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OIL IN NEPTUNE'S KINGDOM: PROBLEMS AND RESPONSES TO CONTAIN ENVIRONMENTAL DEGRADATION OF THE OCEANS BY OIL POLLUTION

*By Swadesh S. Kalsi**

The oceans are being treated as an infinite sink for the reception of waste materials from man's activities. Among these pollutants are oil, chlorinated hydrocarbons like DDT and PBCs, sewage, wastes from food processing, detergents, agricultural run-off, heavy metals, radioactive wastes, inorganic chemicals and heated water. Containerized wastes dumped into the ocean include arsenic, radioactive waste, nerve gas, and deadly chemicals.¹ The effect of this progressing degradation of the oceans cannot be determined precisely, but it is clear that the continued introduction of wastes in vast quantities and at accelerating rates will upset the intricate ocean ecosystem.

Oil is one of the worst pollutants in the ocean because it is poisonous to marine life. The oxidation of oil in the oceans depletes the free oxygen supply in the subjacent water which suffocates marine animals and impairs the growth of phytoplankton — the basic material in the ocean's food chain and the primary source of oxygen on earth.² Moreover, oil, like DDT and PCBs, accumulates in the marine food chains and can reach concentrations which severely impair the organism's physiological functions.

Another serious problem with oil is its transnational character. When spilled, it quickly spreads over large areas of water and may travel hundreds of miles before being oxidized or washed onto beaches. And, as Thor Hyerdahl has found, oil can form into globules in the water and range over the entire ocean for long periods of time.³

I. SOURCES AND EFFECTS OF OIL POLLUTION

A. *Sources*

At least five million tons of oil from all sources entered the sea in

1970⁴ and by 1980 that figure may well double. The most significant sources of oil pollution are tankers, offshore oil drilling operations, deliberate oil pumping by ships at sea, leaking oil from sunken ships, onshore accidents, sewage runoffs, and atmospheric fallout (through the transfer of oil particles in the atmosphere to the oceans).

The most notable instance of tanker spillage occurred when the 119,328 ton oil tanker *Torrey Canyon* ran aground off the coast of England in 1967. An estimated 80,000 tons of oil spilled into the English Channel and onto French and British beaches.⁵

The Santa Barbara blowout of 1969 illustrates the danger of offshore oil drilling operations. A well had been drilled some five miles offshore in 190 feet of water to its planned depth of 3,479 feet when underground pressure forced a geyser. Although there are conflicting reports on the quantity spilled, 5,000 barrels a day is a reasonable estimate.⁶ The oil spill continued for a month and even today oil continues to seep intermittently. The spill caused extensive damage to the beaches along the Santa Barbara Channel for a distance of some thirty miles.

A large amount of oil enters the oceans through sources which are neither accidental nor large enough to attract dramatic publicity. Tankers and other ships deliberately pump an estimated one million tons of oil each year into the sea.⁷ This source is traceable to bilge pumping, deballasting and tank flushing. Deballasting and tank flushing⁸ are the largest contributors. After a cargo of oil is discharged at a port, the tanker, with its tanks empty, takes sea water into the tanks as ballast to stabilize the tanker on the voyage back. The sea water mixes with the oil sticking to the inside walls of the tanker to form an oily emulsion. When the tanker enters the relatively sheltered waters of the shore, the ballast is discharged into the sea. The deballasting problem is not confined to tankers alone, as many dry cargo vessels take sea water into their empty fuel tanks for ballasting purposes. However, only tankers are afflicted with the problem of tank flushing. Although most refineries will take crude oil with a slight contamination of sea water, some refineries cannot function efficiently when crude oil is mixed with sea water. As a result when the next shipper requires clean tanks, the ship owner "flushes" out the residue from the previous cargo of oil. This oil mixture is again pumped into the sea.

A small source of oil pollution in the oceans is oil leaking from ships and tankers sunk during World War II and sunken marine casualties with oil tanks intact. But, there are 428 ships including

100 tankers sunk off the eastern coast of the United States with a staggering five million barrels of oil in their tanks.⁹ As their hulls corrode, these ships will become a serious potential source of pollution.¹⁰

Oil is also spilled into the sea from man's activities on land. Accidents and negligence in loading or unloading oil cargo at shore-based industrial complexes are one source. However, by far the more serious onshore source is the dumping of waste oil into sewers. Such oil can pass unaffected through municipal treatment plants and find its way into rivers and eventually into the sea.¹¹ In the United States gasoline stations dump 350 million gallons of waste oil annually in this manner.¹² Waste oil is also barged out to sea and dumped.¹³

Significant quantities of oil hydrocarbons enter the oceans via atmospheric fallout.¹⁴ Much research yet needs to be done in determining the precise magnitude and effect of the hydrocarbon transfer from land sources into the oceans owing to evaporation, but various estimates have asserted that as much as 10 to 90% of the oil in the seas is attributable to this source.¹⁵

The implications of a continually rising demand for oil and oil products are clear. Moving increasingly greater quantities of oil by sea has had the effect of increasing the size and total number of tankers. In 1951 the average tanker had a capacity of only 14,000 tons.¹⁶ Today the capacity of the giant tankers is approximately 250,000 tons, and a tanker with a 372,400 ton capacity is in operation.¹⁷ At the same time, the size of the tanker fleet is growing rapidly to handle the increased volume of total tonnage. For the eleven years 1960-1971 world tanker tonnage grew by just less than threefold from 65.8 million tons to 191.7 million tons.¹⁸ Estimates for 1980 are between 265.8 and 289.7 million tons.¹⁹ The tanker fleet increased from 3,264 vessels in 1960 to 4,183 vessels in 1971.²⁰ Obviously, this enlarged tanker fleet and the increased pressures for offshore drilling pose even greater threats of oil pollution.

B. *Effects*

For the purpose of understanding the consequences of oil pollution, crude oil can be divided into two classes — persistent and non-persistent.²¹ The higher fractions of petroleum such as gasoline are non-persistent. These are highly volatile but evaporate quickly and leave very little residue. In a crude oil spill, the non-persistent oils evaporate quickly; leaving a residue of persistent or heavy fraction petroleums. The persistent oils include fuel, diesel, and lubricating

oil; and, as their name implies, these oils dissipate very slowly. In colder water, the breakdown of persistent oil virtually stops. It is this persistent oil residue, then, which tars beaches, poisons marine life, and kills birds.²²

II. OCEAN PROTECTION THROUGH INTERNATIONAL LAW

Customary international law does not afford adequate protection in the realm of pollution. Indeed, there is no directly relevant law for the control of oil pollution of the oceans from the transportation and continental shelf production of petroleum. In international law, Sir Hersch Lauterpacht's concise formulation on State responsibility still represents the law today:

An act of a State injurious to another State is nevertheless not an international delinquency if committed neither willfully and maliciously nor with culpable negligence. Therefore, an act of a State committed by right, or prompted by self-preservation in necessary self-defense does not constitute an international delinquency, no matter how injurious it may actually be to another State.²³

There are, however, some rumblings of evolution toward the needed progressive change in the law of state responsibility for environmental damage as reflected in the Trail Smelter Arbitration,²⁴ Lac Lanoux Arbitration,²⁵ and Principle 21²⁶ of the Stockholm Conference on the Human Environment.

Because of the slow evolutionary nature of international law, nations have responded to the urgent need for a framework for environmental protection with an increasing volume of treaties. The section below analyzes treaty provisions relating to oil pollution resulting from ocean transportation and from petroleum mining of the seabed.

A. *Ocean Space*

1. *The Geneva Convention on The Territorial Sea and the Contiguous Zone*

A coastal state exercises the right of sovereignty over its territorial sea although foreign vessels have the right of innocent passage.²⁷ Foreign vessels may lose the right of innocent passage if their transit is "prejudicial to the peace, good order or security of the coastal state."²⁸ Article 17 of the Convention conditions the right of innocent passage on compliance with the coastal state's laws and regulations and other rules of international law. Thus the coastal state may take any necessary action to prevent passage of a foreign ship

which spills oil in transit through the territorial sea.²⁹

Article 24(1) gives the state protective jurisdiction over its contiguous zone for the prevention of damaging effects on the territorial sea or the territory of the state. Such jurisdiction expressly covers regulation for sanitary purposes. It can be argued that discharge of oil from a ship in the contiguous zone is in breach of the sanitary regulations provision of Article 24(1)(a).³⁰

2. *The International Convention for the Prevention of Pollution of the Sea by Oil*

The International Convention for the Prevention of Pollution of the Sea by Oil³¹ went into effect in 1958 and was ratified by the United States in 1961.³² It was amended in 1962, 1969 and 1971, but not all of these amendments are yet in force. It applies to ships³³ registered in any territory of a contracting party and to unregistered ships having the nationality of a contracting party. Article III, the heart of the Convention, prohibits discharges of oil or oily mixtures³⁴ within any of the specified zones.³⁵ Annex 'A' to the 1954 Convention³⁶ charts the prohibited zones which basically include all ocean areas within fifty miles of land. The 1962 Amendments extended these zones to a minimum of one hundred miles. However, the exemption provisions greatly impair the effectiveness of this expanded zone.³⁷

Enforcement provisions require records to be kept of all oil discharges and provide for inspection of these records.³⁸ Any infringement is punishable under the law of the flag State.

The Amendments of 1969 only slightly alter the situation.³⁹ The amendments basically set a criterion for intentional oil discharges from tankers. The rate of discharge must not exceed 60 liters per mile en route and the total discharge on a ballast voyage must not exceed 1/15,000 part of the total cargo carrying capacity. The first of the two amendments proposed in October 1971⁴⁰ imposes tank size and construction standards in order to limit oil outflow from a single grounding or collision incident. The second, the Barrier Reef Amendment, enlarges prohibited zones by calculating base lines from the environmentally fragile Australian Barrier Reef as if it were land.

3. *The Public and Private Law Conventions of 1969*

The Public Law Convention⁴¹ establishes the competence of the coastal state to take remedial action against a ship which has become a marine casualty⁴² on the high seas and which is threatening

pollution to the coastal state or its related interests⁴³ on account of an actual or imminent discharge of oil.⁴⁴ The intervention measures taken pursuant to Article I must be proportionate to actual or threatened damage.⁴⁵ An action by the coastal state in excess of measures deemed reasonably necessary⁴⁶ could obligate it to pay compensation for damage caused thereby.⁴⁷

The Private Law Convention⁴⁸ aims at compensating persons suffering a loss through oil pollution damage⁴⁹ by imposing strict liability on shipowners with enumerated exceptions.⁵⁰ The liability of the shipowner in any one incident is limited to a maximum of 134 dollars⁵¹ per adjusted ton of the ship's tonnage and, in any case, the liability is subject to a maximum ceiling of 14 million dollars.⁵² In the event liability is incurred, the shipowner can only limit his liability if he deposits an amount equal to the extent of his liability⁵³ with the court or other competent authority in one of the contracting states where the action is brought. Once this fund is established⁵⁴ it bars claimants from exercising any rights against other assets of the owner.⁵⁵ If the ship carries more than 2,000 tons of oil as cargo the owner must maintain insurance or other evidence of financial security to cover his maximum liability under the Convention.⁵⁶

4. *The International Compensation Fund Convention of 1971*

The International Compensation Fund Convention⁵¹ is aimed at supplementing the resources available under the Private Law Convention "with a view to ensuring that full compensation will be available to victims of oil pollution" while at the same time forcing the cargo interests to share liability with the shipowners.⁵⁸ It establishes the International Oil Pollution Compensation Fund to provide compensation, subject to exonerations,⁵⁹ for damages to the extent that the Private Law Convention is insufficient to indemnify shipowners to the extent of any additional liability imposed by the Private Law Convention.⁶⁰ The Fund is obligated to compensate if pollution damage is suffered and full and adequate compensation has not been paid to the injured party under the terms of the Private Law Convention.⁶¹ The maximum amount of compensation payable by the Fund in respect to any one incident or from a natural phenomenon of an exceptional, inevitable and irresistible character is limited to 30 million dollars,⁶² including the compensation paid under the Private Law Convention and indemnity to the shipowner or his guarantor.

Contributions into the Fund by each contracting party are mandatory where a consignee or importer receives quantities of oil in

excess of 150,000 tons annually.⁶³ Since the oil companies import by far the largest share of oil in any contracting state, they will be the major contributors to the Fund. Each contracting state must take appropriate measures to insure that the obligation to contribute to the Fund is fulfilled.⁶⁴

B. *The Continental Shelf and the Sea Bed*

The 1958 Geneva Convention on the High Seas⁶⁵ requires the states to:

draw up regulations to prevent pollution of the seas by the discharge of oil from ships or pipelines or resulting from the exploitation and exploration of the sea-bed and its subsoil, taking account of existing treaty provisions on the subject.⁶⁶

The 1958 Geneva Convention on the Continental Shelf⁶⁷ has several provisions applicable to oil pollution. Article 5(1) states that "exploration of the continental shelf and the exploitation of its natural resources must not result in any unjustifiable interference with . . . the conservation of the living resources of the sea." Further, a coastal state is obliged to undertake "all appropriate measures for the protection of the living resources of the sea from harmful agents."⁶⁸ The latter measures are confined to safety zones of up to 500 meters around the continental shelf exploration or exploitation complex.

The open-ended definition of the continental shelf⁶⁹ in the Geneva Convention on the Continental Shelf, combined with recent technological advances in mining resources on the ocean floor has led to the problem of defining the outer boundary of the shelf.⁷⁰ Many proposals have been put forth,⁷¹ but one of the most comprehensive and politically acceptable is the Draft United Nations Convention on the International Sea Bed Area.⁷² Regulations under this Convention will ensure:

the protection of the marine environment against pollution arising from exploration and exploitation activities such as drilling, dredging, excavations, disposal of waste, construction and operation or maintenance of installations and pipelines and other devices.⁷³

C. *Adequacy of Ocean Protection*

1. *Ocean Space*

The most devastating criticism of the IMCO Conventions is that, apart from the 1954 Oil Pollution Convention as amended in 1962,

none of them are in force. There is thus a legal vacuum in the field that the Conventions purport to cover. This is not too important with the Public Law Convention as states can already exercise a similar right of intervention under international customary law relating to self-defense. However, even if all of the conventions were in force, they would be unable to give coastal states the protection needed because they only indirectly set up incentives for the ship-owners to undertake preventative measures to the extent that they are required to pay compensation after oil spills.

The growth in petroleum production and consumption indicates that oil spills must carry heavier penalties. With the increase in tonnage transported, under the present legal minimum discharge level the total discharges can reach magnitudes ecologically unacceptable to the ocean environment. Thus, such minimum levels must take into consideration the increasing opportunities for oil pollution in the midst of growing demand for oil.

Another serious problem is associated with the fact that regulation, surveillance and enforcement measures are left to the flag state. Tankers flying flags of convenience can stay out of the scheme set up by IMCO conventions so that their effect is nullified. A flag state of convenience, e.g., Liberia, Panama or Honduras, has little motivation to require their registered vessels to undergo the necessary improvements in construction and safe navigation for minimizing or preventing oil spills. Rather, the flag of convenience state is interested in the fees paid by the vessel. Extensive regulations regarding safety, routing, or timing of particular tanker voyages would only endanger the state's revenues. The coastal state which is afflicted with oil pollution has an interest in protecting its beaches and adjacent waters, but under the present framework if it is unable to assert jurisdiction or enforce antipollution measures outside the contiguous zone.

Under the Private Law Convention, even though damage may be proved, a problem of proof arises. The Convention does not provide any provision for tagging oil in tankers so that spills may be identified and action taken against the delinquent ship. Formidable problems of proof arise when the tanker is discharging oil in excess of the limit laid down in the 1954 Convention. Self-policing measures, such as on-ship logs of oil discharges, are ineffective for obvious reasons. Similarly, the vastness of the ocean makes it impractical in many instances to take samples of water as proof of illegal discharges.

As the Private Law Convention and the International Convention

Fund are not yet in force, the international structure for compensation is inadequate. The Tanker Owners Voluntary Agreement Concerning Liability for Oil Pollution (TOVALOP) and the Contract Regarding an Interim Supplement to Tanker Liability for Oil Pollution (CRISTAL) are the only international agreements providing compensation for oil pollution today. However, under these agreements, only governments can claim damage, and they must show that the pollution resulted from a "negligent discharge." Moreover, these agreements do not cover consequential or ecological damages.⁷⁴

The Private Liability Convention leaves the question of liability for economic losses through destruction or impairment of the living natural resources of the sea unanswered. Moreover, only damages occurring within a state's territorial limits are compensable.

2. *Continental Shelf and the Ocean Bed*

The legal regime of the continental shelf and the ocean bed is extremely tenuous. If damage is suffered as a result of the exploration or exploitation of the continental shelf, remedies are only available in the vague customary law relating to ultra-hazardous activities beyond national boundaries. This situation is unsatisfactory in the face of the foreseeable increase in oil production from the continental shelf.

There is not much hope either from the proposed draft United Nations Convention on the International Seabed Area which sets up a regulatory framework for the exploitation and exploration of the deep ocean bed. Although provisions for environmental protection exist, it is doubtful whether the ecosystem of the ocean environment will be given a high priority in a system explicitly set up to exploit the ocean resources.

III. NATIONAL CONTIGUOUS ZONES FOR POLLUTION CONTROL

A. *The Canadian Approach*

In June 1970, Canada unilaterally enacted the unprecedented Arctic Waters Pollution Prevention Act⁷⁵ to eliminate and control pollution in the high seas contiguous to its territorial sea.⁷⁶ The Act's purpose is to develop the natural resources of the Canadian Arctic "in a manner that takes cognizance of Canada's responsibility for the welfare of the Eskimos and other inhabitants of the Canadian arctic and the preservation of the peculiar ecological balance that now exists in the water, ice and land areas of the Canadian arctic."⁷⁷

1. *Scope and Applicability*

The Act prohibits the deposit of "waste" in the arctic waters or on the mainland or islands where such waste may enter the arctic waters. Arctic waters extend 100 miles seaward of the Canadian Coast above sixty degrees north latitude except opposite Greenland where an equidistant line demarcates the outer boundary.⁷⁸ Waste is comprehensively defined as any substance that would, if added to water, "degrade or alter . . . those waters to an extent that is detrimental to their use by man or by an animal, fish or plant that is useful to man."⁷⁹ Provision is made in the Act for expanding this definition if necessary.⁸⁰ Waste as defined covers all forms of pollution including persistent and non-persistent oils. The Act applies to all ships of whatever type regardless of registry, size or cargo carried.⁸¹

2. *Liability and Financial Security*

Liability is incurred for the deposit of waste through exploration or exploitation of the arctic continental shelf as well as by the "owner of any ship that navigates within the arctic waters and the owners of the cargo of any such ship."⁸² Liability is absolute⁸³ and includes the costs of governmental remedial action necessitated by the deposit of waste and the damage caused to the coastline. However, no liability attaches in the following circumstances:

1. Where the cargo owner proves that his cargo is of such a nature and is carried in such a quantity that even if all of it escaped it would not constitute waste.⁸⁴
2. Where deposit of the waste is permitted by any regulations.

Further, the Governor in Council may prescribe regulations requiring evidence of financial security from persons engaged in exploration or exploitation of the arctic continental shelf or other marine resources and from the owners of ships navigating in the arctic waters.⁸⁵ Such financial security may be in the form of insurance or indemnity bonds up to the limitation amounts established by the regulations. The financial security must permit the injured party to proceed directly against the insurer or the person providing the security.

3. *Contiguous Zones for Regulation of Shipping*

Within the arctic waters the Act establishes "shipping safety control zones" which go into effect upon 60 days notice in the Canada Gazette.⁸⁶ Any ship may be prohibited from navigating in such a

zone unless it complies with specified safety standards. The standards relate to hull and tank construction, machinery and equipment, manning, type and quantity of cargo, loadlines, fuel and supplies, navigation aids, pilotage and ice conditions.⁸⁷ With respect to the *Torrey Canyon* type of situation where prompt action is needed to protect the coastline from pollution, Section 13 states:

Where the Governor in Council has reasonable cause to believe that a ship that is within the arctic waters and is in distress, stranded, wrecked, sunk, or abandoned, is depositing waste or is likely to deposit waste in the arctic waters, he may cause the ship or any cargo or other material on board the ship to be destroyed, if necessary, or to be removed if possible to such place and sold in such manner as he may direct.

Since Section 13 does not expressly mention the principle of proportionality, it is doubtful whether the qualifying words "if necessary" imply as strict a standard as specified in the Public Law Convention.

Policing in the zones is conducted by "Pollution Prevention Officers" who have extensive powers including the power to board and inspect any ship suspected of non-compliance with the regulations. On reasonable grounds of suspicion that any regulation has been contravened, these officers may "with the consent of the Governor in Council seize the ship and its cargo anywhere in the arctic waters."⁸⁸ A ship may be ordered to depart or refrain from entering a zone if the interests of safety justify the measure. In case of a marine casualty causing or threatening pollution, a Pollution Prevention Officer may commandeer the service of all ships in the area to participate in the clean-up operations,⁸⁹ or order the ship to be destroyed.⁹⁰

4. *Penalties*

Individuals may be fined up to \$5,000 and a shipowner up to \$100,000 for contravening the Act. Fines of up to \$25,000 can also be imposed on the shipowner for non-submission of reports to Pollution Prevention Officers, failure to post bonds and noncompliance with safety standards.⁹¹ A ship violating any regulations, e.g., failing to provide evidence of financial security, is subject to seizure.⁹²

B. Legal Principles For the Establishment of National Contiguous Zones

1. *Self-Defense*

Canada's unilateral implementation of expanded contiguous

zones for pollution control is based on its right to protect the unique arctic ecosystem.⁹³ In post-U.N. international law, the right of self-defense is limited by Article 51 read in conjunction with Article 2(4) of the United Nations Charter which states:

All Members shall refrain in their international relations from the threat or use of [armed] force against the territorial integrity or political independence of any state, or in any other manner inconsistent with the Purposes of the United Nations.

However, armed force may be exercised consistently with the Charter in individual self-defense or in execution of collective self-defense measures expressly reserved by Article 51. Although some writers confine the applicability of Article 51 provisions to defense against armed attack,⁹⁴ any meaningful exercise of the right of self-defense⁹⁵ requires a broader interpretation. Within this broader interpretation, a state is justified in acting in self-defense only when reacting to an illegal act of another state threatening immediate danger to its territorial integrity or political independence in a situation affording no alternative, and where the reaction is proportionate to the harm threatened.⁹⁶

Professor L.C. Green⁹⁷ argues for the extension of the right of self-defense to include protection of the economy as apart from the preservation of the integrity of the territory of a state. Assuming that the right of self-defense may exist for the protection of the economic integrity of the state, it still is subject to the conditions for the exercise of the right, that is, there must be a prior use of force or *prima facie* illegality.⁹⁸ This concept of self-defense does not lend itself to environmental protection as presented in the Canadian arctic legislation.

2. *Self-Protection*

A close relative of self-defense — differing from it only in degree and in military connotation — is the concept of self-protection. International law recognizes the right of self-protection by allowing a state to protect certain vital interests including security, property and integrity of governmental processes. The right of self-protection also extends to the economic interests of a state. The rationale behind this concept is that the “interest which a state may have in the safe preservation of the national economy, of its essential economic interests, may be equally as great as its interest in safeguarding its territory, its political independence or its people.”⁹⁹

A state’s jurisdiction for self-protection is not confined to its terri-

tory. In accordance with the generally accepted objective territorial principle, a state's jurisdiction extends over acts outside its territory which will have an effect within it.¹⁰⁰ This principle recognizes no limit to the extent of the jurisdiction. The operation of the objective territoriality principle is not confined to international criminal law and has made deep inroads into international economic law. To take one example, the extra-territorial application of the United States antitrust laws is based on this principle.¹⁰¹

The 1945 Truman proclamation on the continental shelf¹⁰² is based in part on self-protection and claims exclusive jurisdiction and control over the U.S. Continental Shelf. The United States¹⁰³ and Canada have Air Defense Identification Zones of up to 300 miles from their coasts. Within these zones all foreign aircrafts approaching U.S. and Canadian coasts must identify themselves.¹⁰⁴ Since the zones protect vital security interests of the state, very stiff penalties are provided for violators, and a non-complying aircraft may be intercepted. States have traditionally exercised jurisdiction on the high seas for the purpose of enforcing customs regulations insofar as contiguous zone jurisdiction has its basis in self-protection of a state as regards customs, fiscal and immigration purposes. However, the Geneva Convention on the Territorial Sea and the Contiguous Zone limits the contiguous zone jurisdiction to 12 miles from the coast. Although jurisdiction for the prevention of oil pollution is exercisable in this zone, the zone is really too narrow to adequately protect the environment.¹⁰⁵

C. *Nettles in the National Contiguous Zones*

Canada's unilateral measures for stricter control of pollution in the Arctic were born out of despair. Canada would have preferred an international anti-pollution agreement, and at the 1969 Brussels Conference, which led to the revision of the 1954 Oil Pollution Convention in addition to fashioning two new conventions (The Private Law Convention and the Public Law Convention), Canada made several suggestions for implementing anti-pollution measures but failed to get satisfactory results.¹⁰⁶ The major improvements sought were the broadening of the definition of oil, the rejection of the concept of territorial damages, and the imposition of absolute and joint liability on both the shipowner and the cargo owner.¹⁰⁷ From Canada's point of view the Private Law Convention and the Public Law Convention "did not pay sufficient attention to the fundamental interests of coastal states as compared with the commercial interests of flag states who favored a minimum of interference with

their interpretation of their rights by way of freedom of the seas."¹⁰⁸

The Canadian anti-pollution legislation certainly encroaches on the traditional freedom of the seas. It is, however, a more reasonable action than the unilateral 1945 Truman proclamation. The Truman proclamation eventually brought about the desired change in the law which is now codified in the 1958 Geneva Convention on the Continental Shelf. Since coastal states have a vital interest in protecting the marine environment, the same consequences should result from the Canadian action. In fact, this is where the greatest contribution of the Canadian legislation may lie. While some see alarm in the snowballing expansion of contiguous zones for reasons other than the protection of the environment,¹⁰⁹ the legislation is bound to stimulate the search for a suitable answer to the problem of ocean degradation.

If the legislation is administered with responsible restraint, it will reduce the progressive degradation of the Arctic. There is presently growing support among coastal nations for more strict and more meaningful control of oil pollution from ships as witnessed by the enforcement provisions (Articles 4, 5 and 6) of the IMCO Draft Text of the International Convention for the Prevention of Pollution from Ships, 1973. The Arctic itself is not free from invasion of pollutants from outside the 100 mile zone. The Canadian legislation if implemented and adequately enforced will only be able to reduce the rate of pollution in the Arctic.

A rather serious nettle in the Canadian action is the potential for conflict between nations. Unilateral anti-pollution contiguous jurisdictions run counter to the powerful oil and defense interests of the big powers. Jared Carter argues:

[W]e've got the largest navy in the world. We've got a very substantial interest in freedom of transportation not only because we import and export more than any other country in the world but because our companies own many of the instrumentalities of that commerce. So it is important for us, for reasons other than the fact that Standard Oil of New Jersey happens to want to rent a boat some where to haul a load of oil.¹¹⁰

IV. TOWARD PREVENTING OIL POLLUTION

A. *Preventive Measures*

1. *Definition of Oil*

Since there is conclusive evidence as to the harmful effects of persistent and non-persistent oils, discharges of both should be prevented. The definition of oil in the three international conventions

differs. The Public Law Convention includes persistent and non-persistent oils with the exception of whale oil. The Private Law Convention includes only persistent oils and includes whale oil. The International Compensation Fund Convention defines oil to include only persistent hydrocarbon mineral oils. There should be no escape from liability for discharging any ultra-hazardous substance like oil into the ocean environment.

2. *Onshore Oil Residue Reception Facilities*

In ensuring environmental protection, deliberate discharge of oil should be prohibited. Such a prohibition would require that adequate onshore reception facilities for oily ballast water, and waste oil from ships be provided, for without such facilities tank flushing and deballasting will inevitably take place at sea. The fact that the facilities in existence today are totally inadequate to handle oil wastes creates incentives to deballast while approaching a port for loading.¹¹¹ Article VIII of the 1954 Oil Pollution Convention encourages contracting governments to take appropriate steps to provide facilities to receive oily ballast water and waste residues. However, progress in the construction of oil reception facilities has been extremely slow. From 1955-1960 the increase in new facilities was negligible and from 1962-67 no new facilities were built at all.¹¹² Deballasting in an inadequate onshore facility takes extra port time for the tanker. Economic pressures dictate spending the least time in port so that the ship's freight earnings are maximized. As onshore facilities are a precondition to the prevention of deliberate oil discharges at sea, states should expedite construction of adequate facilities.

3. *Ship Construction Standards*

A super tanker is difficult to maneuver and incapable of stopping within a reasonably short distance. For instance, the crash stop distance for a 200,000 ton tanker is approximately two and one half miles; and during this operation, with the engines in full reverse, the tanker cannot be steered.¹¹³ This lack of maneuvering ability has obviously decreased the ability of a tanker to avoid collision or grounding. In fact, it is impossible for giant tankers to operate within the rules set out in the 1960 International Regulations for Preventing Collisions at Sea.¹¹⁴ Limitation of tanker size could reduce the probability and damage of oil spills, but current economics dictate otherwise. In the long run, deliberate oil discharges can best be prevented through the use of segregated ballast tankers which

have separate tanks for ballast and cargo, and the Draft Text of an International Convention for the Prevention of Pollution from Ships (1973) contains such a provision. Building smaller tankers, better compartmentalization, double hulls, and segregated ballast tanks all go against economies of ship transportation, though. For this reason, the imposition of effective ship construction standards must be made at the international level, as an individual state can hardly hope to influence oil and shipping interests.

4. *Navigation Regulation*

The *Torrey Canyon* ran aground as a result of negligent navigation. The supertankers need many qualified personnel for safe navigation, and all too often, tankers are registered with a flag of convenience state which does not control the qualifications of the personnel. Since a properly manned tanker is less likely to become a maritime casualty,¹¹⁵ it is in the interest of all maritime states to set more stringent international standards. There should be requirements for proper navigational equipment on a ship and standards for its care and inspection at regular intervals.

Taking into account the limited maneuverability of supertankers and the trend toward bigger and more tankers, new mandatory sea lanes should be established.¹¹⁶ It has been suggested that all traffic on congested routes in the ocean should be computerized and regulated like air traffic.¹¹⁷

5. *Universalization of Load on Top System*

The Load on Top (LOT) technique is voluntarily used by some 80% of the oil tankers to reduce discharges of tanker washing and deballasting.¹¹⁸ Nearly one half of the oil pollution associated with tanker transportation is from the 20% of tankers which do not use the LOT technique.

In the LOT method,¹¹⁹ the water and oil ballast is allowed to settle in the tanks of a tanker on voyage to the loading port. The density of oil being less than that of water, it separates out on top, leaving relatively clean sea water at the bottom which is then discharged. Oil mixed with a little sea water is retained in the tanks and the next cargo loaded on top. Except for one or two special purpose crude oils, which cannot afford contamination, e.g., the ones used in the manufacture of lubricating oil, the LOT can be adopted by all tankers without problems of modification or additional equipment. Most refineries accept crude oil with salt water and, in fact, some crude oils contain salt water.¹²⁰ The salt is removed from the

oil before refining as it otherwise poses problems with the pipes and can cause corrosion in the distillation unit. States with refineries which cannot take salt in crude oil should install desalters.

B. *Restorative Measures*

Although preventive measures are of paramount importance, oil spills will inevitably occur, and it is important to contain the damages with techniques which are not harmful to the marine environment.

1. *Clean-Up After Spill*

The present techniques of clean-up after a spill are still primitive, and research needs to be done in exploring new avenues to find satisfactory methods.

The present systems of physically collecting oil in the sea are still in experimental stages. Although small spills in still water can be collected, no method yet devised is appropriate for large spills in turbulent water.¹²¹ Since oil must be contained in a confined area before mechanical recovery by skimming and suction,¹²² improved booms must be developed to contain the oil.

Absorbents like polypropylene have been sprinkled over oil and later collected to recover oil by pressing.¹²³ However, the cost of such absorbents confines this method to small areas like waterways or harbors. Straw has also been used to absorb oil from the surface of the sea, and the oil soaked straw is then collected and burned. This method is extremely labor intensive and therefore expensive. In addition, turbulence in the sea makes recovery of the straw difficult.

Chemical dispersion is one promising technique for disposing of large oil spills at sea.¹²⁴ Small quantities of the chemical disperse large amounts of oil which makes dispersion relatively inexpensive. Dispersion exposes more oil to the air and accelerates the oxidation of the oil. It has been suggested that oil eating bacteria be mixed with dispersants to hasten the breakdown of oil.¹²⁵ It is, however, important that such chemicals be analyzed in regard to their effect on marine life.

Burning the spilled oil is an acceptable way of cleaning up a spill. However, the oil must be ignited soon after the spill when the lighter fractions are still present and before the oil has spread out in a thin layer. As was shown by the attempts to burn the oil released from the *Torrey Canyon*, combustion cannot be sustained adequately when the heavier fractions are spread thinly over the surface of the sea. A laboratory method has been successful in completely burning

heavier fractions of oil after the oil is sprayed with a chemical.¹²⁶ Any residue which remains floating on the surface after the oil is burned can be collected. It is not known how effective this method is in burning oil in turbulent seas though.

An oil spill can be sunk by treatment with hydrophobic minerals, e.g., chalk treated with stearic acid.¹²⁷ Although oil disappears from the surface, it is retained in the ocean environment for long periods before it is oxidized. In addition, the effect of oil on life on the floor of the sea is unknown. It is anticipated that this method will not gain wide acceptance chiefly because the amount of sinking agent required may well be the same as the quantity of oil spilled.¹²⁸

Another technique involves gelling or solidifying oil which is released into the sea by a marine casualty. About 15% to 20% of melted paraffin mixed with crude oil will solidify the oil.¹²⁹ The solidified oil floats on the sea and can be collected by drag nets.

Of all the above methods of containment and rapid recovery, gelling and burning are the best presently available to deal with oil spills. Non-toxic dispersants are acceptable but past experience, e.g. through the use of dispersants in the *Torrey Canyon* incident, has revealed that often more damage is caused to marine life than if oil was left to itself.¹³⁰ Thus, as a minimum requirement, dispersants and other chemicals should be used only when the chemicals or a combination of the chemicals and oil are less toxic to the marine environment than the oil by itself. Sinking oil only creates problems of unpredictable proportions. All the present methods are ineffective and unsatisfactory, and there is no doubt that more research needs to be done.

The right to take remedial action against a marine casualty should be carefully exercised. In the *Torrey Canyon* incident, oil pollution increased as a result of bombing which opened up and released oil from unspilled tanks.¹³¹ The purpose of the bombing was to set fire to the oil, but only a small portion of the oil burned because the higher fractions of oil had evaporated and the heavier fractions had spread out in a fine film on the water.

The lack of organization or coordination in remedial measures after an oil spill is a principal difficulty in minimizing damage. At the national level, there may be bodies which are to some extent organized and can deal with the task of clean-up. However, after the break-up of the tanker *Ocean Eagle* off the coast of Puerto Rico in March, 1968, the clean-up operations by various U.S. agencies were described as an "organization chaos, created by independent agencies, operating under different mandates, trying to achieve different

ends, for example, the Coast Guard seeking to rescue the crew and protect the beaches, the Army Corps of Engineers trying to keep the port open, and the Department of Public Works attempting to clean the beaches. In addition, there were at least six other agencies on hand."¹³²

No international anti-pollution organization exists to deal with oil spills. Oil discharged in the middle of the ocean is never treated even if discovered as it involves expenses by one state for the common good of all. Since oil in mid-ocean can be as damaging to the environment as a spill in the territorial sea of states, anti-pollution measures should be taken wherever possible. In order to accomplish this task regional bodies should be set up with depots equipped to take the necessary remedial action. Since only technologically advanced states have the relevant means and technology, they could be the primary financiers. However, provision should be made to help clean the oceans adjacent to coasts of the less developed countries who do not have the necessary means or technology. Since damage to the ocean environment cannot be localized between states, this subsidization in the form of providing remedial anti-pollution measures is essential.

Speedy anti-pollution action against the *Torrey Canyon* type of oil spill can be facilitated by an international agreement requiring all vessels to carry remedial equipment. The equipment would include approved chemical dispersants, gelling compounds like paraffin, booms for containment of oil, and mechanical removers. In addition, the agreement should incorporate the Canadian innovation of requiring other ships in the area of the maritime casualty to render assistance if so asked.

At present there is no efficient and quick way of detecting oil spills so that remedial action can be commenced far out to sea. An international effort in policing the oceans, perhaps by satellites,¹³³ is required to provide better information.

Ensuring effective compensation for damage by oil pollution is significant for two reasons. First, compensation will help restore the environment; and, second, the existence of potential significant liability for damage will have preventive effects. The ultra-hazardous nature of oil requires the imposition of absolute liability without limit. The Private Law Convention and the International Compensation Fund Convention both provide a framework of strict liability with enumerated exceptions. However, total maximum liability is limited to \$30 million. If pollution from oil is to be reduced or even kept at the present level in face of rapidly growing demand for oil,

absolute liability without exonerations needs to be imposed. The potential damage should be insured to the maximum insurable risk and any damage in excess should be imposed jointly and severally on the shipowner and the cargo owner. Perhaps the coastal states themselves should also participate and insure against damage from oil pollution.

In imposing liability, the polluter first must be identified. While in the *Torrey Canyon* type of incident, identification is not at issue, other types of discharges or dumping creates serious identification problems. A labelling system, identifying each tanker's oil, should be implemented so that should a spill be found in the sea it can be traced to a particular tanker. While radioactive isotopes can be used for such a system of tagging cargoes, the system is unsatisfactory because of the discharge of radioactive material in any spill. However, another precise method of tagging which is currently being developed is based on the identification of unique characteristics of oil from various parts of the world. Even though identification technology is within our grasp, an international agreement is needed to effectively implement such a system. A tagging system would overcome a major hurdle in law enforcement and also act as a deterrent against deliberate discharges.

Another aid in enforcing compliance with sea pollution regulations would be the detection of circumstances where an inference from circumstances leads to the conclusion of discharges at sea. For instance, the amount of oil which adheres to the sides of the tanks after discharging oil cargo can be calculated from the design and operation of the tanker. Hence, when a tanker comes to the loading port with clean tanks or with ballast containing less oil than calculations show, this should be *prima facie* proof of discharge at sea. This concept of *prima facie* proof may be used to impose liability under the 1954 Convention for the Pollution of Sea by Oil. Calculations on design and operation characteristics can reveal the total oil retained by a tanker after it has discharged its cargo. The tanker's retained residues or ballast water being pumped into reception facilities of the port should be equal to this total retention capacity minus the allowance for the 100 parts per million which is allowed under the Convention. If the tanker has a lesser quantity than the calculations indicate that it should have liability for pollution should be imposed. Another method of detecting such discharges is to install monitoring systems on tankers. However, the equipment must be foolproof and an acceptable impartial body would have to be established to seal the monitors and inspect them for enforcement purposes.

V. CONCLUSION

The international framework for limiting and preventing oil pollution is sadly inadequate. However, the dire consequences of upsetting the marine ecosystem through gradual pollution urgently demand action. The oceans near the coastline are extremely rich in marine life and the coastal states have a direct interest in preserving these renewable resources. At the present level of organization in international society, threats to ocean environment can be reduced through expansion of contiguous zone jurisdictions. Whatever their drawbacks, contiguous zones for controlling pollution adjacent to the coastal states can effectively fill the legal vacuum that exists. However, the zones should only last for a temporary transitional period during which international agreements can be negotiated. Expanding contiguous zones for pollution control would also hasten international concern on the issue and bring nations together to discuss an international agreement on pollution control.

In the long run, all deliberate discharges of oil should be prohibited. As a precondition the coastal states will have to accelerate the construction of waste oil and ballast water reception facilities and press for segregated ballast tankers. Since accidental spills will always occur, only research in clean-up methods will yield quick and ecologically harmless methods of dealing with oil spills. Imposition of absolute liability is necessary to ensure the extreme care that should be exercised in the exploration and exploitation of oil on the continental shelf and the ocean bed. The present piecemeal approach to problems is insufficient.



FOOTNOTES

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¹On pollutants in the ocean and their sources, *see*, *THE WATER'S EDGE: CRITICAL PROBLEMS OF THE COASTAL ZONE*, Ketchum, ed., 146-86, (1972); Special Study Comm. of the Ocean Sci. Comm. of the NAS-NRL Ocean Affairs Board, *MARINE ENVIRONMENTAL QUALITY*, at 5-27, (NAS, Aug. 9-13, 1971).

²Schachter and Serwer, *Marine Pollution Problems and Remedies*, 65 *AMER. J. INT'L. L.* 87 (1971).

³*Hearings on Oil Pollution Before Sen. Comm. on Commerce*, 92d Cong., 2d Sess. at 46-54 (1971); *see*, also, *SCIENCE* 168:245, (1970).

⁴NAS, *supra* n.1, at 7.

⁵See, Nanda, *The Torrey Canyon Disaster: Some Legal Aspects*, 44 DENVER L.J. 400, (1967).

⁶See, OCEANS, May-June 1970, at 24. For a sequence of events leading to the blow-up and the eventual plugging of the well, see Holmes, *The Santa Barbara Oil Spill*, OIL ON THE SEA, Hoult, ed., 16-9, (1969). See, also Dye, BLOWOUT AT PLATFORM A: THE CRISIS THAT AWAKENED A NATION (1971); Easton, BLACK TIDE: THE SANTA BARBARA OIL SPILL AND ITS CONSEQUENCES (1972); Steinhart and Steinhart, BLOWOUT—A CASE STUDY OF THE SANTA BARBARA OIL SPILL (1972); Ridgeway, THE POLITICS OF ECOLOGY, 143-160 (1970). On attempts at stricter regulation, including suspension and termination of the Outer Continental Shelf leases off the coast of California in the wake of the Santa Barbara oil spill see, *Santa Barbara Oil Spill, Hearings on S. 1219 before the Sen. Comm. on Interior and Insular Affairs*, 91st Cong., 1st Sess. (1969), and *Santa Barbara Oil Pollution Hearings on S. 1219, S. 2516, S. 3351, S. 3516 and S. 3093 (Parts I and II) before the Sen. Comm. on Interior and Insular Affairs*, 91st Cong., 2nd Sess. (1970).

⁷NAS, *supra* n. 1, at 7.

⁸See, *Oil Pollution of the Sea*, 1 ENVIR. L. REV. 351, (1972).

⁹Moss, PETROLEUM — THE PROBLEM, IMPINGEMENT OF MAN ON THE OCEANS, Wood, ed., 351-2, (1971).

¹⁰Depts. of Int. and Transportation, A REPORT TO THE PRESIDENT ON POLLUTION OF THE NATIONS WATERS BY OIL AND OTHER HAZARDOUS SUBSTANCES, at 7 (1968).

¹¹See, Hoult, *supra*, n. 6, at 7.

¹²Reitze, A.W., Jr., 1 ENVIR. L., 478, (1972).

¹³On November 30, 1970, for example, the Navy dumped 600,000 gallons of waste oil and sludge into the ocean, 55 miles off the coast of Florida. The resultant oil slick spread over 1,000 square miles. See, *Hearings an Oil Sludge Dumping off the Florida Coast before the Sen. Comm. on Public Works*, 91st Cong. 2d Sess., at 54-91, (1970).

¹⁴See, Robinson and Robbins, SOURCES, ABUNDANCE AND FATE OF GASEOUS ATMOSPHERIC POLLUTANTS, 93-103, (1968); SCIENTIFIC AMERICAN, 224:33-42, (1971); Eriksson, in Ruivo, ed., MARINE POLLUTION AND SEA LIFE, 489-91, (1972).

¹⁵REPORT OF THE STUDY OF CRITICAL ENVIRONMENTAL PROBLEMS — MAN'S IMPACT ON THE ENVIRONMENT, at 140-1, (1971); NAS, REPORT ON A WORKSHOP ON INPUTS, FATES, AND EFFECTS OF PETROLEUM IN THE MARINE ENVIRONMENT, (to be published).

¹⁶Letter from Sun Oil Co. to author, June 6, 1973.

¹⁷Sun Oil Co., ANALYSIS OF THE WORLD TANK SHIP FLEET 1971, at 16, (1972).

¹⁸Sun Oil Co., *supra*, n. 16.

¹⁹Gold E., *Pollution of the Sea and International Law* 3 J. MAR. L. COMM. 40, (1970).

²⁰Sun Oil Co., *supra* n. 16.

²¹Gold, *supra* n. 19, at 16.

²²See, Baldwin, *Public Policy on Oil: An Ecological Perspective*, 1 ECOLOGY L.Q. 270, (1971). For a good account of the effect of oil pollution on birds, see, U.S. Dept. of State, ENVIRONMENTAL IMPACT STATEMENT — INTERNATIONAL CONVENTIONS AND IMPLEMENTING LEGISLATION ON LIABILITY AND COMPENSATION FOR OIL POLLUTION DAMAGE, Attch. 5, 198-205, 239-44, (1972).

²³1. Lauterpacht's Oppenheim, INT'L LAW, 343, (8th Ed. 1955).

²⁴Trail Smelter Case, 35 AMER. J. INT'L L. 684, (1941).

²⁵Lac Lanoux Case, 53 AMER. J. INT'L L. 156, (1959).

²⁶See, 11 INT'L LEGAL MATERIALS 1420, (1972).

²⁷The Geneva Convention on the Territorial Sea and the Contiguous Zone, art. 1, § 14-7, (1952), 516 U.N.T.S. 205, TIAS No. 5639.

²⁸*Id.*

²⁹See, Pharand, *Oil Pollution Control in The Canadian Arctic*, 7 TEX. INT'L L.J. 50, (1971); Newman, *Oil on Troubled Waters: The International Control of Marine Pollution*, 2 J. MAR. L. AND COM. 356-7, (1971).

³⁰A number of countries including the U.S. regulate the activities of foreign ships in their contiguous zones for environmental purposes. In support of the proposition of extending special purposes jurisdiction into the contiguous zone, see, McDougal and Burke, THE PUBLIC LAW OF THE OCEANS, at 611-12 (1962); for the contrary view, see, Fitzmaurice, *The Law and Procedure of the Int'l Court of Justice*; 1951-54, 1 BRIT. Y.B. INT'L L. 378-9 (1954).

³¹See, Singh, INTERNATIONAL CONVENTIONS OF MERCHANT SHIPPING at 1158-87, (1963), for the text of the Convention.

³²Dept. of State, TREATIES IN FORCE at 346, (Jan., 1973).

³³Ships include tankers. See, Singh, *supra* n. 31, art. 1(1).

³⁴Article I defines oil as crude oil, fuel oil, heavy diesel oil and lubrication oil, and an oily mixture means a mixture with an oily content of one hundred parts or more in one million parts of mixture, See, Singh, *supra* n. 31.

³⁵See, Singh, *supra* n. 31, at art. III.

³⁶Singh, *supra* n. 31, at 1167-9.

³⁷Article III does not apply to:

- (a) discharges made to secure the safety of a ship, to prevent damage to ship or cargo, or to save life at sea;
- (b) escapes resulting from damage to a ship or unavoidable leakage, if all reasonable precautions have been taken after the occurrence of the damage or discovery of the leakage for the purpose of preventing or minimizing the escape;
- (c) the discharge of residue arising from the purification or clarification of fuel oil or lubricating oil, provided that such discharge is made as far from land as is practicable.

See Singh, *supra* n. 31.

³⁸See, Singh, *supra* n. 31, at art IX.

³⁹See, BROWN, *THE LEGAL REGIME OF HYDROSPACE*, at 136-9, (1971). Oily mixtures now means a mixture with any oil content.

⁴⁰For text of the 1971 Amendments, see, *Message from the President of the U.S. Transmitting the International Convention on the Establishment of an International Fund for Compensation for Oil Pollution Damage . . .* Exec. K., 92nd Cong., 2nd Sess., at 21-28, (1972).

⁴¹The text of the International Convention Relating to Intervention on the High Seas in Cases of Oil Pollution Casualties, 1969, is reprinted in 9 INT'L LEGAL MATERIALS 25, (1970).

⁴²*Id.* Article II(1).

⁴³*Id.* Article II(4).

⁴⁴*Id.* Article I(1).

⁴⁵*Id.* Article V(1).

⁴⁶See, BROWN, *supra* note 39, at 154.

⁴⁷INT'L LEGAL MATERIALS, *supra* n. 41, at art. vi.

⁴⁸The text of the International Convention on Civil Liability for Oil Pollution Damages, 1969, may be found in 9 INT'L LEGAL MATERIALS 45, (1970).

⁴⁹*Id.* Article I(6). Note that pollution damage must be incurred within the territory or the territorial sea of a contracting state and the preventive measures undertaken must be for preventing or minimizing such damage (Article II). It has been suggested that preventive measures may be taken outside the territorial sea to prevent or minimize threatened damage inside the territorial sea. See, Swan, *International and National Approach to Oil Pollution Responsibility: An Emerging Regime for A Global Problem*, 50 ORE. L. REV. 525, (1971); BROWN, *supra* n.39, at 170-71.

⁵⁰*Id.* Article III(1). Article III(2) and (3) exonerates the shipowner from liability in the following circumstances:

- (a) Where he proves that the damage resulted from an act of war, hostilities, civil war, insurrection or a natural phenomenon of an excep-

tional, inevitable and irresistible character;

(b) Where he proves that the damage was wholly caused by an intentional act or omission of a third party;

(c) Where he proves that the damage was wholly caused by the negligence or other wrongful act of any government or other authority responsible for the maintenance of lights or other navigational aids in the exercise of that function;

(d) Where he proves that damage resulted wholly or partly from the contributory negligence of the person injured or damaged.

⁵¹The dollar value equivalent relates to the 1970 dollar.

⁵²INT'L LEGAL MATERIALS, *supra* n. 48, at art. V(1)(10).

⁵³INT'L LEGAL MATERIALS, *supra* n. 48, at art. V(3).

⁵⁴The fund must be accessible to the claimants.

⁵⁵INT'L LEGAL MATERIALS, *supra*, n. 48 at art. VI(1)(a).

⁵⁶INT'L LEGAL MATERIALS, *supra*, n. 48, at art. VII(1).

⁵⁷The text of the Convention can be found at 66 AM. J. INT'L L. 712-33 (1972).

⁵⁸*See*, Tanker Owners Voluntary Agreement Concerning Liability for Oil Pollution (TOVALOP), 8 INT'L LEGAL MATERIALS 497-501 (1969). In force since 1969, TOVALOP is a voluntary mutual insurance syndicate of tanker owners for compensating oil pollution damage from tankers. Only governments and not individuals may claim against the tanker owner for the costs reasonably incurred to prevent or mitigate physical contamination damage to the coast line through negligence of the tanker (Article IV(a)), and it does not cover damage from fire or explosion, consequential or ecological damage (Article I(h)). Liability is limited to \$100 per gross ton or \$10 million whichever is the lesser (Article VI(a)). Another international voluntary agreement called "Contract Regarding an Interim Supplement to Tanker Liability for Oil Pollution" (CRISTAL) was executed by major oil companies on January 14, 1971 (*see*, 10 INT'L LEGAL MATERIALS, 137-44 (1971)). Similar to TOVALOP, it provides compensation for damage from oil pollution with a maximum limit of \$30 million. However, it can be less than 30 million dollars as the amount payable under TOVALOP to a government is deductible from the total claim. On CRISTAL *see* Gold, *supra* n.19, at 30-31; Becker, *Vehicles for Reimbursement of Oil Pollution Damage*, 9 HOUSTON L. REV. 669, (1972).

⁵⁹The Fund incurs no liability if:

(1) It proves that the damage resulted from an act of war, hostilities, civil war or insurrection or was caused by a warship or other government owned or operated ship on government non-commercial service (Article 4(2)(a));

2. The claimant is unable to prove that damage was caused by an incident involving one or more ships (Article 4(2)(b)). In addition, if the damage was caused wholly or partly by the willful act or omission by the injured party or caused by his negligence, the Fund's liability reduces by the degree of such contributory negligence (Article 4(3)).

⁶⁰AMER. J. INT'L L., *supra*, n. 57, at art. 2(1)(2).

⁶¹AMER. J. INT'L L., *supra*, n. 57, at art. 4(1).

⁶²The dollar equivalent relates to the 1970 dollar.

⁶³AMER. J. INT'L L., *supra*, n. 57, at art. 5(1).

⁶⁴AMER. J. INT'L L., *supra*, n. 57, at art. 13(2).

⁶⁵The 1958 Geneva Convention on the High Seas, 450 U.N.T.S. 82, TIAS No. 5200.

⁶⁶*Id.* at art. 24.

⁶⁷The 1958 Geneva Convention on the Continental Shelf, 499 U.N.T.S. 311, TIAS No. 1 5578.

⁶⁸*Id.* at art. 5(7).

⁶⁹*Id.* Article 1 defines the continental shelf as referring "to the seabed and subsoil of the submarine areas adjacent to the coast but outside the area of the territorial sea, to a depth of 200 meters, or, *beyond that limited to where the depth of the superjacent waters admits of the exploitation of the natural resources of the said areas.*" (emphasis added). This exploitability criterion defines the present boundary of the continental shelf, and thus permits expansion of national jurisdiction on the ocean floor beyond the 200 meter depth contour of the first part of the definition.

⁷⁰Subcommittee on National Security Policy and Scientific Developments of the House Comm. on Foreign Affairs, *EXPLOITING THE RESOURCES OF THE SEABED*, at 35-40, (July, 1971).

⁷¹Staff of Sen. Comm. on Interior and Insular Affairs, *THE LAW OF THE SEA CRISIS*, at 114 et seq., 92d Cong., 1st Sess., (Comm. Print, Dec. 1971).

⁷²Draft United Nations Convention on the International Sea Bed Area, 9 INT'L LEGAL MATERIALS 1046 (1970).

⁷³*Id.* at art. 23(a). Also *see*, arts. 9, 11, 27, 40, 68.

⁷⁴*See*, TOVALOP, *supra*, n. 58.

⁷⁵Arctic Waters Pollution Prevention Act (AWPPA), 18-19 Eliz. 2 (1970). For a detailed analysis of the Act, *see* Bilder, *The Canadian Arctic Waters Pollution Prevention Act: New Stresses on the Law of the Sea*, 69 MICH. L. REV. 1.

⁷⁶The Soviet Union has traditionally exercised sovereign rights over parts of the Soviet Arctic. The Soviets supported Canada's

unilateral assertion of Arctic jurisdiction and signed an agreement with Canada on October 20, 1971, to "encourage and facilitate scientific, technological and administrative contacts and exchanges in fields related to the control of pollution and management of the environment." *See*, Dehner, 13 *MAR. INT'L L.J.* 285-6 (1972).

⁷⁷AWPPA, 18-19 Eliz. 2 (1970), at the preamble.

⁷⁸AWPPA, 18-19 Eliz. 2, § 3, (1970). The 100 mile pollution zone applies only to shipping. As regards resources of the Continental Shelf, Canada's claims exceed 100 miles. *See*, Pharand, *supra* n. 29, at 57.

⁷⁹AWPPA, 18-19, Eliz. 2, § 2(h), (1970).

⁸⁰AWPPA, 18-19, Eliz. 2, § 2(2), 6(1)(a), (1970).

⁸¹AWPPA, 18-19, Eliz. 2, § 2(f), (1970).

⁸²AWPPA, 18-19, Eliz. 2, § 6(1), (1970).

⁸³AWPPA, 18-19, Eliz. 2 § 7(1), (1970).

⁸⁴AWPPA, 18-19, Eliz. 2 § 7(3), (1970).

⁸⁵AWPPA, 18-19, Eliz. 2 § 8(1)(d), (1970).

⁸⁶AWPPA, 18-19, Eliz. 2 § 11, (1970).

⁸⁷AWPPA, 18-19, Eliz. 2 § 12 (1), (1970).

Section 12(2) of the Act exempts state owned or operated ships if they comply with substantially similar standards. This provision essentially exempts all such ships—regardless of compliance—under the principle of sovereign immunity. *See*, Pharand, *supra* n. 29, at 59.

⁸⁸AWPPA, 18-19, Eliz. 2, § 23 (1), (1970). Section 24 allows the ship or cargo to be forfeited upon conviction.

⁸⁹AWPPA, 18-19, Eliz. 2, § 15 (3), (1970). Such an action might subject the Canadian government to liability on the basis of a temporary taking. *See*, Swan, *supra*, n. 49, at 567.

⁹⁰If the ship is removed, it may be sold to cover the cost of doing so.

⁹¹AWPPA, 18-19, Eliz. 2, § 19 (2)(1970).

⁹²AWPPA, 18-19 Eliz. 2, § 24(1), (4), (1970). There is a general awareness among nations of the need for stronger and stricter enforcement provisions in oil pollution conventions. For instance, the approach of the IMCO Draft Text of an International Convention for the Prevention of Pollution from Ships, 1973, is moving toward bestowing greater power on coastal states for enforcing provisions of the Convention.

⁹³Pharand, *supra* n. 29, at 67, quotes the Canadian note to the U.S. which states, "the proposed anti pollution legislation is based on the overriding right of self defense of coastal states to protect

themselves against grave threats to their environment." See also, Beesley, *Rights and Responsibilities of Arctic Coastal States: The Canadian View*, 3 J. MAR. L. & COMM. 8 (1971/72).

⁹⁴See, e.g., Kuntz, *Individual and Collective Self Defense in Article 51 of the Charter of the United Nations*, 41 AM. J. INT'L L. 872-873 (1947); Kelsen, *THE LAW OF THE UNITED NATIONS*, at 791-800, (1950); Brownlie, *INTERNATIONAL LAW AND THE USE OF FORCE BY STATES*, at 273, 278 (1963).

⁹⁵Mallison, *Limited Naval Blockade or Quarantine-Interdiction: National and Collective Defense Claims Valid under International Law*, 31 GEO. WASH. L. REV. 344-364 (1962).

⁹⁶Schwarzenberger, *The Fundamental Principles of International Law*, 87 RECUEIL DES COURS 332-335; (Hague Academy of International Law 1955); Mallison, *supra* n. 95, at 355-6. The classic formulation of circumstances permitting resort to self-defense is by the American Secretary of State, Daniel Webster, in the Caroline Incident (1837). In his words, for the exercise of the right the state must show "a necessity of . . . self-defense . . . instant, overwhelming and leaving no choice of means, and no moment for deliberation," and the action taken must not be "unreasonable or excessive, since the act justified by the necessity or self-defense must be limited by that necessity and kept clearly within it," On the Caroline Incident, see Moore, *A DIGEST OF INTERNATIONAL LAW*, at 409-414, (1906). Webster's formulation appears at 412. The policy need for construing self-defense narrowly is in eliminating an open ended definition which might be employed as a cloak for aggression.

⁹⁷Green, *International Law and Canada's Anti Pollution Legislation*, 50 OREGON L. REV. 478-84 (1971).

⁹⁸E.g., Bowett, *SELF DEFENSE IN INTERNATIONAL LAW*, at 111 (1958). As Professor Bowett argues "the essence of self defense is a wrong done, a breach of a legal duty owed to the State acting in self defense. The breach of duty violates a substantive right, e.g., the right of territorial integrity, and gives rise to the right of self defense." *Id.* at 9.

⁹⁹*Id.* at 106. The principle is also embodied in article 15 of the Charter of the Organization of American States (1948) which prohibits foreign intervention of not only armed forces "but also any other form of interference or attempted threat against the personality of the state or against its political, economic and cultural elements." The text of the Charter may be found at 119 U.N.T.S. 3, TIAS 2361. See also, Bowett, *Economic Coercion and Reprisals by States*, 13 VIRGINIA J. INT'L L. 1-12 (1972).

¹⁰⁰See, e.g., Brownlie, *PRINCIPLES OF PUBLIC INTERNATIONAL LAW*, at 293-5 (1973).

¹⁰¹See Report of the Attorney Generals National Committee to Study the Antitrust Laws, entitled *Trade or Commerce with Foreign Nations* (1955), reproduced in 2 Metzger, *LAW OF INTERNATIONAL TRADE*, at 1399-1400, (1966). See generally 1396-1406. See also Brownlie, *supra* n. 100, at 303-6.

¹⁰²The Truman Proclamation is reproduced in Friedmann, W., *THE FUTURE OF THE OCEANS*, at 6-7, (1971).

¹⁰³U.S. Executive Order No. 10197, 15 Fed. Reg. 9180 (1950) directing the Secretary of Commerce to exercise security control over aircraft in flight.

¹⁰⁴See Head, *ADIX—International Law and Contiguous Air Space*, 3 ALBERTA L. REV. 192 (1964).

¹⁰⁵See, McDougal and Burke, *THE PUBLIC ORDER OF THE OCEANS*, at 579-80, (1962); Bowett, *THE LAW OF THE SEA*, at 49-50, (1967).

¹⁰⁶See, Green, *supra* n. 97, at 472-6; Pharand, *supra* n. 29, at 45.

¹⁰⁷Green, *supra*, n. 97, at 475.

¹⁰⁸*Id.* at 476.

¹⁰⁹*Id.* at 491; Sutton, *Pollution Prevention in the Arctic-National and Multinational Approaches Compared*, 5 OTTAWA L. REV. 63 (1971).

¹¹⁰Green, *supra* n. 97, at 500.

¹¹¹E.g., Swan, *supra* n. 49, at 488-89.

¹¹²See, *Sen. Hearings on S. 1591 and S. 1604 Before the SubComm. on Air and Water Pollution of the Sen. Comm. on Public Works*, at 11-2, 21-2, 222-3, 90th Cong., 1st Sess., (1967).

¹¹³Gold, *supra* n. 19, at 42.

¹¹⁴*Id.* at 41-2.

¹¹⁵*Id.* at 550.

¹¹⁶See, e.g., Bryson, *Tanker Collisions, Spills and Marine Traffic Regulations*, 2 ENVIRONMENTAL LAW (to be published); Lettow, *COURSE OF STUDY, FEDERAL ENVIRONMENTAL LAW*, at 270-8, (Feb. 8-10, 1973).

¹¹⁷Nanda, *supra* n. 5, at 422.

¹¹⁸Kirby, *The Clean Seas Code in Oil Pollution of the Sea*, *PROCEEDINGS OF INTERNATIONAL CONFERENCE*, at 70, (Rome, Oct. 7-9, 1968).

¹¹⁹See, *Oil Pollution of the Sea*, 10 HAR. INT'L L.J. 381-2, (1970); *PROCEEDINGS*, *supra* n. 118, at 185

¹²⁰*PROCEEDINGS*, *supra* n. 118, at 186.

¹²¹See, Newman and Macbeath, *The Use of Booms as Barriers to*

Oil Pollution in Tidal Estuaries and Sheltered Waters, in Hepple, ed., *WATER POLLUTION BY OIL*, at 225-34, (1970), (Proceedings of Institute of Water Pollution Control and Institute of Petroleum Semi-nar, May 4-8, 1970); American Petroleum Institute (API), *PROCEEDINGS OF JOINT CONFERENCE ON PREVENTION AND CONTROL OF OIL SPILLS*, at 309-426, (June 15-17, 1971).

¹²²Schachter and Serwer, *supra* n. 2, at 91, report that the Soviet Union has a ship designed to skim 7 tons of oil per hour from the surface of the sea. Even this rate is slow in context of large spills, such as the *Torrey Canyon* which was 30,000 tons.

¹²³API *PROCEEDINGS*, *supra* n. 121, at 221-33; *ENVIR. SCI. AND TECH.*, 7:433-8, 439-43, (1973).

¹²⁴API *PROCEEDINGS*, *supra* n. 121, at 263-70; on the toxicity of dispersants, *see*, *WATER POLLUTION BY OIL*, *supra* n. 121, at 263-72; Ruivo, *supra* n. 14, at 318-22.

¹²⁵E.g., Ruivo, *supra* n. 14, at 481-5.

¹²⁶*See*, *OIL ON THE SEA*, *supra* n. 6, at 83-91; API *PROCEEDINGS*, *supra* n. 121 at 245-51.

¹²⁷*OIL ON THE SEA*, *supra* n. 6, at 11; API *PROCEEDINGS*, *supra* n. 121, at 232-44.

¹²⁸*PROCEEDINGS OF INT'L CONFERENCE*, *supra* n. 118, at 155.

¹²⁹*Id.* at 241.

¹³⁰*See*, *supra* n. 124; Schachter and Serwer, *supra* n. 2, at 91; *Hearings on H.R. 15906 and Related Bills Before the House Comm. on Public Works*, at 305, 90th Cong., 2nd Sess., (1968).

¹³¹Cowan, *OIL AND WATER: THE TORREY CANYON DISASTER*, at 107, (1968).

¹³²*OIL POLLUTION OF THE SEA*, *supra* n. 119, at 388.

¹³³On satellite technology and oil spills, *see*, Brooks, *Technological and Legal Aspects of Environmental Monitoring*, 1 *J. SPACE L.* 12-3, 24-5 (1973).