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The Impact on the Navy of Public Concern with Control of Pollution of the Seas by Oil

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THE IMPACT ON THE NAVY OF PUBLIC CONCERN WITH CONTROL OF POLLUTION OF THE SEAS BY OIL

by

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The contents of this paper reflect my own personal views and are not necessarily endorsed by the Naval War College or the Department of the Navy.

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TABLE OF CONTENTS

THE IMPACT ON THE NAVY OF PUBLIC CONCERN WITH CONTROL OF POLLUTION OF THE SEAS BY OIL

CHAPTER I

INTRODUCTION

A cursory glance at any of today's newspapers will probably disclose one or two articles on pollution problems. Additionally, there will be as well, several advertisements by commercial firms, the government, or ecology groups espousing their programs for improving the environment and appealing for help from the individual. This increasing concern with the environment has resulted in extensive programs being undertaken by both industry and government to reduce, prevent and eventually eliminate pollution. During the last six years alone, three amendments have been enacted to strengthen the Federal Water Pollution Control Act,* and no less than three international agreements have been signed or brought into force to control pollution at sea.**

Much of this legislation is directed towards controlling oil pollution. Just what is behind this current wave of concern and what has occurred to generate it?

Production. The highly industrialized nature of today's world has created an ever increasing demand for fossil fuels. World

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*The Water Quality Act of 1965, (Public Law 89-234); The Clean Water Restoration Act of 1966, (Public Law 89-753); and The Water Quality Improvement Act of 1970, (Public Law 91-224).

**The Agreement Concerning Pollution of the Sea by Oil, June 1969 (The North Sea Pact), the International Convention Relating to Intervention on the High Seas in Cases of Oil Pollution Casualties, November 1969, and the International Convention on Civil Liability for Oil Pollution Damage, November 1969.

production of oil in 1969, for example, was over fifteen billion barrels,[1] almost double the 1960 production of about 7.8 billion barrels.[2] Twenty-two nations produced 17% of the 1969 production, about 2.2 billion barrels, from offshore wells.[3] The well known Santa Barbara Channel incident and several recent oil spills in the Gulf of Mexico have focussed public attention on the hazards of offshore production. Increasing production in this area will add significantly to the problems of oil pollution control at sea.

Transportation. Approximately 60% of the present world production of oil is transported by sea and it is estimated that one tenth of one percent of this oil is lost at sea.[4] This translates to about seven million barrels of oil annually being discharged into the sea in one way or another. There are about four thousand tankers in the world fleet with an average age of eleven years.[5] Some of these tankers are safe and carefully run, yet seldom controlled by law. Others are obsolete and negligently operated by crews of questionable skill and experience.[6] These tankers, while enroute, discharge various amounts of oily waste from tank washings, ballast water and bilges. Collisions, groundings, and other casualties frequently release large quantities of oil, generally close to shore. The spectacular disasters that have occurred in the last few years in the course of production and shipping have attracted much attention and adverse publicity.

Production and transportation of oil, to meet the demands of increased industrialization around the world, is bound to increase at rates that will drastically change the picture of control of oil pollution at sea.

Natural Pollution. Accidental and intentional discharges

incident to production and handling are not the only source of oil on the sea. Natural faults--cracks in the ocean floor in the vicinity of oil deposits--allow oil under pressure to seep into the water at various locations. There are several natural leaks in the Caribbean and off the coast of California. For centuries these natural faults have been discharging oil which has subsequently washed up and polluted beaches.[7] Today they may be sources of occasional slicks of undetermined origin.

Effects. It is difficult at best to evaluate the biological and chemical damages of oil pollution, but the physical effects are graphically evident in the blackened beaches and coastlines around the world and in the floating "tar balls" found in mid-ocean.[8] It is this dramatically visible effect that has stirred public concern.

Whatever the underlying cause, the fact remains that oil has been and is being discharged onto the sea and in many cases washed up onto public and private beaches, and unknown damage is being done to delicate marine life cycles. Thus, prevention of such damage is high on the list of priorities for both national and international concern.

In the face of the ever increasing potential for pollution, President Nixon has pledged that federal agencies will take the lead in pollution abatement programs.[9]

It is the purpose of this paper to evaluate the impact on the Navy of this intense public concern with oil pollution.

CHAPTER 1

INTRODUCTION

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Much of this legislation is directed towards controlling oil pollution. Just what is behind this current wave of concern and what has occurred to generate it?

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In the face of the ever increasing potential for pollution, President Nixon has pledged that federal agencies will take the lead in pollution abatement programs.[11]

It is the purpose of this paper to evaluate the impact on the Navy of this policy, with specific emphasis on oil pollution, which has been generated by the intense public concern with ecology and the environment.

CHAPTER II

THE NAVY PROBLEM

The Navy faces an immense potential for oil pollution. A review of the Navy's basic operation situation and requirements will give some appreciation of the magnitude of the problem.

Operations. The Navy operates some seven hundred ships, most of which use hydrocarbon fuels, from thirteen major United States port areas and nine overseas bases.[1] Of the United States bases, twelve are in harbors that have major oil traffic, and seven of those twelve have traffic exceeding one hundred million barrels annually.[2] (The least of any port is twenty-two million barrels annually.) Although it is the Navy's problem under consideration here, it must be kept in mind that the oil pollution problems are mutually shared with commercial interests.

Navy ships and stations are constantly subject to public scrutiny and are perceived as a major source of oil pollution. Deployments and home-comings are frequently items of local news interest. Navy bases are generally located in easily accessible areas and are often open to public visiting. This is in contrast to merchant ships which normally dock in industrial areas of the city, out of general view of the public. Additionally, Navy ships in large numbers are routinely in port for long periods of time, compared to merchants which frequently spend less than a day at the dock. It is only human nature to focus attention on those problems that can be readily seen. Thus the Navy, ever present in large numbers in the harbor, is easily identified with visible oil pollution.

Fuel Requirements. The Navy uses about sixty-four million barrels of all types of fuel annually.[3] When it is considered that each barrel is handled at least five times before it is consumed, the magnitude of the potential for spills becomes even more apparent. For example, the sixty-four million barrels becomes three hundred twenty million or more in terms of pollution risk potential. Add to this the fact that most Navy oil spills occur in the harbor, where physical effects are most severe, and it becomes obvious that the Navy must be extremely careful to prevent oil spills.

Procurement and Handling. Handling this enormous amount of fuel to keep the Navy's many ships, aircraft, and shore stations operating entails many steps that add to the risk of pollution. Following a shipment of fuel through the supply system from purchase to delivery aboard ship will best illustrate the extent of the potential for pollution.

Once the fuel is purchased, Navy interest in it starts with the loading at the refinery into vessels operated or chartered by the Military Sealift Command. The oil is delivered to one of the Navy "fuel farms" located around the world where it is stored ready for issue. It is at this point that Navy personnel first take physical possession and control of the oil.

Distribution of the fuel to individual ships takes place at the "fuel farm" piers or is piped to normal base piers. In some ports it is necessary to refuel large ships from small yard oilers due to draft limitations at normal refueling piers. Using yard oilers adds only one additional step in the fuel handling process, but due to the

large capacities of ships requiring this method, it may take several trips to complete the refueling process. Similarly, another step is added in the distribution system by large oilers used for underway replenishment. Refueling from these oilers generally occurs outside territorial waters and in most cases hundreds of miles at sea. Potential spills in this handling do not constitute a visible problem at this time; however, they do add to the overall pollution of the sea.

Even after the fuel is aboard the user ship there still exists the potential for a spill. Internal handling is required to trim ship, top off certain tanks, etc., which adds to the risk of a spill due to personnel error. This personnel error during internal handling is the most frequent cause of spills from Navy ships.

For various operational reasons large quantities of fuel are often returned to the fuel farm by user ships. This fuel is, of course, reissued to another ship at a later time.

Policies and procedures designed to eliminate spills caused by personnel error can be set forth at any level, but in practice it will take consciencious supervisors and trained operators to eliminate this, the Navy's weakest link in the oil pollution prevention program.

CHAPTER III

THE IMPACT OF NEW POLICY

Executive Order 11507 has had far reaching effects on the Navy at all levels of command. The most significant response thus far is an instruction issued by the Chief of Naval Operations, getting the Navy officially in the pollution prevention field. This instruction establishes the Navy's environmental quality program and sets forth Navy-wide policy for pollution prevention. Briefly it states that the Navy will:

> a) actively participate in a program to protect and enhance the quality of the environment;
>
> b) conform to the provisions of the Federal Water Pollution Control Act, as amended, insofar as the act prohibits the discharge of oil... The intent of this policy is to prohibit the discharge of all waste oil and oily mixtures in all areas except when operational emergency exists;
>
> c) accelerate the pace of corrective measures to meet environmental standards;
>
> d) incorporate environmental pollution prevention features in basic designs;
>
> e) cooperate with other Federal, State, and local agencies engaged in environmental pollution abatement, and comply with related standards and criteria as are promulgated by those agencies.[1]

Adherance to this policy will require that personnel and resources, currently committed to other projects, be reassigned to environmental quality tasks. Just to maintain the present level of readiness, someone must assume responsibility for the original assignments. In the face of reduced military forces and budgets, no new personnel are

seen to be available for these jobs. Existing personnel must assume the increased workload. If they cannot, then the Navy's ability to carry out its mission must suffer.

The ultimate goal of eliminating all discharges of waste oil and oily mixtures will require larger slop tanks aboard ship. Space will have to be allocated to these tanks, resulting in a reduction of fuel capacity, fighting power, or personnel comforts. The latter, seemingly insignificant, is a critical factor associated with two other high priority defense programs, the retention of trained personnel and the achievement of an all-volunteer force. Living conditions aboard ship are of great concern to the "creature-comfort-bred" young men of today and must be alloted sufficient priority in allocation of space.

Increasing the pace of corrective measures and incorporating environmental pollution protection devices in basic design require increased allocation of funds. If the funds are not forthcoming from the Office of Management and Budget, the Navy must rechannel funds from current projects. State of the art in pollution control is adequate to meet current and future predictable demands, but without additional funding, progress has to be slow or at the expense of other programs.

Notwithstanding the space requirements, it has been estimated that outfitting Navy ships, where feasible, with sewage treatment facilities alone, will cost about $253 million.[2] This figure does not include oil pollution abatement features, consequently the ultimate figure must be appreciably higher. The total amount may

be equivalent to the price of an attack aircraft carrier or at least three Polaris missile submarines.[3] When viewed in this perspective, the profound impact of a tradeoff such as this becomes evident.

Complying with state and local criteria for oil pollution prevention certainly will not have any effect on ships and stations equipped to preclude all discharges of oil. However, if local requirements are for specific types of equipment different from that already installed, there may be considerable conflict. Also, home port changes and visits to other areas may find certain ships in conflict with local laws. Attempting to keep track of what laws apply where and consider them when planning routine port visits will severely complicate planning ship movements. Aircraft operations will present similar problems. Dumping of fuel from Navy aircraft is often required during some missions. Local laws prohibiting release of wastes into the atmosphere could cause cessation of operations in that locality if strict adherance to those laws is required. Also operation of high altitude, supersonic bombers may be in violation of certain state's laws intended to restrict operation of supersonic transports. Notwithstanding the legality or lack thereof of these laws, compliance with them would prohibit flight in the airspace concerned. State and local lawmakers could create major obstructions to Navy operations even if that were not their intention.

Numerous other directives have also been issued requiring considerable response from individual commands. One of these requires submission of environmental impact statements prior to taking any action that <u>may</u> have significant effects on the environment.[4]

Another requires quarterly updating of a report listing all Navy pollution abatement deficiencies, proposed corrective actions, and estimated costs.[5] Thus each command is required to consider environmental impacts prior to any action, to examine its own pollution problems, and at least make suggestions for correcting those problems.

Great importance is attached to identifying and evaluating deficiencies and proposing corrective actions. For example, the Chief of Naval Material has established a survey team to compile data on all Naval forces afloat and ashore to evaluate the scope of the Navy-wide oil pollution problem. All commands are required to report deficiencies on a standard form and an inspection team has been established to sample selected ships, stations, and support activities to aid in the analysis of the data collected.[6] The fact that a Navy Commander, with a Master Of Science degree in Civil Engineering, is heading the team gives an insight into the importance attached to the program by high levels of command.

These and other instructions have created a flurry of activity at all commands. Some of this activity has been productive and has added significantly to pollution abatement; others have had no effect on reducing pollution other than just removing it from sight.

In the administrative area, all stations have assigned an officer with primary responsibility for oil pollution abatement programs. Although there is no current requirement for this officer to have had any formal oil pollution training, two officers concerned at one base have had such training and others are planning it in the near future.[7] As new and intricate equipments and removal

techniques are devised, it will become imperative that such training be given to those involved in pollution abatement. The number of supervisory personnel to be trained initially is not large and no major problems are forseen.

In 1970, partially in response to instructions and partly for legal reasons, most stations began keeping some form of record of oil spills.[8] By simple analysis of the spill records, recurring weak spots can be pin-pointed and corrective action taken to prevent future spills from the same cause. Materials required are insignificant, but a reasonably responsible person must be assigned to keep the records and evaluate the data. In all stations surveyed, it appears that this area is adequately covered.

Station operating expenses will increase in the near future (short term) to provide for the disposal of waste oil. In accordance with instructions from the Secretary of the Navy all dumping of refuse at sea has been discontinued.[9] Until recently it was common practice for Navy fuel handlers to dump waste oil at sea if the quality was too low for sale to local salvage firms. Dumping was always done within the law--more than fifty miles from the coast--with little or no notice taken of the action. Early last December about one-half million gallons of waste oil, dumped by the Navy, was driven by winds and currents and threatened to contaminate local Florida beaches.[10] Public concern was aroused and the dumping practice revealed. It really was no secret, it just hadn't gotten public interest until then. As a result of the strong public opposition and the new Navy policy of environmental concern, this dumping

procedure has been discontinued. It is interesting to note that disposal of the oil by a waste oil dealer would have cost the Navy only $5000 while clean-up operations, had the oil reached shore, would probably have been many times that amount, and possibly the loss of favorable public opinion has already exceeded that amount.

The dumping now prohibited applies to refuse collected in port for disposal at sea. It does not pertain to normally accumulated bilge water and refuse retained aboard while in port. Ships are encouraged to make use of local facilities for trash and garbage and, as an interim measure to reduce the potential for coastal pollution, local commands are requiring ships to refrain from pumping bilges within one hundred miles of the coast.[11] Navy-wide policy prohibits pumping of any oily mixture within one hundred miles of the nearest land in areas covered by the International Convention for Prevention of Pollution of the Sea by Oil, 1954.[12] This Navy prohibition is necessary inasmuch as warships are otherwise exempt from the provisions of the convention. These provisions create little difficulty for ships; meeting them requires only delaying pumping for a few hours. This simple procedure substantially reduces the possibility of any of the oily mixture reaching the beaches and at the same time allows for easier biodegradation of the oil. This policy is adequate to meet present regulations and public opinion demands, but permitting dumping at sea still adds to the overall pollution of the ocean and may be harmful to marine life. As the ultimate goal of eliminating all intentional discharges becomes a reality these restrictions will cease to have any effect on Navy ships.

Procedures have been established and equipment provided to reduce immediately this intentional disposal of oily waste at sea. Oil disposal rings and sludge barges are in use at various bases to collect wastes in port.[13] Oily wastes can then be disposed of ashore or reprocessed. Norfolk Naval Base has a waste burning furnace in which combustible wastes of all kinds are burned to produce steam for various uses.[14] Pollution is reduced, the disposal problem and costs eliminated, and useful energy obtained. Similar systems at bases around the world could improve operating efficiency and save the Navy millions of dollars.

Utilization of civilian contractors for waste oil disposal may create huge administrative problems as well as increasing costs for the Navy. This is due to a provision that the Navy ascertain that the contractor's ultimate disposal meets all applicable pollution control requirements.[15] Executing a contract with a disposal firm may not be sufficient to ensure that compliance, and ultimately the Navy may have to inspect disposal facilities and witness the processing to comply with the instruction. A recent incident in Rhode Island exemplifies the difficulties of government supervision of the contractor. When a ship in distress was intentionally put aground in Narragansett Bay to prevent further damage, a contractor was hired to pump out oily water from the ship to prevent the mixture from polluting the bay. The contractor, in violation of his contract with the city in which he is licensed, dumped this oily waste into a sanitary land fill, where it now threatens to run into a nearby, already critically polluted creek.[16]

Notwithstanding the run-off into the creek, the possibility that the oil will ultimately seep into the soil and contaminate the ground water is perhaps even more important than the creek. The point here is that the contractor, hired and supervised by people with a direct interest in prevention of oil pollution, violated his contract and disposed of the oil in an unacceptable manner. Ensuring that contractors meet local disposal regulations will be a formidable task for Navy officials.

In an effort to curb harbor pollution, refueling procedures have also been made more stringent. Direct telephone communication must be maintained between the ship and the pier by a special watch posted at the fueling valve. He is in a position to secure the valve if a dangerous situation occurs that may lead to an oil spill (such as excessive fueling pressure) or if a spill actually occurs. This procedure involves two men at least, and takes a minimum of time to set up, but could be invaluable for minimizing a spill if trouble should develop.[17]

Contingency plans and instructions are in effect or are being developed for most bases. These directives assign responsibility to various groups and individuals for emergency clean-up operations. As each base is different, the plans vary, but all are adequate. Much improvement in military and civilian response capability could be achieved if all bases (or Naval Districts) were required to establish a plan based on the National Contingency Plan and coordinated with the Coast Guard and local government. This would provide large

harbor areas with a central Navy organization for major oil spill action. This is almost mandatory if the Navy is to achieve a self-contained clean-up capability. Additionally it would help streamline coordinated operations where the Navy was called in to assist in control of a civil spill.

CHAPTER IV

ESTABLISHING ABATEMENT CAPABILITY

Estimating Requirements. The Chief of Naval Material is currently conducting a study to ascertain the needs and estimate the costs of providing an integral clean-up capability to all bases.[1] Results of this study are expected in June 1971.

Projected Costs. If one oil skimmer and two thousand feet of containment boom are to be supplied to only the major base areas referred to earlier, the cost of initial outfitting will run at least one million dollars. Depending on the type of equipment and the level of accessibility required, costs may be many times the optimistic figure set forth here. For example, the Hampton Roads area has been counted only once, while it actually contains nine bases. Travel time by water between bases is up to three hours. The same trip by land takes about one-half that time. Sufficiently prompt action to contain and remove a spill in time to prevent major coastal damage may require three or more complete sets of equipment.

Annual maintenance and replacement costs and man-hours involved are impossible to estimate at the level of this paper, but they most certainly will be substantial. Inestimable also are the costs of submitting, handling and receiving reports, and revision of directives and procedures as experience grows.

Cost Effectiveness. The cost of supplying pollution abatement equipment to each base in sufficient quantity to combat any possible spill is disproportionate to the requirements of day to day

operations. For example, at the bases surveyed, the largest recorded spill that occurred during the period 1 July 1970 to 1 March 1971 was estimated at one thousand gallons and was the result of material failure during a storm. This spill far exceeded all others which averaged twenty-five to fifty gallons, occurred about twice a week, and generally were emitted by ships transferring fuel internally.[2] Clean-up of this "normal" spill requires only sufficient absorbents to collect the oil, and manpower, usually supplied by the ship generating the spill, to scoop up the saturated absorbents. Disposal of the absorbent is accomplished ashore. Major equipments are not required nor would they be particularly effective in close quarters around the piers. Except for the occasional large spill, major equipments will be of use only for clean-up of an occasional spill from ships anchored in open or partly protected roadsteads. Containment of the oil could be effected, then large equipment used to remove it. Other than this, large equipment will probably sit idle for long periods, hopefully years at a time. However, periodic maintenance and operator training will be required. From personal experience, equipments left idle frequently fall into a state of poor repair until a crisis requiring their use occurs. They are then of little use for their intended purpose. It could be argued that firefighting equipments are maintained in generally excellent condition although idle most of the time. However, this operation requires large numbers of men permanently assigned to the task. Providing comparable numbers of trained personnel to operate and maintain the pollution apparatus for exclusive Navy use is prohibitive from a cost effectiveness standpoint.

Alternatives. An acceptable alternative would be to provide limited equipment capable of assisting ships in removing the small spill or containing the large spill, and then contracting with civilian firms for clean-up on a when-required basis. The drawback is the current shortage of equipment on the civilian market and possible excessive time delays in transporting equipment to the scene. A quick reaction capability for minor spill removal similar to the above suggestion is a goal established by the Chief of Naval Operations,[3] but at the present time it appears inadequate due to the lack of civilian equipment as back up for major clean-up operations. (In the New England area, for example, there is only one civilian skimmer available for oil removal.)[4]

A second, more desirable solution from the standpoint of an integral Navy clean-up capability and favorable public relations, is for the Navy to maintain equipments that would also be available to the civilian community to handle spills from commercial ships or shore facilities. Legislation would have to be enacted to provide for such a system and to streamline coordination with other federal agencies involved. Requests for assistance of Navy equipment must now be handled at the departmental level, a time-consuming process.[5] The equipment would be available for immediate use for occasional Navy spills requiring it and would be justified on a cost-effectiveness basis due to multiple users. Reimbursement to the Navy could come from a contingency fund or directly from the using agency. Some economic efficiency will probably result as civilian corporations and state and local agencies will probably not buy their own equipment if federally operated and maintained equipment is readily available.

Helicopter Assistance. Depending on the size and type of equipments, time late at the scene of a spill could be reduced through the use of Navy helicopters which are available at all but one of the east coast Naval bases. The Coast Guard currently is operating a similar system called ADAPTS (Air Deliverable Anti-Pollution Transfer System).[6] It consists of air transportable, submersible transfer pumps, a 40 hp diesel engine, hoses, and a collapsable rubber storage tank. The equipment is flown to the scene and parachuted to the ship in distress. Oil remaining aboard the vessel can be loaded into the rubber storage tank to preclude leakage from the ship. Although the rubber storage tank is too heavy to be carried by the helicopter, the engine, pumps, and hoses can be handled easily. There is no apparent reason why similar equipment to remove oil from the surface couldn't be designed for helicopter delivery. Use of the helicopter could reduce time from one-fourth to one-tenth of that required to deliver equipment by surface means. This could be a significant factor even if the helicopter is used only for transporting containment devices. Such a system might include a compressed gas inflated containment boom that could be lowered to the ship and deployed by one of the ship's own small boats. Major abatement capability maintained by the Navy would be enhanced considerably by incorporation of helicopter delivery, a method not generally available to non-military interests.

Effectiveness of Existing Capabilities. As public concern over oil pollution has been mounting, base commanders have not been waiting idly for the results of the surveys and studies and the promulgation of policy from Washington. Considerable action has

been taken at the local level to provide adequate clean-up capabilities. Under the direction of the Environmental Control officer, the pollution abatement procedures and equipments on hand are adequate for the normal spill. Additional equipment and supplies are being procured by most stations to further improve capabilities. Absorbents are stocked locally in sufficient quantity for routine requirements and mechanical containment devices are available in various amounts from a few hundred to two thousand feet.[7] Even the latter amount is inadequate for some applications. For example, it is insufficient to encircle a large attack aircraft carrier if required to contain a spill. Several bases have mechanical skimmers, either converted Navy reserve small craft or one-of-a-kind experimental devices. One thing all these skimmers have in common is that they are all "jury rigged", interim devices. They are adequate for small spills in calm water but are hopelessly inadequate for large spills in open areas of the harbor, particularly in adverse weather conditions. Instructions for one skimmer state that operation is hazardous at all times and extremely dangerous at night.[8]

Consider a ship the size of a destroyer running around near the Dumplings in Narragansett Bay in seas of three to five feet. A spill amounting to only ten percent of its capacity would put twenty-one thousand gallons of black oil on the water. Recovery of the oil spilled before a contamination of nearby beaches and shoreline occurs is hard to imagine. In fact, the combined resources of Newport Naval Base and all of the New England region would be insufficient to contain

and remove the oil before it reached shore. The best that could be expected would be a reduction of the extent and severity of the contamination and rapid clean-up of the beaches. Although base commanders are aware of the problem and are attempting to obtain adequate equipment, without considerable additional funding, capabilities will continue to remain limited.

CHAPTER V

EFFECTS ON MILITARY SEALIFT COMMAND

General Operations. The Military Sealift Command, (MSC) under the Department of the Navy, is responsible for all Department of Defense waterborne commerce and as such has been affected considerably by anti-pollution legislation and public attitudes. MSC operates about fifty-five tankers, twenty-four of which are government owned and the remainder chartered from civilian companies.[1] During the six months from July thru December 1970, these ships carried a total of about eighty million barrels of various fuel oil products.[2] This is the equivalent of about one-hundred trips of the Torrey Canyon, or in pollution potential about two hundred Torrey Canyon Pollution Potential Units annually. With a pollution potential this great and the probability that an incident would bring unfavorable publicity to the Navy, the Department of the Navy and the Military Sealift Command have been deeply concerned about pollution prevention.

Military Sealift Command, in keeping with the intent of Executive Order 11507, is progressing rapidly with pollution prevention programs. Many new policies and procedures have been adopted within the last year. Some of these policies and procedures will have far reaching effects on both the MSC ships and the Navy combatant types. Inasmuch as MSC carries all Department of Defense fuels, all military activities will feel some effects.

Federal Requirements. Although not all sections of the Federal Water Pollution Control Act apply to public vessels, the Commander MSC has directed that all MSC ships and vessels under bareboat charter shall observe all provisions of the Act.[3] This regulation requires operators of MSC vessels to report any discharges of oil that are in violation of the Act. This procedure will at least allow some clean-up action to be taken on a spill that otherwise might go unreported.

Local Regulations. Although local governments have no jurisdiction over federally operated vessels, and their laws vary widely from port to port, MSC vessels have been directed to comply with local regulations.[4] To implement this policy MSC periodically issues notices containing pertinent local regulations. Representative of these is a December 1970 notice alerting ships of the air pollution requirements of several west coast ports.[5] Compliance by ships will probably not significantly affect their operation but keeping track of local regulations and disseminating the information will be a major administrative task for MSC.

Departmental Regulations. Consideration of pollution potential is required in planning MSC activities. By separate instruction, MSC activities must submit environmental impact statements in the same manner as operating and support forces.[6]

Load-On-Top Procedures. MSC now requires compliance with load-on-top procedures, called the clean seas code, by all its ships.[7] In many cases this will result in a reduction of cargo carrying capacity on some legs of a voyage. Specific instructions have been

issued for ships for tank cleaning procedures and consolidation of wastes in a slop tank. If no facilities are available to offload waste in a particular port, it is to be retained on board until such time as it can be discharged to suitable shore receiving facilities. Carried to extremes, it is easy to visualize a tanker carrying more waste than clean cargo. With tanker capacities partially reduced by this procedure, more trips will be required to transport a given amount of fuel, thereby increasing operating costs.

Deballasting. MSC provides information on deballast facilities to ship masters by publishing a table of the facilities of over one hundred twenty-five commercial and military fueling depots around the world.[8] Originally published in April 1970, rapid construction has already required updating of the list. Frequent additions are anticipated in the near future as public concern induces and new laws require commercial firms to install such equipment. Maintaining the listing up-to-date will entail considerable effort and expense.

As these facilities become more numerous and information more widely circulated, it is anticipated that Defense Supply Agency will limit purchases to those producers who maintain adequate deballast facilities at their loading terminals.[9] Adherance to this policy will increase costs to military purchasers due to longer transit times and longer in port turn around times incurred in offloading slops and ballast. As the number of available facilities increases and offloading procedures improve, it is expected that the

effects of this policy will be gradually reduced. Costs of operating deballast facilities will eventually be reflected in higher prices to all consumers.

Research and Development. Research is also being conducted into the feasibility of incorporating oil-water separators in existing ships.[10] New vessels will probably include such equipment and possibly separate ballast systems. The difficulty in this program is designing a system to handle large quantities of oil-water mixture which may contain many different types of oil in infinite ratios with the water and developing reliable monitoring equipment.

The problems faced by MSC in meeting pollution control requirements are not insurmountable but to achieve success we must accept the high costs involved. The external costs of pollution are being transformed into internal costs and ultimately must be included in operating budgets.

CHAPTER VI

OUTLOOK FOR THE FUTURE

Spills in Foreign Ports. If Navy operations continue at present levels, oil pollution problems in the international arena will be of increasing concern to the Navy. To preclude major international incidents, integral clean-up capabilities will have to be provided to all ships for control of spills in foreign ports. There is no assurance that foreign ports will be equipped to assist visiting ships with oil spill control.

Resort areas, frequently visited by Navy ships for rest and recreation, are extremely sensitive to even small spills. On 13 July 1965 the U.S.S. Shangri-La, (CVA-38), during a routine port visit spilled an estimated 2400 gallons of black fuel oil off the coast of Cannes, France.[1] Amazingly, in spite of the fact that except for carbonized sand no other abatement supplies were available and much of the oil reached the beaches, removal efforts were successful and no permanent damage occurred to the beaches or the tourist trade.* However, it isn't likely that the Navy will be this fortunate in the future. Reasonable planning must include having adequate pollution control equipment available. Provision of oil containment boom to isolate the spill in the vicinity of the ship would have made clean-up operations infinitely easier and presented the picture of an effective Navy capability.

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*Clean-up took only one day and consisted of applying sinking agents offshore, funnelling the oil reaching shore into trenches dug along the beach where it was physically removed, and replacing blackened sand.

This spill, during the height of the tourist season and on the eve of Bastille Day, could have permanently damaged both the United States relations with France and the Navy's public image. A similar incident today, when U.S. forces are attempting to maintain a "low profile" abroad and when many groups would like to keep the U.S. Navy out of their part of the world, might be even more disastrous and have adverse effects on national security.

Assistance from Central Depots. Containment booms and absorbents stocked at major bases, such as Rota, Naples, and Holy Loch, will prove only marginally effective in assisting removal of a spill in other than their local areas, due to the time element involved. For example, if helicopter delivery of this equipment were available, as suggested earlier for domestic employment, it is estimated that time from initial request to delivery of supplies to Cannes from Naples could be at least six hours. Such a delay is clearly unacceptable. If, however, the oil was already contained by equipment on hand, short delays while awaiting delivery of skimmers or other removal equipment by air would be entirely satisfactory.

Ship Carried Equipment. It is evident from the above discussion that all ships visiting foreign ports must be provided with at least containment equipment. Large ships should probably also have sufficient equipment to contain and remove a spill from any ship in its group. Smaller ships could load equipment on a temporary basis when conducting independent visits to non-Navy equipped ports.

Representative equipment for a large ship might include as a minimum two thousand feet of inflatable oil containment boom, a vacuum type skimmer and pumps suitable for use from a 40 foot utility boat, some sort of collapsable storage tank, and sufficient absorbents to remove final traces of oil. Smaller ships on independent duty might carry only the boom and absorbents. Initial purchase costs will be astronomical but precluding the alternative, a major international incident, appears worth the price.

Prevention Methods. Although spills resulting from personnel error, similar to the one described above are not likely to be completely eliminated, there is much that can be done to avoid or reduce damage. For example, in ports where it is available, containment boom should be rigged in such a manner as to isolate a ship prior to commencing routine fueling operations. Any resultant spill would then be totally contained and easily removed with little or no danger of contamination of adjoining coastline. Costs of operation in this manner should be minimal and easily absorbed in operating budgets. This procedure is now in use in Portland, Maine and has proven successful.[2]

An even simpler procedure to avoid adverse publicity and damage in resort areas would be to prohibit internal transfer of fuel except to service tanks, while in resort ports. If trim couldn't be adjusted by transferring water, then a slight out-of-trim condition could be accepted as the price to help avoid pollution incidents.

Installation of automatic shut-off devices in overflow lines or overflow lines leading into slop tanks might be another easy way to avoid accidental spills. With such devices installed, pumping oil

overboard during internal transfer will become difficult if not impossible.

Fuel Conversion. The Navy will probably convert all non-nuclear ships to a distillate fuel sometime in the near future. This change will eliminate the gross contamination and blackening of beaches resulting from a black oil spill but it brings its own unique problems. Distillate fuel, a higher volatile fraction of crude oil, is more damaging to marine life than the heavier fractions.[3] Thus, while distillate is less of a problem from the physical aspect, it is potentially more hazardous to marine life. The fact that distillate fuel is relatively undetectable may allow the accidental discharge to continue for a considerable time before it is discovered and secured and may also allow small spills to go completely undetected, unreported and uncorrected.

Research and Development. The possibility exists that all sewage, garbage, (except metallic items), and other combustible wastes, including oily water mixtures may be converted to water and harmless gasses aboard ship, there by eliminating all intentional disposal of wastes at sea. Research is being conducted into a process that will make this possible (the Zimmerman Process).[4] This system essentially oxidizes all sewage and combustible wastes by a high temperature, flameless process which yields water and harmless gasses. Such a device aboard ship could provide auxilliary heat and fresh water as by-products to its primary function. It is possible that a similar combustion process may be developed for main propulsion power. Then wastes would simply become additional fuel, resulting in the reduction of overall conventional fuel requirements.

Research is also being conducted under Office of Naval Research contract into biological degradation of oil as an oil slick removal method. Two parallel studies are being conducted, one into the use of natural marine bacteria and the other into the use of yeast.[5]

Elimination of slicks in this manner is certainly more desirable than by use of dispersants or sinking agents, but it also has drawbacks. Concentrations of bacteria after the oil is consumed may have adverse effects on biological food chains much as the concentrations of nutrients in some waters has resulted in severe algae pollution. The possibility is very real for a similar situation to evolve from oil eating bacteria.

Abatement Operations. When the studies discussed earlier are evaluated and decisions made as to equipment procurement, it is anticipated that the Navy will ultimately possess sufficient capability to become the major pollution abatement company. Although current policy does not intend that the Navy supply abatement equipment for all sectors of industry and government, emergency operations will undoubtedly result in the use of Navy equipment. Ultimately the Navy will come to be relied on to provide the equipment. From that point on, like it or not, the Navy will be the major operator of abatement equipment. The best action is to plan now for Navy participation at this level so that funds can be allocated and plans formulated to put the system in operation at the earliest possible time.

NOTES

Chapter I

1. Luman H. Long, ed., The World Almanac and Book of Facts, 1971 ed. (New York: Newspaper Enterprise Association, 1970), p. 367.

2. U.S. Bureau of the Census, Statistical Abstracts of the United States, 1970, 91st ed. (Washington: U.S. Govt. Print. Off., 1970), p. 805.

3. United Nations, Department of Economic and Social Affairs, Mineral Resources of the Sea (New York: 1970), p. 5.

4. David P. Hoult, ed., Oil on the Sea (New York: Plenum Press, 1969) p. 6.

5. "Statistical Abstracts of the United States", p. 578.

6. Hoult, ed., p. 103

7. James E. Moss, Character and Control of Sea Pollution by Oil (Washington: American Petroleum Institute, 1963), p. 4.

8. Hoult, ed., p. 6.

9. The President, Executive Order 11507, Prevention, Control, and Abatement of Air and Water Pollution at Federal Facilities (Washington, 1970)

Chapter II

1. U.S. Office of Naval Operations, "Catalog of Naval Shore Activities," OPNAV P 09B3-105 45th ed. Washington: 1 August 1970.

2. George A. Gilmore, et al., Analysis of Oil Spills and Control Materials (La Jolla, Calif.: Dillingham Corporation, 1970), p. B-2.

3. U.S. Military Sealift Command, "Financial Statement, December 1970," Washington: 1 Feb. 1971, p. 17.

Chapter III

1. U.S. Office of Naval Operations, "Environmental Quality Program; Policy and Assignment of Responsibilities for," OPNAVINST 6240.3 Washington: 2 March 1971, p. 2-3.

2. U.S. Department of Interior, The Cost of Clean Water and its Economic Impact (Washington: U.S. Govt. Print. Off., 1969) p. 169.

3. U.S. Navy Department, FBM Facts (Washington: 1970) p. 5.

4. U.S. Office of Naval Operations, "Environmental Impact Statements; policy regarding and assignment of responsibilities for." OPNAVINST 6240.2A Washington: 11 December 1970, p. 1.

5. Letter from Chief of Naval Operations to Chief of Naval Material, "Pollution Abatement; preparation of Air and Water Pollution Control Reports," Ser: 56P45, Washington: 31 December 1970.

6. U.S. Chief of Naval Material," Oil Pollution of Environment by Ship and Shore Facilities, study of," NAVMATNOTE 6240. Washington: 14 January 1971.

7. Interviews and telephone conversations with LCDR I. W. Hastings, USN, Assistant Operations Officer, Naval Base Mayport, Florida, Lt. W. K. Vizza, USN, Senior Civil Engineer, Public Works Center, Naval Base Norfolk, and CWO R. Mays, USN, Environmental Control Officer, Naval Base Newport.

8. Ibid.

9. Message from Secretary of the Navy to all Naval Activities, "Disposal of Oil, Oily Wastes and Refuse in the Oceans," ALNAV 46, Washington: 3 December 1970, p.1.

10. "Slick Nears Fla. Shores," The Newport Daily News, 3 December 1970, p. 15.

11. U.S. Office of the Commander, Naval Base Newport, R.I., "Manual of the Senior Officer Present Afloat, Narragansett Bay," SOPA (Admin) Inst. 5440.2C Newport: 15 December 1970, p. 1-10.

12. OPNAVINST 6240.3, Enclosure 2, p. 2-4.

13. SOPA (Admin) Inst. 5440.2C, p. 1-18.

14. Robert Neil, "Ecology/Navy," All Hands, February 1971, p. 25-31.

15. ALNAV 46, p. 1.

16. "Landfill Operator Told: 'Stop Polluting'," The Providence Evening Bulletin, April 3, 1971, p. 16:1.

17. SOPA (ADMIN) Inst. 5440.2C, p. 1-14.

Chapter IV

1. Letter from Chief of Naval Operations to Chief of Naval Material, "Preparation of Air and Water Pollution Control Reports," Ser. 56P45, Washington: 31 December 1970, p. 1.

2. Interviews and telephone conversations with Hastings, Vizza and Mays.

3. OPNAVINST 6240.3 Enclosure 1, p. 2.

4. U.S. Department of the Interior, Contingency Plan for Spills of Oil and Other Hazardous Materials in New England (Needham Heights, Mass: 1969) p. 3-3-18.

5. OPNAVINST 6240.3, p. 4.

6. "Coast Guard Previews Adapts, System For Averting Tanker Spills" Oceanology International, June 1970, p. 26.

7. Interviews and telephone conversations with Hastings, Vizza and Mays.

8. SOPA (ADMIN) INST. 5440.2C p. 1-11.

Chapter V

1. U.S. Military Sealift Command, "Financial Statement, December 1970" Washington: 1 Feb. 1971, p. 14.

2. Ibid., p. 16.

3. U.S. Office of Military Sealift Command, "Prevention of Water Pollution," COMSCNOTE 3121 Washington: 12 October 1970.

4. U.S. Office of Military Sealift Command, "Air Pollution Control, Excessive Smoke and Boiler Tube Blowing in West Coast Ports," COMSCNOTE 6240 Washington: 21 December 1970.

5. Ibid.

6. U.S. Office of Military Sealift Command, "Environmental Impact Statements," COMSCINST 6240.2 Washington: 9 February 1971.

7. U.S. Office of Military Sealift Command, "Oil Pollution Control," COMSCNOTE 6240 Washington: 17 March 1971.

8. U.S. Office of Military Sealift Command, "Ballast Facilities at Ports," COMSCNOTE 3170 Washington: 8 April 1970 and 11 February 1971.

9. Letter from Director, Military Sealift Command to Chief of Naval Material Command," MSTS Pollution Abatement Requirements," Washington: 27 May 1970, p. 1.

10. Ibid.

Chapter VI

1. "U.S. Navy Recoups on Oily Faux Pas," The New York Times, 14 July 1965, p. 1:2.

2. Interview with CWC R. Mays, USN Environmental Control Officer, U.S. Naval Station Newport, R. I. 8 March 1971.

3. Hoult, ed., p. 7.

4. "How the Navy Hopes to End Water Pollution," The Providence Sunday Journal, 4 April 1971, p. G-4:1.

5. "Yeast Studied in Oil Spill Removal," Navy Times, 27 January 1971, p. 32:1.

BIBLIOGRAPHY

Hoult, David P., ed. Oil on the Sea. New York: Plenum Press, 1969.

Moss, James E., Character and Control of Sea Pollution by Oil. Washington: American Petroleum Institute, 1963.

Gilmore, George A., et al., Analysis of Oil Spills and Control Materials. La Jolla, Calif: Dillingham Corporation, 1970.

U.S. Office of Naval Operations. "Environmental Quality Program; Policy and Assignment of Responsibilities for." OPNAVINST 6240.3. Washington: 2 March 1971.

U.S. Office of Naval Operations, "Environmental Impact Statements; policy regarding and assignment of responsibilities for." OPNAVINST 6240.2A. Washington: 11 December 1970.

U.S. Office of Naval Operations, "Navy Environmental Pollution Control Program; certification of." OPNAVINST 6240.1A. Washington: 4 April 1969.

Portland Harbor Pollution Abatement Committee, "Oil and Hazardous Materials Contingency Plan for Prevention, Containment and Clean-up for the State of Maine." Portland, Me: 1970.

U.S. Department of the Interior. Contingency Plan for Spills of Oil and other Hazardous Materials in New England. Needam Heights, Mass: 1969.

Letter from Chief of Naval Operations to Chief of Naval Material. "Pollution Abatement; preparation of Air and Water Pollution Control Reports." Ser: 56P45. Washington: 31 December 1970.

U.S. Office of Naval Material. "Oil Pollution of Environment by Ship and Shore Facilities, study of." NAVMATNOTE 6240. Washington: 14 January 1971.

Message from Secretary of the Navy to all Naval Activities. "Disposal of Oil, Oily Wastes and Refuse in the Oceans." ALNAV 46. Washington: 3 December 1970.

U.S. Office of the Commander, Naval Base, Newport, R.I. "Manual of the Senior Officer Present Afloat, Narrangansett Bay." SOPA (ADMIN) INST. 5440.2C. Newport: 15 December 1970.

U.S. Military Sealift Command. "Financial Statement, December 1970." Washington: 1 February 1971.

U.S. Office of Military Sealift Command. "Prevention of Water Pollution." COMSCNOTE 3121. Washington: 12 October 1970.

U.S. Office of Military Sealift Command. "Air Pollution Control, Excessive Smoke and Boiler Tube Blowing in West Coast Ports." COMSCNOTE 6240. Washington: 21 December 1970.

U.S. Office of Military Sealift Command. "Environmental Impact Statements." COMSCINST 6240.2. Washington: 9 February 1971.

U.S. Office of Military Sealift Command. "Oil Pollution Control." COMSCNOTE 6240. Washington: 17 March 1971.

U.S. Office of Military Sealift Command. "Ballast Facilities at Ports." COMSCNOTE 3170. Washington: 8 April 1970 and 11 February 1971.

Letter from Director, Military Sealift Command to Chief of Naval Material Command. "MSTS Pollution Abatement Requirements." Washington: 27 May 1970.

U.S. Office of Commander, Naval Base Newport. "Contingency Plan for Spills of Oil and other Hazardous Materials in Narragansett Bay." Unpublished Proposed Plan. Newport, R.I. 1971.

Smith, J.E., ed. Torrey Canyon Pollution and Marine Life. Cambridge University Press, 1968.

The Torrey Canyon. London: Her Majesty's Stationery Office, 1967.