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UTILIZATION OF NAVAL TECHNOLOGY IN ENVIRONMENTAL PROGRAMS OF FOREIGN NATIONS.

Professor Rocco M. Paone
Political Science Department
U.S. Naval Academy
Annapolis, Maryland 21402

Final Report for Period of 1 July 1976 - 30 March 1977

Disclaimer: The views expressed are those of the author and do not represent the position of the Department of Defense.

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Energy-Environment Study Group
U. S. Naval Academy
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This study identified and analyzed uses of naval technology in the creation and implementation of air and water pollution abatement policies in the navies of some 18 foreign nations. It also identified the degree of foreign naval competence in air and water pollution abatement and in waste disposal technology aboard foreign vessels of war.

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UTILIZATION OF NAVAL TECHNOLOGY IN ENVIRONMENTAL PROGRAMS OF FOREIGN NATIONS

Rocco M. Paone, Professor

I. OBJECTIVES OF STUDY

The question of pollution abatement is a sensitive one for many nations. Often the attempt to clean air and water and protect populations from excessive noise and biochemical impediments to living is considered inconsistent with the development and/or expansion of industry. Some individuals have continually asserted that environmental restrictions on industry increase the cost of production and therefore the price of the commodity to the consumer, and also bring about increased unemployment. This type of reasoning propels a short-term view and overlooks the quality of life and employment opportunities in developing effective pollution abatement programs.

Navies of nations throughout the world are very much involved in creating possibilities of pollution in peacetime. There is no question but that they have contributed a reasonable share to the total sum of air, water, and noise pollution, even though the composite portion is minor when compared to the total of marine pollution. Today, there is little reason for navies not to abide by the international conventions and national policies on pollution abatement. This study is an attempt therefore to:

1. identify pollution abatement policies of foreign countries and analyze use of foreign naval technology in air and water pollution abatement policies,
2. measure the degree of activity and responsibility of foreign naval officers in air and water pollution abatement and in waste disposal technology aboard their vessels of war, and

3. assist in creating a system of naval environmental technology interaction by furnishing to the U.S. Navy information on foreign naval environmental technologies related to air and water pollution and discharge of shipboard wastes.

II. INTRODUCTION

In the original research design of this study it was presumed that a compilation of responses to certain questions addressed to naval and scientific personnel of foreign nations, added to an examination of some eight variables related to pollution abatement technique and policy, would serve to ferret out and reflect the development and utilization of naval technology in the environmental policies of foreign nations. The implementation of this embryonic systematic approach led to a good deal of correspondence and many telephone conversations with foreign embassy officials and United States Defense Attaches on duty abroad as well as a number of interviews with foreign naval engineer officers and scientific specialists and of course some dependency on the author's experience and knowledge in the pollution abatement field derived from study at home, attendance at national and international conventions on the environment, and previous travel to a number of the countries listed in the study.

The first of a number of problems that had to be settled once the research design appeared viable related to the selection of nations whose navies were to be researched. Eighteen nations from the Western Hemisphere, Europe, the Middle East, Africa, and the Pacific region were selected. These included major and less than major maritime powers and developed and developing countries. They also had to be nations from which a reasonable certainty existed that the required information could be obtained.

The second problem involved the adoption of variables, both in independent and dependent, to be included in the projected research. In an effort to point the direction of the research design the following variables were determined:

1. amount of money budgeted for pollution abatement by the foreign navy,
2. sum budgeted for environmental matters by the foreign government,
3. input of the navy and its place in the pollution abatement decision-making process, where government legislation or other action might affect the navy,
4. utilization of naval officers in research and development on marine environmental projects,
5. existence of naval specialists in the field of pollution abatement,
6. technological contributions of naval specialists on the environment to pollution abatement and shipboard waste discharge systems,
7. restrictions on disposal of shipboard wastes in territorial waters and naval policy regarding disposal of shipboard waste, water, and air pollution, and
8. utilization of naval technology in national pollution abatement programs.

The duplicative features in several of the above variables are purposeful as a check on some of the points revealed in various correspondence and interviews with foreign naval science specialists.

The third problem faced was related to the methodology to be adopted in contacting the specialists on naval environmentalism in the countries selected. Since nothing has been published in this field of research, identification of such personnel could be difficult. Communication with that section of the Defense Intelligence Agency (DIA) which has a jurisdiction over United States Defense Attaches (USDA) and the use of the Defense Attache Roster went a long way toward solving this problem.

Requests to our defense attaches for some essential information related to the variables could be processed through DIA whose stamp of cognizance would facilitate and expedite the communications. This procedure was pursued. Cover letters and topics were dispatched to USDA's in the nations listed via the Deputy Director, DIA.

Upon receiving my requests, the attachés communicated with the proper authorities of the foreign navies who could supply the information requested. Replies were returned to me directly by the USDA's and/or by the foreign specialists involved and in some instances by foreign embassy naval officials in Washington. These communications in turn led to identification of and ensuing discussions, interviews, and correspondence with foreign environmental specialists in the United States and abroad.

As a back-up approach, the eight foreign exchange officers--all except one are naval officers--on duty at the Naval Academy were informed of my inquiries related to the pollution abatement policies and programs of their navies. They volunteered and assisted in retrieving information, and also in explaining certain of their nations' uses of naval engineer officers. Several also identified naval environmental specialists to be contacted by me.

National Legislation on Pollution Abatement

The utilization of naval environmental technology in the following countries are included in this study. Attempts were made to examine the environmental technology of Iran and Chile; however, the information received was negative in all areas of information sought from the two nations and published sources.

Western Hemisphere	Europe	Middle East	Pacific Region
Argentina	Denmark	Israel	Japan
Brazil	France		Nationalist China
Canada	German Federal Republic		Philippines
Mexico	Great Britain		Republic of South Africa
	Italy		
	Netherlands		
	Portugal		
	Sweden		
	USSR		

The environmental policies of the Italian, Mexican, Portuguese, and Swedish Navies do not include the utilization of naval technology in air and water pollution abatement policies. The information on these four countries was not completed in time for the printing of my "Foreign Navies and Environmentalism" of late 1975. All of these nations have national legislation of Water and Clean Air. In addition, some, such as Canada, the German Federal Republic (GFR), France, Italy, Brazil, the Union of Soviet Socialist Republics (USSR), and Australia have provincial laws restricting water and air pollution abatement. These administrative regions promulgate their own environmental regulations. Countries, including Denmark, Israel, GFR, Japan, Great Britain, France, Netherlands, the Republic of South Africa, and the USSR have enacted legislation on noise abatement. Violation of noise standards is

generally considered to be a nuisance and is punished under the Public Nuisance Acts.

The environmental policies are administered through different government agencies in many of the countries, although in most by a recently created Ministry of Environment, assisted by the Ministries of Health and Interior. The Ministry of Environment generally is directly responsible to the Chief Executive of the nation. In a number of other countries, the Ministries of Agriculture, Transportation, Commerce, and Police administer national environmental policies. In the Soviet Union the Hydrometeorological Service is the main agency in administering environmental programs. While many of the pollution abatement laws have been in existence since the 1950's, it is a fair conclusion to assert that they were ineffective until implemented by the relevantly sudden enactment of environmental legislation during the early 1970's. This research recognizes as well that in most of the nations the execution of pollution abatement policies is the responsibility of the Ministries of Health and Interior while the Environment Prctection Ministry (usually created since 1970) acts as the Chief Adviser on matters of pollution abatement as well as the Principal Coordinator of plans and programs.

A. Effectiveness of legislation. The results of the national legislation of the nations researched are still questionable. In some cases the enactments are too recent for assayance of judgment. On the whole, it is considered that this national legislation has not been as effective as planned. There are a number of reasons for this lack of environmental policy development, i.e.,

1. lack of implementation measures or desire of implementation,
2. insufficient punitive measures for violations of pollution abatement laws,
3. fear of high cost of pollution abatement technology and enforcement of environmental laws,
4. greater desire to support industrialization--more jobs rather than pollution abatement,
5. inability to perceive pollution abatement as a long-term value in areas of health and employment,
6. consideration of possible retarding of combat capability of the Armed Forces, and
7. lack of environmental technology capability in industry and the military.

The factors cited above, added to the recent character of the environmental legislation, leads to the conclusion that the effectiveness of the said pollution abatement enactments is questionable. It will remain in that purgatorial state as long as most of the factors remain as prevalent as they are presently.

ARGENTINA

General

The Government of Argentina is a member of the Inter-Governmental Maritime Consultative Organization (IMCO) and as such is a signatory to the Ocean Dumping Convention of December 1973. Pollution abatement legislation in Argentina covers water but not as yet air and noise, since the latter two are not considered serious problems at the present time. The government has also ratified the 1954 IMCO Convention for the Prevention of Pollution of the Sea by Oil.

The Naval Hydrographic Service is the major administrational office for pollution abatement. For over thirty years, it has been charged with the responsibility of investigating the temperature, salinity, and nutrients of the Argentinian seas. Argentina is presently in the throws of enacting legislation creating a new national environmental agency to handle pollution abatement.

Environment and the Argentine Navy (AN)

With the signing of the Convention for the Prevention of Pollution by Ships by the Argentine Government in 1973, the AN, through government resolution 467, dated 6 May 1974, was given the responsibility of pollution abatement within itself and along coastal and inland waters. A special commission for Marine Pollution Abatement was created from representatives of the Hydrographic, Investigation and Development Services, by the Naval General Department to oversee the development of pollution abatement on a national level.

While the AN is charged with the responsibility of policing water pollution abatement programs on a national level, it does not have within its own organization a complement of environmental engineers. Its

officers are trained to detect violations of the environmental laws and the IMCO dumping convention from ship and on-shore bases and facilities, including those of commercial shipping. The prime targets of the AN in this police effort are the disposal of waste, the problem of oil spills from ships and shore facilities, the control of the discharge of oil, and the construction and regulation of reception facilities in ports and terminals that are used to store the oily mixtures from oil tankers and other vessels. A number of the shore receptacle facilities are in the process of being constructed underground.

Because of a limited budget and lack of technical capability, the Naval Hydrographic Service does not have the capacity to measure the parameters concerning hydrocarbons, heavy metals, and other toxic substances. With assistance from IMCO, the Navy is expanding the laboratory facilities of the Hydrographic Service and acquiring hydrographic and oceanographic ships which assist in the detection of toxic substances in the waters.

In Argentina a full national pollution abatement program is in the process of being planned and the Navy is involved in formulating a portion of it, i.e., that which relates to maritime affairs, both coastal and inland. Most of the provinces have adopted some programs aimed at pollution abatement. The AN, however, has the responsibility of policing the water pollution abatement programs in the rivers of the provinces.

The present pollution abatement program includes the following and is centered around the Navy:

1. Creation of a national pollution abatement law that relates to the

ratification of the IMCO 1954 and 1973 Conventions;

2. Expansion of the marine pollution laboratory of the Naval Hydrographic Service;

3. Persuade the merchant vessels of the necessity to obey the provisions of the 1973 IMCO Convention on Dumping;

4. Training of a group of naval officers in techniques of combating large oil spills. These officers will attend courses given by the U. S. Coast Guard;

5. Creation and development of a group of naval officers and men to specialize in pollution abatement training to acquire the capability of fighting fires on naval shore facilities;

6. Expanded study by naval specialists of the state of pollution in Argentinian waters and inland rivers; and

7. Collateral participation of the Navy with other government agencies to study the pollution caused by land erosion and land precipitation problems that affect the marine environment.

Only recommendations and norms exist on the question of shipboard wastes - human and other. As of the present time (November 1976) the prohibition of free sewage disposal and of garbage dumping in the territorial sea is not law, although it probably will be in the near future. The Navy has had for many years a policy that prohibited the dumping of garbage from combat vessels, however, for security rather than pollution abatement requirements. It is felt by Argentinian Naval authorities, therefore, that the Navy is the pioneer and has much experience in this area of pollution abatement. Yet the Navy does not have an air pollution abatement policy or program.

The Argentine Navy is deeply engrossed in Argentinian pollution abatement affairs, despite the fact that the government is still preparing national environmental legislation. Its main purpose in environmentalism, aside from assuring that its personnel abide by its own regulations on dumping and the basic agreements of the IMCO Conventions that have been ratified by the government, is one of seeking information on pollution abatement from foreign nations (U.S. Coast Guard) and recommending the discontinuance of any practices by merchant ships that violate the IMCO Convention agreements. The AN has been given the responsibility of protecting the marine environment, including the fishing preserves in Argentine waters, not only in waters of the territorial sea, but also in the river vine regions of the land interior. Despite the reality of legal impotency in many areas of its environmental responsibilities, there is little question but that the AN is a pioneer and a leading influence in creating the new national environmental laws which are still under preparation.

References:

Letter, James Rodgers, Captain, USN, to Dr. Rocco N. Paone, 15 September 1976.

"Respuestas A Cuestionario Senor Agregado Naval Estado Unidos."

BRAZIL

General

Just in the last year the government of Brazil created a National Environment Agency (NEA) under the Ministry of Interior. The NEA is still in the process of organizing its staff and budget which, including those Minister of Interior funds allocated to environmental matters, totals some 5 million cruzerios or about $618,000 at the present rate. There is a recently enacted Marine Traffic and Water Pollution Law.

The present Brazilian government policy on environmental matters stresses rapid economic development on the highest priority and any pollution abatement that might slow the pace is regarded as quite secondary. There is an admitted requirement for a strong national pollution abatement policy, yet a weak one exists. Nothing in the way of pollution abatement policy must "traumatize economic development " stated Francisco Fernando de Barros, State Secretary of Works. Viable technical and financial solutions must be found to curb pollution, but they are not to hinder economic development

Pollution abatement laws and policies do exist in the individual states. Two Brazilian newspapers, O Estado de Sao Paulo and Jornal de Tarde, have awakened the people to the deterioration of the quality of life due to excessive pollution, particularly in Sao Paulo and along with the national newspaper O'Globo, have urged that the study of ecology be incorporated into the school systems beginning with the first grade and through high school. The fast urban and technological development, said O'Globo, and use of chemical agents and heavy equipment have injured the physical environment to the level of serious harm.

The national government has recently ordered the inclusion of environmental studies in the school curriculum as a requirement from the first through the high school grades.

The population in Sao Paulo exceeds nine million. In that city there are some 32,000 industrial establishments as well as two military and one commercial airports. The smog burns throats and eyes, kills birds, and withers plants. In a newspaper poll, it was discoverd that 82 percent of the inhabitants in the city consider pollution to be a serious problem. The Director of the Sao Paulo State Environment Agency, Nelson Herfussi, has stated that the major causes of excessive pollution are the advance level of industrialization, lack of controls, and excessive population. Although stiff fines and imprisonment have been introduced in Sao Paulo in an effort to punish polluters, as yet these attempts at legislative control have not been implemented.

The Brazilian Navy and the Environment

Like those of many developing countries, the Navy in Brazil does not have a specific budget for pollution abatement. The financial resources available are obtained from forefeits and fines collected by the Naval Police from merchant ships and industries found guilty of contaminating the sea and rivers in violation of the Marine Traffic and Water Pollution Law. In cases of oil spillage the Brazilian Navy with financial support of the Ministry of Interior hires private firms to remove the oil from the sea. When caught, the violators then compensate the Brazilian government for expenses incurred in addition to suffering punitive fines.

The Brazilian Navy does not have an R&D section on pollution abatement nor does it maintain a budget for research. The Navy does not include personnel with degrees in environmental engineering. There is, however, an Engineering Department in the Navy with direct jurisdiction over naval engineering problems and to which naval engineers are assigned. Yet the Brazilian Navy does not include specialists on pollution abatement, although matters related to this area are studied and handled by the staff of the Naval Engineering Department. The engineer officers are given instruction and adequate training on pollution in their courses, but are not environmental specialists. While concerned with naval pollution abatement, they have centered their major interest on oil waste emissions from ships---this, however, from a desire to achieve the best engine performance rather than from the viewpoint of pollution abatement technology. The naval engineers keep themselves contemporary with pollution requirements levied on the Navy by the government and international agreements in order to adapt new projects and construction to said requirements.

In regard to the utilization of naval environmental knowledge in national pollution abatement programs, the naval engineers are used as advisors whenever so requested. They make a professional contribution through inspection, studies, and technical advice on pollution control programs when so requested by higher authority. As a rule they do not directly participate in such programs unless they are so invited or the projects proposed affect the Navy.

According to law 5357 (1967), disposal of any shipboard waste including oil or oil products, is forbidden within six nautical miles

of the coast. Law 1098 of 28 March, 1970, prohibits the dumping of hazardous wastes of any other material which may be harmful to marine life within the territorial sea. It also extends the territorial sea to 200 nautical miles from the coast.

Also in regard to the disposal of shipboard waste, the newer ships of the Navy have been fitted with special holding tanks for chemical treatment of human and culinary wastes. The older ships, being not so equippped, require the services of trash barges while in the six-mile limit to cart the waste to port facilities.

The Brazilian Navy, through its representative in the National Environmental Agency, participates in the decision-making process related to pollution abatement legislation that might affect it. The Navy is consulted on water pollution and works closely with the state governments through its Directorate of Harbors. In addition, the Director of Ports and Coasts, and the Captain of the Port, as naval officers, head important water pollution enforcement agencies.

Generally, the personnel in the Brazilian Navy have endeavored to contribute towards a major comprehension of the value of pollution abatement programs. Much of this understanding has been incorporated into daily routine aboard ship.

References:

New York Times, 16 June 1975

Conferences with LCDR Raimondo Rocha, BN, August 1976.

Conferences, Professor Paone and LCDR A. Pachecko, BN.

Report from LCDR R. Keenan, USN, Assistant Defense Attache in Rio de Janiero to Professor Paone, 30 July, 1975.

O'Globo, 22 October 1976.

Letter, Milton Ribeiro de Carvalho to Captain Ramon Alvarado, U.S. Naval Attache to Brazil. Admiral Ribeiro de Carvalho is Subchief for Intelligence.

CANADA

General

The Canadian Government enacted a series of stringent water, air and fisheries anti-pollution laws in 1968-70. To ensure Canada's proper management of its renewable resources and their proper development, the Department of the Environment was created in June 1971. Presently, responsibility for environmental protection is shared by the national, provincial, and municipal governments. The federal and provincial agencies receive their powers from the federal and provincial governments. The latter assign the municipalities their environment responsibilities along with their powers.

The Environment Budget.

The Department of the Environment is responsible for the environment budget which for FY'75 was some $20,000,000.

The Canadian Navy and the Environment.

The Navy has a strong voice in the national pollution abatement decision-making process. There exists an inter-departmental working group, representing all agencies of government which are concerned with pollution abatement. This group is chaired by the representative of the Department of the Environment, and the Canadian Forces have a naval member. This inter-agency committee sets policy - it is much more than consultative - for all government activities within existing laws and concomitantly affects pollution legislation both directly and indirectly.

The Canadian Navy does have a recognizable budget for pollution abatement and in FY'75 some $350,000 was allotted. In FY'76 it is planned to configure four destroyers with pollution abatement suits at

an overall cost of $1,600,000. Also planned in FY'76 is a $4,000,000 cleaning barge to service all combatant and auxiliary ships. It would seem, therefore, that pollution abatement costs will be some $5.6 million in FY'76.

The Canadian Navy does not have a separate budget for research and development and is not involved in pure research and development in the environmental field. However, it is actively involved in R&D in the following way: Basic environmental research for the Canadian Navy is undertaken by the Department of the Environment with some assistance from the Defense Research Board (DRB) of the Canadian Department of Defense. The type of naval environmental R&D required under the national laws is decided by the Canadian Navy. At the proposal of the Canadian Navy, both the Department of the Environment and the DRB conduct on various pollution abatement systems. While there is no regular R&D budget for the Canadian Navy the financial "father" of the Canadian Navy R&D is the Department of the Environment.

The Canadian Navy, through its Naval Engineering Test Establishment (NETE) is staffed with test engineer specialists who are very much involved in evaluating the results of the research and testing of the various sewage treatment, oil/water separation, and wet oxidiation processes aboard war vessels. These officers, aided by specialist civilian engineers of the National Defense Headquarters (NDH) are responsible for the evaluation of these systems and have confirmed the practicality and acceptability of vacuum collection and incineration of sewage, among other problems sensitive to the pollution abatement field. The NETE naval engineers spend most of their efforts on seeking and

testing commercially available equipment and suggesting improvements or changes in design and concept to produce more viable systems for adoption by the Navy. Like the engineer specialists of NDH, they also assist in the installation, trial, and support of these systems. Here again the basic attitude is one of procuring, evaluating, and improving commercial equipment available to the Canadian Navy. Thus, while Canadian naval engineers do not conduct pure research, they are nevertheless known as pollution abatement specialists because their functional efforts are often geared toward environmental protection. Through their efforts on product improvement in pollution abatement, it is expected that a reliable system will be created "which will enable Canadian warships to meet the occasional requirements for no-discharge of sewage." It is safe to draw the conclusion that Canadian Naval Engineers contribute in a major way to the improvement of the pollution abatement and shipboard waste discharge systems of the Navy. Their special knowledge in the environmental field is conveyed to and often utilized by other branches of the government through meetings of various interdepartmental committees wherein information is exchanged with other government departments.

What restrictions are placed on the disposal of shipboard wastes--human and other? The Canadian policy on shipboard wastes, which also obligates the vessels of Canada's Navy, briefly is as follows:

General

Currently, the discharge of shipboard wastes in Canadian territorial waters is governed by several legislative acts; namely the Canada Shipping

Act, the Arctic Waters Pollution Prevention Act, the Fisheries Act and the Ocean Dumping Control Act. This leads to considerable confusion, and the Department of Transport is presently taking action to combine the requirements of these various acts into one integrated piece of legislation to be called the Maritime Code. The Maritime Code is expected to become law within the very near future. Within this framework, restrictions on the disposal of shipboard wastes may be summarized as follows:

Garbage/Solid Wastes

Disposal prohibited in Canadian waters and fishing areas.

Oil, Oily/Water mixtures

Discharge prohibited, except in emergency situations, or when discharge is essential for satisfactory operation of machinery.

Sewage/Human Wastes

No restrictions in ocean waters at this time. Restrictions will be contained in the Maritime Code now being developed. It is anticipated that these restrictions will be in accordance with IMCO recommendations. Discharge of sewage is prohibited in the Great Lakes and Inland Waters. In all territorial waters, hold and discharge to shore facilities or incinerator if shore facilities are unavailable. Shore facilities are to be fitted with adaptors to match the standard four-inch flange and quick-disconnect fittings.

As a general policy the Canadian Navy pursues the U. S. Navy concept regarding sewage treatment in that a "moving ship in open water is non-pollutant." Every effort is made, however, to avoid discharging non-biodegradable waste at sea except as dictated by operational requirements. It must be recalled that a warship, by its design is generally not suited to carry or store waste on board while awaiting discharge to appropriate facilities or to process that waste on board.

At the expense of some repetition, but in an effort to stress the naval policy on disposal of shipboard waste, the dumping of garbage in Canadian territorial waters is prohibited by naval regulations. Bilges are not allowed to be pumped within 100 miles of the coastline south of latitude 60N and within 50 miles of the coastline north of that latitute. When Canadian naval vessels operate in Canadian Inland Waters (including the St. Lawrence Seaway and Great Lakes) a policy of "no discharge" is followed. Sewage is disposed of by an onboard collection, holding, and transport system including incinerator. Garbage is compacted on board and stored for landing and bilge water is processed by an oil water separator which is controlled by an affluent purity monitor.

In regard to water and air pollution abatement aboard ships, the Canadian Navy has gone on record as recognizing the legal and moral obligation to prevent, as far as practicable, the pollution of the environment. Navy policy thus is to minimize the discharge of pollutants into the water and atmosphere. Most naval ships now burn low sulphur and diesel fuels. In some vessels' sewage disposal, oil/water and garbage compaction systems have been installed. In the newest warship designs, account is being taken of the need to install similar equipment. The Canadian Navy is attempting to comply with a "no sheen" policy regarding oil pollution (i.e., less than 20 pp no oil in water). Improvement in oil/water separator and monitor systems of all naval ships (at a cost of $40 to $50 million over a ten year period) and designs in the construction of new warships will stimulate the accomplishment of this objective.

It is recognized that both Canadian Federal and Provincial legislation will require that increasing steps be taken in the near future against pollution of the environment. Yet Canadian naval policy, while agreeing with pollution abatement policies in principle, is to continue to give highest

priority to the ships' ability to float, move, and fight. Within this constraint every effort is being made and will continue to be made to meet pollution abatement standards.

Summary

The Canadian Government is a leader in the environment field, both nationally and internationally. The enactment of the Canadian Artic Pollution Abatement Act in 1973 is also a reflection of attitudes of other nations, although the latter have not as yet passed such legislation.

While the Canadian Navy is not directly involved in R&D on the environment, it is indirectly in that it recommends certain R&D to be performed on ship pollution abatement mechanisms and machinery, and is very active in testing the results of such R&D. In addition - this may be considered within the research area - Canadian Naval officers are much involved in testing and recommending changes in commercial maritime pollution abatement systems for adoption in the Canadian Navy. The Canadian Navy's special interest is in the field of sewage, wet oxidation, and oil/water separation aboard its warships.

References:

Letter, Major David A. Wright (CAF) to Professor Paone, 24 June 1975.

Telephone conversation, Paone to Ralph King, Environmental Section, Canadian National Defense Headquarters, 25 June 1975.

Up-date of Canadian Forces (SEA) Programs for Evaluation of Pollution Control Systems as of 1 June 1975.

Letter, Joseph L. Dick, Captain, USN, to Professor Rocco M. Paone, 30 July 1976 with Enclosure 1. Captain Dick is the Naval Attache in the U.S. Embassy, Ottawa, Canada.

DENMARK

General

Since 11 April 1949 Denmark has had a Water Course Act (No. 214) which regulates the flow of sewage and other waste discharges into lakes, streams, and coastal areas. In April 1969, the Water Supply Act was enacted to protect water used for drinking and other purposes and to set up regulations regarding septic tanks and underground oil tanks. Since that time the Danish Government has enacted further legislation on water and air pollution abatement.

To administer and coordinate the environmental policy on a national scale, the government created in 1971 the Ministry of Environmental Protection (MEP) which consists of a secretariat, control, planning, and development bureaus, and an office on environmental protection, all staffed with specialists in the relevant fields. Local responsibility for environmental protection lies with municipalities and the various health boards.

Environment and the Danish Navy (DN)

The working expenses for the Ministry of Environmental Protection for the 1975/76 Fiscal Year were budgeted in the amount of D. Kr. (Danish Krona) 150 million. On the basis that 5.78 D. Kr. equals one dollar, the 75/76 budget is almost $27,000,000. Of this amount some D. Kr. 40 million ($6,920,000) was allocated for specific environmental protection projects.

The DN does not have a separate pollution abatement fund and therefore no money is budgeted for pollution abatement by the Navy or the Defense Department. The budget of the Ministry of Environmental

Protection covers the environment requirements of the DN. The Navy places ships and crews at the disposal of the MEP which reimburses the Navy for any expenses connected with abatement exercises. For FY 75/76 the MEP has an appropriation of D. Kr. 2 million ($345,000) towards abatement of pollution at sea, i.e., oil and chemicals.

The DN is not involved directly in any research on pollution abatement. However, as in the case of Canada, the DN does propose environmental research projects related to pollution abatement policies that obligate the Navy. The MEP assumes the responsibility of this research, and the Navy that of testing and evaluating the results. For FY 75/76 the MEP has an appropriation of D.Kr. 5 million ($862,000) toward research in pollution abatement in the Belts region.

Generally speaking, the DN hardly influences the national policy on environmental protection matters, although it is consulted--this is not an institutional process--before pollution legislation which may require the Navy's assistance is enacted.

Both the Danish government and Navy are well aware of the need for pollution abatement policies. This cognizance is reflected in the responses of Danish civilian and naval specialists to the following:

> 1. Does the Navy have engineer specialists who handle engineer projects within the service, particularly those related to water and air pollution abatement and shipboard waste disposal?

The response was a "yes, partly in connection with other tasks carried out by the Damage Control Section." In regard to air pollution abatement, the Danish engineer specialists handle only those problems in connection with purification of air entering the ship and this is accomplished by the use

of an Atomic, Biological and Chemical warfare (ABC) filter. The DN, like that of the United States, among others, must abide by the national pollution abatement laws.

2. What technological contributions do the engineer officers make to the pollution abatement and shipboard waste discharge systems?

Ships of the Danish naval defense forces observe the provisions laid down in the Act on the Protection of the Marine Environment of the Baltic Sea Area (No. 324, section 4). While this law does not apply to the naval vessels, the Chief of Naval Operations (Flag Officer Denmark) has ordered the Danish Navy to comply with the legislation. This means that oily water is not discharged into the sea, but into mobile separators placed at the three naval stations on the Baltic. The latest major ships under construction are to be equipped with incineration and purification installations.

3. What restrictions are placed on the disposal of shipboard wastes--human and other--particularly in territorial waters?

The answer to this question lies in the prohibitive features of the Act on the Protection of the Marine Environment of the Baltic Sea Area which by order of the Danish CNO are applied to the Navy. All major ships are fitted with holding tanks, particularly for toilet drainage. After establishment of receiving facilities in port, these tanks are emptied during the stay there. At the present time, the tanks are also emptied when the ship is clear of the coast and this is accomplished by means of a water-propelled ejector, thus ensuring that the concentration is low. Food wastes, etc., are stored in plastic bags on board the naval vessel and inserted in containers that are placed in all ports at which naval ships call.

It is also to be noted that in Denmark there often is a regular exchange of information between civilian and naval engineers on pollution abatement programs. In this way the technological knowledge of naval engineers on environmental matters contributes to the national pollution abatement programs.

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Letter, Sheldon O. Schwartz to Rocco M. Paone, 9 July 1976. Captain Schwartz is the U.S. Defense Attache in Copenhagen.

FRANCE

General

The administering agency of French environmental policy is the Ministry for the Protection of Nature and the Environment (created in February 1971), the Director of which answers to the Prime Minister. Basic pollution abatement policies rest on decrees issued by the Prime Minister, principally through his agent, the Minister of the Protection of Nature and the Environment. These decrees have the same force as laws. Under the French political system, the Ministry of Interior has primary responsibility for executing environmental edicts. Cities and municipalities possess considerable independent authority in the environmental and other areas--Paris, being an exception, is almost entirely under prefectural or national government jurisdiction.

The Ministry for the Protection of Nature and the Environment acts as an initiator of legislation of and coordinator for national environmental projects and programs. It's committees coordinate water and air pollution abatement activities and administer funds for environmental programs.

France has a number of stringent anti-pollution laws. The Air Pollution Law (Law No. 61-842), enacted in August 1961, applies to all sources of atmospheric pollution, stationary and mobile, and is the basic legislation governing air pollution abatement. The Water Pollution Laws (No. 64-1245 and 64-1331) enacted in December 1964, control pollution of maritime or coastal waters, particularly from oil spills. In addition, the Public Health Code governs the quality of water for human consumption and the River Code contains limitations on discharges into rivers and lakes.

In October 1959, the French government decreed the establishment of the Central Committee for the Prevention of Noise to promote legislative and regulatory measures aimed at controlling and abating noise, particularly in urbanized and developed regions.

The French Navy and Environmentalism

The French government is quite concerned with military security and until 1973 very little was aimed at curtailing the pollution created by its warships. Combat effectiveness has the highest priority and environmental requirements are quite secondary in importance. There is no specific naval appropriation for any action against pollution. The Navy, however, is charged with coordinating all operations on the site of a disaster, such as an oil spill, and of laying barrages on the high seas. It assumes all financial charges resulting from the use of its own vessels and equipment in such accidents.

While combat efficiency has the highest priority in the French Navy, obedience to national environmental and pollution abatement laws, at least in theory, carries a good deal of weight. The French government has a series of national environmental laws aimed at air, water, and noise pollution abatement. The navy has been excepted from this legislation. However, with the government's signature on the 1973 Convention on Pollution Act, as a follow-up of the Stockholm Conference, the French Navy Headquarters decided to abide by and enforce the statutes "as far as possible" even though it was "possible to exempt warships from complying with this Convention." The naval officers of the Navy's Technical Services are involved in guiding the navy in implementing the national pollution abatement legislation.

The French Navy does not conduct research on environmental projects and therefore does not have such an appropriation in its budget. Research and Development on environmental matters related to the sea is conducted by the National Center for Exploitation of the Oceans. Some of this research includes projects on waste disposal aboard ship.

France has created an interagency group, known as the Interministerial Group for Coordination of the Actions of Administrations at Sea. The Navy has a representative on this committee and through this member it is consulted on anti-pollution legislation which may affect it. It is considered that, unlike in several other nations, including Great Britain, the Navy's opinion weighs heavily in the recommendations of the Interministerial Group.

The French Navy does have engineer specialists who handle projects within the service, particularly those related to water and air pollution abatement and shipboard waste disposal. Since they perform other duties, they are not known as environmental specialists. As a rule, the engineer projects are studied jointly by the specially educated and trained naval officers of the Technical Services and the Naval Shipbuilding Engineers. During the last several years, all questions pertaining to pollution have been considered within such an employment framework.

When asked about other contributions of engineer officers to the pollution abatement and shipboard waste discharge systems, French Naval authorities replied that the ship installations related to pollution problems depend on the "propulsion energy security" service whose chief is an engineer line officer (Technical Branch). The chief is assisted by deputies (Technical

Branch) in solving the problems. All of this means that unless the pollution abatement installations threaten the priority of combat efficiency, they will be adopted for utilization under the technological supervision of engineer officers.

Among the several other questions directed to French Naval authorities on the subject of environmentalism were these two:

1. What restrictions are placed on the disposal of shipboard wastes -- human and other--particularly in territorial waters?

2. What is the naval policy regarding water and air pollution abatement aboard ships?

The responses to both questions indicate a naval attempt to comply with national legislation and international pollution abatement agreements. For those ships whose construction was decided upon since 1973 the following policies prevail:

> Collection of 24 hours of used water, i.e., toilets, water closets, kitchens into cases which can be emptied upon arrival in port or out at sea beyond the 12-nautical-mile limit, and
>
> Crushing and then placing garbage into sacks to be dumped into the ocean, beyond the 12-mile limit, or brought into port and delivered to sewage vehicles.

There is to be no dumping of any kind of material including bilge oil within the 12-mile limit. Hydrocarbon wastes, as a policy, are not to be discarded into the water within 50 miles of shore. The Officerof the Watch is responsible for judging the direction and speed of the current as well as the decision to discard. Care must be taken to ensure, as far as possible, that these discharges are not swept into the 50-mile zone.

The answer to the second question is somewhat less direct. The navy must abide, where possible, with the national laws on air, water, and noise pollution abatement. Thus, the requirements of national policies on these areas of environmentalism generally cover the French Navy. The density of atmospheric pollution from war vessels is determined by the national and pollution abatement legislation--generally. From another view -- the so-called intake one -- there are no problems of polluted air and water since the air entering the ships' holds is conditioned and filtered by nuclear, biological, chemical devices (NBC fight). The water, collected in port or manufactured by boilers aboard ship, is stocked in specially fitted tanks that frequently have devices to control usage.

The technology of French Naval engineer officers has an influence, perhaps indirectly, on national pollution abatement programs. Many naval personnel who receive both training and education in pollution abatement pursue this area of endeavor upon leaving the service by employment in national and local environmental agencies. These individuals apply their navy-obtained experiences on pollution abatement, particularly to water related problems, as employees of industry, the national government, and/or the provinces.

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GERMAN FEDERAL REPUBLIC

General

The Department of the Interior is the administering agency of national environmental policy in the GFR. National laws cover air, noise, and water pollution. The ten states (Lander) that compose the GFR have pollution abatement laws, like our own states, within the basic spirit of the national environment laws. In fact, the Lander probably are responsible for the protection of the environment more than the federal government. Each Lander has small vessels under its jurisdiction to police rivers and seas, within the three-mile limit, for violations of its own environmental laws. Beyond the three-mile limit, the GFR Navy has the responsibility for protecting the pollution abatement policies.

Environment Budget

The GFR budgeted some $240 million in 1975 for environmental matters nationally. Of this amount some 73 percent went for water, air, and noise pollution abatement, a bit less than ten percent for waste disposal and land protection, and the remaining seven percent for "all others."

The GFR Navy and Environmental Budget

The GFR Navy does not have a budget for any pollution abatement. Standards imposed on new equipments are paid for from funds allocated to these equipments. Thus, when national environmental constraints require the Navy to purchase mechanisms aimed at pollution abatement, the Navy merely includes the cost of this equipment in its budget and this expenditure is not regarded as environmental, but as naval. The environmental costs in the GFR Navy, therefore, are hardly identifiable.

The German Navy does not have a research and development budget, nor does it conduct an environment R&D program. The GFR, however, conducts research on environment, mostly via the German Research Association (Deutsche Forschungs Gemeinschaft-DFG) which is financed by the GFR, the Lander, and several private science organizations. Here again the funds for the national R&D effort come out of the general operating budget "without precise amounts allocated" and thus cannot be identified.

The GFR Navy, however, does have an input into the national pollution abatement decision-making process. Along with the other services it is consulted by a federal interagency committee before environmental legislation which may effect combat capabilities is introduced.

In the GFR Navy there are engineer officers who are particularly educated in shipboard engineering above the regular shipboard engineering training that all naval line officers receive. However, the Navy does not enjoy the luxury of having officers specially trained in matters of pollution abatement. The German Navy is free from the obligation of observing the national pollution abatement laws as such. In issuing orders, however, the Navy, on its own, does adhere to national policy. Quite naturally, it must obey the provisions of the various maritime conventions signed by the German Federal Republic.

The chart below, dated 25 February 1975, illustrates the waste disposal policy of the GFR Navy.

Waste Disposal Policy For Surface Vessels of the Federal German Navy

Ship's Location	In Territorial Waters		High Sea					
	own on land	not on land	outside of special maritime areas			inside of special maritime areas		
waste (types)			less than 4 nm*	more than 4 nm	more than 12 nm	less than 4 nm	more than 4 nm	more than 12 nm
			distance from nearest country					
Solids								
- organic	forbidden	forbidden	forbidden	allowed[1]	allowed[4]	forbidden	allowed[1]	allowed
- inorganic	forbidden	forbidden	forbidden	forbidden	allowed[4]	forbidden	forbidden	forbidden
- synthetics	forbidden	forbidden	forbidden	forbidden	forbidden	forbidden	forbidden	forbidden
Liquids								
- oil, fat	forbidden	forbidden	forbidden	forbidden	forbidden	forbidden	forbidden	forbidden
- oil containing compounds	forbidden	forbidden	forbidden	forbidden	allowed[3]	forbidden	forbidden	allowed[2]
- liquid synthetic substances	forbidden	forbidden	forbidden	forbidden	allowed[3]	forbidden	forbidden	forbidden
- waste waters								
a) chem/biol. treated	allowed	allowed	allowed	allowed	allowed[3]	allowed	allowed	allowed
b) chem/mech. treated	forbidden	forbidden	forbidden	allowed	allowed[3]	forbidden	allowed	allowed
c) uncleared	forbidden	forbidden	forbidden	forbidden	allowed[3]	forbidden	forbidden	forbidden
- dirty waters	forbidden	forbidden	forbidden	allowed	allowed[3]	forbidden	allowed	allowed

Legend 1) reduced to broken pieces, not floatable
2) less than 15 ppm while sailing (at speed)
3) less than 100 ppm while sailing (at speed)
4) floating material more than 25 nm off the nearest country

*nm = nautical miles

There is little question that the GFR Navy must pursue a designated waste disposal policy. Up to the present time the solid waste, human and other, is collected in plastic bags and delivered either to harbor piers or to designated supply ships. The newer vessels and those under construction will have installed self-contained waste disposal systems. Since this equipment is expensive the costs will be spread over a number of years. When these technological installations have been made, the scope of engineer officers' duties will be correspondingly enlarged and then it is considered that there will be need for pollution abatement specialists in the navy.

One may conclude that the GFR has had little need for using the technological knowledge of its naval engineers. However, German Federal naval engineer officers are somewhat involved in testing the results of commercial and government pollution abatement systems.

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GREAT BRITAIN

General

The administering agency for British environmental policy is the recently created Department of Environment (DE) which combines the former Ministries of Housing and Local Government, Public Building and Works, and Transportation. The responsibilities related to national environmentalism are quite diffused. The DE is charged with the regulation of many aspects of air and water pollution, and noise abatement, but other government agencies also responsible for protecting the environment include the Ministries of Agriculture and Fisheries and Food, the new Department of Trade and Industry, and the Department of Agriculture for Scotland.

The Navy and Environmental Funds

The national environmental budget covering the period of 1970-1975 was over £ 1,000,000,000 or nearly $2.75 billion. This figure includes expenditures of some £ 5,673,000 on noise abatement, clean air, water pollution abatement, waste disposal, natural resources and conservation. Some £ 2,214,000 of this sum was expended on noise abatement, clean air, and waste. The Ministry of Defense was granted £ 1.1 million for allocation to operational programs in the environment field.

The environmental R&D budget for FY 1975 was £ 25,216,000 or $62,014,080. Such research groups as the Centre for Environmental Studies, Royal Institute for Public Administration, Local Governmental Operational Research Units, and several others received £ 1,443,000. About £ 350,000 were allocated for R&D on ports and harbors.

The Royal Navy (RN) does have a distinguishable environment budget which for FY 75 was £ 320,000. It does not, however, have an environmental R&D budget, nor does it conduct R&D on its own environmental projects. R&D related to naval environmentalism is conducted on a "piecemeal" or as-needed basis. Funds for research on such items as oil separation and shipboard waste disposal are obtained from the overall naval budget--as needed. Naval environmental research is sponsored by other government departments, notably those of Environment and of Trade and Industry as well as by such research groups as those listed above.

Despite a certain degree of "casualness" that seems to mark the evidence, the RN is quite active in the environmental field and has a series of pronounced pollution abatement policies. It does include in its officer corps engineer specialists who direct water and air pollution abatement projects and shipboard waste disposal programs. They are also involved with noise abatement programs, oil pollution abatement, and the discharge of wastes in domestic naval installations. British naval engineers receive special education and training in these fields of endeavor.

As environmental specialists they design constraints for specific application and utilization in pollution abatement. They initiate the design of specialized pollution abatement equipment and also are responsible for developing and evaluating such. Quite logically, the Royal Navy engineers are also obligated to direct in-service performance monitoring, modification, and maintenance of pollution abatement methodologies, mechanisms, and programs. Naval engineering technology is a significant factor in the development and implementation of pollution abatement policies in the Royal Navy.

In addition to the above, the technological expertise of the naval engineers, particularly that of senior officers, is required and utilized to prepare and assist the British delegations to such international conferences as those of the Law of the Sea, International Marine Consultative Organization (IMCO), the various United Nations meetings on the environment, and other international conventions related to pollution abatement.

In regard to air pollution abatement aboard ships, the Royal Navy has changed its fuel from a heavy sulphur oil type to a much lighter and lower sulphur burning fuel. Most British naval vessels have been converted to diesel. To maintain proper flow of clean air into the vessel, quite naturally a system of filters has been developed. The British Navy uses the "Citadel Principle" in this filtering system. The bridge, hospital and mess quarters are among the sensitive points which must be kept free of impure air. This system is also used in Nuclear, Biological, Chemical Defense (NBCD) to keep out poisonous gases.

In an attempt to comply with the clean air requirements in ports, incinerators, where installed, have been fitted with a wash system on the discharge to reduce fly ash and soot. This pollution abatement exercise has also enhanced helicopter operations at sea. Main propulsion exhaust in the British Navy is not treated. However, research is underway on a gas turbine combustion improvement program geared to reduce observable smoke. While detection is the main driving force in this research, air pollution abatement is also a constructive result.

What is the policy and procedure of the navy regarding disposal of wastes?

The current policy in the RN is to provide for shipboard treatment of sewage in the major new construction, and a chemical holding tank (CHT) system in minor vessels. Food wastes are macerated and discharged in the form of slurry garbage, or shredded and/or compacted, and held for discharge ashore or in unrestricted waters. Oily water separators are being installed on two ship classes now under construction to comply with oil discharge regulations.

The British government has been a leader in endeavoring to bring about agreements among nations that would lead to common pollution abatement standards and procedures. Her Majesty's delegation has been a prime mover at United Nations sponsored conventions on the environment and Law of the Sea. The RN is bound by the agreements made, particularly at the last IMCO Convention, which have been translated into national control of pollution legislation in Britain. As a result, there is to be no discharge of oil, garbage, and raw sewage in non-tidal waters and certain designated harbor and river areas as well as in territorial waters. Beyond territorial waters, oil dumping is controlled by international convention rulings, discharge of garbage by operational requirements, and disposal of sewage is not generally restricted.

While it is considered that the Royal Navy has little influence on environmental decisions that may effect it, it does participate on the decision making process through representation on a Defense Service Committee called Working Party on Waste Disposal. A member of the Defense Secretariat who represents the Permanent Under Secretary of State (PUSS) is also a delegate. The efforts of the Waste Disposal Committee are channeled through the DS-5b,

who is the senior science office and also handles naval policy related to international affairs, to the Defense Secretariat and the PUSS who makes the final determination.

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" " " " " " " " " " 20 September, 1976.

General

The administering agency of Israel is the Environmental Protection Service. While Israel does utilize enacted legislation to protect the environment, it does not have a comprehensive law that deals with air, land, or water pollution abatement. The Ministries of Transportation, Health, Interior, Commerce, Agriculture, and Police have pollution abatement responsibilities, the latter participating from an enforcement process.

In 1971 the government created a National Committee on Biosphere and Environment to coordinate all aspects of environmental activities. This responsibility includes the study of environmental quality, the requirement for legislation, creation of guidelines for applicable research, and publishing for public consumption information on the environment.

Fouling of waters and air is considered to be a nuisance and is punished under the Criminal Code. Such deeds are also punished under the Civil Wrongs Ordinance (1944) which prohibits the creation of nuisances. Traffic laws (1961) punish auto owners for excessive emissions of smoke or noise from motor vehicles. The Abatement of Nuisances Law (1961) with its amendments (1962, 1963, 1966, 1971) empowers the Ministers of Health and Interior to enact pollution abatement regulations on smoke and gas pollution from private properties and motor vehicles, on ambient quality standards, and on noise in homes. The Ports Authority Law (1961) establishes provisions on waste disposal and pollution abatement in harbor waters. The Water Law (1959, 1972) provides for water pollution abatement programs. Empowering the Department of Agriculture's Water Commissioner's Office with the responsibility for implementing this Act, it also includes provisions for production or import of certain

materials, restrictions on the use of some chemicals, and for the locating of sources of pollution. Israel also has enacted a series of stringent laws related to harmful noise aboard ship, and loading and unloading of oil.

Most all of the pollution abatement laws have been enacted by the national government, an exception being the disposal of solid wastes, which presently is under the authority of local governments. Regional sewage disposal plans are being developed to tie all sewage programs into a national system. It should also be noted that in the interest of water economy the Israeli government (through the Ministries of Health and Agriculture) have adopted a policy of utilizing waste water for agricultural irrigation. Through the Minister of Health, the government has adopted tentative air quality standards for some 40 pollutants, including sulfur dioxide, carbon monoxide, hydrogen sulphide, lead, oxidants, and nitrogen oxides.

The Israeli Navy and the Environment

With so many national enactments on pollution abatement, the question arises in this study as to how do these restrictions affect the Israeli Navy. Because the Navy is small and the international situation requires it to be in a state of immediate combat readiness, the latter consideration prevails by far over the "luxuries" of environmental considerations. The Navy, as one could expect, does not have engineer specialists or any other types of officers to deal with problems of pollution. Nor is there any special program designed to relate to those problems.

The Navy policy regarding pollution can be summarized rather quickly. The war vessels are bound by the Israeli environmental laws, but more in

theory than in practice. There is to be no dumping of waste, oil, fuel, or gaseous substances in the harbors, territorial waters, and inland waterways. Since the naval crafts are rather small, there are few accommodations aboard and food generally is served on the base; whatever waste does occur is rather easy to keep to a minimum. Human wastes and garbage are emptied into compartments or bins, the contents of which in turn are discharged into waste baskets on the piers.

In regard to oil and fuel wastes, every pier on Israeli waters has in theory an installation to enable vessels to dump oil and other fuel, if need be, to reservoirs located ashore. While it is prohibited to pump bilge oil and oily waters into the harbors and territorial seas -- at least in theory -- both nevertheless are being pumped into these forbidden areas by naval vessels because the Israeli Navy has not as yet installed a waste system on shore to take proper care of the bilges. Since both the restraints of geography and present international politics restrict Israeli naval vessels to "home" waters there cannot be as a rule the pumping of bilges 100 or even 50 miles from shore as required by the laws of other nations. The Israeli Navy is rarely that far from "home."

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ITALY

General

The Administering Agency for environmental protection is the Ministry of Health. Unlike most of the nations of Western and Southern Europe, water pollution legislation as such in Italy is still nonexistent, although as of now two laws related to water pollution abatement are pending before the Parliament. Certain provisions of the Fishing and Mining and Health Laws as well as those of the Penal and Civil Codes may be applied to control water pollution.

Law 283 of April 30, 1962, empowers local, regional, and provincial health authorities with control over the manufacture, trade and sale of any polluting substances. This legislation also provides for fines and other punitive measures under criminal laws for violations. Air Pollution Law 615, 13 July 1966, created a Central Board of Control attached to the Ministry of Health which consists of representatives of several departments, to enforce air pollution abatement.

The Italian Navy (IN) and Environmentalism

The role of the IN in pollution abatement, like that of other European countries, is hardly of major proportions. Responsibility for controlling pollution of the sea has been assigned to the Ministry of Merchant Marine. The Navy, however, does have the responsibility for policing itself and of avoiding a polluting of the sea by hydrocarbon caused by its craft. The Defense General Staff has instructed the General Staff of the IN to investigate possible sources of pollution by naval ships. In conformity with this order,

the Navy General Staff is planning a technical-scientific seminar to be held at the Italian Naval Academy. Among the topics to be studied at this seminar are anti-pollution products and their effect on marine life, marine currents along the Italian coastline, research methodology related to the most efficient and economical mechanical and chemical instruments.

In line with its role in environmental research, the IN has in progress the development of a project called "Oceanographic Research - the Study of the Dynamics of Water Masses". The objective is to investigate and analyze the circulation of permanent and transitory currents and wave motion, "with on the spot measuring, to correlate data registered with the principal physical-chemical parameters" of the sea and meteorological variables. The 90 million Lira appropriation for this research is financed with interforce funds.

While the Merchant Marine has the principal responsibility to combat sea pollution from hydrocarbons, the Navy also collaborates, when needed, in the "Operational and Emergency Plan" to combat this type of sea spoilage. The IN is consulted and has a voice in decision making related to environmental policies, which may affect it, through its representatives in the working groups recently set up by the Permanent Interministerial Commission on pollution of the sea.

The amount of government allocation for environmental programs and budget for the Navy to be utilized in pollution abatement is not known. The latter eminates from the Ministry of Defense on a "need" basis and the government expenditures for environmental programs are distributed via too many agencies for even a general estimate.

References

Bureau of National Affairs, Inc., International Environmental Guide, Washington, D.C., p. 61:1901.

Letter, C. J. McGrath to Dr. Rocco M. Paone, 13 February 1976. Captain McGrath was the U.S. Defense Attache in Italy.

Discussions with LCDR Bruno Lepori, IN, an exchange officer on duty at the Naval Academy. These discussions took place at various times during July-August 1976.

JAPAN

General

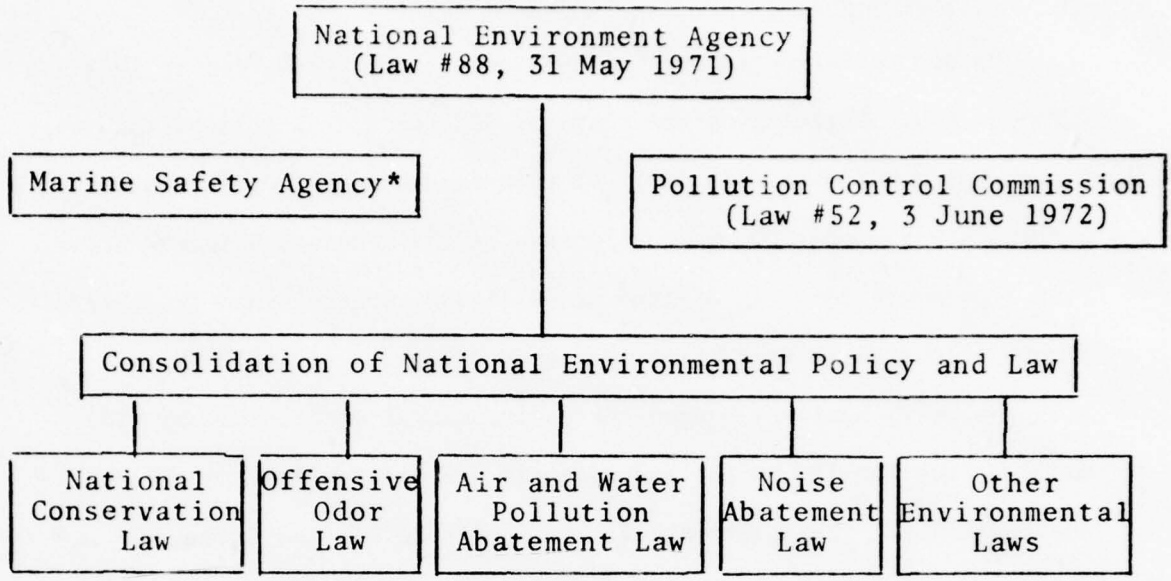
From World War II until about 1960, the problem of pollution in Japan was considered to be local and not one that seriously affected the entire country. Individual provinces or prefectures, enacted ordinances related to factory pollution regulations, noise prevention, soot and smoke prevention, among other pollution abatement laws. As one result of the Korean conflict with its special procurement boom in Japan, industrial pollution became a nationwide problem and the national government initiated a positive pollution abatement policy enacting such legislation as the Industrial Water Law (Law #146, 11 June 1956), Pure Water Laws (Law #181, 25 December 1958, and Law #182, the same date), National Soot and Smoke Law (Law #146, 2 June 1962), and the Noise Regulation Law (Law #98, 10 June 1968).

In a densely populated small island country such as Japan the disposal of industrial wastes is inevitably accompanied by extreme difficulties. With the rise of both industry and population, accompanied by a rise in the consumption level, the volume of wastes, human and industrial, have risen sharply. A considerable proportion of raw sewage and chemical wastes have been discharged into the coastal sea.

Concomitantly the maritime transportation of crude oil and other raw materials has steadily increased. In 1970 imports and exports of oil to and from Japanese ports reached some 35 million tons and the number of ships entering and leaving Japanese harbors exceeded 5.5 million. The oil and waste discharge pollution emitted by these ships and those in the following

years have exceeded the self-purification power of the nearby oceanic waters. In addition, waste plastics which cannot be recycled by natural forces, heavy metals which "render adverse effects on human health through the food chain, and matter such as polymers with direct destructive power have been dumped into the coastal waters." Oil pollution has accounted for about 80 percent of the total number of pollution cases in coastal waters.

Against this background, passage of environmental legislation was speeded and six new national legislations were created. These included laws on Pollution Control Public Works Cost Allocation, Waste Disposal and Public Cleaning, Marine Pollution Prevention, Punishment of Crimes Relating to Environmental Pollution, Agricultural Land Soil Pollution Prevention, and Water Pollution Control. Because of the stress of industrial output and lack of machinery for coordinated enforcement of these laws, pollution in Japan grew increasingly more complex and diverse. Finally in 1971, the National Environment Agency was created (Law #88, 31 May 1971) to organize and centralize pollution control administration. Shortly thereafter, a pollution control commission was created (Law #52, 3 June 1971) and empowered to investigate and settle, via arbitration, disputes over pollution. A suggested picture of the National Environment flow is as follows.



The Marine Pollution Prevention Law is unique in that it aims at wide area control and takes a long-range viewpoint. It permits no discharge of oil or wastes into the ocean waters, although certain special exceptional cases are recognized. It also provides for the removal of oil spills and other wastes in the event that such pollution should accidentally occur.

While the Environment Agency is responsible for administering the pollution abatement policies of the nation and the local prefectures and municipalities are bound by the national edicts, the political subdivisions in Japan may increase the stringency of the national legislation to suit local conditions, but may not lower the environmental standards fixed by the national government.

* Handles pollution abatement violations along coastal river waters. Is under Department of Transportation.

National and Defense Forces Environment Budgets

The appropriation related to environmental preservation in 1973 was Y274,405,000. Figuring on the basis of 300 Yen to the dollar, then that budget was a bit over $914,683. Of this amount some Y20,540,000 or approximately $684,200 were allocated to the Japanese Defense Forces. This figure was some Y45 million or $115,000 greater than the 1972 amount allocated to the Defense Forces.

The FY'75 national budget for environmental protection was Y100 million over the '73 amount and some Y35,458 million over the FY'74 appropriation. The environmental budget of the Defense Forces was increased to Y24,438,000 ($814,600). As in a number of other nations, this budget is not divided according to service.

The pollution control R&D budget for FY'75 totaled Y24,880,000, an increase of Y7 million ($22,540) over the FY'74 figure. This budget supports all of the national activities, including those of the Defense Forces, related to environment R&D. Much of the naval research in environmental matters is performed by the newly created National Institute for Environmental Pollution Research. The budget for this office in FY'75 was Y1,342 million or some $4,473,333. In 1973 the Japanese Maritime Self Defense Force (JMSDF) spent over $780,000 on Environmental Research and Development, in 1974 almost $900,000 and in 1975 it is estimated that the JMSDF will expend almost $1,250,000 in this area, even though it does not have a structured R&D program of its own. It is to be noted that the Maritime Safety Agency, similar to our Coast Guard and under the jurisdiction of the department of transportation, as is the Coast Guard in the United States, is responsible for policing and

controlling oil spills along coastal and river regions. Its FY'75 budget for clean-up projects was set at approximately $50,000. To implement execution of its pollution abatement functions, this agency has three refuse cleaning and two oil recovery boats, oil fencing equipment, patrol boats and some aircaaft. During 1973 alone, the officers of this Maritime Safety Agency brought about some 2,000 arrests for violations of the laws on marine pollution. Over 1,100 of these offenses were for illegal discharge of oil and wastes.

Although the JMSDF threat to the environment is considered minimal, the Defense Forces fall under the environmental jurisdiction of the National Environmental Agency in that they must adhere to the pollution control standards. To cite an example related to noise abatement: "In areas around airports used by the Self Defense Forces, etc., efforts shall be made to attain and maintain the environmental quality standards ...as those for the category of public airports under similar conditions ...considering the average number of landings and take-offs, type of aircraft and concentration of houses." As well, the MSDF falls under the restrictive provisions of the Marine Pollution Prevention Law.

The MSDF cooperates closely with the Maritime Safety Agency (MSA) in pollution abatement related to the sea and often assists the latter in patrolling coastal waters, to identifying areas of contamination, and arrests violators of the pollution abatement laws.

The MSA is the leading agency for anti-pollution activities, consisting as it does of the Maritime Pollution Control Division, Chemical Analysis Division, MSA Research Center, Marine Pollution Research Laboratory and a Hydrographic Department. It has jurisdiction over the

eleven Maritime Pollution Control Divisions into which Japan has been recently divided. To facilitate the achievement of its objectives, the MSA has:

1) An oil pollution detecting device which is carried aboard an aircraft for detecting oil spills at night by infrared rays. There are three such devices.

2) Two radioactivity monitoring boats.

3) Ten pollution surveillance and control boats.

4) Two oil boom extenders to prevent oil spillage spreads.

5) Two oil skimmers.

The MSA has concentrated its main research on ocean environment caused by chemicals for disposing oil, and poisonous effects of oil disposal chemical on human and marine life.

The total budget for the MSA anti-pollution activities in FY'75 was in excess of 370 million yen.

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Environment Agency, Japan, Water Pollution Control in Japan, May 1972.

MEXICO

General

The basic environmental stress in Mexico has been, since 1954, the protection of marine life within the framework of the IMCO and other international agreements. While environmental policy is administered through the Ministry of Health and Environment Protection Agency (EPA), it is formulated by the Secretary of Water Resources, Department of the Federal District, and Petroleos Mexicanos, in addition to the Secretaries of Health and EPA. The Secretary of the Mexican Navy must therefore, collaborate with the Secretary of State and the above listed departments in order to comply not only with domestic legislation on pollution abatement but also the provisions of international conventions that relate to environmental protection.

Still there are additional agencies involved in the environmental arena. The general Staff of Oceanography and Marine Survey undertake studies on marine pollution and also maintain a full inventory on the Mexican marine resources. The Secretary of Industry and Commerce, through the Under Secretary of Fisheries and the National Institute of Fisheries, is responsible for monitoring fishing resources and evaluating programs related to their conservation.

The Mexican Navy (MN) and National Environmental Policy.

The Mexican Navy is charged with the responsibility of policing coastal waters for violations of pollution abatement policies and regulations. It renders technical advice to all other government agencies on the Mexican posture related to marine pollution abatement and recommends adoption of certain national measures for protection of the seas. Along with Petroleos Mexicanos it assists in the treatment of

waters near ports and maritime terminals which have been contaminated by the process of flushing out the oil tanks. In collaboration with the National Institute of Nuclear Energy the navy monitors possible detection of any indications of radioactive contamination in Pacific waters which could result from atomic testing executed by the French in the South Pacific.

Presently the Mexican Navy is assisting the government in drawing up necessary rules related to the control of dumping of permitted substances in the sea and deciding the sites selected for this dumping. It will also monitor these areas, once they are selected.

The Secretary of the Navy participates actively in the environmental policy decision-making process, particularly where marine life is concerned. The MN is consulted directly along with representatives of other agencies possibly related to the impending legislation.

The MN and the Environmental Budget.

Generally, no specific amount of money is programmed by the MN to abate marine pollution as such. In the event of emergencies, each Secretary (Health, Environment, Navy, Fisheries, etc.) is empowered to use the financial resources of his (her) office.

Also, since there are various Secretaries of State involved in environmental pollution control, one cannot realize the total funds budgeted in the national program without requesting this information from each of the agencies concerned with pollution abatement.

During this present year (1975) six oceanographic cruises will take place on both sea coasts. Studies related to pollution and marine life, led mainly by the MN, will be conducted in the Ports of Cabo San Lucas,

B.C.S, Puerto Vallarta, Jal; and Lazaro Cardenas. The cost of these investigations is estimated at 3,000,000 Mexican pesos or about $250,000. In 1974 the Mexican Navy expended some $900,000 on environmental research. Although there is no figure for such a purpose, it is considered the MN will spend more than $1,000,000 in 1975 - mainly on pollution abatement to preserve marine life.

References:

Letter Capt. Pehr Pehrsson, USN, Defense Attache, Embassy of the United States, Mexico City, to Prof. R.M. Paone, 22 July 1975.

"Activities of the Secretary of the Navy (Mexican) in Pollution of the Oceans," by unnamed naval officers of Mexican Naval Headquarters.

Discussions with Lt. A. Alexandres, MN, U. S. Naval Academy.

NATIONALIST CHINA

General

The Republic of Nationalist China has recently enacted Clean Air and Water Acts, and placed the administration and implementation of both under the new Ministry of Health in the Department of Interior. While the government and the people are deeply concerned with pollution abatement, the priority of their interests lies in military and industrial security.

The Environment Budget

In FY'75 the amount of money budgeted by the Chinese government was NT $30,000,000 for air pollution abatement and NT $14,000,000 for water pollution abatement. The new Taiwan dollar (NT$) is 38.5 to the U. S. dollar. Thus, the NT $44 million is the equivalent of $1,145,454.

The following offers ideas and directions of the budget and pollution abatement researches:

1. Water pollution abatement of Keelung coastal water, from August 1971 to July 1972 -- about NT $403,000.

2. Water pollution abatement of Keelung Harbor and vicinities from August 1972 to July 1973 -- about NT $842,000.

3. Water pollution abatement of Kaoshiung Harbor and vicinities, from August 1973 to July 1974 -- about NT $739,400.

4. Pollution studies on shellfish cultivating area along the west coast of Taiwan, from October 1974 to September 1975 -- about NT $800,000.

5. Ecological and environmental study of the northern coast of Taiwan, from July 1974 to June 1975 -- about NT $778,000.

6. Ecological and environmental study of the southwestern coast of Taiwan, including Peng-Hu region, from August 1975 to July 1976 -- about NT $320,000.

The Chinese Navy and Environmental R&D

The Nationalist Government recently created a Council of National Research, commonly known as Academia Sinica, to engender scientific research, including that on environment and energy. The Academia Sinica is quite similar to the National Science Foundation in the United States in objectives and functions. Like the other research agencies, such as the Institute of Oceanography of the State University of Taiwan, the Joint Commission on Rural Reconstruction, the National Health Administration, and the Central Meteorology Office, all of which are involved in environmental studies. The Academia Sinica receives its funds from the cabinet level National Science Council.

The Navy does have a small R&D section which is comprised of seven officers under the command of a captain. While the major interest is weaponry, this group last year did complete a study on pollution of coastal waters and presently is involved in land and ship waste disposal studies. Also, the Naval R&D section, along with the State University of Taiwan, has initiated research on areas of waste disposal, i.e.,

1) recovery of resource value in sewage sludge and garbage;

2) determination of conditions under which ocean disposal of sewage sludge should be utilized; and

3) development of essential water criteria appropriate to water use, as a basis for sewage treatment plant design.

Despite the naval involvement in some areas of waste disposal relatively little has been accomplished. The conclusion is reflected in the responses--information gathered from the U.S. Defense Attache and scientists in Taiwan--to a number of questions:

1. Does the navy have engineer specialists who handle engineer projects within the service, particularly those related to water and air pollution abatement and shipboard waste disposal?

There are "project engineers" in the Chinese Navy, according to reports, but none is assigned specifically to water and/or air pollution abatement or shipboard disposal programs. The inference is that the navy really does not have such programs or a general policy. In line with other evidence shown above, the Navy R&D is of some assistance in the development of pollution abatement studies. These do not necessarily relate to the navy.

2. What technological contributions do the engineer officers make to pollution and shipboard waste discharge systems?

National programs in regard to pollution and shipboard discharge systems are minimal. It is considered by observers in Taiwan that what programs do exist are paper exercises honored somewhat more in the breach than in fact. Actually, there are no programs, known as such, in the Chinese Navy. Where several naval engineers have been associated with studies on national environmental programs, these latter have not affected the navy.

3. What is the policy and procedure of the navy regarding disposal of shipboard waste?

The consensus of opinion of reports from Taiwan reflects that in the territorial waters--and elsewhere, unless there is a known specific prohibition--all solid wastes, regardless of shipboard origin, are discharged over the side. As of now there are no restrictions placed on the disposal of shipboard wastes--

human and other--even in territorial waters. In addition, the navy does not have a policy regarding water and air pollution abatement aboard ship. Like the navies of developing countries in general, Taiwan naval forces are much more concerned with combat readiness and pollution abatement policies are of relatively little concern.

The budget for the Naval or Defense R&D is not available. In fact, the military budget is integrated with that of the Ministry of Foreign Affairs and as such it is hardly discernible. Until this past year Taiwan money to finance scientific research was completely dependent on the United States AID Program for financial support. Because this AID Program has been almost completely withdrawn, it is even more difficult for the country to finance R&D research. It is also to be noted that much of the naval R&D on pollution abatement in Taiwan is devoted to civilian maritime pursuits as well as those of the military.

While the Ministry of National Defense generally is not part of the national pollution abatement decision-making process, because of its efforts in water pollution abatement, the Chinese Navy generally is consulted before anti-pollution legislation which may effect the navy is enacted.

References:

R.M. Paone, "Control of Solid Waste Disposal Systmes by Foreign Nations," unpublished study, August 1974.

Letter, Captain P.H. Shih, Chinese Navy Headquarters, to Prof. R. M. Paone (via Captain S. D. Kully, USN, Defense Attache), 19 July 1975.

Discussions with Commander Yuong, Chinese Embassy, Washington, D.C. and Assistant Professor Daniel Lee, Area-Language Studies Dept., U. S. Naval Academy.

Letter, Professor R. M. Paone to Captain Carswell, 28 May 1976. Enclosure (1) of this letter containing responses to questions was received by Professor Paone on 28 June 1976.

THE NETHERLANDS

General

The Ministry of Public Health and Environmental Hygiene, through its major subdivisions of Public Health and Environment and Social Affairs and Public Health is responsible for administering and developing anti-pollution policy and programs in The Netherlands.

The principal law for water pollution control is the Surface Water Pollution Act (1 November 1969) which prohibits discharges into the sea within a certain distance from the coast without a license. It permits the discharge of effluents, pollutants, and other noxious matter into surface waters only by an installation intended for the purpose and only with a license. The Ministry of Public Health is responsible for issuing the licenses. The Air Pollution Law (1970) established an air pollution council to advise the Minister of Public Health. It restricts the siting of installations in high pollution areas, includes guidance for reporting air pollution incidents, and limits the operation of facilities or use of equipment or fuels likely to cause air pollution.

The Public Nuisance Acts of 1952 and 1953 prohibit the operation of installations that may cause damage of nuisance to the environment. This law is also applied to the control of noise.

Environment and the Royal Netherlands Navy (RNN)

The amount of money used for pollution abatement in the Royal Netherlands Navy is not budgeted separately. It is interwoven in the total project sums of new construction ships. An estimation of pollution abatement costs, including new construction ships, spread over the 1974-80 period is 1,635,000 guilders or about $600,000. The budget for the control of in-shore waste

products for FY1975 was some 50,000 guilders (about $20,000), and the amount of money for the improvements of existing technical facilities in naval dockyards for FY1975 was 2,075,000 guilders or approximately $750,000. It is fair to state that the Royal Netherlands Navy expended less than a million dollars on environment related projects in FY1975.

Like a number of the other navies studied, the Royal Netherlands Navy does not carry out broad environmental protection studies nor does it generally undertake research on such projects. Such research is conducted under the aegis of the Ministry of Public Health and Environment through the National Science Center and/or other specified private research groups and universities. Now and then the Navy performs some research on the environment, but only on an ad hoc basis for a particular problem related to pollution abatement.

Perhaps mainly because of the limitations of size, the RNN does not enjoy the luxury of having engineer officers who are specialists in pollution abatement. It does include, among its complement, engineer officers who assist in designing new ships and who are expected to know thoroughly the channels of possible pollution and how to reduce or eliminate these areas. Some of these engineer officers represent the RNN on the political delegation to IMCO conventions. After an analysis of the IMCO agreements made by the Netherlands government, these officers will recommend which type of available pollution abatement system shall be built into the new vessels of war. While they do not contribute as such to the actual technology of pollution abatement, their other functions related to pollution abatement give the engineer officers a significant role in naval environmental development. This knowledge and expertise is not utilized in national environmental programs.

The RNN, by navy regulations, is bound to abide by the various agreements of the government made at the several IMCO conventions since the 12th of May 1954 London Convention on pollution of seawater by oil. Aside from these restrictions there are officially no restrictions on the disposal of shipboard wastes--human and other--even in territorial waters. There is, however, an unwritten law that while garbage may be thrown over the side in open seas, after being made sinkable, it will be kept on ship in coastal waters until the open sea or a harbor where it can be brought ashore is reached.

The direct laissez-faire policy related to waste disposal is carried over to naval policy regarding water and air pollution abatement aboard ships. The basic theme in these two areas of environmentalism is to:

a) make people feel involved in pollution problems;

b) act as much as possible within the spirit of laws concerning water and air pollution, even when these are not applicable to warships; and

c) equip new ships with water pollution requirement systems.

All of these points add up to a pollution abatement system of vagueness and subjective decisions by the captains of the warships.

The Royal Netherland Navy has no direct input on pollution abatement legislation, although on occasion it is consulted on matters of national or international agreements which may effect her.

References:

Bureau of Natioanl Affairs, International Environmental Guide, Washington, D. C., 1974, p. 61:2201.

Letter, H. J. Uurbanus, Commander RNL Navy, to J. P. Sundberg, Captain, USN, 8 January 1976. Commander Uurbanus is foreign liaison officer in the Royal Netherlands Navy and Captain Sundberg is the U. S. Defense Attache in the Hague.

Letter with enclosure 1, J.P. Sundberg to Prof. Paone, 22 July 1976.

THE PHILIPPINE REPUBLIC

General

The national environmental program of the Philippines is in an embryonic stage. Like so many other facets of Philippine development, environmentalism is considered to be part of a policy aimed at reflecting a posture of self reliance in matters relating to sea and air. Concerning military defense, the Philippine government is pragmatic and efficacious. As a result, naval environmental policy will play a role quite secondary to the combat capabilities and industrial development in the immediate future. The Research and Development Center of the Armed Forces of the Philippines has concentrated its efforts on reconstruction of armored cars and spare parts, including old motor vehicle engines, rather than centering attention on ship oil leakage, shipboard waste disposal and noise.

The administering agent for the national environmental program is the Environment Center of the Philippine Republic which was created in 1973 to replace the National Pollution Center. The Director of the new center is appointed by the President of the country and answers directly to him.

The Navy and Environmentalism

As in the case of developing nations generally, the Philippine Navy (PN) does not have funds budgeted for pollution abatement. The PN, through the Coast Guard, has been tasked to promulgate and execute rules and regulations pertaining to marine pollution resulting from marine shipping and industrial manufacturing. Again, since the environmental program is still in the incipient stage, the program has not been promulgated.

The PN does not undergo research on environmental projects even where such efforts relate to the Navy. This type of research is conducted by the

National Science Development Board, whose members include representatives from the Departments of Public Health, Agriculture, Public Works and Defense.

The PN does have an input into the national pollution abatement decision-making process. Through the Coast Guard, the PN is purported to be the focal point for marine pollution control activities when the national environmental policy is promulgated.

Despite splendid projections for improving the environment, including the creation of the Environmental Center of the Philippines at an estimated cost of 25,205,000 pesos and a five-year plan for operating it--an additional 12,575,000 pesos--the role of naval technology in the development of military and non-military pollution abatement programs is on the negative side. This conclusion is drawn after a careful composition of questions directed to Philippine scientists and technicians and analysis of the responses.

1. Does the PN have engineer officers who handle engineer projects within the service, particularly those related to water and air pollution abatement and shipboard waste disposal?

The consensus of opinion is that the PN has no engineering talent dedicated either to shipboard waste disposal or pollution abatement. It would seem that these "niceties of civilization haven't caught up yet" to the modernization progress with the Philippine military.

2. What technological contributions do engineer officers make to the pollution abatement and shipboard waste discharge systems?

Here the answer is <u>none</u> because the PN has no ships sufficiently modern to modify so as to adjust to anti-pollution standards of the more advanced navies.

3. Where national pollution abatement programs exist that affect the navy, what utilization is made of the technological knowledge of these naval engineers in the national environmental programs?

It is considered that hardly any use is made of naval engineering technology in national environmental programs. There is so far little, if any, application of naval engineering technology to national environmental programs. This governmental position is reinforced by the facts that:

1. There are no naval restrictions placed on the disposal of shipboard wastes--human and other--either in territorial waters or in Metro Manila.

2. The policy of the PN regarding disposal of shipboard waste is merely overboard discharge, and

3. There is no naval policy regarding water and air pollution abatement aboard ships. The Philippine Coast Guard, which is charged with pollution control in territorial waters, has no program.

References

Environmental Center of the Philippines, National Media Production Center, Manila, Philippines, 1974.

Undated enclosure from Captain Richard Evans to Professor Paone. Captain Evans, U.S. Defense Attache to the Philippines, offered some replies to Professor Paone's questions in the enclosure which was attached to the Paone-to-Evans letters of 27 May 1975.

Letter, Paone to Evans, 28 May 1976, with enclosure which was submitted to Paone by Evans on 26 June 1976.

PORTUGAL

General

Like most nations of Western Europe, Portugal has a series of national pollution abatement laws on air, water, and noise. The administering agency is the Ministry of Environmental Matters. The chief of the agency holds the rank of Secretary of State and reports directly to the Prime Minister of Portugal.

The Portuguese Navy and Environment Policy

Unlike many of the navies of Europe, that of Portugal has an identifiable budget for environmental matters. In 1975 this amount was 1,500 contos or $57,000 (1 conto equals $38). In the several years preceding 1975 a total of 15,000 contos or about $570,000 had been expended by the navy on environmental projects.

In 1975 the navy did not have funds at its disposal which were designated for environmental research and generally does not perform research in this area. A National Research Council is responsible for the research that is being conducted on water, air and noise pollution abatement, and some of this at the request of the Secretary of State of Environment. The latter had a budget of almost 5,000 contos (about $190,000) in 1975 for "Diverse Environmental Studies," particularly on "fluvial pollution."

The Portuguese Navy is generally consulted in matters of national environmental legislation which may affect it. At times the navy has been responsible for initiating legislation on pollution of sea waters.

References

Letter, G. E. Ryan, Commander, USN, to Professor Rocco M. Paone, 5 November 1975. Enclosure (1) to the letter is of special significance. Commander Ryan, at the time, was acting Naval Attache in Lisbon.

REPUBLIC OF SOUTH AFRICA

General

The jurisdictional responsibilities for pollution abatement in South Africa are divided among the Departments of Planning and Environment, Water Affairs, and Health. Water pollution control is a responsibility of the Department of Water Affairs, assisted somewhat by the Bureau of Standards. Road Traffic Ordinances set the standards related to air and noise pollution.

National legislation for combating marine and coastal zone pollution was enacted in 1971 and restrictions, including legal machinery, have been passed to prevent water pollution from industry, mining, and sewage.

The recently enacted Atmospheric Pollution Prevention Act bestows on local authorities control over industrial smoke emissions, sets up smoke control zones and authorizes control of industrial pollution to the chief air pollution control officer in the Department of Health. Automotive emission controls are not as yet considered necessary.

The South African Navy (SAN) and Environmentalism

Unlike so many of the nations studied, the SAN has a definite and restrictive policy on pollution abatement. It has issued specific regulations to cover responsibilities related to protecting the environment. Quite naturally, naval officers are to be punished for violating naval regulations in the event that they bring about pollution above the standards set by the government.

The Naval Officer in Command, Simonstown (NOIC) is responsible for the control and movement of all vessels within the port limits as described in

the last paragraph. He is also responsible for the enforcement of precautionary measures preventing oil and other pollution of the waters and beaches within these limits.

Special Command Order No. 4/74 lays down the following regulations:

Prevention of Oil Pollution whilst fueling

(i) vessels alongside or at anchor, taking on, discharging or transferring fuel oil are to take strict precautions to ensure that no oil is discharged overboard.

(ii) The Dockyard Supply Officer (DSO) is to see that every precaution is taken to prevent oil spillage from shore side connections.

(iii) Accidental spillages or leaks of fuel oil or inflammable liquids shall be reported to the Naval Officer in Command, who will order such cleaning action as may be necessary.

Oil Sludge Removal

Requests for drums for the removal of oil sludge should be made to the DSO distinguishing between:

(i) Open-end drums for fuel sludge mixed with oily rags or waste only.

(ii) Closed-end drums for fluid fuel oil sludge not mixed with rags or waste.

(iii) Closed-end drums for used or dirty lubricating oil for landing and return.

Drums should be placed on the quayside well clear of obstructions and attachments and are only to be used for oil sludge.

Refuse Disposal

(i) No refuse or sludge of any sort is to be thrown overboard within the port limits. In particular, the dumping of large floating objects such as logs or crates, which could become navigational hazards, will be regarded as a serious breach of the regulation.

(ii) All refuse from ships alongside is to be placed in the bins provided adjacent to the berth. Where dry bins are provided, they are not to be used for wet sludge.

(iii) Arrangements are to be made with the Assistant Naval Harbour Master for the placing and removal of refuse bins.

(iv) During operational periods, when ships are required to anchor overnight within port limits, all refuse and sullage is to be retained on board until it can be dumped at sea.

Cleanliness of Wharves

Ships lying alongside are responsible for the cleanliness of the wharf abreast of them from the head rope to stern rope bollard.

Dockyard Domestic Facilities

Ships' heads may be used by ships in harbour at all berths, but not in the Selborne Dock when, together with bathrooms, they should be locked, and all domestic water turned off.

Ships requiring the use of dockside heads, bathrooms, galleys or dining hall, should signal their requirements at least 48 hours in advance. The Naval Harbour Master will make the necessary arrangements.

It must be recalled that the SAN is relatively small quantitatively considered and in view of its size pollution by naval vessels is minimal. In regard to water and air pollution aboard ships, abatement of air pollution is aimed more at the effects, i.e., the reduction of noxious funnel fumes more for the consequence this has on whip antennae than clear air for the sake of clean air. Water pollution abatement aboard ship, particularly regarding marine life and in view of the naval regulations cited above, is taken very seriously.

In regard to shipboard waste disposal, harbor pollution is not permitted. At sea, human waste disposal is by chemical holding means. While there is no positive restriction on the disposal of other organic matter, the captains have been ordered to adopt reasonable practice as far as possible. Such a practice would preclude the dumping of hydrocarbons unless it were certain

that such material would not float landward. Oil pollution, particularly in and near harbors is an absolute "No-No".

The SAN does have a corps of engineer specialists educated and trained in the construction, mechanical, civil, electronic, marine, weapon, and chemical fields, but again in view of its size does not have an engineer specialist in pollution control. It is considered, therefore, that since established practices are pursued--according to the naval regulations cited above--there is at present little or no requirement for a pollution control trained officer.

The technological competence of SAN engineer officers has not been utilized by leaders in adopting national environmental programs and the navy has had little if any input into the decision-making process related to environmental legislation that may affect it.

References:

Bureau of National Affairs, International Environmental Guide, Washington, D.C., 1974, p. 81:1301.

Letter, H. W. Bergbauer, Jr., to Professor Rocco M. Paone, 6 July 1976.

Letter, H. W. Bergbauer, Jr., to Professor Rocco M. Paone, 13 July 1976 with Enclosure I. Captain Bergbauer is the U.S. Naval Attache in Capetown, Republic of South Africa.

SWEDEN

General

Pollution abatement responsibilities in Sweden fall under the aegis of the National Environment Protection Board (NEPB) which is responsible to the Minister of Agriculture, and the Swedish Concession Board for Protection of the Environment. The latter is also known as the Franchise Board. The pollution abatement program is federally oriented and covers water and air pollution, and solid waste disposal programs -- all on a national basis rather than on a fragmentary level of provincial jurisdiction.

The Royal Swedish Navy (RSN) and Environmental Policy

The NEPB controls all funding related to pollution abatement. Presently, all new ships in the RSN are equipped with anti-pollution facilities, i.e., waste-oil tanks, sewage tanks, etc. The funds used in this pollution abatement program as well as those that finance installation of abatement mechanisms in older naval vessels are not extracted from the navy budget, but from that of the NEPB. Currently, some one million Swedish Krona ($ .23 in u.s. money = 1 Swedish Krona) are expended annually to improve existing ships and other navy material from an environmental point of view.

The National Swedish Concession Board for the Protection of the Environment (NATURVARDSVERKET) is responsible for environmental research on a nationwide basis. The RSN, however, carries out some research on environmental problems that peculiarly effect it, but on a comparatively small scale. At this time the RSN spends approximately 100,000 Swedish Krona annually on this research.

The RSN takes part in the decision-making process concerning national pollution abatement policies and programs, and has a number of pollution abatement specialists who are at the call of the NATURVARDSVERKET. Records indicate that the RSN is always consulted with regard to legislation on pollution abatement when navy materials planning is foreseen to be affected by new laws or proposed changes in existing ones.

In FY 1975 some 600 million Swedish Krona were budgeted for the national environmental program.

References:

Letter, John R. Wheeler, Captain, USN, U.S. Naval Attache, Stockholm, Sweden, to Professor R.M. Paone 17 October 1975.

Bureau of National Affairs, International Environmental Guide, Washington, D. C., 1974, pp 61:2601-2.

Memo to Professor R. M. Paone from T. Malr, Kommendörkapten, 14 October 1975, Forsvarsdepartementets, Kommandoexpedition.

THE UNION OF SOVIET SOCIALIST REPUBLICS
(USSR)

General

The Hydrometeorological Service of the USSR is the major administering agency for environmental programs in that country. This agency also represented the Soviet Union in discussions related to the US - USSR Environment Agreement of 1972, the Fourth Meeting of the US - USSR Joint Committee on Cooperation in the Field of Environmental Protection held in Washington, D.C., October 28-31, 1975, and at the Fifth Joint Committee Meeting held in Moscow last fall (1976). Among other important committees that are involved with Soviet environmental programs is the Inter-Agency Environmental Committee. Composed equally of academicians, bureaucrats, and industrial representatives, the Inter-Agency Committee resolves disputes between industry and the Hydrometeorological Service.

A third agency, the GOSPLAN (state planning committee) Environmental Committee, represents the financial aspect of Soviet environmental programs, including costs of implementation, and provides funding for most, if not all, the environmental projects. The Soviet Academy of Science also has created a special committee which pursues environmental aspects of Academy projects. In addition, there are various state scientific research institutes that deal with water, air, and gaseous emissions abatement technology.

During the very late 1960's the USSR enacted national legislation on water, air, and noise pollution abatement. As in the case of the German Federal Republic, Australia, and a number of other countries a policy of

confederationalism also prevails in the Soviet Union. As a result each soviet and independent republic promulgates its own environmental rules and regulations. The problem of providing dates of the regulations and enactments is virtually insurmountable.

The USSR is a signatory to the 1948 Convention of the Intergovernmental Maritime Consultative Organization (IMCO) and its amendments of 1964 and 1965. The government has also ratified the 1954 Convention for the Prevention of Pollution of the Sea by Oil (as amended in 1962), the 1958 Convention on the High Seas, the 1972 Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter, among other international conventions related to the environment. In addition, the USSR signed in 1972 a bilateral agreement with the United States on Cooperation in the Field of Environment Protection. This agreement, the first comprehensive one between two major countries, provides for joint research development, mutual cooperation and exchange of information in eleven specific areas of environmental protection, including air, water, and marine pollution.

The results of the US - USSR Joint Committee on Cooperation in the Field of Environmental Protection are not as yet reflected in improving pollution abatement capabilities in the USSR, despite many exchanges of papers on marine, agricultural, and industrial pollution abatement technology. It is of special interest to the U.S. Navy and Coast Guard that technical papers have been exchanged on methods of evaluating toxicity of chemicals to be used in combating oil spills, development of a small shipboard centrifugal separator with a coalescing filter, and oil collection devices based on the vortex principle.

While this study is not a discourse on Soviet pollution in general, it is interesting to note that the country is known much more for its misuses of the environment than for its advances in pollution abatement. Thousands of acres of farmland are lost annually by surface mining of coal and iron ore. Environmental disruptions, particularly in the southern Ukraine regions, are monumental. The enthusiastic drive and necessity to improve the standard of living of the people has led to a virtually total disregard of the responsibility of protecting natural resources for future generations. Environmental enactments are frequently evaded with impunity. The relatively few voices of warning by small pressure groups of scientists, nature lovers, and writers are only faintly heard, if at all, by the political leadership.

The Soviet Navy (SN) and the Environment

Due to the nature of the international political responsibilities derived from its government's involvement in the treaties listed above, the Soviet Navy is quite occupied in pollution abatement. Even if other reasons were lacking, the SN has the obligation of conforming to the pollution abatement provisions of the treaties.

The Soviets feel that there is no need for the Navy to develop engineers with an environmental specialization. Pollution abatement research and development is carried on by subcommittees of the Academy of Science and other agencies in conformity with naval requirements. Thus in equiping ships with pollution abatement mechanisms, the SN uses the devices resulting from the research of the different Ministries which are developed in consonance with the demands of the international conventions and national laws. Aboard ship the responsibility for the control of

pollution abatement machinery is vested in the ships' engineer-mechanics. Thus the technological contributions of engineer officers in the SN are only in an advisory capacity. The decisions of types of pollution abatement mechanisms to be placed aboard military vehicles, including ships, are made by the civilian science specialists. It is a foregone conclusion, as well, that since the Soviet naval engineers do not receive special training in environmentalism, they lack the technological knowledge required to contribute to the national environmental programs.

By decree of the Praesidium of the Supreme Soviet of 1974 "On Reinforcing the Responsibility for Pollution of the Sea with Substances Harmful to the Health of the People or for the Living Resources of the Sea", the government has set up a series of punitive measures to punish violators of international agreements in which the USSR is a signatory. The Navy has integrated this decree into a series of regulations and has adopted a number of necessary measures of conformity.

The dumping of human and other wastes in territorial waters is forbidden. Existing shipboard and shore installation systems are used to the maximum degree in determining the method of shipboard waste disposal. In territorial waters the wastes are stored in holding tanks and then transferred to port facilities at a convenient opportunity. The dumping of hydrocarbons and other harmful wastes is forbidden within 50 miles from shore.

The new ships of the Soviet Navy are being fitted with self-sustaining pollution abatement systems and purification and utilities equipment are being installed in a number of vessels in operation. The cost of the latter installations are considered to be too expensive. Until all of the naval

ships are fitted out with the pollution abatement equipment, fundamental stress is being given to organizational measures, and directions for the prevention of deliberate destruction of the marine environment, and programs aimed at improved control of pollution emission substances.

Summary

Like most nations, the USSR has only lately become involved in pollution abatement. Much of the Sovient environmental policy is theoretical rather than real because the government has decreed that the stress on industrialization, regardless of harm to the environment, has the highest priority. The Navy is just beginning to invoke a pollution abatement policy. The Soviet government's active participation in IMCO Conventions has forced the Navy to set up new standards of pollution abatement related to disposal of wastes and oil spills. Yet naval specialization in the field of maritime environmentalism is weak. The R&D on pollution abatement equipment and systems to be used by the Navy is conducted by civilian scientists outside of the Navy. There is no evidence, presently, that Soviet naval officers have an input in this research or in the conversion mechanism that determines the type of environmental equipment that is to be installed aboard warships.

Lest one feel that the USSR is unmindful of the need for environmental protection, the reader should be reminded that the USSR and the United States are engaged in a good number of cooperative projects on the subject. Among these are: removal and processing of solid waste in urban areas, enhancement of environment in cities, prevention of pollution related to agricultural production, water pollution abatement,

including working groups on water quality planning and management of river basins, lakes, and estuaries, and prevention of air pollution.

References:

Fred Singleton (ed), Environmental Misuse in the Soviet Union, Praeger Publishers, New York, 1975, pp XI-XVII.

Letter, Ronald J. Kurth, Captain, USN, to Professor R. M. Paone, 11 August 1976. Captain Kurth is the U.S. Naval Attache assigned to the U.S. Embassy in Moscow, USSR. This letter contains enclosure 1, both in Rusian and English, which answers a number of questions related to Soviet Naval Environmentalism.

Letter, Ronald J. Kurth, Captain, USN, to Professor R.M. Paone, 26 October 1976.

Statement of Honorable Russell E. Train before the Subcommittee on Domestic and International Scientific Planning and Analysis, Committee on Science and Technology, House of Representatives, November 20, 1975.

Report on the Implementation of the US-USSR Agreement on Cooperation in the Field of Environmental Protection During the Period December 1974 to October 1975.

Report on the Implementation of the US-USSR Agreement on Cooperation in the Field of Environmental Protection During the Period November 1975 to November 1976.

Conclusions

A summary conclusion to the study of the utilization of naval technology in the environmental programs of foreign nations is that the foreign countries studied rarely, if ever, utilize naval technology or the services of naval specialists in pollution abatement in their environmental programs. Yet, in many of these nations, particularly in the less developed ones, the need for environmental pollution abatement is acute and the quantity and, too often, the quality of civilian technology in this field is quite limited.

While few of the foreign navies have specialists in the category of environmental engineers, they do have officers who are engineers and enlisted personnel who are well-qualified technologists. Both groups, in addition, have received special training in pollution abatement techniques for utilization at sea and shore establishments. More often than not the officers are among the best educated group in the nation and there is little question but that both their knowledge and services related to pollution could be made available to the civilian communities.

The following conclusions are also drawn from this study of foreign naval environmentalism:

1. All of the nations are more concerned with fighting capabilities and give a much lower priority to upholding environmental standards;

2. While most of the countries have national legislation on pollution abatement, the navies are generally excepted from these laws;

3. Foreign navies generally are concerned with pollution abatement, because their political leadership has signed the various Intergovernmental Maritime Consultative Organization (IMCO) agreements and/or their

concern for combat elusiveness.

4. Environmental engineers as such are included in but a few navies, although almost all navies have personnel with some training in pollution abatement, yet for the most part, the naval force or a subsidiary of it is given the responsibility of policing the territorial waters and national coastlines for environmental violations;

5. With few exceptions, the foreign navies do not have a budget for pollution abatement as such, although the builders now include abatement devices in the construction of new war vessels;

6. Few, if any, foreign navies are involved in actual research and development on pollution abatement devices, although in some of the nations officers are involved in testing abatement equipment on trials aboard ship;

7. Most of the navies have an input--directly or indirectly--in the decision making process on national environmental legislation that may affect them; and

8. For many of the navies, there are rigid restrictions regarding disposal of shipboard wastes in territorial waters.

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