STATEMENT OF RADM R. E. HAMMOND

BEFORE THE

SUBCOMMITTEE ON AIR AND WATER POLLUTION OF THE
SENATE PUBLIC WORKS COMMITTEE

ON

9 SEPTEMBER 1970

Mr. Chairman, gentlemen:

I am RADM R. E. Hammond, Chief, Office of Operations, Headquarters, U. S. Coast Guard. I am here to discuss, in relation to the proposed Machiasport project, the risk of oil spills from vessel or terminal facilities, the methods available to minimize such risk, and the technology available to clean up oil spills. I shall take these three items up in that order.

The risk of oil spills from vessels. There have been a number of studies of various aspects of oil pollution. The first of these was Battelle Northwest's Oil Spillage Study, done for the Coast Guard in 1967 in the aftermath of the Torrey Canyon incident. We did not agree with all of the conclusions and the study is now somewhat dated. It did, however, spotlight most of the problems we face today.

In 1969, Authur D. Little did an updating of the Battelle study for us. A copy of this study, Combating Pollution Created by Oil Spills, is available for insertion into the record.

Recently the Dillingham Corporation at La Jolla, California, completed a study of major oil spills for the American Petroleum Institute. This is believed to be most authoritative study available today on this subject. It is a follow on and supplementary to the two former studies mentioned.

A major spill was defined for the purpose of the Dillingham study as a spill of 2,000 barrels (84,000 gallons) or more of a heavy or persistent oil. (The National Oil and Hazardous Materials Pollution Contingency Plan classifies as major an oil spill of 100,000 or more gallons in the offshore waters.) Based on analysis of data from 38 past major spills which occurred during the period 1956 to 1969 this study determined that the principal characteristics of major oil spills are:

Source	-75% were associated with vessels, principally tankers.
Composition	-90% involved crude or residual oils.
Volume	-70% of the spills were greater than 5,000 barrels with a median spill volume of 25,000.
Distance Offshore	-80% occurred within 10 miles of shore.
Duration	-75% of the spill incidents lasted more than five days with a median duration of 17 days.
Extent	-80% contaminated less than 20 miles of coastline with a median extent of four miles of coast.
Coastline	-85% occurred off shoreline considered to be recreational.
Distance from Port	-75% occurred within 25 miles of the nearest port.

The characteristics that may be expected of major spills of petroleum products in coastal waters are thus, we believe, predictable to a certain extent. These include the sources of the spill (most likely a tanker), the product involved (probably crude or residual oil), the volume of the spill

(likely to be greater than 5,000 barrels), the distance from shore (within ten miles), the duration of the incident (probably more than five days), the extent of shore contamination (likely only three or four miles), the type of shoreline involved (probably considered at least partially recreational), and the distance of the spill site from port (probably no more than twenty-five miles).

The premise that spills are more likely to occur in geographic regions handling large quantities of petroleum products appears supported by the location of past spills in the coastal waters of the United States. At the same time, the greater precautions taken against spill occurrence and the familiarity with handling petroleum in these high volume regions both on board ships and at terminals argues against spills occurring in these areas and, indeed, relative to volume of oil handled, quantity of spills is low. The conclusion reached is that the location of future major spills is predictable only on a broad regional basis, but that these regions will be those where large quantities of petroleum products are handled.

Oil pollution arises from many sources and in various quantities. The 38 major spills cited above are only the larger and more dramatic. More frequently the danger arises from relatively smaller spills which occur during normal vessel deballasting; oil, fuel or cargo transfer; or tank or bilge cleaning. The cumulative total spilled in fact may be greater than that caused by major spills.

Preliminary Coast Guard estimates indicate that there may be as many as 10,000 U. S. maritime polluting spills a year, ten of which are major spills. In addition, one spill of disaster proportions can be expected on the average of every ten years. About half of these are oil spills, some three-quarters of which may be transportation related.

The total numbers of polluting spills documented by the Coast Guard between 1956 and 1969 are as follows:

Calendar Year	Number of Spills
1956-1963	561 total
1964	192
1965	392
1966	371
1967	458
1968	714
1969	1188 (1,007 were of oil)

In the last five years there has been a more than 500% increase in spills reported, indicative both of heightened public interest and increased awareness by the Coast Guard and other interested agencies. A detailed analysis of the 1969 Coast Guard spill reports is attached.

Let me be more specific and provide you with details involving a port in the area of interest to this hearing. The Port of Portland, Maine, is now the second largest oil port on the East Coast, the largest being New York. In calendar year 1969 some 1,000 ships passed through the Port, 99.8% of them tank vessels. The Coast Guard Captain of the Port for Portland reports that there was an average of almost one spill reported per week, from all causes. In numbers, out of 46 cases filed, 27 arose from spills of oil from tank ships or barges. All of these spills were technically classified as minor, being less than 25 barrels in amount. As a matter of fact, only in two instances did the figure come anywhere near that amount; most were classed as nuisance spills, troublesome but small. The total amount of oil spilled from tank vessels during the whole year was estimated at about 180 barrels. During the same year 143 million barrels of crude oil and 31.5 million barrels of refined

products passed through the port. This is an impressive amount of traffic and a large volume of oil transfered through port terminals with relatively little spillage, and speaks well for Portland terminal facilities.

The methods available to minimize risk. The methods available to minimize the risk of oil spillage revolve around the concept of good practice and preventive regulation. Where good work practices are followed, the number of spills and the amount spilled can be kept very low.

Some good operation practices are:

1. Scuppers always plugged on any ship bunkering or loading.
2. Booms rigged at installations where danger exists.
3. Remote and automatic controls on both ship and shore valves.
4. Use of tank selected by master as slop tank.
5. Terminal capability to receive dirty ballast in large quantities.
6. Fully trained crews ashore and afloat.
7. Automated mooring devices using wire and cable to maintain constant tension.
8. Trained disaster and clean up teams.

Preventive regulation takes over when the normal incentives to good practice fail. The State of Maine has developed a very complete and forward-looking code of regulations to guide oil transportation operations. Pursuant to the Water Quality Improvement Act of 1970, the Coast Guard will also develop preventive regulations for both tank vessels and shore facilities. The first new regulation for shore facilities (oil terminals) are being published, temporarily under our Port Safety authority. A copy of these new regulations is available for inclusion in the record.

Beyond this, proper siting and maintenance of navigation channels, and adequate marine traffic systems--if they should prove necessary--while in-

creasing the safety of maritime commerce also help minimize the risk of pollution as a result of accident. So, of course, do proper ship construction and maintenance and good personnel training and manning standards. All of these have been long under Government regulation and our standards are going to become more stringent.

The Coast Guard is charged under authority of the Tanker Act of 1936, U. S. laws and international treaties with promulgating and administering regulations concerning construction, manning repairs, and alterations to U. S. flag ships including tankers. This is accomplished through our office of Merchant Marine Safety.

Stowage and handling of inflammable and dangerous cargoes are similarly administered by the Coast Guard. We have had to recognize and meet problems attendant with todays trend toward increasingly larger tank vessels. A considerable amount of our effort and manpower is put into these duties, and we feel the record shows these efforts to be well worthwhile.

For example - in regard to construction of American Flag Tankers: Plans for each vessel are reviewed by our Merchant Marine Technical Section, and the vessel is attended constantly by an inspector while on the builder's ways to see that she complies with our regulations. When completed, the vessel is issued a "certificate of inspection" which prescribes the grades and types of cargo she may carry, the routes she may travel and the number of officers and ratings of the crew. These officers are licensed by the Coast Guard after proving competence by examination and the seamen are certificated by a like process. We believe that these procedures contribute significantly to the general safety of the marine tanker fleet and to those ports in which great quantities of liquid inflammables are handled.

Our efforts are not restricted to American Flag Vessels by any means. When dangerous cargoes are brought into U. S. ports by foreign flag vessels, the vessels are inspected by the Coast Guard Captain of the Port and the Coast Guard Marine Inspection Offices. In cases of non compliance with our Port Safety Regulations cargo operations are halted until safety requirements are met.

Our regulations and procedures are not a panacea for all the ills which might befall ships and seaports. We recognize this - and are striving to improve and to adapt to new situations.

All tank vessels carrying flammable or combustible petroleum products in bulk have been subject to inspection by the Coast Guard pursuant to the Tank Vessel Act of 1936. The regulations promulgated under this Act are applicable to the design and construction of such vessels as well as to their equipment and material conditions which are assured by periodic inspections throughout the life of the vessel. The primary consideration at the time of the formulation of the Act and regulations pertained to the safety of the vessel in view of the hazardous properties of its cargo and the perils of the sea. Fortunately the same considerations have been instrumental in limiting the total amount of pollution that might have occurred if certain safety features had not been incorporated.

Requirements for newer ships are even more stringent in this regard as regulations have undergone a process of development to keep pace with modern technology and increased awareness of safety hazards and potential dangers to the ecology.

There is another broad division as to the types of pollution in the case of ships. Accidental pollution and deliberate pollution. Prime examples of

accidental pollution are inadvertent spills and overflows while handling cargo and bunkers and pollution brought about by vessel casualties such as grounding and collisions. Improved technology and competence of operating personnel should do much to alleviate this type of pollution. Examples of deliberate pollution are pumping of bilges and cleaning tanks. To eliminate or reduce this type of pollution will require additional facilities for reception of oily wastes, use of separate ballast tanks, more stringent enforcement, and possibly additional international agreements.

The Technology Available to Clean up Oil Spills. Lastly, let us examine the technology available to clean up -- "cure" -- those spills which do in fact occur, for whatever reason. The Coast Guard recognizes that current methods of confining and cleaning up large oil spills are inadequate; some current methods such as the use of detergents may do more harm than good to the ecology. To provide an effective cleanup capability in U. S. waters, the Coast Guard is conducting a $4-million-a-year research program to develop new techniques and equipment. We hope to continue at this level for several years. Initial emphasis has been on preventing spills from distressed tankers and on preventing spilled oil from spreading. An air-deliverable system for rapidly off loading oil from distressed tankers and storing it temporarily in floating rubber bags has recently been tested and will probably be in operation during the coming year. This system will be available for use when a ship collision or grounding produces a threat of a major spill. During the coming year our plans call for stockpiling usually by the industry of conventional equipment for responding to oil spills. Detection by airborne sensors is under development. Also planned is an air-transportable system for containing major oil slicks on the water during recovery operations. These are the areas in which Coast Guard research and development is being carried out now.

The Coast Guard has also been active this spring in developing detailed oil spill contingency plans. The new Water Quality Improvement Act of 1970 which became law in April, required such plans to be prepared by early June, and the Coast Guard took responsibility for coastal areas, which includes Machiasport. These improved plans involving the Federal Water Quality Administration, Army Corps of Engineers, and local and state agencies as well as industry are now in effect and are considered vital for coordinating government and private actions to respond to oil pollution incidents. They will be continuously updated and improved. A copy of the Boston Regional Plan -- the plan of the region with responsibility for Machiasport -- is available for inclusion in the record.

Let us now look at Machiasport itself. Machiasport is a fine natural harbor. Its general depth to Avery Rock is 50 feet. Generally, there is a one-knot current. The port is normally ice-free. There are, however, considerable tides, with a 12.6 foot mean range. There is an annual average of 1,526 hours of fog, with 1,904 hours as the maximum. At present, there are no known Corps of Engineers projects planned for the harbor. Neither are any Coast Guard aids to navigation presently planned, other than a new LORAN-A station covering the Gulf of Maine. Should Machiasport develop into a major oil terminal, aids to navigation will be a part of that development. These aids can range from buoys to Harbor Advisory Radar Service as the need dictates. Machiasport should pose no unusual pollution control problems.

Gentlemen, I trust that I have met your requirements in this matter, I would welcome any questions you may have concerning any of these areas.

PRESENT REGULATIONS | PROPOSED REGULATIONS | REASON FOR CHANGE

TITLE 33 - NAVIGATION AND NAVIGABLE WATERS
SUBCHAPTER L - SECURITY OF VESSELS AND WATERFRONT FACILITIES (CG-239)
PART 126 - HANDLING OF EXPLOSIVES AND OTHER DANGEROUS CARGOES
WITHIN OR CONTIGUOUS TO WATERFRONT FACILITIES

The proposed addition to Part 126 will enhance the safety of ports, navigable waters of the U. S., and vessels and their cargoes by preventing accidential spillage of bulk liquid and liquid gas dangerous cargoes, which may create a hazard to waterfront facilities, vessels or port areas, during transfer operations.

PRESENT REGULATIONS	PROPOSED REGULATIONS	REASON FOR CHANGE
126.15(o) Maintenance of bulk liquid cargo transfer system (s) used for handling any bulk dangerous cargo shall be so maintained as to prevent leakage. Suitable means, such as drip pans for collecting liquids, shall be provided during coupling or uncoupling operations.	Delete entire section and insert new section as follows: 126.15(o) Control of Liquid Cargo Transfer Systems. When performing bulk liquid and liquefied gas dangerous cargo transfer operations, the waterfront facility cargo transfer system shall be subject to the following conditions: (1) The cargo transfer system in use shall be under the continuous control and surveillance of the waterfront facility owner or operator or his assigned representative, who shall be considered as the person in charge of the shoreside transfer operation. The person in charge of the shoreside transfer operation must be trained in, and capable of performing competently, the necessary operations which relate to the transfer of the specific cargo. The Captain of the Port shall be furnished satisfactory documentary evidence to this affect.	To provide continuous control of the shoreside transfer operation involving bulk liquid and liquefied gas dangerous cargo, and thereby reduce the potential hazards involved in the transfer of these dangerous cargoes. Such control will be consistent with similar regulations for handling the transfer of these products on board the transporting vessel, i. e., supervision by a trained, competent individual, the posting of warning signs, the maintenance of the transfer system, etc.

(2) Prior to the transfer of cargo, the person in charge of the shoreside transfer operation shall insure that the following conditions exist:

(a) Warning signs are displayed on the facility at the point of transfer facing the shoreline, and facing each way along the shoreline, without obstruction, at all times during the coupling, transfer operation, and uncoupling. The warning signs shall conform to 46 CFR 151.45-2(e)(1).

(b) Proper precautions will be taken to insure that no repair work on the transfer system or receiving tanks is carried on during cargo transfer, and that the provisions of 33 CFR 126.15(c) are complied with.

(c) Where fixed sumps or troughs are not installed, adequate pans or buckets have been placed under cargo hose connections during coupling, uncoupling, and cargo transfer.

(d) Suitable material has been used in joints and in couplings when making connections to insure that they are tight and leak free.

(e) Sufficient bolts have been used in bolted couplings to prevent leakage.

(f) That the person in charge of transfer operations on the vessel (including barges), tank car or tank truck has reported ready for transfer of cargo.

(g) Have in his possession a cargo information card for the specific cargo to be transferred. The information card shall conform to the specifications of 46 CFR 151.45-2(e)(3), and shall list:

(i) Cargo identification characteristics, and
(ii) Emergency procedures, and
(iii) Fire fighting procedures

(h) Obtain a Declaration of Inspection from tank ships and may assure himself that the condition of the vessel is as stated in the Declaration of Inspection in accordance with 46 CFR 35.35-30.

(3) When transferring cargo to or from a vessel (including barges), tank car or tank truck the person in charge of the shoreside transfer operation shall in addition to (2) above maintain a means of communications with the person in charge of transfer operations on board the vessel (including barges), tank car or tank truck in order to provide immediate notification to secure the transfer system and cargo flow when necessary. Such communication may be by vocal, visual, or electronic means. If electronic means are used, the equipment shall be suitable for the hazard involved.

(4) The person in charge of the shoreside transfer system shall not start cargo transfer operations or, if started shall discontinue transfer under the following conditions:

(a) During severe electrical storms; or

(b) If a fire occurs on the facility or in the vicinity; or

(c) If a break occurs in the cargo transfer system; or

(d) If requested by the receiving person in charge of transfer operations.

(5) The person in charge of the shoreside transfer operation shall control the shoreside operation as follows:

(a) When transferring cargo from a facility:

(i) Supervise the operation of cargo system valves; and

(ii) Notify the receiving person in charge of transfer that the facility is ready to start the transfer; and

(iii) In coordination with the receiving person in charge of transfer operations, start the transfer of cargo slowly; and

(iv) Maintain cargo connections to prevent leakage; and

(v) Observe operating pressure on the cargo system; and

(vi) Stand ready to secure the transfer system when necessary or when requested to do so by the receiving person in charge of transfer operations.

(b) When transferring cargo from a vessel (including barges), tank car or tank truck to the facility:

(i) Supervise the operation of cargo system valves; and

(ii) Maintain cargo connections to prevent leakage; and

(iii) Observe rate of flow for the purpose of avoiding overflow of tanks or overload of the transfer system; and

(iv) Secure the transfer system only after advising the person in charge of transfer operations aboard the vessel (including barges), tank car or tank truck of intent to do so.

(6) When transfer operations are completed, the hoses on the waterfront facility shall be drained and the piping shall be secured to prevent cargo spillage.

(7) Cargo handling equipment shall be maintained in good operating condition at all times.

(a) Cargo hose shall not be used in transfer operations in which the pressures are such that leakage of cargo occurs through the body of the hose.

(b) Cargo pump systems shall be tested at least once each year to determine that they function satisfactorily at or below the maximum allowable pressure of the safety relief valves, cargo piping or hose, or maximum pump output pressure.

(c) Cargo pump pressure gages shall be calibrated at least once a year.

(d) The cargo hose and piping shall be hydrostatically tested at least once each year to $1\frac{1}{2}$ times its maximum allowable working pressure. The maximum allowable working pressure shall be stenciled on the cargo hoses and piping.

(e) Cargo hose shall not be used with a cargo piping system whose maximum allowable working pressure exceeds that of the hose. The maximum allowable working pressure of a system is defined as the setting of the associated relief valves or the maximum available pressure including hydraulic shock of a system without relief valves.

(f) Relief valve operation shall be checked at the time of each system hydrostatic test.

(g) The dates and results of all testing shall be recorded, and made available to the Captain of the Port upon request. Records may be kept in a log book; or on metal tags attached to the apparatus; or by some similar means.

(h) The escape piping of cargo system relief valves shall return the product to the supply or other suitable receiver.

(i) At facilities where incompatible cargoes are handled, the hoses and systems shall be suitably marked to specify the allowance products.

(8) In case of emergencies nothing in these regulations shall be construed as preventing the person in charge of the shoreside transfer operation from pursuing the most effective action in his judgment for rectifying the conditions causing the emergency.

OIL SPILLS RESULTING IN POLLUTION OF U. S. WATERS - 1969

(USCG Headquarters Statistics)

SOURCE	NUMBER OF INCIDENTS	TOTAL ESTIMATE VOLUME	PERCENT OF INCIDENTS	PERCENT OF VOLUME
1. SPILLS EXCEEDING 100 BBLS				
Vessels	32	45,000 BBLS	48.5	13.4
Non-vessels	34	290,000 BBLS*	51.5	86.6
Total	66	335,000 BBLS*	100.0	100.0
2. SPILLS OF 100 BBLS OR LESS				
Vessels	500	6,000 BBLS	53.1	50.0
Non-vessels	297	4,000 BBLS	32.6	33.3
Source Unknown	144	2,000 BBLS	15.3	16.7
Total	941	12,000 BBLS	100.0	100.0
3. TOTAL SPILLS				
Vessels	532	51,000 BBLS	52.9	14.7
Non-vessels	331	294,000 BBLS*	32.8	84.7
Source Unknown	144	2,000 BBLS	14.3	0.6
Total	1,007	347,000 BBLS	100.0	100.0

* Includes one spill of 218,000 BBLS resulting from collapse of terminal storage tank

ANALYSIS OF TYPES OF VESSEL AND STRUCTURES BY NUMBER OF INCIDENTS

	VESSELS		NON-VESSEL	
SPILLS EXCEEDING 100 BBLS IN VOLUME	Tank Barges	24	Terminals	4
	Tank Vessels	5	Other Shore Structures	18
	Other Vessels	3	Pipelines	10
			Offshore Structures	2
	TOTAL	32		34
SPILLS OF 100 BBLS OR LESS	Tank Barges	145	Terminals	89
	Tank Vessels	118	Other Shore Structures	174
	Other Vessels	237	Pipelines	17
			Offshore Structures	17
	TOTAL	500		297
TOTAL SPILLS	Tank Barges	169	Terminals	93
	Tank Vessels	123	Other Shore Structures	192
	Other Vessels	240	Pipelines	27
			Offshore Structures	19
	TOTAL	532		331