pilothouse readout to interpret hull actions in all weather situations and to alert the master that trouble is developing.

(2) Develop an all-weather capsule that will float free in the event the vessel sinks. Capsule should carry a portable VHF radio or other appropriate electronic signalling equipment capable of being received by search aircraft and vessels. It should be of distinctive color; have radar reflecting qualities. At least two would be carried on each vessel. Such development should not be much of a challenge to space age technology. It would not be dissimilar to the presently available Brucker capsule in general use in the Gulf on oil rigs; the cumbersome launching system would be eliminated.

(3) National Weather Service should expedite planning and development of a marine weather and ice forecast center for the lakes. Lake shipping has been making this recommendation to NOAA and the National Weather Service for a number of years. While the Weather Service personnel on the lakes are extremely cooperative, the fact remains that there is no marine forecast capability for the Great Lakes system, and the marine aspect is inadequately funded. Having full-time marine forecasters here would permit monitoring the progress of a lake storm full-time by experts and making appropriate marine broadcasts.

Weather reporting equipment is not effectively located. To some extent this stems from the station automation program of the Coast Guard. At manned stations Coast Guardsmen were available to record and report selected weather data. The Weather Service now has to rely on automatic reporting equipment in isolated areas and often not located for best results.

(4) NOAA should deploy or develop weather buoys for use on the lakes to fill in these critical gaps in data reporting:

(*a*) Eastern end of Lake Superior

(*b*) Lake Michigan to replace the automated Lansing shoals Coast Guard station

(*c*) Lake Huron to replace reporting from the former Coast Guard Lightship.

I note with interest Congressman Ruppe's comments about weather buoys and I heartily concur.

I understand that Canada is also interested in weather buoys for reporting Lake Superior data. Perhaps the weather services of our two countries should mount a joint program.

(5) Develop a weather manual for deck officer training and use that is oriented specifically towards Great Lakes weather and wave conditions. Note: This has been initiated.

(6) Lake vessels should be permitted to carry an effective "utility" boat, such as a Boston Whaler, for man-overboard rescue and other purposes in lieu of lifeboats, which are largely obsolescent in my opinion. The availability of rescue capsules will hasten the phasing out of lifeboats on the lakes.

(7) Loran-C coverage and related charts should be expedited for the lakes. Reliability and accuracy in position keeping will be in the interest of safety. * * *

(8) United States and Canadian Coast Guard have now completed VHF radio coverage of the lakes for emergency and distress. Reliable communications are available.

(9) A replacement program for the obsolescent 110-foot harbor vessel is about to be commenced by the Coast Guard. The new multi-purpose vessels will be capable of responding to distress calls in all-weather conditions. I have made recommendations to this Committee at earlier hearings what the operational characteristics should be so I won't repeat at this time.

(10) Replacement of the aged 36-foot lifeboat at the nearby Grand Marait Coast Guard Station with a modern self-righting 44-foot lifeboat will permit all-weather response from that station. We appreciate Congressman Ruppe's successful efforts this year for that accomplishment.

(11) The deck officer training provided by our own Great Lakes Maritime Academy at Traverse City is already and should continue to produce officers for tomorrow's sailing who will be equal to the challenge and advances in technology. * * *

Thank you very much for the opportunity to be heard today, Mr. Chairman.

Admiral TRIMBLE. Before looking at the adequacy of the Coast Guard facilities, please bear with me on the when and why of bulk shipping. As you have been told I am sure a number of times, water transportation is the lowest cost mode of transportation, it is the lowest energy consumer per ton-mile of cargo moved and we feel it has the least environmental impact.

Why is it important to the Great Lakes and the Nation? We are talking about domestic lake shipping, hauling of coal; it means wheat, limestone, petroleum products, sand, and so forth.

Improvement in vessel productivity is helping in keeping shipping costs down which in turn affect utility costs to the consumer; what the farmer gets for his grain. And we are talking about the auto industry, the pipeline industry, the oil rig industry, agricultural implements that the farmer uses, the heavy construction equipment, and so forth, so this touches a wide swath through the economy. It also helps to keep domestic steel production costs competitive with foreign supplies, and this impacts on employment, our economy, and the balance of payments.

In 1974, imports of foreign steel exceeded our exports by $3.4 billion. In 1975, the worldwide slump reduced steel demand and the deficit to less than $3 billion, still a significant figure when we think of lost business and employment in our own country. This is especially important to the Great Lakes area, the industrial heartland of the Nation.

Looking ahead from the slump we are emerging from, economists are forecasting steel expansion requirements of 25 to 30 million tons by 1980–81, with increased employment from the mines to the mills of 90,000. Planning toward that goal is well underway with specific expansions announced by most of the major steel companies.

On the raw material side, to meet that demand, and that is where lake shipping is directly involved, construction is already underway to increase domestic taconite pellet production from 55 million tons annually to 85 million tons by 1980, over a 50-percent increase. Dockside ore handling facilities are being modernized or replaced at the head of the lakes to handle the expanded raw material movement.

An ultramodern dockside facility has just been completed at Superior, Wis., to handle up to 20 million tons annually of Western coal for Great Lakes utility plants. This is one of the most modern coal-handling facilities in the world, including the dust handling and other environmental precautions.

With the bulk cargoes projected over a dozen new vessels are under construction or contract through 1982, and others are in the design stage, each with winter navigation capability. Still others are being lengthened or modernized as yard capacity permits.

Under the congressionally authorized and funded season extension program during the past 5 years we have successfully demonstrated that appropriately designed or modified vessels can safely and economically operate on the lakes from 10 to 12 months, instead of the normal 8½ months' season. This substantial improvement in lake shipping productivity, along with newer, larger, and self-unloading vessels, has been accomplished with our existing Great Lakes Waterway, and has involed little additional public investment.

There is a tabulation showing gradual extension from 1968 up to the entire winter in 1974–75 and 1975–76 when we operated around the calendar. In fact, in the last few years we operated up to February.

Forecasted stockpiling savings can only occur if stockpiling is reduced and land use planned accordingly. Vessels use for the year must also be planned ahead for optimum productivity. Carefully coordinated long-range planning in connection with expanded steel production, the supporting pellet production and loading facilities, Western coal movement and handling facilities, and shipping is necessary to achieve those savings.

Huge capital outlays are involved, so the planning is not something that can be turned off and on each year.

A good example of the situation and problem is the expanded pellet production in upper Michigan that has been going on during the past few years, with a further substantial increase just announced this past month that will create an additional 1,000 jobs in this depressed area. The capacity of the rail systems to Escanaba and Marquette are limited, as well as the dock-loading facilities, so the only way, without building new facilities at added capital costs and construction time, to move this added capacity is by operating during the winter. This certainly makes sense as a flexible step that should be taken before going to the expense of new construction. It should be noted that it has even been necessary to operate ships into the winter the last 2 years to move needed pellets. Tha situation is expected to continue this coming winter.

The expanded bulk shipping underway and other changes described have a significant effect on the Coast Guard in the Soo area, especially the following programs: Aids to navigation; vessel assistance, both search and rescue, and icebreaking; vessel traffic control; and R. & D. in support of Coast Guard responsibilities, especially marine safety.

Admiral Gracey has discussed what is being done in the aids to navigation field and I respectfully concur.

On LORAN–C, I admire Admiral Gracey for pursuing this solution for a matter that has been bothering us. I'm optimistic about its use.

The picture is not nearly so rosy when it comes to the Coast Guard's general purpose vessel fleet available for Great Lakes service. None of these vessels were designed specifically for fourth seacoast duties. In fact, no vessel has been built for Great Lakes service since the World War II era.

The duties, the operating environment and the available technology have changed considerably since then. As might be expected, the Coast Guard vessel fleet has grown exceedingly tired in the intervening years and is increasingly difficult to provide parts—support for, and assure the traditional Coast Guard reliability.

I refer primarily to the five harbor vessels, such as the *Naugatuck* here at the Soo, the wintertime work horses of the fleet. These vessels are not only assigned for the rescue and law enforcement, but also for icebreaking. If replacements were so designed, they could also tend aids to navigation. Today these vessels are of marginal value for rescue services in severe weather.

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However, it appears that the master was unaware that his vessel was in jeopardy until it was too late. So it wouldn't have made too much difference what sort of external facilities are available if the vessel itself does not know it is in trouble.

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(5) Develop a weather manual for deck officer training and use that is oriented specifically toward Great Lakes weather and wave conditions. Note: This has been initiated.

(6) Lake vessels should be permitted to carry an effective utility boat, such as a Boston whaler, for man-overboard rescue and other

purposes in lieu of lifeboats, which are largely obsolescent in my opinion. The availability of rescue capsules will hasten the phasing out of lifeboats on the Lakes.

(7) LORAN–C coverage and related charts should be expedited for the lakes. Reliability and accuracy in position keeping will be in the interest of safety.

If the charts are available, we can start using LORAN–C equipment before 1980 when the last station is completed. There is fair coverage even at present so expediting availability of charts will be helpful.

(8) United States and Canadian Coast Guard have now completed VHF radio coverage of the lakes for emergency and distress. Reliable communications are available.

(9) A replacement program for the obsolescent 110-foot harbor vessels is about to be commenced by the Coast Guard. The new multipurpose vessels will be capable of responding to distress calls in all weather conditions. I have made recommendations to this committee at earlier hearings what the operational characteristics should be so I won't repeat at this time.

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Thank you very much for the opportunity to be heard today, Mr. Chairman.

Mr. DE LA GARZA. Thank you very much, Admiral.

We appreciate your testimony and we invite you to stay for the rest of the hearing and be available for questions at the conclusion.

The next witness is Mr. Charles Edwards, Johns Hopkins University. We offer you the same advantage, Mr. Edwards, of inserting your full statement in the record and then quoting from it if you would like to utilize shorter time.

STATEMENT OF CHARLES EDWARDS, JOHNS HOPKINS UNIVERSITY, LAUREL, MD.

Mr. EDWARDS. Thank you, Mr. Chairman.

DEFINITION OF THE PROBLEM

The St. Marys River forms part of the United States and Canadian border and links Lake Superior and Lake Huron. Throughout much of the 65 miles of the river, large vessels—up to 1,000 feet in length and 105 feet in beam—are confined to dredged channels no more than 300 feet in width. To facilitate the large volume of traffic, the Coast Guard maintains an extensive array of buoys, day beacons and visual ranges, as well as a radio vessel reporting system. However, during the winter months, additional aids to navigation are needed to compensate for (1) frequent poor visibility, (2) buoys removed or pushed under the ice, and (3) confusing radar returns because of ice ridges. Prior to the installation of the LORAN-C mini-chain, other

techniques, such as a laser reflector system and a high resolution radar system, were tried.

The St. Marys River mini-chain is functionally identical to a conventional LORAN–C chain except that it has shorter baselines—that is, the transmitters are closer together—and uses lower power transmitters. Four transmitters are used, two in Michigan and two in Canada. Using short baselines assures good time difference geometry and signal strength within the coverage area. The design goal stated by the Coast Guard was to determine a boat's cross track position—that is, left or right of channel—with an accuracy of plus or minus 25 feet for 95 percent of the time. Beyond the design coverage area, the accuracy degrades rapidly because of poor geometry. Thus, the mini-chain should be used only in the immediate vicinity of the St. Marys River.

COGLAD NAVIGATION EQUIPMENT

In 1967 the Applied Physics Laboratory developed a LORAN Assist Device (LAD) for a classified military operation requiring precision aircraft guidance. Since that time, APL has developed a number of newer and more sophisticated versions of the original LAD. In 1970 the Coast Guard funded APL to develop a civilian version of LAD which became known as COGLAD (Coast Guard Loran Assist Device). Two COGLAD systems were eventually built for the Coast Guard and have been used experimentally for positioning buoys in Lake Huron, ice patrol in the North Atlantic and oceanographic research in the Gulf Stream. COGLAD was patented by APL in 1974 and the patent signed over to the Government to insure that the technology would remain available to all. One of these COGLAD systems now forms the nucleus of the equipment currently being used for test purposes aboard Coast Guard vessels in the St. Marys River.

Utilizing LORAN–C for precision guidance is basically a two-step process, data measurement and data transformation. Three or more LORAN transmitters and a suitable receiver provide the raw data for determining a position fix. Navigation with the raw data is awkward because the lines of position are hyperbolic curves and the units are microseconds of time difference of arrival. Manually reducing this data to a position fix—when LORAN charts are available—negates much of the true potential of LORAN–C, especially in speed and accuracy. The second step consists of using some form of processor to mathematically transform the raw data into a form usable for navigation and piloting.

In the art of piloting, the type of position information most meaningful is position relative to a known point, an intermediate way point, or a final destination. The entire St. Marys River from Whitefish Bay to De Tour Passage can be described as a series of 25 to 28 straight line segments where each segment is the center line of its respective channel. Where the center line of two adjacent channels intersect has been defined as an intermediate way point. Each of these way points for the entire river has been numbered and the LORAN coordinates surveyed. By storing these LORAN coordinates in the extended memory of the COGLAD system, continuous navigation guidance can be provided throughout the entire St. Marys River relative to known points.

A special display unit mounted on the bridge provides Along Track Distance to the way point in statute miles, Cross Track Distance rela-

tive to the center line of the channel in feet, Along Track Speed in miles per hour, Cross Track Speed in feet per second, bearing angle to the next way point, time to the next way point in minutes, as well as the number of the way point. For evaluation purposes, an X–Y plotter and a digital printer are also part of the system. Figure 1 is a picture of the COGLAD navigation system and figure 2 is a system block diagram.

While the Coast Guard normally refers to COGLAD as User I equipment, it was designed as a research tool and not intended to be a prototype for commercial production.

[The figures mentioned follow:]

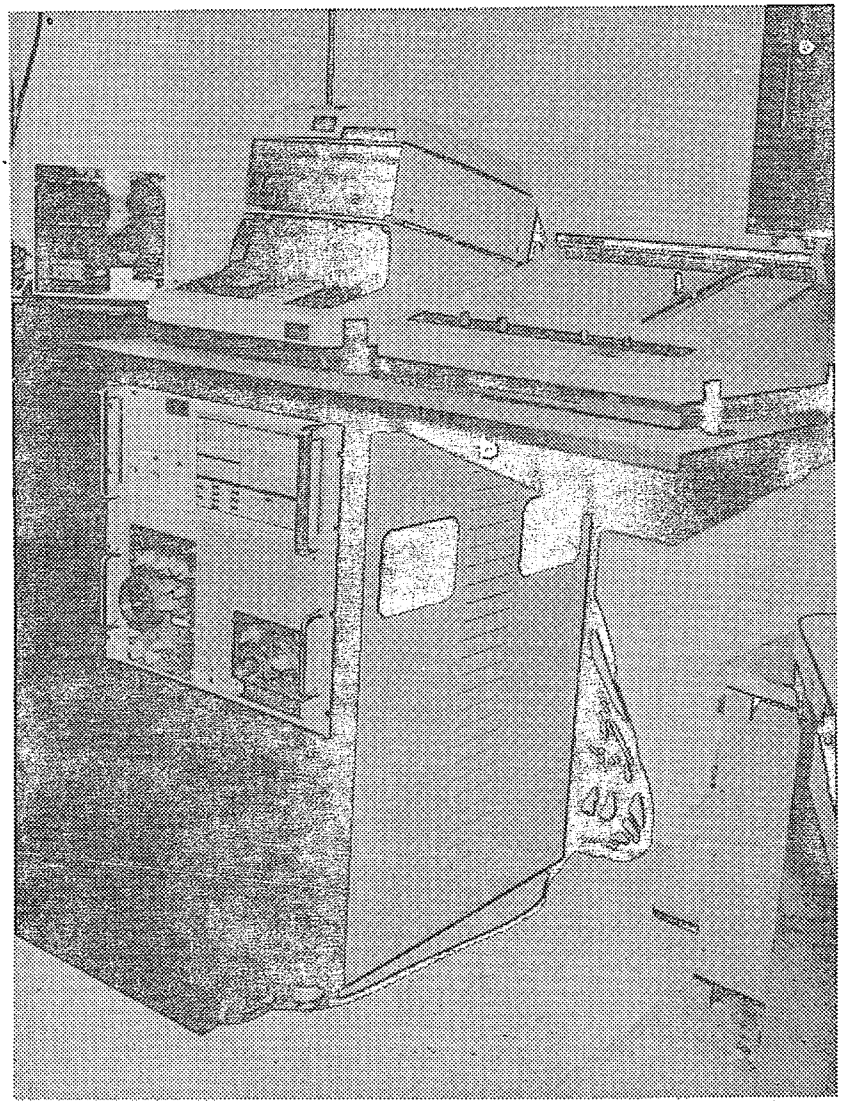

FIGURE 1.—COGLAD NAVIGATION SYSTEM

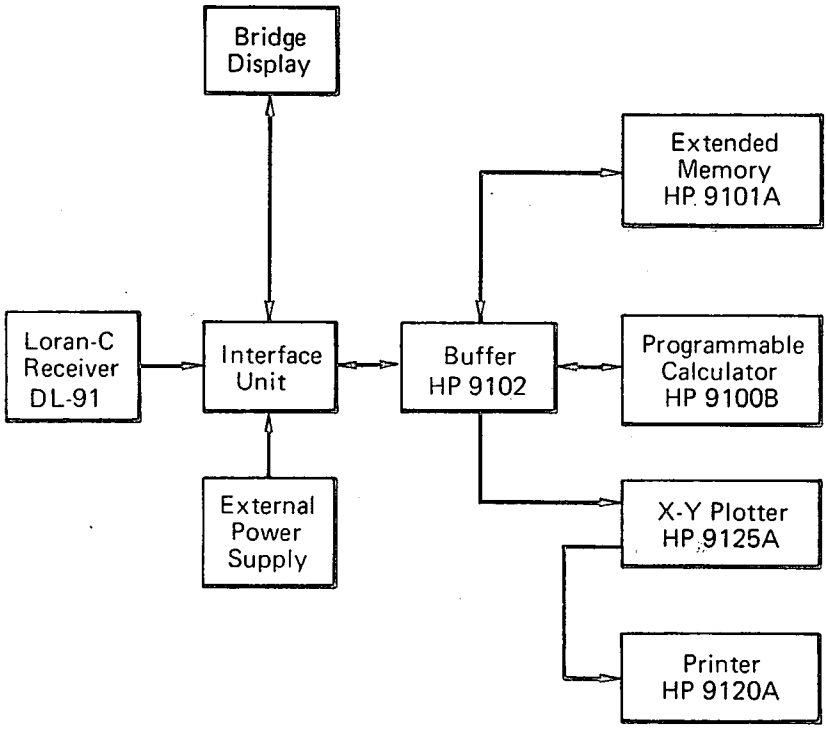

FIGURE 2.—COGLAD NAVIGATION SYSTEM BLOCK DIAGRAM

FIELD TEST CONCLUSIONS

It is APL's opinion that the analysis of the test data indicates, with an 80 to 90 percent confidence, that the mini-chain concept is a viable approach for piloting boats in confined waters. To improve the confidence level, more long-term stability data is needed. It must be established that the required accuracy can be maintained throughout all seasons and all forms of precipitation. Distortions in the LORAN grid have been observed in some parts of the river. These distortions must be compensated for in the data processing.

Beyond this, additional effort will be required, both on the transmitting equipment and the user equipment, to make the St. Marys River mini-chain an operational navigational system.

It was found that the most precise LORAN measurements of the way points could be performed in the winter when the river was completely frozen over. When the boat was stopped in the ice, neither current nor wind would move the boat off station while LORAN coordinates were being measured.

Prior to the start of field testing, it was anticipated that the large ore carriers would produce local distortions in the LORAN grid, and degrade the accuracy during a passing situation. Numerous tests have been conducted and to date, no such distortion has been observed. Distortions observed while passing through the Soo locks were also much less than expected. Only when passing under the International Bridge were the signals observed to be significantly distorted.

Figure 3 is a comparison of COGLAD (User I) position data versus autotape. Autotape is a line-of-sight radio ranging device which was used as a reference. This track plot was made with the CGC *Naugatuck* downbound just south of Six Mile Point and steering on a visual range. The difference in cross track distance measured by the two systems is typically less than 15 feet. Again, I must stress that the LORAN mini-chain must be tested in all seasons and all types of weather. A final report will soon be released to the Coast Guard covering all of APL's participation in this program.

The CGC *Naugatuck* has been assigned to the mini-chain program throughout most of the field testing. The exclusive availability of this boat has been a distinct asset to the program, and the cooperation from the crew has been outstanding.

Before commerical boats can begin using the St. Marys River LORAN mini-chain, assuming the all-weather accuracy requirements are met, the transmitters must be upgraded to operational status and commercial user equipment made available. Upgrading the transmitters would consist mainly of adding redundant equipment and emergency generators at the transmitter sites. The Coast Guard has funded private industry for the development of User II equipment, which may prove to be the prototype of the first commercial user equipment. Testing of this system on the St. Marys River is expected to begin soon.

[The figure mentioned follows:]

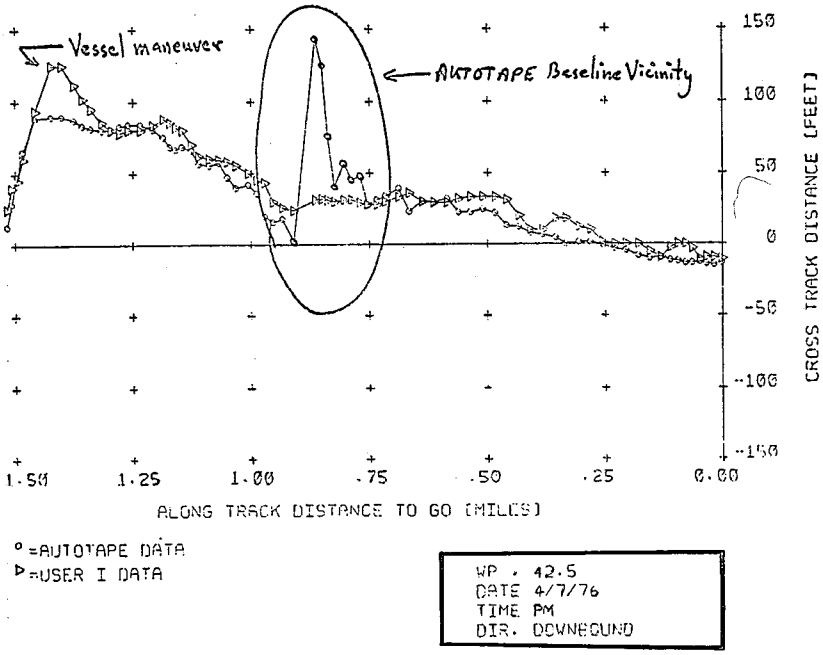

FIGURE 3.—Track Plot of COGLAD and Autotape Position Data

FUTURE APPLICATIONS

APL feels that the technology was ready for the development of the mini-chain navigation system. The main challenge has been to assemble the right combination of components and fine tune them into a precision navigation system. We feel that the technology is also available for more sophisticated applications, such as vessel reporting and traffic control, search and rescue, and port-to-port navigation.

Assume, for example, that all commercial vessels on the St. Marys River are equipped with mini-chain navigation systems. Each vessel's position could be reported to Soo traffic control in LORAN coordinates. Upon receiving an interrogate code from Soo control, the shipboard navigation system would transmit its LORAN coordinates on a time-shared marine UHF channel. A computer at Soo control would then display a composite picture of the river and vessel locations on a television screen. An operator could expand any portion of the picture for greater detail.

As an added refinement, the composite picture could be transmitted on a UHF–TV channel. Each vessel could view the entire river or any portion of it. Another possible refinement would be to interface the boat's radar to the LORAN navigation system.

Search and rescue would be greatly enhanced by shipboard LORAN navigation equipment. A boat in distress could automatically or manually transmit its LORAN coordinates. Other boats would enter these coordinates as a destination and be guided directly to the boat in distress. If the LORAN coordinates are not known and an area is to be searched, a series of way points can be entered to guide the search boat in a precise search pattern unaffected by set and drift. Additional Coast Guard applications for LORAN navigation systems include patrolling oil slicks, offshore dumping, and the new 200-mile fishing limit.

Use of LORAN navigation systems need not be confined to the St. Marys River. The expanded east coast LORAN chain will provide coverage throughout all of the Great Lakes, the east coast and the gulf coast. Expanding the memory of the shipboard equipment would allow continuous navigation information from port to port. Accuracy would be less than the mini-chain but ± 100 feet or better seems reasonable.

Other rivers and harbors with critical navigation requirements could be equipped with LORAN mini-chains and benefit from the development work here on the St. Marys River. The St. Marys River is uniquely qualified as a test area for developing future vessel control systems. It has the only Coast Guard mini-chain in operation. The river is larger than most harbors and has a full range of weather conditions including liberal amounts of ice, snow and fog. There is a large volume of big boats with severe channel requirements. Developing user equipment is greatly facilitated by the regular flow of boats through the river. Unlike ocean-going vessels that visit a given harbor infrequently, most of the commercial boats pass through the St. Marys River every 3 or 4 days.

Potential aircraft applications for LORAN-C navigation systems are very similar to the shipboard applications. Even with allowance

for the greater speed and mobility of aircraft, most of the shipboard technology is directly applicable. Experimental navigation systems have been successfully flown by APL on Coast Guard aircraft as early as 1970, and aboard Navy aircraft still earlier. Use of LORAN-C for air traffic control has also been studied by APL.

RECOMMENDATIONS

Based on results to-date, APL would like to make the following recommendations: (1) Work should continue toward developing the St. Marys River LORAN-C mini-chain into an operational system; (2) Program management and expenditures should be directed towards a more expedient development of this system; (3) Additional personnel for field test support are needed. Technically qualified Coast Guard personnel available for shipboard evaluation are spread too thin with other job assignments; (4) To encourage and accommodate commercial development of navigation systems for the St. Marys River, a data package should be prepared containing: results of the St. Marys River tests, suggested systems configurations, and any expected Government performance requirements. Documentation on hardware, software, and transformation algorithms for systems previously developed by APL and others should be referenced in this data package; (5) A study should be conducted to determine the projected requirements for navigation systems on the St. Marys River and to plan an orderly evolution of the necessary equipment.

Mr. DE LA GARZA. Thank you very much, sir, and we invite you to remain for the rest of the hearing and be available for questions.

Dr. Herman Mark, NASA, Lewis Research Center, Cleveland, Ohio. You may proceed, sir.

STATEMENT OF DR. HERMAN MARK, NASA, LEWIS RESEARCH CENTER, CLEVELAND, OHIO

Dr. MARK. Good morning.

I am Herman Mark, Chief of the Aerospace Applications Branch of the NASA Lewis Research Center located in Cleveland, Ohio.

The duties of my position include the development of advanced technology that can be applied to civilian needs especially if the capability can be deployed with the use of satellites in a cost/beneficial way. This effort is part of the ongoing program in the NASA Office of Applications which has already successfully demonstrated many such applications with its series of developments of weather satellites, communications satellites, earth resources survey satellites, and other similar space developments.

The purpose of my appearance is to discuss existing capabilities for all-weather observations of the Lakes by means of side-looking airborne radar, and recent applications of these capabilities by the Coast Guard as an aid to vessel traffic. This capability was deployed during the multifederal agency effort to determine the feasibility of extending the shipping season on the Great Lakes to include the four extending the shipping season on the Great Lakes to include the 4 winter months. I will also describe a cooperative Coast Guard/NASA/NOAA/Navy effort to deploy the same equipment to aid

Arctic shipping along the west and north coasts of Alaska during the period when military and civilian shipping attempts are made to resupply critical locations in that icebound part of our country. Perhaps the most relevant effort I will discuss is the cooperative Coast Guard/NASA effort which has been under way for the last 2 years to determine the utility of this equipment for detecting icebergs and ships in the North Atlantic during the international ice patrol.

For the past 3 years as part of the Federal program called for by the Congress, including Public Law 91–611, to extent the Great Lakes shipping season, the Coast Guard, NASA, and NOAA have been working cooperatively to provide timely allweather images and interpretive charts of the ice cover in all areas where such information is critical to shipping. The plan for providing this ice information is as follows: When the Coast Guard Ice Navigation Center, located at the 9th District Headquarters in the Federal Office Building in downtown Cleveland, determines there is a need for ice information on the Lakes, the Officer in Charge of the Center signals the Commander of a Coast Guard HC–130B stationed in the area and the aircraft sets out directly to fly over these critical areas at an altitude of about 11,000 feet. From this altitude when passing over the areas of interest, the SLAR equipment on board can make an image of the Earth below right through cloud cover since clouds are transparent in this wavelength.

The swath width of the image collected aboard the aircraft is 100 kilometers (approximately 62 miles). This image is digitized and scanned at a convenient rate for transmission (6,250 bits per second) from the aircraft via a UHF radio link to the NOAA/GOES–1 satellite in orbit at Easth synchronous altitude 22,000 miles above the Equator. From the GOES–1 the signal is relayed to NOAA's command and date acquisition station at Wallops Island, Va., thence via an ordinary telephone line back to the Ice Navigation Center. Thus as the aircraft flies the area of interest, an image approximately 62 miles wide appears in real time in the Ice Navigation Center for the length of duration of the aircraft flight line. When a satisfactory area of 100- to 200-miles long was been collected, personnel in the Ice Navigation Center who are experienced in ice interpretation make an annotated chart at the same scale as the received image. Ice thickness measurements are also made remotely by a sounding radar as well as by drilling measurements added when available to the chart. This image/chart ice information product is then transmitted via a MARAD-sponsored VHF–FM radio system with transmitters at various locations around the lakes, directly to the vessel wheelhouse where they are received on telefax equipment installed for that purpose by winter shippers. This system has been in operation during the last two winters and has provided over 300 such ice information products to vessels shipping during the winter. As a demonstration the program has been quite successful and has been a definite assistance to shipping which continued for the first time for 24 consecutive months (1974–1976).

The agencies involved have been sufficiently encouraged to plan a deployment of this very system to aid shipping in the Alaskan Arctic this summer. Since the shipping which resupplies Arctic military sites

and the shipping which supplies the North Slope civilian efforts to bring oil from this extremely hard-to-reach location is essentially coastal, the format required for ice information by those vessels is similar to that for the open Great Lakes winter shipping. The Arctic demonstration is to begin next month in the middle of August.

For over 50 years the International Ice Patrol has been collecting information on the icebergs that may drift down from the higher latitudes into the North Atlantic shipping lanes and cause a hazard to vessels operating in that area. For the last 2 years NASA has been cooperating with the International Ice Patrol in evaluation of methods involving this same SLAR for improving the efficiency of the patrol. Since the North Atlantic in the Grand Banks area is very often covered by fog and by a low overcast for most of the rest of the time, covering the area employing human observers involves a great deal of low-altitude flying and is often too dangerous or even impossible to accomplish. The very same SLAR equipment described above, to which fog and clouds are transparent, is being used to evaluate the advantage of such a system to perform the surveillance required by the International Ice Patrol. In this evaluation the following results have been determined:

(1) SLAR greatly increased the effectiveness of the patrol.

(2) There were no misses. All bergs seen by the chase plane had been detected by the SLAR.

(3) Small bergs are consistently detected.

(4) Large bergs are detected in sea ice.

(5) All vessels in the area were also detected.

Although all targets are detected by this system, one cannot yet reliably distinguish between icebergs and ships and this problem is continuing to receive attention.

From my own personal experience in working with the Coast Guard in cooperative interagency efforts, such as those I have described above, I have found the Coast Guard to be cautiously determined to develop and to assist in the development of the capabilities it requires in performing its mission.

I believe the Coast Guard is going down the right path in providing themselves with the advantages of the technological advances that have been made in recent years. If a role or requirement develops for very large area surveillance responsibility, or for the application of SLAR to vessel traffic assistance or for search and rescue, it seems to me the Coast Guard will be in a position to deploy the appropriate system toward this need. It is my personal hope that in the not-too-distant future when appropriate systems are shown to be effective and cost beneficial from satellites, the Coast Guard and the Department of Transportation will be able to deploy a system of Coast Guard satellites.

I would like to add that in my experiences with the Coast Guard, I have found the 9th District, the Elizabeth City Air Station, the Office of Ocean Operations, and the International Ice Patrol are especially interested in modernizing, upgrading, and improving the cost effectiveness of the methods by which they perform their functions. I would like to recognize, with pleasure, the assistance the programs I described above have received from the Commander of the 9th Coast Guard District, Rear Adm. J. S. Gracey; from the

Chief of Ocean Operations, Capt. Richard J. Knapp; from Comdr. A. D. Super of the International Ice Patrol, and from Lt. Comdr. Leon Thomas, Elizabeth City Air Station.

Thank you very much.

Mr. DE LA GARZA. Thank you very much, Doctor, and we invite you to remain for the rest of the hearings and be available.

I understand the next two witnesses, Mr. Reed and Mr. Hutton, would prefer to appear at the end of the other witnesses and that Mr. E. L. Slaughter from the ILA has some scheduling problems and would like to appear now and that you would be accompanied by Captain Rico, is that correct?

Mr. SLAUGHTER. Yes, sir.

STATEMENT OF E. L. SLAUGHTER, INTERNATIONAL VICE PRESIDENT, INTERNATIONAL LONGSHOREMEN'S ASSOCIATION, ACCOMPANIED BY CAPT. A. F. RICO, PRESIDENT, UPPER GREAT LAKES PILOTS, INC.; JAMES L. CHESTNUT, CHESTNUT, BROOKS & BURKARD, MINNEAPOLIS, MINN.; AND CAPT. R. W. O'BRIEN, CHAIRMAN

Mr. CHESTNUT. Mr. Chairman, I am Jack L. Chestnut, counsel for Upper Great Lakes Pilots, Inc.

We have coordinated the positions of several interested parties in the statement of Mr. Slaughter. Mr. Slaughter is immediately on my left. To his left is Capt. A. F. Rico who is president of Upper Great Lakes Pilots and to my right is Capt. R. W. O'Brien, who is chairman. In addition, a number of employees are here in the audience as well as other interested parties involved in the maritime industry in Duluth and Lake Superior.

Mr. Slaughter has a short statement from which he will read excerpts and very general comments. At this time I offer the statement of E. L. Slaughter for the record.

Mr. DE LA GARZA. Without objection, the full statement will appear in the record and then we will be very happy to hear from you at this time, Mr. Slaughter.

[The statement follows:]

STATEMENT OF E. L. SLAUGHTER ON BEHALF OF THE INTERNATIONAL LONGSHOREMEN'S ASSOCIATION

I am E. L. Slaughter, appearing on behalf of the International Longshoremen's Association of which I am International Vice President. I reside in Duluth, Minn. Also in attendance with me at this hearing is Captain A. F. Rico, President of Upper Great Lakes Pilots, Inc., who also subscribes to the positions set forth in this statement.

There are a number of matters that are of major concern to the organizations we represent, with respect to navigation and the handling of maritime commerce in the Great Lakes, particularly during winter seasons. The U.S. Coast Guard, the Corps of Engineers, industry and labor must all be prepared to improve our current operating system if we are to insure safety.

It has come to our attention that in recent years the Coast Guard has maintained a practice of removing navigational aids in November. Oftentimes this is 45 to 50 days before the closing of the navigational season for those vessels engaged in foreign commerce and many days before the closing of the system for those ships in interstate commerce. There have also been delays of as high as 30 days or more in properly installing navigational aids at the beginning of the

season. These aids are absolutely essential for operating the system in a safe and efficient manner. The Coast Guard must find methods by which to maintain these navigational aids during the entire season, regardless of the winter weather conditions. They are more important during these periods of potentially hazardous weather conditions than in periods of "blue bird" weather during the middle of the season.

Private industry has engaged in the hazardous practice of handling its lines by use of ship's crew. This is a dangerous and inefficient procedure during good weather. Private industry utilizing the Great Lakes navigational systems during winter navigation conditions must be required to use adequate shoreside personnel to handle the vessel's lines and to insure that docks, piers, and all maritime facilities are maintained in such a maner as to protect the ship's crew and dockside personnel. Line handling by ship's crew should not be permitted during the winter navigational season. It is dangerous to the life and limb of those involved.

In respect to those vessels engaged in foreign commerce which may be using the Great Lakes system during periods of winter navigation, the entire system should be "designated" within the meaning of the Pilotage Act of 1960.

In the area known as District No. 3, where necessary three pilots should be required to be on each ship in all areas. It is essential to have three pilots due to the inability to service these vessels with pilot boats during winter navigation conditions. It is imperative that a watch-standing pilot be on the bridge 24 hours a day to preserve the safety of these ships and the system. Designation of the entire system should commence on December 15 and end on April 15 of the following year.

Present search and rescue equipment maintained by the Coast Guard on the Great Lakes and in the Soo region is antiquated. New and substantially larger Coast Guard cutters are essential, not only to normal operations on the Great Lakes but would become critical to any attempts for an extended winter navigation season. In addition, communication service should be such that it would facilitate immediate search and rescue by helicopter. Facilities should be established at sufficient locations throughout the Great Lakes area to provide for 15 to 20 minute contact in the event of a disaster endangering human life. Additional attention should be paid to the area of lifesaving equipment and proper training of Coast Guard personnel to insure their paramedical ability to meet emergencies that will occur.

It is essential that both the Coast Guard and the Corps of Engineers be prepared to maintain all systems throughout the entire Great Lakes navigational area on a 24-hour basis. Currently we believe that a number of these operations are substantially reduced in the winter season. They cannot be reduced. They must be increased as the weather hazards increase.

Obviously the Coast Guard must have sufficient year round equipment and personnel available to maintain regular channels year round. However, we do not believe that these channels extend to the private slips or dock facilities maintained by industry. The ice free conditions of these facilities should be maintained to a safe standard established by the Coast Guard but at the expense and maintenance of industry.

We are concerned, obviously, with the economics of an extended winter navigation season and the possibility of new jobs that might be created. We are not in a position to comment at this time about the costs which must be borne by the Government in respect to maintaining the system during an extended winter period. We do understand that these costs will be explored at later hearings. There is one cost which we are discussing. The system cannot, should not, and will not be maintained at the cost of human life and limb, of ships' crews or shoreside personnel. That expense is too great.

Mr. OBERSTAR. If I may just extend a word of welcome to Mr. Slaughter and Captain Rico who are constitutents of mine. And Jack Chestnut is an old freind of all the pilots I know. It is a pleasure to have you, Buster, on the opposite side of the table, although we have always been on the same side of the issues that affect the people of our area.

Mr. SLAUGHTER. Thanks, Jim.

Gentlemen, I am E. L. Slaughter, appearing on behalf of the International Longshoremen's Association of which I am international vice president. I reside in Duluth, Minn.

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Thank you.

Mr. DE LA GARZA. Thank you very much, Mr. Slaughter.

Mr. SLAUGHTER. If I may, Mr. Chairman, I would just like to add a couple of comments that I think might be interesting.

I have been asked about year-round navigation. Actually, I look at safety aspects of the additional jobs. And I want to point out that we just have opened up a brand new facility at the head of the lakes. It is located over in Superior and it is known as Oretron. It is a new highly automated million dollar facility. When it is in full operation, the trains will shuttle from the west with 100-car trains carrying 100 tons per car, and that will be an around-the-clock operation. They claim, they think that this year, and it is not in full operation yet, that they are going to have between 8 and 9 million or 15 million tons of coal. Of that coal, 90 percent is going to be used by Detroit Edison.

We are shipping coal out of there now. There are surveys being made where there are other industries that are interested and they claim there will be at least two or three more of these facilities built and a lot depends upon the coal being shipped the year round, and year-round navigation.

One point I wanted to bring out, they also ask how can you load ships during the winter time? Well, there is nothing difficult doing that. We have loaded grain. We have unloaded grain. We have devised a system where we used to have to cut the ice with saws, 25 to 30 inches of blue ice. In our own way we devised a way where we can cut a ship out in a matter of hours, so these things can be done, and, of course, keeping the safety in mind all the time. I just wanted to bring this part out, that one little area up there alone could mean jobs, it could mean several hundred jobs alone just loading and handling coal from dock to ship, and I think that this is a forerunner and maybe we won't be around, some of us, to realize it, but I think they are going to pop up like topsy all over because they found something out there that they never had before.

Mr. DE LA GARZA. Thank you.

Mr. CHESTNUT. If we could beg the committee's indulgence, we have meetings that the pilots are conducting so we will not be able to stay for the remainder of the hearing.

Mr. DE LA GARZA. I will ask my colleagues if there are any questions; if not, we might excuse you because of your other commitments.

Mr. CHESTNUT. Thank you.

Mr. RUPPE. Just one question. Mr. Slaughter, you bring up that you desire as a part of any winter navigation program to have a Coast Guard capability of getting on scene in 15 or 20 minutes. I think that is important and it behooves all of us to follow up to determine once contact is made, if it is by fixed-wing aircraft, how rapidly a subsequent followup by helicopter can be accomplished, whether that helicopter is in a position to drop lifesaving equipment or to actually undertake the rescue mission itself, how quickly a surface vessel can get on station and what is the likelihood of survival of any individuals in the open water prior to the arrival on scene of a Coast Guard vessel. I think there are a number of questions to be answered, both in terms of how quickly can the Coast Guard get to the scene and what then can be the followup to any contact that might be developed within the very short time frame that you suggested here this morning.

As an example, there was a good question about the helicopters——

Mr. SLAUGHTER. I had an experience one time where we were trapped in an airplane and something happened where we could not put the gear down and it wasn't a very nice feeling, and they wired ahead or they called ahead, and we were met by helicopter from the Army and they couldn't get the gear down and it was supposed to land way off in left field someplace and they met us and we were no sooner on the ground and they were over us with ladders and asbestos suits and everything else. It was just absolutely amazing what they can do if it is planned out. It would depend on where they were calling from and how far they would have to travel. If they were spaced out where they could service us——

Mr. RUPPE. Yes, because in the case of the *Fitzgerald*, there is really a very good question whether if a helicopter had indeed gotten to the scene and there were crewmen alive, whether they could have effected a rescue mission because of the tremendous winds and the high seas at the point of the accident. I question the usefulness at least or the capability of available helicopters effecting a rescue, at the point and time of the sinking of the *Fitzgerald*.

Mr. SLAUGHTER. Well, I cannot talk too much on the *Fitzgerald*. People at the table were in the immediate scene.

You are right. I have often wondered. If they can do it in Vietnam and they went in and hauled out a lot of people in worse conditions than the *Fitzgerald*, and they did it and with safety, that should tell somebody something, that they have had that much experience. I don't know, this is up to the experts. A lot of people are talking this way.

Mr. DE LA GARZA. Mr. Oberstar?

Mr. OBERSTAR. Thank you, Mr. Chairman. I don't have any questions. I do want to commend Mr. Slaughter and his panel on the excellent statement that focuses in on people needs of this winter navigation season. I think you have rendered a great service to your constituents and to ours and to this cause of the winter navigation program by

focusing as perceptively as you have done on the needs which should be—additional technology that should be put in place by the Coast Guard and the responsibilities of industry as well as the Government. I think it is a great service and we appreciate having you here this morning.

Mr. SLAUGHTER. I would say this, Congressman Oberstar, that if there is any information that the committee desires, they can communicate with us and we will give them anything and everything we possibly can because we are very interested in this. When you put something together, it has to be put together in the right way. It cannot be haphazard. We have got a lot of bodies, but we have none to spare.

Mr. DE LA GARZA. Thank you very much, Mr. Slaughter, Mr. O'Brien, Captain Rico and Mr. Chestnut.

Our next witness.

You may proceed.

STATEMENT OF JOHN BLUITT, PORT AGENT, SEAFARERS INTERNATIONAL UNION, RIVER ROUGE, MICH.

Mr. BLUITT. Mr. Chairman and members of the subcommittee, my name is Jack Bluitt. I am the port agent for the Seafarers International Union in Detroit, Mich. The Seafarers International Union represents merchant seamen employed on American-flag vessels of all types engaged in our Nation's foreign and domestic trade, including approximately 2,500 seamen on vessels operating on the Great Lakes. As such, we are especially pleased to have this opportunity to present our views to the House Subcommittee on the Coast Guard on the operations and activities of the Coast Guard in this area, the Nation's fourth seacoast.

As you know, the U.S. Coast Guard has been given the congressional mandate to protect life and property at sea. In this regard, the Seafarers International Union supports the realistic development and expansion of such aids-to-navigation as LORAN-C and Vessel Traffic Systems. Both have proven successful in other regions and, through consultation between the Coast Guard and all segments of the maritime industry on the Great Lakes, they should prove equally helpful and successful in our region.

There is, however, one extremely important point which must be made, especially in light of past and present Coast Guard policies and practices. We firmly believe that the development and expansion of any aid-to-navigation system—LORAN–C, Vessel Traffic System, or any other—should not be considered as a substitute for trained and qualified shipboard personnel. Such systems should instead be developed to complement the experience and expertise of merchant seamen.

Mr. Chairman, the prime concern of the Seafarers International Union is and has always been the occupational safety and health of the merchant seamen working on board U.S. flag vessels. We strongly believe that the shipboard worker is not only the most important component of any successful shipping operation, but also the most valuable. Replacing a highly trained, skilled and experienced merchant seaman who is injured or killed in the course of his employment is far more costly in the long run than insuring that each worker is provided with a safe and healthful place of employment.

Unfortunately, it is becoming increasingly apparent that the Coast Guard, in the administration of its congressional mandate relative to merchant vessels and their personnel, is indifferent to occupational safety and health considerations on the Great Lakes as well as in other port areas.

All too often the Coast Guard acts unilaterally to eliminate job ratings and to reduce the number of crewmembers necessary for the safe and efficient operation and maintenance of vessels without first determining the impact of such decisions on the working conditions of the remaining crewmembers.

We have on numerous occasions, Mr. Chairman, expressed our willingness and desire to work with the Coast Guard to develop and implement regulations which protect worker safety and health. As the representative of workers directly exposed to the hazards inherent in shipping operations on the Great Lakes as well as on the inland waters and deep sea, we believe we can contribute the experience and expertise needed to promulgate meaningful and effective regulations.

Regrettably, the Coast Guard persists in its refusal to develop formal, regular, and objective procedures for consultation with the representatives of merchant seamen. Similarly, and of equal importance, the Coast Guard refuses to develop minimum manning standards applicable on a uniform basis to similar type vessels. Instead, the Coast Guard grants each of its districts autonomy to determine manning on a vessel-by-vessel basis within each port.

In other words, each Coast Guard district, on its own, without consultation with maritime labor, without review by Coast Guard headquarters in Washington, D.C., without consideration for occupational safety and health, sets a vessel's manning. As a result, we are confronted with instances in which similar class ships have crews which vary significantly in number and ratings, and with vessels with such reduced manning that crewmembers work overtime in excess of 100 percent.

One example which clearly demonstrates the Coast Guard's disregard for life and property is its decision to significantly reduce engineroom manning aboard three vessels owned by American Steamship Co. These vessels—MV *Sam Loud*, MV *C. E. Wilson*, and MV *Roger M. Kyes*—were originally granted manning certificates requiring four licensed and three unlicensed men in the engineroom. However, after only one full season of operation with this manning, the Coast Guard arbitrarily reduced the engineroom manning by eliminating entirely the three unlicensed oilers.

In the above-mentioned instance, Mr. Chairman, we believe the Coast Guard once again failed to consider vessel maintenance as well as vessel operation when it issued the new manning certificates. In fact, the Coast Guard's own Navigation and Vessel Inspection Circular No. 1–69, dated January 8, 1969, dealing with engine room manning, states that:

> Sufficient qualified personnel will be required to: (1) Operate and monitor the plant in event of control failure; (2) make emergency repairs in event of machinery casualties; and (3) perform daily or periodic operations, inspections, and maintenance to insure the continued quality of plant performance.

We believe the guidelines set forth in this circular requiring that sufficient personnel be on board to operate and maintain the plant are valid and absolutely essential to safe shipping operations. Simply

put, a vessel cannot be operated safely if the onboard equipment is not properly maintained. And, a reduced number of personnel, sufficient to operate a vessel under optimum conditions, will not be able to respond adequately to emergency situations or to normal shipboard maintenance requirements.

Mr. Chairman, the Seafarers International Union has a collective bargaining agreement with American Steamship Co. which requires three oilers on board these vessels. The action by the Coast Guard to arbitrarily reduce the manning certificates with no consultation with maritime labor representatives illustrates that agency's disregard for congressionally mandated Federal labor policy which declares it to be the policy of the United States to encourage collective bargaining. By rewriting and eliminating ratings at will; by failing to develop uniform, objective manning standards; and by failing to work with maritime labor representatives, the Coast Guard thwarts national policy in the name of automation.

Finally, with respect to search and rescue operations, the incident involving the *Fitzgerald*, a 729-foot ore carrier, serves as an example of the need for new, stringent regulations. The *Fitzgerald* sank suddenly on November 10, 1975, on Lake Superior during a storm. No distress call was given; no bodies or survivors were found.

Mr. Chairman, Coast Guard search and rescue operations proved meaningless in this situation because an ore ship such as the *Fitzgerald* will sink in approximately 5 minutes or less once it is broken up or ruptured in some way. This happens because ore ships are little more than one large shell—they have no watertight compartments and the self-unloaders have one continuous conveyor belt underneath the cargo holds. They are completely hollow with no watertight compartments.

We believe that these vessels should no longer be allowed to be built in this manner, posing an enormous risk to the lives of the crewmembers.

These, Mr. Chairman, are only a few of the areas indicative of the Coast Guard's failure to execute its responsibility to advance the occupational safety and health of merchant seamen on the Great Lakes and throughout the Nation.

The Seafarers International Union believes, Mr. Chairman, that this subcommittee should undertake an extensive investigation of these and other Coast Guard policies and practices as they affect the privately owned merchant marine so as to eliminate the threats to the health and safety of merchant seamen.

Again, thank you for the opportunity to express our views on this important area of mutual concern.

Mr. DE LA GARZA. Thank you very much, Mr. Bluitt, and we invite you to remain through the rest of the hearing and be available for questions.

I might interject, though, that this subcommittee has a program for hearings in September in Washington with the areas in which you address yourselves to and we invite you or your union to participate and it will be a public hearing with witnesses from the public sector.

Mr. BLUITT. Thank you, Mr. Chairman.

Mr. DE LA GARZA. I understand our next witness, Mr. Melvin Pelfrey, has been detained because of flight problems, but that Mr. Daniel L. Smith will appear in his behalf.

STATEMENT OF DANIEL L. SMITH, DISTRICT NO. 2, MARINE ENGINEERS BENEFICIAL ASSOCIATION—ASSOCIATED MARITIME OFFICERS, AFL–CIO, TOLEDO, OHIO

Mr. SMITH. Mr. Chairman, honorable members of the subcommittee, honored guests: My name is Daniel L. Smith. I am a representative of District No. 2, Marine Engineers Beneficial Association-Associated Maritime Officers, AFL–CIO, 967 Summit Street, Toledo, Ohio, 43604. District 6, MEBA–AMO is a labor organization that represents licensed officers employed aboard American-flag vessels.

I'd like to thank the Chairman and the members of the subcommittee for inviting me here to offer my views on the U.S. Coast Guard's operations on the Great Lakes. I will confine my remarks today to the topic of crew safety, which we believe is the Coast Guard's most important jurisdictional area. Crew safety has become Great Lakes maritime labor's major concern in the wake of the sinking last November 10 of the ore carrier *Edmund Fitzgerald.*

We who represent Great Lakes maritime officers felt, like everyone else, a deep shock when the *Fitzgerald* went down in the steel-blue waters of Lake Superior. We felt as though the impossible had happened; the *Fitzgerald,* after all, had been considered by those who sailed her to be one of the finest and safest vessels in service on the lakes. By lakes standards, she was a new ship, a grand lady, the flagship of the Columbia Transportation Fleet. Yet 29 men were lost—29 good men, who had loved their work and who had performed it well.

And we are reminded of the 1958 sinking of the SS *Carl D. Bradley* in Lake Michigan and the 1966 sinking of the *Daniel J. Morrell* in Lake Huron. Both ships went down under circumstances similar to those that brought the *Fitzgerald* to her violent end.

The parallels between the three disasters are shocking: Each vessel went down in the open waters of the Great Lakes; each vessel sank within minutes of being stricken; and the hull of each vessel was found broken. Of the total complement of crewmen, only three survived, and under circumstances that can only be called "miraculous."

The Coast Guard's investigation of the *Bradley* sinking droned on interminably but failed to answer many questions to our satisfaction. The investigation of the *Morrell* disaster concluded that the vessel broke in half because of a structural failure in the hull girder amidships.

But nothing was done to improve the overall structural integrity of Great Lakes vessels following the *Bradley* and *Morrell* sinkings, and there is a feeling in the industry that we are heading down the same inconclusive, uninformative, bang-your-head-against-the-wall path with the inquiry.

The frightening thing about the loss of the *Fitzgerald* and her crew is the great speed with which the vessel went under. The men aboard apparently had no time to don lifejackets or launch lifeboats. We know the *Fitzgerald* was taking on water; the cargo holds must have flooded almost immediately because the *Fitzgerald*—no exception to the Great Lakes rule—was not equipped with watertight bulkheads between cargo compartments. The ship was lost within minutes after she was stricken.

Contrast this with the story of the SS *Maumee*, an ocean-going tanker that struck an iceberg at the South Pole recently. The collision tore a hole in the ship's bow large enough to drive a truck through, yet the *Maumee* was able to travel halfway around the world to the repair yard, without difficulty, because she was fitted with watertight bulkheads.

It's amazing—a stricken ocean tanker, with her bow nearly torn off, can travel halfway around the world for repairs, and one of our best Great Lakes freighters taking on water could not make it 55 miles to the safety of Whitefish Point.

It is my opinion that watertight bulkheads, which are required on all ocean-going vessels, have never been required on Great Lakes vessels because most of the people in Washington who write the laws are under the mistaken impression that the Great Lakes are really not much more than knee-deep ponds. Gentlemen, here is a 769-foot ship lying in the mud under 600 feet of water in the "knee-deep pond" we call Lake Superior.

Watertight bulkheads should be required on all Great Lakes vessels. Great Lakes shippers claim that such bulkheads would cut down on loading and unloading times, cut into valuable cargo space, and curtail the efficiency of their operations. But it's time we decided that men will come before cargo. Human life must take precedence over machinery. If shipping must be slowed down somewhat, then so be it. Let's stop saving money to make more money. Let's stop cutting corners at the expense of the men who move these ships. And it's time for you, the Congress, to pay as much attention to human overhead as you have to economic efficiency.

And the Coast Guard must revise its existing safety regulations to take into account the proven fact that stricken Great Lakes vessels have the demonstrated capability of sinking rapidly. The agency must require that each man aboard each vessel be issued a quick-donning, cold-resistant survival suit of the type that I have argued for for at least 5 years.

The dramatic words of Great Lakes historian William Ratigan writing about the *Bradley* sinking, speak forcefully for survival suits:

> Could anything live, unprotected, out there in that berserk water? It seemed incredible that men might be clinging to life out there, tossed and tumbled in the crashing blackness, struggling in a 36-degree water with the air temperature fallen to the twenties, feeling the ice form in their hair, fighting sleep and nightmare thoughts, praying for strength to keep their heads above the suffocating seas, steeling themselves with the will to live for just one hour, and then another, until dawn.

Assuming the 29 men aboard the *Fitzgerald* might've had time to escape the doomed vessel, I doubt they would have survived without such suits. The waves and the wind were strong enough to capsize any liferaft or boat that might have been launched, and the water itself was at a temperature that surely would have brought on hypothermia and death within minutes.

As I've said, district 2, MEBA-AMO has continually urged the Coast Guard to require these suits aboard Great Lakes ships, particularly since the idea of extending the navigation season on the lakes grew beyond the drawingboard stage. But 5 years into the winter navigation demonstration program, the suits still do not exist on these ships.

We want to go on record here as being supportive of extending the navigation season through the winter, because continued season extension would be a portent of continued prosperity in the industries providing maritime jobs on the Great Lakes. But we are opposed to extending the season at great risk to human life.

And a storm situation on the Great Lakes can make launching a lifeboat impossible. Accordingly, the Coast Guard must require that Great Lakes vessels be equipped with self-launching Brucker-type survival capsules, which offer warmth and protection from icy sprays, waves, and high winds.

Another area we are concerned with is the Coast Guard's cargo load limitations for Great Lakes vessels. In 1969, the Coast Guard gave a number of Great Lakes ships additional feet of draft. Draft refers to the distance a loaded vessel drops into the water, measured from the keel of the boat to the water line. Further draft increases have been made since then. Vessels are sitting deeper and deeper in the water.

Additional draft allows freighters to carry tons of extra cargo—more cargo than the vessel was originally designed to haul. This increased cargo must surely put tons of additional stress on the vessel's hull. It also results in considerably less freeboard for each affected vessel.

We question the Coast Guard's wisdom in permitting the changing load-line limitations. How do the new limits affect a vessel's stability? Do they lessen a ship's ability to withstand stress and survive a storm? Do they make it more difficult to navigate and maneuver in a storm? We want an independent agency to review the Coast Guard's altered load limits. We want that agency to answer our questions and the questions of our membership.

And we cannot forget the families of those seamen who are lost in disasters like the ones we've experienced on the Great Lakes. It is of the utmost urgency that Federal legislations setting company liability limits be amended or repealed because it encourages the industry to ignore the safety of vessel crew members.

The law permits the owner of a sunken vessel to limit its economic responsibility to the survivors of the crew to an amount that is sadly below any humanitarian or civilized standard.

It is the vessel owner, not the crew, that determines the seaworthiness of a vessel. It is the vessel owner who is responsible for the ship's movements. And we deeply resent present Federal legislation which shifts the awful economic burden of a seagoing catastrophe to those persons least able to afford it—the seamen and their families.

The companies can afford this economic burden; they can distribute the expense throughout the industry as a cost of doing business.

The present liability limits do nothing to encourage vessel owners to seek higher safety standards for their ships. Insofar as it affects the crew of the vessel, the law of liability must be repealed or, at the very least, the limit of $60 per deadweight ton—established in 1936—must be increased to a figure commensurate with 1976.

There are other recommendations that we have made of the Coast Guard, and which we will make to you, the people with the power to change existing laws and rules and regulations.

(1) Stress meters should be installed on all Great Lakes ships that do not have them, so that the man in the pilothouse can monitor stress at critical hull points;

(2) Depth and King gages should be installed on those vessels that do not have them, so that officers can know how deep their vessel sits in the water and if the ship is taking on water;

(3) Existing navigational aids should be improved upon;

(4) Methods of keeping ice from forming on deck and topside equipment should be developed;

(5) A "large craft" advisory system should be instituted;

(6) Navigation during the treacherous month of November, which presents unusual hazards because of the weather changes that occur during that month, should be regulated by the Coast Guard; and

(7) All officers and seamen should be carefully educated in abandon ship techniques.

Let's not let the memory of the SS *Edmund Fitzgerald* and the 29 men abroad her fade into history, as did the memories of the *Bradley* and the *Morrell*, without some positive action taken to prevent disasters and minimize human loss in the future.

There's no question that shipwrecks will continue to happen. But the great loss of life that accompanies shipwrecks on the lakes need not take place.

It's time for you and the Coast Guard to stop bowing to company pressure that the safety measures we've called for would cut down on the efficiency of a vessel and its cargo-handling capabilities.

The real issue here is money. The vessel operators naturally will not spend the money to implement real safety measures unless they are forced by law to do so.

Economic scare tactics must not cloud our judgment when it comes to protecting the lives and well-being of the men who give their best to keep the American merchant fleet moving on the Great Lakes.

After the *Fitzgerald* went down, everyone joined in praising the bravery of the lakes sailor. But bravery is not enough to keep a man alive and in one piece.

We've had enough of these frustrating investigations. Now it's time for action.

I thank you for your attention.

Mr. DE LA GARZA. Thank you very much, Mr. Smith. Our next witness is Mr. Lucci. Mr. Stephen Nolawski, and Mr. Bush will accompany you, and Mr. Armstrong, too.

STATEMENT OF STEPHEN NOLAWSKI, GREAT LAKES SEAMEN'S LOCAL 5000, UNITED STEEL WORKERS OF AMERICA, CLEVELAND, OHIO, ACCOMPANIED BY CAROL ARMSTRONG, DISTRICT NO. 4, AND THOMAS BUSH, DISTRICT NO. 33

Mr. NOLAWSKI. We are staff people with the United Steel Workers of America. Mr. Armstrong and myself out of District 4, Mr. Bush out of District 33.

Mr. DE LA GARZA. Will you kindly identify them by first name?

Mr. NOLAWSKI. Mr. Carol Armstrong, staff, U.S. Steel Workers of America, District 4, myself, Stephen Nolawski, staff, District No. 4, Mr. Tom Bush, District 33.

Mr. DE LA GARZA. Thank you very much. We will be happy to hear from you.

Mr. NOLAWSKI. Well, I have a short presentation. I sat here and listened and I agreed with a lot of papers prior to my coming here. Mine is short.

I issue this statement on behalf of the Steel Workers of America and on behalf of the Great Lakes Seamen, Local 5000, who lost two vessels within the last 2 years, namely, the *Morrell* and just lately, the *Fitzgerald.*

As a union speaking for unlicensed seamen employed in transportation of raw materials on the Great Lakes, the United Steelworkers of America recognizes the realities of this industry. Like all others within our economic system, it is a profit-making venture. Rightly so, its continued profitable operation means employment producing a decent living for our members and their families.

That the different operators compete with each other for the profits to be realized is likewise a basic rule of the system.

With all of this we have no quarrel, nor should we. Our members are among those who benefit from the workings of this industry.

That the master of a vessel has full authority and final discretion in the navigation of vessels has been accepted by consensus as necessary as long as humans have traveled over the water. This we accept. But when the operation of vessels and the judgment of their masters are influenced by considerations of profit, prestige and competitive advantage to the point of endangering and even sacrificing the very lives of our people, we object. We protest in the strongest possible terms. We demand constructive measures to end this roulette game with seamen's lives. To get down to concrete terms, what do we mean by endangering crew members' lives in pursuit of profits? This is what we mean.

In shipowners' accounting offices, as in shipowners' dispatching offices, the watch word is "Time is Money." The faster the load, the faster the transit, the quicker the turnaround, the greater the profit. Delays for whatever reason, are translated into red figures in ledgers. The master who runs his vessel through a heavy storm to arrive on schedule generates profits. The master who goes to anchor in lea of land does not.

Masters competing within a fleet for the more desirable vessel assignments have reason to believe that their chances are enhanced by a reputation as "a real money maker, not afraid to go out in anything." The results of this mental set are vividly shown by separate episodes on November 10, 1975, as gathered from union shipboard reports.

November 10, 1975, the Str. Armco arrived Silver Bay approximately 10 a.m. Coming up Lake Superior the ship was so battered in rough seas that the couch in the Chief Engineer's room broke loose. Oil barrels tore loose and rolled around in the Engine Room. The Armco loaded and departed safe waters going back out into the Lake Superior Gale for more battering.

November 10, the Strs. Cort and Beeghly left Taconite Harbor approximately 9 p.m., going out into the same Lake Superior storm which claimed the Str. Fitzgerald less than two hours earlier.

On the night of November 10, the Str. Midletown was in the St. Mary's River downbound. Instead of anchoring in safe waters, the master took this ship out into the battering waves of a Lake Huron Gale. Everything on deck was washed off—the deck lights, deck safety blocks, even the aluminum ladder had the squares that hold the rungs torn loose.

November 10—Lake Erie. Per the crew the Str. G. A. Tomlinson was at the dock in Fairport. After unloading it took approximately 1½ hours to wend around. The By-pass on the engine had to be opened up to get enough power to make the turn in the face of the wind. Tremendous seas were pouring over the breakwall. Instead of tying up and laying alongside the dock in sheltered waters, the Captain took the ship out into the Lake Erie Storm. Out on the lake he could not head the vessel for Detroit. Turning in battering seas, he finally got the ship to shelter behind an island. With the anchor down the ship would not hold due to the wind and seas. So the engine had to be run at full speed to maintain position. At the height of the storm, some of the crew members put on their life jackets. Upon seeing this, one of the mates informed them if he were the Skipper, he would fire every goddamn one of them—excuse the English.

It should be obvious that the judgment of these masters was unduly influenced by a compulsion to competitive performance beyond prudence and ordinary good sense, thereby damaging equipment and placing vessels and crews, themselves included, in extraordinary peril.

We will never know whether the decisions of the late master of the *Fitzgerald* were influenced by his awareness that the Str. *Anderson*, a comparable vessel of a competing operator, was making headway through the disastrous storm of November 10, 1975. The records and testimony introduced in the investigation of that disaster raise an inescapable surmise that such a consideration did enter into the event, with tragic results.

The urge to excel and the urge to compete, which can be assets in normal conditions, can, in other circumstances, imperil life itself.

To eliminate this kind of hazard in future operations, the United Steelworkers of America recommends, as it has on prior occasions, what it has tentatively named an "All Craft Warning"—the issuance by the Coast Guard in collaboration with the National Weather Service of a general warning for all craft and vessels of whatever size, to seek or remain in shelter, or safe harbor.

We will not at this time attempt to recommend specific levels of gales or seas, or exact weather patterns which should activate such a warning. We would only urge that the specifications be realistically set with reference to what they should accomplish.

Such a warning would in effect declare "a whole new ball game," officially sanctioned and recognized by the entire industry, when such is warranted by dangerous weather.

It would have the effect of saying to the masters of all vessels in the waters involved, "Now your first and only concern is the lives of your men and the safety of your vessels. Your usual concerns over profitable operation and competitive position must be temporarily suspended."

Clear guidelines would thus be set for the exercise of the master's discretion.

Adoption and use of an "All Craft Warning" would benefit the steelworkers sailing members first and foremost by saving their lives. By reducing the hazards to vessels and equipment, it would benefit the entire industry in which they earn their living.

We urge that the Coast Guard and other appropriate agencies devise and implement such a warning policy prior to the next fall storm season. This will be one appreciable step toward making the *Fitzgerald* disaster the last of its kind on the lakes.

Mr. DE LA GARZA. We thank you very much, Mr. Nolawski, we appreciate your being here.

We invite you to stay for the remainder of the witnesses.

Mr. NOLAWSKI. I might add one more comment before I leave.

Mr. DE LA GARZA. Yes, sir.

Mr. NOLAWSKI. I notice that there are some people, due to their lack of experience here on the lakes, that cannot realize some of the statements that were made around here. I have sailed for the 35 or 40 years, both salt water and on the Great Lakes, both in wartime and in peacetime, and the difference only is because of the smallness of the lakes. Our seamen are as good, our officers are as good, I think our vessels are as good, but where a master in a storm at sea can alter his course to ride out a storm and possibly alter his course for 2 or 3 days, outside of losing a little time he didn't do anything. Here if you alter your course in order to weather the storm, you are either beaching it in Canada or the United States. It is a terrific situation and this is why we believe the conditions of the sea being in the right condition, all vessels have to be asked to get off the lake.

Thank you very much, sir.

Mr. DE LA GARZA. Thank you very much, sir.

The next witness is Mr. Peter J. Benzoni.

Mr. BUSH. Mr. Chairman, Mr. Benzoni is unable to be here today.

Mr. DE LA GARZA. All right, sir, we will inform Mr. Lucci and Mr. Benzoni of the availability of the record, Counsel, in order that their statements might be incorporated.

Mr. AMATUZIO. Likewise with him.

Mr. DANIEL REED. Is Mr. Reed here?

STATEMENT OF DANIEL REED, WHITEFISH BAY TOWNSHIP SHORELINE OWNERS ASSOCIATION, PARADISE, MICH.

Mr. REED. Yes.

Mr. DE LA GARZA. We have come down to you now, sir. Are you and Mr. Hutton together?

Mr. REED. Mr. Hutton would be with me if he were here. He was unable to come. He notified me last night. He concurs in the statement that I will make and also would have added a few comments of his own because of his personal knowledge. He has sailed on the lakes, himself. He now has two sons sailing and he would have concurred in some of the remarks made by the last speaker in regard to ship usage during severe weather.

Mr. DE LA GARZA. Well, you might inform him, sir, that the committee will welcome in writing any recommendations he might like to make.

Mr. REED. I will be glad to do so, Mr. Chairman.

Mr. DE LA GARZA. And we will be very happy to hear from you now.

Mr. REED. I received the invitation to appear only Tuesday, and my home is in Paradise and Paradise does not have a duplicating machine available, so I have only two copies to leave with you. You have more equipment in Washington than we have in Paradise. That is partly what makes it "paradise." [Laughter.]

Mr. DE LA GARZA. We apologize for the delay in getting the invitation to you and we can understand your problems with making copies. We will take care of that, sir.

Mr. REED. Thank you, Mr. Chairman.

I am Daniel Reed, a resident of Paradise, Mich. My home is on the shore of Whitefish Bay of Lake Superior, about 10 miles south of the Whitefish Point light which has been referred to several times. It is the oldest active light on Lake Superior and actually what I will submit to you in writing is more or less a summary of what I would say. I hope the points are clear in the statement.

The Whitefish Point light and foghorn with radio beacon are important to commercial navigation, but also to the fishing fleet and to an increasing number of small craft which are operating in Lake Superior.

The light marks a course change in navigation and the area is one of the true "graveyards" of ships on the Great Lakes. This goes back many years, but it is still a hazardous area. A harbor of refuge is located about a mile south of the Point and the light on Whitefish Bay. The station is presently operated by remote control from Sault Ste. Marie which is a road distance of approximately 75 miles. Servicing of that station depends on the Sault Ste. Marie area.

In this whole situation, apparently dependability is the name of the game and there is a need for manning the station for dependable operation, to render service also which is not now available such as observation of accidents, disasters and potential disasters and rendering such service as possible and calling for appropriate assistance. No residences are located within miles of the Whitefish Point light on the Lake Superior shore.

Just within the past 2 weeks two of our men, one of whom is a fisherman up there, Gustafson Brothers did observe a sailboat tipped over on the lake, it was drifting away from the shore, three people involved. They were the only ones apparently that observed it. They finally were able to launch their boat because of a problem at the launching site, but they got out and saved the people and then went back out and brought in the boat. This is a potential minor disaster in terms of the number of people involved, perhaps, but it is the sort of thing that is increasingly happening as we are encouraging additional small boat travel in the area.

On November 10 of 1975, which has been referred to as the date of the *Fitzgerald* sinking, both the light and the foghorn were not operating. As far as I know, the radio beacon was dead.

Whether or not this had anything to do with the *Fitzgerald's* problems is certainly questionable, but it is significant that the master of the *Fitzgerald* asked a ship that was lying in Whitefish Bay whether of not the light was working. It was not. It did not work the rest of the night. It did not come on automatically as it should and the next morning our telephone serviceman in the area, in checking the lines to see what was wrong, to see if it was anything connected with the telephone lines, found that the machinery was not operating and at the request of somebody here in the Soo station jiggled the relay, I suppose, and set it in operation, but regardless of the sophistication of some of the equipment that has been discussed and described here this morning, there still is not real substitute in the final analysis for the human touch.

The unmanned automatic equipment failed at the very time when it could have been useful. All the rest of the year it operates.

Right when you needed it, it didn't.

There is also the need in this area, by the way, for the physical presence for someone in authority, both for the protection of the Government property in that area, and also for the protection of people who are far from any police protection and yet that is an area which attracts many people because it is a very significant agate hunting area and thousands of people a year are up there, and yet there is nobody up there of any authority to be of any assistance to people who may be there.

However, there are two good houses there, now closed and boarded up, which are attached to or very closely adjacent to the light. These homes, we believe, should be housing two families, probably under contract, with housing, utilities and a modest sum as an annual stipend furnished, to provide the dependable servicing that these installation require.

This would also provide the official presence that I mentioned in the area and would give other service in terms of health problems that might occur where many people gather and some kind of contact with the outside world. Telephone, electricity, snow-plowed roads and schoolbus service are available to service families that might be placed there. Manning this operation would permit the elimination of a disturbing nuisance in the area. At present, the light and foghorn operate year around, night and day.

The foghorn blasts every 30 seconds and the decibel count is very high. I realize that a foghorn would not have been much help to the *Fitzgerald*, but it is kind of an odd thing, isn't it, that that blast, every 30 seconds, was not working during the storm. We had a dedication ceremony for a historical marker 2 years ago there. Captain Bloxsom, who headed the Coast Guard at the Soo at that time was very embarrassed. He was very embarrassed that he had to stop every 30 seconds until the foghorn ceased. It is kind of an odd thing, too. I serve on the Michigan Environmental Review Board which reviews the environmental impact statements covering highways, structures for housing elderly people—many things, and one of the items we constantly concern ourselves with is the decibel level of noise that may be around. Believe me, the decibel level of noise interference, noise pollution at Whitefish Point is very high and it makes no sense. It puts government in a ridiculous light to be operating that sort of situation year round every 30 seconds, when at other points we make a big effort to try to reduce and suppress noise pollution.

The light and the total installation at Whitefish Point needs protection from the severe erosion which is now being caused by the continued high water levels which results from the storing of extra water on Lake Superior in order to reduce the levels on the lower lakes.

Last fall in the same storm that sank the *Fitzgerald*, primarily in that storm, although some other storms may have contributed, approximately one-half of the distance between the water and the lighthouse installation was destroyed, leaving now only about 150 feet separating that installation from the sea. Groins which were put in there many years ago and which were footed back into the shore only last summer, now are standing out in the lake, the inner end some 75 to 100 feet in the water and, as you know, a groin, when it has been undercut at the back end, is more damaging than it is good.

Something ought to be done at that point soon, or the installation will be lost.

I had occasion to talk with a U.S. Steel captain about 3 or 4 weeks ago and I won't divulge his name because I did not tell him I was interested in knowing what he thought about it for reasons other than just curiosity, but after some discussion, he said that the foghorn at Whitefish Point isn't really very much of a factor to us now, but he said, "Don't let them take the light away." That was his observation.

I am president of the Whitefish Bay Shore Erosion Association, an organization of about 150 families who own shore properties, homes, and cottages along the shore and who are suffering and have suffered considerable damage from the artificially high water levels. We have as yet received little recognition and no relief from what we believe to be an unfair situation foisted upon us and the Government now is facing that same situation in connection with this installation.

Thank you very much, Mr. Chairman, it is very good to be able to present this to you and I will stay for questions.

Mr. DE LA GARZA. Thank you very much. We appreciate your cooperation, and we invite you to remain right there. Is there any person that is not on the scheduled list of witnesses that might wish to appear with any testimony?

Our official reporter has been working hard and we will allow her about 5 minutes.

The committee will stand recessed for 5 minutes, and then we will invite everyone who has testified with the exception of the admiral who has already been questioned, to come forward and be available for questions.

We will take a 5-minute recess.

[Recess.]

Mr. DE LA GARZA. The subcommittee will be in order.

We will invite all the witnesses to be at the witness table. You may bring enough chairs if there are not enough.

Thank you very much. We appreciate your cooperation, those of you that have stayed to be available for questions which we hope that we might expedite here in order that we might continue with our oversight of the area.

Mr. Oberstar?

Mr. OBERSTAR. Thank you, Mr. Chairman. I will try to set an example of being brief.

Admiral Trimble, in your judgment, will the new equipment for heavy weather capability which Admiral Gracey cited be adequate to respond to the emergency situations that we have heard described this morning?

Admiral TRIMBLE. I am satisfied that they will, Mr. Oberstar.

Mr. OBERSTAR. Is this something that ought to be more heavily focused upon during the future winter navigation demonstration program?

Admiral TRIMBLE. No, sir, I don't believe that that is indicated. I think that the oversight that this committee is giving to it in the authorization hearings of the Coast Guard and hearings such as this will be adequate in the situation because I think this is a Coast Guard

responsibility rather than a winter navigational board general responsibility.

Mr. OBERSTAR. Mr. Edwards, how far off, in your judgment, is the mini-loran system from being an operational system and how much more of an investment would we need in this winter navigation demonstration program to further that purpose?

Mr. EDWARDS. That is a difficult one for me to handle. The equipment—I specialize in shipboard equipment and that is going on in parallel with verifying the ability of the change to meet the year-round requirements.

I would speculate that in the order of a year or so depending upon the definition of operational—how many boats will they have? As far as the cost, I'm afraid I cannot address myself to that. That is being handled by the Coast Guard.

Mr. OBERSTAR. Thank you.

Mr. Smith, you had a very comprehensive statement that I greatly appreciate having. It will be very helpful to the committee and for the Public Works and Transportation Committee on which I also serve and which has authorized the winter navigation demonstration program, and I will make your testimony available to my colleagues on that committee as well.

Mr. SMITH. I appreciate that, sir.

Mr. DE LA GARZA. That is Mr. Pelfry's statement.

Mr. OBERSTAR. Yes. You suggested having watertight bulkheads and also pointed out that the industry felt that these would cut down on their loading and offloading time. But don't we have experience with the same type of thing on ocean vessels? Are they that different from lakers?

Mr. SMITH. They are, in the basic type of cargo they carry, yes. The Great Lakes vessels are mostly bulk carriers.

Mr. OBERSTAR. We see them leaving every day from the port of Duluth.

Mr. SMITH. That is right, if you are talking about grain vessel converted to tanker use, carrying liquid to bulk—in light of that, yes, there are comparable types of cargo being carried.

Mr. OBERSTAR. Are there no bulkheads at all on the taconite and other ore carriers?

Mr. SMITH. There are bulkheads, but they are not watertight. A Great Lakes vessel does not possess any watertight integrity in its cargo spaces which is the major portion of the vessel.

Mr. OBERSTAR. Have you studied the problem enough to know whether that could be done by Coast Guard regulation or whether new Federal legislation is needed?

Mr. SMITH. Well, we view the Coast Guard as the enforcers of the Federal legislation. We would assume that it would have come down from a Federal level to provide for the construction of watertight bulkheads in the Great Lakes vessel.

Mr. OBERSTAR. Well, that is something that we will have to determine, whether it needs new legislation or whether it can be done by Coast Guard regulation. I will address that question to the Coast Guard later.

Mr. SMITH. Thank you.

Mr. OBERSTAR. Mr. Nolawski, again a very helpful statement. It is obviously based on extensive experience that you have gained both on salt water and fresh water. You suggested that there ought to be a system by which all vessels could be ordered off the lakes at the time of severe water. How could you reconcile that statement with the almost unchallenged authority of the ship captain to command his vessel, and can that be done by regulation of the Coast Guard or is legislation needed to do that?

Mr. NOLAWSKI. Well, I haven't investigated that thoroughly, but I am informed that the Coast Guard does have that authority now, but this industry such as it is, there are many, many pressures and they always use an excuse that we are infringing on the judgment of the master. We don't want to infringe on the judgment of the master. We say the industry itself infringes on his good judgment because he has got to compete for his job, he has got to compete for his wages to actually stay out on the lakes and we are asking for a door to be opened for him, that he can use his good judgment and not get into trouble.

To give an example, the *Fitzgerald* was the second vessel we lost in 10 years. The *Morrell* was the one we lost 8 years prior to that. The *Morrell* was in anchor in the Huron River. It wasn't going out. Here comes the steamer *Townsend*, same company, but there is a gung ho skipper on it, he is going out. This is a bad reflection on the man on the hook. He picks up and follows. Yes, the *Townsend* got battered, yes, it had to be scrapped after that, but who lost the crew and vessel? The *Morrell*. This is what we are trying to get away from. We've got to give some of these masters the right to use their judgment without getting themselves in trouble with their employers. This is what we are looking for. I do believe the Weather Bureau can and did predict to the *Fitzgerald* with plenty hours to spare, the severity of it, but the industry, such as it is, is gung ho-go. Time is money and this is what is involved.

Mr. OBERSTAR. Is there any information or will we ever be able to obtain information indicating whether the captain, the skipper of the *Fitzgerald*, actually knew the severity of the conditions at the time he sailed right into it?

Mr. NOLAWSKI. I think he knew because Captain Cooper, the skipper of the *Anderson*, which was just a couple of hours behind him, and he testified in the hearings in Cleveland that he plotted the whole storm and he predicted 80-mile-an-hour winds and when *Fitzgerald* lost its radar equipment and a lot of other things, he was giving them instructions from his vessel, so I knew they knew the severity of that storm.

Mr. OBERSTAR. So you are saying in addition to the modern technological devices that have been developed as aids to navigation, plotting the weather, determining its intensity and charting its course, in addition to that, there is a judgment factor that in some way must be subject to Federal regulation?

Mr. NOLAWSKI. I don't quite——

Mr. OBERSTAR. What I am saying, your testimony indicates that even if we give the skipper all the information he needs with radar and satellites, weather and navigation, he still has to make a judgment. He has to get that cargo through. You are saying somewhere there ought to be a check on rash judgment?

Mr. NOLAWSKI. Due to the makeup of the lakes, like I mentioned before in my testimony, we have storms just as severe and more severe out in the ocean, but because of the size of the ocean, you cannot alter your course. I have been on vessels where you altered your course for practically a week to ride out a storm and maybe we lost a couple of days from where you are supposed to be. Here, you cannot do that, so if you use your judgment and you are wrong, you are in trouble, and if your judgment is influenced by the people you work for and the competition around you, against your better judgment, you do things—what I am trying to stress, maybe I am using bad language, is that we have got to get these skippers off the hook because there are many, many good skippers, there are. Some are more gung-ho than others. I say that our people out there are just as capable as anyone anywhere else, but the competition they are involved with and seeing another man in your own fleet go out and he stays there, he has got to follow because a black eye is developing. I am looking for something that the weather conditions are so severe that the Coast Guard issues an all-craft warning, that you shouldn't be out there, then at least the man who stays on the hook cannot be ostracized too badly because he was told he shouldn't be out there.

Mr. OBERSTAR. Thank you very much, Mr. Chairman.

Mr. DE LA GARZA. Mr. Nolawski, talking to the Coast Guard, what you would like to have is the Coast Guard formulate a plan similar to what they now have for small craft warning that at a designated wind velocity or turbulence intensity of such a nature, they issue a general warning unsafe for craft?

Mr. NOLAWSKI. And direction, because the direction of the wind and the direction of the sea—if it is lengthwise of the lake, it doesn't hurt anything, but if it is at such an angle that you are going to have to buck the storm and buck the wind, you should not be out there.

Mr. DE LA GARZA. And once issuing that, then of course it is still up to the individual master.

Mr. NOLAWSKI. Yes, it would be up to the master, but at least the one who used his judgment couldn't be ostracized because the Coast Guard said it wasn't weather to be out in. He used his good judgment and stayed in. He could use his vessel a little different to the other fellow, but it gives him something more than just the competition; I have to go out because he is going out, which affects his good judgment.

Mr. DE LA GARZA. Thank you.

Mr. Ruppe?

Mr. RUPPE. Thank you, Mr. Chairman. I have a letter from Mr. John Hoeft of the Waldorf Corp. of my district. May I have unanimous consent to make this letter, which is in effect a statement, part of the record?

Mr. DE LA GARZA. Without objection, it will be incorporated.

[The letter follows:]

HOERNER WALDORF CORP.,
Ontonagon, Mich., February 16, 1976.

Hon. PHILIP E. RUPPE,
House of Representatives,
509 Cannon Office Building, Washington, D.C.

DEAR PHIL: Thanks very much for sending me the 1976 calendar. I appreciate this as well as your note soliciting further ideas.

I have been following with interest your current inquiry into the adequacies of the Coast Guard, especially with reference to the sinking of the Fitzgerald. While this is showing up certain deficiencies regarding the search and rescue capabilities for commercial vessels, I believe if you would look into it further, you would find greater discrepancies as regards pleasure boaters. The Coast Guard's current dependency on the volunteer efforts of Coast Guard auxiliary amounts to almost complete abdication of their responsibilities for search and rescue on pleasure boaters. At present instead of the Auxiliary helping the Coast Guard, it has approached the point of the Coast Guard helping the Auxiliary. The Coast Guard, in order to fulfill its obligations certainly needs more staffing and equipment.

I have also been watching their activities regarding all winter shipping. It seems that a tremendous amount of energy, attention, and money is being expended to promote all weather shipping. As you have pointed out, this is at considerable discomfort and inconvenience to others, such as those on Sugar Island. This is an expenditure of taxpayer money for the benefit of a few shipping companies and the money could be better spent for the benefit of the Coast Guard in their traditional search and rescue efforts.

Sincerely,

JOHN E. HOEFT.

Mr. RUPPE. Mr. Chairman, I also have one additional article entitled "Inland Seas." It is an article in retrospect by Dr. Wolf addressing the *Fitzgerald* sinking and perhaps with unanimous consent, I could make that a part of the record as well.

Mr. DE LA GARZA. Without objection, it will be incorporated in the record.

[The article follows:]

[From the Inland Seas, Quarterly Journal of the Great Lakes Historical Society,, Summer, 1976]

IN RETROSPECT

(By Dr. Julius F. Wolff, Jr.)

"Regarding your interesting story of Lake Superior shipwrecks, in the Spring 1976 issue of INLAND SEAS, may I question your statement that the *Fitzgerald* and several other major ships unsuspectingly sailed into the weather monster. Unheedingly, very likely, but not unsuspectingly.

"Gale warnings were posted for Lake Superior at 9 P.M., e.s.t., November 9th, and these were upgraded to storm warnings at 4 A.M., November 10th. At the latter time I would place the *Edmund Fitzgerald* very near Keweenaw Point, affording good shelter from N. and NW. winds. The frequency and diversity of weather warning broadcasts make it incredible that the *Fitzgerald* and others would be unaware of what lay ahead of them, weatherwise.

"This seeming disregard of severe weather warnings shows up in other fields of transportation also. As I write this, the radio tells us of the Eastern Airlines Kennedy Airport disaster report, in which it is clearly established that said aircraft and others were attempting to land through a violent thunderstorm. It is interesting to note that the next succeeding storm, to the one on November 10, found at least one large ore carrier in Marquette Harbor, waiting it out."

Since receiving the above letter and after checking and reviewing a large number of newspaper reports on the *Fitzgerald* case, I'm afraid I have to stand by my terminology, "unsuspectingly." There is nothing to indicate that Lake Superior skippers had any inkling that this particular storm warning would involve "hurricanic" winds, such as developed during the late afternoon and early evening of November 10. The writer's chronology of the weather warnings differs from those reported in Lake Superior circles, but not by many hours.

Gale warnings in western Lake Superior were correctly posted in the early evening of November 9, some seven hours after the *Fitzgerald* had sailed, and winds from 39–54 miles per hour apparently did materialize, with some snow, beginning at Duluth a little after 7 p.m. The *Fitzgerald* was hit by this weather, reporting to the Cleveland office at 1 a.m., November 10, that she was beset by winds up to 52 knots with 10-foot waves. She encountered no trouble, though she was off Keweenaw Point at this time. Six hours later, when perhaps 40–50 miles east of Keweenaw, she again reported that the wind had dropped to 36 knots per hour, seemingly indicating that the worst was over.

This report out of Cleveland (in *Duluth Herald*, November 20, 1975, p. 15) coincided with the information furnished to the chief vessel agent of another large fleet of ore carriers operating on Lake Superior. His company received the gale warning on November 9 (winds 34–47 knots), which was taken down some hours later, to be replaced a few hours thereafter by storm warnings (winds in excess of 48 knots)—the hurricane warning is not used on the Great Lakes. Later a ranking meteorologist of the Weather Service informed him that the original low-pressure system had been moving north on the afternoon and night of November 9 and was expected to pass northward over central Lake Superior with a center near Marquette on the morning of November 10. Instead, the storm center veered sharply to the east, resulting in the near hurricane conditions locally in the extreme eastern lake that afternoon and evening. Numerous reports of winds gusting to 70, 80, and even 90 knots were received for late November 10 by the Coast Guard Board of Inquiry. The Weather Service had no data anticipating this type of situation which might previously have occurred in November 1872, November 1908, November 1913, and December 1927, and possible in other instances over the last 100 years.

It was obvious that four professionals skippering four of the largest and most powerful ships (*Fitzgerald, Anderson, Blough,* and *Fort William*) felt that the forecast of rough weather held no terrors for their respective vessels. For that matter, neither did the skippers of several vessels which had headed west in the hours before the *Fitzgerald* was sunk. Very rarely do the modern high-powered carriers anchor for protection under Keweenaw Point. My vessel agent contact could recall only one instance in the last ten years in his fleet. If a carrier was waiting in Marquette harbor during a following storm, I would suspect that ship was probably loaded there, as Marquette is over 70 miles south of the down-bound vessel lane, and a skipper would not move that far for shelter.

The loss of the giant *Fitzgerald* and her 29 men was most regrettable, but can find no suggestion that her skipper and the other captains disregarded ominous meteorological forecasts. Our present methods of weather forecasting still remain inprecise in that formidable 75 miles of eastern Lake Superior which historically is known as the "Graveyard of the Lake."

Dr. Julius F. Wolff, Jr., in his two-part article, "One Hundred Years of Rescues: The Coast Guard on Lake Superior," included reference to the *Edmund Fitzgerald* and her tragic sinking, in the Spring issue of Inland Seas, referred to above.

A resident of Duluth, Minnesota, Dr. Wolff is Professor of Political Science at the University of Minnesota. For many years he has had an absorbing interest in research concerning Lake Superior shipwrecks, about which he has written several earlier articles for our Journal.

Mr. RUPPE. It is interesting to note how the whole question of our knowledge of the weather and our ability to forecast weather is so much in doubt. I am not questioning what you say in any way, but I am pointing out how good men and different minds can come to various conclusions because he states, and this is Dr. Julius Wolf saying that, "I can find no suggestion that her skipper and the other captains disregarded ominous meteorological forecasts." Our present methods of weather forecasting still remain imprecise in that formidable 75 miles of eastern Lake Superior which historically is known as the "Graveyard of the Lake."

I only bring that up because I agree to a large measure with what you say beyond that. I think we are woefully short of the weather information and the weather reporting facilities and techniques that we really ought to have not only to run a normal shipping season, but particularly an extended winter navigation season.

Mr. NOLAWSKI. I believe in generality what you say is true, our weather forecasting can be improved and refined. However, in this case, when these vessels left their loading docks, the storm warnings and the intensity of the storm was known, but they still left. So the warnings were there.

Mr. RUPPE. Admiral Trimble, I understand that you have given a lot of very serious and thoughtful time to the whole question of the

Fitzgerald and the sinking of it; do you have any particular ideas of your own as to what very likely caused the sinking and the loss of the *Fitzgerald*?

Admiral TRIMBLE. As you know, the board has not finished its deliberations yet, but nevertheless quite a bit of the information has been made available through the testimony that was in a public posture. It is my conclusion, based on that information, and I think this is the general feeling of the industry, that the *Fitzgerald* did damage herself by grounding on the shoal in the vicinity of Caribou Island. That started the train of events that led to her sudden breaking up and going down.

It apparently happened without the knowledge of the master, I have to assume that because he did not issue a broadcast SOS or ask for help in any way. He did not have the crew alerted, it would seem. It sounds like by the time the vessel did break in two, he did not know before that. Now, if we follow this reasoning and I think that this theory will be proved largely when the results of the Canadian hydrographic soundings are completed later this year. The board did ask Canada to recheck the soundings and Canada apparently agreed and they will do it before this year is out. I think it is quite likely that we will find that the shoal area is larger than shown on the charts.

Keep in mind that the present soundings date back to the early part of the century. There has been no recheck. If we find the shoal area extends further toward the island, eastward, it was established that the vessel was in that vicinity, Captain Cooper of the *Anderson* did testify that he plotted the vessel in that area. The chart shows only a small shoal area so the masters would have no way of knowing that it was inaccurate. I think this theory will be proven or disproven when the Canadian hydrographic work is in.

Mr. RUPPE. Mr. Reed indicated a few minutes ago very possibly in addition to the light and foghorn not operating, the radio beacon could well have been out of commission. Would this in your opinion cause the vessel to navigate less accurately than might otherwise be the case?

Admiral TRIMBLE. It certainly could. On the other hand, if the shoal extent is not shown on the chart, even if the vessel knew where he was in relation to the plotted shoal, he could still be in trouble. But any time your navigation equipment is not working, that is a problem. This is one of the reasons we are looking forward to the LORAN–C coverage of the lakes. I'm sure you are aware it is not a new device. It has been tested in the 1950s in connection with the missile program as well as being used in Vietnam. So its accuracy has been proven. Here, in addition to the other navigational aids, it should certainly improve the situation for navigation in the Great Lakes and especially Lake Superior.

Mr. RUPPE. Since you have a good measure of contact with the shipping companies, several of these gentlemen have indicated that operators apply directly or indirectly efficiency ratings for their vessels in terms of turn-around time and in terms of the ability of the master to make the trip in the shortest possible number of days. If that is the case, would not that really have the effect of forcing a master to drive his vessel in the face of adverse and unsafe weather possibly of the type that beset the *Fitzgerald*?

Admiral TRIMBLE. I think this is a bone of contention, Mr. Ruppe. If a master does go out in adverse conditions and sustains damage, I think he is going to get a worse rating whether it is a written rating or whether it is in someone's mind. Either way, he is going to get a worse rating because of his bad judgment in that respect. I don't think any of the companies have a policy that says "You go through unless weather is so adverse that you can't move." I don't think any of them have. I have heard them instruct their masters with their crews at their annual meeting before the season starts, that the master is expected to exercise judgment as far as going out in adverse weather. Of course, this is one of the reasons why we have been pushing strenuously for improved weather forecasting on the Great Lakes as a navigation system.

Mr. RUPPE. There are two things that several of the gentlemen have raised previously and obviously will be brought out in greater detail in the hearings that the chairman has referred to later in this year; but in any event, several of the witnesses in the latter stages of the hearings have indicated that the vessels should have watertight compartmentation and also one or more of these gentlemen indicated that the liability limits should be increased to offer better protection to the families of those that suffer from these accidents. Are you in a position at this point to comment on either suggestion?

Admiral TRIMBLE. I am not in a position to comment on the second point, particularly, Mr. Ruppe. I would comment on the first, just generally.

When you talk about watertight integrity, that they did specify in the cargo hold area, sometimes there have been statements made that there are no watertight bulkheads. There are on most on the bow and the stern area on either side of the cargo department, so that it has been referred to as primarily in that broad expanse in the cargo hold area. This has been brought up numerous times and of course when you look at the situation, if the *Fitzgerald* did drown on the shoal off Caribou Island, then we have a physical condition that caused the accident and not a matter of a structural defect or something that would be materially improved by changing the watertight compartmentation.

We are all very interested in the safety of the crews, vessel, and the cargo—crews, by all means, first. This is something that would have to be weighed. I think the testimony of naval architects would be very helpful, people who are specialists in the field, would then look at actual experience. I think it has been brought out by Admiral Gracey and Commander Deck that the *Morrell* and the *Bradley* were in ballast rather than loaded. The *Fitzgerald* is the first vessel in recent or modern times that has sunk in a loaded condition. So it does not appear that we have a problem. I think we have to look at the experience, to some extent, as well as the theoretical possibility.

Mr. RUPPE. If the loads are increased and the load line is reduced——

Mr. NOLAWSKI. Increased.

Mr. RUPPE. It has been several years since I put in my time in the Navy. A witness has indicated it would not put stress on the lower hull. Does the increased load at any time put stress on the so-called upper hull or so-called superstructure?

Mr. NOLAWSKI. I thought the testimony was it did not increase the stress in the loaded condition; it was primarily in the ballast condition that the problems have occurred in the past. So increasing the loading would not seem to be part of the problem. The newer ones, the larger ones will carry more. They have been designed on that basis, so their strength on the various skeletons and their framework has been strengthened to meet the loading requirements that are planned as far as the cargo carrying mood of that vessel.

Mr. RUPPE. One last question. I thought that one of the witnesses indicated along the way, perhaps as early as 3 or 3:30 that perhaps something happened along the way to the vessel, that it had listed a bit or it had taken on water. I don't know if that is fact or conjecture. I would ask any one of you if that happened, wouldn't the captain have sent out some kind of SOS or distress signal or told the crew to be on the alert, that they might have some trouble lying ahead? I have a difficult time following the possibility of something happening at 3 o'clock or 3:30 and the vessel going down without any distress signal coming from it a number of hours later.

Mr. NOLAWSKI. Mr. Ruppe, I included a statement attributed to the chairman of the board of inquiry along that line. He did not expand on it and say what happened. The testimony in the board of inquiry did indicate that they had lost a vent or vent cover, this is to one of the ballast tanks, and that they did have some water in a ballast tank. However, the pumps in accordance with the captain's conversation with the *Anderson*, were handling the water and he did not seem to be too concerned about it, so it must be—if he damaged himself on the shoal, it is possible with the sea pounding that he didn't realize that he did violence. I have been in vessels pounding in heavy seas in salt water and I sure thought we hit bottom and I knew we couldn't have hit bottom though it felt like it. The problem could be such that he really bottomed without knowing about it and if he cracked the hull in such manner the wave motion caused the vessel to break in two suddenly, that is what must have happened, or he would certainly have gotten off an SOS. He was standing on the bridge with a radio in front of him. It would only have taken seconds for him to say something over the radio. He didn't have time for that, apparently. He must not have, from his conversation with the *Anderson*, considered the water threatening that was coming in through the vent. This is the vent on deck. The water coming in there compared to the capacity of his pumps did not excite him, apparently.

Mr. RUPPE. I have one question for Admiral Gracey. But before I do, I want to congratulate my very fine constituent Dan Reed for his statement. On one point, Dan, I think you bring up a very important point to consider and that is that Coast Guard surveillance and equipment attendant on the Great Lakes has to necessarily involve the small boater who in terms of numbers is the greatest user of the Great Lakes. It is certainly true that an accident of this type, the accident to the *Fitzgerald*, triggers inquiries and studies of this nature, and hearings, and I think we should never lose sight in deploying Coast Guard forces and achieving better information of the small boater. He is a very important and very numerous individual. One thing I am glad you bring out is that the winter navigation board considered transportation problems and environmental problems related to the winter navigation season.

The legislation that Congressman Oberstar and I have introduced to extend the demonstration period for an additional 2 years would give the winter navigation board new authority to look at transportation problems and environmental damages. I hope that the winter navigational board will look further at environmental damage and determine how much of the shoreline loss is caused by natural conditions, how much by extended winter navigation, and how much is caused by the higher water levels that the International Joint Commission has unilaterally maintained on the Great Lakes, especially on Lake Superior, in the past few years.

The last question, if I might, Admiral Gracey, I understand that the Ports and Waterway Safety Act of 1972 would authorize the Coast Guard to "control vessel traffic in areas especially hazardous or under conditions of reduced visibility, adverse weather," et cetera. Has the Coast Guard ever considered applying this authority to situations such as beset the *Fitzgerald* some months ago?

Admiral GRACEY. I can't speak in terms of broad policy for the entire Coast Guard. I assume you are alluding to the sailing when there were some storm conditions predicted?

Mr. RUPPE. Yes.

Admiral GRACEY. Is that the kind of situation you mean when you said beset the *Fitzgerald?*

Mr. RUPPE. Yes; the sort of typical November weather which is the most hazardous period.

Admiral GRACEY. I don't know what the whole Coast Guard has done, but I will tell you I have given it serious thought on the lakes as to whether it would be feasible or not and I have not given up looking at it. In fact, I am very seriously considering taking a look at whether or not the conditions of the lakes and the kind of marine traffic we have here would warrant our instituting a large craft warning system, if you will on the lakes.

It would be a warning system. I have not really seriously considered a program which would deny a large vessel the right to decide whether it sailed or not. Even on a small craft, we do not tell the men "Don't go out." We warn them. We tell them it is unsafe; we do everything we can to try to convince them not to go in terms of providing them information and education, but the small boater still goes out and we still wind up going out and trying to find him.

Mr. RUPPE. Weather information is a difficult thing to predict. I know in the copper country we may have a storm warning when only a fool there will go out and again, maybe because of some local peculiarity of the weather, it is really not all that unsafe although the person considering going out ought to take a little extra thought and precaution about putting his boat out in face of the Coast Guard warning.

Admiral GRACEY. There has been a good deal of concern about the weather service no longer asking us to fly the storm warning flags. A lot of people have voiced concern about that, and we have tried to explain that action on the basis that the flag is good only for those who can see it and once you have left the place where the flag is and it is hoisted after you get out, it doesn't do any good because you can't see it. What we are trying to do is to have the people buy a small $12 radio, whatever it costs, and they have constant

weather broadcasts and you carry it in your pocket or on the boat and listen to it before you sail and listen to the weather.

But, I have been doing a lot of reading about shipwrecks on the Great Lakes, not just in preparation for the hearing, by the way. As I mentioned in the beginning, I am rather entranced with this part of the world for some strange reason these days and I have done a lot of reading about shipwrecks over the years, and it just comes through time and time again about the weather and the patterns and the peculiar patterns, and even in the face of what seems to be very fine capability to predict, when the weather gets out over the lakes, strange and wonderful things happen to it. Wind and weather conditions change. The big storm in November of 1913 was the case of three violent hurricane force storms all coming together at once, but none of them were predicted to do that. Very much the same kind of thing happened in the storm last year. The only thing we didn't have was the third storm coming from the South, but we had two other ones that came together, but they weren't predicted to do that. It is a very tricky part of the world as far as weather is concerned. Short of having some buoys or something out there to give some data or using the satellite information, there is no way to determine what the weather is going to do.

Mr. RUPPE. Would it not be the duty of your organization and the maritime agencies to develop a system of large vessel warning?

Admiral GRACEY. I wouldn't consider instituting such a thing without consulting with the industry and weather service and all kinds of other people.

Mr. RUPPE. Mr. Nolawski?

Mr. NOLAWSKI. I think the Secretary did give the Coast Guard the right to control the vessel traffic. It is there now, but somehow or another the people are dodging a responsibility that should be exercised by somebody. Let's hope the Weather Bureau could accept it. Let us hope that somebody with some authority accepts it, because they are sweeping something under a big rug which endangers the vessels and the people's lives on the vessel and endangers the profits. It does not follow. I don't know why they even write it, if this is what they are doing.

Mr. RUPPE. You bring up two questions. The first one is, should we have a large vessel warning system, and second, what materializes after such a warning is issued? Do you let the master go on his own risk or do you actually tell him to seek refuge?

Mr. NOLAWSKI. We are using a lot with the master's discretion at sea and the master's discretion in navigable waters. When the Coast Guard and regulations are in force, he doesn't use his discretion. He can only use his discretion when he is at sea. Here is the discretion of man going out—whoever is in authority, that Coast Guard or whoever says it is dangerous—they cannot control it. Why doesn't anyone exercise authority? Everyone seems to think they are infringing on the master. He is the master at sea. But here he is not. The Coast Guard has regulations which they think can regulate them.

Thank you, Mr. Chairman.

Mr. DE LA GARZA. We appreciate all of you being here. Your testimony has been most helpful.

I would like to thank Lake Superior State College and the staff of Congressman Ruppe and the staff of the committee that made the arrangements for the hearing; and pending the statements that will

be submitted later, questions that may be submitted to witnesses, the committee will stand adjourned.

[The following was submitted for inclusion in the record:]

DEPARTMENT OF TRANSPORTATION,
U.S. COAST GUARD,
Cleveland, Ohio, August 24, 1976.

Hon. PHILIP E. RUPPE,
House of Representatives, Washington, D.C.

DEAR MR. RUPPE: Enclosed are my personal answers to the questions sent with your letter of July 22 re: the Soo hearings. I have tried to write them to sound as they would have had I answered them during the hearing. They are numbered according to the subject matter, using the following code: SAR—Search and Rescue; HS—Human Survival; SS—Ship Safety; SLAR—Side-Looking Airborne Radar; LC—Loran C; ML—Mini-Loran; and VT—Vessel Traffic Control.

You asked two questions about weather forecasting which I have not tried to answer. I think a more meaningful answer would come from the National Weather Service, who, I understand, maintain rather extensive data on the accuracy of their forecasts.

You also asked for an assessment of the Whitefish Point erosion problem which was discussed at the hearing by Mr. Dan Reed. Unfortunately, the copy of the transcript I received did not include Mr. Reed's testimony, so I cannot provide a pertinent answer now. I have asked for a copy of that part of the transcript. When it arrives, I will promptly provide the assessment you asked for plus an answer to your later letter on Whitefish Point. I hope to be able to get that out later this week.

I have sent a copy of the answers to Coast Guard Headquarters, but I have not coordinated the answers with them.

Your consideration during the hearing and your kind words since are much appreciated. The same is true of Mr. Oberstar and Mr. de la Garza.

Sincerely,

J. S. GRACEY,
Rear Admiral, U.S. Coast Guard,
Commander, Ninth Coast Guard District.

Enclosures.

Question. Does the Coast Guard maintain a facility plan applicable to ships, aircraft and rescue stations, based upon some kind of established time and distance criteria?

Answer. The Coast Guard has a facility plan which consists of 3 parts: Cutter Plan, Aviation Plan, and Shore Facilities Plan.

The ultimate facility requirements development in each part are based on a wide range of critieria which are determined by the mandates of our many missions. Since Coast Guard facilities derive their special record of effectiveness in part from their multi-mission capability, their selection and numbers must per force be based on critieria of many sorts. "Time" and "distance" are factors used in part in the Cutter Aviation Plans. They are not used, per se, in the Shore Facilities Plan because of the wide variety of geographic locations, climatic conditions, population densities, "clientele" characteristics, caseloads and case severity and assigned missions in which our shore units are placed and with which they must cope.

Question. Would you furnish such plan or plans as they relate to all of the Great Lakes?

Answer. Each of the three Plans I discussed in answering the previous question consists of a rather large volume. Except in sections which provide tables of projected facility needs the texts are not divided by specific geographical areas nor are discussions so oriented. I have excerpts, which I will provide for the record to give a feel for the thought process upon which decisions are made for the Search and Rescue Program.

III. BOAT REQUIREMENTS

A. ANALYTICAL PROBLEM

The requirements for Coast Guard boats have been determined in the past by program managers using a variety of analytical and non-analytical techniques. A major task for the first update of the Boat Plan in 1975 will be the development of a standard methodology for determining boat requirements which can be applied to all programs.

In many cases, especially for those newer stations with primary responsibility for the Search and Rescue (SAR) program, a computer simulated queueing model has been exercised to determine optimal SAR boat standby requirements. In most cases, however, the results of many years of trial and error has established the stations' needs. It can be argued that this approach could result in over-capacity at many units if the true needs were unconstrained. The tendency would be to overequip for the most demanding missions expected. In fact, personnel and financial constraints have been imposed throughout the Service. The limited availability of personnel and operating expense funding induces program managers, as well as operational commanders, to minimize the number of boats which will consume these constrained resources.

Despite this acknowledgement, the study has identified a major need for future in-depth analysis of actual station requirements. The short time period allowed for this first year's plan was insufficient to carry out that analyses. However, some time was available to frame out the methodological approach to be used during 1975 for the first updating of the Plan.

B. PROPOSED SOLUTION

The boat requirements may be developed by describing a series of potential operational constraints which are imposed on boats carrying out the wide variety of mission tasks. Tasks that boats will be required to perform for each Coast Guard program are first listed. Operational constraints are then determined from environmental conditions as well as from human, social, and institutional factors that affect boat operations. Historical workload data is then grouped into these categories and future demand expectations are estimated. The resultant projected workload within each category should provide a descriptive statistical basis for determining future demand for boat services.

BOAT TASK DESCRIPTION OF PROGRAMS

Search and Rescue (SAR)

Search for vessel
Search for person in water
Vector another unit to scene
Provide communications assistance
Provide direction finding assistance
Provide navigational assistance
Provide engineering assistance
Provide medical assistance (advice)
Rescue personnel from water
Rescue personnel from sinking or burning vessel
Rescue personnel from land
Remove property from sinking or burning vessel
Remove property from land
Refuel
Deliver medical supplies
Deliver pump
De-water
Fight fire
Refloat
Make repairs
Stand-by
Provide escort
Tow
Fight fire and tow
De-water and tow
Fight fire, de-water, and tow
Refloat and tow
Refloat, repair and tow
Refloat, repair, de-water, and tow
Fight fire and escort
De-water and escort
Fight fire, de-water, and escort
Relieve tow
Provide diving platform

Recreational boating safety (RBS)

Board boat
Pursue boat
Patrol regatta
Visit marina

Enforcement of Laws and Treaties (ELT)

Board fishing vessel
Patrol Security Zone
Interdict drug traffic
Interdict alien traffic

Aids to Navigation (A/N)

Inspect day beacon
Inspect minor shore light
Inspect unlighted buoy
Inspect lighted buoy
Inspect bridge light
Check signal
Check buoys mooring
Recharge buoy
Hot pack buoy
Repair buoys visual equipment
Repair buoys audio equipment
Clean buoy
Paint buoy
Relieve buoy
Land on breakwater
Recharge fixed aid
Hot pack fixed aid
Clean fixed aid
Repair structure
Replace structure
Paint fixed aid
Renew Reflective tape
Establish temporary aid
Load batteries
Load buoys

Tow buoy
Replace lamps
Replace lanterns
Replace flasher
Replace wiring
Replace lampchanger
Replace dayboard
Supply lightship
Supply light station
Replace engine-generator
Operate in exposed location
Operate in semi-exposed location
Operate in protected location
Service aid located on sea coast
Service aid in bay, harbor, or inlet
Service aid in river or canal
Service aid on breakwater
Service aid on shore
Remove ice from buoy
Remove ice from fixed aid
Drag for buoy remains
Provide diving platform

Reserve Training (RT)

Train coxswain
Train engineman

Port Safety and Security (PSS)

Supervise hazardous cargo transfer
Supervise radioactive material transfer
Board merchant vessel
Board barge
Visit pier
Patrol security zone
Patrol safety zone
Patrol harbor
Patrol remote harbor area
Patrol off-shore structure
Inspect waterfront
Control vessel movement
Escort vessel movement
Observe special interest vessel
Investigate accidents on vessel
Investigate accidents on bridge
Investigate accidents at port facility
Provide communications for traffic control

Marine Environmental Protection (MEP)

Monitor liquid bulk transfer
Monitor removal of discharged material
Remove discharged motor oil
Investigate discharge
Monitor ocean dumping activity
Deliver oil containment boom
Deliver oil absorbing material
Deliver pump and hose
Deploy oil boom
Deploy hose
Distribute absorbent material
Operate skimming pump
Collect water samples
Collect contaminated wildlife
Board vessels for sanitation systems inspection
Provide communications for on-Scene Commander

Bridge Administration (BA)

Inspect bridge lights
Inspect bridge for signals
Inspect bridge material condition
Observe drawbridge operations
Observe waterway traffic

1. Boat Tasks

Each program can be described by listing all tasks that are accomplished in carrying out that program's work. These are tentatively listed and are shown for each program in Table III–1.

2. Operational Constraints

Operational constraints are factors that determine how program tasks are performed with boats. They can be grouped as either environmental conditions of as human, social, and institutional factors.

Environmental conditions.—Those external elements that are part of the environment surrounding the boat are classified and assigned numerical values where appropriate. These include climate, weather and sea conditions, visibility, location in reference to land, etc. A proposed classification scheme is shown in Table III–2.

A preliminary analysis attempted to correlate climatological data of selected coastal regions with environmental conditions reported during SAR assistance cases. A rough analysis indicated that the two data sources generally conform. The next step will be to relate the potential climatic severity of each region with explicit levels of operational capabilities and crew protection afforded by each class of Coast Guard boats. Severity thresholds may be useful to determine minimum boat capabilities required for each geographical area. The work to date suggests that this approach will provide the environmental constraint descriptions which are necessary for the task analysis.

TABLE III–2.—ENVIRONMENTAL CONDITIONS

Sea state (feet high):	Visibility (miles):	Distance from shore (miles):
0 to 2	0 to one-fourth	0 to 3
3 to 4	one-fourth to one-half	4 to 10
5 to 9	one-half to 1	11 to 25
10 to 19	1 to 5	26 plus
20 plus	6 to 10	Breaking waves on:
Water depth (feet):	11 plus	Bar
0 to 2	Relationship to land:	Beach
3 to 4	High seas	Shoal
5 to 6	Coastal	Condition:
7 plus	Inlet	Daylight
Wind speed (knots):	Bay	Dusk
0 to 10	Sound	Night
11 to 21	Harbor	Fog
22 to 33	Marsh	Rain
34 to 47	River	Snow
48 plus	Lake	Sleet
		Haze

Human, social, and institutional factors.—These factors should describe existing and anticipated conditions such as human physical capabilities, organizational responsibilities and boundaries, laws, public expectations, planning rules-of-thumb, policies, and other factors both inside and outside the Coast Guard which affect how boats can be used to perform various tasks. For example: lives are to be saved before property, communications are to be maintained between operating units and higher commands, district and group boundaries, legal implications of an improperly positioned aid to navigation, etc.

3. Demand for Boat Services

Historical demand.—Existing program data should be used to develop tables showing historical utilization of boats in fulfilling program tasks. Data would be broken into groups that parallel the environmental categories and human, social, and institutional factors. For example: number of searches for vessels between 10 and 50 miles off-shore in the 12th Coast Guard District, number of trips to manned lights within bays in the 5th Coast Guard District, etc.

Future demand parameters.—Future demand parameters are those factors that have been identified for use in transforming historical data to projected data. There are three types of changes in the marine environment and concepts of Coast Guard operations that can have an impact on the future demand for boat services. The first step is to identify and measure those factors which can be quantified (e.g., extrapolations of the SAR data base). The second step is to identify and estimate those other factors which cannot be quantified exactly, but can be roughly estimated to describe the range of possible future conditions (e.g., locator beacons to be required by law on all pleasure boats. The third step is to list other imaginable but not predictable future events (e.g., fuel rationing imposed on maritime users).

Future demand estimation.—Future demand is estimated by applying the three types of parameters to the historical demand. First, the parameters which can be quantified exactly are applied to the historical demand to project future demand. These projections are spread through the range of secondary parameters. Lastly, note is made of the speculated effects of the unpredictable future events upon future demand for Coast Guard boat services.

C. USING REQUIREMENTS TO SELECT RESOURCES

1. Model Development

After the requirements are developed, a methodology is needed to select boats to carry out the programs. The selection process should result in the most cost-effective fleet possible. There are, however, a wide choice of boat classes that can be used to satisfy program objectives. The problem then becomes how to find the least expensive resources to carry out well defined tasks at explicit levels of service.

The resource allocation process has two stages in its solution. The preliminary decision concerns what boats classes should be pre-positioned by assignment to which shore facilities. The operational decision is what boat should be dispatched

by the officer-in-charge to carry out each task requirement. The model to be developed cannot resolve the on-the-scene question. This is done by the dispatching officer applying his judgment based on experience to his knowledge of all factors affecting the decision, including the preconstrained choice of boats at his station. Other models, such as Computerized Assisted Search Planning (CASP), are available to assist in that decision.

Clear definitions of tasks are necessary but they are not always easily described. For example, multiple tasks can often be carried out simultaneously. Some of these multiple usages may support the same program while others will support more than one program. In many other cases, one task requirement precludes use of the boat for other assignments. There is also an interrupting mode of operation, where the task is of a routine or scheduled nature, and the other task is an emergency or is unscheduled. Provision for interrupting the routine use of the boat can be made through proper design, outfitting, communications, and training of personnel.

In a few instances, the boat may provide an immediate life or property-saving relief while waiting for the arrival of a Coast Guard resource better-suited for the mission. In another case, additional resources or personnel may be delivered to the boat which is on the scene.

Given that provision can be made for describing these forms of boat task applications, complete listings of each program's tasks will define the effectiveness side of the cost-effectiveness equation. The cost side will be determined with life cycle costing of all existing and proposed boat classes. This is also a methodological problem area, but additional analysis will probably result in useful estimates of costs.

2. *Resource Capability Matrix*

The Resource Capability Matrix may be the key to the resource allocation problem as a cost-effectiveness mechanism. It uses a broad list of factors which describe boat tasks. These capability factors are determined as environmental conditions, human limitations, and operational capabilities of the boats. The matrix is shown in Table III–3. It was originally developed for use in the Search and Rescue Simulation Model (SARSIM).

The matrix is a binary coded table which indicates the capability of each boat class to carry out the tasks described with the capability factors listed. The number "1" is assigned in the body of the table only when a resource can satisfy the demand attribute. When a boat cannot satisfy the description, the number "0" is assigned. The task is described by selecting those capability factors needed for the task. Only those resources that produce a product of "1", when all applicable factors in a vertical boat vector are multiplied, can be assigned to the task described by that list of attributes. Relative boat costs are to be indicated and the least expensive boat among those capable of providing the service is assigned.

Sufficient time was not available during this initial study to complete the development of the matrix as a usable decision making tool. The original proposed matrix was expanded, however, to include all boat classes discussed in the Plan. Expert advice was then sought to determine the capability factors applicable to each boat class.

3. Additional Methodological Problems

Some of the undeveloped aspects of this methodology require additional study. One concern is how to deal with the geographical and time distribution of demand for boat services. Another problem area is how to combine demands for scheduled patrols and response actuated sorties. One possible solution may be in establishing specific minimum levels of response availability based on various thresholds of expected demand. For example, if expected operations will take place in sea states over 10 feet during 5% of SAR cases, one 44′ MLB must be assigned. Similar rules could be established concerning availability of suitable resources within specific distances or response times. Development work will continue in order to improve the model for use in subsequent boat plans.

Relief boat allowances must then be determined to provide suitable backup for boats placed out of service due to scheduled overhauls and major casualties. Relief boats should be assigned to centrally located units to minimize delivery time. Determination of the ideal numbers, types, classes, and geographical distributions is to be developed. At present, provision is made for relief boat procurements in the Boat Plan for 44′ MLB, 41′ UTB, and 30′ UTM replacements where allowances already exist in OPFAC. No reliefs are programmed in the MRB and PWB procurements since they will be backed up with excess

MSB(SU)'s and relief UTB's in the early years of their introduction to the boat fleet.

TABLE III-3.—Resource capability matrix.

CAPABILITY FACTORS	BOAT CLASSES																														
ENVIRONMENTAL	44' MLB	52' MLB	26' MRB	25' MSB	41' UTB	40' UTB	30' UTM	16' 25' UTL	32' PWB	31' PSB	55' ANB	45' BU	63' ANB (MOD)	46' BUS L	21' TAN B	19' TIC WAN	SKB	SKM	SKL	RCV	LSAERI B
Sea State (feet high)																					
0-2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
3-4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	1	1
5-9	1	1	1	1	1	1	1	0	1	0	1	0	1	0	0	0	0	0	0	1	1
10-19	1	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20+	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Breaking Waves on																					
Bar	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
Beach	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
Shoal	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
Water Depth (feet)																					
0-2	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
3-4	0	0	1	1	0	0	0	1	1	0	0	0	0	0	1	1	1	1	1	1	1
5-6	1	0	1	1	0	1	1	1	1	1	0	1	0	0	1	1	1	1	1	1	1
7+	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Wind Speed (knots)																					
0-10	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
11-21	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1
22-33	1	1	1	1	1	1	1	0	1	0	1	0	1	0	0	0	0	0	0	1	0
34-47	1	1	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
48+	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
HUMAN																					
Crew																					
2	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	1	1	1	0	1
3	0	0	0	1	1	1	1	0	1	1	0	0	0	0	1	1	0	0	0	1	0
4	1	0	0	0	0	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0
5	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coxswain Position																					
Seat	1	1	0	0	1	0	0	1	1	0	0	0	0	0	1	1	1	1	1	1	1
Windshield	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	1	0
Covered	1	1	0	0	1	1	1	0	1	1	1	1	1	1	0	1	0	0	0	1	0
Enclosed	0	1	0	0	1	0	0	0	1	0	1	1	1	1	0	0	0	0	0	1	0

NOTE: This is for use as a planning tool and not as a directive to operational commanders.

CUTTER PLAN

In recent years, the tremendous expansion of recreational boating, the increasing use of small powered vessels for commercial fishing, and the acceptance by the United States of providing a higher level of assistance to the mariner on the high seas has created new problems in the Search and Rescue field. The Coast Guard has responded to these changing maritime patterns by relocating SAR stations to inlets and bays, by establishing different capacity cutters to assist in the variety of offshore waters, and by establishing a series of safety oriented programs such as Merchant Marine Safety, Boating Safety, Port Safety, and Automated Merchant Vessels Reporting System. Modern managerial methods are now available to assist in determining the SAR resource mix needed to keep pace with these changing demands.

C. ECONOMIC

Tangible economic benefits that form a basis for the SAR program are normally measured in terms of prevention of death and property loss. Less tangible economic gains for the nation are accomplished by the program's encouragement of recreational boating and maritime commerce. Practically any maritime activity profits directly or indirectly from the Coast Guard's SAR program.

III. Resource Capability Required

The specific SAR resource capability required varies from performance of vessels in direct location and quick recovery to use of rescue craft specially equipped for long searches. Resource performance is also dependent on environmental factors such as visibility, sea state, temperature, nearness to shoals or other hazards. In general, High Endurance Cutters and Medium Endurance Cutters have the endurance and seakeeping capacities to provide SAR at ranges

up to 1000 and up to 300 miles respectively. These cutters provide coverage while engaged in other missions or while in homeport. Patrol Boat Cutters have endurance and seakeeping characteristics to effectively handle SAR cases up to 100 miles from the coast.

IV. Performance (Mission)/Response Criteria

CRITERIA

1. Program criteria

a. The philosophy of basing SAR response on "worst case"; i.e. ability to handle the heaviest workload situation previously encountered or envisioned could render the use of cutter and personnel resources dysfunctional. A philosphy of basing SAR response on maximum allowable risk permits planning for resources within a frame work of acceptable tolerances. The currently accepted value is a risk not to exceed 3% failure to respond to serious cases. In some areas 3% is considered too high for planning purposes and 1% has been used.

b. Tolerance time is the waiting time involved upon initial notification of the Coast Guard to when first Coast Guard resource arrives on scene. Longer tolerances result in higher over-all utilization of resources since slower less expensive resources may be selected. A distress client should be served within a given tolerance time which varies with five levels of distress severity. Tolerance time is established within specific geographical areas based on conditions of survivability of that area and the guidelines of B–09, B–10 of the SAR Report Manual CG–397. All resources which are capable of serving the needs of the client, under existing environmental conditions, within the tolerance time are considered equally satisfactory. It should also be noted that the tolerance time as defined is Coast Guard criteria and does not fully consider client tolerance. In the eyes of the client, his tolerance time is a function of when the distress occurred, not when the CG was notified. The *time of occurence* is a critical factor in client survival and consequently has a definite impact on the probability of successfully responding to a given distress incident. A ranking based on cost is made to select the preferred resources among those that can meet the tolerance (Ref Tab A).

2. Response criteria

a. A SAR cutter shall be capable of reaching the scene of distress within the 100 to 300 mile zone of the U.S. coast within 36 hours, search for seven days at 15 knots, and return to port with a tow. A second cutter of same capability shall be able to reach the scene within 48 hours.

b. A SAR cutter shall be capable of reaching the scene of distress within the 10 to 100 mile zone of the U.S. coast within 12 hours, search for two days at 12 knots and return to port with a tow. A second cutter of same capability shall be able to reach the scene within 18 hours.

c. No response criteria is specified for distances beyond 300 miles from the U.S. coast.

3. Demand criteria

a. The density plot of SAR cases illustrates that the major portion of distress cases, which are responded to by cutters, occurs within the 10 to 100 mile zone of the U.S. coast.

b. A SAR cutter shall be capable of reaching the scene of 75% of the cases occurring within 100 miles of the U.S. coat within 12 hours and 90% of the cases within 18 hours.

c. A SAR cutter shall be capagle of reaching the scene of 75% of the cases occuring with 100 to 300 miles of the U.S. coast within 36 hours and 90% of the cases within 48 hours.

V. Trade-off possibilities

Trade-offs exist among small boats, patrol boat cutters, and helicopters in many mission areas. The Cutter Issue Study resource selection matrix outlines the considerations involved when choosing an appropriate resource. It is anticipated that the SAR Simulation Model now in use will enable analysts and managers to better evaluate the significance antnd exte of these trade-offs.

VI. Benefit and Effectiveness Rationale

The benefits of the SAR program are the prevention of death and loss of property. To develop the number of deaths prevented from reported statistics five factors are combined: (1) the number of lives saved, (2) a percentage of the number of

persons assisted who were reported in severe danger, (3) a lesser percentage of the number of persons assisted who were in moderate danger, (4) an even smaller percentage of persons who were in little or no danger, and (5) a percentage of persons assisted by the Auxiliary. The percentages developed depend on the probability of loss by assistance that hss not been rendered in the 45 categories of distress listed in the SAR Reports Manual CG–397.

The value of property loss prevented is considered a percentage of property which was assisted. Estimated percentages of probable loss, had assistance not been provided, are assigned to each of the 45 distress categories. The dollar value of property assisted within each distress category and degree of severity is obtained from assistance reports.

EFFECTIVENESS

Effectiveness reflects the degree of success of the SAR program in rendering aid to persons and property in distress. Effectiveness can be improved by decreasing time delays in providing assistance by such methods as (a) earlier detection of distress by better communication systems and search resources, (b) faster response by increased speed of recovery resources, (c) increased density of resource facilities. Effectiveness is decreased by increasing clientele without a proportionate increase in men and facilities. Effectiveness must be examined with each proposed change in resource assignment or method alteration.

AVIATION PLAN

The Maritime Region has been divided into three zones:[1]

1. Long-Range—the areas beyond 300 miles from the coast.
2. Medium Range—the band between 150 and 300 miles from the coast.
3. Coastal and Harbor—this zone includes rivers, bays, and inlets, and extends 150 miles to seaward.

From the standpoint of *where* SAR operations are conducted, Assistance Report Data files provide detailed information as to the specifics of each SAR case, including position. Analysis of assistance report files reveals that over 90% of all assistance calls to which aircraft have responded are located within the Coastal and Harbor Zone.[2]

* * * * *

In an effort to determine the validity of the criteria established by the *1967 Aviation Issue Paper* in this area, the *1971 Aviation Resources Study* [3] examined the historical performance of aircraft as to compliance with the desired criteria. For FY 1970, statistics reveal that of all incidents responded to in the Coastal and Harbor Zone by Coast Guard air facilities, 70.5 per cent could have been reached by a recovery aircraft in one-half hour and 86.7 per cent could have been reached in one hour. Appendix A–8 presents a tabular illustration of this analysis.

Coverage factor—The Coast Guard's responsibility for providing aid to persons and property and distress over vast ocean areas was previously discussed and is illustrated in Figure SAR–1. To meet this offshore responsibility, there exists a requirement for the Coast Guard to operate long and medium range SAR aircraft capable of reaching distress incidents anywhere within the prescribed areas.

As a result of the foregoing considerations, the following SAR mission criteria have been established.

1. Each SAR aviation unit shall be provided one aircraft system capable of immediate response to a distress incident. A second alert system shall be provided for those units at which the queue demand is such that two systems are required outside of normal working hours nine or more times per year.

2. SAR aviator units shall, within the Harbor and Coastal Zone, be capable of flying to the scene of 75 per cent of the assistance cases within one-half hour and 90 per cent within one hour and be capable of recovering (rescuing) persons in distress.

3. The SAR aviation forces shall provide aircraft capable of reaching any point within the maritime areas of SAR responsbility and rendering some form of aid to persons in distress.

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[1] Aviation Issue Paper, September 1967, Volume I, pg. 5, USCG Headquarters, Office of Operations.
[2] Ibid., pg. 7.
[3] Ibid., pg. IV–63 thru 65.

Those areas which appeared to be inadequately serviced in accordance with the preceding coverage and response criteria were subjected to further scrutiny. Where indicated, the Search and Rescue Simulation Model (SARSIM) was exercised on a selective basis to provide information as to the potential utilization of aircraft in areas showing an apparent need. The model is able to present a "before and after" evaluation which compares responses of a theoretical air station with those of existing adjacent resources, both surface and air. When the results of this comparison showed that aircraft could be utilized to provide an improved SAR response capability, those areas were subjectively evaluated from the standpoint of potential response to other program requirements. When the results of these multiprogram considerations indicated that it would be advantageous to do so, new units were included in implementation plans.

For ease of analysis and to ensure that consideration was given to the complex interrelationships resulting from aircraft procurement, aircraft relocation and establishment of new units, all air stations were considered on an annual basis. Accordingly, the following paragraphs described the development of requirements on a year-by-year basis, starting with FY 1974.

Question. In 1974 Coast Guard Authorization Hearings Admiral Bender furnished this Committee with a table showing "times necessary to provide surface, fixed wing, and/or helicopter response to the furthest point in the Beaver Island, Munising, Portage, and Isle Royale areas." I have a copy for your perusal—can the Coast Guard still meet those response times?

TIMES NECESSARY TO PROVIDE SURFACE, FIXED WING, AND/OR HELICOPTER RESPONSE TO THE "FURTHEST" POINT IN THE BEAVER ISLAND, MUNISING, PORTAGE, AND ISLE ROYALE AREAS

Craft	Beaver Island	Munising	Portage [1]	Portage [2]	Isle Royale
Surface	2h	1h 51 min	2h 50 min	5h 18 min	5h 32 min.
Fixed wing	33 min	1h	1h 18 min	1h 29 min	1h 41 min.
Helicopter	57 min	1h 53 min	2h 31 min	2h 54 min	3h 18 min.

[1] Keweenaw Bay.
[2] Offshore of western end of Keweenaw Waterway.

Answer. Our ability to respond within a given time to a call within a specified area depends on weather conditions enroute and whether or not the available rescue unit is involved in another case when the call is received. If a unit is already underway in an area closer to the case than the home base and/or if it is blessed with favorable winds, the response can be quicker than planned. The opposite conditions would cause a slower response. The times shown in the table Admiral Bender provided are based on normal cutter, boat and aircraft speeds and they assume departure from homeport or air station. Given conditions which permit realizing those speeds and departure from the same points, we can meet those times today.

Question. Do you consider the single Coast Guard vessel for Lake Superior at Duluth, Minnesota, capable of meeting established criteria and response times?

Answer. The 180-ft buoy tender whose homeport is Duluth, the cutter WOODRUSH, is not capable of reaching cases in the eastern part of Lake Superior in a timely fashion unless she is underway in the Lake when a call is received. However, we do not rely solely on WOODRUSH for Lake Superior surface coverage. We have several other units capable of responding in all but the most extremely severe weather. We have 44-foot motor lifeboats in Duluth and Marquette and another is in the FY 77 budget to replace the 36-foot boat at Grand Marais, Michigan. We have 41-foot rescue boats at Bayfield, Wisconsin and the Soo. And we have a 40-foot boat at Duluth and a 30-foot boat at the Soo. We also have the 110-foot tug NAUGATUCK at the Soo. When it is replaced by the first of the new 140-foot tugs that have been authorized, we will have heavy weather capability at both ends of the Lake.

Question. Would you not consider the assignment of another vessel to a more central location warranted today?

Answer. To increase our heavy weather capability in mid-Lake Superior we have recently moved a 44-foot lifeboat to Marquette, Michigan. Last year we also considered proposing that an even larger vessel be added. It would not be feasible to move WOODRUSH because her primary mission is aids to navigation and she needs the logistics support available in Duluth. There is now no other vessel we could move that would be more capable than the 44-footer, which, I might add,

is a *very* capable boat. We are presently giving serious thought to suggesting that one of the new 140-footers be homeported in a port like Marquette or Munising.

Question. Is not the northern reaches of Lake Huron in need of additional attention—in view of the gap between the stations at Tawas and St. Ignace that was once covered by two former Lifeboat Stations?

Answer. The two stations have been closed for more than 25 years, so it is difficult to draw any parallels between operational need when they were open and now. Analysis of 1974 and 1975 cases in the area between lines 15 miles north of East Tawas Station and 15 miles east of St. Ignace Station shows the following experience:

1974.—32 cases (at least 5 of which were false alarms) 7 were "severe" (4 others that were treated as "severe" turned out to be false alarms) 12 were handled by air, 3 were medical evacuations, 13 were disabled small craft, and 5 were "overdues."

1975.—29 cases (at least 3 of which were false alarms) 7 were "severe" (1 other that was treated as "severe" turned out to be a false alarm), 11 were handled by air, 7 were medical evacuations, 3 were disabled small craft, and 9 were "overdues."

Most of the cases were within 30 miles of East Tawas. There is an Auxiliary flotilla at Alpena but it has not been necessary to call on them for emergency assistance.

This case experience does not warrant the large expense of establishing a station between St. Ignace and East Tawas.

Question. What, if any, special detection equipment is carried aboard Coast Guard search aircraft assigned to the Great Lakes region?

Answer. Aircraft regularly assigned to the Great Lakes area have no specialized detection equipment. We do have NIGHT-SUN illumination on helicopters and radar on the HU–16E aircraft.

Question. How does NIGHT-SUN illuminating equipment work?

Answer. The NIGHT-SUN is an illumination device manufactured by the Spectrolab Division of Textron, Inc. which consists of a high intensity xenon light of 3.8 million candlepower. It is mounted on the port side of Coast Guard helicopters only when needed as its weight of 65 lbs. would be a burden during daylight flights or when it cannot be used. It can be installed on the helicopter in 3 to 7 minutes when needed. The light is trainable ahead, astern, to the left, and to some degree beneath the helicopter to its right side. Either the crewman in the cabin controls the light with a portable toggle switch or the co-pilot controls it with a fixed toggle switch. The beam diameter on the surface of the water (or land) when the helicopter is at 500 feet is a maximum of 166 feet 8 inches. From a 1000 foot helicopter altitude its beam diameter is 333 feet 4 inches.

Question. Are all search aircraft so equipped?

Answer. No. We have equipment for one HH52–A helicopter at each Air Station. The device can be readily transferred from one helicopter to another, so we always have NIGHT-SUN capability with the ready helicopter.

Question. In two recent drowning cases in Green Bay and off Eagle Harbor in Lake Superior, lives were lost that might have been averted if sophisticated electronic detection equipment was available. The Commandant has indicated to me that this was an on-going Reserch and Development effort. Can you advise of the status of this development project?

Answer. Research and Development of the following equipment has progressed as shown for each:

Forward looking radar for the new Medium Range Search (MRS) aircraft . . . in the final operational test phase.

Active gated television (AGTV) . . . under development.

Wide area illumination system (WAILS) for the HH–3F helicopter . . . under development.

Forward looking infra-red (FLIR) for helicopters . . . specification ready for prototype to be contracted for in Fiscal Year 1977.

Infrared/ultra violet line scanner . . . being developed.

Question. I have heard that the Coast Guard has a detection package ready to go aboard its proposed new medium surveillance aircraft. Can you describe this equipment, its expected effectiveness and its availability?

Answer. Detection capability planned for the new medium range search (MRS) aircraft is as follows:

All aircraft will have a new forward looking radar for weather and collision avoidance and search. It will be a quantum improvement over present equipment, which has very limited surface detection capability. The new unit is designed to provide search capability as well as flight safety functions.

Selected aircraft will also have a sensor package called Aireye installed. I believe this is the package your question alludes to.

Aireye is a remote, all weather, day/night, wide area, airborne surveillance system with the capability to detect, map and identify and document targets. The system consists of the following:

Side-looking airborne radar (SLAR),

SLAR provides long range, day/night, all-weather detection of oil, ship/boat, ice and aids to navigation targets. SLAR will also be capable of recording the radar picture to provide hard copy for further operational review and/or for documentation.

Infrared/ultraviolet line scanner (IR/UV–LS),

IR/UV–LS confirms the presence of oil and maps the real extent of oil pollutants and when combined with some ground measurement reference, provides an absolute surface thermal temperature map. It also can be used to discriminate between various targets (i.e., the ability to distinguish icebergs from ships or oil from kelp beds).

Aerial Reconnaissance Camera (ARC),

The ARC, during day time only, provides hard copy photographic evidence which can be used to identify targets of interest.

Active gated television (AGTV),

The AGTV provides a recordable day/night target identification; classification, and activity determination capability.

Airborne Data Annotation System (ADAS),

ADAS annotates SLAR, IR/UV–LS, ARC and AGTV with aircraft position and other enforcement data.

Control, Display and Record Console (CDRC),

The CDRC acts as the nerve center for the system. It controls, displays and records all sensor generated data. The individual sensors which comprise AIREYE each satisfy a portion of the total system performance requirements. Each sensor has limitations of weather penetration or day/night or target type detection capability. The integrated combination of the sensor provides complimentary performance to meet desired requirements.

Question. What are the plans for replacement of the Traverse City HU–16 search aircraft?

Answer. The HU–16E aircraft at Traverse City will be replaced with an equal number of fixed wing aircraft as part of the Coast Guard program to acquire a new medium range search (MRS) plane. The planned date of replacement depends on progress in the overall program.

Question. What are the plans for replacement of the aging HH–52 helicopters assigned to the Ninth Coast Guard District?

Answer. The HH–52A helicopters at our three Air Stations will be replaced by an equal number of short range recovery (SRR) aircraft as part of the Coast Guard program to acquire replacements for all its HH–52A helicopters. The actual date of replacement depends on when the overall Coast Guard program starts.

Question. What is the extent of Coast Guard Auxiliary coverage of the Great Lakes Search-and Rescue region? Of Coast Guard Reserve contribution to this effort?

Answer. On the Great Lakes we have one of the most extensive, active and dedicated group of Auxiliarists in the entire Coast Guard. There are 5,500 of them and they provide over 1,700 vessels, 40 aircraft and 105 radio stations. Last year they responded to 2,222 SAR cases, saving 163 lives and over $1,300,000 worth of property. Auxiliarists man seasonal stations during peak boating periods at Sodus Point, NY, Sackets Harbor, NY, Munising, MI, Portage, MI, South Haven, MI, and North Superior, MN.

We also have three seasonal stations manned full-time by Coast Guard Reservists. But that is only part of what our Reservists contribute. Reservists in my District are also among the most dedicated and active in the Coast Guard. In addition to manning the three stations they also augment regular personnel at stations and in boats during peak periods and for special needs.

Question. Should Auxiliary strength decline, as I understand may be the case in a few locations such as Munising, what regular Coast Guard forces are available to fill the void?

Answer. Our Auxiliary forces in most areas are pretty stable. We do experience changes, of course, as individual members come and go. When strength declines in a relatively isolated area like Munising, we do not have any regular forces that can fill the void at the site itself. We rely on the nearest regular stations for boats to handle the surface portion of searches and long range cases, and we count on the local police or sheriff or volunteers to help with local cases. As a long range solution, however, we try to restore the Auxiliary Flotilla to its needed strength through local recruiting and training.

Question. Do all rescue stations have the modern 44-foot motor lifeboats attached?

Answer. 22 of our 40 year-round stations have 44-foot MLB's assigned. Another—Grand Marais, MI has an older version, a 36-footer. It will be replaced by the 44-footer which is in the FY77 budget.

Question. If not, why not?

Answer. The extra expense of providing the special capability of the 44-footer to work in heavy seas is not warranted in all our areas. Some of our busiest stations are in relatively protected waters. They need the greater speed and flexibility of our 30, 40 and 41 ft boats more. Examples of these stations are Belle Isle on the Detroit River; Alexandria Bay on the St. Lawrence River and St. Clair Flats on the St. Clair River.

There are other stations in more exposed areas that don't have 44-footers because they are near stations that do. By alternating we can provide the benefits of both types of boats in a general area and still have but one boat at a station when that is all the workload warrants. An example of this is Grand Haven, MI, which is between Muskegon and Holland, each of which has a 44-footer.

Question. How effective are the helicopter services provided by other military agencies as an adjunct to your State and Rescue mission? I recall that an Air Force helicopter dispatched to the recent Eagle Harbor drowning incident was unable to remain on scene due to high winds and that it did not appear to have searchlight equipment?

Answer. The effectiveness of helicopter services provided by other military agencies is somewhat limited by their design and intended mission. The helicopters at K. I. Sawyer Air Force Base and those assigned to the 316th Army Air Detachment in Cleveland are quite small. Their primary missions are search and rescue over land in moderate weather and medical evacuation. They are not designed or intended for lengthy searches over water and are not equipped with suitable illumination equipment for over water searches at night.

Question. Are all Coast Guard-manned units provided with a boat or some kind for emergency use—even if by the public—including Light Stations such as Eagle Harbor?

Answer. All operational Coast Guard-manned units are provided with a boat of some kind except Auxiliary operated stations. Recruiting offices, and other primarily administrative units are not equipped with boats. We do not allow the public to operate Coast Guard boats.

Question. If not, why not?

Answer. Units that do not have boats assigned are those whose missions do not require waterborne activities—either for direct operations or logistics. Units that do have boats assigned have boats of types that are compatible with their need.

We do not allow anyone, public or Coast Guard, to operate a Coast Guard boat unless he or she is trained and qualified in the use of that boat and the mission for which it is to be used. If there is a Coast Guard boat at a unit, there are people there to use it, so there would be no need to call upon a member of the public to operate one of our boats for us.

Question. In an earlier exchange of communications from the Coast Guard I was advised that one of the new 140-foot icebreaking tugs would be stationed at the Soo instead of in Lake Superior. Is this advisable from a SAR standpoint in the light of transit time through the Locks and Upper St. Marys River to a likely point of distress?

Answer. In selecting a homeport for a vessel the size of the 140-footers we must use sites that are in reasonable proximity to primary operating areas and which can provide adequate logistics for the ship, residences for families of the crew and morale and recreation for the crew. Unfortunately, in the eastern end of Lake Superior and Whitefish Bay, the areas of greatest SAR concern for Soo-based ships, there is no community except the Soo that can provide adequate homeport facilities. We are looking very closely at the possibility of also putting a 140-footer in Lake Superior—probably in Marquette. This would complement the ship at the Soo.

Question. A communication from Kewaunee, Wisconsin, made a comparison between war time days and today when the number of pleasure-bound fishing vessels has mushroomed with no available rescue boat. Can you comment on this scene?

Answer. Recreational boating and pleasure fishing are burgeoning all over the Great Lakes—in many areas at an even greater rate than Kewaunee, WI. Fortunately most of the areas of greatest activity have Coast Guard stations well situated to provide coverage. While we do not have a station with rescue capability in Kewaunee, we do have one at Two Rivers, about 24 miles to the south, and another at Sturgeon Bay Canal, about 30 miles to the north. Neither has had a particularly heavy caseload.

Question. What is the status of studies relating to survival of vessel crews? (Consider exposure protection, distress alert; detection, man overboard alarms, protective clothing, evacuation techniques.)

Answer. The below listed studies are completed and are available to the public:

a. Climatological and Environmental Factors that Influence Surivval on the Great Lakes—CG–D–11–74

b. Evaluation of Survival Suits for the Use of the Crews of the Great Lakes Carriers—CG–D–14–73

c. Assessment of the Requirement for Survival on the Great Lakes—CG–D–55–74

d. Man Overboard Feasibility Study—CG–D–75–75

e. Man in Cold Water: Cooling Rate in Heavy Winter Clothing—University of Victoria

f. Treatment of Accidental Hypothermia: An Experimental Study of Inhalation Rewarming—University of Victoria

The below listed studies are in progress:

a. Test and Evaluation of Three Escape System

b. Development, Test and Evaluation of A Self-Encapsulating liferaft.

c. Testing and Evaluation of Portable Hand Held Radar Transponders to Enhance the Aerial Detection of Small Survival Craft.

d. Investigation of Concepts to Define an Inclined Plane Launch System that can be Used to Deploy, Fully Loaded, A Recovery Boat or Survived Craft directly from the Deck of a Merchant Vessel.

e. A study to Address the Viability of Designing Survival Systems that will Reliably Float Free from a Vessel as it Sinks.

f. Testing of VHF–FM EPIRB's in The Winter Environment to Determine Effectiveness and Limitations in Performance.

g. A Sociological Examination to Investigate added Stress Factors to which Personnel Participating in Winter Navigation are Subjected.

Question. What crew safety and survival activities have been tested and studied under the auspices of the navigation season extension demonstration program? (See Page 61, 62 of Demonstration Report.)

Answer. The work program continues to bear heavily on the four most needed areas of survival—individual exposure protection, group exposure protection, distress alert and detection enhancement, and man overboard alarm.

Activities in individual exposure protection saw the prototype constant-wear exposure jacket developed by the Naval Air Development Center delivered for evaluation with the enhanced survival module tested in summer. Determination of survival times in cold water while wearing typical seaman's winter clothing was conducted by the University of Victoria under the direction of the noted physiologist, Dr. John Hayward. Further, pamphlets describing the latest information and techniques for survival in cold water will be distributed to the crews this next winter season.

Activities in the early alert and detection enhancement area included an exercise held last December 1974 with four Coast Guard personnel set adrift in a raft in Lake Huron to test the effectiveness of a radar transponder and other equipment. That test was highly successful. A follow on to that is the distribution of a new radar transponder to several ships in the fleet for evaluation. Further testing was conducted in Lake Erie in April 1976.

Efforts in group exposure protection continue to track with the Coast Guard's own major work. A contract has been let with the U.S. Naval Academy to determine the feasibility of the concepts of launching a survival or rescue vehicle down a ramp or inclined plane to the water and float-off survival craft capability where the ship abandons the survival craft. The results of these initial studies will be available in the fall of 1976.

In the previous fiscal year program, a feasibility study to determine the viability of a man overboard alarm system was made and concluded that two different techniques were viable. Accordingly, a contract has been let this year which will settle on a particular design.

Lastly, while not directly related to the above work, but within the charter of the subcommittee, a contract was let to complete the study of the psychological and sociological impact of the extended season on the personnel working in the extended season. This study was initiated last fiscal year.

Question. Have any special studies been conducted with regard to survival time in cold water and the contribution that special winter clothing would have in prolonging life?

Answer. Yes. "Man in Cold Water: Cooling rate in Heavy Winter Clothing", a study and report done by J. S. Hayward, J. D. Eckerson and M. L. Collis of the Departments of Biology and Physical Education, University of Victoria, Victoria, Canada.

Studies are continuing in cooperation with Canadian Defense Forces and the Australian Air Force.

Question. Describe any other techniques or procedures that such studies may have disclosed for prolonging life?

Answer. Life in cold water may be prolonged by: (*a*) Reducing activity, (*b*) Bringing the body into a tight position to cover the high heat loss areas of the crotch, arm pits, neck; and (*c*) Tightening and gathering clothing to cover the above mentioned areas.

These items are fully explained in the Cold Water Survival Pamphlet which is to be printed and distributed to all the Great Lakes Merchant Seamen.

Question. Is accidental hypothermia a problem in cold weather and water environment?

Answer. Yes, it is a common and serious problem which has been the subject of considerable study in recent years. It results from the rapid rate of cooling which occurs when the human body is immersed in cold water or is exposed to extremes of cold air in accidents ashore.

Question. What studies have been made and what procedures developed to cope with this.

Answer. "Treatment of Accidental Hypothermia: An Experimental Study of Inhalation Rewarming." A study and report done by Professor J. S. Hayward, A. M. Steinman, of the Department of Biology, University of Victoria under Coast Guard Contract and completed in June 1975. The methods and techniques developed in that study are now being tested and refined by the Canadian Armed Services and the Australian Air Force.

Question. I understand that the American Bureau of Shipping increased draft marks for Lake vessels in 1973—with a reduction in freeboard. What adverse effect might this have had on vessel structural integrity?

Answer. To be allowed an increased draft under the 1973 amendments to the Load Line Regulations a vessel had to meet the Federal Strength Standard at the new draft, the Standard being 10% or more greater than the A.B.S. standard for vessels over 710 feet in length.

In that the strength standard is a factor of both length and depth, a greater requirement was imposed at a greater draft. This prohibited some vessels from obtaining a deeper draft and required other vessels to add strength members to obtain approval for the new drafts.

Additionally vessels approved for the new drafts had to remove any square hatch corners, have single piece hatch covers, update all structures to meet the 1973 scantling requirements, and provide for the use of the master and mates an approved loading manual.

The total effect actually improved the overall structural integrity of the vessels affected.

Question. Are any regulations or plans under consideration for critical stress points of a vessel's hull?

Answer. This problem is still under study through Coast Guard and ABS sponsorship in the Society of Naval Architects and panels hull strength–1 and hull strength–2 and through the studies sponsored by the Ship's Structure Committee.

No regulations are presently contemplated.

Question. What lifesaving equipment regulations, if any, does the Coast Guard contemplate issuing for Great Lakes vessels? (See Federal Register for June 7, 1976).

Answer. The Coast Guard is considering proposing amendments to the regulations governing lifesaving equipment on vessels operating on the Great Lakes.

The proposals under consideration include requirements concerning the following subjects:

a. Lifeboat exposure protection.
b. Lifeboat maneuverability.
c. Survival craft availability.
d. Launching of survival craft from stowed positions.
e. Lifeboat capability to float free automatically from a sinking vessel.
f. Personal exposure protection.
g. Communications equipment on survival craft.
h. Lights and reflectorized materials.
i. Standards for equipment substituted for required equipment.

Use of equipment proposed in this notice should improve chances for survival following a casualty requiring vessel abandonment.

Question. What plans does the Coast Guard have for placing Emergency Position Indicating Radio Beacons aboard Great Lakes vessels?

Answer. The Coast Guard is presently developing a portable battery operated EPIRB which will be suitable for storage and use in cold environments. The Coast Guard is also actively engaged with the FCC relating to frequency designations for those devices.

Question. Is it feasible for all new Great Lakes ship designs to have crew quarters above the waterline? Above the main deck? I have been advised that when loaded some living spaces are below the waterline.

Answer. Current construction regulations for Great Lakes vessels require the deck of the crews quarters to be above the deep load water line. This has been a specific point of review prior to allowing any increase in draft under the 1973 Load Line amendments.

Since the period on new construction began with the designs of the *Cort* and the *Blough* in 1968, all new Great Lakes vessels have been designed with all the crews quarters above the weather deck.

Question. Do all automated Light Stations have an emergency generator and/or battery-powered system as a backup?

Answer. Yes.

Question. What consideration has been given to additional watertight subdivisions for bulk Great Lakes freighters? (See *Morrell* Marine Board of Investigation.)

Answer. The status of recommendation 9 made by the Marine Board of Investigation involving the *Daniel J. Morrell* regarding watertight integrity and subdivision is as follows:

The development of subdivision requirements for cargo vessels, both dry cargo ships and tankships, was given consideration by the Coast Guard following the loss of the *Morrell*. Draft regulations were prepared for cargo vessels in 1970 and 1971. These draft regulations were carefully evaluated within the Coast Guard and discussed in relations to international application with the appropriate United States SOLAS Working Groups. On the basis of their evaluation and discussions and in light of the preparatory work being done for the 1973 Pollution Convention relative to subdivision further development work on these draft regulations was suspended.

Emphasis was then placed on presenting the topic of subdivision requirements to the Joint U.S./Canadian Technical Committee for Great Lakes Load Lines. This committee was considering revisions for the updating of the 1935 Great Lakes Load Line Regulations. This portion of their work extended from 1969 to 1973. After careful evaluation of what little agreement could be obtained within this Committee, the Coast Guard felt that the partial requirements which could be imposed would not only be inadequate but would create a false sense of safety. Therefore, further efforts along this avenue of approach were suspended.

Subdivision regulations for new tankships have been placed into effect by recent regulatory action. The regulations affect both ocean and Great Lakes tankships and tank barges.

At the present time, the matter of subdivision for dry cargo ships is an item on the agenda of the IMCO Subcommittee on Subdivision, Stability and Load Lines.

No specific studies have been conducted into the possibility of altering existing Great Lakes vessels to provide subdivision.

Question. What action has been taken to require mechanical disengaging apparatus for lifeboats suspended from Great Lakes vessel davits? (See *Bradley* Marine Board of Investigation)

Answer. 46 CFR 94.10–5(a)(4)(i), 46 CFR 33.10–15(a) and 46 CFR 75.10–5(a)(6)(i) have been modified to require that each lifeboat on all Great Lakes vessels of over 3000 gross tons be fitted with mechanical disengaging apparatus.

In accordance with 44 CFR 75.10–90 and 46 CFR 94.10–90 existing common hook installations may be continued in service so long as they are maintained in good condition for vessels contracted prior to May 26, 1965. However, all new installations or major replacements shall meet the requirements of an approved mechanical disengaging apparatus constructed in accordance with Subpart 160.033 of Subchapter Q.

Question. Have you reviewed the five (5) principal recommendations of the 1959 Marine Board of Investigation into the foundering of the Steamer *Bradley* and, if so, can you advise to what extent they have been accomplished?

Answer. *Recommendation 1.*—The recommendation that all life preservers be provided with crotch straps to hold the jacket down on the body and with a collar to support the head out of the water was not concurred with by the Commandant of the Coast Guard. Leg or crotch straps are not considered desirable on approved life preservers because of the added complications and time element involved in donning and adjusting.

Recommendation 2.—46 CFR 94.10–40(a) and 46 CFR 94.15–10(c)(3) have been modified to require two approved inflatable liferafts for every Great Lakes vessel of 300 gross tons and over, when crew, berthing, and/or working spaces are widely separated. The capacity and location of the liferafts shall be to the satisfaction of the Officer in Charge, Marine Inspection.

Recommendation 3.—Please refer to my answer to the previous question.

Recommendation 4.—46 CFR 94.20–15(a), 46 CFR 94.20–10(a), 46 CFR 33.15–10(a), and 46 CFR 75.20–15(a) have been modified to require two painters on all Great Lakes vessels.

Recommendation 5.—46 CFR 94.20–10(a), 46 CFR 94.20–20(a), 46 CFR 94.20–15(hh), 46 CFR 94.20–25(n), 46 CFR 33.15–5(a), 46 CFR 33.15–15(a), 46 CFR 75.20–10(a) and 46 CFR 75.20–20(a) have been modified to require at least six red parachute type flare distress signals and the means to project them on each lifeboat and liferaft on Great Lakes vessels.

Question. Have you reviewed the eleven (11) principal recommendations of the 1967 Marine Board of Investigation into the sinking of the Steamer *Morrell*, the Commandant's Action, and additional recommendations of the National Transportation Safety Board and, if so, can you advise to what extent they have been implemented?

Answer. The status of actions on the principal recommendations of the *Morrell* Board and the Commandant's Action is as follows:

Recommendations 1 and 2.—46 CFR 94.10–40(a) and 46 CFR 33.05–20(c) have been modified to require the forward and aft liferafts to be of the inflatable type and to provide for 100 percent capacity for Great Lakes cargo and tank vessels of 300 gross tons and over.

Recommendation 3a.—Regulations as recommended have been implemented and a separate source of power close to the radio telephone and well above the water line is required for Great Lakes vessels.

Recommendation 3b.—Requirement for an emergency radio with self-contained source of power was incorporated in the Great Lakes Radio Telephone Agreement between Canada and the United States.

Recommendation 3c.—The U.S. Coast Guard promulgated rules and regulations on 18 March 1974 which required certain inspected vessels in ocean and coastwise service to carry an emergency position indicating radio beacon (EPIRB). The Coast Guard has supported the use of EPIRB's for many years. However, it was not until several major marine casualties occurred that opposition to the carriage of EPIRB equipment, principally from the U.S. Air Force who feared that the radio beacon might disrupt the use of 243 MKz as a military emergency channel, could be overcome. As a compromise measure it was necessary to limit the number of vessels which would be required to carry the radio beacon. It was determined that the device would be most beneficial to those vessels operating beyond the range of VHF radio distress coverage. Consequently the regulations did not extend to vessels transmitting the Great Lakes where VHF radio distress coverage is considered adequate.

Recommendation 4.—A structural examination was made of all Great Lakes vessels constructed prior to 1948. Details of this special examination are on file at Commander Ninth Coast Guard District (mmt). (Report of Structural examinations of Great Lakes Bulk Carriers dated 21 June 1968).

Recommendation 5.—Requiring the owner or operator of each Great Lakes Bulk Carrier to furnish the Master a loading manual which shows the effect of various loaded and ballasted conditions upon longitudinal bending moments including the effects of dynamic forces of free water in cargo holds has been

implemented. All vessels built after January 1970 are required, as a condition of classification by the American Bureau of Shipping, to have a Loading Manual.

Recommendation 6a.—46 CFR 113.25 has been amended to require all Great Lakes freighters contracted for on or after November 19, 1952 to have an approved general alarm system as called for.

Recommendation 6b.—No Coast Guard action has been taken to require separate sources of power at each end of the vessel for the general alarm. After the sinking of the *Daniel J. Morrell,* the Commandant reviewed the question of a general alarm system at each end of the vessel so that if the circuit should be broken due to a casualty, the forward and after general alarm could be operated independently. After review of this question, it was determined that the complications of the system proposed were not engineeringly feasible.

Recommendation 7.—46 CFR 97.15–20 (Hatches and other Openings) requires a vessel's Master to make his hatches watertight before leaving protected waters.

Recommendation 8.—A 24 hour interval reporting system was initiated after the sinking of the *Daniel J. Morrell* and remained in effect for approximately a three to four year period after which it was felt by the marine industry and the Coast Guard that it was not an effective system nor served its intended purpose. As the result of this, the program fell into disuse.

Recommendation 9.—Action taken on this recommendation, which pertains to additional watertight subdivisions for bulk Great Lakes freighters, was discussed in my previous answer on that specific subject.

Recommendation 10.—The National Weather Service (then the U.S. Weather Bureau) immediately initiated all the provisions of this recommendation into their marine weather broadcasts after the sinking of the *Daniel J. Morrell.*

Recommendation 11.—Specifications require that signal pistols be constructed as recommended by the Board. Coast Guard field inspectors were advised to check signal pistols and a letter to manufacturers was sent advising manufacturers of a need to adequately secure screws joining the two major component groups of many signal pistols.

The status of actions on Recommendations of the National Transportation Safety Board in the *Morrell* case is as follows:

Recommendation A.—All Great Lakes vessels were examined to see that they were structurally sound, in all respects, for operation upon the Great Lakes. Those vessels found to have deficiencies were required to make permanent repairs prior to certification of the vessel, and in one instance a vessel was required to be taken out of service.

A program was initiated to inspect 25 percent of the internals (double bottoms) at each winter layup period. This would insure that at the end of the five-year period when all internals (double bottoms) are required to be inspected, that we would have a structural history of the overall condition of the vessel's structural and nonstructural members.

A program was initiated to inspect Great Lakes vessels in way of the cargo hatches, hatch comings, bounding angles, and stringers during the operating season to insure/detect that no cracks are propagated from these highly stressed areas.

Recommendation B.—Great Lakes vessels are inspected each year and only issued a Certificate of Inspection for a period of one year. Any deficiencies or areas that require a special renewal program are brought to the owner's/operator's attention at this time and appropriate plans are sbumitted to the Commander, Ninth Coast Guard District (mmt) for review.

Question. I understand that your SLAR or side-looking airborne radar system provides radar images of ice on the Great Lakes on a near real-time basis—please describe in laymen's terms how this system works?

Answer. SLAR uses an elongated antenna and phased (vertical/horizontal polarity) electronic signals to produce radar images of high resolution, so high in fact, that a 1-inch ice edge is discernible out to the maximum detection range of the radar. A trained ice observer can readily recognize ice formations in the SLAR images. SLAR pictures show images out to 27 nautical miles on either side of the aircraft. A Coast Guard HC–130–B aircraft is equipped with SLAR. The system works like this:

1. The aircraft transmits the electronic SLAR signal and receives the reflected echos.

2. While a photograph negative is being produced aboard the aircraft, the SLAR information is electronically beamed to the NOAA GOES satellite in a synchronous orbit about the earth.

3. The satellite relays the SLAR information to a NASA receiver at Wallops Island, Virginia. The information is then transmitted to the Coast Guard Ice Navigation Center in Cleveland by telephone line.

4. At the Ice Navigation Center SLAR image pictures are produced from the signals.

5. Coast Guard Marine Science Technicians interpret the SLAR images and produce ice charts.

6. The ice charts are sent by facsimile recording equipment to a commercial marine radio station, several Coast Guard stations, other government agencies, and the Canadian Coast Guard.

7. Vessels may obtain the facsimile pictures from the commercial marine radio station broadcast or pick them up in person from a Coast Guard unit.

It takes about three hours for the entire process to take place.

Question. Can you furnish some representatives pictures with interpretative data for the record?

Answer. Yes, attached are the following:

1. Figure 1: The presentation which is received from the aircraft via the GOES satellite.

2. Figure 2: A facsimile reproduction of the transmission from the aircraft (2a) and the ice chart (2b).

3. Figure 3: Photograph reproduction obtained from the aircraft after it has returned.

Note: Figure 1 is not the same geographical location as figures 2 and 3.

[The figures were placed in the committee files.]

Question. Does the Coast Guard Ice Navigation Center superimpose recommended routing or track lines on the SLAR image pictures? If not, why not—at least in an advisory capacity?

Answer. No, we do not superimpose recommended routings on the SLAR pictures. Selection of courses for a particular voyage is a responsibility that belongs to the master of the vessel—and to him alone. It depends on weather (including predicted ice locations), vessel loading, handling characteristics, etc. Much of the information to do the job is more readily available to the master than to Ice Navigation Center personnel, who, in addition, are not experienced in sailing lakers. Furthermore, SLAR images portray the situation as it was some 3 hours before. To select track lines one must predict where the ice will be when a vessel arrives in a given area. This depends on wind conditions and changes. Experienced masters of Great Lakes vessels are far better equipped to make the necessary assessments of future wind effects than our Ice Navigation Center Personnel.

Instead of trying to recommend specific routings, we think it better to provide as much detailed information as possible to the master, including advice on how to interpret the SLAR images. We also provide interpreted ice chartlets for him. He can than add this information to other data he has, including personal observation at the scene, and plan his voyage according to his experienced, professional assessment of the whole.

Question. What other applications have been developed for SLAR that would contribute to safety of navigation?

Answer. SLAR has some limitations as a search and detection device—primarily because it must be complemented by some other means to identify targets sighted. However, some applications besides ice imagery are being explored and some are in use. SLAR in used for iceberg detection by the Coast Guard's International Ice Patrol. Other possibilities being looked at are detection of small objects in the water, wide-path search to speed location of targets of all sizes and aerial surveillance.

Question. To what degree does Loran-C now serve the Great Lakes?

Answer. For all practical purposes Loran-C is not used on the Great Lakes. It is possible to get a line of position using sky-wave coverage from East Coast stations, but until very recently there were no charts a vessel could use. Even now the charts are of such a scale as to be useful only for general positioning. To my knowledge, very few of the "lakers" have Loran-C receivers aboard. Some of the salt water vessels do have them but I do not know the extent to which they use them in the Great Lakes area.

Question. What is the status of planning for the Minnesota Station which is essential to complete Loran-C coverage for the Lakes?

Answer. We are proceeding with site selection and preliminary planning in anticipation of future appropriations. We expect to have the station on the air in 1980.

Question. Once fully operational, will any existing aids become obsolete—such as radiobeacons?

Answer. No. We will have to continue existing aids such as radiobeacons for users who do not have or cannot afford Loran-C. I expect the primary users of radiobeacons will be recreational boaters eventually. Hopefully, the complexity of the radiobeacon system can be reduced. After Loran-C has proved itself with commercial vessels, we would like to replace long range and sequenced radiobeacons with marker beacons. I am sure that major vessels will all use Loran-C eventually. Of course normal audio-visual aids such as buoys and lights will continue in use.

Question. What other applications are contemplated for the Loran-C system?

Answer. A large number of miscellaneous uses for Loran-C are planned for or under consideration. The following are some examples:

1. *Offshore Helicopter Navigation to Oil Rigs, etc.*

2. *Overland Aircraft Uses.*

Forestry Service—(Firefighting).—Men on ground with a light portable receiver retransmit LC signal so aircraft can rendevous with ground crews in remote areas. Also, firefighters can be airdropped with accuracy within a few feet.

Department of Agriculture.—To maintain spray patterns for pest control.

FAA.—Area navigation, point to point, for aircraft and non-precision terminal approach navigation.

3. *Vehicle tracking.*—Police cars, ambulances, etc. Control vehicles by retransmitting LC signal every 30 seconds.

UMTA.—Keep track of buses, routes, and schedules.

FRA.—Keep track of boxcars.

New York State.—Develop reference system on rural roads. The state was planning to establish 0.1 miles sign. LC grid saves this cost.

Tracking of vehicles carrying dangerous or precious cargo.

4. *Census Bureau.*—Use in developing demographic grids of various kinds.

Question. What attention has been given to the development of an automatic vessel position-reporting system using Loran-C?

Answer. As I mentioned in my discussion of other potential uses of Loran C, it can be used for vehicle tracking. The same basic principle could be used for keeping track of vessel positions within the Great Lakes. Except for being aware of the potential to meet some future perceived need, little attention has been devoted to this application of Loran C in the Great Lakes. Except during ice season, when information on vessel progress is essential to planning icebreaker operations, a general position reporting system for vessels on the Great Lakes would be of questionable value, considering the excellent communications available when needed and the staggering load that would be added to the communications net by such a system.

Question. Would not such a system reduce the dependence on voice radio reporting?

Answer. Such a system would reduce dependence on voice reporting, but that would not be all good. It would substitute for voice reporting a heavy load of data reporting. It would also require separate frequency allocation and other technical coordination and clearances on an international level. Voice reporting now is limited to special situations in specific areas and to winter operations (when relatively few vessels are operating) so the reduction from present practice would not be significant. At present the benefits do not warrant the cost and complications.

Question. Can you estimate what impact a vessel reporting system would have on Coast Guard resources?

Answer. Not in any meaningful way. Resource requirements depend on the nature of the system that may be selected, and we have not yet really addressed that in any specific way.

Question. What is Mini-Loran?

Answer. Mini-Loran is, as its name implies, a miniature version of a coastal Loran-C electronic navigation system. Because the "mini" system is intended for use in restricted navigating areas such as the St. Marys River, it must provide much more accurate positioning data than a coastal system does. In the St. Marys River, for example, we are striving for a positioning accuracy of better than 25 feet as compared to the 50 yard accuracy generally accepted as "good enough" for the coastal system. This is achieved by strategically locating a master station and its secondary stations to provide optimum geographical relationships for near right angle crossing of lines of position. Because they cover a very small geographic

area, the "mini" system transmitters can be of much lower power (and cost) than for a conventional system. This small geographic area of coverage is also what makes the higher degree of accuracy possible because it permits optimal crossing angles of lines of position throughout the coverage area and reduces the opportunity for signal distortion by terrain and atmospheric conditions.

The USER equipment being designed for use with this system will provide the following information to a ship master: position quality, off track distance in feet R or L, cross track speed in feet per second, attitude to track in degrees R or L, present track heading in degrees true, next track heading in degrees true, miles to next turn, along track speed in miles per hour, time to next turn in hours, minutes, and seconds, and lead distance in feet.

Question. How successful has the pilot installation been?

Answer. So far we have been very encouraged by the few test runs we have made using rather basic first generation equipment. The signals are very stable and have produced accuracies even better than expected in some reaches of the St. Marys River. I am confident the system will be very successful once we get all the "bugs" out.

Question. What is the status of user equipment?

Answer. The USER–II system, commercially developed under Coast Guard contract, has recently arrived at Sault Ste. Marie. It will be installed in CGC *Naugatuck,* which will navigate the St. Marys River using the USER–II system.

The USER–I system, used to develop calibration information for the river, will remain installed in *Naugatuck* to provide additional and comparative data for evaluating both systems. We hope to evaluate USER–II on board a commercial vessel this fall and to receive additional user imput to design needs.

Question. What other areas are likely subjects for Mini-Loran systems?

Answer. In the Great Lakes/St. Lawrence Seaway region, the only other areas that are worthy of consideration for Mini-Loran are the Seaway itself and the Detroit and St. Clair Rivers. We do expect it to have considerable application in other parts of the country, however—in navigation areas whose problems are similar to those of the St. Marys River.

Question. Is this user equipment compatible with standard Loran-C receivers?

Answer. This is one of the design criteria we established at the very beginning of the project—and someday it will be so. At present, however, not all Loran-C receivers are capable of the fine resolution needed to produce the accuracy required to take full advantage of Mini-Loran's capabilities. Recievers capable of full tie-in with Mini-Loran User equipment can be used to navigate anywhere in the Loran-C coverage area, however, The solution for the near future is for vessels, such as lakers, which operate regularly in a Mini-Loran coverage area, such as the St. Marys River, to install receivers capable of using the Mini-Loran signals. Those making occasional passages will have to rely on normal audio visual aids complemented by regular Loran-C. Later, we hope to be able to use portable equipment, installed for the voyage, for these vessels—until Mini-Loran is more common and they have receivers installed that can work with the USER device.

Question. Would a "salty" coming into the Lakes be able to "plug" his standard Loran-C receiver into the Mini-Loran system?

Answer. That, too, was a basic design criteria of the system. As explained in my answer to the previous question, where vessels have receivers of required capability, they will be able to "plug in" to the USER equipment. Transient vessels would have portable USER equipment which they would use only for the particular voyage.

Question. We have asked questions (or will) relating to Loran-C, Mini-Loran, and SLAR—as aids to navigation and as possible integral parts of a Vessel Traffic Control System—will you briefly describe the component parts of the St. Mary's River Control System?

Answer. The regulations regarding navigation of the St. Marys basically provide for a manned vessel traffic control service which includes bridge to bridge radiotelephone (Great Lakes Radio Agreement, 1973), speed limits, anchorage regulations, traffic separation (around Neebish Island), vessel movement reporting and limited surveillance. The Captain of the Port operates the service from a control center at Sault Ste. Marie. Vessels report in and receive appropriate directions via VHF–FM radio telephone. Surveillance is conducted with a low light level, closed-circuit television camera located at Mission Point in Little Rapids Cut and with a manned lookout station at Rock Cut in West Neebish Channel. The primary purpose of the surveillance is to monitor visibility and ice conditions in

the river. The secondary purpose is to monitor vessel passages and speeds. Vessel speeds are also checked by mobile teams with radar. Vessels and boats are available for use in controlling traffic, if required. Equipment now under evaluation includes Mini-Loran-C and remote visibility-monitoring equipment.

Question. What is your authority for this operation?

Answer. Anchorage and Navigation Regulations; St. Marys River Michigan (33 CFR 92) are issued under the authority of 33 USC 474 (Anchorage and General Regulations for St. Marys River.)

Question. The Ports and Waterways Safety Act of 1972 would authorize the Coast Guard to "control vessel traffic in areas . . . especially hazardous, or under conditions of reduced visibility, adverse weather . . . etc.". Have you considered applying this authority to situations like those that beset the *Fitzgerald?*

Answer. Yes, I have considered it and I have generally concluded it to be unwarranted and impracticable. There is a variation of the idea, however, to which I am giving serious thought. That is the feasibility of working with the National Weather Service to develop a large craft advisory system along the lines of the small craft warnings that have been issued for years. The present storm warning system may suffice for this purpose, however.

Question. Have you consulted with representatives of marine industry, etc., with regard to such an exercise of authority?

Answer. Only in a very general and preliminary way—and only as regards the large craft advisory idea.

[Whereupon, at 12:40 p.m., the committee recessed subject to the call of the Chair.]