

NON-TECHNICAL PROBLEMS
OF
NUCLEAR MERCHANT SHIPS

A Study Under the Auspices of the Maritime Administration

United States Department of Commerce

The Study Staff

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PREFACE

This research study was commissioned and financially supported by the Maritime Administration, United States Department of Commerce. Its aim was to investigate the non-technical problems which the first and subsequent nuclear merchant ships will encounter, so that the Maritime Administration, in its planning for the operation of the first nuclear merchant ship, the N.S. SAVANNAH, and its consideration of governmental policy to foster subsequent nuclear merchant ships, would have available the thinking of a research group as to the alternative solutions which might be feasible. Neither the findings concerning the problems nor the suggested alternative solutions are to be interpreted as embracing the official position of the Project's principal, the Maritime Administration. Nor do they represent the Nuclear Projects Office, the administrative unit possessing an organizational status in both the Maritime Administration and the Atomic Energy Commission (as the Maritime Reactors Branch). The study has, then, been an independent one, not attempting to reconcile opinions of the report with official positions currently being held by the Maritime Administration.

The Project staff believe that many advantages could be served by making the report public. Since it merely defines many of the issues and indicates where further work should be taken, it would serve to stimulate further exploration of problems and solutions. Furthermore, the objective of making nuclear merchant ships commercially feasible involves somewhat intangible considerations, such as the public acceptance of the safety of nuclear shipping, the proper allocation of liability for nuclear incidents as between the Government and the ship operators, and the arrangements for the accommodation of nuclear shipping in port areas. All of these considerations would be helped toward practical and complete solution much more easily by extra governmental discussion for which this report could serve as a basis.

The principal planner and coordinator for the entire report was Mr. Alfred B. Clubok, presently associated with the University of Florida. The principal investigator on the legal section was Mr. Leonard S. Sandweiss, presently associated with the University of Michigan. The principal investigator of the public information program for the N.S. SAVANNAH was Mr. Leon Gordenker, presently associated with Princeton University. The principal investigator of the foreign legal aspects of the report was Mr. Robert M. Northrop, presently associated with Rutgers University.

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I. INTRODUCTION

The utilization of energy released by a controlled nuclear reaction is a technological development of rapidly growing importance both in the United States and abroad. Of many possible uses of nuclear energy, perhaps most important is the harnessing of such energy to perform tasks which formerly depended on the world's limited conventional fuel resources. Ever since World War II the problems of producing electric power from nuclear energy have been under study, and the results may be seen today at Shippingport and Calder Hall and elsewhere. Although nuclear power is still more expensive than power produced by conventional means, progress has been so rapid that in some areas this will no longer be true in a very few years.

Nuclear energy can also be used as a source of motive power, and a great deal of careful planning has been devoted to this field in recent years. The possibility of propelling ships and other sea-going craft by means of nuclear energy was made real with the launching of the NAUTILUS in 1954, and her achievements since that date are known throughout the world. In 1957 the United States embarked upon a new program to design and construct a nuclear-powered surface vessel for commercial use. By 1960 this first nuclear merchant ship, the N.S. SAVANNAH, will begin providing the experience necessary to the full-fledged introduction of nuclear propulsion into the world's shipping industry.

As in the case of land-based power reactors, there will be many technical problems to solve before a nuclear-powered merchant ship can compete cost-wise with a modern conventionally-powered vessel. The results of a nuclear ship symposium held in Washington in August, 1958, suggest that these problems may well be solved more rapidly than had been anticipated. As reported in the press, the really widespread application of atomic power to merchant shipping had been considered at least two decades away. This thinking had to be revised as a result of the analyses prepared for the symposium. Evidence presented supported a conclusion that "nuclear ships can economically compete now with conventional ships on long trade routes at high speeds." A representative of the General Electric Company presented significant data on a proposed tanker to be driven by a boiling water reactor. The initial economic performance of such a vessel, he said, would be within 5 per cent of a conventional tanker. On the basis of such revelations, it seems fully justifiable to conclude that the technical problems of nuclear shipping are being solved with unanticipated swiftness, and that economically competitive nuclear ships are not too far in the future. ¹

These are not the only technical problems, however. We must

also face the problem of nuclear accident. While an atomic explosion caused by a reactor may be considered virtually impossible, the possibility of the escape of radioactivity has received a good deal of attention. One of the advantages of nuclear propulsion, of course, depends on a lengthy fuel cycle. While this means lower costs, it also means that a considerable amount of radioactive fission products accumulate within the reactor. Release and distribution of these fission products could cause personal injury and death, as well as property contamination -- indeed, in a populous area under certain conditions such an incident could amount to a major disaster.

The possibility of accident and the means by which it might be prevented have received much attention. Occurrences which are to be guarded against are a runaway reactor - an uncontrolled reaction - and a loss of coolant both of which would allow the radioactive decay heat to raise the temperature and produce a reactor meltdown. In such a case the temperature of the fuel elements rises so high that actual mutilation of the metal occurs. This of itself results in the emission of fission products; if it is accompanied by chemical reactions, the dispersion of the fission products may be increased.

Many safeguards have been designed to prevent such occurrences; for example, an auxiliary cooling system can take over in case of damage to the primary system. In addition, containment vessels have been developed to hold in the fission products if all protective devices should fail and meltdown should occur.²

The result is that the possibility of a major nuclear accident is almost "vanishingly small." Nevertheless, the damage could conceivably be so great that even the one chance in ten million must be provided for. Hence we must assume that there is some risk which cannot be eliminated by technical inventions, and we must make arrangements to determine who shall compensate for the damages in case of accident. The same assumption was made in the case of reactors ashore; the fact that the government is willing to indemnify for liability up to \$500 million indicates that an atomic incident cannot be considered a total impossibility.

It may well be that there is even more justification for such precautions in the case of a ship reactor. Among other things, the possibility of collision with another ship suggests itself as a possible danger. Ship collisions are by no means the rarest of occurrences, although they seldom attain the magnitude and drama of the ANDREA DORIA - STOCKHOLM affair. In theory, one can imagine a collision which would so penetrate a containment vessel and so damage the reactor as to set the stage for a release of fission products.

Again, these matters have been anticipated, and the planning of the N.S. SAVANNAH has proceeded accordingly. As a result of the placement of the reactor, the provision of collision mats, and other factors, it was asserted at the Washington symposium mentioned earlier that if the SAVANNAH were to be struck by the STOCKHOLM as that ship struck the ANDREA DORIA, the reactor containment vessel would not be damaged and there would be no fission product release. Certainly the possibility of a major nuclear incident in a shipping situation will be, as was the case for land-based reactors, exceedingly small. Yet there are more unknown factors here, and there is certainly as much ground for laying plans to handle contamination from a ship reactor as there has been in the case of land-based reactors.

So we must start this study with two given technical characteristics of nuclear shipping. It could be really hazardous if some big effluence of radioactive materials should occur. It is also really useful both as a better means of propulsion and as a matter of world leadership in the peaceful applications of atomic energy. So we want to protect ourselves from the possible trouble, but at the same time we do not want to hamper development of this new use of atomic fuel. This involves a two-fold job. First it entails pushing ahead with plans for the SAVANNAH as the trail-blazing merchant ship, in whose path nuclear ships to come can easily follow. Mr. Richard P. Godwin has explained this mission well as follows:

This ship is a pioneer, not only technologically, but also in the sense that it will open the question of commercial nuclear propulsion through its entrance into the various ports of the world. We recognize the importance of such problems as the development of construction codes and regulations, the agreement on operating procedures and techniques, the training of crews, the acceptance of nuclear ships by the various port authorities, and the development of a world commercial environment in which ship owners could assess the financial risks and incentives which would be involved in building privately-owned nuclear ships.⁴

The second job to be done is to devise means of protection from the possible risk, so that this first and other nuclear ships will be accepted, looked upon with favor, let into port even if no accident occurs, and so that if someone does unavoidably get hurt, he will have it made up to him by having adequate remedies and compensation available.

The risk problem is primarily a legal matter. However, devising the legal framework which will be needed to provide for liability and recovery of damages in case of nuclear incident is not the only non-technical problem standing in the way of nuclear

shipping. The situation is much broader than that; indeed, the question is how a nuclear powered merchant ship will fit into the overall pattern of arrangements which has been fashioned by the shipping nations of the world, over a period of centuries, to govern the ownership and operation of commercial vessels. Of this pattern the question of liability and assessment of damages is only a part, albeit an extremely crucial and pressing part. The question is also how a nuclear ship's mobile reactor is to be controlled by atomic energy statutes which have been developed for land-based reactors in a fixed location. In effect, what is needed is a fusing of emerging but as yet indefinite atomic energy law with historic and intricate admiralty law.

The SAVANNAH has become important, too, as a further manifestation of the interest of the United States in the peaceful applications of nuclear energy. Undoubtedly there will be a great deal of interest among the nations of the world, particularly the shipping nations, in this first commercial atomic vessel. By taking advantage of this interest, it appears certain that the groundwork can be laid for an understanding and acceptance of nuclear shipping and at the same time for a clearer idea of the interests and achievements of the United States in peacetime atomic energy in the minds of the various peoples of the world.

This report relates to these three non-technical problem areas involving nuclear shipping and the SAVANNAH. Part II deals with the legal problems. The questions considered are: what is the law now on accidents in admiralty and how might it be changed so that damage is taken care of but at the same time so that the shipping industry can go ahead with atomic propulsion without the risk of bankruptcy if there is an accident. As the first nuclear ship in the form of a public vessel on a governmental mission, the SAVANNAH will present some unique problems of legal status and government liability. These are treated in Part III. Both the SAVANNAH and subsequent nuclear shipping will have to be fitted into a pattern of control and regulation by various United States Government agencies. The first section of Part IV will be devoted to this question.

However, solution of the legal and administrative problems is not the whole story. The future for nuclear shipping would look a lot brighter if, in addition to establishing a legal framework to protect the public, the United States could get the SAVANNAH in and out of ports easily and without special handling - in other words, a successful inauguration of nuclear shipping. In Part IV we treat on the special considerations involved in getting the SAVANNAH in and out of domestic and foreign ports.

The initial period of operational evaluation of the SAVANNAH

provides a great opportunity to build a favorable public opinion and much good-will throughout the world. But it will be necessary to get off on the right foot, play it right, and take every advantage of the time when large numbers of people will be interested. This justifies a lot of planning to get acceptance abroad and take advantage of the actual visits in foreign ports. In effect, this entails a public information program, which we outline in Part IV and apply in detail to Great Britain, the Netherlands and France in the Appendices.

II LEGAL PROBLEMS OF ALL NUCLEAR VESSELS

The legal problems associated with nuclear shipping center around two main areas: (1) problems of jurisdiction, (2) problems of liability. Accordingly, these subjects will furnish the two main headings in this section.

The problems of jurisdiction will concern us with the boundary lines between different governmental controls arising within the United States and outside the United States. Liability problems will involve a discussion of substantive admiralty law as well as problems of indemnification and conflicts of laws.

JURISDICTION OVER NUCLEAR SHIPPING

Nuclear shipping employs atomic (nuclear) energy, closely regulated in every country in which it is utilized. The great amount of government control arises from (1) the military potential of atomic energy which dictates the necessity to keep some of its applications secret and (2) the danger of injury to public health and safety which careless use of atomic energy could cause. Accordingly the United States Atomic Energy Act¹ prescribes procedures in great detail for the private utilization of atomic energy. Government ownership is retained for all special nuclear material² (material "capable of releasing substantial quantities of atomic energy").³ Licenses are required to possess and use special nuclear material,⁴ utilization facilities (nuclear reactors and components),⁵ production facilities (reactors or separation plants making special nuclear material),⁶ source materials (uranium and thorium and material "essential to the production of special nuclear material"),⁷ and byproduct material ("any radioactive material except special nuclear material yielded in or made radioactive by exposure to the radiation incident to the process of producing or utilizing special nuclear material").⁸ As other countries permit greater non-governmental use of atomic energy their statutes in turn will introduce complicated regulatory schemes for its control

The American licensing provisions present special problems for nuclear vessels because they require that the licensee's activity be under or within United States' jurisdiction. Specifically, Sections 103 and 104, which provide for the licensing of utilization facilities, and without which no American nuclear vessel could be operated, state:

No license under this section may be given to any person

for activities which are not under or within the jurisdiction of the United States....⁹

The fuel used in the ship's nuclear reactor will be special nuclear material, for which a license is required. Section 57b of the Act specifically states, moreover, that: "The Commission shall not distribute any special nuclear material (1) to any person for a use which is not under the jurisdiction of the United States...." ¹⁰

The problem with vessels is that they ply from country to country. While doing so, are they "under or within the jurisdiction of the United States"? There are three situations which we must consider: (1) when the vessel is in United States territorial waters, (2) when the vessel is on the high seas, (3) when the vessel is in foreign territorial waters. It is clear enough that the vessel while within United States territorial waters would satisfy the provisions of the Act. The same would seem to obtain when the vessel is on the high seas. The case of the S.S. Lotus gives the rule:

... a ship on the high seas is assimilated to the territory of the state, the flag of which it flies. For just as in its own territory that state exercises its authority upon it and no other state may do so ... it follows that what occurs aboard a vessel on the high seas must be regarded as if it occurred on the territory of the state whose flag the ship flies. ¹¹

It is clear, then, that the United States does have jurisdiction over vessels on the high seas which fly the American flag.

The only remaining question would be: did Congress intend to include this type situation when it wrote the Atomic Energy Act? In Cunard Steamship Company, Ltd, v. Mellon ¹² the same type of situation arose. Congress had passed the National Prohibition Act which prohibited the possession of intoxicating liquors within "the United States and all territories subject to the jurisdiction thereof." The court held that, although a ship flying the United States flag is under the jurisdiction of the United States, Congress did not intend to include vessels on the high seas, when it forbade the possession of intoxicating liquor in territory subject to the jurisdiction of the United States. The court said, however, that there is no doubt that Congress could have made vessels on the high seas subject to the act, had it so desired. It is true that "under or within the jurisdiction of the United States" would appear to allow more room for application to vessels on the high seas than would "territory subject to the jurisdiction thereof." We point out the problem, however. Congress could easily clear it up by making provision for nuclear ships, specifically.

The situation can not be so easily resolved, however, when we deal with a vessel in foreign territorial waters. Fenwick's

International Law, suggests the difficulty:

When merchant vessels leave the high seas and enter foreign ports, the jurisdiction of their national state comes into conflict with the jurisdiction of the foreign state. This conflict has been adjusted by treaty and custom so as to permit the exercise of a limited jurisdiction by the flag state without encroaching upon the ultimate jurisdiction of the territorial state.¹³

The jurisdiction of the flag state, then, is subservient to the jurisdiction of the state in whose waters the vessel lies. Any jurisdiction which the flag state retains is fixed by custom and treaty rather than by sovereign right. The United States itself has invoked its ultimate jurisdiction over foreign vessels in our ports. In *Strathearn S.S. Co., Ltd. v. Dillon*¹⁴ the libelant instituted an action in a United States court to recover wages. The libelant was a foreign seaman, and the respondent a foreign merchant vessel. The issue was whether the United States law or the foreign law applied. The court said:

It was for this government to determine upon what terms and conditions vessels of other countries might be permitted to enter our harbors and to impose conditions upon the shipment of sailors in our own ports, and make them applicable to foreign as well as domestic vessels.¹⁵

In the *Cunard* case alluded to above, the court decided that the National Prohibition Act covered foreign vessels in United States territorial waters. It would be stretching language very much, then, to say that "under or within the jurisdiction of the United States" applies to American vessels in foreign waters. If the United States is to have a nuclear vessel fleet the atomic energy licensing procedures will have to take account of the fact that vessels in foreign waters are under the ultimate jurisdiction of the foreign nation, whose interest in asserting control over atomic energy operations within its jurisdiction might be overriding.

The possibilities for conflict between the United States and foreign atomic energy statutes are great when a United States nuclear vessel is in foreign waters. As we have asserted, nations are very much concerned over the presence of nuclear installations within their jurisdictions, if for no other reason¹⁶ than fear of a nuclear incident. The British Atomic Energy Act¹⁶ as amended has several sections which create difficulties. Section 4 empowers the Minister of Supply to compel the divulgence of information about materials, plant, and processes concerning atomic energy. Section 5 authorizes the Minister of Supply to appoint a person who, on production of authority, may enter any premises where he has grounds for believing that radioactive substances exist, or where atomic energy is being utilized, and

may inspect the premises and any of the materials found therein. He has the additional authority to make copies and drawings of information found. Section 8 gives the Minister of Supply the right to acquire radioactive substances and any plant designed for the production or use of atomic energy, by compulsory process. Under Section 10 the Minister may prohibit the use of any nuclear energy plant, except by a license granted by him. It is not clear whether the British Government would apply these sections to a foreign nuclear vessel, but if it did not, it would be solely from comity or treaty, not from lack of jurisdiction. These provisions conflict directly with the provisions of the United States Atomic Energy Act which, for example, penalize those who communicate Restricted Data to persons not authorized to receive it.¹⁷ The British Minister of Supply is not authorized, under the United States Act, to receive Restricted Data from licensees. He could receive it legally only from the United States Government under an agreement for cooperation.¹⁸ The United States and United Kingdom agreement for cooperation on the civil uses of atomic energy does not obviate the problem.¹⁹ Article I (a) states that the parties shall assist each other in the achievement of use of atomic energy for peaceful purposes "subject to the applicable laws, regulations, and license requirements in force in their respective countries."²⁰ A Bill now being considered in the United Kingdom provides that all those who utilize a plant which produces atomic energy must have a license.²¹ "Plant" does not include "anything comprised or to be comprised in any means of transport, whether by land, water, or air."²² Under this Bill, it appears that no license would be required for a nuclear vessel. An explanatory Memorandum states that the purpose of the Bill is to control land-based reactors.²³ The possible conflicts under the new Bill are less than under the existing legislation; nevertheless, it is obvious that diplomatic negotiation to settle whose law applies to what is imperative, not only with the United Kingdom but with any nation to whose ports American nuclear vessels go.

A further source of potential jurisdictional conflict relates to admiralty in rem procedures, according to which a vessel is treated as a person for purposes of suit. If a vessel incurs liability it can be libeled and sold to satisfy the judgment. When this occurs, all parts of the vessel may be attached no matter who owns the various parts of it. The John G. Stevens states the rule:

The offending ship is considered as herself the wrongdoer, and as herself bound to make compensation for the wrong done. The owner of the injured vessel is entitled to procedure in rem against the offender, without regard to the question who may be her owners, or to the division, the nature, or the extent of their interests in her. (Emphasis supplied.)²⁴

The fuel in an American nuclear vessel will be special nuclear material owned by the United States Government. If it were owned by anyone else, clearly it could be attached, whether owned by the shipowner or not. But for the Government-owned special nuclear material in the reactor of the ship, the doctrine of immunity of sovereign property from attachment would probably prevail over the admiralty in rem procedure, were a nuclear vessel libeled. This could be done by requiring the licensee to post bond with the Atomic Energy Commission equal to the value of the special nuclear material. Thus in the event that the vessel is attached, and the owner does not post bond for the entire vessel to keep it moving, the Atomic Energy Commission can retain its title to the special nuclear material by turning over to the libelant the amount of the bond posted with it. However, the title to the special nuclear material is of little use to the Government in this situation. The fuel remains in the ship which is no longer in the possession of the licensee. Furthermore, physically it cannot be removed except at certain dockside locations where cranes and decontamination facilities are available. In fact, the nuclear fuel and the ship for both economic and safety reasons should remain inseparable until the end of the fuel cycle.

Furthermore, the nuclear reactor as well as the special nuclear materials in it will be under license from the United States Atomic Energy Commission, which will not want either to be used by unlicensed persons. To obviate this difficulty, the Atomic Energy Commission could require the licensee to post a bond with it in the full amount of the vessel and its fuel so that the Atomic Energy Commission can turn this over to the libelant in return for letting the ship go free. This would unfortunately add to the expense of operating a nuclear ship. Another solution would require international agreements to the effect that nuclear ships be free from libel in return for inter-governmental guarantees of meeting liabilities to the full value of the ship.

Jurisdictional conflict is not limited to international matters. Within the United States the potential for state-federal difficulties is manifold. Other works on atomic energy go into this question in great detail; we shall not do so. Suffice it to say that there is a problem: how much may states regulate in an area already regulated by the Federal Government? In the case of nuclear vessels the issue will also arise in regard to state port regulations, which, it has been reported to us, are often very strict.

LIABILITY PROBLEMS

A prevalent attitude is that atomic energy cannot easily slip into the present legal doctrines--that a change in technology of such magnitude requires some modification of the law. In this section, it is our purpose to examine doctrines of liability in admiralty law, and note whether they are adequate to cope with atomic energy. Where we find them not to be so, we will offer some suggestions about changing them.

The possibility of a nuclear incident cannot be lightly dismissed. Especially is this so in regard to nuclear vessels. We are not scientists, but a glance at the technical literature on nuclear vessels suggests some possible hazards. There are, first of all, all the problems which land-based reactors could have: improper disposal of waste which contaminates the atmosphere or bodies of water nearby, radiation of persons working with the reactor, run-away reactor causing an explosive release of nuclear energy.

These problems are magnified when the reactor is on a vessel. There is always the possibility of collision. Historical data show that there will generally be seven accidents per year involving ships of over 20,000 tons dead weight.²⁵ (Nuclear ships will be in that classification.) Of the seven accidents, about three or four will occur in or near ports, or in contained bodies of water. One author concludes:

When nuclear-ship programs are in full stride, say about 1970, they may suffer one or two of these accidents each year near populated areas. Thus, although land based reactors may be designed with the understanding that major catastrophes (earthquakes or floods) are quite unlikely, ship reactor designs must consider the fact that earthquake proportion damage is a real possibility.²⁶

In case of collision, grounding, torpedoing, etc. the reactor will have to be fool-proof. One alternative in such cases is to utilize "scram control."

Scram control involves the overriding of all automatic control features by inserting large rod absorptivities into the reactor core to sharply curtail its neutron flux... From the safety view-point the scram actuator mechanisms constitute dominant concern. They must be absolutely reliable under all conditions. (Emphasis supplied.)²⁷

An accident may be so severe that abandonment of the ship is necessary. In such a case safety would require that the reactor be stopped and that the then existing radioactive contaminants be permanently contained within the core safety tank.²⁷

Another special feature about vessels which might pose concern is the possible failure of one or more of the reactor fuel elements. One writer states the difficulty in this manner:

Because of the great number of fuel elements in a reactor, they usually are grouped into bundles. For nuclear plants ashore, these bundles are lowered into place with no undue concern for their inservice arrangement. On shipboard, however, new hazards are introduced by normal vibrations and poundings at sea. A nuclear ship rising up on one wave and slamming down on the next would only too readily loosen its fuel elements. The subsequent disarrangement would set up restrictions to the flow of coolant, thus producing rapid failures.²⁸

We do not wish to suggest that nuclear vessels are a perilous proposition. That is not the case. Atomic powered submarines have operated without mishap. Planners of nuclear vessels have, of course, been aware of the problems discussed above, and have provided for them. For example, it was asserted at the Washington symposium, as we have mentioned earlier, that due to the placement of the reactor, installation of collision mats, and other factors, there would be no fission product release if the SAVANNAH were to be struck by the STOCKHOLM as that ship struck the ANDREA DORIA. On the other hand, prudence requires taking account of the possibility of accidents, however slight the possibility may be. Discussion, then, of possible liability from nuclear mishaps is in order; especially is this true in regard to nuclear vessels.

Liability in Admiralty Law

Since this report is not being written for lawyers only, and since admiralty, anyway, is a narrow specialty, it is advisable to sketch a very general picture of liability in admiralty law before we concern ourselves with specific problems.

In admiralty law, generally, except for seamen's rights, one who has been injured may recover from another only if: (1) the other caused the injury, (2) the other was at fault. Liability is predicated on fault. One is at fault if he departs from the conduct of a reasonable and prudent man in the same position.

Collision liability follows this general rule, found also in the common law, of course. Collision law differs from the common law, however, in that contributory negligence is no defense. Some nations apportion damages according to the degree of fault of each vessel; American law, however, either finds one party totally at fault, in which case he is liable for all the damage, or finds that both were at fault, in which case

the damage is divided equally, although the fault may not have been equal.

Although admiralty deals with vessels on navigable waters, it, nevertheless, is concerned with injuries consummated on land. This was not always true in American admiralty law, nor is it true now in some foreign nations. In 1948, however, Congress passed the Extension of Admiralty Jurisdiction Act²⁹ which provides that any injury caused by a vessel on navigable waters can be a maritime tort. "Caused by" are the tricky words in this provision. It is clear that they are not restricted to actual physical movement into something. In *Hovland v. Fearnley* the court held: "... for an injury to be caused by a vessel within the meaning of the Act, it is not necessary that the vessel itself be the physical instrumentality producing it."³⁰ In this case, the court allowed damages under the act to a person who had slipped on a gang plank, and who alleged that the negligence of the ship's personnel had caused his fall. It seems clear that an injury sustained anywhere-- on land as well as on sea--comes within admiralty so long as a vessel, lying in navigable waters, caused it, and that cause means more than actual collision. Negligence is the standard of liability for these types of injuries also.

A ship owner can be liable if he or those working for him negligently cause injury to cargo. He is not liable, however, for every injury caused by a negligent act. The law excuses the shipowner from liability if cargo is damaged due to faulty navigation or management of the vessel, provided that the owner has exercised due diligence in furnishing a seaworthy vessel. The law will hold the owner liable if cargo is damaged because of an unseaworthy vessel, which due diligence could have prevented, or faulty stowage, care, or delivery. In no case is the owner liable for damage to cargo without negligence.

Admiralty law is not as lenient toward owners when seamen are involved. In fact, nowhere else in admiralty law will one find such a strict standard of liability imposed. Seamen generally have three remedies, each of which has its own peculiarities, and overlaps to some extent with the others. Basically, the three remedies are: (1) maintenance and cure, (2) recovery for unseaworthiness, (3) the Jones Act remedy. Since these remedies are so complex and involved,³¹ it seems almost absurd to try to give a general picture in one paragraph. But we shall attempt this anyway. (Later we shall go into much more detail.) Maintenance and cure is a type of insurance, resting neither on negligence nor cause. If the seaman becomes incapacitated while he is subject to duty with the vessel, the owner of the vessel has a duty to provide for his care and maintenance. The Jones Act and unseaworthiness are compensatory remedies, by which the seaman

is entitled to recover from the owner if he is injured as result of his employment. Theoretically, the Jones Act requires negligence, whereas unseaworthiness does not. The two remedies are often applicable to the same facts, and as the years progress the two are becoming more alike--the requirement of negligence in Jones Act cases becomes increasingly easier to satisfy. In this tangled area, one finds the only place in admiralty law, as it stands today, where the owner is liable without negligence, and sometimes without even having caused the injury.

Another feature of admiralty law with which the reader should be familiar before we venture further is the doctrine of limitation of liability. Since this doctrine will not receive its own comprehensive treatment elsewhere, we shall deal with it in more detail than we have with the other doctrines so far.

Limitation of liability grew out of the ancient law of abandonment, under which the owner of a vessel would satisfy claimants by leaving his vessel to them. No matter how damaged his vessel may have been, that is all the claimants could get from him. Limitation of liability is founded on the same basic idea, although it is now more sophisticatedly garbed. The policy reason behind limitation of liability is to encourage investment in shipping. It was thought, when the law was promulgated in the United States, that few persons would invest in vessels if their liability risk exceeded their investment, especially since once the vessel left port, it was out of the owner's control.

Limitation of liability in the United States is based partly on statute, and partly on court admiralty rules. Basically, it provides that, except in the case of personal injury or death, the owner's liability shall not exceed the value of the vessel after the voyage in which the liability-creating event occurred plus the freight which the owner earned on that voyage (insurance which the owner may have recovered is not included in that amount), so long as the negligent act which caused the injury was without the owner's "privity or knowledge." In 1936, after the MORRO CASTLE disaster, it was provided that in the event of personal injury or death, limitation would proceed in this manner: the limitation fund would be established (value of the ship + freight earned), the fund would be distributed pro rata to all the claimants (property and personal); property claimants would get no more, but the personal injury claimants would then be entitled to their share of an additional fund which would not, when added to the aggregate already received by the personal injury claimants, exceed the total amount of \$60 per gross ton of the vessel.³² It is important to note that this \$60 per ton fund, however, does not come into being unless the vessel is "seagoing."³³

"Privity or knowledge" are the key words to the whole scheme. If the owner has "privity or knowledge" he does not get to limit his liability. What do these words mean? One court has defined them as "a term of art, meaning complicity in the fault that caused the accident."³⁴ The owner will be at fault if he has not used "due diligence" to furnish a seaworthy vessel. That is about as precise a definition as we can report. With two exceptions it must be the fault of the owner himself which can deny limitation. The two exceptions are: (1) in case of personal injury or death claims, privity or knowledge of the Master at or prior to the beginning of the voyage is conclusively presumed to be the knowledge or privity of the owner; (2) in the case where the owner is a corporation, and managerial personnel are at fault, there will be knowledge or privity of the owner. In earlier years, when the courts were more favorably disposed to the limitation idea, they did not find knowledge or privity as often as they do now. Gilmore and Black point to the manner in which "knowledge or privity" may be treated:

Judicial attitudes shape the meaning of such catchword phrases for successive generations. In the heyday of the Limitation Act it seemed as hard to pin "privity or knowledge" on the petitioning owner as it is thought to be for the camel to pass through the needle's eye. If in our own or a subsequent generation the philosophy of the Limitation Act is found less appealing, that attitude will be implemented by a relaxed attitude toward what constitutes "privity or knowledge," "design or neglect." The Act, like an accordion, can be stretched out or narrowed at will.³⁵

It is fairly clear that judicial attitudes have changed, and that it is much more difficult now to limit liability. THE PENNSYLVANIA³⁶ is a good illustration of this point. The facts of the case were these: THE PENNSYLVANIA had developed a crack; the vessel was then repaired and passed by two inspectors, one from the Coast Guard and one from the American Bureau of Shipping. The ship then put out to sea, and split in half. The court held that either the owners knew or should have known that the vessel was unseaworthy. THE MORMACKITE³⁷ is another illustration. In this case, the vessel rolled over on her side with a consequent loss of life and cargo. The court found that the cause of the accident was improper stowage of cargo. The court found that while the immediate supervision over the loading may have rested with one of the ship's officers, the Master had ultimate responsibility, and he was high enough in the ranks of the corporation's employees to have his negligence fastened on the corporation. In earlier cases, improper loading of cargo, supervised by ship's officers or others to whom the duty had been delegated, did not render the vessel unseaworthy by act of the owner. Gilmore and Black sum up the proposition we have been advancing:

There is at least some reason to believe that the judicial attitude in the second half of the twentieth century will be on the whole hostile to the limitation idea, that the early cases will be whittled down if they are not flatly overruled, that the statute, even without further limiting amendments, will be narrowly and not expansively construed.³⁸

The reasons are not hard to find. For one thing, most of the shipping industry is incorporated, thereby limiting liability to begin with. Furthermore, extensive insurance coverage now exists which would cover the occasion where formerly a man could lose his fortune by being liable for acts of a vessel over which he had no control. Improved technology, moreover, gives the home office a great deal of control today.

The operation of nuclear vessels will make the existence of the limitation doctrine even more tenuous. It does not strain the imagination to conceive of the courts finding "privity or knowledge" from the barest circumstances in order to deny limitation of liability in the event of a nuclear incident, especially if the incident is in a harbor. The future of the limitation doctrine becomes even more dim when we recall that insofar as nuclear vessels within the United States are concerned, they would be covered by the Atomic Energy Act, under which the owner of the vessel would be indemnified for all liability not covered by private insurance. It should be noted too that the legislative history of the indemnification provisions shows that Congress was as much concerned with protecting the public as it was with protecting industry.³⁹ It is almost inconceivable that a nuclear vessel could sustain a large nuclear incident in a harbor, and the owner be permitted to leave only the remnants of the ship plus the earned freight for the victims. People in the shipping industry and in the admiralty bar with whom we have spoken agree. It is obvious that changes in the Limitation Statute are in order. (We shall have some recommendations later on when we talk about indemnification, a subject to which limitation is closely related.) It is our opinion that statutory modification is preferable to the judicial straining which is sure to result if Congress does not act. (What court, realizing that \$500 million indemnity is available, would allow an owner of a nuclear vessel within the United States to limit his liability?) Making the courts squirm to reach a just result will lessen the respect of the public for both the courts and the Congress.

It should be noted, in assessing the Limitation Act, that the American scheme is not the only possible one. Other nations have limitation statutes which proceed on a different basis. The British, for example, measure the limitation fund not by the value of the vessel but, rather, by the tonnage of the vessel, £15 per ton for personal injury alone or with accompanying property damage,

and £8 for property damage alone.⁴⁰ Nations which adhere to the Brussels Convention of 1924, among which are Belgium, Denmark, Finland, Norway, Netherlands, Portugal, and Spain, follow another system.⁴¹ Here the owner's liability for property damage is limited to the value of the ship, freight, and accessories, but not to exceed £8 per ton. In case of collision or other accident, the value of the ship is to be calculated at not less than 10 per cent of its value at the commencement of the voyage. In case of personal injury or death, however, the owner is liable for an additional amount up to £8 per ton, regardless of value. If this additional fund, from which personal injury and death claimants must draw first, is not sufficient to satisfy their claims, they may then delve into the other fund, sharing it pro rata with the property claimants. German and French law follow the theory of abandonment, mentioned earlier. The Brussels Convention of 1957 (which the United States, along with the Soviet Union, did not sign) follows, basically, the British approach which measures the limitation fund according to the ship's tonnage, and distinguishes between property and personal claims.⁴² None of these schemes appears to be preferable to that of the United States, from the point of view of compensating injuries caused by a substantial nuclear incident. The views of Mr. E. Robert Seaver, General Counsel of the Maritime Administration, who speaks for himself, Mr. Clarence G. Morse, and Mr. John Mann (three of the four-man delegation from the United States to the Brussels Convention of 1957) should be considered here:

...the Convention provides distinct advantages for the shipowner, in many instances. The owner's total liability would actually be less under the Convention than under our statute in any case where the value of his vessel exceeds \$207 per "Convention" ton, and does not sustain substantial damages as a result of a casualty.

The value of any postwar built vessel exceeds this figure....

An advantage that will inure to all American interests under the Convention stems from the fact that it will bring about a much greater increase in the limitation fund in foreign courts than it will in our courts.⁴³

In other words, the proposed Convention would, in many cases, allow for a smaller limitation fund than is now available under United States law, and the present funds which can now be set up under foreign law are even smaller than the "Convention" fund. In some cases, where the ship is substantially damaged, the "Convention" fund might be greater than the United States fund, but even then the "Convention" fund would probably not be sufficient. Assume a nuclear vessel has a weight of 20,000 tons. Under the Convention, its liability would be limited to \$4,140,000. This is much less than the limits of liability for nuclear incidents

established under the United States Atomic Energy Act (\$500 million), and the draft bills in the United Kingdom (\$14 million) and Germany(\$3.6 million). It seems apparent to us that if, in order to accommodate the possibility of a substantial nuclear incident, Congress should wish to modify the present Limitation of Liability Act, it should not turn to the foreign systems or that proposed by the Convention. We should make it clear that our comment relates solely to limitation law concerned with nuclear vessels, and we venture no opinion whatsoever about the merits of any limitation scheme which deals with conventional vessels.

Another feature of limitation law merits consideration. The United States has a peculiar system of admiralty jurisdiction which affects limitation of liability. In the United States there is the regular admiralty court which will hear admiralty matters. But it is not the only court which can do so. State courts and federal district courts, sitting on their civil side, have jurisdiction over admiralty matters as well. It has been decided, however, that the admiralty courts are the only ones which may hear petitions for limitation of liability. Nevertheless, a continual problem has arisen: when an action has been instituted for a limitation of liability, do all other present and future actions arising from the same facts cease? The answer to most cases has been "yes." Such a procedure has led some writers and supreme court justices to conclude that the major reason for limitation of liability is concursum, the bringing together of all claimants in one action. There are enough exceptions to the general rule, however, to question this assertion. In practice, the courts have worked out the matter in this way: when there is only one claimant or where the aggregate claims will not exhaust the limitation fund, a petition for limitation of liability will not cause other actions to cease.

We mention this problem of concursum because in the event of a nuclear incident, there will be many litigants, and it seems both more fair to the owner and also more efficient, for all the claims to be tried at once. That would be the case were the present system of limitation of liability maintained. If the system should be abolished or modified, Congress could provide for concursum since it has the constitutional power to regulate matters of admiralty, but this would most likely require new legislation.

Before we finish this discussion of limitation of liability, there is one more aspect which we should discuss. No matter what type of limitation fund is used, nuclear vessels will present these additional problems which arise from the nature of radiation injury: (1) how to estimate the extent of the claims in cases where those injured may not know of the fact until years later? (2) How to compensate those whose injury is apparent

at the time of the event without at the same time penalizing those whose injuries are not manifested until some future date? (3) What should be the cut-off date, if any, for presenting one's claim against the fund? These same problems are present in the limitation funds set up under various atomic energy statutes or bills. The authors of the United States Atomic Energy Act appear to have considered some of these problems, but they did not provide for a means by which to meet them. Section 170e of the Act, which covers situations in which the aggregate liability for a nuclear incident exceeds the amount available for compensation, provides:

The Commission or any person indemnified ... shall be entitled to such orders as may be appropriate for enforcement of this section, including an order limiting the liability of the persons indemnified, orders staying the payment of claims and the execution of court judgments, orders apportioning the payments to be made to claimants, orders permitting the partial payments to be made before final determination of the total claims, and an order setting aside a part of the funds available for possible latent injuries not discovered until a later time.⁴⁴

Note that Section 170e does not suggest how these various jobs are to be carried out. Nor does it cover the question of a cut-off date. Presumably state statutes of limitation would be controlling. In many states, the statute of limitations provides only three years to bring a tort action.

The British draft atomic energy bill, alluded to earlier, provides us with no better answer. The Bill would set ten years after the "last date on which any ionising radiation to which the hurt or damage is wholly or partly attributable were emitted" as the cut-off date for all claims.⁴⁵ In regard to the other problems, however, the Bill would provide only that the reactor licensee maintain financial protection of £5 million, and that "if ... it appears to the Minister that ... the aggregate amount of all claims ... is likely to exceed five million pounds, he shall by order certify accordingly, and any such order shall be made by statutory instrument and be laid before the Parliament after being made; and after the making of such an order no claim ... shall be dealt with until Parliament so determines."⁴⁶ The British, then, would leave it to Parliament to work out the problems after the event, as it saw fit.

The O. E. E. C. Draft Convention on Third Party Liability recognizes the difficulties, but it leaves their solution to the courts of the O. E. E. C. nations.⁴⁷ Mr. Jerry Weinstein of the O. E. E. C. Legal Office made this clear in a recent speech: "Claims for compensation in the event of a nuclear incident may differ greatly in nature, amount and time, and measures may be

necessary to ensure an equitable distribution of the amount of compensation available if this amount is or may be exceeded. It will be for the competent court, in accordance with the national law applicable, to decide the form and extent of the compensation, within the limits of the Convention, as well as equitable distribution."⁴⁸

In short, while many have considered the problem of equitable distribution of a limitation fund, none seems to have arrived at any sort of definite plan. Perhaps such is not feasible. Perhaps the British idea of dealing with the problem when it arises is the best way. The tradition in admiralty courts, anyway, is to deal with problems in a flexible common sense manner. (Of course, this problem will come up whether the admiralty limitation of liability is retained or not, since there is also, as we have mentioned, an overall limitation of liability for nuclear incidents, written into the Atomic Energy Act, but if the admiralty limitation doctrine is continued, the problem will arise more frequently since the fund would be much less than the \$500 million fund of the Atomic Energy Act.) It is interesting to note too that if the admiralty rule is retained, the short statutes of limitation for tort injuries will not present the great difficulty found in other areas of atomic energy law since admiralty has no statutes of limitation. It uses, rather, the doctrine of laches. It is true that admiralty courts will look to the analogous state statutes of limitation when deciding whether laches should be invoked, but it does not have to, and if it does, it does not have to make the findings conclusive. In Gardner v. Panama R. Co., the rule was announced:

Though the existence of laches is a question primarily addressed to the discretion of the trial court, the matter should not be determined merely by a mechanical application of the statute of limitation. The equities of the parties must be considered as well. Where there has been no inexcusable delay in seeking a remedy and where no prejudice to the defendant has ensued from the mere passage of time, there should be no bar to relief.⁴⁹ Gilmore and Black conclude: "The admiralty court, in deciding whether an action is to be barred for laches on the analogy of a foreign or of a local statute, is in a position to manipulate the concepts with a degree of flexibility not allowed to other courts."⁵⁰

To sum up our discussion of limitation of liability in admiralty law, we have attempted to make these points: (1) the admiralty doctrine of limitation of liability will have to be modified, at least in regard to nuclear incidents in a port (as we have said, we shall give more detailed recommendations in our chapter on collision and third party liability); (2) none of the alternative schemes of limitation of liability seem adequate to accomplish this modification; (3) the doctrine of concursum now often applied in limitation proceedings ought to be retained to

cover nuclear incidents without regard to the law on limitation; (4) if the admiralty limitation of liability is retained in any form (perhaps in cases where all the injury is at sea), the nature of radiation injury creates problems in regard to distribution of the limitation fund which might best be met pragmatically; at least no one has as yet advanced any particular plan.

Tort Law as Affected by Atomic Energy

This is a topic concerning which books are now being written. A complete analysis of this area would require delving carefully into most of the law of torts. Accordingly, we shall not attempt any exhaustive study, but, rather, shall supply enough information to make understandable those topics which deal with admiralty problems, peculiarly.

The first question which comes to mind is: what shall be the measure of liability for one who operates a nuclear facility? Generally, there are three alternative measures for liability: (1) negligence, (2) strict liability, (3) duty of an insurer. Negligence requires fault. Basically, in a negligence action the plaintiff must prove these things in order to recover: the defendant owed the plaintiff a duty to use due care; the defendant breached that duty by acting in a manner not prudent or reasonable under the circumstances; the breach of the duty caused the injury. Note that both fault and cause by the defendant's act are essential.

Strict liability does not take account of fault. Under this measure of liability, the defendant may be liable although he proceeded in a prudent manner. To recover damages under strict liability the plaintiff must prove: the defendant owed him a duty not to injure him; the defendant's act caused his injury. Note that here only cause by the defendant's act is essential.

The duty of an insurer rests neither on fault nor on cause by the defendant's act. An insurer is liable if an accident occurs for which, either by previous agreement, or by duty imposed by law, he must compensate the party injured, although he, himself, had nothing to do with the plaintiff's injury. Note that under this doctrine neither fault nor cause by the defendant's act are important. All that need be established is that the injury arose from the circumstances within the duty of the insurer. Thus here cause, generally, is not done away with, since the plaintiff must still establish that his injury arose from the special circumstances. For example, an insurance policy which compensates for damage to an automobile from collision with another automobile does not cover all injuries to the automobile. And if the operator of a nuclear facility had the duty to compensate for all radiation damage attributed to his reactor, whether or not he was negligent and whether or not his act caused the injury, he

would still not be liable for radiation damage from other reactors, or from other sources, such as an X-ray machine.

The usual measure of liability in the United States is negligence. Strict liability and the duty of insurer are imposed by law only for special reasons, although there does not seem to be full agreement on what those special reasons are.

When the law imposes strict liability, in effect it says: "what you do is socially useful, therefore it is not illegal, but your acts are so potentially harmful that you will be held accountable for any damage you cause, whether or not you proceed prudently." Prosser⁵¹ states the policy reasons behind the rule of strict liability: "This ... policy frequently has found expression where the defendant's activity is unusual in the community, and the danger which it threatens to others is unusually great and will be great even though the enterprise is conducted with every possible precaution. The basis of the liability is the intentional behavior in exposing the community to such a risk."⁵² (Emphasis supplied.) The rule of strict liability grew out of the English case of Fletcher v. Rylands in which the defendant was liable when water escaped from a reservoir which the defendant had on his land, and flooded the plaintiff's adjoining mine. The court did not pay any attention to the question of negligence, but asserted that storing of water was a "non-natural" use of the defendant's land, and, therefore, he was "prima facie answerable for all the damage...."⁵³ Subsequent English cases affirmed the policy that strict liability will be imposed when the defendant "damages another by a thing or activity unduly dangerous and inappropriate to the place where it is maintained, in the light of the character of that place and its surroundings."⁵⁴ Prosser reports that American cases tend to follow the Fletcher v. Rylands doctrine even in those jurisdictions which repudiate it by name.⁵⁵ The Restatement of Torts applies strict liability to "ultra-hazardous" activity only, and defines as ultra-hazardous conduct which "necessarily involves a risk of serious harm to the person, land, or chattels of others which cannot be eliminated by the exercise of the utmost care," and "is not a matter of common usage."⁵⁶ The Restatement appears to modify Fletcher v. Rylands somewhat by placing less emphasis on the circumstances of the activity (so as to decide whether it is "natural" or not), and placing more emphasis on the degree of danger involved and its ineradicability. Nevertheless, although they might differ over the amount of consideration to be afforded to one particular element, all these theories of strict liability appear to contain requirements of great danger and uncommon usage.

Prosser states:

The first case involving damage from the escape of radiation from the use of atomic energy has yet to

reach the courts. When it does, it is not difficult to predict that there is no court which will refuse to apply to it the principle of strict liability found in the cases which follow *Rylands v. Fletcher*.⁵⁷

We are not as sure as Professor Prosser that the matter is foreclosed. At least, we think that not every injury from radiation will be handled according to the strict liability doctrine. What is "non-natural" we do not know. We suggest that the presence of a nuclear reactor in a vessel is not ipso facto non-natural; at least not any more than is an X-ray machine. Furthermore we suggest that as the art of nuclear industry progresses and as the economic advantages involved in nuclear shipping become established, the world's merchant fleet might very well consist of nuclear vessels. Would such a commonplace thing as a nuclear vessel be "non-natural" then?

If it does not seem correct to fasten strict liability on the users of atomic energy simply on the basis that all use of atomic energy is "non-natural," does "unduly dangerous" supply the justification? If "dangerous" means that there is a likelihood that the use of atomic energy is likely to lead to many accidents, strict liability should not be applied to atomic energy users, since, it is fairly well agreed, the possibilities of nuclear incidents are slight. (Users of automobiles are not charged with strict liability although each year hundreds of deaths occur from the use of automobiles.) If "dangerous" relates to the possible extent of injury rather than to the frequency of occurrence, there is some justification for applying strict liability to atomic energy. We need not suggest the possible catastrophe which could result from a major nuclear incident. But what about the situation where the total amount of injury which could possibly occur is known beforehand? For example, the possible injury to cargo on a nuclear vessel? We shall come forth with our recommendations on where strict liability might be invoked when we reach the special chapters on cargo, seamen, collision and third party liability, since we think that strict liability should not be applied in a wholesale fashion, but, rather, as it seems justified according to specific circumstances.

The text books on torts do not have as a separate chapter "the duty of the insurer." In fact, many of the considerations to be discussed in this paragraph are included in "strict liability" elsewhere under the heading of "duty." Nevertheless, we think that the two concepts are different and that they ought to be discussed separately so as to impress the reader with the thought that strict liability does not necessarily mean that the perpetrator of a non-natural or unduly dangerous activity will be held liable for all injury attributed to the activity. To use Baron Bramwell's tiger which is chained to

its cage, as an example: if the tiger broke loose and wreaked havoc, the owner would be liable under strict liability doctrine, whether or not the owner had been negligent; but if lightning broke the chain, and such could not be reasonably foreseen, there is doubt that the doctrine of strict liability would make the owner liable, although as an insurer of all damage having anything to do with his tiger, the owner would be liable. As a further example, it is doubtful that strict liability would make the owner of a nuclear vessel liable for radiation injury if such resulted from the collision of a wayward tug with a nuclear vessel lying in port, minding its own business. Yet, if the law made the owner of the nuclear vessel an insurer for all damage which could be traced to the vessel, he would be liable.

The Restatement of Torts, Sec. 522, would make all those carrying on an extra-hazardous activity insurers. According to the Restatement, "one carrying on an ultrahazardous activity is liable for harm... although the harm is caused by the unexpected (a) innocent, negligent or reckless conduct of a third person, or (b) action of an animal, or (c) operation of a force of nature."⁵⁸ The "Restatement" view, however, is not accepted by the courts or by many of the influential text writers. The more general view is that the defendant in strict liability cases will not be held liable if the immediate cause of the accident was the intervention of an outside force, which could not be reasonably anticipated.⁵⁹ Within this view, however, there is an additional problem: as a matter of law, are the negligent acts of third parties foreseeable? It would appear that if it should be desirable to fasten the owner of a nuclear vessel with the duty of insurer in some circumstances, Congress should say so, since it does not necessarily follow that even if the courts do as Prosser says they will--invoke strict liability--that they will go as far as making the owner an insurer against all damage which could be traced to the vessel.

Before we leave strict liability and the duty of an insurer, one more aspect should be discussed. Under neither would the defendant be liable (in the absence of negligence) for any type of injury which might result. Thus, if the reason for invoking either of the two is the danger of radiation inherent in the operation of a nuclear reactor, the owner of a reactor would not be liable if the plaintiff's injury was a broken arm sustained from the slamming of a reactor door. The owner of a nuclear vessel would not be liable (in the absence of negligence) for non-nuclear injury.

Although the doctrine of res ipsa loquitur falls under the general heading of negligence, we thought it might be more prudent to discuss it after our survey of strict liability and duty of an insurer, since it has some aspects which are common to all three measures of liability. Cause of some sort must be

established in order to invoke either of the three, and res ipsa bears not only on the question of negligence, but, in its more radical form, on the question of cause as well.

Whether negligence or cause exists in a given case is a matter for a jury to decide on the basis of the evidence presented. Yet, in our system of law the jury does not have complete control over the resolution of fact questions. The judge has his responsibility as well: not to allow the jury to proceed on guess work. "If the evidence [submitted by the plaintiff] is such that no reasonably intelligent man would accept it as sufficient to establish the existence of a fact essential to negligence, it becomes the duty of the court to remove the issue from the jury...."⁶⁰ (The same can be said in regard to the existence of any fact crucial to the plaintiff's recovery.) Res ipsa loquitur is a device by which the plaintiff can get his case to the jury even though he cannot, on his own, establish the facts essential to his recovery.

Res ipsa loquitur is a rule of evidence. In a negligence case, the plaintiff must produce evidence from which a jury can reasonably infer that the defendant was negligent, and that the defendant's negligent act caused the plaintiff's injury. Most of the time this will be done by introduction of circumstantial evidence. To show that the defendant was speeding, the plaintiff might introduce evidence of skid marks. If witnesses saw the defendant's car hit the plaintiff, the inference of causation will be eminently reasonable. In other cases, however, the plaintiff cannot introduce evidence such as skid marks. Often, all he can produce in court is his bare injury. This is not enough to win a recovery. If, however, the plaintiff can show that the circumstances from which the injury arose conform to the res ipsa formula, his cause is not doomed, and the jury may do its job of determining the facts.

The orthodox res ipsa loquitur formula is this: (1) the accident is one which does not ordinarily occur without negligence on someone's part, (2) the defendant had exclusive control over the instrumentality which injured the plaintiff, (3) no voluntary act of the plaintiff caused the injury wholly or partly. Note that this formula does not abolish the requirement for evidence. Rather, it allows the introduction of a different type of evidence--that contained within the act itself. This point is made clearly in Foltis, Inc. v. City of New York:

The doctrine [res ipsa loquitur] merely means that certain occurrences contain within themselves a sufficient basis for an inference of negligence, and it does not differ from ordinary cases of circumstantial evidence except in the respect that the

facts and circumstances from which the inference of negligence is drawn are immediately attendant on the occurrence.⁶¹

In effect, then, the res ipsa rule allows the jury to infer facts on the basis of the act itself, so long as the requirements of the rule are met.

The plaintiff's burden of proving causation appears to be taken care of in the res ipsa formula by requiring that he show that the instrumentality which caused his injury was under the exclusive control of the defendant. In some jurisdictions, this requirement of exclusive control is rigidly enforced, and if there is a possibility that someone other than the defendant might have caused the injury the plaintiff's invocation of res ipsa loquitur does him no good. Other courts, however, will not only permit the jury to infer negligence from the circumstances attendant upon the act itself, but also to infer causation. In other words, it need not be absolutely certain that the defendant had exclusive control, it need only appear that it is more probable than not that he did. Prosser says:

In many cases the inference to be drawn is a double one, that the accident was caused in a particular manner and that the defendant's conduct with reference to that cause was negligent.... When a gasoline filling station mysteriously explodes, many possible explanations can be suggested, but the most likely one may be negligence on the part of those in charge. The plaintiff is not required to eliminate all other possible causes, or inferences....⁶²

Prosser goes on to add that the words "exclusive control" are ill chosen, anyway. What is really meant, he says, is "that the apparent cause of the accident must be such that the defendant would be responsible for any negligence connected with it."⁶³ To sum up, res ipsa loquitur is a rule of evidence permitting a jury to speculate from the circumstances of the accident itself, on negligence, and, in some jurisdictions, on causation as well.

We have discussed res ipsa loquitur because it is bound to play a crucial role in radiation injury cases. If the measure of liability will be negligence, res ipsa may very well be the only way to establish it. If strict liability is imposed, the plaintiff may not be able to show, other than by inferences stemming from the mere fact of the accident, that the defendant caused his injury. If the defendant has the duty of an insurer, the plaintiff will still have to show that his injury arose from the circumstances within that duty, and, again, the only way that he might be able to accomplish this is through the res ipsa principle. Consider these possible situations. A nuclear vessel emits radiation and X thereby gets injured; how shall he prove negligence? A seaman has worked on a nuclear vessel for five years, and

thereafter finds that he has cancer; how can he prove that radiation from the vessel's reactor caused his malady? Should the jury even be allowed to speculate on these questions in the absence of any more evidence?

Problems of proof and the use of circumstantial evidence are not peculiar to res ipsa cases. Another type of problem one encounters is where it cannot be said that it is more probable than not that A rather than B caused X's injury, but it can be said that it is more probable that either A or B caused the injury than that someone else did. This type problem could arise when X is a seaman with an injury which, it can be proved, was caused by radiation, X has worked on two different nuclear vessels, one owned by A and the other by B, and X cannot show from which vessel his injury arose. A further difficulty is suggested in the case where a nuclear vessel explodes. Who caused the accident? The ship's personnel, or the manufacturer of the reactor? What about the case in which X, a seaman, has received cumulative doses of radiation from his employment on various vessels, but no one dose, in and of itself, caused his injury? Some of these situations will be covered in later sections of the report. We have suggested them here, however, because they are problems which the use of nuclear energy will aggravate, and if there is to be any justice, both for injured parties and for operators of nuclear facilities, these situations must receive careful consideration.

There are two more ways in which atomic energy affects tort law which we wish to mention, and then, only briefly. One is the problem of statutes of limitation about which we spoke earlier. As the reader may recall, the point was made that radiation injury often does not become manifest until long after the radiation dose was received. This has been estimated to be as long as twenty years. Clearly a two-or three-year statute of limitation, which is adequate for most tort injuries, is inadequate for radiation injuries. We made the further point, however, that in admiralty this is not as touchy a problem as it is in land law since admiralty uses the concept of laches, which is flexible and which is used according to the equities of the particular situation.

The other problem we wish to mention relates to the type of injuries which should be regarded as compensable. Some of these injuries may occur now, but the use of nuclear energy will probably make their occurrence more frequent, and courts (or perhaps legislatures) will have to find a way to deal with them. Injuries to which we refer include shortened life, genetic damage (should a malformed child be able to sue the operator of a nuclear facility for possible genetic damage inflicted upon his parents before he was even conceived?) and inability to have children. We shall leave the discussion of

these problems to the writers on general atomic energy law. They are interesting, but outside the scope of this paper. We mention them merely to advise those concerned with atomic energy that these problems exist.

Having considered some of the ways in which atomic energy can affect the law in general, we shall now turn to the effects of atomic energy on the particular doctrines of admiralty law.

Effect of Atomic Energy on the Law of Cargo

Our previous discussion of cargo showed that the carrier is liable only if he negligently furnishes an unseaworthy vessel, or if the cargo is negligently stowed or handled. We have seen that in no event does the law impose strict liability on the carrier of cargo in admiralty law. We know that the ship owner can, under present law, limit his liability in regard to cargo. Should the fact that a vessel is propelled by nuclear energy rather than conventional power change any or all of the present law?

First, what about strict liability? We do not think that strict liability ought to be applied to cargo. The use of nuclear energy in a vessel does not appear to us to be "non-natural." Nor does cargo get subject to an inordinate danger when it is carried on a nuclear vessel. Danger, as we have seen, can mean that the possibilities of accident are great, or that the possible extent of injury can be severe, or both. We have already noted that there is no reason to assume that the frequency of a nuclear accident will be any greater than the frequency of a conventional accident. Nor, does it seem to us, can it be said that the damage to cargo which could result from a nuclear accident would be catastrophic. What makes a possible nuclear incident catastrophic in other situations is its limitlessness. But such is not the case when cargo is involved. At the outset, the maximum extent of possible damage is known. True enough, total loss of cargo is no light matter; yet such a result can occur by sinking as well as by radiation, and the probability of one is no greater than the other. Why single out radiation damage for strict liability?

We also suggest that the present rule on limitation of liability in regard to cargo be retained. Elsewhere, we have suggested that limitation of liability may have to be abolished or modified for certain situations, in which possible damage would so far exceed the limitation fund that to allow liability to be limited would work an injustice on those injured. Again, this is not the case in regard to cargo. We allow limitation of liability today even though the cargo may be totally damaged. It is not thought that this is unjust to the shipper. Should it make

any difference that the total loss is from radiation rather than faulty stowage? We think not.

Nor do we recommend any change in the rule which absolves the owner for damage to cargo arising from faulty navigation or management of the vessel. This rule rests on the proposition that it is unfair to make the owner responsible for accidents which occur from causes outside the owner's power to control. If this proposition makes sense in regard to conventional vessels, why not in regard to nuclear vessels? We can find no valid basis for a distinction.

It should be understood that these rules do not leave the owner liability-proof. If he has put a defective reactor on board the vessel, he may be liable for radiation damage to cargo. If he has not engaged competent personnel to operate the reactor, he has not furnished a seaworthy vessel, and, hence, may be liable for cargo damage. If cargo is stored where it is not adequately shielded from the reactor, there can be liability.

To sum up, our main point has been this: if the present law on cargo is considered sound for conventional vessels, there is no reason to change it just to accommodate nuclear vessels.

Effect of Atomic Energy on Seamen's Rights

We start off this section with a caveat usually invoked when this topic is reached: "let the reader beware."

We have already mentioned the seamen's three main remedies; we shall repeat them. They are: (1) maintenance and cure, (2) a suit for unseaworthiness, (3) a suit under the Jones Act. In this section of the report we shall attempt to describe the type of problems which atomic energy is likely to produce in each one of them. Before we do so, it is advisable to take a brief glance at the judicial attitude toward seamen, for that attitude is a major source from which present and future law flow.

The philosophy of the courts is spelled out in *Socony-Vacuum Co. v. Smith*. This is what the Supreme Court had to say:

...the seaman, while on his vessel, is subject to the rigorous discipline of the sea and has little opportunity to appeal to the protection from abuse of power which the law makes readily available to the landsman. His complaints to superior officers of unsafe working conditions not infrequently provoke harsh treatment. He cannot leave his vessel at sea. Abandonment of it in port, before his discharge, to avoid unnecessary dangers of employment,

exposes him to the risk of loss of pay and to the penalties for desertion. In the performance of duty he is often under the necessity of making quick decisions with little opportunity or capacity to appraise the relative safety of alternative courses of action. Withal, seamen are the wards of admiralty, whose traditional policy it has been to avoid, within reasonable limits, the application of rules of the common law which would affect them harshly because of the special circumstances attending their calling... It is for this reason that remedial legislation for the benefit and protection of seamen has been liberally construed to attain that end. (Emphasis supplied.)⁶⁴

Another court decision wraps up the Supreme Court attitude: Seas Shipping Co. v. Sieracki.⁶⁵ In justifying the imposition of an insurer's duty in unseaworthiness actions - a topic we shall soon discuss in detail - the court explained its reasons:

These [the hazards of marine service], together with their helplessness to ward off such perils and the harshness of forcing them to shoulder alone the resulting personal disability and loss, have been to justify and to require putting their burden, in so far as it is measurable in money, upon the owner regardless of his fault. Those risks are avoidable by the owner to the extent that they may result from negligence. And beyond this he is in a position, as the worker is not, to distribute the loss in the shipping community which receives the service and should bear its costs. (Emphasis supplied.)⁶⁶

We begin, then, with two basic assumptions: (1) courts will be as liberal as possible toward seamen, who are a favored class; (2) wherever possible the courts will put the burden of a seaman's injury on the shipowner because he can better bear the costs of injury. The shipowner can count such costs in his rates, whereas a seaman could not pass along the costs of his injury, but would have to stand them himself. With these assumptions in mind, it becomes perfectly understandable why the courts, where they can, will impose the duty of insurer on shipowners, and, where they cannot, because of a statute, will find negligence where it might not be found in a case not concerned with seamen.

One place where admiralty law has traditionally imposed the duty of insurer on shipowners is in maintenance and cure cases. Maintenance and cure is a type of health and accident insurance for the seaman. The owner of the vessel is, by law, made the insurer. Under the doctrine, the seaman is entitled to his wages, his keep, and his medical expenses. It makes no difference whether or not the illness or injury was caused by the employment,

or was due to the fault of the owner of anyone else on the vessel, or was partly brought about by the seaman's own acts. The only criteria necessary for recovery are: (1) that the injury or illness arose during the period in which the seaman was "subject to the call of duty," (2) that the injury or illness did not arise from the seaman's own willful misconduct, and (3) that the seaman, when he signed on, did not intentionally conceal an illness he already had. Note that maintenance and cure is not a damages remedy in the sense that it does not compensate for such things as impaired earning power, pain and suffering. Nevertheless, in some respects it is a remedy which is more complete than workman's compensation since it insures for illnesses and injuries which may have nothing at all to do with the employment. Note also that since maintenance and cure is based upon general maritime law, it has no statutory limitation period, but, rather, is governed by the rule of laches. We have already discussed this rule. It is enough for now to point out that insofar as the courts will analogize from state statutes of limitation, laches will set in later in maintenance and cure cases than in unseaworthiness cases (also based upon general maritime law), since the former is held to resemble contract actions while the latter, which is compensatory in nature, is held to resemble actions in tort. (Limitation periods for contract are generally twice as long as they are for tort.)

We shall discuss the damages remedies, the Jones Act and unseaworthiness, shortly, but it is necessary now to make some cursory observations. These remedies, especially the latter, are very liberally treated by the courts. Nevertheless, in some ways they are not as broad as maintenance and cure since they require proof that the injury at least arose from the employment whereas maintenance and cure does not require such proof. Furthermore, the Jones Act by law has a much shorter period of limitation than maintenance and cure, and, it is possible, as we have shown above, that laches will set in sooner on unseaworthiness than on maintenance and cure. Thus for some purposes, maintenance and cure will be a better remedy than the other two since (1) it does not require the same type of proof, (2) it has a longer period of limitation. We have made these comparisons because there are situations which could give rise to all remedies (although maintenance and cure does not require that the injury arise from the employment, there is no rule that says that there cannot be a recovery in maintenance and cure where the injury, in fact, does arise from the employment.) Where the problems of proof or of limitation appear burdensome, the seaman might be better advised to sue for maintenance and cure than for damages since he would have a chance to recover something, although that something would not be as much as a damages recovery. This might be especially true for seamen on nuclear vessels, since, as we have shown, problems of proof

and limitation, are most acute where the injury is radiation-induced.

We recommend no statutory changes in regard to maintenance and cure. A more liberal remedy would be hard to find; it asks a minimum from the injured seaman. Judges invoke it benevolently.

Our remaining discussion will present a few problems which nuclear shipping is likely to introduce into this area. We shall offer some suggestions. The problems are illustrated by the following hypothetical situations: a seaman is exposed to radiation, but the effects of the radiation are not manifested until years later; (1) when the effects are manifested he is a seaman on board another vessel; (2) when the effects are manifested he is no longer a seaman, or, at least, he is not subject to the call of any vessel; (3) the condition of the seaman is such that he either has a chronic condition which requires medical attention from time to time, or has a constantly deteriorating condition, or is left with a chronic condition which does not require further medical attention.

If the seaman is on board another vessel at the time that his radiation injury manifests itself, he would be entitled to maintenance and cure from the owner of the vessel on which he serves, even though he might have received the radiation dose while working on board a different vessel. The rule is clear: "the duty, which arises from the contract of employment... does not rest upon negligence or culpability on the part of the owner or master ... nor is it restricted to those cases where the seaman's employment is the cause of injury or illness."⁶⁷ The tough problem is whether the owner can be indemnified from the owner of the vessel on which the seaman got his dose of radiation. The only cases we can analogize from are those in which a tort-feasor has caused the injury, and the owner has had to pay for the seaman's maintenance and cure. Some courts (e.g. the 3d Circuit)⁶⁸ will permit the owner to recover from the tort-feasor; others will not (e.g. the 2d Circuit.)⁶⁹ (This type situation has not yet come before the Supreme Court.) Of course, in that jurisdiction which does not allow recovery from tort-feasors, it is hard to see how our hypothetical shipowner could recover. In the jurisdictions which do allow recovery from a tort-feasor, our shipowner would probably be able to recover from the owner of the other vessel in those cases where negligence had caused the exposure to radiation. But what about those cases in which there had been no negligence; but, had the seaman sued, he might have recovered damages from the other owner on grounds of unseaworthiness, which doctrine, as we shall see, does not require fault? It is tempting to argue that since the courts have not been in agreement as to whether there can even be an indemnity from those who are negligent, therefore the rule

should not be extended to those cases in which the party being sued for an indemnity has not been negligent. This argument makes some sense, especially when we consider that the doctrine of unseaworthiness, with all its liberality, was developed for the benefit of the "wards of admiralty" who are seamen, not owners.

The second hypothetical situation, in which the effects of the radiation are manifested when the seaman is not subject to the call of any vessel, presents this issue: does the doctrine of maintenance and cure require that the disease or injury be manifested at the time that the seaman worked on the vessel, whose owner he sues for maintenance and cure?

*Bowers v. Seas Shipping Co.*⁷⁰ might help us. In this case the seaman hurt his knee while on board ship. He thought it was nothing. However, a few months after he had left the vessel, he discovered that his injury required hospitalization. He then sued for maintenance and cure. The court denied the remedy because the seaman had been too slow in finding out what was the matter with him. Implied in this reasoning, however, is a recognition that had he acted when he first had reason to believe that he had been injured, the fact that he discovered his injury after he left the vessel would have made no difference. So long as the courts would hold that being radiated is, in and of itself, an injury, it would seem that, in theory, the seaman in our hypothetical situation would be entitled to his recovery. Practically speaking, however, he would have a tough time proving that his injury arose at the time that he was subject to the call of the vessel. He would have to show that his malady got its start while he was on board the vessel. In radiation cases that would be no easy task. Whether the court would allow a jury to speculate on the matter, we do not know, but, as we shall show later, in regard to the damages remedies, it is not inconceivable.

Our last hypothetical situation involves this question: assuming a recovery for maintenance and cure, to what is the seaman entitled in those cases where his condition is chronic? According to present law,⁷¹ the seaman can get maintenance and cure up to the time of maximum cure of his condition. Once it is determined that further medical care will not improve the health of the seaman, maintenance and cure ceases. It can be seen, therefore, that maintenance and cure is not as satisfactory a remedy for the seaman as is damages. On the other hand, it represents a substantial hope for the injured seaman who, either because of the passage of time or difficulty of proving causation, cannot get damages.

We come now to the remedies for damages. One is the doctrine of unseaworthiness, founded in the general maritime law; the other is the Jones Act.⁷² We shall discuss unseaworthiness first.

In our comments on how atomic energy affects tort law we were concerned with the question of whether strict liability or the duty of an insurer ought to be imposed upon users of nuclear energy. In regard to unseaworthiness, this is an irrelevant question since the doctrine already imposes the duty of an insurer (within certain limits) on the shipowners. Another problem was how to deal with the statutes of limitation, many of which provide for short periods. That, again, is not an acute point here, because unseaworthiness actions are governed by laches, which, as we have shown, is susceptible to consideration of the equities in particular circumstances. Our last major concern was how to deal with limitation of liability. This question, also, has no particular urgency here. First of all, as we pointed out in our discussion of cargo, what makes limitation of liability objectionable in other situations is that the total extent of injury cannot be estimated in advance. In regard to seamen, this can be known in advance. The only new element that nuclear shipping introduces is the quality of the injury; it does not increase the possible extent of the injury beyond the point that the law already contemplates in its provision for limitation. Secondly, the possibility of claims exceeding the limitation fund is not as great as, for example, in cases where the injuries are consummated on land. Our main point is that if limitation of liability in regard to the claims of seamen is now considered proper, the introduction of nuclear vessels should not make limitation improper. We have, then, no recommendations for changes in the law of unseaworthiness. Our remaining discussion of this topic will explain what unseaworthiness is, and will deal with some hypothetical problems which could arise on a nuclear vessel.

A definition of unseaworthiness commonly offered is this: where a vessel is not reasonably fit for the purpose for which she is being used. The concept of unseaworthiness, then, is a relative one. A vessel can be fit for some purposes, but unfit for other purposes. A vessel can be unfit if its crew is incompetent or dangerous, if it has faulty equipment, if it is not constructed properly. Note also that the vessel must be reasonably fit in order for the owner to escape liability. Thus not every accident attributable to the unseaworthiness of a vessel will give rise to liability.

Elsewhere, we have mentioned that the duty of the owner in regard to unseaworthiness is that of an insurer within certain limits. We mean this: once it is determined that the vessel was not reasonably fit for its purpose, the fact that the

unseaworthiness was not due to the fault of the owner, or that he did not even cause the unseaworthiness makes no difference; he is liable if the unseaworthiness was the proximate cause of the injury. Thus, for example, if a seaman is injured, while a stevedoring company has control of the vessel, by the company's faulty equipment, the owner of the vessel is liable for the injury, even though he may have exercised every precaution in choosing a competent concern to do the stevedoring.⁷³ We shall repeat: the only limit to the liability of a shipowner for an injury to a seaman caused by anything on the vessel is the reasonably fit concept; on the above facts, the owner would not have been liable had the equipment been reasonably fit. But even this limitation affords no great comfort to the shipowner since courts will use a type of res ipsa doctrine to find that the vessel was not reasonably fit. For example, in the above situation, although it could not be proved directly that the equipment was not reasonably fit, the court might infer that to be the case if there were no other satisfactory reason for the accident. It should be readily apparent why we do not think that a new measure of liability is needed for nuclear vessel owners.

The main controversy in this area is over the matter of "transitory unseaworthiness." Although the probable attitude of the Supreme Court appears to us to be clear on this matter, the Circuit Courts have disagreed. (The Supreme Court has not yet had occasion to rule squarely on the subject.) What "transitory unseaworthiness" is can be demonstrated by citing the facts of *Cookingham v. United States*.⁷⁴ *Cookingham* was walking up a stairway on a vessel, and slipped on some jello which lay on the stairs. There was no indication how long the jello had been there. It is clear that stairs with jello on them are not reasonably fit for their purpose of being a place upon which to walk. On the other hand, it is also clear that the unsafe condition is not due to any defect inhering in the stairs themselves, and that there is no conceivable way that shipowners could prevent an accident of this sort. It seems to us that, according to the law of unseaworthiness, those injured because of transitory unseaworthiness ought to recover. The Supreme Court has said on the question of the owner's liability that it makes no difference whether or not he knew of the condition of the vessel, or, even, had control of the vessel at the time of the injury. What difference can it make, then, whether or not the owner has a chance to remedy the transitory condition or whether the defect is inherent in the vessel? Is it any less reasonable to hold the owner liable for jello on a stairway than it is to hold him liable for defective equipment brought on board by a competent stevedoring company?

Turning to nuclear vessels, it is difficult to imagine the case in which a seaman can prove that he was exposed to radiation on a vessel, but could not recover for a radiation-induced injury. The owner could argue that he did not know that the reactor was defective,⁷⁵ that the reactor's defect was the fault of the manufacturer,⁷⁶ that a crewman had tinkered with the reactor (thus making it only transitorily unsafe),⁷⁷ that it was the libelant himself who had made the reactor temporarily unsafe.⁷⁸ None of these arguments would avail the shipowner. Moreover, if the seaman could not prove that the reactor was defective, it is not difficult to conceive that the courts might say: since there is no other satisfactory reason for the accident the reactor must have been defective.⁷⁹ It is well to call to mind again at this point that the courts regard seaman as the wards of admiralty, and will place the costs of their injuries insofar as possible on the shipping community.

Theoretically, there are two cases in which the radiated seaman might not be able to recover on grounds of unseaworthiness. One is the case in which the seaman is radiated as the result of an improvident order given by a concededly competent officer.⁸⁰ We have already pointed out that unseaworthiness requires that some part of the vessel be not reasonably fit; for purposes of this doctrine an officer is considered as part of the vessel. If he is concededly competent there is nothing that the courts could call unseaworthy. (Of course, counsel would argue that anyone who gave such an order must have been incompetent, and, hence, not reasonably fit.) The other case is one in which there is a negligent act which alone causes the injury, the party committing the act is concededly competent, and the injury occurs during the perpetration of the act. *Grillea v. United States*⁸¹ illustrates this point. The libelant had placed the wrong hatch cover over a "pad-eye", thereafter stepped on it and fell through. One of the respondent's arguments was that the libelant could not sue under unseaworthiness because the injury was part of one operation - that the only action could be for negligence. It made the point that in any negligent action, the vessel at least for a moment is rendered unseaworthy, for example, "when someone of the crew carelessly turns a lever that drops a boat from its davits, there is a moment, however short, during which her unfitness causes the injury."⁸² Respondent pointed out that this type of situation is not considered unseaworthiness, but, rather, negligence. The answer of the court was that in the *Grillea* case enough time had elapsed between placing of the hatch cover and the injury to make the case one of unseaworthiness. This, then, appears to be the situation: time is important in deciding whether or not the action was continuous, but, if it is found that the act was not continuous, the amount of time between the appearance of the

unsafe condition and the injury is immaterial. If it is continuous, the case is one of negligence, not unseaworthiness, even though for a moment there is an unseaworthy condition.

It is interesting to speculate on the outcome of a case in which the seaman was radiated because the vessel had been torpedoed, or hit an iceberg. In our view, the seaman would probably be able to recover since the reactor after the accident would not be reasonably fit, and, as the discussion of transitory unseaworthiness pointed out, the only relevant question appears to be whether or not the vessel was reasonably fit at the time of the accident.

The major difficulty the seaman will have in recovering for radiation injury will be in proving that he was radiated while on board the vessel, and that this radiation was attributable to the vessel. Note, however, that the seaman's proof problem will be lighter than the problem of a person radiated on land. Under unseaworthiness, the seaman will not have to show negligence, and will not have to show that it was one party rather than another who caused his injury so long as he can prove that he received his radiation dose from the vessel. The proof problem nevertheless remains substantial. Consider the case where the seaman develops cancer or sterility, conditions which can be caused by radiation, but can also be caused by other things. The court has to decide whether or not the case should go to the jury: are there enough facts from which a reasonable jury could infer that the seaman's condition was caused by radiation, and that the seaman was radiated while on the vessel owned by the man whom he is suing? What if the seaman were able to show that his monitoring device had recorded an unusual degree of radiation during one period of his employment? After the case of *Schulz v. The Pennsylvania Railroad Co.*⁸³ it is difficult to rule out absolutely the possibility of such cases reaching a jury. In the Schulz case, a seaman, Schulz, was found drowned with a flashlight in his hand, half clad. His widow brought suit under the Jones Act. Schulz had been a watchman, and had been working at night on four unlighted and icy tugboats. It was conceded that the death was accidental. The lower court held that these facts, by themselves, were not sufficient to allow the case to get to the jury. The Supreme Court overruled the lower court and had this to say:

And reasonable men could also find from the discovery of Schulz's half-robed body with a flashlight gripped in his hand that he slipped from an unlighted tug as he groped about in the darkness attempting to perform his duties. But the courts below took this case from the jury because of a possibility that Schulz might have fallen from the one boat that was partially illuminated by shore lights.

Doubtless the jury could have so found (had the court allowed it to perform its function) but it would not have been compelled to draw such inferences....Jurors are supposed to reach their conclusions on the basis of common sense, common understanding and fair beliefs, grounded on statements by witnesses or proof of circumstances from which inferences may fairly be drawn.⁸⁴

It seems that here again the benevolence of courts toward seamen took effect since the case went to the jury on facts which certainly fell far short of imputing cause to the owner.

Then there is the case in which the seaman might have worked on two or three different nuclear vessels. How will he be able to prove that it is the owner of vessel X from whom he should recover? Here, in the common law courts, two attitudes have developed. One is that unless the plaintiff can prove that it was one rather than the other who caused his injury, he cannot recover from either.⁸⁵ A second attitude is that if the plaintiff can prove that it was one of the two rather than anyone else who caused his injury he can recover from both unless one of the defendants can demonstrate that his act was not the cause.⁸⁶ It does not seem unlikely that the admiralty courts will invoke the less stringent rule should an analogous case come up. But even if they should take the view that the plaintiff must show that it was one particular vessel which gave rise to his injury, the plaintiff might not be totally out of luck. *Zaepfel v. du Pont*⁸⁷ is a case rather analogous to our hypothetical situation in the sense that the plaintiff worked for three different chemical companies, and later died from aplastic anemia, a disease which could be contracted from the chemicals with which he was working. The suit was brought for workman's compensation, a setting similar to the remedy of a seaman in that the courts tend to be satisfied with less proof in these areas than they are in ordinary tort actions. The court in the *Zaepfel* case recognized the fact that there was a "paucity of experience generally with aplastic anemia as an industrial disease."⁸⁸ That there was a lack of certainty about the cause can be shown by the fact that the plaintiff tried the case on the theory that each of the employments contributed to the disease. The medical testimony about the cause of death and where the cause came from was conflicting. The most favorable testimony to the plaintiff was that "Historically and from the evidence presented, the picture could very well have begun at the time he was employed handling the benzene rings at du Pont."⁸⁸ The court held that there was enough evidence from which to place the liability on du Pont. It concluded with this opinion:

In support of medical opinion by the doctor who had the benefit of personal observation, the record discloses a young man with no serious ailment exposed by his employment

to chemicals known to cause aplastic anemia, who contracted such disease at the age of thirty-nine as a result of the disease. Neither the purpose nor the language of the Workmen's Compensation Law requires that, to become entitled to compensation his widow must establish the precise exposure which caused his death to an absolute certainty.⁹⁰ It is not unlikely that this same liberal attitude would manifest itself in actions brought by seamen in like cases.

A complete discussion of all the possible fact situations is beyond the scope of this paper. All we have tried to do is to indicate some of the problems which could arise, and indicate the kind of attitude which courts may be expected to maintain in regard to them. We have also recommended that insofar as unseaworthiness is concerned no changes to accomodate nuclear vessels appear to be necessary.

The Jones Act is the other damages remedy. It is founded in statute, unlike unseaworthiness. It is also complicated. We do not propose to cover it in detail, but shall explain the remedy, highlighting those areas relevant to nuclear shipping.

The first question which naturally comes to mind is this: the seaman is given two damages remedies; may he sue under both, or must he elect one, and if he elects one and not the other, what considerations will guide his choice? Although the question has never been squarely presented to the Supreme Court, it is now taken for granted that a seaman may sue under both theories for the same cause of action, and so long as the facts sustain a verdict under either theory, the verdict will not be upset.⁹¹ It is common procedure today, therefore, for a seaman to bring his action on grounds of unseaworthiness and the Jones Act with the thought that he might as well give himself the most opportunity to win. In most cases either one of the two remedies would be appropriate.

As one author has put it, "the Jones Act 'negligence' notion and the 'unseaworthiness' idea overlap and blend indistinguishably."⁹² But since unseaworthiness is the more liberal remedy - as we shall soon point out - it is rare, in those cases, that a seaman would choose the Jones Act solely. The only time that a seaman would choose the Jones Act and not the unseaworthiness is in those highly theoretical situations alluded to earlier in which there is negligence only - no unseaworthiness, as well. If the seaman dies from an injury suffered from his employment his survivor could not sue under unseaworthiness, but would have to use the Jones Act. These are the only two situations in which the Jones Act is very important. As Gilmore and Black put it: "the Jones act ... has become obsolete."⁹³

The measure of liability in the Jones Act is negligence. The Jones Act incorporates the negligence concepts of the Federal Employers' Liability Act (FELA).⁹⁴ The Act says: "Any seaman who shall suffer personal injury in the course of his employment may, at his election, maintain an action at law, with the right of trial by jury, and in such action all statutes of the United States modifying or extending the common law right or remedy in cases of personal injury to railway employees shall apply..."⁹⁵

The law says that all sections of the FELA are to apply to seaman, but in practice the courts have held that this is not strictly so. The practice appears to be that those sections of the FELA which would not narrow the substantive rights which seamen already had should be applied in Jones Act cases. Those sections of FELA which do not meet this test should not be.⁹⁶ All the procedural aspects of the FELA are, however, incorporated into the Jones Act, one of which is the three year limitation on claims.

The same liberal attitude toward seaman comes forth in the manner with which the courts treat negligence in Jones cases. *Kernan v. American Dredging Company*,⁹⁷ a recent case, is a good illustration of this point. A seaman was killed by fire because the tug on which he was working caught fire from a scow which had caught fire because its kerosene lamp ignited vapors on the water's surface. Had the kerosene lamp been eight feet above the water the fire would not have started. Coast Guard regulations require the lamp to be eight feet above the surface, but the purpose of the rule is to protect other vessels in their navigation; the rule is not for the purpose of preventing accidents of the type in this case. Under ordinary negligence law, violation of a statute is negligence only when the injury "which the violation causes is that from which it was the purpose of the enactment to protect..."⁹⁸ Nevertheless, the court allowed a recovery, saying:

In the railroad and shipping industries, however, the FELA and Jones Act provide the framework for determining liability for industrial accidents. But instead of a detailed statute codifying common-law principles, Congress saw fit to enact a statute of the most general terms, thus leaving in large measure to the courts the duty of fashioning remedies for injured employees analogous to the development of tort remedies at common law. But it is clear that the general Congressional intent was to provide liberal recovery for injured workers....(Emphasis Supplied.)⁹⁹

It is the attitude of the courts, then, that the Jones Act provides merely a framework in which the courts are free to fashion

remedies which do not necessarily conform to the common law standards of negligence. This attitude shows again in the less rigid manner in which the courts treat the res ipsa rule.¹⁰⁰ All in all, it is fair to say that although the measure of liability in the Jones Act is negligence, the definition and proof of negligence employed in these cases fall far short of common law standards.

Perhaps we have already spent too much time on the Jones Act since it has almost become displaced by the more liberal action for unseaworthiness. Nevertheless, a word should be said about a problem which nuclear vessels might bring to the Jones Act cases. It is the short limitation period. Three years is obviously too short for radiation injuries. This is a crucial fact in death actions since unseaworthiness does not offer a remedy there. It might be important too if one of the theoretical cases about which we spoke earlier should ever arise. The best remedy we could propose would be to permit, by statute, a longer limitation period for radiation injuries. This will take care of those few cases which will be brought under the Jones Act.

To sum up the area of seaman's rights: atomic energy does not affect this part of admiralty law very much since it is already extremely liberal to seamen. Under unseaworthiness which will take care of almost all the seaman's claims, the owner has the duty of an insurer. In those cases which require a showing of negligence under the Jones Act, the seaman's burden is greatly lightened by extension of the definition of negligence and the contraction of the requirements for proof. And in cases where, from the nature of things, the seaman cannot offer even the attenuated type of proof necessary for a recovery under unseaworthiness or the Jones Act, or where laches prevents a recovery under unseaworthiness, he can, in many cases, get partial compensation, at least, by invoking his remedy for maintenance and cure. The seaman can rest assured that he will get a recovery of some sort for radiation injury if the courts can possibly award it.

As far as limitation of liability is concerned, because there is the possibility that damage claims could be higher for nuclear injuries than for non-nuclear injuries, there may be merit in enlarging the limitation fund available. (We are hard-pressed to see what difference it should make whether passengers or seamen get injured; both are persons, and it may, thus, be advisable to extend the \$60 per ton provision to cover seamen.)

Collision and Third Party Liability

Third party liability can result from causes other than

collision, (and we shall discuss those situations here), but we treat collision and third party liability in the same section because they can be conveniently handled as we move a nuclear vessel from United States waters, to the high seas, to a foreign port in a series of hypothetical situations. Before we get into specifics, however, we shall introduce the topics by some general observations, first about collision. (There are of course several types of marine casualties other than collision, but for the purpose of simplification, we shall mainly discuss collision.)

Collision liability is based upon honest-to-goodness negligence. Furthermore, the owner of a vessel can limit his liability for collision damage. Should nuclear shipping change this scheme? Unless third party injury ensues from a collision (e.g., injury to persons and property on land), we see no reason to change this scheme drastically. In regard to strict liability: (1) it is doubtful that nuclear energy in a vessel is "non-natural;" (2) the possibility of a nuclear incident is no greater than the possibility of a conventional incident; (3) the maximum extent of possible damage from a collision with a nuclear vessel is not so far beyond what is possible under present conditions as to justify changing the law from negligence to strict liability. (If there is total loss of life and sinking of the vessel as a result of a nuclear incident, the extent of injury is no greater than total loss of life and sinking from any other cause. However, where persons are injured, but not killed, it is possible that nuclear injuries might give rise to claims higher in amount than those brought for conventional accidents.) Because the maximum extent of possible injury by collision is not far greater than that already possible, we see no reason to scrap limitation of liability for the sole purpose of accomodating nuclear vessels, although it might be advisable to raise the amount of the limitation fund, perhaps by applying the \$60 per ton provision to cover all personal injury, as suggested in our section on seamen.

Third party liability is another matter. Injury to third parties will normally occur when the vessel is in a port. As we have pointed out, any injury which arises from a vessel, even though it is consummated on land, is a maritime tort. Under present United States law, the owner of a vessel which causes the injury to persons or property on land is liable only for negligence, and may also limit his liability. We believe that here the law should be changed to accomodate nuclear vessels. What makes an injury consummated on land different from injury to cargo, seamen, and other vessels is that the extent of potential damage is unlimited, in the event of a nuclear incident. In regard to cargo, for example, it could be said that the possibility of total damage in conventional ships is such a real possibility

that it must have been contemplated by the law makers when they developed the law on cargo; our point, then, was that it does not make much difference whether the total damage is caused by radiation or by other means. It cannot be said, however, that Congress anticipated the type of damage possible in the event of a nuclear catastrophe when it included in the admiralty law, torts caused by vessels and consummated on land. Here, thus, the type of accident is important. To state it more graphically: in regard to cargo, seamen, and collision, a nuclear incident affects the quality of the injury, but does not extend the quantity of injury far beyond what is already contemplated as a possibility (no matter how severe the accident there is only so much that can be damaged); in regard to third persons on land, a nuclear incident could not only affect the quality of the accident, but could extend the quantity of injury far beyond that already contemplated as a possibility. It would appear, then, that this is one place in which the concept of "unduly dangerous" might apply so as to invoke strict liability or the duty of an insurer. Furthermore, in this context, excellent policy reasons exist for abolishing limitation of liability where there is a nuclear incident consummated on land. (See our previous discussion.)

Since it appears to the shipping industry, as it does to us, that strict liability, or the duty of an insurer, will be the rule, at least for nuclear incidents consummated on land, and that either the courts, if they have to, will find some means of getting around the Limitation of Liability Statute, or the statute will be modified (as suggested by this report), the industry will not employ nuclear vessels unless they are assured of indemnification for liability above the amount obtainable from private insurers. This point was emphasized by everyone with whom members of this project spoke in a series of interviews, and is in accord with the attitude of other industries interested in nuclear energy. Furthermore, all nations whose ports nuclear vessels will enter will wish to be assured that, in the event of a major incident, someone will compensate those injured, even if the person liable does not have sufficient assets to pay the claims, and even if he could not obtain enough insurance to cover the claims. For these two reasons a scheme of indemnification is essential to a nuclear shipping industry, and we shall have to base our recommendations largely on what appears to best suit an adequate system of indemnification, as we proceed with our hypothetical situations. We shall now turn to those hypothetical situations.

Let us begin with the nuclear vessel in an American port. Although there appears to have been some confusion on this point (since it is clear that the problems of nuclear vessels were not

in the forefront of Congress' concern when it wrote the Atomic Energy Act and amendments thereto), it is now generally agreed that the indemnification provisions of the Anderson amendments to the Act¹⁰¹ apply to nuclear vessels in United States ports.¹⁰² For that reason, it is advisable to give a brief sketch of what those amendments provide. Basically, they provide that the United States Government will indemnify the operator of a nuclear reactor for liability in excess of that covered by his insurance policy, and will also indemnify anyone else who may be liable for damage attributable to the operator's reactor.

Licensees of reactors, who must enter into indemnity agreements, with the United States Government, must demonstrate financial responsibility to cover liability below the amount at which the government indemnity begins. Most do this by insurance. To make sure that public claims will be paid no matter whom the courts find liable, the Atomic Energy Commission¹⁰³ insists that the insurance be of the all-risk type, with the insurance company promising to pay for whatever damage is attributable to the reactor, whether or not the operator himself is liable. Thus, in the famous hypothetical case of the airplane crashing into a reactor, the licensee's insurance policy would pay for all the damage up to the amount covered in the policy, and, thereafter, the government would pay the rest of the claims. As we have stated before, it is not at all certain whether under the doctrine of strict liability the operator of the reactor would be liable for damage caused by an intervening third party; it might appear odd therefore that the operator's policy would pay for claims for which the operator might not be liable. This contingency is understandable, however, when we recall that one of the two prime purposes of indemnification was to protect the public; by causing insurance policies to be written in this manner, the Atomic Energy Commission assures that there will be no gaps in financial resources to pay for nuclear injury. (Most likely the aircraft operator's insurance would not cover injuries of this sort, or would not cover the amount possible in nuclear incidents, and the operator's resources would usually not be enough to pay for all the claims.) There is one possible gap in the liability coverage. That is in the case where no one is liable for injury; where the courts might hold that the injury was caused by Act of God. Here there would be no indemnity because there would be no one to indemnify, and there would be no one to call the "insured" in the insurance policy. On this point one observer has said: "That is a hazard of being alive and you must suffer the consequences."¹⁰⁴ Another observer takes a less fatalistic view in which he finds no gap:

I personally feel that given this legislation and given the private insurance coverage which will be available that it is extremely unlikely that in the event of an accident

any court is not going to find that it can, under one theory or another fix liability. I would think... that it is most likely that it will be fixed on the reactor operator.¹⁰⁵ Another feature of the indemnity amendments is that they limit the liability of the licensee. This is done by providing that the maximum government indemnity for each nuclear incident will be \$500 million.

To sum up: in order to encourage an atomic industry, and in order to protect the public Congress has provided a scheme of indemnification in which private insurance covers the risk up to its capacity, and the government takes the risk for damage in excess of that covered by insurance, up to the point of \$500 million. To make sure that there will be adequate resources to pay for all injury, the government requires that the insurance cover anyone who might be liable for a nuclear injury emanating from the licensee's plant, and it agrees to indemnify any such person for amounts beyond the insured amount.

Turning again to our hypothetical nuclear vessel in an American port, let us imagine a nuclear incident, not caused by any extrinsic force. According to the suggestions made by us, the owner would be liable for radiation damage whether or not he was negligent because a nuclear vessel in a port would be "unduly dangerous" due to the vast amount of damage it could cause. (It is important to note that only nuclear injury would fall within this measure of strict liability since it is only for the purpose of dealing with radiation injury that the rule of strict liability is applied in the first place.)¹⁰⁶ Nor would there be, in our scheme, any maritime limitation of liability. This case would be treated just as if the reactor were land based; that is, the insurance policy would cover up to the amount provided for, and, if necessary, the government would indemnify beyond that amount.

Now suppose that the incident is caused by an Act of God e.g. a tidal wave. We have just mentioned such a situation, and concluded that there could be a gap if the courts invoked one area of authority which would make no one liable. It is well to note, however, that in admiralty there is no need to conjecture the possible attitudes of courts. Admiralty is within the federal jurisdiction, and there is no doubt that the Congress may by statute determine measures of liability in admiralty. For this reason, so as not to leave any possible gaps, Congress should make the owner of a nuclear vessel an insurer by law, against accidents caused by acts of God. By this arrangement there would be an insured party in the insurance policy and there would be liability for which the government would indemnify. Such a liability should not push up insurance rates

since the likelihood of accidents caused by acts of God would be slim. (And there may be a good argument that, in any event, the operator should see to it that his reactor can withstand the most severe conditions.)

Consider now the case in which a non-nuclear vessel rams into a nuclear vessel, which is anchored in the port. All the fault rests with the non-nuclear vessel. The obvious analogy is the aircraft flying into the reactor. Proceeding according to this analogy (which will be the case, unless Congress changes the indemnity provisions to take care of nuclear vessels separately), the nuclear vessel's insurance would cover claims asserted against anyone up to the insured amount and beyond that the government would pay. This would leave no gaps insofar as the public is concerned. We have already suggested that the liability for any incident in harbors emanating from the operator's reactor be placed on the operator, or, in this case, the vessel owner, and that his right to limit liability in the maritime sense be abolished. (We have also pointed out that such scheme is easily obtainable by Congressional enactment since admiralty is within the federal jurisdiction.)

The next problem is whether the owner of the vessel, or, in effect, the insurance company subrogated to his rights, would have a right of recourse against the non-nuclear vessel. Of course, in admiralty law of collision there is no authority on this matter since vessel owners do not now have the duty of insurer. Other areas of admiralty law, however, may be instructive on this matter. We have discussed earlier the duty of insurer which the owner of a vessel has in maintenance and cure cases, and we noted that some courts allow the owner to recover from the tort-feasor who caused the seaman's injury the amount that the owner had to pay. The same type situation exists in regard to harbor workers. Unseaworthiness, as we noted, rests upon a "duty of insurer" basis. Harbor workers are counted as seamen for purposes of the remedy. In some situations, the courts have given the vessel owner who was not at fault a right to recover from the employer of the harbor worker who was at fault, and whose fault was the immediate cause of the injury.¹⁰⁷ In any event, it would seem fair to permit the vessel owner to recover from one who caused the injury for which the owner had to pay. In the event that both were at fault, some sort of contribution scheme would appear to be in order. If the nuclear vessel could recover from the third party tort-feasor, there appears to be no reason why that tort-feasor (the non-nuclear vessel, in this case) could not limit his liability. In that event, the amount that the insurance company could recover would be limited to the value of the vessel after the accident plus the freight earned.

The major fault with the scheme outlined above is that it would make the nuclear vessel's insurance rates excessive, for two reasons: (1) the likelihood of collision - in contrast to the probability of an airplane ramming a reactor - is not slight, as our previous discussion on the probabilities of collision near populated centers indicates); (2) the amount that the insurance companies might be able to recover under their rights of subrogation, if they could recover at all, would be limited by the admiralty law on limitation of liability. It is therefore improbable that the insurance companies would treat coverage for accidents caused by non-nuclear vessels, or nuclear vessels, for that matter, as they did for airplanes.

Another way to handle the situation in which the non-nuclear vessel rams a nuclear vessel would be to retain the rules of liability as they are presently constituted; in which case the non-nuclear vessel would be liable for all the damage (we have been supposing that all the fault rested with the non-nuclear vessel.) In such a case, as the insurance policies are now written, the nuclear vessel's insurance would have to pay for the non-nuclear vessels liability. We have pointed out that this makes insurance rates too high. To avoid this result, the government could indemnify the non-nuclear vessel down to zero, not requiring that the nuclear vessel's insurance cover the non-nuclear vessel's liability. This scheme, of course, would fully protect the public because the government would be paying for everything. What is objectionable, however, is that it does violence to the conception that insofar as possible private industry, including insurance, should conduct the United States atomic energy program. What is objectionable, further, is that owners of non-nuclear vessels would be getting a free ride.

A further alternative is to make the nuclear vessel an insurer for all injuries from its reactor, as we have been suggesting. Under such a scheme its insurance would pay for its liability. We then suggest that the insurance company have a right to recover from the non-nuclear vessel, and, then, not permit the non-nuclear vessel to petition for a limitation of liability. This would permit the insurer of the nuclear vessel to recover the full amount paid out, in which case the insurance rates for nuclear vessels would not have to be as high. Furthermore, it would, no doubt, make non-nuclear vessels carry insurance to protect themselves from heavy losses. Since the chance that a non-nuclear vessel would get into a nuclear accident, would be much less than the chances of a nuclear vessel, insurance rates for non-nuclear vessels would not have to be excessive. As far as the public is concerned, it would be protected under this scheme since, in any event, the nuclear vessel would be liable, and, by law, would have adequate financial protection.

In effect what this scheme would do is distribute the cost of insurance for nuclear incident throughout the whole shipping community, rather than leave it entirely with the nuclear vessels.

In the case where a nuclear incident in a port results from the collision of two vessels and both are to blame, the same considerations are involved. The only difference such a situation would make is that in those cases in which we suggest that the insurance company have a right of indemnity from the other vessel, the indemnity would be limited in proportion to the amount of fault, or to 50% of the total bill, depending upon whether Congress would wish to apply the divided damages rule here. In the possible case in which the liabilities are determined as they are now, and in which the government indemnifies the non-nuclear vessel down to zero, the only difference would be that the amount of the government's indemnity would be less, since part of the damage would be covered by the nuclear vessel's insurance.

Since the discussion of indemnification schemes rests so much on the capabilities and costs of the insurance industry, and since we have not investigated these topics, we cannot offer a final recommendation as to which scheme of indemnity and liability is best. We are setting forth various schemes which should be considered. A final determination awaits the investigation of the insurance picture for nuclear and non-nuclear vessels.

It is our belief that a collision between two nuclear vessels would present the very same considerations we discussed in regard to collision between a non-nuclear and a nuclear vessel, since, as to each vessel which would sustain a nuclear incident, the other vessel would be regarded as if it were a non-nuclear vessel, or an airplane, for that matter. This is so, since the other vessel's insurance policy would cover only the liability incurred as the result of a nuclear incident emanating from its own reactor, and, its indemnity agreement with the government would cover its liability only for incidents from its own reactor; whatever liability the other vessel would have would be taken care of by the first vessel's insurance and indemnity agreement. There is, then, no reason to treat a nuclear vessel any differently from a non-nuclear vessel insofar as we are talking about its responsibilities derived from the incident sustained by the other vessel's reactor.

Implicit in this argument is the assumption that if two nuclear vessels collided and each vessel's reactor emitted radiation there would be two "nuclear incidents". The Act defines a nuclear incident as "any occurrence within the United States causing bodily injury, sickness, disease, or death, or loss of or damage to property, or for loss of use of property arising out of or resulting from the radioactive, toxic, explosive,

or other hazardous properties of source, special nuclear, or byproduct material."¹⁰⁰ The key words are: "any occurrence." It seems to us reasonable to say that there would be two occurrences here. The inference which the Act seems to suggest is that for every accident arising from a reactor, there is a nuclear incident. (Of course, if just one reactor emits radiation, there is no need to get into this question at all.)

The question which now follows is how do you know what injury to attribute to each reactor in the case where both reactors emit radiation simultaneously? Our answer is that, except in two cases, it makes no difference in result how the damage is apportioned between the reactors. The two cases are: (1) where the total damage from both reactors exceeds \$6,200,000 (assuming in these hypothetical cases that the insurance carried for each reactor is \$60 million); and (2) where it could not be said that each reactor caused a minimum of \$60 million damage. Some hypothetical situations will illustrate our contentions. Assume that the total amount of damage caused by both reactors is \$600 million. Now assume two cases. In case (a) the damage attributable to each is as follows: vessel X's reactor caused \$200 million damage and vessel Y's caused \$400 million damage. Turning first to the incident from X's reactor, X's insurance company would pay \$60 million (no matter whose liabilities were involved), and the government would indemnify whatever party or parties were liable for the incident for the amount not taken care of by the insurance. Thus, in this case, the government would end up paying \$140 million. Turning now to the incident sustained from Y's reactor, invoking the same type of analysis, Y's insurance company would end up paying \$60 million and the government, \$340 million. The end result would leave the insurance companies paying a total of \$120 million and the government \$480 million. Now turn to case (b) in which the total damage resulting from the two incidents is again \$600 million, but X's reactor caused only \$100 million and Y's reactor caused \$500 million. In regard to X's incident, the insurance company would end up paying \$60 million and the government, \$40 million, and in regard to Y's incident the insurance company would pay \$60 million and the government, \$440 million. Thus, the net result under case (b) would have the insurance companies paying out \$120 million and the government, \$480 million: the same result as under case (a).

One of the two difficulties arises where the total damage exceeds \$6,200,000 because, it may be recalled, the government limits its liability at \$500 million for each nuclear incident. Thus it makes a great deal of difference in a case of this sort how the damage is apportioned. To illustrate this point, assume, again, two different cases in which the total damage is \$800 million. In case (a) the damage attributable to reactor X is \$400 million, and that attributable to Y is \$400 million. The

same analysis invoked before would yield a result in which the government, for each incident, would end up paying \$340 million. But now assume that the damage apportioned to X is \$100 million and that apportioned to Y is \$700 million. For X's incident the government would pay \$40 million. For Y's incident, Y's insurance company would pay \$60 million of the claim, leaving \$640 million to be paid by the government. As mentioned before, however, the Atomic Energy Act limits the government's responsibility at \$500 million per nuclear incident. Thus, theoretically, there would be the possibility that claims amounting to \$140 million would not be paid. How the damage would be apportioned in a case of this sort, we do not suggest. The uncertainty, however, should not disturb us greatly for two reasons: (1) the possibility of aggregate damage exceeding the amount of both insurance policies plus the \$500 million is slim; (2) Congressional spokesmen have suggested that even if the unpaid claims exceeded \$500 million, the government could, and probably would, appropriate enough extra money by special act of Congress to take care of all the claims.¹⁰⁹

The other difficulty arises when it cannot be estimated that each reactor sustained a minimum of \$60 million. In this case, the problem relates to the amounts which the insurance companies must pay. If the total damage, for example, is \$75 million, it makes all the difference in the world to the insurance company whether it must pay for \$10 million or \$50 million. Or if the total damage is \$600 million and there is the possibility that one reactor caused only \$50 million worth, the insurance company which insures that reactor will be very much interested in the question of whether it must pay \$50 million or \$60 million. Frankly, we have no solution to this problem. Perhaps the answer lies in a sort of "rough justice" estimate made by persons most competent to do so.

While on the subject of how the indemnity amendments apply to nuclear vessels in American waters, we wish to mention one more matter. Section 11 u of the Atomic Energy Act deals with on-site and off-site property of the reactor operator. "Public liability" for which liable parties are indemnified under Section 170 c, includes damage to the licensee's property with the exception of his property "which is located at the site of and used in connection with the activity where the nuclear incident occurs."¹¹⁰ Applying this standard to stationary installations may be difficult enough, but the difficulty is compounded when nuclear vessels are involved. Does on-site mean any other part of the vessel, or just that part connected with the propulsion unit? Does off-site mean only the other vessels which the owner of the nuclear vessel might own? For purposes of this provision, would vessels under charter or under a general agency agreement be

regarded as the operator's off-site property? These are questions which would have to be decided by a court, but Congress itself could clear them up by making special provision for nuclear vessels.

We have discussed the problems of liability and indemnity of nuclear vessels in American waters. We have proposed that vessels sustaining nuclear incidents in ports close to centers of population be subject to the duty of insurer against all incidents arising from their reactors, and that owners of such vessels not be allowed to limit their liability under the maritime law. We have investigated various means of indemnification of persons liable for incidents arising from nuclear vessels, and have concluded that, so long as the nuclear vessel's insurance must cover all claims arising from a nuclear incident emanating from that vessel, no matter who may have been at fault for causing the incident, insurance rates for nuclear vessels will be too high unless the insurance company has a right to recover from a party whose fault may have wholly or partly caused the incident, and that such party, if it is another vessel, be not permitted to limit liability. We have also pointed out that the problem of on-site and off-site property is in dire need of clarification.

We shall now transport our nuclear vessel out of American waters onto the high seas. We have already mentioned that liability for incidents sustained on the high seas involves considerations different from those discussed in regard to incidents sustained near centers of population. We proposed that the conventional rules of collision liability and limitation of liability (with, perhaps, some modifications) be retained for collisions in which the incident does not touch persons or property on land. (We are aware that a nuclear incident on the high seas may irradiate marine organisms in the vicinity and these in turn might make unsafe, until tested, fish in a wide area, but this appears to be a contingency for which a prearranged system of liability should not be designed.) Since the maritime limitation of liability would be retained, under our proposal, indemnity by the government would not enter the picture. The government indemnifies, under the Atomic Energy Act, persons who are liable for amounts that these persons cannot provide for by insurance. But since, in this case, limitation of liability would keep the liability of any vessel causing the incident within insurable limits there is no need for government indemnification.

If our suggestion is not heeded, and limitation of liability is abolished in cases of nuclear incidents sustained on the oceans, many nice and complicated questions would arise. First of all, would the Atomic Energy Act indemnity provisions apply to nuclear vessels flying the American flag? Section 170 c indemnifies for "public liability." "Public liability" is defined as "any legal liability arising out of or resulting from a nuclear incident..."¹¹¹

A "nuclear incident" is "any occurrence within the United States...."¹¹² Two questions are suggested here: (1) for purposes of this Act would a vessel flying the United States flag be considered "within the United States"? (2) does the Act require that the incident not only have its origin within the United States, but that all indemnified injuries be sustained within the United States, as well? (This question is acute since collisions might very easily be between American and foreign vessels or the damage might be to marine life in the ocean.)

We think it doubtful that the Congress intended that vessels flying the American flag be considered "within the United States" for purposes of the Atomic Energy Act. In fact, there is little to suggest that Congress thought very much at all about nuclear vessels when it wrote the act. Although for some purposes, international law looks upon ships as being "assimilated to the territory of the state, the flag of which it flies,"¹¹³ and although our courts have held that vessels bearing the American flag can be placed under the jurisdiction of the United States, if Congress means to include nuclear vessels flying the United States flag within the indemnity provisions, it ought to say so.

According to one expert source, the indemnification amendments would indemnify for "liability to residents of other countries who suffer loss as a result of an accident at an installation located in the United States."¹¹⁴ Whether or not this is correct, Congress should state whether or not this applies to nuclear vessels. Remember that if the Act would extend to damage of property and persons on foreign vessels, it might also extend to damage within the territorial limits of foreign nations caused by American nuclear vessels in foreign waters. Of course, this whole problem hinges on the above question of whether or not an American vessel is "within the United States."

If the United States Atomic Energy Act does not provide for collisions on the high seas, and if some sort of indemnity provision were sought to cover such cases, the only sort of solution we can suggest is an international convention, unless each nation wished to provide an indemnity for its own vessels, or wished to engage in a scheme of reciprocal indemnity, each nation indemnifying the vessel of the other nation for injury caused to persons and property on the vessel flying its flag. (Such a scheme of reciprocal indemnification will be discussed later when we move the vessel into a foreign port.)

We have suggested that since limitation of liability ought to be retained for nuclear incidents on the high seas, there is no need to worry about the operation of indemnity provisions, but that, if our suggestion on the retention of limitation of

liability be not heeded, Congress should say specifically whether or not the Atomic Energy Act applies to such situations since there is room to argue that it does. We have also suggested that if Congress wants an indemnity provision but, yet, does not wish the American government to indemnify for foreign claims in the same manner it does for American claims, thought ought to be given to an international convention or bilateral treaties. More will be said on those two schemes shortly.

We shall now move our nuclear vessel into foreign waters. Some scheme of indemnification will be necessary to take care of possible nuclear incidents emanating from nuclear vessels in foreign waters. Foreign nations will undoubtedly wish to be assured that there will be adequate financial resources to cover any nuclear incidents involving foreign ships in their jurisdictions, and American operators of nuclear vessels will want to be indemnified for liabilities arising from nuclear incidents above insurable amounts no matter where they arise. These are the very same type attitudes which gave rise to the Price-Anderson indemnity amendments to the Atomic Energy Act.

Is there any need to find some new scheme? Does the Atomic Energy Act cover the nuclear vessel in foreign waters? This brings to bear the same discussion we had in regard to collisions on the high seas. But here it is even more doubtful that Congress intended "within the United States" to apply to American vessels since, as we noted in our discussion of jurisdictional matters, American nuclear vessels in foreign waters are under the ultimate jurisdiction of the foreign nation. Assuming that the courts would hold that the Atomic Energy Act does not apply to American vessels in foreign waters, or that Congress specifically states that it does not, some other scheme of indemnification will be necessary.

One simple solution is to remove the requirement of "within the United States", for nuclear vessels, and to have the United States government indemnify the owner of the nuclear vessel for liability he assumes for incidents injuring foreign persons and property. Presumably, the indemnification under such a scheme would be up to \$500 million. It is highly questionable, however, that the United States Congress would wish to protect foreign nationals and their property to the extent of \$500 million. The problem is further complicated by the fact that even if the United States were willing to do so, it would be foolish and, perhaps unfair, not to require that foreign nuclear vessels in our waters have behind them financial protection amounting to the amount of their insurance plus \$500 million. Obviously no shipping firm could have that type of financial protection without some sort of indemnity agreement with its government. It is extremely unlikely that any foreign nation would do so. No foreign nation

protects its own citizens up to that amount, or anywhere near that amount. It is possible to reason that the United States indemnity law would take care of foreign vessels in our ports up to \$500 million. This will be the case whether a foreign vessel operator has to comply with existing law by obtaining a license to operate a nuclear reactor within the United States or whether he is allowed under an amendment to the Atomic Energy Act, to bring his nuclear vessel into the United States subject to reciprocal inspection standards. In either case an indemnification agreement and financial protection requirements will protect our citizens up to \$500 million plus insurance. But the point is that it is not right that the United States indemnify for incidents sustained by our vessel abroad and also for incidents sustained by foreign vessels here.

International arrangements of some type, then, appear to be in order. There are two such possible arrangements which come to our minds. One is an international convention in which each nation agrees to indemnify its vessels for damage caused in foreign nations. Essential to this scheme is an agreement concerning the amount for which the nations will indemnify. The United States considers that, in order to protect its citizens properly, \$500 million of possible indemnity is essential. Other nations feel differently. West Germany, for example, in its draft atomic energy bill provides for indemnification up to \$3.6 million.¹¹⁵ The British in their draft bill, do not provide for any scheme of indemnity, but provide, rather, that Parliament take an ad hoc approach to any incident beyond the capacity of the insurance policy to pay.¹¹⁶ In order to avoid this obstacle another plan is proposed which would not require any agreement on the amount of the indemnity, and, yet, would provide for indemnity for citizens of foreign nations. This is a scheme which we might call reciprocal indemnification.

Reciprocal indemnification would work in this manner: each nation would do what the United States will presumably do when foreign nuclear vessels enter our ports - indemnify that foreign vessel for any liability (above that covered by insurance) incurred from a nuclear incident emanating from its reactor. Under such a plan, each nation would cover the vessels of every other nation up to the amount that in its own opinion would adequately protect its citizens. One problem here, however, is how to agree on the private insurance requirement. Would vessels have to take out insurance up to the amount that is required by the nation requiring the most insurance? It is possible, however, that nations could agree by treaty or convention on the amount of insurance required since, presumably, what guides decisions as to the amount of insurance is how much can be obtained at reasonable rates. Since insurance for vessels comes out of international

insurance pools, what amounts can be obtained at reasonable rates ought to be fairly uniform throughout the world. There is another problem, however, which reciprocal indemnification raises which is not so easily susceptible to solution. It is whether non-nuclear nations would agree to such a scheme. One possible advantage to non-nuclear nations of such a scheme might be that foreign nuclear vessels would come to their ports, which might not be the case if their owners had to be concerned about ruinous liability, or if the nation required financial protection which the nation whose flag the ship was flying was unwilling to give. Non-nuclear nations could not close their ports to nuclear ships forever, especially since most of the vessels in the future may very well be nuclear propelled. On the other hand, it is obvious that non-nuclear nations would not benefit as much from such a scheme as would nations which had a nuclear vessel fleet.

Besides the advantages of reciprocal indemnification outlined above, there is yet another advantage, a reduction in forum shopping (seeking out the court which is likely to apply the law which will allow the best award). Conflicts of law in admiralty is a difficult subject. (Although we have not had the time to study this in detail, we shall have a short section on it further in the report.) Suffice it to say, for our present purposes, that one problem which has plagued admiralty law for years is the lack of certainty as to which nations should exercise jurisdiction over maritime torts committed in various parts of the world. For example, American courts will assert jurisdiction over any incident involving any vessel which occurs in any part of the world so long as the parties or the res (ship) are before the court; other nations will take jurisdiction only when: (1) one of the parties to the tort is a national of the state, (2) the tort occurs in the nation's territorial waters. What we find, then, is a choice of forums available often to the injured party. He will generally seek to sue in that court which will afford him his best remedy. Our scheme of reciprocal indemnification would to a great extent remove this forum shopping for nuclear incidents which cause damage above that covered by insurance. If, for example, an American vessel sustained a nuclear incident in British waters causing damage of more than \$60 million (assuming that amount would be the maximum covered by the insurance), injured British plaintiffs would not sue in American courts because there would be no indemnity available to the shipowner, but, rather, would sue in British courts because the British Government might then indemnify the shipowner, as appropriate under British law. If the vessel in British territorial waters sustained an incident which caused injury to persons in other nations, as well as in Britain, in an amount greater than that covered by the insurance, foreign suitors would wish to sue also in British

courts if the British scheme of indemnity, like the American apparently does for injuries arising in the United States, would cover incidents consummated in other nations, but which arise in Britain.

This brings us to the question of what would be the case if the British, for example, did not wish to provide for injuries consummated in foreign nations, emanating from reactors within their territory. This problem of multinational injury is no great obstacle to our scheme of reciprocal indemnification. Nations could agree to indemnify each other's vessels for injuries incurred within their various jurisdictions, and not, necessarily, for injuries which start within their jurisdictions. For example, the American vessel in British waters which had an incident which caused damage in Britain and France could be indemnified by the British for injuries in Britain and by the French for injuries in France. This too would reduce forum shopping since persons would most likely sue only in that nation which indemnified the vessel's owner. This approach involves some complicating problems: how the insurance would be split up among the claimants before referring the rest to their national indemnification and how the separate national limitations on liability for nuclear incidents could be consolidated. This scheme of indemnity by the nation in which the injury is sustained might also be utilized for collisions on the high seas which cause radiation damage in foreign nations, if it were found desirable to abolish the maritime limitation of liability in such cases.

We have suggested the following: (1) some sort of indemnity scheme which will cover incidents sustained abroad is a prerequisite for an American nuclear shipping industry; (2) it is not proper that the United States extend the Price-Anderson indemnity amendments to cover incidents abroad; (3) one way to meet the problem is by international convention, but this might be difficult because of different views toward what constitutes adequate financial protection; (4) a plan which will avoid this lack of agreement, and will, nevertheless, provide protection to the shipowner and the public is the scheme of reciprocal indemnification, under which nations will indemnify the vessels of other nations either for incidents arising within their territory, or for incidents sustained within their territory; (5) an incidental advantage of reciprocal indemnification is that it will reduce forum shopping.

Effect of Atomic Energy on Conflicts of Laws in Admiralty

A glance at the international legal problems connected with nuclear incidents will reveal an enormous complexity. The Harvard report,¹¹⁷ which looked into the matter in some detail, outlines in its introduction the type of problems which arise:

The complexity arises not only from a multiplicity of differing legal systems, substantive rules of law, procedural requirements, measures of damages, legal traditions, standards of living, and public attitudes. It also arises from the possibility of complex circumstances in which, to use a relatively simple example, an atomic installation located in one country, having been designed or equipped by a supplier with its place of business in another country, contaminates persons and property in yet a third country. This situation gives rise to a host of problems. It involves such matters as the requirements of the courts of each of the three countries for entertaining suits. Will these courts apply their own rules of law to the decision of substantive issues or those of one of the other countries? Under what circumstances will the courts of each country enforce judgments rendered in the courts of the others? Certain aspects of these problems may be governed by existing treaties or international conventions. Others may be further complicated by local legislation pertaining to state ownership or the conservation of foreign exchange.¹¹⁸

As tough as the problem is in regard to land based reactors, in regard to reactors on vessels the problem is chaotic. First of all, admiralty law, in which conflicts of law is so important because vessels ply from country to country, has never worked out a satisfactory method for dealing with conflicts problems. Maritime law has been called a universal law, but this is true only to a limited extent. We have already pointed out how many different laws there are on limitation of liability. As a further example, some nations will regard limitation of liability as substantive law which they should follow in applying foreign law;¹¹⁹ other nations will regard it as attaching only to the remedy and, thus, will not apply foreign law on limitation.¹²⁰ A further illustration of lack of uniformity is that in the United States torts caused by vessels on navigable waters are maritime torts whether or not the injury is consummated on land,¹²¹ and vessel owners may limit liability for injury ashore; in Britain at present there appears to be no right to limitation of liability for loss of life and personal injury ashore caused by a vessel in navigable waters,¹²² although this right would be established by British ratification and the coming into effect of the Brussels Convention of 1957.¹²³

Another reason why the conflicts question in admiralty is so complex is the possibility that liability-creating events can occur on no man's land, the high seas, between vessels of different nations. Here there is not even the possibility of invoking one of the standard conflicts rules: that lex loci governs. A further reason for the complexity is that in admiralty it is easily possible for interests of persons of a great many

nations to be affected by a marine casualty. Consider this case, not too unlikely: a collision takes place in waters of Country A, between ships owned by corporations in Countries B and C, flying the flags of Countries D and E, and involving cargo from countries F and G, crew members from Countries H, I and J, and passengers from Countries K and L. Add to this the facts that the two vessels are nuclear propelled and that their reactors emit radiation which causes injury in Countries M and N, and we shall have a question to tax even Solomon.

This project has not had enough time to pursue the conflicts question to the degree that is really necessary. Nor was it in our scope of study to try to straighten out conflicts of laws in admiralty. Accordingly, all we shall do is to suggest some further problems which nuclear shipping might add to this already tangled area.

The first problem which suggests itself is raised by the limitation of liability for nuclear incidents which all countries, or, at least, most countries are likely to have. (We wish to make it clear that we are not now talking about maritime limitation of liability, but, rather the type of provision found in the United States Atomic Energy Act which limits liability at \$500 million plus insurance.) In many countries the limitation figure will not be anywhere near \$500 million. What if an American vessel sustains a nuclear incident in a foreign port, and the foreign atomic energy statute limits the liability of the owner at a point below the total damage? If the foreign nation indemnifies the American owner for all claims above his insurance, all well and good. But what if the foreign government leaves part of the claims unsatisfied? There is nothing to prevent the foreign suitor from suing in a United States court, and, at least, obtain a judgment on which he could try to recover from the owner's assets. United States atomic energy legislation would not be relevant since it applies only to "occurrences within the United States."¹²⁴

There is, thus, the possibility that foreign limitation statutes might not avail the owner of a nuclear vessel at all, and that he could be faced with ruinous liability. It might be thought that United States courts would invoke the limitation law of the foreign country, and, hence, this problem would disappear. But if experience with maritime limitation of liability (a concept exactly alike for our purposes) is at all instructive, American courts will not apply the foreign limitation law on the grounds that such law is not substantive law. The Titanic¹²⁵ established this rule; Justice Holmes, for the Supreme Court, said that American limitation law should apply even though British substantive law should be followed, on the grounds that limitation

law attaches to the remedy and not to the right. Subsequent cases¹²⁶ have upheld this rule. It should again be noted that as to foreign incidents there would not be any limitation law. It might also be argued that an American court would heed the contention of an American defendant that since jurisdiction of American courts is discretionary when foreign parties are involved, in the first place, the court should decline to hear a claimant out of deference to another nation's limitation proceeding. Such an argument was rejected in *The Western Farmer*,¹²⁷ however, in which Judge Hand simply quoted *The Titanic* opinion to the effect that, regarding limitation of liability, the law of the forum applies. Now, all this discussion has rested on the assumption that American courts might look to the manner in which maritime limitation laws have been handled by the courts, when they have a case involving atomic energy limitation of liability before them. Logically, it appears that this is what they should do. It is hard to see how limitation attaches any less to the remedy in atomic energy suits than in maritime suits, employing the court's reasoning. But, as we all know, law is not always logic. For practical reasons, the courts might not apply the maritime analogy because of the severe consequences which could ensure, if they did. It should also be reported that *The Titanic* decision has not met with much favor, anyway.

Another problem is in regard to statutes of limitation (in the usual sense - a period of time within which an action may be brought). As we have said, this is already a big problem in atomic energy law. It is not likely that all nations will have the same limitation periods. Again, American courts will not invoke foreign statutes of limitation since, it is held, they are procedural rather than substantive.

The last problem which we shall mention relates to collision on the high seas. If it is thought that atomic energy legislation ought not to apply to nuclear vessels on the high seas, then the problem would be handled in the same tangled fashion in which it is now handled with conventional vessels. If, however, Congress decides to extend the atomic energy act to such situations, and, if foreign nations do likewise, which atomic energy law will govern? This might make a big difference if one nation indemnifies more than the other, and if the injury is so severe that it mounts beyond the amount covered by insurance. Choice of law might also make a big difference if one nation's atomic energy law encompassed measures of liability which differed from the other nation's. We have already shown that the rule of lex loci could not be applied here since the high seas are no one's territory. At present, maritime law works out such problems in this manner:¹²⁸

(a) in case of collision between two vessels flying the same flag, most courts apply the law common to both vessels; (b) this rule is extended to include collisions between vessels from two

countries which have essentially the same law; (c) where two different flags with two different systems of law collide, the case is "desperate", to quote Rabel - some nations will merely apply the lex fori, some will apply the law most favorable to the plaintiff, and others will apply the law most favorable to the defendant. We have not been able to give this question a great deal of thought, but even a cursory look suggests the need for some type of international agreement.

We have said that conflicts in admiralty law is chaotic, and we have not been able to investigate it thoroughly. We have suggested some possible problems: (1) an American vessel owner being sued in the United States for a nuclear incident abroad without the protection of any limitation on his liability, (2) accommodation of differing statutes of limitation, (3) deciding which law to apply when vessels from two different countries collide on the high seas.

All in all, as we see it, the introduction of nuclear shipping will not change materially the quality of the problems of conflicts of laws in admiralty. It will, however, present more opportunities for problems to arise (1) by creating the possibility that more persons will be involved, especially in those situations where greater quantities of people on shore would suffer injury, and (2) by adding novel atomic energy statutes to the existing statutes.

III LEGAL PROBLEMS IN CONNECTION WITH THE SAVANNAH

THE SAVANNAH OVERSEAS

The SAVANNAH overseas will give rise to all of the legal liability problems which have been discussed in the preceding part of this report. However, both its uniqueness as the first nuclear merchant ship and the unusual governmental responsibility to take it on a tour to further the public policy of the United States Government will tend to cause the SAVANNAH to be treated legally as an exception. Long-term modifications in maritime tort liability, either on the national level or the international level, will not likely be made at the time of the SAVANNAH's initial voyages. As a result, it will be difficult for the United States Government to do more than make pledges of its legal liability in the case of the SAVANNAH with each of the nations whose ports will be visited on the voyage.

In the negotiations with each foreign government the United States Government will work out (1) specific agreements setting forth the extent of the legal liability of the United States Government as a result of a nuclear incident arising from the SAVANNAH; and (2) specific authorization for the use of the SAVANNAH's nuclear reactor under each country's atomic energy law. These two aspects of the legal negotiations will probably be made conjointly as they are closely interrelated. In addition, other negotiations concerning the use of harbors, docks and channels will have to take place, although probably at a later date than these basic agreements mentioned above. The latter types of arrangements and subsequent facilitation for the actual arrival and reception of the vessel will be discussed in a subsequent part of this report dealing with the SAVANNAH and its demonstration voyage.

The first legal question which will have to be cleared up with foreign governments is that of the status of the SAVANNAH in international law and, in the light of that status, the United States Government's willingness to submit to the jurisdiction of foreign courts. The question is one of immunity from suit of sovereign states and their vessels in the courts of foreign states. Although the law on this subject is in flux, most changes in the law apply to vessels which, although state-owned, are conducting a commercial operation. This is known as "state-trading". There are three major approaches to this matter: (1) The first is that of the English courts in which, although the doctrine of sovereign immunity of state-owned vessels has been questioned for "state-trading" activities, sovereign immunity still remains as the law.¹ The United States held the same principle until recently, although in 1952 a letter was published by the Department of State in which it was announced that the

Department would no longer favor claims of immunity from a foreign government for their commercial activities, thus signifying that it was beginning to look to the nature of the operation rather than the fact of state-ownership.² (2) The second major approach is that held by most continental countries which could be described as the "doctrine of qualified immunity." Under this doctrine, it is the activity of the foreign government which determines whether sovereign immunity from suit in a foreign court will be retained for the government's ships. Belgium, France, and Italy, attempt to distinguish between actions jure imperii and actions jure gestionis. The former applies to acts of the state which are within the traditional functions of governments, and the latter applies to governmental activities of a business or commercial nature. It is true that the definition is difficult and the dividing line between the two is hard to apply.³ (3) The third approach is that taken by the 1926 Brussels Convention, in which it was set forth that ships operated and owned by governments for commercial purposes do not enjoy sovereign immunities.⁴ This is like the European Continental law except that it speaks clearly of commercial activities as a definable series of transactions.

Now when the SAVANNAH puts to sea, it will not be carrying a commercial cargo or commercial passengers. It will also have a function which is tied in with the public policies of its government. Thus it appears that under all approaches, the sovereign immunity from suit will be granted in foreign courts of almost every state. However, there is one complicating factor here: the SAVANNAH, while built and owned by the United States Government and operating for a public purpose of a non-commercial nature, will be operated under a general agency agreement by a private shipping firm, the States Marine Corporation. Might the private firm be deemed legally liable in some foreign court? The nature of a United States general agency agreement offers strong evidence on this point. Under such an agreement, the ship is in control of officers who are employees of the United States; the crew are employees of the United States. Furthermore, the particular general agency agreement for the SAVANNAH ties the hands of the master of the vessel much more tightly than the usual agreement, so that the Atomic Energy Commission can order the master when and how to operate the reactor power plant. Therefore, it appears that the United States is clearly liable for any tort committed by the ship.

It is understood that the Atomic Energy Commission will turn over to the general agent the operation of the nuclear power plant by designating it as a contractor or licensee. Normally, the Atomic Energy Commission contractors have been held liable for tort action, and likewise, licensees who operate nuclear reactors have equally been deemed to be liable. Is it possible

to have the apparent contradiction that the general agent of the United States Government is not liable but the same firm, as the Atomic Energy Commission contractor or licensee, is liable? It is likely that an arrangement will be made whereby the operator of the SAVANNAH will be clearly the agent of the United States Government, both as to the operation and navigation of the ship as well as the operation of the nuclear reactor. In this case, this problem of liability of the private firm will not arise.

A contractor's or licensee's status would be unfortunate from the legal standpoint because it might upset the sovereign immunity of the public vessel status of the SAVANNAH, and create the situation in which the ship operator might be involved in a court suit. Although the operator is now indemnified by the United States Government up to the amount of \$500,000,000 under Public Law 85-602 which came into effect on August 8, 1958,⁵ it undoubtedly should be the United States Government which should be handling all matters concerning the first nuclear-powered ship which is making a tour under government auspices. As a matter of fact, the \$500,000,000 indemnification behind the operating company provides a temptation for foreign suitors to go against the shipping company because of the certainty of collecting any damage award from the United States Government.

To clarify the vessel's status in international law, the United States Government can designate in foreign agreements that the ship is a public vessel for whose torts the United States assumes liability. If foreign courts are to be used to determine this liability, there will also be needed an agreement in which the United States Government waives its sovereign immunity as a public vessel so that suit can take place in foreign court against the United States Government. In waiving this sovereign immunity, the United States can generally use the language of Article 3 of the Brussels Convention of April 10, 1926 on the immunity of state-owned vessels.⁶ This article provides that ships operated by a state and used (at the time a cause of action arises) exclusively on governmental and non-commercial service shall not be deemed to be passenger and/or cargo vessels under the same rules of liability. At the same time, the United States can make clear that as the SAVANNAH shifts to a commercial operation, its status will change to that of a publicly-owned vessel engaged in commercial operation and thereby subject to the same court jurisdiction and same rules of liability as private vessels.

On the assumption then, that the United States government will want to waive sovereign immunity for the SAVANNAH abroad because it would want to assure foreign states that suits in their courts would be accepted and that recovery of damages by this means would

be allowed (as part of a general guarantee and assurance that the nuclear reactor was a safe means of propulsion), what methods could be used to renounce sovereign immunity. In the past, this has been done by the United States Government by various methods: by treaty, by general announcement, and by circular to foreign offices abroad. (For example, on March 22, 1923, the United States sent to the various foreign offices abroad a circular stating that the United States would not claim that ships operated by or on behalf of the United States Shipping Board, when engaged in commercial pursuits, were entitled to immunity of arrest or to other special advantages which were generally accorded to public vessels of foreign nations.)⁷

Treaty renunciation of sovereign immunity for state-owned vessels engaged in commercial activities has been a feature of several United States treaties concluded since World War II, referred to as "Freedom, Commerce, and Navigation" treaties, or "Amity, Economic Relations and Consular Rights" treaties. For example, the Italian bilateral treaty signed at Rome, February 2, 1948, and entering into force on July 26, 1949, had Article XXLV, Section 6 which reads:

No enterprise of either High Contracting Party which is publicly owned or controlled shall, if it engages in commercial, manufacturing, processing, shipping or other business activities within the territories of the other High Contracting Party, claim or enjoy, either for itself or for its property, immunity therein from taxation, from suit, from execution of judgment or from any other liability to which a privately owned and controlled enterprise is subject therein.⁸

The complete right to use sovereign immunity is underlined in other agreements, not known as "Freedom, Commerce, and Navigation" treaties, such as that with Great Britain signed on December 4, 1942 in which Article 5 of the accord declares: "Nothing in this Agreement shall be construed as a waiver of the right of either contracting Government in appropriate cases to assert sovereign immunity."⁹ And in an exchange of notes of September 28 and November 13 and 15, 1946, the United States and Canada concluded an agreement relating to waiver of certain claims involving government vessels.¹⁰ Article 5 of this agreement states: "Each Government shall facilitate the assertion by the other Government of sovereign immunity in relation to any Government vessel."¹¹ On March 14, 1949, the United States and France concluded an agreement concerning maritime claims and litigation and containing language similar to that in the British-United States accord.¹²

Therefore, it is clear that the general question of sovereign

immunity is discussed in treaties or accords other than those known as "Friendship, Commerce and Navigation," and that there is no definite general policy applied to all nations regarding the renunciation of sovereign immunity for commercial vessels owned by governments. In all cases, however, previously worked out, the sovereign immunity has been for vessels of a commercial nature. Since the SAVANNAH's initial demonstration will not be commercial, renunciation of sovereign immunity (if it should be required for the SAVANNAH) would be an exceptional matter requiring a special agreement.

The advantage of renunciation of sovereign immunity for the SAVANNAH is that in thus submitting to the jurisdiction of foreign courts (which could be expected to be liberal in granting awards in tort actions arising out of a nuclear incident), the United States Government would reveal its confidence in the safety of its first nuclear ship. However, since the adjudication of claims regarding nuclear damage is novel, involves specialized knowledge and requires the relaxation of legal time limits for receiving claims, it may be deemed desirable to avoid the use of foreign courts in the assessing of nuclear damages and in their place utilize for this purpose a governmental body which would be especially created in case of a nuclear incident and would be directly bound by the foreign government's policy regarding radiation damage. In this way, the technical and unusual problems of atomic radiation could be handled by a specialized group of individuals chosen by their government.

From the standpoint of the American interest, a bi-national claims commission which would select a mutually agreeable and impartial chairman would be much more advantageous than a unilateral claims body. Such a bi-national organ, therefore, would provide a remedy which would be representative of the public interest as each government saw it, compromised by the impartial chairman. At any rate, a special claims commission, whether bi-national or not, would have a great advantage as far as United States public relations is concerned. It would allow the remedies to be apportioned more quickly than by courts and thus allay any lasting unfavorable reactions resulting from the failure to make prompt restitution. For this reason, the United States might be willing to agree to a unilateral claims body as long as it was arranged that only persons with specialized backgrounds in atomic radiation be eligible for membership, as a precaution against the unfounded assumptions of radiation damage by uninformed persons.

As rules of liability for this commission, the foreign government will probably seek application of the doctrine of absolute liability. In the light of the likelihood that this

doctrine will be used abroad generally for torts arising from atomic radiation, the United States will find it advisable to agree to the introduction of the rule of absolute liability.

Another allied legal problem for the SAVANNAH will concern the traditional right of an owner of a vessel to petition for a limitation of liability in a court having jurisdiction over tort claims against the vessel. Of course, where sovereign immunity obtains, no state needs to limit its liability since no liability can be attached against it without its consent. But where the state has renounced its sovereign immunity from suit, a state like any other vessel owner can petition for its limitation of liability according to the maritime law governing the situation. This would be in accordance with the Brussels Convention of April 10, 1926, which has a section reading:

Seagoing vessels owned or operated by States, cargoes owned by them, and cargoes and passengers carried on Government vessels, and the States owning or operating such vessels, or owning such cargoes, are subject in respect of claims relating to the operation of such vessels or the carriage of such cargoes, to the same rules of liability and to the same obligations as those applicable to private vessels, cargoes and equipments.¹³

In the case of the SAVANNAH, the United States Government will not want to have this right to petition for a limitation of liability for a nuclear incident. To retain it would create doubts about the United States' willingness to compensate for any liabilities arising from the SAVANNAH, and to invoke it when the limitation amount would be inadequate to cover the damage claims from a nuclear incident would create an extremely hostile public opinion in any foreign country. Also, it is quite certain that any foreign government which wants the United States to waive its sovereign immunity for the SAVANNAH in favor of court adjudication of nuclear damage claims will insist also on a waiver of the right to limit liability. However, where another adjudicatory tribunal is substituted for a court, the right to limit liability will not be available and no waiver of it will be necessary. This latter procedure, then, has another advantage: under it the law of limitation of liability could be left intact until experience with the SAVANNAH had given evidence as to how it should be adapted to nuclear types of liability.

The question of the SAVANNAH under foreign atomic energy law is an open one. At present, to our knowledge, foreign law does not embrace a nuclear ship as such. We think that any foreign licensing or inspection systems that might apply to the land-based nuclear reactors should not be applied directly to the

SAVANNAH. Rather, a special immunity or waiver should prevail. Eventually reciprocal arrangements for nuclear shipping will be required, but we feel these cannot be worked out at the time of the SAVANNAH's initial voyages. Thus exceptional arrangements for the SAVANNAH must be worked out between the Department of State and foreign governments. These are beyond the scope of this report.

THE SAVANNAH IN THE UNITED STATES

Under United States legislation, the SAVANNAH will be considered a public vessel,¹⁴ and, hence, within the purview of the Public Vessels Act.¹⁵ (There are two statutes which waive immunity for United States owned vessels. One is the Public Vessels Act; the other is the Suits in Admiralty Act.¹⁶ The latter covers vessels which are engaged in commercial operations; the former covers vessels which, like the SAVANNAH, do not engage in commercial operations.) The main thrust of the Public Vessels Act is that the United States may be sued, but in personam only, as if the vessels were privately owned, with a few exceptions which do not concern us here.

Since the United States Government could be sued as if it were a private party, any maritime tort committed by the SAVANNAH would give rise to government liability. The United States could petition for a limitation of liability¹⁷ and the law applied to private persons would be applied to it. We have suggested that, as to private persons whose vessels sustain a nuclear incident causing damage ashore, limitation of liability ought to be abolished and that the duty of insurer ought to be imposed. Unless the Limitation of Liability Statute is modified before the SAVANNAH goes into operation, it is hard to see how the government could be denied the right to limit liability. It is highly unlikely, however, that this would be done, if for no other reason than political consequences. What about the duty of insurer? Although Congress may not have, by law, imposed such a duty before the SAVANNAH sailed, there is the possibility that a court might impose such a duty, in the event of a nuclear incident. Is there anything in the Public Vessels Act which would prohibit such a holding?

The famous Texas City case¹⁸ held that when the United States waived its immunity from suit, it did not agree to be held liable on grounds of strict liability. But the Texas City dictum does not apply in this case, because the suit against the United States was brought under the Federal Tort Claims Act,¹⁹ which does not apply here. (The Public Vessels Act is the plaintiff's sole remedy.)²⁰ It is instructive to compare the two statutes. The Federal Tort Claims Act reads:

Federal District Courts shall have exclusive jurisdiction of civil actions on claims against the United States, for money damages, ... for injury or loss of property, or personal injury or death caused by the negligent or wrongful act or omission of any employee of the Government while acting within the scope of his office or employment, under circumstances where the United States, if a private person, would be liable to the claimant in accordance with the law of the place where the act or omission occurred.²¹

The Public Vessels Act reads: "Such suits shall be subject to and proceed in accordance with the provisions of an act entitled "An Act authorizing suits against the United States in admiralty...."²² Thus, we have to look at the Suits in Admiralty Act, which says:

In cases where if such vessel were privately owned or operated, or if such cargo were privately owned and possessed, a proceeding in admiralty could be maintained at the time of the commencement of the action herein provided for, a libel in personam may be brought against the United States....²³

It should be noted that the Federal Tort Claims Act mentions a negligent wrongful act whereas the Public Vessels Act merely says that the liability which a private person would have will be the liability of the Government. Thus, if the courts were to impose the duty of an insurer on a private vessel owner, there appears to be no reason why it could not impose it upon the Government.

One difficulty with the Public Vessels Act, however, is that it affords only a two year period during which suits may be brought.²⁴ In regard to radiation injuries, this is obviously too short a period. Unless it is the intention of the government to take care of all possible claims against the United States by special enactment after the event, this two year limitation period ought to be changed for nuclear incidents.

A word should be said about seamen's remedies for any injury on the SAVANNAH. It has been settled that any claim by seamen on a vessel operated under a General Agency Agreement may be pursued only against the government, and not against the General Agent.²⁵ For Civil Service seamen under such conditions, the law is not clear as to whether their sole remedy is under the Federal Employees' Compensation Act,²⁶ or whether they can sue the United States for their personal injuries under maritime law.²⁷ However, since the seamen on the SAVANNAH will not be civil service employees, it appears that they will have available the remedies of general maritime law.

IV ADMINISTRATIVE AND POLITICAL PROBLEMS IN CONNECTION WITH THE SAVANNAH

As the United States' first nuclear merchant ship, the N.S. SAVANNAH presents unique problems of intra-governmental and inter-governmental relations. These problems arise, not only from the technological "newness" of the vessel, but also from the dual nature of the vessel's purpose: (1) To serve as a "case study" for the construction and operation of future nuclear shipping, and (2) to provide an instrument of foreign policy in which the dramatic application of a new peacetime use of atomic energy is shown to the world. In order to plan for and fulfill both aims it will be necessary to formulate some new policies and procedures. In some sectors, expansion of existing practices will be required, either on a temporary or permanent basis. In still other fields, present operations must be adapted to fit a new situation.

This portion of the report discusses major governmental relations questions, both domestic and foreign, pertinent to the operation of the N.S. SAVANNAH and subsequent nuclear-propelled ships. The initial section deals with internal problems of arranging for the voyages of the SAVANNAH by the Maritime Administration, the Atomic Energy Commission, the United States Coast Guard, the Public Health Service and the Department of State. Activities of the latter agency lead naturally to a consideration of relevant foreign jurisdictional patterns and governmental attitudes, which are examined, and compared with those in the United States, in the second section. Since official positions and actions are, at least in part, a reflection of popular opinion, the third section is devoted to a study of the requirements for an effective public information program for the N.S. SAVANNAH, both from the viewpoint of facilitating the voyage of that vessel and succeeding atomic ships and providing maximum public relations value to the United States.

GOVERNMENTAL RELATIONS PROBLEMS

Maritime Administration - Atomic Energy Commission

Primary jurisdiction over the N.S. SAVANNAH lies with the Maritime Administration and the Atomic Energy Commission. These agencies are authorized by Public Law 848 of the 84th Congress¹ to design, construct, and prepare the vessel for operation. The authorization does not specify jurisdictional boundaries for either agency. However, the legislative history of Public Law 848 clearly indicates that Congress intended the Atomic Energy Commission to have jurisdiction over the

reactor and propulsion system, while the Maritime Administration was to have jurisdiction over the hull and non-nuclear outfitting. The joint operating group established by the Maritime Administration and the Atomic Energy Commission is an effective solution to the problems inherent in jurisdiction; close cooperation of the two agencies is a prerequisite for the successful completion of the project.

While Public Law 848 authorizes the design, construction, and preparation for operation of a nuclear vessel, the Act does not provide for the actual operation of the ship. Public Law 701 of the 84th Congress ² gives the Secretary of Commerce authority to develop tests and operate experimental vessels under general agency and bare boat charters. The N.S. SAVANNAH obviously fits the category of an "experimental vessel", and could be operated under the authority granted in Public Law 701. However, because of the unique character of the vessel and expected public and professional interest, special Congressional authorization covering the ship's initial period of operational evaluation would be advisable.

Specific roles which the Maritime Administration and the Atomic Energy Commission will play in the operation of the vessel once it enters the operational evaluation stage must be determined. A number of alternatives exist.

Should the Atomic Energy Commission decide to withdraw from active control over the vessel before or during the period of operational evaluation, the reactor system must be licensed to either the Maritime Administration or the private operator of the vessel. Should the Atomic Energy Commission remain as a joint operator of the vessel during its evaluation period, the reactor will remain an Atomic Energy Commission utilization facility and no license will be necessary. However, the Atomic Energy Commission's participation in the evaluation period raises the question of the compatibility of contracting procedures under atomic energy law and the procedure for obtaining a general agent under maritime law.

It is clear from the Atomic Energy Law of 1954 that the regulation of private licensees and government contractors is mutually exclusive. That is to say, if a contractor relationship is not established, the provisions of the Atomic Energy Act with regard to the licensing of utilization facilities and special nuclear materials will come into force. To be free of the licensing requirements, the Atomic Energy Commission had to sign a contract for the operation of the facility with either the Maritime Administration

or with the private shipping company which will operate the vessel. Actually, the States Marine Corporation has become the contractor of the United States Government under Atomic energy law and the general agent of the United States Government under maritime law. The question then arises, is the general agency agreement compatible with the contractor agreement of the Atomic Energy Commission?

The standard form for general agency agreements defines the general agent in the following manner:

A general agent is any person, firm, or corporation designated as such under a standard form of Service Agreement to manage and conduct the business of vessels of which the United States is owner or owner pro hac vice.³

Generally, the duties of the general agent include such responsibilities as conducting the business of the vessel and handling port activities. The agent collects and desposits accounts due the United States. It is his duty to maintain and repair the ship. He hires the master of the vessel, subject to the approval of the United States; the master acts as the agent and employee of the United States and has full control over the movement of the vessel subject to the orders of the United States.

At least once a month, the United States pays the general agent compensation for services rendered at a fair and reasonable amount. The general agent is also paid by the United States for all costs including supplies, equipment, and wages of the crew.

It would appear that the general agent acts only as a business agent of the government, and that the activities of the general agent and the master and the crew are at all times subject to the authority of the United States except for that discretionary authority which must reside in the master of the vessel in order to provide for the safety of the vessel at sea. Given the provisions of the general agency agreement, we see no difficulty in the Atomic Energy Commission becoming a party to the agreement and thereby controlling the operation of the reactor system and vessel through one document. It is, of course entirely possible for the Atomic Energy Commission to conclude a separate contractual agreement with the general agent. However, since the master, officers, and crew of the vessel would be subject to the control of the United States through the general agency agreement, the separate contractual agreement would not provide further safeguards of supervision.

United States Coast Guard

Turning to areas of jurisdiction outside of the immediate

ownership and operational control of the vessel, both the United States Coast Guard and the Public Health Service will play important roles in the development of commercial nuclear shipping. The United States Coast Guard is essentially a law enforcement agency. Such technical activities as it engages in are incidental to the enforcement of laws governing the safety of ships and life at sea. Proper construction of ships, adequate and qualified manning, and operation in compliance with local and international laws of the sea are the Coast Guard's primary concern. In matters relating to ship design and construction, the Coast Guard has the technical support of the American Bureau of Shipping, whose professional objectives are similar to those of the Coast Guard. Official recognition of the American Bureau of Shipping's role in establishing standards for ship construction and design is reflected in both statutory law and the regulations of the United States Coast Guard. American Bureau of Shipping rules are adopted with few modifications and the American Bureau of Shipping Certificate of Classification is accepted as properly describing the compliance of a vessel with safe standards of design and construction and physical condition.

The scope of Coast Guard inspection of new vessels is outlined in the Code of Federal Regulations:

The initial inspection, which may consist of a series of inspections conducted during the construction of a vessel, shall include a complete inspection of the structure, machinery, and equipment including the outside of the vessel's bottom and the outside and where possible the inside of the boilers. The inspection shall be such as to insure that the arrangements, materials, and scantlings of the structure, boilers, and their appurtenances, piping, main and auxillary machinery, electrical installations, life-saving appliances, fire detecting and extinguishing equipment, and other equipment fully comply with the applicable regulations for such vessel.... The inspection shall also be such as to insure that the workmanship of all parts of the vessel and its equipment is in all respects satisfactory.

The Coast Guard's present procedure for issuing certificates of inspection was not designed to meet the situation presented by the SAVANNAH. Presently constituted rules and regulations governing inspection procedures and inspection criteria do not recognize nuclear power. The Coast Guard has had no reason to maintain a technical staff competent to evaluate the reactor system, and it is questionable whether the Coast Guard in the immediate future will maintain such a staff. The American Bureau of Shipping for similar reasons, has not developed rules and regulations governing nuclear propulsion nor maintained a staff which could

develop such rules and regulations.

Accordingly, in order for the Coast Guard to issue a certificate of inspection for the SAVANNAH it must maintain close cooperation with the Atomic Energy Commission. The Coast Guard could request the Atomic Energy Commission to develop for the Coast Guard's use a set of standards to be used in evaluating reactor construction, performance and safety. Given such a set of standards the Coast Guard could then accept the Atomic Energy Commission's inspection and certification if such standards have been met. The Coast Guard already follows this procedure with the American Bureau of Shipping's standards and inspections. The question remains however, whether at the present time the Atomic Energy Commission is able to establish such standards and regulations. If such standards could not be established by the time the SAVANNAH is ready for such inspection, it might be advisable for the Coast Guard to accept in lieu of such standards a written statement by the Atomic Energy Commission that the reactor has been designed and built so that, to the best of the Atomic Energy Commission's knowledge, the reactor is safe and in good working order. The Atomic Energy Commission presently has construction yardsticks and inspection methods which would make such a procedure feasible. Once such a statement of assurance by the Atomic Energy Commission is transmitted to the Coast Guard, that agency could undersign the assurance and issue a certificate based upon it.

As we see it, there is no alternative to obtaining a Coast Guard certificate. Maritime Administration vessels are specifically required to undergo Coast Guard inspection. But whether or not this might be legally waived in the case of a public vessel, the fulfillment of the objectives of the evaluational tour would demand that a Coast Guard certificate be obtained. Furthermore, in order to reassure foreign authorities, the certificate of inspection should be supplemented by other statements from the Atomic Energy Commission concerning the safety of the vessel under operating conditions.

The Coast Guard certificate of inspection is a prerequisite for a certificate of registration from the Bureau of Customs, which is required of all vessels of the United States with the exception of public vessels. While the SAVANNAH remains a public vessel, it will therefore not need a certificate of registration.

The Coast Guard is responsible for the general safety of both ships and harbors. Hence it will be incumbent on this agency to develop some countermeasures which are ready to be employed in case of a nuclear incident involving the SAVANNAH.

Although the SAVANNAH has been designed to prevent all radioactive contamination from going beyond the containment vessel and these safety features will be carefully explained to all safety and health officials in the ports to be visited, a calamity conceivably could occur. Therefore an additional assurance of Coast Guard countermeasures ready to be employed on notice in order to lessen contamination would be of great utility in convincing these officials that the likelihood of radioactive contamination had been reduced to the absolute minimum. Although the Coast Guard's jurisdiction would clearly cover moving the ships out of the harbor and raising a submerged containment vessel, such countermeasures as decontamination of the ship or surrounding ships, might be found to be more efficiently performed by the United States Public Health Service. At any rate, a federal responsibility is clearly indicated, since state and local units constitutionally would not be required to deal with matters arising from the navigable waters of the United States and equitably should not be required to provide remedies for a problem created by federal action.

Finally the Coast Guard is specifically required to enforce the safety regulations under the act regulating the carriage of explosives or dangerous substances.⁵ While the nuclear ship's fuel is not properly classified as coming within the terms of this act, the cargo in the holds in a nuclear-powered merchant vessel must be checked for possible exposure to radioactive contamination. Such contamination would of course produce a "dangerous cargo" in the holds. Inspection of ship's cargo reportedly radioactive has been carried on by the United States Coast Guard, and it would be appropriate for the Coast Guard to continue that function.

United States Public Health Service

A further jurisdictional problem arises in connection with health safety inspection aboard the N.S. SAVANNAH and subsequent nuclear ships. Primary jurisdiction in health matters on vessels in the United States ports belongs to the United States Public Health Service. The basic authority of the Public Health Service in the area of marine inspection is set forth in 42 USC Section 264:

The Surgeon-General, with the approval of the secretary (Health, Education and Welfare) is authorized to make and enforce such regulations as in his judgment are necessary to prevent introduction, transmission, or spread of communicable diseases from foreign countries into the States or possessions....

In order to carry out this function Title 42 USC Section 267 also provides the Surgeon-General with the power to control, direct and manage all United States quarantine stations and anchorages, designate their boundaries, and name quarantine

officers to act at such stations. Upon arrival in a quarantine anchorage, the master of a ship completes a maritime quarantine declaration. The declaration is also signed by the ship's surgeon if one is carried. The quarantine examination includes inspection of the ship, its cargo, manifests, and other papers to ascertain the sanitary history and condition of the vessel, and an examination of persons and their effects to determine the presence or risk of communicable diseases. All persons on board a vessel are examined, except that on an approved regular line vessel which carries a ship doctor examination may be limited to those designated by the ship's surgeon. The quarantine officer can inspect the ship's cargo and place that cargo in quarantine or, if necessary, order its destruction. The primary responsibility, then, of the United States Public Health Service, vis a vis shipping, is to prevent the transmission of diseases from vessels arriving in United States waters.

Without attempting to stretch the definition of communicable diseases to cover atomic health matters, an atomic health inspection system will be necessary for nuclear ships, and a logical agency to carry out such a function appears to be the United States Public Health Service. Inspection is necessary from two stand-points: (1) to prevent radioactive contaminated cargoes from being distributed in the United States and (2) to make sure that the radiation records obtained from the ship's radiation monitoring stations have been properly kept by the ship's surgeon and are maintained as a permanent file of radioactivity in various sections of the vessel which can be used at a later date as evidence in disputes which might arise in the courts of the United States or other countries concerning the cause of illnesses attributed to atomic radiation. Since the United States Public Health Service is required by law to maintain quarantine stations and to inspect incoming vessels, it would be a relatively simple matter to expand the jurisdiction of the United States Public Health Service to cover inspection and maintenance of radiation level records for nuclear ships.

The training of a ship's surgeon in atomic health matters has already been anticipated by the Atomic Energy Commission and the Maritime Administration. Since the Atomic Energy Commission will in one form or another participate in the initial period of operation of the SAVANNAH, the Commission could handle all questions of public health connected with radiation exposure. Unquestionably the Commission has the power to regulate its contractors so as to protect the public health. As for licensees, 42 USC Section 2134 (Supp.V, 1952 Ed.) provides the same authority for the Commission:

The Commission is authorized to issue licenses to persons applying therefor for utilization and production facilities

involved in the conduct of research and development activities leading to the demonstration of the practical value of such facilities for industrial or commercial purposes. In issuing licenses...the Commission shall impose...regulations... as will permit the Commission...to promote the common defense and security and to protect the health and safety of the public....

The Atomic Energy Commission will desire to maintain radiation health records on the N.S. SAVANNAH for its own use. Therefore, the question of competent authorities examining health records is not crucial in this first phase. However, when nuclear shipping is commercially entered the Atomic Energy Commission will no longer be the logical agency to carry out this health function. Rather, the United States Public Health Service and, with respect to cargo, the United States Coast Guard, would be in a better position to carry out such functions, especially because of the fact that both agencies maintain officials at major ports in the United States. When commercial shipping is established it is doubtful if the Atomic Energy Commission would wish to maintain a large staff of inspection officials to supplement the normal work of the officers from the Public Health Service and the United States Coast Guard. Therefore, it will be appropriate for the Atomic Energy Commission, the United States Public Health Service, and the United States Coast Guard to cooperatively establish regulations governing maximum radiation exposure levels permissible on board the SAVANNAH, which can be modified, if necessary for subsequent nuclear vessels. The United States Public Health Service and the United States Coast Guard could act as the administering agencies.

Whether the Public Health Service, the Coast Guard, or the Atomic Energy Commission is the final authority in such matters does not seem to be the essential question. However, if the desire is to have operating procedures established in the United States which will indicate to those abroad our desire to treat nuclear vessels as nearly like conventional vessels as possible, then it would be appropriate to make a transfer of the health and inspection functions as quickly as possible.

Furthermore, certifications by the United States Public Health Service to the effect that the SAVANNAH meets domestic health standards each time it enters a port in the United States will be good authority on which counterpart health agencies abroad can rely when they will have to confirm that the SAVANNAH is safe on health grounds in their harbors.

Local Port and Health Officials

At the beginning of the period of operational evaluation for

the SAVANNAH, her visits to several American ports will be virtually a necessity. These visits will satisfy the American public's curiosity before sharing the new ship with foreign citizens. They will enable the Maritime Administration - Atomic Energy Commission and the States Marine Corporation to gain experience in the conduct of public ceremonies adapted to the SAVANNAH. They will reassure foreign governments that the visit of the SAVANNAH in their ports will be a safe undertaking to authorize. The willingness of the United States Government to bring nuclear propulsion machinery close to its own citizens in large cities will indicate its confidence in the rigorous standards of safety which have been incorporated in the design and operational management of the ship as well as in the countermeasures readied for any eventuality.

American port visits will involve the port and health officials of state and local agencies. Although these officials are independent of the Federal Government, they are likely to trust the judgment of their functional counterparts in the Federal Government. However, they are also responsible to the local political officials and in turn to the local population. For this reason, careful explanations of the safety measures taken in connection with the SAVANNAH with special reference to port cities should be made periodically during the year as part of the persistent, domestic public information program.

These local port and health officials must not only be informed. They must be consulted, for their views concerning the movement of and the general protective measures for the SAVANNAH in their respective ports must be duly considered in the planning for port visits at the start of the period of operational evaluation. Replies to a questionnaire sent to the principal American ports indicate in what way specific state and local agencies will be involved in the event the SAVANNAH enters each respective port.

Foreign government officials are aware of the independence of our state and local officials in this country. Therefore, if these independent port and health officials interpose no exceptional or cumbersome regulations for the SAVANNAH, the foreign officials will be impressed by this unanimous endorsement of the safety of nuclear shipping.

Department of State

There is little question but that the N.S. SAVANNAH will draw widespread interest throughout the shipping world. Furthermore, when she enters either domestic or foreign harbors, it may be anticipated that both the general public and technically

trained persons not concerned with shipping per se will express curiosity concerning the ship. The United States should be prepared to meet such interest, both for the purpose of gaining public acceptance of the SAVANNAH and subsequent nuclear vessels and for the purpose of capitalizing on the public relations values inherent in United States leadership in nuclear-propelled merchant shipping.

As the official voice of the United States in matters concerning American relationships with foreign nations, the Department of State will necessarily play a key role in visits to foreign ports by the SAVANNAH. Those aspects of her initial period of testing and demonstration which would in any way affect the foreign policy or the relations of the United States with a foreign government should be cleared through the Department of State before being put into effect.

We can visualize the governmental planning and preparation for a foreign tour for the SAVANNAH in four phases. The Department of State must be involved in all four. First will be the making of government-wide decisions concerning the philosophy, justifications and objectives underlying the tour. In the light of this tenor and rationale will be decided the content of the advance publicity which will be released concerning the tour. Second will be the tour planning itself, involving itinerary and selection of ports in such a way as to heighten the success of the mission. Third will be the designing of a world-wide public information program and its concrete application to the itinerary as set. Fourth will be the negotiations with foreign countries to gain specific permission for the SAVANNAH to enter each foreign port and be received by an official ceremony.

The Department of State's authority in this area, however, does not imply that it must be the initiating agency for plans concerning a voyage to foreign ports. It would be quite appropriate for the dual status agency of the Atomic Energy Commission and the Maritime Administration to make concrete proposals concerning the demonstration voyage. But the close cooperation of the Department of State will be necessary at every stage thereafter. In administrative situations involving the jurisdiction of several agencies, once a primary Department (as State will be in this matter) has been offended or alienated, the program has been injured, and no amount of repair work can ever regain the initiative and drive which close cooperation at every stage would have made possible.

Accordingly, it is suggested that an interdepartmental committee be formed to concern itself with the overseas voyage of the SAVANNAH. If set up with a membership of very high-ranking officials, it should have a working group composed of administrators

of less elevated rank but of sufficient stature to carry forward the work and secure the cooperation of other officials whose specialities will be involved from time to time. The Department of State representative on the committee should be the chairman. The Maritime Administration and the Atomic Energy Commission should be represented separately. A representative of the shipping industry of national and international prominence should also sit on the committee. The latter will be in a position to do much to smooth the way in foreign shipping circles for the SAVANNAH's tour and help to keep it pointed toward the shipping business of the free world, which some of governmental members may tend to lose sight of.

The period of planning will result in a firm United States policy concerning the demonstration voyage. At this point, it will be incumbent upon the Department of State to negotiate by means of its Foreign Service with the foreign countries to be visited concerning the permission of these countries for the SAVANNAH to enter their harbors and to receive representatives of government, science and shipping. In such negotiations, a primary consideration will concern the legal liability which the United States government will assume for any nuclear incident caused by the SAVANNAH and affecting foreign nations. Such negotiations will have the help of the Department of Justice attorneys and the legal officers from the Maritime Administration and the Atomic Energy Commission. Undoubtedly, certain nations will demand more explicit guarantees than others. In such cases, the United States government will have to decide whether they wish to accede to these requirements or whether it would be better to omit this country from the demonstration voyage. In all cases, the considerations of foreign policy will be very important. Furthermore, the most rigid guarantees which are acceded to will tend to become the standard guarantees, because of the fact that no nation will like to appear to be less protective of its citizens than the government of any other country.

The negotiations will involve the question of inspection of the nuclear reactor itself. Presumably, the United States government will be able to convince foreign governments of the technical proficiency of the reactor and its safety features which have been securely designed, tested and cleared by competent authorities in the United States. In this case, a foreign government would not require any independent inspection of the reactor system and would be willing to be guided by reactor safeguard reports from competent and independent inspection groups in the United States.

Another question would involve the monitoring devices which the

ship will carry and the proficiency of the entire monitoring system for detecting any unusual amount of radiation. Presumably, here also, a foreign nation would be willing to accept the American monitoring system and not have a separate inspection or monitoring operation by its own government experts before allowing the ship to enter its harbor. At any rate, all of these matters will have to be worked out carefully and completely to the full satisfaction of both the foreign government and the United States Government.

Another aspect of these negotiations will concern the actual harbor movement of the vessel. It appears unlikely that the Danish denial of permission for the SKATE to enter Copenhagen harbor will remain the policy of the Danish or other governments by 1960 when negotiations for the visit of the N.S. SAVANNAH will be in order. The Danish order was primarily based on an existing regulation, and we should think that this will be modified in the light of the operational results of nuclear submarines. Rather, the issue will be whether the ship will operate freely, whether she will be especially escorted to her docking place, and whether the ship's power in the harbor area will be that of the auxiliary plant or the nuclear reactor. Here again, the Department of State will have to decide whether any special navigational and docking arrangements will be acceded to or whether the United States Government will wish to avoid such arrangements and will, therefore, omit from the itinerary a country making such demands.

The next phase of the Department of State's negotiations will be to arrange for the participation of the foreign government's representatives in the actual ceremony of welcoming the SAVANNAH to the foreign ports as well as the clearance by the foreign governments of arrangements and guest-lists for non-governmental participation. In these matters, the American Embassy staff would probably take the lead without need to clear the actual arrangements with Washington. However, the plans for such arrangements should be sent from Washington so that the types of ceremonies and guest-lists can be considered from the point of view of the impact of the tour in its entirety.

In short, the Department of State will have four different kinds of jobs to perform concerning the SAVANNAH: (1) Planning for the general purport of the SAVANNAH's foreign voyage of evaluation, (2) deciding on the content of the public information to be disseminated throughout the world, (3) negotiating diplomatically agreements for the vessel to enter foreign harbors and be officially received, and (4) arranging for the ceremonies and receptions for foreign dignitaries at the time of the actual visit of the SAVANNAH.

United States Information Agency

In planning the foreign information program and adapting it to the various countries, the interdepartmental committee on the SAVANNAH will benefit by enlisting the cooperation of the United States Information Agency. As a specialist in informing foreign citizens about United States activities, the Agency will know how to arouse foreign interest in the SAVANNAH.

Reorganization Plan No.8, effective August 1, 1953,⁶ provides for a transfer of public information functions from the Secretary of State to the Director of the United States Information Agency.

The Director of the United States Information Agency is authorized, when he finds it appropriate, to provide for the preparation, and dissemination abroad, of information about the United States, its people, and its policies, through press, publications, radio, motion pictures, and other information media,⁷ and through information centers and instructors abroad.

The United States Information Agency, then, possesses authority independent of the State Department and its Foreign Service in the field of foreign dissemination of information concerning the United States. However, the Department of State maintains primary control over the contents of any program for use abroad which states the official position of the United States government. Reorganization Plan No.8 provides further:

The Secretary of State shall direct the policy and control the content of a program, for use abroad, on official United States positions, including interpretations of current events, identified as⁸ official positions by an exclusive descriptive label.

In accordance with this mandate, the Department of State will supply the policy concerning the SAVANNAH's tour, but the United States Information Agency can cast this policy into information materials to be used abroad. Thus each area Assistant Director(Latin America, Europe, Far East, Near East, South Asia and Africa) can adapt the program to the field problems of his area in order to reach specific publics there.

The United States Information Agency has field offices in many countries of the world. Being thus an administrator of a permanent public information program, it can best handle the detailed operations of a special public information program for the SAVANNAH.

FOREIGN REACTIONS TO DEMONSTRATION VISITS BY THE SAVANNAH IN HARBORS ABROAD

The activities of United States Government agencies in preparing for the demonstration voyages of the SAVANNAH will be facilitated to the extent that information concerning foreign governmental activities and ideas concerning nuclear shipping is known by the United States Government. In an attempt to elicit some information along this line, this Project sent to a number of foreign officials in various prominent foreign ports a questionnaire concerning the reception of nuclear-propelled merchant vessels in foreign ports. The responses of these officials who will have to deal directly or indirectly with the N.S. SAVANNAH and other commercial nuclear ships indicate the nature of the problems which will confront the Department of State and the other agencies working in this area.

Since we realized that there would be no official opinion on the problems relating to nuclear shipping in this early developmental phase, we asked for unofficial and tentative personal views of the respondents. Communication was made only with the local harbor and health officials in port cities, because it was felt that these officials, having duties which would be directly concerned with the SAVANNAH should it come into their ports, would be more immediately interested in the SAVANNAH than national officials in shipping, health or atomic energy agencies who would be presently preoccupied.

This Project sent to 90 harbor officials in 51 separate ports of 25 countries a questionnaire dealing with movement, berthing and handling of nuclear-propelled vessels in ports of call. Officials to whom a copy of the questionnaire was mailed were requested to supply both factual information and personal opinion in answer to 8 questions. A similar questionnaire, containing 6 questions concerning medical problems related to nuclear shipping, was sent to 47 health officials in 35 separate ports of 24 countries.

To date, 31 of the port questionnaires (34 percent) have been returned to the Project completed, 9 from United States officials and 22 from officials of foreign ports. A total of 27 of the health questionnaires (57 percent) has been received in completed form, 9 from United States officials and 18 from foreign health officials.

Percentage figures on responses received, however, tend to obscure the actual amount of participation. Because the Project was unable to obtain an accurate list of harbor and health officials who could be known to speak from knowledge and authority

concerning the effects of commercial nuclear shipping in their country, questionnaires were sent several individuals in many port cities in the hope that at least one of the queries would reach an appropriate official. Furthermore, it was felt that if separate officials responsible for similiar functions in a single port city should return questionnaires containing repetitive information, this would serve as confirmation of the validity of the answers. Meager information available regarding foreign jurisdictional patterns made it necessary to pick the persons selected on the basis of official title alone in numerous cases; when more than one title appeared significant, questionnaires were sent to all. The inevitable result was a degree of duplication. Some queries were received by subordinate governmental units who referred them to the parent organization, which perhaps also received a questionnaire. Obviously only one answer was required. A few inquiries were directed to agencies not directly concerned with the subject matter. In some cases the questionnaire was then forwarded to the correct governmental unit, which might or might not have been sent a form. Undoubtedly, in other cases, it was merely ignored. In any event, the total samples for statistical purposes should be regarded as considerably less than 90 and 47. More nearly correct figures would be those for the number of ports involved in the poll.

Of the 51 ports involved in the port questionnaire at least one completed response was received from 28 separate ports (55 percent). (The reply from the Captain of the Yokohama Port arrived too late for inclusion in this report). Of the 35 ports involved in the health questionnaire, at least one completed response was received from 23 separate ports (66 percent).

It should also be pointed out that statistics on individual completed questionnaires do not indicate fully the quantity of information gained by the survey or the degree and nature of interest in the two questionnaires. For instance, questionnaires were sent to 12 port officials at 6 ports in the United Kingdom. Although a number acknowledged receipt of the form, none returned a filled-in questionnaire. The reason: matters involving nuclear shipping are currently under study by a committee of the United Kingdom Ministry of Transport and Civil Aviation and individual port authorities have been advised to withhold answers until national policy has been determined. This information, although negative in character in terms of total response, provides an insight into the nature of the United Kingdom's jurisdictional pattern in dealing with nuclear vessels. Likewise, the French port of Marseilles replied:

... I have undertaken the study of the different questions which your letter poses. However, the Ministry of Public Works, of Transportation and of Tourism having informed me recently that the visit of the ship in question in the

different French ports was being made the subject of a study of the entire question, it appeared to me necessary to subordinate my reply to your questionnaire to the results of this study.

Thus it was discovered that the French government was, like the British, engaging in a study of the treatment of nuclear ships in its harbors.

A number of officials in other countries have indicated that they have received a copy of the questionnaire and announced their intention to assist in securing the desired information, either through referral to more pertinent authority or additional investigation on their part.

The "port official" questionnaire was sent to specific individuals who hold positions of responsibility at ports in the following 25 countries: Japan, United Kingdom, Norway, France, Germany, Brazil, Argentina, Uruguay, Chile, Canada, Australia, Eire, Republic of the Philippines, Turkey, Denmark, Sweden, Finland, Peru, Cuba, French West Africa, Union of South Africa, New Zealand, Portugal, Italy, and the United States. The "health official" questionnaire was mailed to pertinent authorities in the same countries, with possibly one exception.

Examination of the list of countries containing ports to which questionnaires were sent will immediately reveal geographical and political discrimination. For instance, with the exception of Japan, a nation with a strong interest in nuclear shipping, and the Republic of the Philippines, a significant trader with the United States, no questionnaires were sent to harbor or health officials in Asian ports. This was done deliberately in recognition of the touchy nature of the discussion of atomic energy in many of these countries. In Europe, the questionnaire was mailed only to officials in Western democracies. All major British Commonwealth nations and a number of Latin American countries were included. As has been pointed out, no replies came from the United Kingdom, and only two completed questionnaires were received from Latin-American countries (Chile and Cuba).

The poll was in no sense "scientific". Because no complete compilation of port and/or health officials exists, it was obviously impossible to know the total "population" and hence a representative sample could not be obtained. Specific individuals to whom the questionnaires were sent were selected arbitrarily and include local, state, and national officials. Furthermore, interpretation of questions was not identical among respondents, and some respondents failed to answer all questions. In light of these facts, the findings reported here should not be regarded as a basis for generalization but rather as hints to current thinking on the subjects involved.

Port Officials

Respondents included officials of the following ports: Baltimore, Boston, New Orleans, New York, San Francisco, Savannah, Seattle, Vancouver, Montreal, Helsinki, Oslo, Le Havre, Bordeaux, Dunkerque, Bremerhaven, Hamburg, Genoa, Venice, Naples, Sydney, Auckland, Wellington, Durban, Cape Town, and Kobe.

Q. What city and/or port officials have the authority to restrict the movement of a vessel in the waters of the port, or to prevent a vessel from berthing at any given wharf, by declaring the vessel hazardous?

A. Responses indicate that with respect to movement and berthing, both in the United States and abroad, nuclear ships may expect to be subject to the jurisdiction of a variety of governmental agencies. In the United States, local port officials (harbormasters, chief wharfingers, boards of port commissions or authorities) possess independent local authority (in some cases state) to prevent free movement in harbors, although at present none of them gave indication that they would exercise it to restrict the movement of the SAVANNAH. Abroad, the way in which replies were or were not made gave clues to the amount of local discretion possessed. The United Kingdom and France will work out a common policy regarding nuclear shipping which all harbormasters will follow. In South Africa the South African Railways general management at Johannesburg will do the same for its systems managers at Cape Town and Durban. The National Harbour Board will have a common policy for Canada, and in Norway no local official would take action contrary to the national decision.

On the other hand, Hamburg and Bremen as free city-states will be inclined to exercise authority apart from the Federal Republic. In Australia, the Maritime Services Board of New South Wales was not even aware of what were the views of the Commonwealth Department of Shipping and Transport (Marine Branch), although the latter would also be involved in the matter. In New Zealand the individual Harbour Boards of Wellington and Auckland would have some discretion. The three Italian ports of Naples, Genoa and Venice through their respective port agencies all answered emphatically without reference to the national government.

Q. Do you think, speaking unofficially, that any of these persons would consider a nuclear propelled ship as hazardous?

A. In general, most respondents do not believe a nuclear-

propelled ship would be regarded as hazardous by officials authorized to regulate port movement and/or berthing. Some of those who completed the questionnaire felt compelled to submit qualified answers. For instance, the office of the Director-General of Norwegian Harbors declared:

There is a certain agitation against everything connected with atomic energy, and one must calculate with the fact that some opinion has been formed against any use of such an energy source. Probably this will be changed when one gets further information regarding the circumstances under which atomic energy is used.

The President of the Autonomous Authority of the Port of Genoa asserted that "some members of the Port Authority would consider it (a nuclear-propelled ship) dangerous." Other respondents did not foresee objection if certain minimum precautions were taken. For example, the President of the Autonomous Port of Le Havre, while visualizing no protest on the grounds of "hazard" stated:

Nevertheless, it is probable that some controls will be instituted in order to make sure that the holds of the ships will not be contaminated and that the ship itself is not likely to contaminate the atmosphere or the harbor water. The port authority could demand besides that it be verified by an expert that the ship has complied completely with the framework rules and that the ship is handled under conditions set forth by the rule to govern in this matter.

Wellington stated: "provided the nuclear vessel has a certificate of safety issued by the United States Government, it is thought that such a vessel would not be considered hazardous." But the Maritime Services Board of New South Wales indicated specifically: "a vessel holding the approval of the Reactor Safeguards Committee set up by the United States Atomic Energy Commission... would not be regarded as hazardous..." Since the Reactor Safeguards Committee would not normally render an approval unless the ship were to be licensed, thought should be given to obtaining this Committee's approval in any case.

The two major ports in Germany gave opposite opinions. The Hamburg respondent stated that some officials in all of the regulatory agencies would consider a nuclear ship dangerous. The Bremerhaven reply said it would not be considered so in principle if "all those safety measures have been met which the present state of science requires." The Kobe Port Captain stated: "sufficient measures to maintain safety in any given ordinary circumstances and to prevent any possible mishap must have been taken when the N.S. SAVANNAH was built, I imagine." Almost all of the American officials were willing to state their unofficial opinion that no serious objection to the SAVANNAH would be raised by local officials.

Q. Do you think nuclear ships will be restricted from free movement in the waters of the port or from free use of the port wharves?

A. Most respondents indicated that movement and berthing of a nuclear-propelled vessel would not be unduly restricted. Some foreign respondents predicted that special regulations might be imposed, however. For example, the Oslo Harbour Master stated:

I understand the ship can move itself within the harbour like a conventional ship without special restrictions. But I think, however, that if a nuclear-powered ship will be allowed to enter the harbour, it will be directed to follow a pre-determined course.

The Office of the Director-General of Norwegian Harbours confirmed this forecast. "As the affairs are today, I think that an atomic powered ship will be charged with certain restrictions upon entering Norwegian harbors, but I think that it will not be denied admission to the harbor." The General Manager of the Auckland Harbour Board hedged his answer, declaring: "Provided adequate safeguards are determined we see no reason why such a vessel should not be handled and accomodated like any other class of ship." Genoa asserted that movement and berthing would probably be restricted "according to the regulations of a general character that would be sent by the national government."

Le Havre reported that with respect to movement, the nuclear ship would be required to proceed "according to the rules established for the purpose of diminishing the risks of collision." Sydney stated that "the vessel should only be allowed to navigate in the Port between the hours of sunrise and sunset so as to reduce the risk of collision."

In connection with berthing, the Le Havre official stated that "it is probable that these ships(nuclear ships) will be placed in preferred positions at berths on the quai of the exterior docking basin(tidal basin)." Sydney responded that at the wharf the ship should have "sufficient crew on board to provide efficient fire and observation watches and to be available in the event of it being necessary to move the vessel." The Hamburg answer was the most cautious, stating that the ship would be restricted from the free use of the wharves in that city.

Q. In your own opinion would the general public be interested in seeing and visiting a nuclear vessel?

A. Both domestic and foreign port officials were agreed that the general public would welcome an opportunity to visit a nuclear ship. Hamburg stated the exception: the general

public would not be interested in a general "open house", but, under certain circumstances, affected experts might be interested. However, Bremerhaven replied: "In view of the great interest in Bremerhaven in all matters of shipping, the public will certainly be interested in seeing a nuclear propelled vessel."

Q. What do you think the attitude of the local stevedores would be towards a nuclear ship? Do you think the local stevedores would want extra pay for working on a nuclear ship?

A. Almost all of the respondents expressed the belief that stevedores would adopt a positive attitude toward the nuclear vessel. However, there were some who hesitated to venture an estimate or were somewhat skeptical of stevedore enthusiasm. Among the former, Baltimore suggested that "local stevedores may be influenced in their attitude by action taken at other ports". San Francisco observed: "Assuming that stevedores operating on the East Coast and Gulf Ports consider the SAVANNAH to be safe, the opinion expressed by local authorities is that stevedores here will also accept that conclusion." Vancouver's port manager declared that local stevedores "would be entirely guided by advice from governmental sources." Durban's Port Captain foresaw no objection by stevedores "if properly approached and no 'scare headlines' in the local press." The Autonomous Port of Bordeaux reported that: "If conditions of work are normal and if the regulations still under study do not impose any particular precautions for the work on board, it appears possible that the longshoremen will work normally."

Most energetic research conducted by any respondent in reply to this question was that undertaken by Oslo's Harbour Director. His answer:

In connection with the longshoremen's viewpoint, we one day quite unofficially took a Gallup Poll in Oslo's harbor. About 100 longshoremen were asked several questions in regard to nuclear-powered ships. All of them had heard about nuclear ships, and more than half of them knew what it meant. About half of them figured that there was no special risk involved in loading or unloading a nuclear-powered ships, while 36 percent were aware of the potential danger, and about 16 percent had no viewpoint. About 60 percent were willing to load and unload a nuclear ship, without any questions raised, while 5-10 percent would not touch the ship with a pair of tongs.

The only reply which might be interpreted as negative was that received from the Secretary of the Wellington Harbour Board:

The only indication which can be given as to the attitude of the local stevedores was an occasion last year when a Japanese merchant ship arrived at Wellington having passed through a danger area of the Pacific Ocean following an atomic explosion. Before the stevedores would agree to handle the cargo from this ship they asked that it be tested for radioactivity."

With respect to extra pay for stevedores working a nuclear ship, most respondents felt that such a demand would not be made. However, several port officials disagreed with this view. Genoa expressed the belief that additional wages would "probably" be requested; this view was echoed by Bordeaux. Dunkerque declared that a demand was "almost certain." Auckland stated that: "Our experience in such matters suggests that a claim for extra pay would be an almost certainty." A Baltimore official asserted that "since a nuclear ship would be considered as presenting some hazard in the minds of the general public... stevedores could very well use this as a basis for requesting extra pay for working on a nuclear ship."

Hamburg and Sydney thought that extra pay would be demanded, the latter adding that other demands would possibly include special protective clothing or other precautions. Wellington brought in a complication that the claim would be "subject to the decision by the authority set up to consider waterfront labour disputes after consideration of all the facts."

Q. Does the city or other local government agency regulate health and safety conditions at the piers? If not, what agency does?

A. Health and safety conditions at piers in both the United States and other countries are regulated by municipal agencies in about one-half of the respondents' cities. In the other one-half, state (in the case of the United States and Germany) or national officials have primary responsibility. Frequently not a single but several levels of government may be involved.

Q. Have shipments of radioactive material passed through your port? Are there regulations covering radioactive cargoes? If so, are these national or local regulations? Who enforces the regulations? Do stevedores receive extra pay when handling radioactive cargo?

A. While nearly all United States respondents indicated that shipments of radioactive materials have passed through their ports, less than one-half of foreign officials reported

such cargoes. The phrase was interpreted broadly by authorities who provided affirmative answers, and included such materials as radioactive waste headed for disposal at sea and medical supplies. In most cases the amount involved was small.

While the majority of United States respondents reported the existence of regulations covering radioactive cargoes, most foreign respondents indicated that such rules have not been promulgated in their respective countries. Where such regulations were said to be in effect, the national government was, with a few exceptions, named as responsible for enactment and enforcement. New York has local regulations dealing with this subject. Bremerhaven now enforces a state decree regulating all kinds of radioactive shipments which went into effect on June 18, 1958. United States port officials replying to the questionnaire often cited Atomic Energy Commission, Coast Guard, or Interstate Commerce Commission regulations pertinent to radioactive cargoes.

Q. Are there any regulations covering nuclear vessels now in effect? If not, have any regulations covering nuclear ships been proposed or talked about?

A. All 22 foreign respondents declared that there are currently, in their respective countries, no regulations covering nuclear vessels. The Port of Auckland reply stated: "We are not aware of any steps being taken either local or national to formulate regulations to cover nuclear ships. However, as indicated in the covering letter, we now intend seeking information from overseas which will permit us to consider such steps." The Autonomous Port of Le Havre pointed out that while local port officials have not yet examined the question, an "interministerial commission is now in the course of being formed in Paris for the purpose of establishing general rules for the entrance of nuclear propelled vessels into ports." The commission "will undoubtedly work out a general draft regulation applicable to all French ports which will then be amplified in each port by a particular regulation...For its part, the Ministry of the Merchant Marine is studying some framework rules which will be imposed on such vessels in order to insure public safety." This information was confirmed by replies from Bordeaux, Dunkerque, and Marseilles. Vancouver declared: "No regulations covering nuclear ships have been proposed or talked about but we are grateful to you for raising the issue in the manner you have. We are sure that this will result in such proposals or discussions." Durban replied: "To date no policy directives of any nature have been given in connection with vessels propelled by nuclear power and it is considered that until such directives are received the only problems will be those arising from adverse effects of publicity in the local press." The office of the Director-General of Norwegian

Harbors stated that: "The question has been inquired into, but the case is only in a preparatory state, and, since there are not enough available facts to build upon, no common regulations can be prepared." Kobe responded: "Laws regulating the structure, movement, etc. of nuclear vessels have never been proposed yet, but they are being considered now."

The United Kingdom's Ministry of Transport and Civil Aviation submitted the following statement:

The dock and harbour authorities of the United Kingdom are at present taking part in an examination of the various marine safety problems which will arise as a result of the introduction of nuclear power in merchant ships. This work, which will cover, among other things, the problems dealt with in your questionnaire, is being conducted by a Committee appointed by the Minister of Transport and Civil Aviation. The results of this examination will, therefore, be authoritative, but until it is completed the port authorities in the United Kingdom would have difficulty in offering a firm enough indication of their views to be of any help to the United States authorities. It is considered that, at this stage, no useful purpose would be served by giving individual replies to the questions which you pose, since these might, in the absence of fuller information, give misleading indications about the willingness, or otherwise, of port authorities to receive nuclear-propelled ships. United Kingdom Port Authorities have been so informed and you should therefore not expect to receive separate replies from them. The appointment of the Committee referred to above is so recent, and the problems arising in this matter so complex, that it is doubtful whether it will be possible to give you any early help in your inquiries.

(It is interesting in connection with the above statement of the Ministry of Transport and Civil Aviation that consolidation of policy making in that agency extends even to matters of health related to atomic ships. This fact was revealed in a letter from the United Kingdom Ministry of Health which said in part:

It is true that this Department, and the Port of London Authority, are concerned with port health conditions generally, but hazards from nuclear-propelled ships have not so far been regarded as a health matter coming directly within the responsibility of either. We would regard these hazards as coming within the field of port safety arrangements which are the concern of our Ministry of Transport....

Health Officials

Respondents included officials in or for the following

port cities: Baltimore, Boston, New Orleans, New York, San Francisco, Savannah, Seattle, Sydney, Melbourne, Vancouver, Montreal, Marseille, Le Havre, Bremen, Hamburg, Manila, Dublin, Valparaiso, Cape Town, Durban, and Havana.

Q. Does the city Health Department regulate general health conditions at the wharves in your port? If not, what agency does?

A. The responses brought out that the local health department's authority over health conditions on the wharves is greatest in the United States, Canada and Ireland. Typical of the American responses was this Baltimore reply:

The City Health Department is responsible for regulation of general health conditions obtaining at the wharves in the Port of Baltimore. With respect to epidemic or quarantinable conditions imported by international traffic, the Foreign Quarantine Division, Public Health Service, and its regulations governing international traffic would supervene. The local health department would, however, be requested to lend assistance, especially, in extending control measures into the surrounding community.

The Department of National Health and Welfare at Ottawa explained the Canadian situation:

The health conditions are supervised according to the International Sanitary Convention. General health conditions are regulated by the City Health Department whereas the health aspects of international travel are supervised by the Quarantine Service of the Department of National Health and Welfare.

The exception to this local jurisdiction occurs in San Francisco, where the Department of Health for the City and County of San Francisco explained:

The City of San Francisco does not have any control over the Port of San Francisco. The Port Authority is appointed by the Governor of the State of California and has complete control over the operation and activities of the Port. Of course, the United States Public Health Service has control of cargoes entering and leaving the United States.

In foreign countries (excluding Canada and Ireland) the local health department has no jurisdiction, according to the responses obtained. In France, New Zealand, the Union of South Africa, Chile, Cuba, and the Republic of the Philippines the national government appears to have exclusive control. The Department of Health in Pretoria answered that the Port Health Officers are employed by it. The New Zealand Department of Health stated: "Shipping inspectors under the control of the New Zealand Department of Health are responsible for general

health conditions at the wharves in the Port of Auckland."

Federal states naturally use their states for such duties rather than the national government. Thus Hamburg and Bremen (states of the German Federal Republic) control health conditions in their respective ports. In Australia, the State of Victoria administers this function through its Department of Health, although the State of New South Wales uses its Maritime Services Board. Of course, quarantine functions are universally national.

Q. Have shipments of radioactive materials passed through your port? Are there regulations covering radioactive cargoes? If so, are these regulations national or local? Who enforces the regulations?

A. Most of the world ports have handled radioactive cargoes, and except for Chile, the Republic of the Philippines, and Ireland of those countries responding, the various countries have established regulations regarding them. In most cases the regulations are promulgated and enforced by the national government. United States officials generally referred to rules established by the Coast Guard, the Atomic Energy Commission and the Interstate Commerce Commission. The Medical Director of the United States Quarantine Station at New Orleans supplied an explanation of how the Federal agencies would handle radioactive cargo:

Should a commercial vessel from a foreign port with radioactive cargo enter this port and come under Quarantine jurisdiction, the vessel would be isolated, placed under Coast Guard authority and instructions would be requested from the Division of Radiological Health, Public Health Service, for the proper handling of this vessel.

New York City is exceptional in that it has in its Sanitary Code regulations for the control of radiological hazards in the City. It is doubtful, however, whether these would be extended to radioactive shipments until they were landed.

Q. Are any regulations in effect which are designed to control hazards associated with ionizing radiation producing machines or material such as x-ray machines or radioactive isotopes? Are any regulations in effect or proposed which are designed to protect workmen near sources of radiation?

A. Most respondents gave an affirmative answer to the first question. Regulations cited ranged from a local ordinance dealing with shoe-fitting to state statutes and national laws and policy statements concerned with broadly outlined precautionary measures. United States' respondents referred to local and state laws; foreign respondents mentioned state and national legislation.

A majority of those replying declared that there presently exist, within their area, regulations either in effect or proposed which are designed specifically to protect workmen near sources of radiation. Of United States respondents, answering this question, only New York and Boston currently have such legislation on the books. Seattle and Baltimore reported laws are currently being formulated. United States replies dealt almost exclusively with local and state regulation.

Among foreign respondents, Sydney indicated that the New South Wales Radioactive Substances Act of 1957 provides protection for workmen, and Montreal cited the Canadian Atomic Energy Control Act of 1952. Great Britain pointed out that "...the use of ionizing radiations and irradiating apparatus in hospitals in the United Kingdom is covered by a non-statutory Code of Practice issued in 1957." Vancouver reported that such regulations have been drafted and are being printed by the Workman's Compensation Board. Marseilles stated that: "An order is in preparation in the Ministry of Labor with the collaboration of the Ministry of Public Health, concerning the protection of workers exposed to x-rays and radioactive materials."

It appears that these regulations dealing with radioactive shipments, ionizing radiation sources, and the protection of workmen near sources of radiation would not be directly applicable to the SAVANNAH. Such external controls will not be required, because the SAVANNAH will be subject to regular and continuous internal inspections by the most modern methods of determining types and amount of possible radiation hazards for its own operating personnel. Thus when the United States Government furnishes the details of this inspection system and its findings to the authorities at each port of call, the latter will be able to compare these with the standards set forth in their own regulations and easily satisfy themselves of the protection against radiation hazards which is maintained on board. We think that in very few cases would an independent physical check of the SAVANNAH's radiation inspection system be demanded by the governmental port authorities. Nor do we think it likely that the standards of these regulations abroad would be more rigorous than those already set for the SAVANNAH to adhere to.

Q. Have any reactors been set up or proposed in your city? If so, what government bodies are responsible for the health safety of the operation?

A. The majority of the port cities in the United States contain within their boundaries, or in close proximity to the metropolitan area, operating reactors or other radioactive devices, e.g., "sub-critical assemblies", "sub-critical teaching

reactors", cobalt "bombs". Abroad, such installations are exceptional. Generally, the replies indicated that the national atomic energy agency regulated them to ensure the protection of public health, but in the United States, of course, some state legislation is appearing which will supplement the Federal requirements.

Q. Speaking unofficially, do you think the Health Department would object from the health standpoint to a nuclear ship entering the port?

A. United States health officials, in general, saw no objection from the health standpoint to a nuclear ship entering their respective ports. The Commission of Health of New York City replied: " Without details as to the possible radioactive effluence to the air or to the water, this question cannot be answered. In general, if A.E.C. approval is granted, the Department of Health would probably concur." In substance, the City of Boston Health Department gave the same reply.

Abroad, many of the officials refused to give an opinion on the grounds of lack of information. The Canadian Department of National Health and Welfare foresaw no objection "if full particulars regarding the health aspects (shielding, handling of waste, contamination possibilities, etc.) of the nuclear ship are made available beforehand." The Department of Public Health of New South Wales explained the principle by which they would be guided in judging the health safety of the SAVANNAH:

The principle adopted by the Radiological Advisory Council established under the Radioactive Substances Act... is that no person shall be exposed to avoidable radiation however small the dose. Where exposure is unavoidable, warning notices must be exhibited and the dosage must not exceed the limits prescribed under the Act. Provided the Advisory Council is satisfied on these points I think it would not raise objections.

In the same vein, the Department of Health of the Union of South Africa stated:

From purely a health point of view, it is unlikely that strong objection would be raised to a nuclear powered ship visiting the Union's ports, provided radiation emanating from the reactor is adequately shielded so as not to expose dock workers and the general public to excessive radiation (i.e. limits internationally accepted), and provided no radio-active waste or other material is discharged into the territorial waters of the Union of South Africa without the permission of the Atomic Energy Board.

The most unfavorable reply came from the Director of the Dominion X-Ray and Radium Laboratory, Christchurch, New Zealand, whose unofficial view was forwarded by the Department of Health in Wellington:

Possible hazards arising from, e.g. a collision with a nuclear powered ship in or near the Harbour, are such that only the most compelling economic or military reasons would justify the entry of a nuclear powered ship into the Port of Auckland.

Concern was raised by the Commonwealth Department of Health in Australia in this comment:

There is a general concern about radiation by the public at the present time and there could well be an unfavorable reaction from some groups owing to a lack of understanding of the subject. I believe the question of radiological safety would, almost certainly, be raised.

Quite favorable opinions were obtained from a number of respondents. The President of the Health Department in Hamburg (in contrast to the negative reaction of the Director of the Department of Business and Transportation) answered:

If such a ship, before going to the harbor of Hamburg, has been in service for sometime, if the voyages as well as the visits in the harbors were accomplished without difficulties and without incidents, and if there was observed during this time no harm to the health of the crew or other persons, then a visit of such a ship to Hamburg will not be considered dangerous for the population of Hamburg.

The officer of the frontier sanitary control of the Ministry of Public Health at Le Havre commented: "It appears interesting to me to report that the Port of Le Havre has already received the Nautilus, without the entrance and the stay of this atomic powered submarine having raised any particular difficulties." In the same vein, the Department of Health of Cuba said:

The General Director of Health of this Ministry is of the opinion that from the sanitary point of view the arrival in Cuba of ships of nuclear propulsion, anchored in the proper place like any other ship, will not offer any danger to the citizens, since these vessels have visited before other foreign ports without causing problems to the personnel working on the wharves, or to the public health.

It appears that actual safe operating experience for nuclear powered ships will rather quickly dispel official doubts as to their radiological safety.

We do not wish to make claims that the rapidly mounting interest and activity in the study of port and health aspects of nuclear shipping which is taking place in many countries is due in great

part to the questionnaire which we distributed. However, it does appear that in some small way the questionnaire did serve as a catalyst to formalize some studies which were already informally under consideration. Indicative of this is this statement in the letter from the Auckland Harbour Board:

Following receipt of your letter and in the expectation that nuclear powered ships may, in the now too far distant future, be calling at New Zealand ports, we are not conducting world wide enquiries and research in this field.... Any further information obtained on this subject will willingly be forwarded to you, at the same time we would appreciate being informed of any developments affecting ports, which your enquiry will unquestionably elicit.

In this regard, it is interesting to note that the International Maritime Committee has just begun a study of nuclear shipping. We did not send a questionnaire to this body, but we received the following interesting communication from it:

We have pleasure in informing you that our association has constituted a committee for studying nuclear shipping, but up till now no report has been issued. Such report will probably be submitted to the plenary conference of our committee and this plenary conference will take place at Rijeka in September 1959.

Results of the survey support several conclusions important to the planning of the N.S. SAVANNAH's initial cruise and to operation of future commercial nuclear ships.

1. Unofficial "official" opinion in port cities, so far as it can be judged by poll responses, is generally predisposed toward commercial atomic vessels. Stevedores and the general public are reported to hold, in the main, a favorable attitude. These facts will make the Department of State's negotiations easier and assist the public information program. However, it must be remembered that poll answers in no way represent official positions and that public opinion is a mercurial thing which may reverse overnight. In such a case, public pressure will be an important consideration in the official decision about whether the SAVANNAH will gain entrance to any particular port.

2. While visits to United States' ports will require contact with local and/or state officials, arrangements for calls in foreign ports can be arranged in the main with national government authorities, although subsequent clearances with state agencies in federal countries may be necessary. This situation exists not only for diplomatic reasons but also for the practical reason that, poll responses indicate, abroad national governments determine policy for their ports and implement these decisions through detailed regulations. The case of the United Kingdom

has been referred to previously. A similar situation appears to exist in Canada, Norway, France, and Union of South Africa. The national-local relationship is apparently more direct than that known in the United States. In part this phenomenon may be explained by the fact that nuclear shipping is new and local officials seek guidance from the national government in handling this type of vessel. But repeated deference to central government authority by many respondents to the questionnaire indicates that the pattern is more basic. The implication for the N.S. SAVANNAH and subsequent American nuclear ships is clear: if approval of the national government can be obtained, port officials will undoubtedly accept atomic vessels.

3. No nation from whom questionnaires were returned presently has in effect regulations regarding nuclear ships. Few of these countries have even proposed or talked about such regulations. Herein lies a valuable opportunity for the United States. Obviously, within the next few years regulations will be formulated. Insofar as possible, drafters of these rules will wish to utilize practical experience with commercial nuclear vessels as a background against which to develop both a philosophy and a procedure for handling this type of ship. The United States, as a leader in the field, will be in a position to provide the desired information and thus influence indirectly future foreign legislation and increase acceptance of this form of marine propulsion. Likewise, a safe and successful voyage by the N.S. SAVANNAH would undoubtedly encourage foreign legislatures to avoid placing undue restrictions on nuclear shipping and aid in the rapid advancement of its use.

4. While United States port officials who responded to the questionnaire were unanimous in their belief that no serious objection would be raised to a visit by the N.S. SAVANNAH, foreign response was not so enthusiastic. Therefore, it would seem advisable that the ship stop at several United States ports before visiting foreign harbors. Such a procedure will demonstrate the safeness of the vessel and allow the American people to examine their country's product before it is "exported."

5. The poll revealed that many officials in foreign countries have little knowledge of nuclear ships. The general public in these countries certainly have even less. The need for an effective public information program for the N.S. SAVANNAH is readily apparent. Provision of adequate information may forestall incidents which might damage the prestige of the United States and injure the future of nuclear shipping.

Because of the importance of this phase of planning for the SAVANNAH's maiden voyage, the following section has been devoted to its consideration.

PUBLIC INFORMATION PROGRAM

General Approach

A public information program for the SAVANNAH involves not only making known the facts about her technical and operating capabilities but also the purposes and philosophy of her construction and demonstration. The latter is much more complicated and difficult. But without the facts, the purposes cannot be made clear.

A public information program involves not only a domestic operation but also an international one. Again, the latter is much more complicated and difficult. But without the domestic program first, the international one would be almost impossible, because a favorable reaction by American citizens is a prerequisite to a favorable reaction by foreign citizens.

We have assumed that the philosophy behind the public information program and the foreign tour itself must be the service which the SAVANNAH is rendering to the shipping industry and the atomic energy industry throughout the world. We think that such a philosophy will be very helpful to the Department of State in its role of gaining access for the SAVANNAH abroad by persuading foreign officials of the value of the ship for their respective countries.

It would be very easy for the public information program to sound the note merely of national prowess. But, in our opinion, unlike space rockets, the SAVANNAH demonstrates American national scientific prowess not nearly as much as she reveals that the United States was willing to spend American money to develop the economic feasibility of commercial nuclear shipping so that the shipping industry of the world and the people of the world which it serves can be aided by this new peaceful use of atomic energy. It must be clear to most observers abroad that the SAVANNAH will be outmoded shortly after she begins to operate, because in her very construction and operation she will enable scientists and engineers to see the results of her particular design and equipment and to improve upon them. It appears to us, therefore, that the United States will be called upon to publish the results of her trials and tests and release a great amount of information concerning her technical features in order to substantiate the philosophy of service in the SAVANNAH's construction and to gain the good will abroad which this will command. Such actions will be in keeping with the same idea of service incorporated in the public information program.

In making the following schematic analysis of problems involved in formulating such a public information program, we

have found it convenient to make these assumptions: (1) The United States Government desires to inform the publics in various nations concerning the operation of a nuclear vessel before and when the N.S. SAVANNAH calls at a port of that nation, and (2) the United States wishes to make a maximum effort at presenting this type of information.

Fundamentally, three major points should be kept in mind:

1. The program should not be expected to change the opinion of an individual who blindly fears atomic energy as such. Nor should it be expected to produce partisans for United States foreign policy. Rather, it should present full information on the ship and should indicate what sort of an attitude can appropriately be held on a basis of such information. An honest presentation of the facts should underpin any general conclusions at which the information program is aimed.

2. No one technique of informing persons who visit the ship, either in person or vicariously, will be universally effective. Thus, a public information program must be flexible and varied.

3. Some individuals or groups have more importance in terms of the general policy aims of the United States than has the public at large. The "public" is composed of every type of group and individual, and because of its heterogeneous composition provides a vague target for an information program. Therefore, some attempt should be made to single out individuals and groups who have the greatest importance in terms of the aims of the evaluation period.

Construction and operation of the N.S. SAVANNAH is meant to demonstrate the applicability of nuclear energy to merchant shipping, thus paving the way for future nuclear vessels and exhibiting to the world United States determination to employ the atom in a creative fashion. This broad purpose may be broken down into a number of sub-aims, each of which will require somewhat different approaches in terms of a public information program. Among these might be listed the following:

1. To demonstrate the competence of the United States in ship construction and technical development.

2. To show the safety with which nuclear ship propulsion may be used.

3. To foster commerce and navigation by tackling the problems of nuclear ship propulsion.

4. To make clear the depths of peaceful intentions on the part of the United States in developing the peacetime use of nuclear energy.

This aim and its sub-aims have political overtones. An information program to assist in achieving them, therefore, will necessarily be more delicate to plan and operate than another kind which concerns solely technical, non-political aims. The multiple nature of the N.S. SAVANNAH's purpose must always be kept clearly in view during planning of the information program. It has a direct and constant bearing on such matters as the selection of persons to whom information material should be sent, preparation of lists of individuals to whom invitations to visit the ship should be directed, determination of ports of call, and the scheduling of such visits.

The general public can usefully be divided into many "publics" or easily definable groups. Not all groups which make up the general public can be interested or informed about the ship. Therefore, the aim of the information program in regard to the general public should be to touch as many of the smaller "publics" as possible. These tend to divide themselves on the basis of subject matter around which groups organize.

In any group, even one as diffuse as a "general public," some individuals tend to lead and others to follow. Leaders have a particular significance in an information program, since they communicate to their followers not only factual information but also attitudes. Thus, it is suggested that in considering any target group, particular attention be paid to the inexact but important division of leaders and followers. Two examples will make clear what we mean by leaders.

The visit to the ship by a popular king would have the effect of giving the event a certain importance among almost all of his subjects. Such a visit would be news of the kind that popular newspapers disseminate everywhere. To look to the recent past, when Theodore Roosevelt arranged to have the American fleet visit Tokyo harbor during a period of friction with Japan over mistreatment of Japanese on the American West Coast, the Imperial Government made such a display of hospitality that the public, sensing how much importance the Emperor and his government gave the event, joined in joyous celebration. American sailors rarely have had such an extraordinary welcome. To give another example, a few words of praise for the interior decorations of the ship from the leading designer of home interiors in country 'X' would penetrate the consciousness of thousands of housewives.

With these two rather crude but useful divisions of the general public established, (small "publics" based on subject matter, and leaders and followers) it becomes easier to sort out in a theoretical way those individuals towards whom an information program should be directed. Generally speaking, governmental

leaders and political figures (including those from legal opposition parties and political groups) tend to help set the attitude of the mass of citizens in the visited country. Specifically, governmental leadership can conveniently be divided into many segments, each with special interests. Because the ship is a foreign vessel to which the proprietor government has given special importance, representatives of the foreign affairs ministry of the country of call could be expected to be interested. Officials of the commerce or merchant marine ministry would be anxious to learn about the ship. So, too, would officials of the power or atomic energy ministry. Military and naval officers would wish to learn about the ship because of the long-range military importance of nuclear propulsion. Those governmental departments concerned with education might well wish to hear about the special training of the crew as well as about research implications of the reactor. The labor ministry would have an interest in the conditions of work for the crew. An example of the sort of interest discussed here occurred recently when the Soviet delegation to the United Nations General Assembly in 1957 touched down near New York in a new Russian-made jet airliner. Civil aeronautics officials looked it over with great care, as did military officers assigned to the plane as guides.

Officials of intergovernmental organizations who might be in the area of the port visited should be regarded as part of the governmental public. Representatives of such organizations as the United Nations, the Organization of American States, the World Health Organization, the Intergovernmental Maritime Consultative Organization, the International Labour Organization, the Economic Commission for Europe, the European Common Market, the European Coal and Steel Community and many others should be treated as parts of the specialized governmental groups discussed in the paragraph above.

While the governmental publics separate themselves from the rest of the population by their official status, a great number of significant groups of private individuals within the general public can be defined by the nature of their interests. These groups include business, labor, professional, educational and cultural groups and organizations.

Leaders in the business group would include such persons as owners and directors of shipping concerns; ship builders; ship suppliers and repairers; exporters and importers and freight forwarders and handlers of various kinds; banks interested in international trade or ship-building and ship operations; and insurance firms. It can be assumed that everywhere in the world these businesses are organized in trade associations, covering both business generally and the various specialties. For example,

at Le Havre, there is no doubt a local Syndicat d'Initiative; similar organizations exist for France as a whole. In addition, there are special Franco-American chambers of commerce on both sides of the Atlantic. Specialized business organizations for international trade and for shipping also function. Finally, the international shipping conferences would be included in this category.

Labor groups analagous to the business organizations touched on in the previous paragraph can be found in many places. Parallel to the business organizations, they function on national, local and international levels. While their interests center around working conditions, wages and job security aboard ship, they would want information, as would the business organizations, on the economics of nuclear-powered shipping. Labor organizations, of course, are highly specialized. Those whose activities bear most directly on shipping and commerce and energy production would be the best target for the public information program, because of their direct interest in the long-range implications of nuclear propulsion. The prime labor targets, then, would be the leadership of dockside and seafaring unions; of ship construction and repair workers unions; electrical and nuclear energy production workers unions; electrical and electronics manufacturing workers unions; and, finally, general trade union organizations.

Various professions would be concerned with the nuclear ship. Engineers would have an obvious interest in the power plant and the general design of the ship. Branches of engineering most closely concerned would be nuclear, electrical, mechanical and chemical. Naval architects and engineers would have a special interest. The medical profession would be concerned with the radiation hazard and the legal profession with admiralty and international law aspects of the ship. The recognized professions are universally organized into well-defined associations and academies, the leaders of which would be important targets. At the same time, the public information program should reach leaders of the professions who do not take leading roles in professional organizations. These leaders would include persons of great eminence and, in addition, leading teachers and researchers.

Educational leaders, both in government service and in various educational institutions, would be targets in proportion to their concern either with shipping or with nuclear energy. Directors and important teachers in maritime and naval academies could be among those reached. Technological researchers and scientists interested in nuclear energy would probably fall in this category. While it is perhaps more difficult to isolate leaders in the field of education than to find the officials of trade associations, their importance as redisseminators of

information is so important that considerable attention should be given them. Moreover, their influence on the attitudes of students would produce a long range effect.

This brief analysis of the publics as targets implies that business, labor and professional categories can be communicated with in terms of their respective subject-matter interests primarily. This would likewise be true for the governmental specialists, but the general leaders of foreign governments and political groupings have to be communicated with in terms of the general purposes of the SAVANNAH and its tour in relation to their countries' national interests.

Communicating with the Publics

Three paths are available everywhere for communicating with the publics and their leaders. These are mass communications media, selective media and face-to-face contact.

Mass media include the popular press, which circulates generally in the form of daily or weekly newspapers or weekly or monthly magazines; radio; television; films for general distribution; and exhibits, posters and other display material. The mass media, obviously, can most appropriately be used for reaching the undifferentiated general public. On the whole, they cannot be expected to carry information of great sophistication or subtlety and in many cases will miss the main point of the material which it is hoped they will communicate. For example, the press usually covers the arrival of a new passenger liner in a port as a public spectacle rather than as an event of importance in business, industrial and cultural life. But at least the point is made that a new ship has arrived.

News is what puts the mass media to work. The bare arrival of the SAVANNAH, despite its intrinsic importance, will merit much less space in the press than if the ship were met by a large welcoming party of eminent people or were greeted with a civic or national welcome. To get maximum coverage by the mass media, full information on the operation and purpose, the design and special details of the ship should be available to any representative of the media who requests them. Advance information in simple form should be in their hands well before the arrival of the vessel. Such information, incidentally, should not be dropped in a bundle on the desks of editors and producers but should be built up gradually from an initial announcement to a pre-arrival summary of technical features and a schedule of events.

Of vital importance to the mass media is first-hand observation.

It follows that free access to various parts of the ship and information about it will be necessary. The fuller the facilities for covering the ship, the fuller the coverage is likely to become. Some attention should then be given to lighting for films, to radio recording facilities, to working space for the press, to telephone access to shore and to the provision of guides and public relations officers specializing in mass media relations.

Public information programming for the mass media, then, would be similar to that for the arrival of a new American passenger ship for the first time in a foreign port. It might differ markedly, however, in the depth of technical information which might have to be made available and also would ideally include more extensive facilities for the representatives of mass communications media.

What are called here the selective media include scholarly and scientific journals, trade publications, technical films, exhibits and photographs, and radio and television broadcasting to specialized audiences. These media provide communication directly with leadership groups in the differentiated publics outlined above. Because their messages are produced with special competence and are related to the expertise of the precise specialized groups which presumably would be the most important targets of a public information program, they should get special attention. Although these media would require access facilities similar to those of the mass media, they also would need more expert guidance and information. As far as possible, the representatives of these media should receive reprints of technical reports and studies relating to the ship, should have available aboard ship detailed information on the vessel and the nuclear propulsion plant, should be able to obtain still photographs free of charge and should have the opportunity to discuss with the most competent men aboard the various features of the design and operation of the ship.

To be more specific, the representative of a shipping industry trade publication should be permitted to inspect the ship from stem to stern and should be guided by an expert. He should have an opportunity to interview the captain and chief engineer and other members of the crew as he thought desirable. Some person aboard the ship, perhaps an official of the Maritime Administration or the Atomic Energy Commission, should be available to answer questions on the broad purpose of the vessel. The reporter might be invited to stay aboard the ship for a meal or even to be on board for a short cruise or a trip to the next port. His report would then be based on the fullest possible information.

Scholarly, technical and scientific publications often do not employ staff writers but rather receive their articles from leading professionals. These individuals not only have an important role in shaping the attitudes of the professions but, as writers, also have an equally important task in disseminating information. They should therefore have careful attention during visits and should be provided with such information as they request. Requests for information can be stimulated by putting into their hands before the ship calls appropriate technical, scholarly and scientific studies which may have appeared in the United States.

The film on the N.S. SAVANNAH, understood to be in preparation, would be most valuable for presentation to scholarly, technical and scientific societies if it included sufficient detail and information in depth. It might well be shown during the visit, on board ship or off, and after the visits.

Mention of the savants who are responsible for scholarly, scientific and technical journals leads immediately to a consideration of face-to-face contact as a means of carrying out the public information program. With scholarly groups and societies, this method of informing has particular importance. While basic information can be disseminated by means of studies previously prepared, discussions should supplement them. Discussions also might give interesting opportunities for American scientists and technicians to learn of possible refinements in nuclear propulsion, engineering and ship design. It can therefore be recommended that scientific and technical advisers of the highest possible competence be aboard ship available to the leaders of the specialized groups which must carry much of the burden of informing the specialized publics. These advisers could appropriately deal with such advanced students as might visit the ship, as well as with their teachers, many of whom might be contributors to important journals.

Face-to-face information methods have little application to the public at large, but they are expected by political and social leaders who would interest themselves in the ship. Such persons, who might include even heads of state, would anticipate dealing with officials of appropriate rank and, at the same time, quite likely would ask questions and expect information based on expert knowledge.

Similar face-to-face contacts can be expected with mass media representatives, who will require the services of information officers capable of translating technical data into the vernacular. Such officers must be well briefed and trained in dealing with the mass media.

Interference of many kinds with the orderly flow of information to the various publics can be anticipated. These will vary greatly in intensity from place to place and some may be absent altogether. A discussion of some of the more obvious of them follows.

In some countries, governmental monopolies of the means of communication may seriously limit the extent and quality of information which can be transmitted to any of the publics. For example, in the Soviet Union it could be anticipated that the extent of coverage of the ship, if it should visit there, probably would be rather small if not altogether absent in the mass circulation press, radio and television. But it could also be expected that despite restrictions on information in the mass media, a considerable amount of technical and scientific information might be used by the selective media.

Where governmental controls do not exist or are relatively limited in effect and extent, party control of the means of communication might limit the information reaching at least some segment of the mass media public. For example, a visit to Genoa probably would be covered relatively little and with considerable bias by the Communist Party organs, which have very considerable circulations in Italy. The public information program in such a port must rely on the organs of political parties and organizations more friendly to the United States. (Incidentally, it probably would be a grave mistake to prohibit the representatives of anti-American organs from boarding the ship or receiving information, for this would simply give ground for yet another complaint.) Moreover, the state radio in such areas generally can be expected to reach some of the people otherwise subject only to politically-motivated information sources.

Social organization and attitudes in other places might easily interfere with communication. A considerable body of Indian opinion, for example, appears to react violently against suggestions that material advances have intrinsic importance and, at the same time, object to anything resembling "high pressure" information methods. Extreme care would be required to prevent a hostile reaction. Individuals who react adversely in these matters often belong to the best-educated segments of the population. But because such groups in many parts of the world, especially the former colonial areas and the underdeveloped areas, frequently control the information disseminated throughout the land, they must not be disregarded.

Even such educated groups, however, may have little technical competence. The rest of the population has correspondingly less technical knowledge. This technical ignorance could result in failure to communicate information on the purposes and uses of the ship to most of the mass of the population and could limit the scope of communication even with important leadership groups. Whenever such a situation is encountered, public information materials should be on a level appropriate to local technical understanding, no matter how rudimentary.

Where the level of technical competence is low, a general paucity of means of communication may well be encountered. Newspapers and magazines may have small circulations and little professional accomplishment. Radio may have a miniscule audience and television may be unavailable. Scholarly and technical journals may be altogether lacking. In such a situation, only slight results can be expected from a public information program. Whatever is attempted might be done with motion pictures and posters as the most appropriate media.

Language itself will be a persistent factor interfering with communication. Wherever possible, material for use by mass media should be available in the local languages. Where several languages are used, care must be taken to treat all equally. For the selective media, the use of local languages is less important but nevertheless helpful. For face-to-face contact, the use of local languages is indispensable for maximum results.

A final interference with communication of all kinds about the ship could result from local holidays, festivals, sporting events and religious ceremonies. This sort of public affair tends to dominate local news and activities. It would thus be unwise to bring the ship into a port with a predominately Muslim population at the end of the Ramadan (a great religious fast which is broken with a celebration) when local feasting would overshadow everything. Similarly, few spectacles can compete with the Tour de France, the great annual French bicycle race.

Analogous to the social events of local importance would be public manifestations motivated for political purposes against the visit of the ship. These would tend to interrupt or interfere with much face-to-face contact and would tend to overshadow positive reporting of the purposes and significance of the ship. The possibility of such demonstrations varies greatly from port to port and can be estimated only for given places at given times.

No single public information program can possibly serve to inform every person and every group. A general analysis of the composition of the general public indicates that it can be divided into many groups, some of which are more suitable than others as public information targets in connection with the SAVANNAH. The most profitable targets are those groups which have interests closely connected with the operation and design of the ship. But each group which it is hoped to influence should be furnished with material appropriate to its interests. In part, this material can be designed on the basis of the kind of communication medium to be used. Some media have great effectiveness in reaching specialized groups while others are useful only for disseminating

attitude-forming messages.

Our analysis of a public information program has been generalized. Its application in a specific country will require modification in order to meet special conditions faced in that nation.

Appendix C contains an analysis of governmental and private attitudes toward nuclear shipping in Great Britain and an outline of a public information program for that country. This presentation is submitted as a case study and is intended to be indicative of the type of planning which will be required in connection with all countries whose ports are visited by the N.S.SAVANNAH. In order to show the necessity of an individually-tailored information program for each nation which plays host to the vessel, comparative studies of France and the Netherlands are presented in Appendix D.

Great Britain was selected as an example for several reasons:

- (1) It seems likely that Great Britain, a friend and ally of the United States, will be among the first foreign countries visited;
- (2) Great Britain is a major shipping nation and has indicated a strong interest in marine nuclear propulsion;
- (3) Great Britain has a strong atomic energy program and a degree of sophistication concerning nuclear matters which will make necessary a maximum public information program.

France and the Netherlands were picked for comparative purposes to emphasize the point that such factors as geographical closeness and common ideological backgrounds do not diminish the necessity of custom-fitting an information program to individual nations.

Conclusions

Motivations for construction and operation of the N.S. SAVANNAH demand that the ship be both "ordinary" and "extraordinary."

On one hand the N.S. SAVANNAH is regarded as a "way-paver", the forerunner of future commercial nuclear ships. As such she is expected to provide an opening wedge which will help insure general acceptance for atomic vessels. To accomplish this purpose every effort should be made to avoid treatment of the ship as an "exception". The United States should encourage and assist foreign governments in adapting or promulgating directives which are aimed at establishing long-range policy and procedures dealing with nuclear-propelled ships. Attempts to waive the rules or confer special status should be discouraged whenever possible.

The idea of making the N.S. SAVANNAH "ordinary" involves public opinion considerations as well as legal ramifications. Paramount in lay discussion of atomic energy in peaceful employment is the question of public safety. The more "normal" the handling of the SAVANNAH, the less likely it is that fears, real or fanciful, will arise.

The "extraordinary" aspect of the SAVANNAH concerns its role as a prestige development for the United States. The ship is expected to be the first commercial nuclear-propelled vessel launched, a demonstration of United States technical leadership and determination to advance the peaceful use of the atom. As such, it is desirable that the ship receive extensive publicity and special handling. To treat it in too "regular" a fashion would hinder accomplishment of this purpose.

The paradox is not as acute as would first appear. Arrangements required to accomplish each purpose do not necessarily conflict. To attempt to insure public awareness of United States accomplishment does not demand abandonment of efforts to normalize the legal treatment and the movement and berthing of the SAVANNAH in world ports: the two campaigns operate on different levels of public contact.

The dual nature of the SAVANNAH's purpose should be borne in mind throughout the planning and the executing of the demonstration program. Accomplishment of both aims would be of lasting significance to the United States.

V APPENDICES

APPENDIX A

PORT QUESTIONNAIRE AND OFFICIALS WHO GAVE SUBSTANTIVE REPLIES

On the following three pages are a letter and a questionnaire designed to elicit information of use in planning a demonstration of the SAVANNAH in the United States and abroad. This was sent to officials who could answer concerning 51 separate ports. Following this is a listing of the 31 officials (22 abroad and 9 in the United States) who gave substantive replies. This excludes a number who merely acknowledged receipt of the questionnaire. The correspondence was conducted in the native languages of the officials, and their replies (with translations) have been made available to the Nuclear Projects Office, Maritime Administration.

THE UNIVERSITY OF MICHIGAN
ENGINEERING RESEARCH INSTITUTE
OFFICE OF THE DIRECTOR

TELEPHONE
ANN ARBOR NORMANDY 3-1511
EXTENSION

ADDRESS REPLY TO:
ENGINEERING RESEARCH INSTITUTE
EAST ENGINEERING BUILDING
ANN ARBOR, MICHIGAN
ATTENTION OF THE WRITER

Dear Sir:

The University of Michigan, Engineering Research Institute, Project 2717, is presently engaged in an analysis of nontechnical problems affecting the operation of nuclear powered commercial vessels. The first phase of this study will concern itself with the initial demonstration cruise of the American nuclear propelled merchant-passenger ship, the NS Savannah.

Among the specific problems that are to be studied are those which may arise in the ports of call. In terms of ports, the study's main interest centers around the question of port regulations, local laws, public opinion, and union (stevedore) attitudes.

Since no itinerary for the cruise is available at the present, a number of ports are being studied in order to draw general conclusions about problems which may be encountered. has been selected as one of the ports to be investigated for this purpose, and your help in gathering information for this investigation would be greatly appreciated.

The study will assume that the purposes of the nuclear ship Savannah's cruise will be best served if the vessel can enter the port and be cleared with no unduly burdensome inspection, and can berth at a pier suitable for a conventional merchant passenger vessel, preferably near adequate public transportation. Anything which would prevent the attainment of these conditions would be of interest to the Research Staff of this Project. It may be pointed out that the vessel is expected to call in various United States ports before it sails for foreign ports.

A questionnaire is enclosed outlining the type of information needed, and detailed answers to each question will be helpful. However, any information on any problem that could be anticipated is welcome. Any information sent to us will be considered as a personal opinion rather than an official position of a government official and, of course, will be treated with strict confidence. We realize that supplying the information we have requested will be burdensome. However, your reply will greatly facilitate our analysis.

Thank you for your consideration of this matter.

Sincerely,

Morgan Thomas, PhD

PORT OFFICIALS

1. What city and/or port officials have the authority to restrict the movement of a vessel in the waters of the port by declaring the vessel hazardous?

	<u>Name</u>	<u>Title</u>
(a)	_____	_____
(b)	_____	_____
(c)	_____	_____
(d)	_____	_____

1a. Speaking unofficially, do you think any of these persons would consider a nuclear propelled ship as hazardous?

1b. Do you think nuclear ships will be restricted from free movement in the waters of the Port of

2. What city and/or port officials have the authority to prevent a vessel from berthing at any given wharf by declaring the vessel hazardous?

	<u>Name</u>	<u>Title</u>
(a)	_____	_____
(b)	_____	_____
(c)	_____	_____
(d)	_____	_____

If your answer to Question 1 and Question 2 are the same, do not answer Question 2a.

2a. Again speaking unofficially, do you think any of these persons would consider a nuclear propelled ship as a hazardous ship?

2b. Do you think that nuclear ships will be restricted from the free use of the wharves in the Port of

3. In your opinion would the general public in
be interested in seeing and visiting a nuclear vessel?

- 3a. (If no) Why not?
4. What do you think the attitude of the local stevedores would be towards a nuclear ship?
- 4a. Do you think the local stevedores would want extra pay for working on a nuclear ship?
5. If the vessel should call at the port of and take on board a large number of visitors, which wharf do you think would be best?
6. Does the city or other local government agency such as the City's Health Department or Fire Department regulate health and safety conditions at the piers?
- 6a. (If yes to Question 6) What Agencies are these?
- 6b. (If no to Question 6) What Government Agencies do regulate?
7. Shipments of radioactive materials are handled as cargo at some of the large ports of the world. Have shipments of radioactive materials passed through the Port of
- 7a. Are there any regulations covering radioactive cargoes?
- 7b. (If yes to Question 7a) Are they the national or local government regulations?
- 7c. (If yes to Question 7a) What agency enforces these regulations?
- 7d. (If yes to Question 7) Do stevedores receive extra pay when handling radioactive cargo?
8. Are there any regulations covering nuclear vessels now in effect?
- 8a. If yes, could you give us a citation of the law?
- 8b. Have any regulations covering nuclear ships been proposed or talked about?

OFFICIALS WHO GAVE SUBSTANTIVE REPLIES
TO THE PORT QUESTIONNAIRE

Australia

Secretary
The Maritime Services Board
of N.S.W.
Circular Quay West
Sydney

Canada

Port Manager
National Harbours Board
Montreal Harbour
357 Common Street
Montreal 1, P.Q.

Port Manager
National Harbours Board
Harbour of Vancouver
Dunlevy Avenue
Vancouver 4, B.C.

Finland

Harbour Master
Harbour Office
Helsinki

France

Directeur
Port Autonome de Bordeaux
Service Maritime de la Gironde
Palais de la Bourse
(2, Place Gabriel)
Bordeaux

Directeur
Ponts et Chaussées -
Département du Nord
Service Maritime
Ports de Dunkerque et Gravelines
7, Rue de Ponceau
Dunkerque (Nord)

Le Président
Conseil d'Administration du
Port Autonome du Havre
125 bis, Boulevard de Strasbourg
Le Havre

Germany

Port Captain
Hansestadt Bremisches Amt
Bussestrasse 27
Bremerhaven

Ltd. Regierungsdirektor
Freie und Hansestadt Hamburg
Behörde für Wirtschaft und
Verkehr
Amt für Hafen und Schifffahrt
(24a) Hamburg 36
Gr. Bleichen 23/27

Italy

Il Presidente
Consorzio Autonomo del Porto
di Genova
Genova

Il Presidente
Ente Autonomo del Porto di
Napoli
Napoli

Il Provveditore
Provveditorato al Porto
di Venezia
Dorsoduro - Zattere, 1401
Venezia

Japan

Captain of Kobe Port
Kobe, Hyogo Prefecture

New Zealand

General Manager
Auckland Harbour Board
C.P.O. Box 1259
Auckland

Harbour Master and Chief Pilot
Wellington Harbour Board
Box 893, C.P.O.
Wellington

Secretary
Wellington Harbour Board
Box 893, C.P.O.
Wellington

Director
Port of Boston Commission
The Commonwealth of
Massachusetts
14 Court Square
Boston 8

Norway

The Director-General of
Norwegian Harbours
(For Havnedirektøren)
Uranienborg Terrasse 22
Oslo
(For Bergen and Oslo)

Director of the Port
Board of Commissioners
Port of New Orleans
2 Canal Street
New Orleans

Port Director of Oslo
Oslo Havnevesen
Prinsens Gt. 2
Oslo

Executive Director
Port of New York Authority
111 8th Avenue at 15th Street
New York 11

Union of South Africa

General Manager
South African Railways
Hoofbestuurder se Kantoor
Johannesburg
(For Cape Town and Durban)

Port Director
San Francisco Port Authority
Ferry Building
San Francisco 6

Port Captain
South African Railways
Harbours Department
Durban

Executive Secretary
Savannah District Authority
130 Bay Street, East
Savannah

Harbor Master
Harbor and Wharves
130 Bay Street, East
Savannah

United States

Chief, Harbor Master
Department of Finance
Sub-Department Harbor Master
Pier No. 4, Pratt Street
Baltimore 2

General Manager
Port of Seattle Commission
P. O. Box 1878
Seattle 11

Director of Engineering
Maryland Port Authority
Pier 2
Pratt Street
Baltimore 2

APPENDIX B

HEALTH QUESTIONNAIRE AND OFFICIALS WHO GAVE SUBSTANTIVE REPLIES

On the following page is a questionnaire designed to obtain information about health requirements which would be useful in planning a demonstration of the SAVANNAH in the United States and abroad. This was sent to health officials who could answer concerning 35 separate ports. Following this is a listing of the 25 officials (16 abroad and 9 in the United States) who gave substantive replies. This excludes a number who merely acknowledged receipt of the questionnaire. The correspondence was conducted in the native languages of the officials, and their replies (with translations) have been made available to the Nuclear Projects Office, Maritime Administration.

HEALTH OFFICIALS

1. Does the city Health Department regulate general health conditions at the wharves in the Port of
- 1a. (If no to Question 1) What agency does regulate health conditions?
2. Shipments of radioactive materials are handled as cargo at some of the large ports of the world. Have shipments of radioactive materials passed through the Port of
- 2a. Are there regulations covering radioactive cargoes?
- 2b. (If yes to Question 2a) Are the regulations national or local regulations?
- 2c. Does the Health Department enforce the regulations?
- 2d. (If no to Question 2c) What agency enforces these regulations?
3. Are any regulations in effect which are designed to control hazards associated with ionizing radiation producing machines or material such as x-ray machines or radioactive isotopes?
- 3a. (If yes to Question 3) Could you please give us a citation for the regulation?
4. Are any regulations in effect or proposed which are designed to protect workmen near sources of radiation?
- 4a. (If yes to Question 4) Could you please give us a citation for the regulations?
5. Reactors have been operated in a number of large cities, and industrial reactors have been located near other large cities. Have any reactors been set up or proposed in this city?
- 5a. (If yes to Question 5) What government bodies were responsible for the health safety of the operation?
6. Speaking unofficially, do you think the Health Department would object from the health standpoint to a nuclear ship entering the Port of

OFFICIALS WHO GAVE SUBSTANTIVE REPLIES
TO THE HEALTH QUESTIONNAIRE

Australia

Director-General of Public
Health
Winchcombe House
52 Bridge Street
Sydney, New South Wales

Chief Health Officer
Commission of Public Health,
Victoria
295 Queen Street
Melbourne, Victoria

Director-General for Health
Department of Health
Canberra, A.C.T.

Canada

Director, Health Services
Department of National Health
and Welfare
Jackson Building
Ottawa

Senior Medical Health Officer
Metropolitan Health Committee
City Hall
453 West 12th Avenue
Vancouver

Chile

Minister of Public Health
and Social Prevision
Republica de Chile
Santiago

Cuba

Minister of Health and
Social Assistance
Republica de Cuba
Havana

Eire

Minister for Health
Department of Health
Republic of Eire
Dublin

France

Directeur, Contrôle Sanitaire
Aux Frontières
Direction de la 2^{me} Circon-
scription
Ministère de la Santé Publique
et de la Population
Chaussée du Quai d'Escale
Le Havre

Directeur, Contrôle Sanitaire
Aux Frontières
Direction de la 5^e
Circonscription
Ministère de la Santé Publique
et de la Population
Esplanade de la Tourette
Marseille

Germany

Der Senator für das Gesund-
heitswesen
Hornerstrasse 70 (Ansgarhaus)
Bremen

Präsident
Gesundheitsbehörde
Freie und Hansestadt Hamburg
Tesdorpfstrasse 8
Hamburg 13

New Zealand

Deputy Director-General (Admin.)
Department of Health
Wellington

Republic of the Philippines

Secretary of Health
Republic of the Philippines
Manila

Acting Commissioner of Health
Department of Health
City of New York
125 Worth Street
New York 13

Union of South Africa

Secretary for Health and
Chief Health Officer
for the Union
Department of Health
Pretoria

Sanitary Engineer Director and
Assistant Regional Engineer
Region 2
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U.S. Department of Health,
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United Kingdom

Chief Medical Officer
Ministry of Health
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Acting Director of Public Health
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Department of Public Health
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United States

Medical Officer in Charge
U.S. Department of Health,
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Public Health Service
U.S. Quarantine Station
Curtis Bay
Baltimore 26

Health Commissioner
Health Department
City of Boston
Haymarket Square
Boston 14

Medical Director
U.S. Department of Health,
Education and Welfare
Public Health Service
U.S. Quarantine Station
New Orleans (Algiers)

Director
Division of Engineering and
Sanitation
Department of Public Health
Chatham County
Savannah

Director of Public Health
Seattle-King County Depart-
ment of Health
Room 1500 Public Safety
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APPENDIX C

A PUBLIC INFORMATION PROGRAM FOR GREAT BRITAIN

This Project has made the assumption that it could be of assistance to the Maritime Administration in its dealing with other agencies in arranging for the tour of N. S. SAVANNAH. Accordingly it has prepared this Appendix which sets forth the considerations involved in making a maximum impact on the people of Great Britain as a result of the visit of the SAVANNAH. The Appendix is directed particularly to the Maritime Administration's member on any governmental planning group which may be set up. It will, we think, advise him and permit him to be more influential in planning and administering the demonstration abroad. To set the stage for the construction of the program, we begin with an account of the current British interest in and opinion about nuclear shipping. There follows a report on where this interest is greatest, who are the prominent people in the interested groups, and how they can best be reached as a part of the public information program. Then we explain the present state of the mass media in Britain and conclude with some suggestions for a more popular and general public information program for Great Britain.

SOME ASPECTS OF NUCLEAR SHIPPING IN BRITAIN*

The British approach to nuclear-propelled shipping is one of high interest and equally high caution. The interest grows out of the frequently mentioned realization that Great Britain as a trading nation must have a modern merchant marine and that it is dependent to a great degree on imported fuels to operate that merchant marine as well as its manufacturing both for export and the home market. The caution derives from doubts about the economic advantage of present nuclear propulsion devices and about their safety. The result is that British shipbuilders and shippers, as well as the government, are supporting research into nuclear shipping but do not appear to have any expectation that a British nuclear-propelled merchant vessel will very soon be on the seas.

The principal British research effort in the nuclear shipping field is carried on at Harwell at the British Atomic Energy Authority laboratory by researchers from governmental staffs and from the British Shipbuilding Research Association. The latter organization has more than ten persons at work at all times at Harwell. Some of these work at Harwell for short periods of time and then bring back to their shipping and ship-building

*The following material is based on information secured through interviews and from publications in England late in July.

firms knowledge of the nuclear propulsion work in process. They will constitute a pool of trained manpower for an eventual nuclear-powered merchant vessel.

This research, however, lacks the highest priority reserved for large central nuclear power stations. Nuclear propulsion for shipping ranks in priority below small land-based power stations.

Because much of the results of this research is available in papers of the United Nations conference on atomic energy, it will not be summarized here. (See United Nations Documents A/Conf. 15/P/72, P/265, P/266 and P/301.) Nevertheless, certain points should be emphasized. One is the seriousness and determination with which the problem of nuclear propulsion is being approached in the United Kingdom. A second is the interlocking of government and industry in these efforts.

The existence of the research team at Harwell and the publication of the United Nations documents in itself reflects the importance given the subject. Moreover, the directorial personnel of the team has had advanced scientific training and is knowledgeable both in the atomic energy and shipbuilding fields. These individuals and the British Shipbuilding Research Association can be expected to have a leading role in the eventual development of nuclear shipping in the United Kingdom.

The approach of the researchers in the United Kingdom is most concrete. They are highly interested in specific problems of nuclear shipping and have followed the announcements of work on the N. S. SAVANNAH with close attention and comprehension. They are perfectly willing, as is the shipping industry generally, to accept the idea that nuclear shipping someday is a certainty. But they are unprepared to think that it will be a certainty in 1960, believing that another ten years will be necessary before nuclear shipping could become economic.

Because of their concrete interest in specific nuclear shipping problems and their information on the N. S. SAVANNAH, these researchers and members of the British Shipbuilding Research Association who are especially concerned with nuclear shipping show a high interest in the forthcoming visit of the SAVANNAH. They want especially to see how the vessel handles, how its reactor is maintained, how the personnel is organized and how safety is promoted. In a sense, they must be hoping that they can use the SAVANNAH's experience as a basis for their own plans. If the SAVANNAH is considered part of the "Atoms for Peace" program, the British approach fits perfectly, for that program aims at sharing information and experience.

At the moment, one question appears to overshadow all other technical and economic problems in the minds of the British researchers and shippers. That is the question of nuclear fuels. It is believed now in Britain that enriched uranium fuel will be a necessity for successful nuclear propulsion (and papers at the Geneva conference indicate that even for large land-based reactors natural uranium cores have been proving less than fully satisfactory). The only reliable source for enriched fuels is now the United States, although it is expected that eventually the military production facilities in Britain may furnish some. The price of the American fuels now is considered so high as to make nuclear shipping doubtful economically. Perhaps the only sort of vessels envisaged at the moment which could operate economically are very large tankers.

The fuel problem leads directly back to the point made above as to the interlocking of industry and government in the nuclear shipping field in Britain. The United Kingdom Atomic Energy Authority controls production and distribution of nuclear fuels in its territory. In shipping uses some nuclear fuel can be expected to go under private control even if the nuclear-powered ships are subsidized in operation and construction. It can be anticipated therefore that the entire question of nuclear shipping in Britain will have certain political overtones and that it will frequently be discussed in Parliament as well as in shipping circles. Moreover, the diplomatic overtones are obvious, for the British government would have to obtain enriched fuel from the United States, a process which implies diplomatic negotiations.

British shipping interests are already well aware of this set of tangled factors and are alive to the political problems involved. While it would be perhaps far too strong to state that they are exerting pressure on the government, their links with the Atomic Energy Authority, the Admiralty, and the Department of Transport will give them an important share in determining governmental policy. It is possible that the visit of the SAVANNAH will influence their views in such a way as eventually to shape governmental policy toward nuclear shipping.

British opinion, insofar as it has been expressed, shows little alarm over the safety prospects of nuclear energy generally, but specialized groups with more direct concern in nuclear energy than has the undifferentiated public, show much sensitivity to the problem. The recent reactor accident at Windscale has, if anything, broadened consideration of safety questions.

The shipping and shipbuilding groups take the position that not a great deal is yet known about the safety of reactor operations. Shipping reactors particularly would have to have additional automatic safeguards with control and shutoff systems

which were, as one writer put it, "foolproof, fail safe and operate under conditions at sea and are not put out of action by collision or stranding."

Furthermore, there are the usual hazards of collision, fire, grounding, and foundering which apply to any merchant vessel. British shipping groups show considerable anxiety that an accident with a nuclear-propelled vessel would produce ancillary hazards of radioactivity in the waters adjacent to the accident. It is likely that research on the measure of hazard involved has already begun in England.

The visit of the NAUTILUS during August, 1958 shows how seriously the safety problem has been taken by the British government. Land-based reactors in Britain are deliberately placed in lightly populated areas. When the NAUTILUS visited Portland, an official statement by the United States indicated what had been earlier understood as the British policy. Nuclear-propelled submarines were to be directed to ports around which the population density resembled that of land-based reactor sites. Such ports are few and not centrally located. The implication of this policy for the visit of the N. S. SAVANNAH is most grave, for unless a change is made in the policy, the merchant vessel would be barred from London, Liverpool and Southampton, the three most attractive ports for a visit. While there is no question that leaders of the British shipping and shipbuilding industry would enthusiastically travel to Portland or elsewhere to see the SAVANNAH, few members of the general public could be expected to do so and the extent of press coverage might quite likely be lighter than a visit to a less isolated part would produce. If such permission to visit a major port could be obtained, the visit of the ship would then constitute an important step forward for nuclear shipping. It is clear that the negotiations prior to the visit of the NAUTILUS would be most instructive in this regard, and it is suggested that information on them be obtained if possible.

From this discussion, it can be concluded that a visit by the N. S. SAVANNAH would be regarded by British shipping leaders as having the highest importance. This importance is enhanced by the very caution with which the industry and government have approached nuclear shipping.

THE SPECIALIZED TARGETS

Faced with an imminent shortage of fossil fuel, British government, industry and business have become keenly aware of the importance of nuclear energy and of the potential use of nuclear energy for marine propulsion. This interest furnishes the basis of a successful public information program in connection with the visit of the SAVANNAH, for it will not be necessary

to search out "clients" for the visit. Instead, they have made themselves known.

The words of Kenneth R. Pelly, M. C., President of the Chamber of Shipping of the United Kingdom, provide a gauge of this interest. In his presidential address on February 23, 1956, he said:

... I feel sure that we can look forward to nuclear power. Experiments are already taking place and land stations are being completed; it may well be with us for ships before many years have passed. To realise that this is no idle dream, one has only to look back to the end of last year which brought with it news of a big expansion in atomic energy for power production and ship propulsion with, for Britain, cheaper atomic power and new types of reactor furnaces. Within the last few weeks the Lord Privy Seal publicly announced that the Atomic Energy Authority was collaborating with the British Shipbuilding Research Association in a joint study of the feasibility of using nuclear energy for marine propulsion. It is satisfactory that the Chamber of Shipping, the shipbuilders, the Admiralty, the B. S. R. A. and Lloyd's Register are in touch with each other on these and other developments. (Reference: Chamber of Shipping of the United Kingdom, Annual Report, 1955-56, London, Witherby and Co. Ltd., 1956, p. 261.)

Mr. Pelly not only was testifying directly as to the interest of British shippers in nuclear energy but also was indicating how closely the official United Kingdom Atomic Energy Authority and various trade organizations had been cooperating.

This cooperation began in 1955 when a team from the British Shipbuilding Research Association (hereafter called B. S. R. A.) and the Parsons and Marine Engineering Research and Development Association (hereafter called PAMETRADA) started work at the Harwell Research Establishment of the Atomic Energy Authority on the possibilities of applying nuclear energy to marine propulsion of merchant ships. This group is called the Merchant Ship Propulsion Group and works in the Reactor Division, mainly on feasibility, including economic and technical aspects. (Source: United Kingdom, Department of Scientific and Industrial Research, Report for the Year 1955-56, HMSO, 1957: Cmnd. 213, p. 193, and J. V. Dunworth, "Nuclear Energy for Ship and Submarine Propulsion," Annual Review of British Industry, 1957: "The Atomic World," The Financial Times, July 1, 1957, pp. 28-29.)

The Suez Canal crisis in 1956 gave considerable impetus to the developing interest in atomic propulsion, for the closing of the canal emphasized British dependence on transportation of liquid fossil fuels. One immediate suggestion was the construction of very large tankers as an alternate to smaller tankers

which had to use the canal in order to operate economically. The United Kingdom government reacted to such suggestions, which often included advocacy of nuclear propulsion for the large vessels, by the appointment of Admiral G. A. M. Wilson as the Royal Navy's first Deputy Engineer-in-Chief (Nuclear) to foster nuclear development in both the Royal Navy and the merchant marine. The Admiralty established a committee on which shipbuilding and marine engineering industries were represented. At the same time, construction of a reactor to propel a nuclear submarine began. Four British companies announced in July, 1957 that they would undertake studies of marine nuclear propulsion and the construction of nuclear-powered tankers. Hawker Siddeley, Ltd. and John Brown and Co. formed Hawker Siddeley John Brown Nuclear Construction Ltd., while Babcock and Wilcox Ltd. and Cammell Laird and Co. agreed to work in cooperation without forming a separate firm. (Source: British Information Services, Reference Division, Nuclear Energy in Britain, New York, 1957, I. D. 1275, October, 1957, pp. 44-45.)

A keen British interest in the economic characteristics and possibilities of the SAVANNAH can be predicted. Mr. Dunworth, who is head of the Reactor Division at Harwell, writes:

A large nuclear-powered merchant ship could be built to obtain operational experience and would be roughly competitive with a conventionally powered ship even assuming no increase in oil prices relative to nuclear power costs. The position with regard to small ships with powers of appreciably less than 20,000 shaft horsepower is not so obvious. (Source: Dunworth, Financial Times, July 1, 1957.)

Dr. J. Ramsay Gebbie, vice-president of the Institution of Naval Architects, urges that an atomic merchant ship be built in Britain whenever research shows a reasonable chance of technical and economic success which is "not just yet." (Source: Atom Industry, published monthly in London at 132-134 Fleet Street, London, EC 4, February, 1958, and Financial Times, January 10, 1958, p. 9.) It thus appears that the SAVANNAH would be of the highest interest to shipbuilders and to certain engineers and scientists connected with the Atomic Energy Authority.

At the present time, a Committee on "Safety of Nuclear Ships" appointed by the Ministry of Transport and Civil Aviation is examining the various marine safety problems which will arise as a result of the introduction of nuclear propulsion in merchant ships. British dock and harbor authorities are participating in the work of the Committee which should lead to uniform rules and regulations governing nuclear shipping in England.

The mention of several organizations in the foregoing discussion implies that British efforts to utilize nuclear energy for ship propulsion are highly centralized and are employing

the great degree of professional organization among British engineers and scientists as an easy means of communication to specialists. The following discussion will deal with the most important of these organizations.

As we have explained, the Atomic Energy Authority's Research Establishment at Harwell, which is naturally the focus of research activities on reactors, has a Reactor Division where research bearing directly on ship propulsion is under way. The Merchant Ship Propulsion Group in that Division includes representatives of B. S. R. A. and PAMETRADA.

B. S. R. A. includes both governmental and private organizations. The following organizations send members to the B. S. R. A. Research Board: the Shipbuilding Conference, the National Association of Marine Enginebuilders; the General Council of British Shipping; Lloyd's Register of Shipping; the Institution of Naval Architects; the Institution of Engineers and Shipbuilders in Scotland; the North-East Coast Institution of Engineers and Shipbuilders; the North-East Coast Institution of Naval Architects; the Institute of Marine Engineers; the Admiralty; the Ministry of Transport; the Department of Scientific and Industrial Research. (Source: Sir Archibald Hurd, ed., "Shipping World" Year Book and Who's Who 1954-55, London, "The Shipping World" Offices, 1954, p. 949.)

PAMETRADA is an association of private firms in the shipbuilding industry and includes members appointed by the Department of Scientific and Industrial Research, Admiralty, B. S. R. A., Lloyd's Register of Shipping, the Ministry of Transport and the General Council of British Shipping. It has important research functions. (Source: "Shipping World" Year Book, pp. 971-72. A list of member firms and other personnel is included.) The PAMETRADA research station is located at Wallsend, Northumberland.

Lloyd's Register surveys and classifies ships for safety and operational efficiency and gives technical advice all during building and operations. An underwriter accepts a satisfactory Lloyd's classification as a guarantee that he may accept a risk. (Source: United Kingdom, Central Office of Information, Britain: An Official Handbook, London, HMSO, 1956, p. 210.) Lloyd's Register comprises representatives from a large number of private shipping and shipbuilding organizations and also government members.

The Chamber of Shipping of the United Kingdom consists of local shipowners' societies, protection and indemnity clubs, and owners of tonnage who are members directly. Its numerous committees and its Council include the most eminent leaders of the shipping industry in Britain. It maintains liaison with important

business and commercial groups in the United Kingdom and has an active press department. (Source: Chamber of Shipping of the United Kingdom, Annual Report, 1955-56, passim.)

The Department of Scientific and Industrial Research, a British government agency which grants considerable sums to British industry for research, maintains the National Physical Laboratory at Teddington, Middlesex. This laboratory includes a ship laboratory, which gives attention to resistance to propulsion, ship models, pitching behavior and other marine engineering problems. A hydrodynamics laboratory is under construction. This department also has a physics division and its nuclear physics committee includes many of the eminent British scientists in the field of nuclear energy. (Source: United Kingdom, Department of Scientific and Industrial Research, Report for the Year 1955-56, p. 87.)

The interests of the many British engineering and scientific societies, as they bear on nuclear energy, are coordinated by the British Nuclear Energy Conference. This organization, which appears to be most active, is a permanent conference of the following major societies: the Institution of Civil Engineers; the Institution of Mechanical Engineers; the Institute of Physics; the Institution of Chemical Engineers; the Iron and Steel Institute; and the Institute of Metals. Sir John Cockcroft, head of the Harwell Laboratories is Chairman of the Conference, and Alexander McDonald is Secretary. It publishes a quarterly journal. (Source: William Davidson, ed., Nuclear Power Year Book and Buyer's Guide, 1957, London, Rowse Muir Publications Ltd., 1957.)

A counterpart of the Nuclear Energy Conference coordinates the activities of trade associations. This organization is the Nuclear Energy Trades Association Conference, which includes: the British Chemical Plant Manufacturers' Association; the British Electrical and Allied Manufacturers' Association; the British Engineers Association; the Scientific Instrument Manufacturers' Association; and the Watertube Boilermakers' Association. (Source: Nuclear Power Year Book.)

In addition to these coordinated bodies and high specialized organizations which have moved directly into the field of nuclear energy, a large number of important learned and technical societies flourishes in Britain. Their memberships can be expected to take a considerable interest in the arrival of the ship. These include the following selected organizations: the British Association for the Advancement of Science; the Royal Institution of Great Britain; the Royal Society; the Royal Society of Arts; the Royal Society of Edinburgh; the Society of Visiting Scientists Ltd.; the Faraday Society; the Physical Society; the Chemical

Society; the Royal Institute of Chemistry; the Society of Chemical Industry; the Association of Engineering and Shipbuilding Draughtsmen; the Institute of Fuel; the Institute of Marine Engineers; the Institute of Transport; the Institute of Welding; the Institution of Electrical Engineers; the Institution of Engineers and Shipbuilders in Scotland; the Institution of Naval Architects; and the Society of Consulting Marine Engineers and Ship Surveyors.

All of these institutions have publications, some of which are of major importance in their fields. Many of the publications are quarterlies and are therefore very slow as communicative media. Most of these organizations and those discussed earlier have annual meetings at which papers are read and discussed. (Source: Scientific and Learned Societies of Great Britain, 58th ed., London, George Allen and Unwin, 1956.)

Finally, a number of trade and technical journals, not necessarily attached to any of the above organizations, are published regularly in Britain and enjoy a very considerable circulation among the scientific community and among those interested in the development of nuclear energy. These include the following: Atomics and Nuclear Energy; Journal of Inorganic and Nuclear Chemistry; Journal of Nuclear Energy; Nature; Nuclear Power; Nuclear Engineering; Applied Atoms; Atom Industry; Atomics; Progress in Nuclear Energy; and Progress in Nuclear Physics. (Source: Nuclear Power Yearbook.)

THE SPECIALIZED INFORMATION PROGRAM

Environmental factors provide postulates from which an analysis of a possible information program in Great Britain has been developed. These factors, stated generally, are as follows:

1. The British people speak English and that language is common to the entire nation.
2. Great Britain is highly industrialized.
3. British industry includes shipping and shipbuilding facilities of such magnitude as to make it one of the world leaders in these fields.
4. The British industrial plant includes outstanding nuclear energy installations and research projects.
5. British industry and government show considerable interest in nuclear propulsion for ships.
6. Highly centralized and organized groups interested in nuclear propulsion for ships are active in Great Britain.

Two important assumptions underlying this analysis should be made clear from the outset. The first of these relates to the scope of the analysis. It is assumed that a maximum public relations effort will be made in the United Kingdom. This assumption is necessary to present the maximum number of choices of particular features of a program, some of which would have to be omitted under a fixed budget. The second assumption limits the targets of the public information program. It is assumed that the most rewarding targets for a public information program in Britain are the leaders of technical and scientific groups, including members within and outside of government, which have exhibited an interest in nuclear ship propulsion or who could logically be assumed to have an interest in some of the specialized problems involved in the construction and operation of the SAVANNAH.

Any public information program should be based on an explicit determination of how much of its resources will be devoted to reaching specialized audiences and how much to undifferentiated audiences. Specialized audiences have a leadership function in the undifferentiated public, for it is to the expertness of its members that mass communications media must look for authentic information. It follows then that information provided to specialized groups will have a multiplied effect and that part of it will reach the undifferentiated public. But probably no spectacular impact on the great mass of Britishers can be achieved through this route. Yet a long-lasting effect, based on understanding in the groups to whom understanding is vital for professional existence and operation, can be built up. In the long run, it is probable that such understanding would produce a generalized opinion favorable to the American program of peaceful uses of nuclear energy and, moreover, pave the way for maximum penetration of news into the general public when the ship visits a British port.

The foregoing summary of the principal British shipping and nuclear energy organizations points up several important facts. First, persons and organizations interested in nuclear ship propulsion are highly organized. Second, existing organizations differentiate persons and groups with interests specialized on nuclear propulsion from more generalized groupings. Third, multiple channels of communication exist. Fourth, a background of alertness to new developments in nuclear energy and ship propulsion exists.

Every effort should be made as soon as possible to secure cooperation of these groups and to keep them informed as to the progress of constructing the SAVANNAH. This high degree of centralization suggests two especially important means of informing these groups before the SAVANNAH calls. The first is a series of formal calls on high officials of the groups by an authorized representative of the Maritime Administration and the

Atomic Energy Commission. This representative would seek information and advice as to the sort of program which would be most interesting to British groups. He would, at the same time, officially offer whatever information was available at that time and attempt to establish permanent contact so that information could be given the organizations.

The second means of informing these groups would be through the presentation of technical papers at their formal meetings. Arrangements for the presentation of such papers, if they could be prepared, could be made in the course of the formal calls recommended above. Such papers should exhibit the highest possible technical competence and should be clearly of novel content and based securely on the desire to make public every possible fact regarding the construction and operation of the SAVANNAH. It can be expected that such papers would be reprinted in the many prestigious journals published by groups noted here. An important by-product of such publication would be the dissemination of information about the SAVANNAH throughout the world, for these journals are followed with considerable interest by researchers and technicians in other countries.

Another opportunity not to be neglected comes with such events as the nuclear energy conference sponsored by the Federation of British Industries on April 10-11 at Eastbourne. (Source: Atom Industry, February, 1958.) Such conferences not only offer an opportunity to inform one of the most interested British publics but also serve to identify the leaders. No doubt another such conference will be held next year. It is suggested that a representative of Maritime Administration-Atomic Energy Commission (hereafter MA-AEC) be present.

Recommending these two particular means of contact implicitly suggests that high priority and importance should be given to face-to-face methods of public information in Britain. Such methods are particularly appropriate where no important language barrier exists, where cooperation is an old habit and where centralization of interests has reached such a high degree. To achieve maximum effectiveness for such contacts during the visit of the ship, they should be prepared well in advance. During the visit of the ship, they should receive highest priority.

It follows then that during the visit of the ship a large number of personal contacts should be scheduled. These might take the form of small symposia, lectures, social gatherings, luncheons, dinners, private conferences, tours of the ship, and ceremonials. This in turn implies that sufficient staff of appropriate capabilities will be available aboard the SAVANNAH during the visit.

Emphasizing the importance of face-to-face contact does not imply, however, that the technical and scientific press should be neglected. On the contrary, full information should be furnished, and can be expected to have wide influence. This information broadly will consist of two separate types. The first of these will be news items, e.g., the launching of the ship, the first sea trials, the date of arrival in Britain, etc. These should be delivered speedily and, if possible, in advance of the event, to the appropriate publications. The United States Information Agency might well take on much of this work. The second type of information is technical and scientific and will deal with the ship as the substance of scientific or technical interest. Many of the trade publications, which would use such information, are monthlies. Therefore, such technical items should be delivered with the expectation that their publication will take at least a month. Both types of information should be accompanied by appropriate still photographs, illustrating as far as possible the contents of the articles.

Radio, television and entertainment film media reach the technical and scientific groups only superficially and are only appropriate for wide distribution of simple information about the SAVANNAH. The only exception to this statement is perhaps the MA-AEC film which is being planned. If it contains, or can be edited to emphasize, detailed technical information, it might be shown during the visit of the ship or immediately before. If it is prepared in a special version to illustrate the solution of specific problems, it might be appropriate for showing as a basis of discussion in a small specialized group. Any detailed planning of such showing, however, must await fuller information on the nature and content of the film.

As far as possible, the relations with the scientific and technical press should be planned with the advice and cooperation of appropriate personnel in Britain. The American Embassy's new scientific adviser should be consulted for suggestions. Similarly, it would be useful to consult the Director of Public Relations of the United Kingdom Atomic Energy Authority and the Press Departments of shipping and technical organizations. Contact could be made with the editors of trade and technical journals in an effort to elicit in advance their requirements.

A few general comments might be made about press relations techniques in Britain. British publications generally are scrupulous about observing embargoes and their writers prefer to have advance stories so that they can supplement them with their own research. They do not, however, usually resent efforts of a press relations officer to point out what are likely to be the most significant aspects of a story. As is generally true of the trade and technical press throughout the world, British specialized press writers are themselves well informed specialists and should

be honored with releases and other prepared material which reach a very high standard. News stories should be released generally on an equal basis for all. Special articles can be "planted" exclusively or requests for them can be stimulated through contacts with editors. Such special articles, which could be written by MA-AEC technical experts or by freelance writers hired on contracts, could be offered to selected publications. But if any are made available, it must be anticipated that articles of equal weight might have to be prepared for all technical journals.

The public information program for Britain can conveniently be divided into phases based on time periods. Phase I would be the preparation stage, beginning during the year before sailing and reaching up to the departure from the United States. Phase II would be the actual sea voyage. Phase III would be the hours of arrival in England. Phase IV would be the stay in Britain. Phase V would be departure and voyage to the next port of call. Phase VI would be the follow-up period.

During the first phase, contacts and preparation for further contacts during the visit should begin. This should be the time of consultation with officers of organizations, preparation of guest lists for invitations to the ship, publication of technical articles, attendance at meetings of technical societies and advance stories for general readership. During the last month, general releases should spread the information available as to the arrival of the ship in Britain, the length of stay and the activities planned. It should be anticipated that an increasing number of inquiries will be received from organizations and from the press as this period draws to an end. It is recommended that a liaison officer capable of dealing with such inquiries be available in Britain during the last three months, at least, of this phase. In addition, it is recommended that special attention be given the meetings of specialized societies interested in nuclear energy during this period and that whenever possible papers dealing with the SAVANNAH be presented. A register of contacts should be established for future use.

Phase II, the sea voyage, would provide an opportunity to feed the specialized trade press with first-hand material on the operation and sea capabilities of the SAVANNAH. It probably would be well worthwhile to invite British correspondents of trade journals, as well as perhaps the general press, to come to New York and make the voyage as guests of the United States. These correspondents, who work for monthlies, would not need elaborate communications facilities. If they were not offered passage to New York but required to find their own transportation to the point of departure, the number of applications would quite likely remain small. This point could, however, be

determined during Phase I consultations. Similarly, it probably would be wise to inquire as to the desires of outstanding figures in the shipping and scientific worlds to make the voyage. This also could be done during Phase I. In view of the limited passenger capacity of the SAVANNAH, the plan to carry guests as outlined here might prove both physically impractical and politically unwise because of possible Congressional and other objections to offering free passage to foreign nationals. In such a case, it would be necessary to work out "pooling" arrangements for press and radio coverage. Such arrangements should be worked out well in advance and it is recommended that a decision in principle covering this question be made as soon as possible. Similar arrangements should be made for still and motion picture photographers. In any case, MA-AEC should have still and motion picture photographers aboard during Phase II, and be prepared to furnish still photographs and motion picture footage of the voyage to persons with legitimate interest.

Phase III, the arrival in port, would consist mainly of welcoming ceremonies. This phase would be of little interest for its technical content, although the trade press would cover it as a matter of news. Trade press representatives should be treated on this occasion as part of the general press. It could be anticipated that some leaders of the scientific community, notably those of the Atomic Energy Authority and the Ministry of Transport and Civil Aviation would be invited to participate in whatever ceremonies took place. This phase, it is suggested, should be made the object of a special study under the guidance of an expert who has had experience with the ceremonial entrance of new ships into port.

Phase IV, the stay in port, would be the most important for the specialized scientific, technical and industrial groups interested in nuclear propulsion of ships. Specific planning for the individual discussions and luncheons and dinners should be based on the investigations performed during Phase I. Invitations should be cleared with appropriate British authorities and by the American Embassy. Presumably, the Embassy would issue the invitations to most guests, although negotiations to secure appropriate British speakers, if desired, might be carried on by a representative of MA-AEC.

Symposia represent a desirable feature in a maximum public information effort. While they would require a large number of specialists, they might nevertheless prove possible in the first stop or two of the ship, particularly if these are to be Great Britain and France. Certainly they would prove excellent newsmakers if the information presented and discussed in them had novelty and intrinsic importance. At a somewhat lower, less elaborate level would be lectures and below them, question and answer periods. An adequate in-port program might be built up

of a combination of all three of these kinds of gatherings. If face-to-face contact is to be emphasized, however, it will be necessary to have meetings of some sort aboard the ship.

All sessions should be open to the general and specialized press. Some accreditation scheme will be necessary, and it is recommended that it be planned well in advance. This could be worked out by an MA-AEC representative or by the American Embassy in cooperation with the Atomic Energy Authority. Again, it will be necessary to raise this question with the Atomic Energy Authority in Phase I. Although accreditation should be completed during Phase II, it will be necessary to have facilities for emergency accreditation. The press staff traveling with the SAVANNAH should be augmented during this phase by appropriate personnel from the United States Information Service in London and the American Embassy. Similarly, the Scientific Adviser of the American Embassy should have an important role during this period in assisting experts aboard the SAVANNAH.

During this phase, major demands for literature can be anticipated. (Comments on non-specialized literature will be found below.) Each visitor to the ship should receive an inexpensive, attractive souvenir brochure. This should be designed to give elementary facts about the ship and its reactor but should contain no sophisticated information. All important persons invited specifically to tour the ship should receive appropriate background information. If budgetary limitations permit, copies of the papers presented at the symposium of July 30, 1957 at Washington (U. S. Atomic Energy Commission, Nuclear Powered Ships for American Ship Operators, Oak Ridge, 1957, TID 7539) would be appropriate for distribution to them prior to the visit. Any additional studies of this nature also might be made available. Reprints of important papers published during Phase I also might be included. Aboard the ship, these papers should be available to visitors invited to the ship. In addition, a detailed booklet to accompany the tour should be prepared. This might contain an attractive illustration of the reactor by means of overlaid plastic pages. An example is contained in Nuclear Engineering, 2, 11 (February, 1957). This booklet should be distributed free of charge to special guests and might be sold to casual visitors.

The recommendations on distribution of information materials imply that a stock of publications would be carried on the SAVANNAH. Indeed, a rather complete documents service, which would care for the stock and deal with requests, probably would be an ideal arrangement. If the officers concerned with such work had special training on the problems of SAVANNAH, they could be of great assistance to visitors by answering questions and finding appropriate printed material. It also would be useful to carry prints of any available films for lending to

interested technical and scientific groups and to television outlets.

Whether to charge for materials is a question which frequently arises in connection with public information programs. Many public information specialists have concluded from experience that anything which is offered free, beyond the simple brochure mentioned above, quite likely will be wasted on most recipients. Therefore, it is suggested that visitors to the ship who are not among the specially invited guests, be charged nominal fees for material they request. These fees could scarcely cover full publication costs of some of the more expensive studies which would be pertinent to the ship, but the fact that anything is charged will tend to channel material to the people who could most effectively use it. Nevertheless, it would be unfortunate to cut off any person from information merely because he could not pay immediately for documents. Therefore, if it were possible to arrange for it, a small reference library where documents and publications on the ship could be inspected, might prove to be a most useful device to spread information. It could be cared for by the documents service personnel. It is recommended that establishment of a small reference library be considered.

For the general press, aside from the technical documentation, a mimeographed press release of about 2,500 words should be prepared as a brief guide to the ship and to its significance. This release should contain general statistics, a statement of the purpose of the ship and a specific invitation to make detailed inquiries of press relations officers. It should be made available as a matter of routine to each accredited correspondent.

Films, television and still photographers can be expected to show some interest in the activities during Phase IV if many eminent figures attend. It is recommended that an attempt should be made to secure an understanding as to the periods during which special lighting is to be used by any of these media. The presence of many teams of photographers can be most disturbing to discussions. One possibility is to limit them to working during the first and last five minutes of discussions and to undertake to arrange special interviews as requested. Those agreements should be secured during Phase I, Phase II and Phase III.

It will be noted that some events in the above discussion are reserved for specifically invited guests. This should not preclude visits by ordinary members of associations which have a special interest in the scientific, technical and industrial problems of nuclear propelled shipping. On the contrary, they should be invited to visit the ship by means of the publications of their associations. They should be encouraged to take the

tour through the ship. If tickets for special tours are to be distributed to members of associations, it will be necessary to set up a staff to handle the expected mail. This might well be done by contract with a private British firm and handled as routine by them until tickets are exhausted. A careful determination of the ship's tour capacity would, of course, be required as a basis for ticket distribution. It is assumed that the general public will show a great interest in visiting the ship and that times will be set aside for tours. That problem, however, is outside the scope of this study.

One final comment is appropriate. Material distributed in Britain and probably in most other parts of the world should be attractive and clear but should not be luxurious or suggest "high-pressure" advertising. A good assumption to make is that specialists know how to read and do not need to be lead by "gimmicks."

Phase V, the departure of the SAVANNAH for the next port of call, probably will be of little interest to the specialized publics dealt with here. It is possible that requests might be received from journalists or important scientists, technologists or industrialists to travel on the ship for a short period. They might be invited aboard for this phase.

Phase VI, the follow-up period, would be a fruitful time to secure further publication of scientific papers dealing with the SAVANNAH. The United States Information Service in London or the American Embassy might be requested to undertake an impressionistic evaluation of the program as guidance for further activities. A similar request might be made of the United Kingdom Atomic Energy Authority and other cooperating groups. It probably would not only be expensive but rather unfruitful to attempt an evaluation by public opinion polling techniques. If an evaluation is undertaken by MA-AEC, it probably should be based on the number of visitors, the number of inquiries, the number of pieces of literature distributed and the contents of editorial comment. In any case, some effort should be made to maintain a running record of news stories, articles and comments which appear on the SAVANNAH from Phase I to one year after the end of Phase IV.

CHARACTERISTICS OF BRITISH MASS MEDIA

In order to provide a setting for the British general public information program, this section will set forth the characteristics of British mass media through which the general public will become aware of the SAVANNAH and its mission. We shall start with the newspapers.

The British people rank among the world's leading newspaper readers. Some 31 million copies of 137 newspapers are sold daily in Britain, enough to give every two Englishmen a daily newspaper.

Despite the considerable number of newspapers appearing in Britain, the London dailies circulate everywhere. Eight of 15 newspapers, printed and edited in the capital, constitute a national press. (Some of the larger papers have provincial printing plants but depend almost exclusively on the London offices for the news.) Of these, only one, the influential and prestigious Times has well below a million readers, selling some 250,000 copies daily. At the other end of the scale, the keen, brash Daily Mirror, a tabloid which serves as a model of the popular (not to say "yellow") press throughout the world, sells more than five million copies. Close behind it in the four-million class is the chauvinistic Conservative Daily Express and then rather further behind is the self-consciously moral Daily Mail, which gives its Conservative opinions to more than two million purchasers. Grouped together in circulation are the tabloid Daily Sketch (under a million), the Conservative, informative Daily Telegraph (more than a million), the Liberal News Chronicle (1,300,000) and Labour's Daily Herald (under two million). (The Communist Party publishes in the ineffectual Daily Worker which has never reached the 100,000 mark.) A specialized paper published in London is The Financial Times, which is extremely well-informed and influential in business circles.

Among the many provincial newspapers, which have a reputation for being well-read and therefore have no difficulty in getting advertising, some have political influence and one of them has a national circulation. The latter is the Manchester Guardian, an informative and responsible journal of independent political views and only half the circulation of the Times. Typical of the influential and responsible local press are the Scotsman of Edinburgh and the Glasgow Herald. They have a keen interest in political and economic stories and maintain able correspondents in London. A good many other provincial papers belong to chains, the most important of which are the following: the Northcliffe group (Daily Mail), 11 dailies, nine weeklies and a Sunday; the Kemsley group, 12 dailies, five weeklies, six Sundays; the Westminster group, 13 dailies, 33 weeklies, one Sunday; the Provincial group, four dailies, 12 weeklies; and the Harmsworth group, four dailies, 11 weeklies. The Sunday papers published by these chains circulate from London. All of them maintain correspondents in London. The provincial newspapers on the whole can be expected to give good play to important national stories and to emphasize local stories. If the N. S. SAVANNAH called at the home town of a provincial paper, it would certainly get good coverage, but it probably would get good provincial coverage through the news agencies and the London correspondents of the provincial papers.

There should be no illusion about the character of the British mass circulation press. Without exception, it contains

heavy copy intended to entertain and nothing more. This practice perhaps reaches its high point in the three London afternoon papers--the Star, the Evening News and the Standard--which rarely contain any "hard" news not of bulletin character. For the rest, their few pages contain all sorts of features, including serial stories. (Incidentally, these papers circulate very little outside of the London area, in which they have some three million readers.) Not even the most popular of the London dailies, despite its enormous circulation, is physically a big paper by American standards: the Daily Mirror usually has a quarter of the pages put out by the New York Daily News. What they lack in space, they make up in technical proficiency. Sensation blazes forth from the pages of all the high circulation newspapers, even if it is cloaked in the middle class morality of the Mail, Herald and News Chronicle. The "oh, gee whiz!" story, expected to leave the reader stupefied and gaping with amazement, always appears. The classic formula that money, crime and sex sell newspapers never is forgotten in most of these sheets. Pictures heavily pound home the point. Stories about personalities and animals get heavy play. And sports! Dog races, football, cricket, and the pools are heavily exploited over many pages.

Most of these newspapers have science editors or writers. The News Chronicle, where Ritchie Calder, a well-known popularizer, was a science editor, often handles science stories with skill and balance. The Daily Mirror, to give another example, has a science editor who is well informed and hard working but who has real difficulty in getting anything less than a major story, such as the earth satellites or the voyage of the NAUTILUS, into the columns. Science stories compete with everything else that might entertain, including money, crime, sex and sports. When science stories can produce a full-throated "oh, gee whiz!" they make the paper. Otherwise, they are likely to die on the editor's desk.

Similar comments might be made about almost all of the British Sunday press, which is on the whole an extension of the daily press on additional pages. Some of the Sunday papers bear the same names as their daily counterparts, such as the Sunday Express or the Sunday Graphic. News of the World is the giant of the field with a circulation of eight million but none of the rest falls below the million mark. News of the World has a prudish tone in its chronicles of the police courts, while most of the others also have their special marks. Reynold's News is strongly Labour as is Sunday Pictorial, published by the Daily Mirror. The Sunday Times, no relative of the daily, is a strongly Conservative paper which can be searching and enterprising. The Observer, Liberal, well-informed and sober, does on Sunday what the Times does on weekdays, but the former has four times the circulation of the latter. Others in the Sunday field are the Sunday Chronicle and Sunday Empire News, Kemsley

papers; the Sunday Dispatch, published by the Daily Mail; and People. All of the Sunday papers develop their own stories and have their own editors, despite their connections with chains or daily papers. Because of their many pages--they often run more than 20 pages--they can carry rather long articles and well-illustrated picture stories.

Another kind of weekly--the critical literary and political journal--appeals perhaps more readily than most of the Sunday papers to the serious reader. This class of publication includes such outstanding publications as Spectator (Conservative), Time and Tide (staunchly Conservative), The New Statesman (left wing) and a few others. These papers have "quality" circulations but not great numbers of readers. They contain comments on the news, politics, the theatre, radio and television, the press, cinema and books. They are without exception serious, intelligent and ably written by well-informed writers. They are not, however, information papers in the way that the best Sunday papers are. The Economist probably should be included in this group because of its comments and analytical articles.

Finally, there is a mass circulation periodical press in Britain. It has such familiar fixtures as picture magazines, fashion and women's magazines, sports journals and "how to do it" papers. Several publications concentrate on popularized science stories and achieve healthy circulations. Such magazines as Illustrated, John Bull and Reveille, none of them perhaps first choice for a church warden's parlor, reach into every corner of the kingdom. But higher quality magazines, such as the Illustrated London News and Sphere should not be overlooked.

If the British people are newspaper and magazine readers, they are just as faithful radio listeners and television viewers. British radio is entirely in the hands of the British Broadcasting Corporation, a public corporation which is not directed by the government. Each owner of a radio set pays a tax for the privilege of hearing the BBC. The BBC publishes the Radio Times, which lists programs, gives news about radio and reprints program material of special interest. Eight million people buy this publication each week. The BBC also publishes The Listener which reprints important controversial, scholarly and artistic programs.

The BBC has three services which reach the entire country through 105 radio transmitters. In addition to network shows, some local programs are devoted to matters of regional interest. Two of the programs--the Home Service and the Light Program--get almost all of the listeners, while the high-brows can tune into the recently truncated Third Program which puts out first class intellectual material. The Home Service and the Light Program carry unemotional, careful, clear news broadcasts at many times during the long broadcasting day. The 9 p.m. news show with a

commentary directly afterward was for many years the town crier of Britain but now appears to be losing listeners to television. In addition to its news bulletins, the BBC carries a news feature show, the Radio Newsreel, which contains interviews and eye witness accounts. Finally, the BBC does not shun talks by well-informed persons and commentaries by authorities. Not to be overlooked, too, is the able BBC schools program which is widely used and meticulously prepared.

Side-by-side with this output is the BBC External Services, which cost more each year than the domestic broadcasts. Beamed overseas, this service broadcasts in many languages and at many times. Its English language service for North America is familiar to many Americans and newscasts from it are carried by the Canadian Broadcasting Company. Many of its beams lead into Eastern Europe and Asia where, from time to time, it is reported that BBC broadcasts are subject to less jamming than the Voice of America. The BBC's home news shows provide the basis of the External Services' newscasts, which are tailored for specific areas by a large staff of native writers and announcers. The overseas service uses a considerable number of informative talks.

Two television networks serve Britain and cover almost all of the island, although some small areas are blacked out by technical difficulties. One of the networks belongs to the BBC, which established the first regular television service in the world before the Second World War. The other is operated by the Independent Television Authority, a corporation chartered by Parliament and under public--but not government--direction. Unlike the BBC, the Independent Television Authority (ITV) is a profit-making business which sells radio time to appointed program-producing companies. There are now four such companies. Advertising is inserted between programs, but unlike the American system, advertisers may not buy blocks of time for their own programs. Thus, while advertisers pay for ITV operations, which now are showing immense, even embarrassing, profits, they do not sponsor specific programs.

ITV grew not only out of the desire of business interests to make money and get a promising advertising medium but also in part from a widespread feeling that the BBC-TV service was unnecessarily stodgy and was giving the people what the BBC directors thought was good rather than what was popular. The character of programming on the two networks still reflects their history to a certain extent. One looks to ITV for bright, popular entertainment programs in the American fashion (some are indeed purchased from the United States) and to the BBC for more serious programs. This difference, however, should not be regarded as immutably defined nor as applicable to all programs at any time. The two networks compete with spirit and steal each other's ideas, talent and audiences.

Both networks carry news and actuality shows. They depend heavily on films of actuality and on comment and discussion for their news treatment. Television viewing is increasing very rapidly in Britain, even to the point where a third network has been demanded by some people. As for television as a news source, Sir William Haley, former BBC director and now editor of the Times, has expressed the belief that British television is becoming the medium for furnishing serious news to those newspaper readers who see only entertainment in their daily and Sunday newspapers.

Finally, the British are movie goers, although recent estimates indicate that cinema attendance has fallen with the increase in television viewing. Altogether, there are 4,500 motion picture theatres in Great Britain. Some of these specialize in short films and newsreels. The theatres which show entertainment films customarily show newsreels as part of their offerings. British newsreels tend to carry fewer hyper-thyroid comments and long puffs of production magnates than is usual in the United States.

THE GENERAL INFORMATION PROGRAM

The very great centralization of the British press and radio-TV industries in London indicates that the capital should be and need be the only base of operations for a public information program.

If the N. S. SAVANNAH could visit the Port of London, it would be able to tie up literally at the backdoor of the British mass media capital. Such a visit, however, might be a considerable departure from present British policy regarding nuclear installations, which so far have been located away from densely populated areas. It can be inferred that the ports so far open to American submarines with nuclear power plants have been similar in geographical character to the locations of British atomic energy installations on land. Thus a visit to London by the SAVANNAH might not only attract attention from the mass media because of proximity but also as a dramatic demonstration of safety.

While British shipbuilders and nuclear energy firms have shown a keen interest in the SAVANNAH, the popular press has not made much of it so far. It may never do so. One well-informed British expert on nuclear energy believes that only an accident will provoke a wide and searching public discussion of the uses and dangers of nuclear shipping. Moreover, because British shipbuilders show considerable caution about embarking on nuclear shipping ventures before knowing more about their profit-making prospects, Parliament has not had occasion to discuss the possibilities in any depth. This channel of informing the public, therefore, has had no use.

The lack of much discussion in the mass media, combined with the publicity splash given the NAUTILUS in Britain (and almost everywhere else), provides a good possibility for stimulating the "oh, gee whiz!" school of science writers to turn out stories. The SAVANNAH will obviously offer them some material and even if she will not be so dramatic as a subpolar submarine, a link can be made with the NAUTILUS. It is suggested, therefore, that for the popular press, radio, television, and films, the novel aspects of the SAVANNAH be emphasized and the connection between it and the NAUTILUS be stressed. As will be seen below, it probably would not be rewarding to work toward very complete stories in the mass media.

The popular news media tend to follow crowds. Normally, the general public in Britain is not invited to visit merchant ships but have the opportunity to board warships. If the SAVANNAH could be thrown open to all comers on a weekend, if something of a campaign to get visitors interested preceded the weekend and especially if the ship were docked at London, the popular papers would have a great inducement to cover the vessel. It is suggested, therefore, that a prior decision must be made, as to whether the undifferentiated public is to be invited aboard the ship, in order to work out a detailed public information program. In any case, if the leading figures in British shipping are invited to the ship, the popular press and other media should be asked aboard at the same time in order to get mass media coverage of the "big names." If the ship is opened to the general public, an inexpensive leaflet on the SAVANNAH, stressing her novelties and long-term promise, should be put into the hands of each visitor. Some of the information thus acquired by the visitors will "stick."

Pictures are essential to popular press coverage and they are equally fundamental in television coverage. Necessarily, such pictures would be different in nature from those needed by the technical press. For television news shows, pertinent film footage, covering the background of the ship, is essential. This might include scenes such as the beginning of reactor operation, the launching, shots from the test cruise and perhaps an advance interview with the captain and some crew men. This should be offered the BBC and ITV well in advance. When the ship enters port, both press reporters and still and motion picture photographers will need special privileges if coverage is to reach the maximum. Both reporters and photographers should be able to see the ship enter port; a reserved section of the dock should be ready for them. They should be invited aboard immediately and should have full freedom to attend any ceremonies and to view and make pictures of everything possible. A special press conference with informed and authorized persons, perhaps the captain and chief reactor engineer, would be useful. A ready room for photographers and a writing room with a documents file would be much appreciated.

There is no point pretending that the output of these reporters and photographers will satisfy the demanding standards of research scientists or even the least theoretically inclined engineer. Popular news media simplify, condense and dramatize. They do not inform sophisticated audiences. Nevertheless from the point of view of the United States Government, as high a standard of accuracy as possible is desirable. Such a standard will be met in the low-circulation, high-quality press and perhaps on some radio and television programs. The fact that many British papers have science editors and that the BBC is meticulous promises a better normal standard than many countries can boast. It might even be possible to induce the BBC to carry a talk by an American authority on nuclear power. If full advantage is to be taken of such possibilities, it will be necessary to prepare for the visit of the SAVANNAH by making available hard, authentic information. If a sound information program for technical and scientific groups is undertaken in connection with the visit of the ship, it can be expected that the principal newspaper and radio science specialists will receive much useful material (but will not ensure its use; nothing can). In addition, however, special material, designed for the popular media, should be prepared and distributed. A typical program of such material might include press releases along the following lines:

A. Three weeks before the visit: an official announcement of the exact date and port by competent British authorities. This announcement would, of course, have to be coordinated with the Americans in charge of the visit.

B. Two weeks before the visit: a background press release on the visit, containing, in addition to facts on the ship, complete information about press, radio and television facilities. Release of films and pictures to press and television.

C. Ten days before the visit: an illustrated brochure and guidebook of the ship sent to science editors and writers; a full background story of about 2,000 words on the ship, its purpose, its propulsion and its characteristics. The purpose of the story would be to emphasize the important aspects of the brochure.

D. Opportune spot releases as the ship's visit approaches.

E. Twenty-four hours before the arrival: a final story on the ship, emphasizing ceremonies in connection with the ship's arrival. (A number of suggestions as to arrival ceremonies are contained above in the section on the British Specialized Information Program.)

To speak of press releases implies their acceptability in Britain. The British popular media are accustomed to receive hand-out material of a high quality, carefully drafted and

factual. The best products of an American public relations firm would serve well, but puffy releases would not. Such hand-out material frequently serves in Britain as the base of press, radio and television stories. At the same time, British mass media expect the assistance of a press officer and a radio-television officer where possible. A well-informed press officer can do a great deal to shape the interpretations which will be carried by the British mass media. He should go on duty as long as possible before the ship arrives but not less than one month before, assuming that such mechanical, but vital, matters as a mailing list, telephone, office space, mimeographing service, etc., can be arranged before he arrives.

If a competent press officer were on duty sufficiently in advance of the ship's arrival, he could undertake the task of arranging technical matters in connection with coverage. He might even be able to work out some agreements with newsmen to limit the activities of still and motion picture photographers at public ceremonies to prevent them from monopolizing the proceedings.

A point of less importance which should be considered is hospitality. Most newsmen appreciate having tea or coffee from their hosts if they must spend much time on a story. A buffet lunch and drinks are customary on certain industrial stories. Practice on the SAVANNAH should conform to whatever is customary on shipping stories in Britain but should not appear niggardly.

SUMMARY AND CONCLUSIONS

The British press, radio and television reach mass public in every sense of the word. Their work is centered in London and serious thought should therefore be given to sending the N. S. SAVANNAH to London. Just as the mass media are extensive, they are simple, sensational and popular when dealing with information which they hope will have mass appeal. At the same time, there are in Britain very considerable information channels which reach more thoughtful audiences than those served by the great popular press. These channels tend to be fed information by well-informed persons who would be reached by a public information program aimed at specialized groups.

In addition to the daily and Sunday press and the weeklies, television and radio offer enormous opportunities for reaching the public. But for them, as for the popular press, certain facilities are essential in order to achieve maximum results. These include easy access to the ship, advance information and advance pictures and films.

A program of press releases would serve well in Britain. A press officer on duty well before the ship arrives would be desirable, if not essential. The releases and efforts of the press officer should be directed to emphasizing the novel aspects of the N. S. SAVANNAH in order to reach the maximum number of people.

APPENDIX D

PROGRAM PROBLEMS FOR OTHER COUNTRIES-- THE NETHERLANDS AND FRANCE

This Appendix will consider in broad outline what sort of public information program would be appropriate in the Netherlands and France in connection with the projected tour of the N. S. SAVANNAH. Like the preceding one, it is designed to be of assistance principally to the Maritime Administration's representative in an interagency planning group by acquainting him with the program problems which each of two continental countries will present in contrast with those in Great Britain.

The discussion here is based on the results of interviews and research in both countries as well as on experience in both places. The mass media of both countries will be considered separately but wherever possible in comparison with each other and with those of England. Then the state of nuclear shipping and interest in it in each country will be described. Finally, suggestions and comments made in the course of the discussion or raised by it will be brought together in a conclusion which will contain recommendations and will identify some questions which should be settled.

MASS MEDIA IN THE NETHERLANDS

Dutch newspaper readers have a rich range of choice. Nearly 110 main editions of daily newspapers and 55 subeditions appear in the Netherlands, which has only some 11 million inhabitants. It is obvious that no newspaper has a massive circulation and in Dutch press circles 250,000 readers are viewed as a very large number. Of the many newspapers, 13 claim national circulation, while the rest are not generally available outside of the local areas. The leading newspapers are the Nieuwe Rotterdamse Courant, the Algemeen Handelsblad, De Volkskrant, De Telegraaf, Het Vrije Volk and Algemeen Dagblad, all of which have national circulations.

Many of the local newspapers have links to national newspapers. For example, Het Parool, an important Socialist paper of Amsterdam, has a tie with the Nieuw-Utrechts Dagblad which uses articles from the former. Similarly, many local papers cooperate on newsgathering and correspondence. Nevertheless, the Dutch press does not include chains of newspapers in the English sense.

The largest newspapers maintain staffs abroad and subscribe to foreign news services. The most frequently used stories derived from foreign services carry Reuters and Associated Press credits, but some papers also receive Agence France Presse (AFP)

and United Press International news. Moreover, certain papers have acquired rights to reprint from foreign papers: De Telegraaf, for example, uses much sensational material from the Daily Express of London. All Dutch dailies of any significance receive news from ANP (Algemene Nederlandse Presbureau), the Dutch cooperative newsgathering agency which has some correspondents abroad and has the right to carry despatches from some foreign news services. ANP is the vehicle for governmental announcements and covers Dutch politics. ANP stories are factual and informative but rarely anything else. It exchanges news with AFP and Reuters.

The character of the Dutch daily press differs far more from the American model than does the English. To begin with, Dutch newspapers generally seem far less anxious to ride on top of the news than do their Anglo-Saxon counterparts. The result is that the Dutch press frequently follows the news at some time distance. Moreover, the newspapers generally are small in size, the maximum number of pages usually being not more than sixteen, except for a larger Saturday edition. Most running news stories tend to be short but large blocks of space are given to feature material. On the whole, Dutch newspapers are serious and present their frivolous material on the sports pages. Feature stories frequently take up literary or social questions or are devoted to international political disputes. Human interest stories frequently are pegged on the birthdate of an eminent elderly person. Art, architecture, music and the theatre get good coverage. An event such as the recent launching of the ROTTERDAM would be covered from several angles and might well include a long article on the position of Dutch shipping in world markets. Even a popular paper such as De Telegraaf includes serious articles on art, the theatre and books as well as the police and human interest stories on which the yellow press builds circulation. Pictures do not get extraordinary displays but are used when a story justifies them.

Aside from the spot information stories, most of the material in the Dutch press is interpretative and may even become polemic. Such stories usually are signed (except in the Nieuwe Rotterdamse Courant which takes pride in the anonymity of its excellent staff) and often may be written by contributors rather than staff members. Almost without exception, each newspaper has one or several eminent contributors whose articles appear regularly, rather in the fashion of the American columnist. The political character of the longer, analytic pieces often is predetermined by the inclinations of the newspaper involved. Few of the Dutch newspapers are sheets of general circulation in the sense that they are intended for any reader; rather they are aimed at rather well-defined groups. For example, De Volkskrant is explicitly a Roman Catholic newspaper. Het Vrije Volk is the organ of the Partij van de Arbeid (Socialists) and the Nieuwe Rotterdamse

Courant is associated with the views of the liberals who include many important business leaders. De Telegraaf, which has a reputation as a popular, mass circulation paper, supports extremely conservative views.

Generally speaking, science and technology do not get much coverage in the daily press of the Netherlands. During the United Nations conference on atomic energy, for example, much of the coverage was routine wire service material and official announcements. Nevertheless, the Nieuwe Rotterdamse Courant carried a highly competent and informative series of articles on the questions raised by the conference. When a public problem stirs the imagination of a Dutch editor, such coverage usually follows.

One characteristic of the content of the Dutch press remains fairly constant. This is an unusual interest in international cooperation and in legal and pacific settlements of international disputes. While such interest tends to arise primarily in small countries, it is unusually strong in the Netherlands because of a long tradition of international legal studies and a general realization that the country is in no position to use power to extricate itself from disputes. This attention to international cooperation, which manifests itself, for example, in good coverage of the Council of Europe, the European Trade Community, Euratom and similar organizations, might well serve as part of the foundation of a public information program in connection with the SAVANNAH.

Dutch newsmen, in contrast to most of their British counterparts, usually are university-trained and many of them are lawyers. They have, therefore, come from rigorous lower schools, as do the French newsmen, and have not been spared the pain of learning mathematics. While this schooling does not guarantee that Dutch newsmen can be expected to grasp the subtleties of reactor physics, it does mean that usually the story turned out by a reporter in Holland will be based on some background information and study. This fact, along with the general seriousness of the Dutch press, usually ensures that an article on a complex subject will get careful treatment. Dutch newsmen with few exceptions speak English and French well. It will not be necessary to translate material given them and the lack of Dutch versions will cause neither resentment nor misunderstandings; indeed the use of foreign languages among educated Dutchmen is so frequent and considered so desirable that news releases in English would probably prove more attractive than the same material in Dutch. The Dutch press does use handout material, although, as in France, press conferences tend to produce the best results. The press conference technique has the advantage of bringing perhaps only slightly informed reporters into contact with an informed person and permits the introduction of handout material by way of questions and comments. Editors of

Dutch newspapers, unlike those in the United States, tend to sit on a much higher level than their staffs and are most conscious of their directorial functions. They therefore rather expect formal calls by information officers concerned with a particular story. Such calls might prove quite advantageous in the case of the SAVANNAH.

In addition to its many daily newspapers, Holland has an almost incredible number of weekly newspapers and magazines and periodicals. In all, a recent UNESCO report indicates, 339 weekly papers and magazines and 3,500 periodicals are put out in Holland. Many of these are house organs and the information sheets of minor organizations but because printing costs are low in Holland they appear in type rather than mimeograph. Most of these publications may be disregarded for our purposes, but some are relevant.

Among the weeklies, four have large circulations and the greatest prestige. They have the standing in Holland that the British weeklies have in England. These four papers are Elsevier, the biggest of the weeklies, Vrij Nederland, Haagse Post and De Groene Amsterdammer. All of these papers have a literary and political emphasis, although each of them carries economic and scientific pieces on occasion. Much of their material is contributed by eminent authorities and generally their articles are serious and careful. Elsevier is politically at the right and generally bourgeois. Vrij Nederland, the descendant of a resistance paper, is liberal and critical. The Haagse Post is primarily a society paper with literary and political features; it tends to the right. De Groene is leftist, was once influenced by the Communists but now is independent, critical and satirical. An article in any one or all of these papers on nuclear shipping and the SAVANNAH would be highly desirable in any public information program.

The Dutch periodical list includes no less than eight publications on shipbuilding and twenty on ship transport. As in England, such specialized publications have followed closely the SAVANNAH's progress and would be very likely to report every movement of the vessel and every technical facility on which information is furnished. These publications would be eager to cover her visit. Their titles and personnel are not listed here because of the existence of excellent classified directories of the Dutch press. Because of the importance of the shipping industry in the Netherlands and because of the high educational qualifications of its directorial personnel, the specialized press serving that industry has high standards and can be expected to make extremely good use of technical material. Such material should be available well in advance of the visit and should include full background information. Pictures should supplement the information. Information may be furnished in English.

The Netherlands is blanketed by two radio transmitters, located centrally at Hilversum where broadcasting and recording studios also may be found. The radio transmission facilities belong to the Dutch government and are administered by the Ministry of Transport and Waterways through the State Establishment for Post, Telegraphy and Telephony. The PTT, however, merely operates the technical facilities. All broadcasting is in the hands of five semi-public organizations, most of which have a religious orientation. Certain programs, such as news, are produced by a combined service (Radio Unie) but the time allocated it is very limited. The semi-public organizations represent Catholic, reformed Protestant, "free-will" Protestant, Labour and general liberal groups. Each of them produces its own program publication and each of them has its own time during which to produce its own programs. The programs are not commercial in the American sense and contain no advertising. The content of the programs, of course, reflects to some extent the views of the sponsoring organization. These shows range widely from popular comedy entertainment to highly intelligent lecture and discussion; a considerable number of religious programs is broadcast. It is quite possible that one or another or perhaps several of the radio sponsoring organizations could be induced to carry a show dealing with the SAVANNAH. But any such attempt must precede the scheduled time by at least a month so that the show could be set up and listed in the appropriate program guide.

Straight news shows on the Netherlands radio are written by ANP and are produced by Radio Unie. Generally these news broadcasts are straight, sober and factual, modelled on the BBC shows. They do not appear to be guided by any rules except those of news. Information on the SAVANNAH would appear on the news broadcasts as a matter of course if it were thought sufficiently important. The Netherlands radio, incidentally, did carry news of the visit of the SKATE to Den Helder.

Television has assumed great popularity in Holland despite the high cost of receivers and the few hours--less than fifteen per week--during which shows are broadcast. The shows appeared to be a very mixed variety with a considerable emphasis on straight entertainment. Occasionally a short feature on some news item appears. Television is directed independently of the radio broadcasts and so far has not come under the control of the semi-private groups which produce the radio shows. The transmitters and programs now are under the control of Nederlandse Televisie Stichting (Dutch Television Foundation). It is quite possible that a film about the SAVANNAH, suitable for a general audience and carrying a Dutch sound track, would be found acceptable for broadcast in Holland.

Newsreel coverage of Dutch news is heavy. A number of private organizations make newsreel footage and are represented

at every important event. Because the arrival of the SAVANNAH could be expected to be most photogenic, it surely would be covered. The outlet for these films is furnished by 513 theatres, including those, found in every large town, which are devoted exclusively to newsreels and short films. An effort should be made to furnish films on the SAVANNAH to these theatres. Incidentally, many of them operate under the auspices of important local newspapers.

MASS MEDIA IN FRANCE

France has more than 130 daily newspapers with more than ten million circulation. With one newspaper for every four or five persons, the country is fairly well in contact with the press. Nevertheless, France is perhaps the only country of western Europe where newspaper reading has been on the decline. In recent years, overall circulation has dropped.

It has been speculated by French newsmen and publicists that the main reason for this decline is an increasing distrust of a press which has had a venal and controversial history. The distrust of the French press may also derive from its partisan nature. Almost every French newspaper strongly espouses a particular political view which permeates the entire news coverage. A result is that not only are most stories interpretative but are done in the light of a given political, social or economic doctrine. Such a press necessarily tends to be spotty and even unpredictable in news coverage: what seems an important event to one editor is nonsense to another. French journalists of any stature tend to follow the political views of their papers, as they must if they are to turn out interpretative articles which can pass the editor.

As in England, in France there is a national press, emanating from the capital. But unlike England and perhaps more as in Holland, there is also an important provincial press which by picking up readers, has to some extent developed a circulation trend contrary to the general trend. Such important provincial papers may be found in Lille, Bordeaux, Toulouse, Marseille, Lyon, Strasbourg and Nancy. The important provincial dailies maintain sizeable bureaus in Paris and report national news, often exceedingly well, from there. The national papers of Paris and the papers in the port and shipbuilding cities would show primary interest in the SAVANNAH.

The French press has strong literary as well as political interests. While each paper (with the exception of the several Communist sheets) has a financial and business section of some sort, this is frequently less emphasized than the large sports sections. Entertainment features, such as feuilletons (sections of criticisms, short stories, or serials), comic strips, gossip

columns and pictures, are common. It is not hard to imagine, then, that technical and scientific news generally receives perfunctory and rather unimpressive coverage. Moreover, the French journalist usually regards himself primarily as a "literary man." His interests are in the universal problems contained in the news rather than in the details of what happened: he is more likely to develop a sweeping interpretation of what he regards as a trend than he is to do a painstaking job of research.

Newsgathering in France includes little of the footslogging which is so much a part of the job in the Anglo-Saxon countries. Nor is it based on the thorough research which goes into the Dutch interpretative articles. In France, the longer article and even the short news story are likely to be polemical and doctrinal, based on implicit assumptions which are shared by most readers of a particular paper. Nevertheless, the best newspapers in France, such as Le Monde or Le Figaro (when their political interests are not in play), can do surprisingly good "reportage"--long articles or what Americans would call feature stories.

Press conferences are commonly used for news dissemination. French reporters and editors are accustomed to them and expect them, while Frenchmen attempting to make news organize them. The principals present a statement, which may be in the nature of a short lecture, and then reporters follow up with questions. The didactic, controversial tone of the statement and the polemic quality of answers to questions set off this technique from that employed generally in Anglo-Saxon countries.

Most French reporters expect that a press conference on less than highest urgency news will be accompanied by a buffet. Both food and drink are served. Although some of the reporters appear to live on little else than these buffets and turn out copy which sometimes has no relation to the subject of the press conference, to omit this hospitality could well be taken as barbarous behavior. It is suggested that a press conference dealing with the SAVANNAH be held during the ship's visit to France and that hospitality be offered the visiting newsmen.

The location of the press conference has importance. By far the best location would be aboard the ship. Although the national dailies probably would have local correspondents in the ports, these reporters could not be depended upon to get much into the press. It would be much better to bid for correspondents and editors from Paris and the important provincial dailies. Such invitations would necessitate the provision of transportation from Paris to the port, presumably one of those on the Channel or the Atlantic. French newspapers usually do not scatter expense account money among their staffs and without transportation it is likely that the turnout would be small.

This situation contrasts with that of both England and the Netherlands where reporters would on the whole be able to make their way to the ports without difficulty and would not need special transportation, although there are certain advantages to furnishing it.

Any material given French reporters and editors and any interviews with them must be conducted in French. Not only do few French reporters and editors have competence in English but also a large number of them regard anything in a foreign language as either suspicious or downright untrue. Incidentally, the French used must be without fault or the effort to gain publicity is likely to result in a discussion of the poor quality of speech and writing in the United States. On the whole, press releases can be expected to produce practically no result and should be used with caution.

If the popular press in Britain cannot be depended upon to furnish entirely accurate and relevant coverage of a scientific or technical story, such coverage is even less likely in France because of the orientation of reporters and newspapers and because of the technique of newsgathering.

As in England and Holland, the national press has a considerable range. The largest newspaper in France by all odds is France-Soir, a garish afternoon daily which thrives on sensation and sports. It is generally right wing in its political views and rarely conforms to the highest standards of either accuracy or responsibility. Journalistically, it is very keen. It has a smaller imitative competitor in Paris-Presse-L'Intransigeant. The second paper is Le Figaro, the favorite of the middle classes generally. Well-written, sober and thorough, it contains considerable information as well as large doses of opinion. Le Monde is perhaps the most informative national paper in France. It is, however, small in circulation and high in quality. Its political views are moderate left, critical of American and French foreign policies and highly responsible. The Communist paper, l'Humanité, circulates throughout the country but has drastically lost circulation since the Hungarian uprising. It might well omit any coverage of the SAVANNAH in view of the fact that the Soviet Union also is developing a nuclear propelled vessel, thereby erasing any objection in principle to nuclear shipping. The Parisian paper, par excellence, is Le Parisien Libéré, which is primarily an entertainment paper of large circulation. L'Aurore, which espouses extreme right wing views, uses a similar technique to build a considerable circulation in Paris and in the country. Libération is crypto-Communist and what is said of l'Humanité applies to it. On the left, but not Communist, are Combat, which is intelligent, intellectual and critical, and Franc-Tireur, which appeals to a less intellectual group. Finally, there is the sad little Populaire, once the

thriving organ of Leon Blum's Socialist Party and now read by fewer than 25,000 persons.

Aside from the considerable staffs maintained by the newspapers, the French press relies principally on Agence France Presse, a huge cooperative newsgathering machine which makes up its deficit through governmental grants. AFP is a semi-public corporation and its Director-General and upper staff are not immune from governmental influences. For example, one of Pierre Mendès-France's early actions was to replace the AFP director, who later regained his rights after a long bout with the Conseil d'État. Incidentally, AFP furnishes news on an exchange basis to ANP and to Reuters.

French radio--Radio-Télévision Française--resembles the BBC in many respects. It is entirely governmentally owned but has on the whole been free from governmental direction. It is financed through a tax on listeners. It has several programs, serving different tastes, and has regional transmissions. It covers the entire country. It carries national news bulletins and news feature programs and, at the same time, puts out much of pure entertainment material. It is centrally directed from Paris.

There have been recent signs that the Ministry of Information has been taking over closer direction of the news shows, referred to as Le Journal Parlé. When Jacques Soustelle took office as Minister of Information, one of his first acts was to replace the director of Le Journal Parlé. Something of a scandal followed in which critical newspapers reported that discussion of the Algerian question and of the constitutional crisis altered sharply in RTF broadcasts. This suggests that for the SAVANNAH to get good news coverage on RTF, it would be wise to precede the visit with a careful understanding with the government of what was intended.

Many of the news feature shows include eye-witness reporting which has been developed to a rather high art on RTF. An invitation should be extended to RTF to cover the SAVANNAH's visit with a correspondent. Every facility should be given him. This comment applies equally to radio and television. To obtain the best coverage on either media, arrangements should be made well in advance.

French television, unlike that of Britain but like that of Holland, is entirely non-commercial. It maintains a high technical standard and is rather enterprising. Its news shows include films of actuality and direct pickups. Because it covers the country and has a wide viewing audience, French television would be an admirable medium for information on the SAVANNAH.

It might be possible to induce the network, which broadcasts at least as many hours as the BBC and many more than the Dutch television, to carry a film on the SAVANNAH and the news section would no doubt be eager for early newsreel footage.

Newsreel footage, some of which finds its way into theatres elsewhere in France, is made by five French companies. As in England and Holland, newsreels commonly precede movies and there are separate newsreel theatres which maintain their popularity. With some 5,300 theatrical outlets, this is a medium not to be overlooked. Invitations should be issued to the five French companies to cover the arrival and the visit. Newsreel men, like still photographers, need the use of a ready room and appreciate anything that can be done to ease their work. It would be well worthwhile to confer with the newsreel and television cameramen in advance of the visit.

More than 7,000 weeklies and periodicals in France provide much more selective information media than either the daily press or the radio-television establishment. Among these papers are the weekly journals of opinion, such as L'Express, which concentrate primarily on political affairs; literary journals, such as Le Figaro Littéraire, interested mainly in letters; and a large number of other more specialized papers. Probably the SAVANNAH will have little direct contact with these, except insofar as they have specifically maritime or nuclear energy specializations. In detailed planning of the public information program for France, a good classified list of periodicals such as Répertoire de la Presse et des Publications Périodiques Françaises (Paris, Éditions de la Documentation Française) should be consulted. From it a list of interested publications can quickly be built up. But the general periodicals and weeklies probably will exhibit interest on their own initiative, if the SAVANNAH strikes their fancy.

Among the periodicals are a handful which are devoted to subjects especially relevant. These include such magazines as l'Age Nucleaire, Atomes, Chimie et Industrie and Navires, Ports et Chantiers. On the whole, the scientific publications maintain a high standard and some of them are organs of learned societies. The shipping papers appear to follow developments abroad very closely and could be counted upon to have some background information on the SAVANNAH although it is hard to avoid the impression that they follow the news at a considerable distance. These specialized papers should receive every encouragement to cover the SAVANNAH more thoroughly than would be their wont.

Along with the specialized periodical press should be listed one daily paper, l'Antenne, which specializes in maritime and related news. Its interest in the SAVANNAH is obvious and

it should be given fullest possible information and facilities. Also to be listed is L'Information, a daily financial paper.

Many of the specialized papers depend on material from contributors who are acknowledged experts in their fields. In this respect, the French publications are similar to those of Holland. In order to provide relevant background for these experts, public information activities should begin far enough in advance so that scholarly papers come into their hands. The more industrially oriented specialized and trade papers also will require pictures and other illustrations. In this respect, they duplicate the requirements of the British publications.

THE DUTCH SHIPPING INDUSTRY, ITS LEADING GROUPS AND NUCLEAR SHIPPING

Shipping and shipbuilding constitute one of the major Dutch industries. The importance of the industry is enhanced by the fact that the Netherlands is a principal trading nation with a long tradition on the seas. Because of the volume of its trade and importance of that trade to the Dutch economy, an interest in the shipping and shipbuilding industry manifests itself widely in Holland. Even newspapers in the interior of the country print shipping schedules and give good display to stories about the shipping industry. For example, one of the Atlantic lines recently purchased a company which had built its principal trade with the former Dutch East Indies. The story of this merger and speculation about its precise meaning was page one news for a week, even in Utrecht in the center of the land. Moreover, this enormous shipping industry--the Netherlands ranks among the top ten nations in world tonnage--belongs to a country of only 11 million people. Its impact on them, therefore, is even higher than the impact of the British shipping industry on the British people and far greater than the influence of the counterpart industry in France on the French people. A final statistic can serve to emphasize this point: Rotterdam now is the second harbor of the world in tonnage handled, surpassing even London. This implies not only that the Dutch shipping and shipbuilding industry is important but also that it has strong international links.

At least two Dutch shipbuilding companies have the capacity to construct large merchant and military vessels. One of these is the Rotterdamsche Droogdok Maatschappij, which recently launched the new ROTTERDAM and is known to be interested in building large ships, submarines and large machine components for other industry. The other is the De Schelde works in Vlissingen, which can take on similar jobs. Both of these companies also can repair and service any sort of vessel. Both are known to be interested in nuclear propulsion and shipping industry sources generally state that they are the only two presently able to do much with the problem.

In addition to these two leading companies, Holland has a large number of lesser shipbuilders and repairers. These range all the way from major drydock establishments down to builders of small canal barges and boats. A considerable number of middle-rank concerns build vessels of about 10 thousand tons or less and many coasters. These firms so far have followed nuclear propulsion developments simply as industrial news and without aiming at entering the field themselves. Many directors of such firms believe, however, that in the long run they may serve as suppliers to builders of nuclear energy equipment.

Aside from this large shipbuilding industry, which has an obvious and direct interest in nuclear propulsion developments, a highly developed machine and electronic industry in Holland also will eventually be involved in nuclear energy projects. This industry includes such large firms as the Stork engineering works and Philips, the electronics firm, as well as a large number of smaller suppliers.

The shipping industry itself includes several giant firms, such as the Holland-America Line, the Rotterdamsche Lloyd and the Koninklijke Stoomvaart Maatschappij, and hundreds of smaller operators. Initially only the big firms and the Shell petroleum group could be expected to take a direct interest in nuclear propulsion; the smaller firms probably would follow at a distance.

At this point, a word about the directorial personnel of Dutch shipping and shipbuilding firms probably is in order. The directors of these businesses, even of many of the smaller ones, impress the visitor as well-informed, alert and very well trained. In the large firms, many of the top-rank administrators are engineers trained at the excellent technical university at Delft. Graduates of this institution generally assume the leading roles in the large manufacturing and engineering firms in Holland. They frequently lead smaller businesses as well; often these are family businesses of long standing, some being several centuries old. A considerable number of leaders in this industry have studied abroad, especially in England, and almost without exception they have lived or visited abroad for long periods. They commonly speak good English, French and German and read material in all three of these languages. This broad educational base provides a great advantage for an information program since technical material need not be translated into Dutch.

The high educational standard, the frequency of Delft graduates in the shipping industry, the importance of the industry in the country and the small size and compact nature of the nation all combine to establish very close relations among the leaders of the shipping industry. These leaders

probably have closer relations than the counterpart group in England and yet compete more than the closed group in France. Not only are many of the leaders of the shipping industry in Holland old friends and colleagues, but also they see each other frequently in many social clubs. It need hardly be said that new developments in the Dutch shipping industry become known very quickly.

As in England, the shipping industry and the scientists are highly integrated in formal organizations, although these are by no means as extensive as the English counterparts. Of some 30 odd organizations concerned with shipbuilding and seafaring, the Instituut voor Scheepvaart and Luchtvaart (the Institute for Shipping and Air Transport) probably has the most relevance to the visit of the SAVANNAH. With offices in Rotterdam and Amsterdam, it tries to promote scientific knowledge of seafaring and maintains important reading rooms and documentary research functions. Its director, H. Quispel, is said to be one of the more knowledgeable leaders in Dutch shipping.

The Koninklijk Instituut van Ingenieurs in The Hague brings together the personnel interested in more technical questions. It has a department for ship repair and building and another for atomic energy. This organization publishes a weekly paper. It would no doubt be one of the key interest groups which would be interested in the SAVANNAH. (Reference on Dutch shipbuilding and transport corporations and on associations and interest groups: Pyttersen's Nederlandse Almanak voor Iedereen 1958, Zaltbommel, N. V. van de Garde and Co's Drukkerij, 1958.)

Although these organizations and the informal relations of shipping industry personnel with government decision makers and civil servants may affect overall shipping policy and practice in the Netherlands, much more direct links exist and provide direct access of the shipping industry to government and vice versa. The main point of contact is in the Nederlandse centrale organisatie voor toegepast-natuurwetenschappelijk onderzoek (Netherlands central organization for applied scientific research) and its sister organization, Nederlandse organisatie voor toegepast-natuurwetenschappelijk onderzoek ten behoeve van Nijverheid, Handel en Verkeer (Netherlands organization for applied scientific research on behalf of industry, trade and transport), both located at The Hague. These organizations, abbreviated as Centrale Organisatie T. N. O. and Nijverheidsorganisatie T. N. O., have a function comparable to the Department of Scientific and Industrial Research in Great Britain. As in Great Britain, both T. N. O.'s marshal governmental and private research facilities to solve problems susceptible to applied science.

As in Great Britain, nuclear energy affairs are separated from the applied research functions. In Holland, nuclear energy development is in the hands of the Commissie voor Atoomenergie,

a dependency of the Departement van Algemene Zaken (Department of General Affairs), which is the portfolio of the Minister-President of the government. The Commissie voor Atoomenergie thus reports directly to the government leader. It is linked to the T. N. O.'s, however, through the simple device of overlapping membership. Moreover, the directorial committees of the T. N. O.'s referred to here include representatives of the relevant governmental departments. (Source: Staatsalmanak voor het Koninkrijk de Nederlanden 1958, Staatsdrukkerij-en uitgeverijbedrijf, Gravenhage, 1958.)

Nijverheidsorganisatie T. N. O. produced an offspring which performs functions exactly analogous to the British Shipbuilding Research Association. This is the Studiecentrum T. N. O. voor Scheepsbouw en Navigatie (T. N. O. Study Center for Shipbuilding and Navigation) with general offices in The Hague and workshops and laboratories in Amsterdam. The directorial committee of this organization unites governmental and business personnel, including the leading figures of the three most important shipbuilders, of several outstanding shipping concerns, of the navy ministry, the ministry of transport, the Nederlands Scheepsbouwkundig Proefstation (the Netherlands Shipbuilding Experiment Station), the Lloyd's surveyor for Holland and the technical university at Delft.

One department of this organization deals directly with nuclear propulsion of vessels. This department was organized only in 1957 and appears so far to have published nothing, but it has been at work. It is directed by Ir. J. P. Hulsman, who until his retirement because of ill health, had been a director of the Rotterdamsche Droogdok Maatschappij. His advisory committee includes directors of five of the largest shipyards in Holland and of two shipping companies, a rear admiral from the naval ministry and a professor. Moreover, Ir. Hulsman also is chairman of the advisory committee of the machine construction department of Studiecentrum T. N. O. voor Scheepsbouw en Navigatie, where a number of other shipbuilding companies and machine companies, as well as professors from Delft, are included. (Reference: Studiecentrum T. N. O. voor Scheepsbouw en Navigatie, Verslag over het Jaar 1957, Nijverheidsorganisatie T. N. O., n.d.)

It is fair to say, then, that matters concerned with nuclear shipping have engaged some of the most important people in the Netherlands and at the same time are highly centralized in one organization. This provides a clear channel directly to the opinion leaders on nuclear shipping questions for they have already identified themselves. Moreover, they already have basic information on the SAVANNAH and unquestionably would be eager for more. In addition, their organizations provide quick access to high quarters in the government. Should changes

in governmental policy be required for a successful visit of the SAVANNAH, the Studiecentrum would be highly influential.

The work of Studiecentrum and the Stichting Reactor Centrum Nederland (Netherlands Reactor Center Foundation), which was set up by the Ministries of Economic Affairs and of Education, Art and Science in 1955, has resulted in a rather clear outline of Dutch policy toward nuclear shipping. To begin with, the Netherlands expects within a short time to be producing cheap atomic fuels. It expects to cooperate with West Germany in this enterprise which will be based on a process developed by Prof. J. Kistemaker of Amsterdam. Estimates have predicted that nuclear fuels can be produced by this process for a fraction of present costs. The process was described fully at the United Nations Conference at Geneva this September.

Secondly, the Netherlands plans to conduct experiments with a nuclear-powered vessel. An announcement to that effect was made at Geneva by a member of the Commissie voor Atoomenergie who also is a director of Reactorcentrum Nederlands. A nuclear power plant would be installed in a tanker and the purchase price and experiments are expected to have the support of Euratom. Apparently, the vessel would not have a direct economic justification but would, like the SAVANNAH, be primarily for experimentation. It is understood that the vessel would have complete standby propulsion equipment and would be intended to give feasibility data and experience to Dutch shipbuilders and operators with a view to later exploitation. Clearly, Dutch shipping and the Dutch government are keenly interested in the future of nuclear shipping.

Despite this interest, the Dutch government has not decided that nuclear-powered shipping should be accepted immediately. On the contrary, the chairman of the Commissie voor Atoomenergie declared at Geneva that the Dutch government planned to lay down special regulations for nuclear-powered vessels to prevent any safety hazard. These regulations would be more stringent than those now in force for oil tankers. The precise content of the regulations has not so far been made public and probably they are not yet in a final stage. This announcement, which had been expected for some time, as had the disclosure of Dutch plans for experiments with nuclear vessels, came soon after the visit of the SKATE to Holland. She was not allowed to enter Rotterdam or Amsterdam but rather was confined to the naval base at Den Helder, where newsmen saw health inspectors board the ship with detection devices for radioactivity. The submarine got a clean bill of health but also a flurry of stories in the press.

The governmental plans for safety regulations probably will meet some skepticism in Dutch shipping circles. Leaders of the industry have assumed that nuclear-powered ships presented no

extraordinary hazards with which harbors had not already learned to cope. They view the SAVANNAH as just another ship so far as harbor safety is concerned and declare that more dangerous cargoes than a working reactor are handled daily in the harbors. Moreover, they have full confidence that Dutch dock labor, which does not have the stormy relations with management that English and French stevedores do, will not present any demands for hazardous duty pay. The assurance of shipping leaders on these points is striking and may be a useful factor for developing a public information program which emphasizes safety and ease of handling of nuclear shipping.

It can be said flatly that the compact group of leaders of the Dutch shipping industry expects to be invited aboard the SAVANNAH on any visit to the Netherlands. They are particularly interested in learning how her experience will bear on their own experimental nuclear ship. Incidentally, they do not anticipate a big public show, hinting that public visits are not customary for merchant vessels and are not expected by the general public.

THE FRENCH SHIPPING INDUSTRY, ITS LEADING GROUPS AND NUCLEAR SHIPPING

To write of the French shipping industry after discussing the Dutch and English counterparts is to suggest many contrasts. Shipbuilding and shipping, while no minor industry in France, does not have nearly the importance it does in the other two countries. France has never been a seafaring country, despite the importance of some of its shipping lines. Moreover, its shipbuilding has developed more strongly toward naval and passenger ship construction than toward cargo carrier building.

At the end of World War II, French shipping had been reduced dramatically. Since then, the French government has tried to rebuild to the prewar level and lacking construction capacity at home has contracted abroad for as much as half of its new tonnage. It also bought many ships from the United States merchant fleet. By 1951, France had reached 65 per cent of its prewar tonnage and surpassed it in tankers and cargoes. Since then, the French merchant marine has not failed to increase. France operates nationalized shipping, private shipping and subsidized craft and lines. The operating regime is worked out in the Conseil Supérieur de la Marine Marchande, which has representatives of each group. Thus, private and governmental enterprises (the latter includes the large Messageries Maritimes and the Compagnie Générale Transatlantique) are guaranteed access to the government through the Sous Secrétariat d'État à la Marine Marchande. (Reference: Henri Cloarec, La Marine Marchande, Presses Universitaires de France, 1949.)

This rebuilding industry reflects many of the characteristics of French business and society. To begin with, the firms, especially those primarily interested in shipbuilding, are often closely held family affairs. In any case, none of the firms, as is usual in French business, is very open-handed with information about its activities. But the industry is nevertheless highly organized. The organizations often are small and developed around very particular specializations. These organizations frequently are members of larger, more general bodies. Thus, while people in the shipping industry may be well acquainted with current developments and ideas, it is difficult for an outsider to penetrate very far. Even a study of the trade press does not lead very far, for much of the material there is culled from foreign publications.

Yet the shipbuilding corporations are among the largest in France and are linked to huge engineering and machine building firms. Many of the leaders of the shipbuilding and shipping industries not only serve in regional and specialized trade organizations but also take leading parts in the work of the Conseil National de Patronat Français, which can be likened to the American National Association of Manufacturers. Moreover, French shipping and shipbuilding constitute powerful lobbies with considerable influence in the French legislature. (Current constitutional changes are unlikely to lessen this influence.) (Reference: Henry W. Ehrmann, Organized Business in France, Princeton, Princeton University Press, 1957.)

One shippers' organization has a direct counterpart in England. This is Bureau Véritas, Registre International de Classification de Navires et d'Aéronefs, which corresponds identically to Lloyd's Register of Shipping.

A partial counterpart of the British Chamber of Shipping is the Chambre Syndicale des Constructeurs de Navires et de Machines, which is, as its name indicates, a shipbuilders and suppliers group. Some 56 companies belong to this association. It has links to a large number of smaller, specialized groups, which include the following: Syndicat Patronal des Constructeurs et Forges de Marine de Boulogne-sur-Mer; Chambre Syndicale des Industries Métallurgiques, Mécaniques Connexes de la Région Havraise; Syndicat National des Entrepreneurs de Peinture Navale, Carénage et Travaux Connexes; Syndicat Général de Constructeurs et Réparateurs de Bateaux Fluviaux; Fédération de la Métallurgie de Bordeaux et du Sud-Ouest; Syndicat des Industries Navales des Bouches-du-Rhône. The object of the general organization and its corresponding associations is the defense and study of the industrial, economic and commercial interests of the different branches of naval construction.

One of the spawn of the Chambre Syndicale is a direct counterpart of the British Shipbuilding Research Association and the

Studiecentrum T. N. O. voor Scheepsbouw en Navigatie in Holland. This is the Institut de Recherches de la Construction Navale. Moreover, the Chambre has a section which deals with legal, economic and social questions.

Finally, three other associations should be noted. Shipping companies are grouped in a Comité Central des Armateurs de France. Repairers and maintenance companies support the Union Nationale des Industries de la Manutention dans les Ports Français. Marine suppliers belong to the Fédération des Chambres Syndicales des Fournitures Générales pour l'Industrie et la Marine.

All of these general organizations have offices in Paris. They have permanent personnel to coordinate activities and publish trade journals of one sort or another. Frequent meetings take place and the organizations usually attempt to watch political developments closely. (Reference: Juris-Classeur des Syndicats, Paris, Éditions Techniques, 1956; Jean Meynaud, Les Groupes de Pression en France, Paris, Librairie Armand Colin, 1958.)

The Institut de Recherches de la Construction Navale (IRCN) has followed developments in the nuclear energy field and may have begun certain experimental work. The profundity of any such work probably is doubtful now. In any case, the personnel of the Institut apparently has been specifically enjoined from discussing in any positive way the nature of their work. Moreover, the Institut has published nothing on the subject and will not now indicate any plans for such publication. This reticence is thoroughly in accord with the business practices mentioned above.

The role of the Institut in the development of French nuclear shipping is quite unlikely to parallel that of the Studiecentrum in Holland and the British Shipping Research Association. To begin with, the Institut does not appear to be associated directly with the research in nuclear shipping now in progress in France. Rather, development has been in the hands of private enterprises and government stimulation. Some of them are acting as a result of the direct initiative of the Commissariat de l'Énergie Atomique (CEA), the very advanced and energetic French government directorial agency in the nuclear field. As early as the beginning of this year, it was known that the CEA was planning to have a submarine and a tanker, propelled by nuclear energy, in the water by 1961. (In addition, CEA was planning four experimental piles, two advanced piles, three energy prototypes and a separation factory for U₂₃₅.) At that time, however, it was not known whether a budget allocation could be secured and in view of the political crisis in France, the entire future is probably still rather unsettled. The specific projects in which CEA was interested

include plans for a tanker of 20,000 tons and one of 40,000 tons. From these plans, an experimental ship would be built. The plans were to be drawn up by three industrial groups, France-Atome, Sudatom and Schneider-Creusot. (Reference: Atomes, No. 139, December, 1957 and No. 140, January, 1958.)

The work had evidently been in progress for some time, for some material on the French interest in nuclear shipping was included in the French pavillion at the Brussels' World Fair. Late in July, two governmental officials concerned with the project made a special effort to call attention to it: they gave an interview to the conservative newspaper, Le Figaro. The content of the interview appears to indicate that they acted on their own initiative and not at the request of the newspaper. The officials--M. Poirier, director of the merchant fleet section at the Subsecretariat for the merchant marine, and M. Giques, chief of mechanical studies at the CEA research installation at Saclay--made the situation quite clear. Three industrial groups--France-Atome, Sudatom and the "Société des Forges et Ateliers du Creusot"--had entered a competition and each produced plans for an oil tanker of 40,000 tons and one-half that weight and each of the plans proved highly satisfactory to the two officials. They were confident that any of the plans would be a technical success and understood that French industry was ready to begin work on them. Economic studies had just been concluded, indicating that profitable operation of a nuclear ship was not out of the question and that if an experimental ship were to be built it would be made profitable to the operator by means of a subsidy. A comment by Le Figaro's reporter is revealing, on the one hand, of the tone of much of the French press and on the other, of the attitude which may underlie the French view of nuclear shipping. He said: "We are not the first in the race which has started. But we find ourselves in a good position at the beginning. Let's not fall behind." (Reference: Le Figaro, 26-27 July 1958.)

Incidentally, the vigorous CEA is the point of contact for nuclear energy leaders with scientists and professional researchers in the universities and technical schools. CEA includes many young, highly intelligent, vigorous men and women on its staff and, as in England and Holland, is deeply concerned with theoretical research in the institutions of higher learning. It can be taken as sure that many CEA personnel belong to the major scientific societies of France and are thoroughly informed on the latest developments in the nuclear field.

It should be noted that industrial groupings are involved in these studies. Only one of the competitors was an individual company. That company, the Schneider-Creusot firm, has connections, incidentally, with the Rotterdamsche Droogdok Maatschappij. The leading firm in Sudatom was the Ateliers et Chantiers de France

and in France-Atome, the Chantiers de l'Atlantique. France-Atome combines 14 firms. A third industrial group, made up of 10 large firms, also exists in France. This is Indatom, which appears to have the leadership of Schneider-Creusot. The existence of these industrial groupings points up the centralization of nuclear energy activities in France. Moreover, they are further centralized because of the activities of the CEA-sponsored Association Technique pour l'Utilisation de l'Énergie Atomique, which encourages studies and conferences in the atomic field. This Association, however, does not appear to have been highly active in the nuclear shipping field so far. Finally, a few companies, not so far mentioned, are known to have nuclear energy sections and one of them, the Société Alsacienne de Construction Mécanique, is said to be directly interested in nuclear tankers. The other companies are Électro-Mécanique, Société Rateau and La Société des Chantiers Réunis Loire Normandie.

In addition to these technical plans, some efforts have been made to develop social regulations in regard to the utilization of nuclear energy by industry. The Conseil Économique, an official advisory body, unanimously informed the government during July of its opinion that it was necessary to go ahead with the development of a systematic and rigorous program for the protection of workers and populations against the dangers of radioactivity connected with industrial activities. Without doubt, the Ministry of Labor and the Ministry of Economic Affairs are studying such regulations, which quite possibly could be ready by the time of the visit of the SAVANNAH. Fuller information should be secured on this question if possible. The IRCN has not been studying this question.

It appears from the visit of the NAUTILUS to France in 1958 that no special regulations have yet been explicitly applied to the ports. Without doubt, the question of ports is under study as well, although there is no indication that it has as high a priority as in the Netherlands. Again, IRCN apparently has not been concerned with this matter.

A word may be said about the personnel of the French industries discussed here. The younger French scientists, engineers and managers tend to be much more cosmopolitan than the older generation. It is no longer unusual to find among them individuals who speak English and other foreign languages without difficulty. This new cosmopolitan attitude is neither prevalent nor very honored among many of the older personnel who still man the highest directorial posts. Some of these people, if one may be permitted too broad a generalization, tend to know much about France but very little about the rest of the world, even if they are engaged in international businesses. They insist on speaking French only and not a few of them become incensed when their language is misused by a clumsy

foreigner. They have great faith in their own ability and friends and little in anything else. They are really not amenable to information programs about events outside of their circle unless those events may be shown to have a direct bearing on their own affairs. Most of these leading figures have had good general and sometimes technical educations and in their positions of importance have high prestige in French society. They are accustomed to being treated as leaders. At the same time, many of them head family businesses and can rightfully claim little knowledge of hard competition either for position or business leadership. Fortunately for the French marine industry and the foreign groups which come into contact with it, not all of its leaders are guided by such chauvinistic attitudes. Public information should be directed primarily to the open spirits rather than to the narrower individuals from whom little could be expected.

It probably could be said with accuracy that the French government atomic agency has given strong encouragement to the development of plans in the field of nuclear propulsion of merchant ships and that this encouragement has elicited a keen interest on the part of several important industrial firms. On the other hand, the rather closed and highly protected French shipbuilding industry perhaps has not responded quite so strongly as the engineering firms, where young, highly-educated personnel have an important role in making decisions.

CONCLUSIONS AND RECOMMENDATIONS

Both in France and the Netherlands, as in England, leading groups in the shipping and nuclear industries can be identified readily. In both countries, they have a trade press, a number of specialized organizations and an overlapping membership. In both countries, they tend to cluster around governmentally directed, inspired or supported activities. In both countries, there is a high degree of government involvement in all plans for developing nuclear shipping and, in the Netherlands, international organizations are brought into planning. In both countries, on the whole, the prospect of nuclear shipping has made little impact on the general public although in the Netherlands a more widespread knowledge can be expected than in France because of the importance of the maritime industry to the country.

It can be concluded from this centralization and governmental involvement that the primary target groups for a public information program in France and the Netherlands should be, as in England, the leading groups in shipping, shipbuilding and governmental nuclear energy research and control establishments. In France, the governmental group in most respects could be considered the most important. In the Netherlands, the industrial groups probably have a leading role in developing

nuclear shipping. In both countries, university professors should not be overlooked, since they have a wide influence and many connections in these leading groups.

Because these leading groups in both countries are deeply involved in many highly-developed industrial, commercial and scientific societies, it is recommended that insofar as possible the information channels afforded by these associations be employed. Therefore, attendance at meetings, presentation of scientific papers and liaison with these groups, as previously suggested for England, would be desirable. Much of the material prepared for use in England may be employed in the Netherlands. Because of the general knowledge of English in the Netherlands, especially among university-educated people, any written material for leading groups may be distributed in the English language. English may also be employed in calling on editors and officials.

The situation in France is markedly different. While some of the scholarly publications might be induced to take material in the English language, they would do so without joy. In the trade press, unless the material were remarkable, it would not be considered unless it were in French. It is important, then, to deal with groups in France only in the French language; moreover, the French should be good. In addition, the French trade groups, their press and the scientific press usually watch their English language counterparts. It is therefore very desirable to present fresh information to the specialized press in France.

The centralization of trade and scientific associations in Paris makes it easy to arrange for formal calls. It is suggested that formal calls by a representative of the Maritime Administration or other appropriate agencies on the Secretaries-General of the appropriate trade and scientific associations in the shipping, shipbuilding and nuclear industries might be highly appreciated and certainly would be the logical way to begin a public information program in France. Similar visits might well be employed in the Netherlands. They should produce information as to fruitful means of cooperation.

It is strongly recommended that in both France and the Netherlands, leading figures in the shipping industry and in nuclear research be invited to special visits and receptions aboard the ship. As in England, this will produce news and it also will ensure that information on the ship goes through the appropriate association channels.

In the Netherlands, H. R. H. Prince Bernhard of the Netherlands is honorary chairman of several important scientific organizations. He also has exhibited a keen interest in commercial and scientific affairs. It is quite possible that

he might accept an invitation to visit the ship. In France, it is rather unlikely that the President of the Republic would accept such an invitation. But various ministers of the government might well do so. If such visits could be arranged, coverage by the general press is a certainty.

As is indicated by the analysis above, the French press and specialized publics are likely to be highly sensitive to such superficial occurrences as faults in the use of French. This sensitivity is linked to a rather general tenderness where foreigners are concerned. At the moment, when French nationalism seems to have intensified, this sensitivity may well have increased. At the same time, the general rejection of "hand-outs" by the French press, including some of the specialized press, indicates that public relations as it is practised in the United States would be unlikely to score many successes in France. This is not to say that every effort to make information available should not be used. But it is to say that the press must be treated with special caution. It therefore is recommended that a French public relations firm--there are several reputable and able ones--should be employed to advise on and perhaps carry out the entire public relations program for that country. It can be predicted that such a firm would endorse suggestions made above as to transportation to the port and a buffet for the reporters and special attention to RTF personnel. (Employment of such an agency for the Netherlands probably would be unnecessary, especially if the personnel used in England also were available for Holland.)

As in the case of England, it is recommended that if possible an authorized representative and knowledgeable spokesman be available in France and Holland for as long a time as possible before the visit of the ship. A timetable similar to that suggested for England should be worked out.

It has been assumed that the SAVANNAH would be able to call at a major Dutch port, such as Rotterdam or Amsterdam. Yet this is in doubt because of the recent announcement by the Dutch government that special regulations were being designed to cover nuclear-propelled ships. It is recommended that clarification of these regulations be sought as soon as possible and that every effort be made to ensure that the SAVANNAH may call at a major port.

In the event that the ship is confined to Den Helder, the best public information program probably would be one which gave most priority to industrial and governmental groups. There would, of course, be some general interest, and the major newspapers, radio and TV could be expected to give the ship coverage. But visits by the general public probably would not be possible. If, however, the ship were permitted in Rotterdam or Amsterdam,

it is clear that general public interest would be much higher. More than in England, this general interest would be meaningful because of the importance of shipping to the Netherlands generally. In the Netherlands, the themes of the public information program could successfully be international cooperation on peaceful uses of atomic energy because of the Dutch interest in international action.

In France, the port of visit is unlikely to be a major population center unless the ship calls at Marseilles. But even such a call would have less impact on the country as a whole than a visit to Le Havre, which is close to Paris and therefore to the publishing center. Probably the theme of international cooperation would not be very attractive to most French publications and to the RTF. Rather, the interest of French leaders in the ship and its value as a counterpart of the French projects might be emphasized.

As in the Netherlands, it is important in France to determine the attitude of the government toward a visit by the ship. If new safety regulations are in force or any hesitance about permitting the ship in a major harbor is detected, efforts should be made to secure clarifications which would permit a visit. Probably the effective agency in deciding on these regulations will be the CEA, but the approach would have to be made through the Ministry of Foreign Affairs.

The themes suggested for each country probably would serve as a basis for any mass media program. As for public visits to the ship, the suggestions made for England would apply here. It is suggested in addition that for general public visitors, a Dutch edition of any explanatory brochure be prepared. A French edition would be essential.

The choice of media for a mass public information program has a good deal of importance. In the Netherlands, given its widely read and varied press, emphasis probably should be given to the daily and weekly papers. This implies that many reporters would be expected to visit the vessel. In addition, some radio coverage should be secured, if possible. Therefore, invitations should be issued to the five radio producing organizations and to Radio Unie. Television should not be overlooked, but it probably would act on its own initiative. Film footage should be offered it as background and feature material and any completed feature should be made available.

In France, because of the wide distrust of the press, a major effort to secure radio and television coverage probably should have priority. Such an effort should begin well in advance and should be handled by someone who is familiar with

French radio and television. In addition, it probably would be worth an effort to secure a story in Paris-Match, a picture magazine of very wide circulation (and not notable accuracy). A story there would have the great virtue of able pictorial coverage.

Visits by the general French public should be encouraged, although very great results probably could not be expected because of the distance of the port from the population center. Nevertheless, in view of the increasing number of motor cars in France, visiting hours on a weekend should produce good results and some press coverage.

For both France and Holland, it is recommended that information material similar to that recommended for the popular press in England be prepared. It is not recommended that much effort be made to mail such material in France. It should be available aboard the ship. In Holland, advance material may be mailed with good effect. It is essential in both countries to have aboard the ship an official who is knowledgeable and authorized to answer questions.

To sum up in general terms:

1. In both France and Holland, leading industrial, scientific and governmental groups should be the target.
2. On the whole, better mass results can be expected in Holland than in France.
3. Any information efforts should begin well in advance.
4. Clarification of governmental policy is essential to planning public information for any visit.

APPENDIX E
QUESTIONNAIRES AND ACCOMPANYING LETTERS
IN
FOREIGN TRANSLATIONS

THE UNIVERSITY OF MICHIGAN
ENGINEERING RESEARCH INSTITUTE

TELEPHONE
ANN ARBOR NORMANDY 3-1511
EXTENSION

ADDRESS REPLY TO:

Monsieur:

L'Institut de Recherches de l'Ecole d'Ingénieurs de l'Université de Michigan a entrepris (projet n° 2717) une étude détaillée des problèmes d'ordre général (et non techniques) posés par l'utilisation de navires atomiques. La première phase de cette étude est en rapport direct avec la croisière que va entreprendre, à titre de première démonstration, un navire américain mixte (passagers-marchandises) à propulsion nucléaire, le NS Savannah.

Les problèmes à étudier sont, entre autres, ceux qui peuvent se poser dans les ports où le navire fera escale. De ces ports, il est de toute première importance pour nous de connaître leur réglementation, les arrêtés particuliers qui peuvent les régir, l'état de l'opinion publique, ainsi que l'attitude des syndicats de dockers.

Etant entendu que nous ignorons, jusqu'à maintenant, l'itinéraire de croisière du navire, nous devons faire porter notre enquête sur un certain nombre de ports afin de parvenir à une vue d'ensemble des problèmes qui pourraient se poser. Le port de _____ a été choisi comme objet d'enquête dans cette intention, et toutes les informations que vous pourriez nous communiquer seraient pour nous d'un secours inappréciable.

Nous pensons que les intentions qui animent les promoteurs de cette croisière seraient plus fidèlement servies si le navire pouvait entrer dans le port et être déchargé sans avoir à subir une inspection particulièrement fastidieuse, s'il pouvait être amarré à un quai normalement aménagé pour les navires de type conventionnel transportant des passagers, et de préférence à proximité de moyens de transports publics. Tout ce qui pourrait s'opposer à ce que ces conditions soient remplies intéresse particulièrement notre Bureau de Recherches. Il faut cependant souligner que ce navire aura fait escale dans divers ports des Etats-Unis avant son départ pour les ports étrangers.

Vous trouverez ci-joint un questionnaire précisant le genre d'informations dont nous avons besoin. Des réponses détaillées à chacune des questions nous seraient très utiles. J'ajouterai que, toute suggestion de votre part à propos d'une question ou d'un problème qui, éventuellement, pourraient se poser, sera la bienvenue. Toutes ces informations seront considérées comme strictement personnelles, et n'engageant en rien votre responsabilité sur le plan officiel; elles resteront, de ce fait, entièrement confidentielles.

Nous sommes conscients de la lourde tâche que représente pour vous la réponse à ce questionnaire. Mais votre contribution facilitera grandement notre étude.

Avec tous nos remerciements pour l'intérêt que vous voudrez bien porter à cette enquête. Veuillez accepter, Monsieur, l'expression de ma considération.

Morgan Thomas, PhD

Autorités portuaires

1. Quelles sont les autorités locales ou portuaires qui ont le pouvoir de limiter les déplacements d'un navire dans les eaux du port en déclarant ce navire dangereux?
 - 1a. Etant entendu que vous parlez à titre privé, pensez-vous que l'une quelconque de ces autorités puisse considérer comme dangereux un navire à propulsion atomique?
 - 1b. Pensez-vous que les déplacements de navires atomiques seront soumis à restriction dans les eaux du port de
2. Quelles sont les autorités locales ou portuaires qui ont le pouvoir d'interdire l'accostage d'un vaisseau à un quai quelconque en le déclarant dangereux?
(Si les réponses aux questions 1 et 2 sont les mêmes ne pas répondre à la question 2a.)
 - 2a. Etant à nouveau entendu que vous parlez à titre privé, pensez-vous que l'une quelconque de ces autorités puisse considérer comme dangereux un navire à propulsion atomique?
 - 2b. Pensez-vous que la libre utilisation des quais par des navires atomiques sera soumise à restriction dans le port de
3. A votre avis, l'arrivée et la visite d'un navire atomique sont-elles susceptibles d'intéresser la population?
 - 3a. (si non) Pourquoi?
4. Quelle serait, à votre avis, l'attitude des dockers envers un navire nucléaire?
 - 4a. Pensez-vous que les dockers exigeraient une rémunération supplémentaire pour travailler à bord d'un navire nucléaire?
5. Si le navire devait faire escale à _____ et accueillir à son bord un grand nombre de visiteurs, quel est le quai qui, à votre avis, conviendrait le mieux?
6. Est-ce qu'il existe des autorités municipales ou d'autres services administratifs locaux (Direction départementale de la Santé, Service de Protection contre les Incendies, par exemple) spécialement chargés de réglementer les conditions générales de sécurité sur les quais?
 - 6a. (Si la réponse à la question 6 est oui) Quels sont ces services?

7. Des cargaisons de matière première radio-active sont manipulées comme fret ordinaire dans quelques grands ports mondiaux. De telles cargaisons ont-elles transité par le port de
- 7a. Existe-t'il une réglementation applicable à ces cargaisons?
- 7b. (Si la réponse à la question 7a est oui) Cette réglementation est-elle nationale ou locale?
- 7c. (Si la réponse à la question 7a est oui) Quel est le service chargé de faire appliquer cette réglementation?
- 7d. (Si la réponse à la question 7 est oui) Les dockers reçoivent-ils une rémunération supplémentaire lorsqu'ils manipulent un chargement radio-actif?
8. Les navires nucléaires sont-ils actuellement soumis à une réglementation particulière?
- 8a. Dans l'affirmative, pouvez-vous nous communiquer un extrait de cette réglementation?
- 8b. A-t'on proposé ou envisagé une réglementation particulière applicable aux navires atomiques?

Service de Santé

1. Est-ce que ce sont les services locaux du Ministère de la Santé qui réglementent les conditions générales d'hygiène et de santé publique dans le port de
 - 1a. Dans la négative, quel est le service qui assume cette charge?
2. Des cargaisons de matière première radio-active sont manipulées comme fret ordinaire dans quelques grands ports mondiaux. De telles cargaisons ont-elle transité par le port de
 - 2a. Existe-t'il une réglementation applicable à ces cargaisons?
 - 2b. Dans l'affirmative, cette réglementation est-elle nationale ou locale?
 - 2c. Le Ministère de la Santé est-il chargé de faire respecter cette réglementation?
 - 2d. (Si la réponse est non) Quel est le service qui assume cette charge?
3. Applique-t'on actuellement une réglementation destinée à prévenir les accidents éventuels que pourraient provoquer des radiations émises soit par des appareils (appareils à Rayons-X, par exemple) soit par des corps (tels que des isotopes radio-actifs)?
 - 3a. Dans l'affirmative, pourriez-vous nous communiquer un extrait de cette réglementation?
4. Applique-t'on ou envisage-t'on une réglementation destinée à protéger les personnes travaillant à proximité des sources de radiations?
 - 4a. Dans l'affirmative, pourriez-vous nous communiquer un extrait de cette réglementation?
5. Des réacteurs atomiques ont été mis en service dans certaines grandes villes, et des réacteurs industriels installés à proximité d'autres grandes villes. A-t'on installé de tels réacteurs dans votre ville, ou se propose-t'on de le faire?
 - 5a. (Si la réponse à la question 5 est oui) Quels sont les services administratifs qui, dans ces circonstances, ont la charge d'assurer la protection de la Santé Publique?
6. Etant entendu que vous parlez à titre privé, pensez-vous que le Ministère de la Santé s'opposerait, du point de vue de la Santé Publique, à l'entrée d'un navire atomique dans le port?

THE UNIVERSITY OF MICHIGAN
ENGINEERING RESEARCH INSTITUTE

TELEPHONE
ANN ARBOR NORMANDY 3-1511
EXTENSION

ADDRESS REPLY TO:

Sehr geehrter Herr!

Die "University of Michigan, Engineering Research Institute, Project 2717" befasst sich zur Zeit mit einer Studie nicht-technischer Probleme, die sich aus der Operation atomangetriebener Handelsschiffe ergeben. Die erste Phase dieser Studie betrifft die zukuenftige Maidenfahrt eines atomangetriebenen amerikanischen Handels-Passagierschiffes, der NS Savannah.

Probleme, die sich im Zusammenhang mit dem Anlaufen von Haefen ergeben koennten, sind ein Teilgebiet der allgemeineren probleme, die von uns studiert werden sollen. Was das Anlaufen von Haefen selbst anbetrifft, so sind wir hauptsaechlich an Hafengebieten, lokalen Verordnungen, Fragen oeffentlicher Meinung und Gewerkschaftsansichten (Hafenarbeiter) interessiert.

Da noch kein bestimmter Plan fuer diese Fahrt festgelegt ist, beabsichtigen wir, eine Anzahl von Haefen zu studieren, um zu einigen allgemeinen Schlussfolgerungen ueber die Probleme zu gelangen, mit denen auf einer solchen Fahrt zu rechnen ist. ist einer der Haefen, die zu diesem Zweck gewaehlt wurden. Wir waeren Ihnen sehr dankbar, wenn Sie uns in der Beschaffung der fuer dieses Forschungsprojekt notwendigen Information behilflich sein wuerden.

Unsere Studie gruendet auf der Annahme, dass die Fahrt dieses atomangetriebenen Schiffes Savannah nur dann reibungslos verlaufen und ihren Zweck erfuellen wird, wenn es ein Hafengebiet ohne besonders erschwerliche Inspektionen betreten und verlassen und an einem fuer gewoehnliche Handelsschiffe vorgesehenen Pier docken kann, wenn moeglich im Bereiche von Anschlussmoeglichkeiten an oeffentliche Verkehrsmittel. In unserem Projekt nun sind wir daran interessiert, all die Schwierigkeiten herauszufinden, die sich einem solchen Vorhaben in den Weg stellen und seine Erfuellung verhindern koennten. Es darf erwaeht werden, dass das Schiff verschiedene Haefen in den Vereinigten Staaten aufsuchen wird, ehe es fremde Haefen anlauft.

Ein beigefuegter Fragebogen skizziert die Art Information, die wir benoetigen: detaillierte Antworten auf jede Frage waeren wuensenswert. Jegliche Auskunft ueber irgendwelche andere zu erwartenden Probleme wird ebenfalls dankbar entgegengenommen. Natuerlich wird alle Auskunft, die Sie uns mitteilen, als persoenliche Ansicht und nicht als offizieller Standpunkt einer Behoerde gewertet und als solche streng vertraulich behandelt werden. Wir wissen, dass unsere Bitte um Auskunft eine zeitraubende Belaestigung darstellt, doch Ihre Antwort wird unsere Studie wesentlich erleichtern.

Herzlichen Dank fuer Ihren freundlichen Beistand.

Hochachtungsvoll,

Dr. Morgan Thomas

Hafenbehoerden

1. Welche Stadt- und/oder Hafenbehoerden sind befugt, die Bewegungsfreiheit eines Schiffes im Hafengebiet zu beschraenken, indem sie es als "gefuehrlich" bezeichnen?

	<u>Name</u>	<u>Anschrift</u>
(a)	_____	_____
(b)	_____	_____
(c)	_____	_____
(d)	_____	_____

- 1a. Ihrer persoelichen Ansicht nach, glauben Sie, diese Behoerden wuerden ein atomantriebenes Schiff als "gefuehrlich" bezeichnen?
- 1b. Glauben Sie, dass atomantriebene Schiffe im Hafengebiet von besonderen Vorschriften unterworfen wuerden, die sie in ihrer Bewegungsfreiheit im Hafen beschraenken wuerden?
2. Welche Stadt- und/oder Hafenbehoerden sind befugt, einem Schiff das Anlegen an bestimmten Piers oder Docks zu verweigern, indem sie es als "gefuehrlich" bezeichnen?

	<u>Name</u>	<u>Anschrift</u>
(a)	_____	_____
(b)	_____	_____
(c)	_____	_____
(d)	_____	_____

Falls Ihre Antworten auf Fragen 1 und 2 die gleichen sind, bitte beantworten Sie Frage 2a.

- 2a. Ihrer persoelichen Ansicht nach, glauben Sie, dass diese Behoerden ein atomantriebenes Schiff als "gefuehrlich" bezeichnen wuerden?
- 2b. Glauben Sie, dass man atomantriebenen Schiffen die unbehinderte Benutzung der Hafenanlagen von _____ verweigern wuerde?
3. Sind Sie der Ansicht, dass die Oeffentlichkeit Interesse daran haette, ein atomantriebenes Schiff zu besichtigen?

- 3a. (Falls Nein) Warum nicht?
4. Wie wuerden sich Ihrer Ansicht nach die Hafentarbeiter zu einem atomangetriebenen Schiff stellen?
- 4a. Glauben Sie, die Hafentarbeiter wuerden fuer Arbeit an einem atomangetriebenen Schiff extra Lohnforderungen stellen?
5. Falls das Schiff anlaufen und eine groessere Anzahl von Besuchern an Bord nehmen wuerde, welcher Pier oder Kai waere am besten geeignet dafuer?
6. Werden Gesundheits- und Sicherheitszustaende im Hafengebiet von staedtischen oder anderen oertlichen Behoerden, wie z.B. vom Gesundheitsamt oder der Feuerpolizei, ueberwacht?
- 6a. (Falls Ja auf Frage 6) Welche Behoerden sind dies?
- 6b. (Falls Nein auf Frage 6) Welche anderen Behoerden sind mit einer solchen Ueberwachung beauftragt?
7. Ladungen, die radioaktive Substanzen enthalten, werden in einigen groesseren Welthaefen als allgemeines Frachtgut behandelt. Sind solche Ladungen je im Hafen von verschifft worden?
- 7a. Existieren gesetzliche Bestimmungen ueber radioaktives Frachtgut?
- 7b. (Falls Ja auf Frage 7a) Stammen diese vom Bund, Land, oder der Stadt?
- 7c. (Falls Ja auf Frage 7a) Welche Behoerden sind mit der Ueberwachung der Ausfuehrung und Einhaltung dieser Bestimmungen beauftragt?
- 7d. (Falls Ja auf Frage 7) Erhalten Hafentarbeiter, die mit radioaktivem Frachtgut zu tun haben, extra Lohn?
8. Existieren gueltige Bestimmungen ueber atomangetriebene Schiffe?
- 8a. Wenn ja, koennten Sie uns bitte eine genaue gesetzliche Quellenangabe dieser Bestimmungen geben?
- 8b. Sind gesetzliche Bestimmungen, die sich auf atomangetriebene Schiffe beziehen, je vorgeschlagen oder eroertert worden?

Gesundheitsbehoerden

1. Hat das staedtische Gesundheitsamt Bestimmungen ueber allgemeine Gesundheitsverhaeltnisse im Hafengebiet von _____ erlassen?
- 1a. (Falls Nein auf Frage 1) Welche Behoerde ist befugt, solche Vorschriften zu erlassen?
2. In einigen grossen Welthaeften werden Ladungen radioaktiver Substanzen als gewoehnliches Frachtgut behandelt. Wurden solche Ladungen je im Hafen von _____ verschifft?
- 2a. Existieren gesetzliche Bestimmungen ueber radioaktives Frachtgut?
- 2b. (Falls Ja auf Frage 2a) Stammen diese vom Bund, Land, oder der Stadt?
- 2c. Wird die Ausfuehrung und Einhaltung dieser Bestimmungen von den Gesundheitsbehoerden ueberwacht?
- 2d. (Falls Nein auf Frage 2c) Welche Behoerde ist damit beauftragt, die Ausfuehrung und Einhaltung dieser Bestimmungen zu ueberwachen?
3. Existieren gueltige Bestimmungen, die sich auf die Gefahren beziehen, die im Zusammenhang mit ionisierenden Strahlungsapparaten, Roentgenapparaten und radioaktiven Isotopen auftreten koennen?
- 3a. (Falls Ja auf Frage 3) Koennten Sie uns bitte eine genaue gesetzliche Quellenangabe dieser Bestimmungen geben?
4. Sind Bestimmungen in Kraft - oder vorgesehen - die zum Schutze von Arbeitern dienen, die in der Naehel von Strahlungsquellen arbeiten?
- 4a. (Falls Ja auf Frage 4) Koennten Sie uns bitte eine genaue gesetzliche Quellenangabe dieser Bestimmungen geben?
5. In einigen groesseren Staedten oder deren Umgebung wurden Atomreaktoren in Betrieb genommen. Sind Atomreaktoren in Ihrer Stadt errichtet oder geplant worden?
- 5a. (Falls Ja auf Frage 5) Welche Regierungsbehoerde war fuer gesundheitliche Schutzmassnahmen verantwortlich?
6. Ihrer persoenlichen Ansicht nach, glauben Sie, die zustaendigen Gesundheitsbehoerden haetten Einwaende, wegen moeglicher Gesundheitsgefaehrung, wenn ein atomangetriebenes Schiff den Hafen von _____ anlaufen wuerde?

UNIVERSITY OF MICHIGAN
ENGINEERING RESEARCH INSTITUTE

TELEPHONE

ADDRESS REPLY TO:

Egregio Signore,

L'Università del Michigan, Istituto di Ingegneria per le Ricerche, Progetto 2717, è attualmente impegnato in un'analisi dei problemi non tecnici che il funzionamento di navi commerciali a propulsione nucleare comporta. La prima fase dello studio è connessa con la crociera dimostrativa della nave mercantile e passeggeri a propulsione nucleare "NS Savannah."

Tra gli specifici problemi allo studio vi sono quelli attinenti i porti toccati, per i quali lo studio si interessa principalmente delle questioni sulle regolamentazioni di porto, leggi locali, opinione pubblica ed attitudine dei sindacati (dei lavoratori portuali.)

Siccome non è ancora disponibile un itinerario per la crociera, un certo numero di porti è allo studio al fine di trarre conclusioni generali concernenti i problemi che si potranno incontrare. Il porto di è stato scelto per gli scopi di questa indagine ed il Suo aiuto ci sarà di notevole apporto nel raccogliere le informazioni relative.

Pensiamo che gli scopi della crociera dimostrativa della nave nucleare Savannah saranno meglio raggiunti se essa potrà entrare nei porti ed essere ispezionata senza eccessiva perdita di tempo, nonchè potrà attraccare ad un molo adatto ad una normale nave passeggeri e mercantile, preferibilmente con adeguati trasporti pubblici nelle vicinanze. Qualsiasi cosa che possa impedire il raggiungimento di queste condizioni interesserebbe l'Ufficio Ricerche di questo Progetto. Possiamo aggiungere che la suddetta nave toccherà vari porti degli Stati Uniti prima di salpare per porti stranieri.

Alleghiamo un questionario che delinea il genere di informazioni che sono necessarie e le risposte dettagliate ad ogni domanda ci saranno di notevole aiuto. Tuttavia, qualsiasi informazione su problemi che Ella può prevedere sarà bene accetta. Le informazioni che ci saranno inviate saranno considerate come Sua opinione personale e non la posizione ufficiale di un funzionario governativo e, naturalmente, saranno trattate come strettamente confidenziali. Ci rendiamo conto che l'invio delle informazioni che Le richiediamo Le sarà di un certo qual incomodo. La Sua risposta, tuttavia, faciliterà enormemente la nostra analisi.

Ringraziando La per la Sua cortese cooperazione, Le porgiamo i nostri più distinti saluti.

Morgan Thomas, Ph.D.

FUNZIONARI PORTUALI

1. Quali funzionari comunali e/o portuali hanno autorità per limitare il movimento di una nave nelle acque del porto dichiarando una nave pericolosa?

	Nome	Posizione
(a)		
(b)		
(c)		
(d)		

1a. Parlando non ufficialmente, crede che taluna di queste persone considererebbe pericolosa una nave a propulsione nucleare?

1b. Crede che il libero movimento di navi nucleari verrebbe limitato nelle acque del porto di _____ ?

2. Quali funzionari comunali e/o portuali hanno autorità per impedire l'attracco di una nave ad un dato molo dichiarando una nave pericolosa?

	Nome	Posizione
(a)		
(b)		
(c)		
(d)		

Se le Sue risposte alle domande 1 e 2 sono identiche, non risponda alla domanda 2a.

2a. Nuovamente parlando non ufficialmente, crede che taluna di queste persone considererebbe pericolosa una nave a propulsione nucleare?

2b. Crede che il libero uso dei moli nel porto di _____ sarebbe limitato ad una nave nucleare?

3. Secondo Lei, il pubblico di _____ sarebbe interessato a vedere e visitare una nave nucleare?

3a. (in caso di risposta negativa alla domanda 3) Perché no?

4. Quale potrebbe essere l'atteggiamento dei lavoratori portuali locali verso una nave nucleare?

4a. Crede che i lavoratori portuali locali richiederebbero una particolare indennità per lavorare su di una nave nucleare?

5. Se la nave dovesse fermarsi nel porto di _____ e prendere a bordo un gran numero di visitatori, secondo Lei, quale sarebbe il molo più adatto?

6. Sono le condizioni igieniche e di sicurezza ai moli regolate da Enti comunali o governativi locali, come ad esempio l'Ufficio d'Igiene comunale od il Comando dei Vigili del Fuoco?

- 6a. (in caso di risposta positiva alla domanda 6)
Quali sono tali Enti?
- 6b. (in caso di risposta negativa alla domanda 6)
Quali Enti governativi esercitano tale funzione?
7. Partite di materiali radioattivi sono maneggiati come carichi ad alcuni dei più importanti porti mondiali. Si è mai verificata tale eventualità nel porto di _____ ?
- 7a. Vi sono regolamentazioni relative a carichi radioattivi?
- 7b. (in caso di risposta positiva alla domanda 7a)
Sono tali regolamentazioni nazionali o locali?
- 7c. (in caso di risposta positiva alla domanda 7a)
Quale Ente provvede all'osservanza di tali regolamentazioni?
- 7d. (in caso di risposta positiva alla domanda 7)
I lavoratori portuali ricevono una particolare indennità per il maneggio di carichi radioattivi?
8. Regolamentazioni concernenti navi nucleari sono attualmente vigenti?
- 8a. Se si, potrebbe darci gli estremi della legge?
- 8b. Sono state proposte o si è parlato di regolamentazioni concernenti navi nucleari?

FUNZIONARI DEI SERVIZI DI IGIENE E SANITA'

1. Il Servizio di Igiene cittadino regola le condizioni generali di igiene ai moli del porto di _____ ?
- 1a. (in caso di risposta negativa alla domanda 1)
Quale Ente regola le condizioni di igiene?
2. Partite di materiali radioattivi sono maneggiati come carichi ad alcuni dei più importanti porti mondiali. Si è mai verificata tale eventualità al porto di _____ ?
- 2a. Vi sono regolamentazioni attinenti carichi radioattivi?
- 2b. (in caso di risposta positiva alla domanda 2a)
Sono tali regolamentazioni nazionali o locali?
- 2c. E' il Servizio di Igiene e Sanità che provvede a far osservare tali regolamentazioni?
- 2d. (in caso di risposta negativa alla domanda 2c)
Quale Ente provvede all'osservanza di tali regolamentazioni?
3. Vi sono regolamentazioni attualmente vigenti aventi lo scopo di controllare il pericolo proveniente da macchine produttrici di radiazioni ionizzanti o materiali radioattivi, come ad esempio macchine per raggi X od isotopi radioattivi?
- 3a. (in caso di risposta positiva alla domanda 3)
Potrebbe citarci tali regolamentazioni?
4. Vi sono regolamentazioni, attualmente vigenti o proposte, aventi lo scopo di proteggere coloro che lavorano nei pressi di fonti di radiazioni?
- 4a. (in caso di risposta positiva alla domanda 4)
Potrebbe citarci tali regolamentazioni?
5. In alcune grandi città reattori atomici sono in funzione e presso altre grandi città sono situati alcuni reattori industriali. Sono stati tali reattori impiantati oppure proposti nella Sua città?
- 5a. (in caso di risposta positiva alla domanda 5)
Quali Enti governativi sono incaricati della sicurezza igienica e sanitaria connessa con il funzionamento dei reattori?
6. Parlando non ufficialmente, Ella pensa che il Servizio di Igiene e Sanità solleverebbe obiezioni dal punto di vista igienico all'ingresso di una nave nucleare nel porto di _____ ?

ミシガン大学工学研究所は、現在、原子力商船の操作に関する非技術面の調査としてあります。

この調査の主眼は、米口原子力商船「サヴァナ」の処世航海に関するもので、問題は米口港に於ける諸問題、特に港灣令、地方法律、公衆の意見、及び荷揚労働者組合に関するものです。現在のところ航海の予定が不明のため、吾々は一般的結論を得るため、吾々の港を対象として調査を進めています。横濱港はそれらの港の一つに扱われていますので、中見港が吾々の資料集りに御助力下さるならば幸甚です。

吾々としては「サヴァナ」が貴港に入港出来、不当な検閲に悩まされることなく、商船として適当な交通の便の良い棧橋に停泊出来るならば、「サヴァナ」の目的は達せられるものと思っております。もしそのために何らかの防げがある場合、それは吾々にとりて参考になるものであります。なほ、この船は諸外口へ向け出帆する前に米口の諸港へ寄る港する筈にござります。資料として必要の諸問題の概要を同封致しました。他々の問題に出来ただけ詳細にお答え下さるならば幸いです。勿論、これらの他に問題となる点があれば、お書き添え下さい。なほ、吾々に御送り下さる資料は、公文書としてではなく、他人の意見としてお扱います。又、厳重に秘密とされるものを申し添えます。質問書は込みいったものでお手紙の段、おあい致します。どうか御協力の程、平にお願致します。

港湾局公務官へ

1. 市又は港のどの公務官が船舶を危険だとして港での動きを制限する権限を持っていますか。

名前 官名

a. c. d.

1. a. 私的意見として、貴方は二通りの人々の誰かが原子推進式船舶を危険だとみなすと思いますか。

1. b. 貴方は横浜港内に於いて、原子船舶は自由行動を制限されると思いますか。

2. 市又は港のどの公務官が船舶を危険だとし、割合を求めた停泊所へその船が入るのを疎にする権限を持っていますか。

名前 官名

a. c. d.

2. a. 私的意見として、二通りの人々のうち誰かが原子船を危険な船と考えるであろうと貴方は思っていますか。(1.2.の回答が同じ場合、向2. a. だけ省略して下さい。)

2. b. もし2. a. の答が肯定的の場合、貴方は横浜港に於て原子船が埠頭の自由な使用を制限されると思いますか。

3. 貴方自身の意見として、横浜の一般市民は原子船見学の興味をもつと思いませんか。

3. a. もし3. の答が否定の場合、何故興味をもたないと思いますか。

4. 貴方は原子船に対し、当地の荷揚場労働者などの拒否態をとると思いますか。

4. a. 原子船で働く者に対し、当地の労働者は臨時手当を要求すると思いませんか。

5. 貴方はもし船舶が横浜港に停泊し、
その見学者を乗船させるとすればどの
埠頭が最もよいと思えますか。

6. 市又は地の当局筋例えば市保健課
又は港湾衛生課等が桟橋に於ける保
健上の安全性を統制して下さるか。

6. a. (もし6.の答が肯定の場合) どの課が
して下さるか。

6. b. (もし6.の答が否定の場合) 政府のどの課
がして下さるか。

7. 世界の大半の港では放射性物質が貨
物扱いとうけられますが横浜港では放射
性物質の扱いと異なる点がありますか。

7. a. 放射性貨物に適用される規則が
ありますか。

7. b. (もし7. a.の答が肯定の場合) その規則
は口法ですか、地方法ですか。

7. c. (もし7. a.の答が肯定の場合) 何課が
その規則を実施して下さるか。

7. d. (もし7.の答が肯定の場合) 放射性
貨物を取扱う場合、荷揚労働者は
臨時手当がもらえますか。

8. 原子船舶に適用される現在有効な
何らかの法がありますか。

8. a. (もし8.の答が肯定の場合) その法
律を引用して下さい。

8. b. 原子船舶に適用される何らかの法律が
今までに提案され、又は審議された
点がありますか。

保健公務官へ

1. 市保健課は横濱港埠頭の一般衛生管理を行いますか。

1. a. もし1.の答が否定の場合、誰が衛生管理を行いますか。

2. 在界の大きな港では放射性物質が

貸物扱いとつけまわすのが横濱港では放射性物質の取扱いはどうなっていますか。

2. a. 放射性貨物に適用される規則がありますか。

2 b. (もし2. a. の答が肯定の場合) その規則は口法ですか、地方法法ですか。

2. c. 保健課はその規則を実施しますか。

2. d. (もし2. c. の答が否定の場合) 誰がそれを実施しますか。

3. 例えばレントゲンの機械や放射能アイソ

トプの標記イオン化系放射物質を扱う機械や物質を統制するための何か

3. a. (もし3. の答が肯定の場合) その規則を引用して下さい。

4. 放射物質源の近くで働く労働者を保護するために何かある。又は現に有効な規則がありますか。

4. a. (もし4. の答が肯定の場合) その規則を引用して下さい。

5. この大都市では反汚調査機がどこにあり、又近隣都市には工業用反汚調査機が設備されていますか。又市では反汚調査機がどこにあり、どこにありませんか。

5. a. (もし5. の答が肯定の場合) 政府のどの機関がその操作に対する保健上の安全性に責任をもちますか。

6. 私的意見として、貴方は原子船が横濱港に入るのを保健課が保健的見地から反対すると思いませんか。

UNIVERSITY OF MICHIGAN
ENGINEERING RESEARCH INSTITUTE

TELEPHONE

ADDRESS REPLY TO:

University of Michigan, Engineering Research Institute, Project 2717, arbeider for tiden med en analyse av ikke-tekniske problemer som kan ha innvirkning på driften av atomdrevne handelsskip. Den første delen av dette arbeidet foretas i forbindelse med demonstrasjons- og prøveturen for det amerikanske atomdrevne handels- og passasjerskip N/S "Savannah."

Blant de spesielle problemer som skal undersøkes er de som eventuelt kan oppstå i anløpshavnene. I denne forbindelse vil undersøkelsens hovedproblemer være spørsmål om havnevedtekter, lokal lovgivning, den offentlige mening og arbeiderorganisasjonenes (losse- og lastearbeiderne) holdning.

Da det for øyeblikket ikke foreligger noen reiserute for prøveturen, blir et større antall havner undersøkt slik at en kan danne seg et generelt bilde av de problemer en eventuelt må ta i betraktning. Oslo er blitt valgt som en av de havnene som skal undersøkes i denne forbindelse, og vi ville være meget takknemlige om De kunne være behjelpelig med å skaffe tilveie opplysninger for denne undersøkelsen.

Vi antar at hensikten med N/S "Savannah" 's tokt vil bli best tjent hvis skipet kan anløpe havnen og bli klarert uten noen overdrevent brysom inspeksjon, og hvis det kan legges til ved en kai som passer for et konvensjonelt handels- og passasjerskip, helst i nærheten av offentlig transportmiddel. Alt som kan være til hinder for å oppnå slike betingelser, vil det være av interesse for forskningsstaben for dette prosjektet å få opplysninger om. Det bør kanskje nevnes at skipet ventelig vil anløpe forskjellige havner i U.S.A. for det gar til utenlandske havner.

Et spørreskjema som gir rede for hva slags opplysninger som er nødvendige er vedlagt, og detaljerte svar til hvert spørsmål vil være til stor hjelp. Imidlertid vil enhver opplysning om eventuelle problemer som ventelig kan oppstå være velkommen. Alle opplysninger som blir sendt til oss vil bli betraktet som en personlig oppfatning og ikke som et offisielt standpunkt for en offentlig tjenestemann, og de vil selvsagt bli behandlet strengt konfidensielt. Vi er klar over at det vil være brysomt å skaffe tilveie de opplysningene vi har bedt om. Deres svar vil imidlertid i høy grad lette vårt analysearbeid.

På forhånd takk for Deres hjelp i denne saken.

A e r b ø d i g s t

Morgan Thomas, Ph.D.

HAVNENYMDIGHETER:

1. Hvilke by- og/eller havnemyndigheter har myndighet til å begrense skipstrafikken inne i havnebassenget ved å erklære at et skip medfører risiko?

Navn:

Tittel:

- (a) _____
- (b) _____
- (c) _____
- (d) _____

1a. Som Deres uoffisielle mening, tror De noen av disse personer vil betrakte et skip drevet med atomkraft som risikobetonet?

1b. (Hvis "ja" til spørsmål 1a) Tror De at atomdrevne skip vil bli nektet fri fart innen Oslo havn?

2. Hvilke by- og/eller havneautoriteter har myndighet til å nekte et skip å legge til ved en hvilken som helst kai ved å erklære at skipet medfører risiko?

Navn:

Tittel:

- (a) _____
- (b) _____
- (c) _____
- (d) _____

Hvis Deres svar til spørsmål 1 og 2 er de samme, besvarer de ikke spørsmål 2a og 2b.

2a. Igjen som Deres uoffisielle mening, tror De at noen av disse personer vil betrakte et atomdrevet skip som risikobetonet?

2b. (Hvis "ja" til spørsmål 2a) Tror De at atomdrevne skip vil bli nektet å bruke kaianleggene i Oslo havn?

3. Etter Deres personlige oppfatning, vil publikum i Oslo være interessert i å se og besøke et atomdrevet skip?

3a. (Hvis "nei") Hvorfor ikke?

4. Hvordan tror De de lokale losse- og havnearbeideres holdning vil være overfor et atomdrevet skip?

5. Hvis skipet skulle anløpe Oslo havn og ta ombord et større antall besøkende, hvilken kai mener De vil være den beste?

6. Regulerer noen av byens lokale myndigheter, f. eks. byens helseråd eller brannvesen, helse- og sikkerhetsforholdene ved denne kaien?

- 6a. (Hvis "ja" til spørsmål 6) Hvilke myndigheter er dette?
- 6b. (Hvis "nei" til spørsmål 6) Hvilke regjeringsorganer regulerer disse forhold?
7. Skipninger med radioaktivt materiell blir losset i enkelte av de store havnene rundt i verden. Har skipninger med radioaktivt materiell passert Oslo havn?
- 7a. Foreligger det vedtekter som dekker radioaktiv last?
- 7b. (Hvis "ja" til spørsmål 7a) Er disse vedtektene nasjonale eller lokale?
- 7c. (Hvis "ja" til spørsmål 7a) Hvilke myndigheter påser at vedtektene overholdes?
- 7d. (Hvis "ja" til spørsmål 7) Mottar losse -og havnearbeiderne ekstra betaling når de håndterer radioaktiv last?
8. Foreligger det for tiden noen vedtekter som dekker atomdrevne skip?
- 8a. Hvis ja, kunne De være så vennlig å sitere loven for oss?
- 8b. Er det blitt snakket om eller foreslått noen vedtekter som skal dekke atomdrevne skip?

HELSEMYNDIGHETER:

1. Regulerer byens helseråd de generelle helsemessige forhold ved brygge- og kaffeanleggene på Oslo havn?
 - 1a. (Hvis "nei" til spørsmål 1) Hvilke myndigheter regulerer disse forholdene?
2. Skipninger med radioaktivt materiell blir losset i enkelte av de store havnene rundt i verden. Har skipninger med radioaktivt materiell passert Oslo havn?
 - 2a. Foreligger det vedtekter som dekker radioaktiv last?
 - 2b. (Hvis "ja" til spørsmål 2a) Er disse vedtektene nasjonale eller lokale?
 - 2c. Er det helserådet som påser at disse vedtektene overholdes?
 - 2d. (Hvis "nei" til spørsmål 2c) Hvilke myndigheter påser at vedtektene overholdes?
3. Foreligger det vedtekter som har til hensikt å kontrollere risikoen ved maskiner eller materiell som produserer ioniserende straling, slik som roentgenapparater eller radioaktive isotoper?
 - 3a. (Hvis "ja" til spørsmål 3) Kan De være så vennlig å sitere disse vedtektene for oss?
4. Foreligger det eller er det foreslått, vedtekter som skal beskytte folk som arbeider i nærheten av kilder for radioaktiv straling?
 - 4a. (Hvis "ja" til spørsmål 4) Kan De være så vennlig å sitere disse vedtektene for oss?
5. Reaktorer har vært i drift i flere større byer, og industrielle reaktorer har blitt anlagt i nærheten av andre store byer. Har noen reaktor blitt bygget eller foreslått bygget i denne byen?
 - 5a. (Hvis "ja" til spørsmål 5) Hvilke regjeringsorganer var ansvarlige for den helsemessige sikkerhet i forbindelse med driften?
6. Som Deres uoffisielle mening, tror De helserådet (event. Helsedirektoratet) vil protestere fra et helsemessig standpunkt mot at et atomdrevet skip anløper Oslo havn?

UNIVERSITY OF MICHIGAN
ENGINEERING RESEARCH INSTITUTE

TELEPHONE

ADDRESS REPLY TO:

Ex^{mo.} Sr.

O Projecto 2717 do Instituto de Pesquisas da Universidade de Michigan está actualmente encarregado de estudar e analisar problemas de natureza não-tecnica que dizem respeito a operação de navios propulsionados pela energia nuclear. A primeira fase deste estudo trata-se da viagem de ensaio do navio mercante-passageiro americano o NS Savannah propulsionado pela energia nuclear. Entre os problemas específicos que o Projecto se propõe estudar encontram-se os que possam surgir nos portos que o navio deve tocar. O que mais interessa ao estudo no que diz respeito aos portos é o problema dos regulamentos dos portos, leis locais, opinião publica e a atitude dos estivadores.

Como actualmente nao conhecemos o itinerário da viagem, está-se a estudar um grande numero de portos a fim de se chegar a conclusões gerais sobre problemas que tenhamos de enfrentar. foi escolhido como um dos portos a ser estudado para esse fim, e ficar-lhe-iamos muito agradecidos se V. Ex^{cia.} nos pudesse ajudar a obter as informações necessárias.

O estudo assume que o sucesso do NS Savannah ficará garantido se o navio puder entrar no porto e passar a inspecção sem inconvenientes e acostar a um cais bom para um navio convencional mercante-passageiro, de preferéncia com acesso facil aos meios de transporte publicos. Qualquer impedimento em satisfazer essas condições seria de interesse ao pessoal de investigação do Instituto. Informa-se mais que o navio espera tocar em portos dos Estados-Unidos antes de fazer viagem para portos do estrangeiro.

Remetemos incluso um questionário sobre as informações que necessitamos e estimariamos obter respostas detalhadas a esse questionário, e qualquer outra informação pertinente.

Qualquer informação que nos seja enviada será considerada como opinião pessoal e não a atitude oficial dum funcionário do Governo, e será tratada na mais estrita confidencia.

Antecipamos desde ja os nossos agradecimentos pelo interêsse que lhe possa merecer

De V. Ex^{cia.} muito a^{to}. e grato,

1. Quais são os funcionários do porto e/ou da cidade que tem a autoridade de restringir o movimento de um navio em águas do porto declarando que o navio é perigoso?

	<u>Nome</u>	<u>Cargo</u>
(a)	_____	_____
(b)	_____	_____
(c)	_____	_____
(d)	_____	_____

1a. Falando não-oficialmente V. Ex^{cia}. é de opinião que qualquer destes funcionários possa considerar como perigoso um navio propulsionado pela energia nuclear?

1b. É de opinião que o franco movimento de navios nucleares será restringido nas águas do porto de _____ ?

2. Quais são os funcionários do porto e/ou da cidade que tem a autoridade de obstar a que um navio acoste a qualquer cais, declarando que esse navio é perigoso?

	<u>Nome</u>	<u>Cargo</u>
(a)	_____	_____
(b)	_____	_____
(c)	_____	_____
(d)	_____	_____

Se a resposta às perguntas 1 e 2 é a mesma não responda a pergunta 2a.

2a. Falando não-oficialmente é de opinião que qualquer destes funcionários consideraria como perigoso um navio propulsionado pela energia nuclear?

2b. É de opinião que o livre uso dos cais do porto de _____ será de qualquer forma limitado a navios nucleares?

3. Em sua opinião o publico em geral estaria interessado em ver e visitar um navio nuclear?

3a. (se a resposta é negativa) Porquê?

4. Em sua opinião qual seria a atitude dos estivadores do porto em consideração, em relação a um navio nuclear?

4a. Acha que estes estivadores exigiriam salário extraordinário para trabalharem num navio nuclear?

5. Se o navio tocar no p^orto de _____ e receber a bordo grande numero de visitantes, qual é o cais que, em sua opinião, seria mais conveniente?
6. As medidas de saude e segurança das docas são regulamentadas pela cidade ou outro departamento governamental local tais como o Serviço de Saude ou o Serviço de Bombeiros da cidade?
- 6a. (Se a resposta à 6 é afirmativa) Quais são os servicos governamentais que regulam estas medidas?
7. Carregamentos de materiais radioactivos são tratados como carga em alguns dos maiores portos do mundo. Carregamentos de materiais radioactivos teem passado pelo p^orto de _____ ?
- 7a. Carga radioactiva fica ao abrigo de quaisquer regulamentos especiais?
- 7b. (Se a resposta à 7a é afirmativa) Estes regulamentos são regulamentos do gov^erno nacional ou local?
- 7c. (Se a resposta à 7a é afirmativa) Qual é o departamento que põe estes regulamentos em vigor?
- 7d. (Se a resposta à 7 é afirmativa) Os estivadores recebem salário extraordinario quando lidam com carga radioactiva?
8. Há actualmente em vigor quaisquer regulamentos abrangendo navios nucleares?
- 8a. (se a resposta à 8 é afirmativa) Poderia informar-nos quanto à menção da lei?
- 8b. Teem sido propostos quaisquer regulamentos abrangendo navios nucleares?

FUNCIONÁRIOS DO SERVIÇO DE SAÚDE

1. As condições gerais de saúde nas docas, no porto de são
reguladas pelo Serviço de Saúde da cidade?
- 1a. (se a resposta à 1 é negativa) Qual é o departamento que regula as condições de saúde?
2. Carregamentos de materiais radioactivos são tratados como carga em alguns dos maiores portos do mundo. Carregamentos de materiais radioactivos tem passado pelo porto de ?
- 2a. Há quaisquer regulamentos abrangendo carga radioactiva?
- 2b. (se a resposta à 2a é afirmativa) Seriam eles regulamentos nacionais ou locais?
- 2c. Os regulamentos são postos em vigor pelo Serviço de Saúde?
- 2d. (se a resposta à 2c é negativa) Qual é o departamento que faz executar esses regulamentos?
3. Há regulamentos em vigor que se destinam a controlar riscos relacionados com equipamento ou material que produz radiação ionizante tais como as máquinas de raio-x ou isotópos radioactivos?
- 3a. (se a resposta à 3 é afirmativa) Poderia informar-nos quanto à menção de lei?
4. Há quaisquer regulamentos propostos ou em vigor que se destinam a proteger trabalhadores perto das fontes de radiação?
- 4a. (se a resposta à 4 é afirmativa) Poderia dar-nos a menção destas leis?
5. Há reactores em operação em um grande numero de grandes cidades, e reactores industriais tem sido instalados na proximidade de algumas outras. Tem sido propostos ou foram instalados quaisquer reactores nesta cidade?
- 5a. (se a resposta à 5 é afirmativa) Quais são os órgãos do governo responsáveis pela segurança de saúde na operação destes reactores?
6. Falando não-oficialmente acha que o Serviço de Saúde objetaria sob o ponto de vista de saúde a que um navio nuclear entrasse o porto de ?

THE UNIVERSITY OF MICHIGAN
ENGINEERING RESEARCH INSTITUTE

TELEPHONE
ANN ARBOR NORMANDY 3-1511
EXTENSION

ADDRESS REPLY TO:

Estimado Señor:

El Instituto de Investigación del Departamento de Ingeniería, Proyecto 2717, de la Universidad de Michigan, está actualmente haciendo un análisis de los problemas no técnicos que afecten la operación de barcos comerciales de poder nuclear. En la primera fase de este estudio, se tratará del viaje de demostración inicial del barco Americano, mercante y de pasajeros, de propulsor nuclear, el NS Savannah.

Entre los problemas específicos a estudiarse están aquellos que pueden suceder en los puertos de parada. En lo relacionado a puertos, la parte más importante del estudio se centraliza en los reglamentos de los puertos, las leyes locales, la opinión pública y la actitud de los estibadores.

Ya que aún no tenemos ningún itinerario del viaje, un número de puertos está siendo estudiado, para así poder sacar conclusiones generales de los problemas que puedan sobrevenir. ha sido seleccionado como uno de los puertos a investigarse para este proyecto, y su ayuda en darnos información será sumamente apreciada.

El estudio asumirá que el propósito del viaje del barco nuclear Savannah será mejor si el barco puede entrar al puerto y ser despachado sin las molestias de inspección indebida y que pueda anclar en un muelle favorable para una nave de mercadería y pasajeros, preferiblemente cerca de transporte público adecuado. Cualquier cosa que impidiera la realización de estas condiciones será de mucho interés para el grupo investigador de este proyecto. Deseamos señalar que dicho barco tocará varios puertos de los Estados Unidos antes de salir para puertos extranjeros.

Incluimos un cuestionario que describe el tipo de información que necesitamos y respuestas detalladas de estas preguntas serán de gran valor para nosotros. Sin embargo, cualquier información adicional a cualquier problema que se anticipe será muy agradecida también. Toda información que nos venga será considerada como una opinión personal, más que una oficial y por supuesto será tratada con carácter estrictamente confidencial. Nosotros nos damos cuenta de la molestia que causamos al pedir esta información, pero su respuesta facilitará grandemente nuestro análisis.

Agradeciéndole de antemano su consideración a este asunto, me es grato subscribirme de usted como su atento y seguro servidor.

Morgan Thomas, PhD

AUTORIDADES DEL PUERTO

1. Qué oficiales de la ciudad o del puerto tienen autoridad para restringir los movimientos del barco en las aguas del puerto, declarando tal nave peligrosa?

	<u>Nombre</u>	<u>Titulo</u>
(a)	_____	_____
(b)	_____	_____
(c)	_____	_____
(d)	_____	_____

1a. Hablando inoficialmente; cree usted que alguna de las personas arriba mencionada considere un barco de propulsión nuclear peligroso?

1b. Cree usted que los barcos nucleares serán restringidos de libre movimiento en las aguas del Puerto de

2. Que oficiales de la ciudad o del puerto tienen autoridad para impedir que un barco se ancle en cualquier muelle por declararlo barco peligroso?

	<u>Nombre</u>	<u>Titulo</u>
(a)	_____	_____
(b)	_____	_____
(c)	_____	_____
(d)	_____	_____

Si su respuesta a las preguntas 1 y 2 son iguales, no conteste las preguntas 2a.

2a. De nuevo hablando en terminos no oficiales; cree usted que alguna de las personas arriba mencionada considere un barco de propulsión nuclear peligroso?

2b. Cree usted que los barcos nucleares van a tener restricciones del uso libre de los muelles en el Puerto de

3. En su opinión propia, estaría el público en general interesado en ver y visitar un barco nuclear?

- 3a. (Si la respuesta es nó) Por qué?
4. Cual cree usted que será la actitud de los estibadores con respecto a un barco nuclear?
- 4a. Cree usted que los estibadores querrán pago extra por trabajar en un barco nuclear?
5. Si el barco se estacionara en el Puerto de _____ y se llevara a bordo a un número de personas para que lo visitaran, qué muelle sería el más apropiado?
6. Es el Departamento de Sanidad, o el Cuerpo de Bomberos el encargado de las condiciones de seguridad y sanidad en los muelles?
- 6a. (Si la respuesta a 6 es afirmativa) Qué agencias son éstas?
- 6b. (Si la respuesta a 6 es negativa) Qué Agencias Gubernamentales son las encargadas?
7. La carga de materiales radioactivos se maneja como carga en algunos puertos grandes del mundo. Han pasado cargas de materiales radioactivos por el Puerto de _____
- 7a. Hay reglas especiales para cubrir cargamentos radioactivos?
- 7b. (Si la respuesta a 7a es afirmativa) Son reglamentos locales o nacionales?
- 7c. (Si la respuesta a 7a es afirmativa) Qué agencia pone en vigor estas reglas?
- 7d. (Si la respuesta a 7 fué afirmativa) Se les paga extra a los estibadores cuando trabajan con carga radioactiva?
8. Hay reglamentos para cubrir barcos nucleares en efecto?
- 8a. Si la respuesta es afirmativa, nos puede decir cual es?
- 8b. Se ha discutido el asunto de leyes para cubrir barcos nucleares?

AUTORIDADES DE SANIDAD

1. Es el Departamento de Sanidad de la ciudad el encargado de las condiciones generales de salud en los muelles del Puerto
- 1a. (Si la respuesta es negativa) Que agencia está encargada de las condiciones de salud?
2. Los cargamentos de materiales radioactivos son manejados como carga en algunos puertos grandes del mundo. Han pasado cargamentos de materiales radioactivos por el Puerto de
- 2a. Hay reglamentos para cubrir carga radioactiva?
- 2b. (Si la respuesta a 2a es afirmativa) Son estos reglamentos nacionales o locales?
- 2c. Es el Departamento de Sanidad el que pone en vigor estos reglamentos?
- 2d. (Si la respuesta a 2c es negativa) Qué agencia pone en vigor esos reglamentos?
3. Hay algunos reglamentos en efecto destinados a controlar los peligros asociados con la radiación producida por las máquinas o materiales tales como: máquina de rayos X, o istopos radioactivos?
- 3a. (Si la respuesta a 3 es afirmativa) Nos puede dar o citar este reglamento?
4. Hay algunos reglamentos en efecto, o a efectuarse, que estén designados a proteger a los empleados que trabajan cerca de fuentes de radiación?
- 4a. (Si la respuesta a 4 es afirmativa) Nos puede dar o citar ese reglamento?
5. Reactores se están usando en varias ciudades grandes, y reactores industriales se han puesto cerca de otras ciudades. Se han puesto, o proponen poner, reactores en esa ciudad?
- 5a. (Si su respuesta a 5 es afirmativa) Qué parte del Gobierno estuvo encargada de la seguridad de salud de esas operaciones?
6. Hablando inoficialmente: Cree usted que el Departamento de Sanidad objete, desde el punto de vista de sanidad, a que un barco nuclear entre ol Puerto de

VI NOTES

PART I

1. New York Times, Aug. 22, 1958, p.24, col.1.
2. Based on Atomic Energy Commission Report: Theoretical Possibilities and Consequences of Major Accidents In Large Nuclear Power Plants, (United States Atomic Energy Commission, WASH-740, March, 1957) pp.1-30, & esp. Appendix A.
3. New York Times, Aug.22, 1958, p.24, col.1.
4. United States Department of Commerce, Maritime Administration Release SP 58-19, dated Sept. 3, 1958.

PART II

1. 42 U.S.C. 2011 et seq.
2. 42 U.S.C. 2072.
3. 42 U.S.C. 2014(y) and 2071.
4. 42 U.S.C. 2073.
5. 42 U.S.C. 2014(aa); commercial licenses: 2133; research and development licenses: 2134.
6. 42 U.S.C. 2014(t); commercial licenses: 2133; research and development licenses: 2134.
7. 42 U.S.C. 2014(x) and 2091; license: 2092.
8. 42 U.S.C. 2014(e); license: 2111.
9. 42 U.S.C. 2133(d) and 2134(d).
10. 42 U.S.C. 2077(b).
11. The S.S. Lotus(1927), Permanent Court of International Justice, Series A, Number 10(Judgment No.9).
12. 262 U.S. 100(1923).
13. Charles G. Fenwick, International Law(3d. Ed.) p.313-314.
14. 252 U.S. 348(1919).
15. 252 U.S. 348, 356(1919).
16. British Atomic Energy Act, 1946, 9 & 10 Geo.6, Chapter 80, as amended by the British Atomic Energy Authority Act, 1954, 2 and 3 Eliz.2, Chapter 32.
17. 42 U.S.C. 2274. The Atomic Energy Act attempts to safeguard secrecy mainly by these provisions: (1) certain data is classified as "Restricted Data"; (2) no one may have access to Restricted Data unless his loyalty has been found to be in order, and he has obtained an access permit, given only upon a finding that the information sought is necessary for the activity contemplated; (3) anyone who discloses Restricted Data to any person not authorized by the act to have access to such Data, with knowledge, or reason to know, of

such fact can be fined \$2500, upon conviction; (4) anyone who discloses or receives Restricted Data, in a manner not sanctioned by the Act, with "intent to injure the United States or with intent to secure an advantage to any foreign nation" can be fined, imprisoned, or both, upon conviction (receipt of such Data can, upon recommendation by a jury, be punishable by death); (5) tampering with Restricted Data (by removing, concealing, mutilating, etc. documents containing Restricted Data), is punishable by death or life imprisonment, upon recommendation of the jury, or by fine, imprisonment, or both.

18. 42 U.S.C. 2153, 2164.
19. Agreement for Cooperation on Civil Uses of Atomic Energy, entered into force July 21, 1955, TIAS 3321. Extension and Amendments, Oct. 20 and Nov. 3, 1955, TIAS 3359.
20. Ibid.
21. Nuclear Installations (Licensing & Insurance) Bill (H.L.), 7 Eliz. 2, clause 1(1) (p.1, lines 5-15).
22. Ibid., clause 9(1) (p.11, lines 22-25).
23. Ibid., Explanatory Memorandum, p.i, par.1.
24. 170 U.S. 113, 122-123(1897).
25. R.A. Fayram and H.J. Schneider, "It's Time To Look At Nuclear Merchant Ship Safety," Nucleonics, May, 1957, p.109.
26. Ibid., p.109.
27. Holmes F. Crouch, "Safety Measures For Nuclear Ships," American Society of Naval Engineers Journal, vol. 69, no. 3, August, 1957, p.568.
28. Ibid., p.566.
29. 46 U.S.C.A. 740.
30. 110 F.Supp. 657, 658. (1952).
31. Gilmore and Black have this to say in regard to the Jones Act: "The United States Code Annotated not only prints well over two hundred pages of annotations to the Jones Act (as of 1955); it prefaces the statute with a seventy-page essay entitled Commentary on Maritime Workers, supplemented by a diagrammatic 'Chart to Illustrate the Jurisdiction of the Courts'. The editors of the Code evidently felt, and with reason, that without these aids there was no hope for the traveler who ventures into the wilderness of Jones Act case law." (p.282.)
32. 46 U.S.C.A. 183(b)
33. 46 U.S.C.A. 183(f)
34. Blacker v. Jacobus Transportation Co., 243 F(2d) 733, 735 (1957).
35. Gilmore and Black, op. cit., p.696.
36. 1957 A.M.C. 2277.

37. 1958 A.M.C. 1497.
38. Gilmore and Black, op. cit., p.667.
39. See statements of Representatives Cole and Price, Hearings on Governmental Indemnity, Joint Committee on Atomic Energy, 84th Congress, 2d. Sess., pp.57-58.
40. Merchant Shipping Acts, 1862, 1894, 57 & 58 Vict. c. 60, sec. 503.
41. International Convention for the Unification of Certain Rules Relating to Limitation of Liability of Owners of Seagoing Vessels, signed at Brussels on August 25, 1924 by 18 countries, registered with the League of Nations on July 25, 1931, no.2763; 120 LNTS 123.
42. International Convention on the Limitation of Shipowners' Liability for Loss of Life, Bodily Injury, or Damage to Property as a Result of Accidents at Sea, signed Oct. 10, 1957 by 22 countries with nine abstentions, including the United States and the U.S.S.R. See Keesing's Contemporary Archives 1957-1958, p.15918F.
43. The Maritime Law Association of the United States, Document No. 418, July 1958, Appendix 4, "Comments Regarding the 1957 Brussels Convention on Limitation of Shipowners' Liability" by E. Robert Seaver, at 4271.
44. 42 U.S.C. 2210(e).
45. Nuclear Installations (Licensing & Insurance) Bill, 7 Eliz. 2, clause 4(1)(b) (p.5, lines 41-42).
46. Ibid., clause 4(1) (p.5, lines 38-39).
47. "The O.E.E.C. Draft Convention on Third Party Liability," Speech delivered at the 1958 Annual Conference of the Atomic Industrial Forum, Washington, Nov. 10, 1958, p.12.
48. Ibid.
49. 342 U.S. 29, 30(1951), cited in Gilmore & Black, op. cit., p.630.
50. Gilmore & Black, op. cit., p.635.
51. Prosser, Handbook of the Law of Torts p.317.
52. Ibid.
53. 1866, L.R. 1 Ex. 265.
54. Ibid. 279-280.
55. Prosser, op. cit., p.332 and p.336.
56. Restatement of the Law of Torts, sec. 520.
57. Prosser, op. cit., p.336.
58. Restatement of the Law of Torts, sec. 522.
59. See Prosser, op. cit., p.340.
60. Prosser, op. cit., p.191-192.
61. 287 N.Y. 108, 116(1941).
62. Prosser, op. cit., p.204.
63. Ibid., p.206.
64. 305 U.S. 424(1938).
65. 328 U.S. 85(1946).
66. 328 U.S. 85, 93-94(1946).

67. Calmar S.S. Corp. v. Taylor, 303 U.S. 525, 527(1938).
68. Jones v. Waterman S.S. Corp., 155 F(2d) 992(1946).
69. The Federal No. 2, 21 F(2d) 313(1927).
70. 185 F(2d) 352(1950).
71. See Calmar S.S. Corp. v. Taylor, 303 U.S. 525(1938)
and Farrell v. U.S., 336 U.S. 511(1945).
72. 41 Stat. 1007(1920); 46 U.S.C.A. 688.
73. Alaska S.S. v. Petterson, 347 U.S. 396(1954), a per curiam
decision affirming 205 F(2d) 478(1953).
74. 184 F(2d) 313(1950).
75. Seas Shipping Co. v. Sieracki, 328 U.S. 85(1946).
76. Alaska S.S. v. Petterson, loc. cit.
77. Grillea v. U.S., 232 F(2d) 919(1956).
78. Ibid.
79. Alaska S.S. v. Petterson, 205 F(2d) 478(1953).
80. See Gilmore and Black, op. cit., 320.
81. 232 F(2d) 919(1956).
82. 229 F(2d) 919, 922(1956).
83. 350 U.S. 523(1956).
84. 350 U.S. 523, 526(1956).
85. See, e.g. Gerber v. Faber, 129 P(2d) 485(1942).
86. See Ybarra v. Spangard, 154 P(2d) 687(1944), and Litzmann v.
Humboldt County, 273 P(2d) 82(1954).
87. 134 N.Y.S.(2d) 377(1954).
88. Ibid., 379.
89. Ibid., 380.
90. Ibid., 381.
91. See McAllister v. Magnolia Petroleum Co., 78 S.Ct.1201
in footnote on p.1203.
92. "The Tangled Seine; A Survey of Maritime Personal Injury
Remedies", 57 Yale Law Journal 243, 259, cited in
Gilmore and Black, op. cit., p.292.
93. Gilmore and Black, op. cit., p.315.
94. 45 U.S.C. 51-60.
95. Jones Act: 46 U.S.C. 688.
96. See Panama R.R. Co. v. Johnson, 264 U.S. 375(1924).
97. 78 S.Ct. 394, _____ U.S. _____ (1958).
98. Restatement of the Law of Torts, Sec. 286, Comment (h).
99. 78 S.Ct. 394, 398.
100. See Gilmore and Black, op. cit., p.311.
- 100a. 46 U.S.C.A. 183(f) defines "seagoing" by excluding a
group of vessels: tugs, scows, barges, and tank vessels,
etc. Since these were all non-passenger carrying, it
has been argued that Congress meant thus to apply the
statute to passenger-carrying vessels. This argument
was rejected by the Federal District Court: "But if this
were true, certainly it may be assumed the Congress would
have more clearly set forth such intent and would have
excluded, by express provision, certain cargo vessels
in a non-passenger carrying status." (Petition of

- Panama Transport Co. - The J.H. Senior, 73 F.Supp. 716, 717 (1947) On the authority of this case, which specifically held that the "tank vessels" excluded from the seagoing provision were of the river or harbor type, we maintain that dry cargo vessels and tankers are seagoing and have to use the \$60 per ton fund as part of their total limitation amount. Gilmore and Black are not clear on this point, stating: "the exclusion under §183(f) of many types of non-passenger-carrying vessels operates to exclude most merchant seamen from the additional recovery" (p.720). See Secs. 10-7 (pp.669-670) and 10-35 (pp.719-720).
101. Public Law 85-256(1957), which amended sec. 11 and added sec. 170, Atomic Energy Act.
 102. Hearings on Governmental Indemnity and Reactor Safety, Joint Committee on Atomic Energy, 85th Congress, 1st Sess., p.23.
 103. Federal Register, vol. 23, No. 169, Thurs., Aug. 28, 1958, pp.6681-6687 (10 C.F.R. Part 140) in which A.E.C. published the approved form of indemnification agreements and nuclear energy liability insurance policies for financial protection for nuclear incidents.
 104. Statement of Rep. Sterling Cole, Hearings on Governmental Indemnity and Reactor Safety, Joint Committee on Atomic Energy, 85th Congress, 1st. Sess., p.167.
 105. Statement by Mr. Arthur W. Murphy, on behalf of the Special Committee on Atomic Energy of the Association of the Bar of the City of New York, Hearings on Governmental Indemnity and Reactor Safety, Joint Committee on Atomic Energy, 85th Congress, 1st Sess., p.167.
 106. Restatement of the Law of Torts, Sec. 519, Comment(b).
 107. See Ryan Stevedoring Co., Inc. v. Pan-Atlantic S.S. Corp., 349 U.S. 901(1955).
 108. Sec. 110, P.L. 85-256.
 109. See open letter by Senator Anderson to the atomic power industry, printed in Hearings on Governmental Indemnity, Joint Committee on Atomic Energy, 84th Congress, 2d. Sess., p.2.
 110. Sec. 11 u, P.L. 85-256.
 111. Ibid.
 112. Sec. 11 o, P.L. 85-256.
 113. The S.S. Lotus(1927), P.C.I.J., Series A, Number 10. (Judgment no.9).
 114. See Report of the Atomic Industrial Forum, Inc., printed in Hearings on Governmental Indemnity and Reactor Safety, Joint Committee on Atomic Energy, 85th Congress, 1st. Sess., p.181.
 115. See Dr. M. Scheidwimmer, "Der Schutz Gegen Die Wirtschaftlichen Folgen Von Reaktorschäden," Die Atomwirtschaft, No.5, 1958.

116. Nuclear Installations (Licensing and Insurance) Bill, 7 Eliz. 2, Explanatory Memorandum, p.ii, para.6.
117. Financial Protection Against Atomic Hazards: The International Aspects. Preliminary Report of a Study Under the Auspices of Harvard Law School and Atomic Industrial Forum, Inc., May, 1958.
118. Ibid. p.2.
119. See Ernst Rabel, The Conflict of Laws.
120. See The Titanic, 233 U.S. 718(1914).
121. Extension of Admiralty Jurisdiction Act(1948), 46 U.S.C.A. 740.
122. See The Athelvictor(1946) P (Probate, Divorce and Admiralty Division) 42.
123. The International Convention Relating to the Limitation of the Liability of Owners of Seagoing Ships, signed at Brussels in 1957.
124. Se. 11 o, P.L. 85-256.
125. 233 U.S. 718(1914).
126. Black Diamond S.S. Co. v. Stewart, 336 U.S. 386 (usually referred to as The Norwalk Victory) questioned "The Titanic" rule and remanded the case to the lower court to decide which limitation law should apply. But nothing further developed from this case, and in Lauritzen v. Larsen (345 U.S. 571 /19537), no mention at all is made of The Norwalk Victory and The Titanic is cited approvingly by Justice Jackson for the Court. See Gilmore and Black, op. cit., p.739, n.188.
127. (Kloeckner Reederei, etc. v. A/S Hakedal), 210 F(2d) 754; appeal dismissed 348 U.S. 801.
128. For the succeeding summary in the text, see Ernst Rabel, The Conflict of Laws II at 347-51 and the cases there cited.

PART III

1. See Krajina v. Tass Agency, 2 A.E.R. 274(1949).
2. For this and subsequent information in this paragraph, see W. Friedman, "Some Impacts of Social Organization on International Law," 50 American Journal of International Law 475, 478-482(1956).
3. Ibid.
4. International Convention for the Unification of Certain Rules Relating to Immunity of State-owned Vessels, signed at Brussels, April 10, 1926: 176 League of Nations Treaty Series 199. See esp. Art 3, re ships operated on non-commercial service. The records of the Department of State show that the following countries have ratified the convention: Belgium, Brazil, Chile, Denmark, Estonia, France, Germany, Hungary, Italy, Netherlands, Norway, Poland, Portugal, Rumania, and Sweden; and that the following have acceded to the convention (not having

- originally signed it): Greece, Switzerland, and Turkey. Letters from Charles I. Bevans, Assistant Legal Adviser, Department of State.
5. For text, see Congressional Record, 85th Congress, 2d Sess. (July 28, 1958), p.13926.
 6. 176 League of Nations Treaty Series (LNTS) 199. See footnote 4, supra.
 7. Eleanor W. Allen, The Position of Foreign States Before National Courts (New York: The Macmillan Company, 1933), p.22.
 8. Treaties and Other International Acts Series (TIAS) 1965; 63 Stat.(2) 2255. Similar language is contained in the Irish bilateral treaty and in the Greek treaty. An expanded version of this language is in the treaties with Israel, Japan, Germany, Iran, The Netherlands, Nicaragua, and Korea. It must also be noted that since World War II, the United States has signed several treaties of the "Friendship, Commerce, and Navigation" type which do not contain a renunciation clause. These treaties include those with China(1946)(TIAS 1871); Ethiopia (1951)(TIAS 2864), and Yemen(1946)(TIAS 1535). In general, it appears that most recent "Friendship, Commerce, and Navigation" treaties have contained a clause renouncing sovereign immunity for state-owned enterprises which engage in business activities, including shipping, although no attempt has been made to make a complete listing of treaties in which such renunciation clauses occur.
 9. Agreement relating to certain problems of marine transportation and litigation, and exchange of notes, 56 Stat. 1780; EAS 282.
 10. 61 Stat.(3) 2520; TIAS 1582.
 11. Ibid.
 12. 61 Stat.(3) 2499; TIAS 1935.
 13. 176 LNTS 199.
 14. For a case establishing the public vessel status of a vessel owned by the United States, operated under general agency agreement, and not transporting cargo for hire for private shippers, see George W. Rogers Construction Corp. v. U.S. (118 F.Supp. 927). In that case the officers were civil service employees, whereas the SAVANNAH's officers will be merely "employees of the government". We do think that this distinction is legally not consequential.
 15. 43 Stat. 112; 46 U.S.C. 781.
 16. 41 Stat. 525; 46 U.S.C. 741.
 17. Public Vessels Act, Sec. 9; 46 U.S.C. 781.
 18. 197 F(2d) 771(1952).
 19. 28 U.S.C.1346.
 20. See Prudential S.S. Corp. v. U.S., 220 F(2d) 655(1955),

- and Johnson v. U.S. Shipping Board Emergency Fleet Corp.,
280 U.S. 320(1930).
21. 28 U.S.C. 1346(b).
 22. Sec. 2: 43 Stat. 112; 46 U.S.C. 781.
 23. Sec. 2: 41 Stat. 525; 46 U.S.C. 742.
 24. Sec. 2 of the Public Vessels Act incorporates this period
by reference to the Suits in Admiralty Act (Sec. 5:
46 U.S.C. 745).
 25. See Cosmopolitan Shipping Co. v. McAllister, 337 U.S.
783(1949). Also Wead et al v. Dickmann, Wright, and
Pew Inc., 337 U.S. 801(1949).
 26. 5 U.S.C.A. 751 et seq.
 27. See Gilmore and Black, op. cit., p.255, n. 23.

PART IV

1. Public Law 848, 84th Congress, 2d. Sess., 70 Stat. 731.
2. Public Law 701, 84th Congress, 2d. Sess., 70 Stat., 531.
3. National Shipping Authority Order No.1 (AGE-1), Maritime
Administration, Department of Commerce.
4. 46 C.F.R. 71.20-15.
5. 46 U.S.C. Sec. 170.