Abstract: With the advancement of science and technology, the use of nuclear energy has become a necessity in recent years due to extreme energy shortages. As such, some States favor using spent nuclear fuel from nuclear reactors as a form of energy. This has increasingly led to the international trade of nuclear materials, mainly spent nuclear fuel. Most commonly, this trade takes place via clandestine sea transportation. Because of the clandestine nature of this transportation, issues arise as conflicts between traditional navigational freedom laws and the protection of the marine environment and human safety, the applicability of precautionary principle, requirements of prior notice, and assumption of liability of States. In particular, Japan is one of the major States transporting nuclear materials by sea. Despite the clandestine shipping lanes, such Japanese transportation undoubtedly navigates through the South China Sea and Taiwan Straits. Therefore, China must be aware of issues regarding clandestine transportation of nuclear materials by considering theories of international law and the potential threats that it faces. In doing so, China should seek cooperative solutions to safeguard itself against the dangers posed by those States transporting nuclear materials.

Key Words: Clandestine transportation of nuclear materials; Freedom of navigation; Marine environment

Nuclear materials are the substance of considerable destruction. Exposure to radiation can lead to death, cancer, genetic variations and other consequences to humans. Accordingly, the international community has strict control over highly-
radioactive nuclear materials. However, due to global energy shortages, some States now favor nuclear energy. Advancements in science and technology have given rise to its more prevalent use as an alternative form of energy. As such, exporting processed nuclear materials has significantly increased. Transporting nuclear materials via sea has the potential to create great threats to coastal States, with some of these States opposing sea transportation. This has led to sharp conflicts of interests between coastal States and transporting States.

Transporting nuclear materials by sea involves the following legal disputes: disputes between freedom of navigation and the marine environmental protection, application of precautionary principle, and the necessity of prior notification, among other concerns.

I. Dispute between Freedom of Navigation and the Marine Environment and Human Safety

The traditional navigational freedoms when transporting nuclear materials are constrained by requirements to protect both human safety and the marine environment. Severe disputes can occur between the States that transport nuclear materials and coastal States. These disputes arise where States transporting nuclear materials argue that, based on the principles of navigational freedom, ships carrying nuclear substances are not required to give prior notice to coastal States just as prior notice is not required of other materials. Coastal States argue that safeguarding life and protecting the marine environment, traditional navigational freedoms shall not be applicable to ships transporting nuclear materials and thus, these States require prior notification and the application of precautionary principle. Examining international law regimes can help guide in balancing the interests of these States.

A. Regimes under International law in Relation to Freedom of Navigation

The United Nations Convention on the Law of the Sea (UNCLOS), the Geneva Conventions, and international customary law, all have legal regimes that regulate transporting highly-radioactive spent-nuclear fuel by sea. Currently, most States apply the provisions of the UNCLOS, so it is necessary to analyze the regimes under the UNCLOS and the Geneva Conventions in relation to freedom of navigation.
1. Regime of Passage in the Territorial Sea – Innocent Passage

Ships of all States, whether coastal or landlocked, enjoy the right of innocent passage through territorial seas, according to the Convention on the Territorial Sea and the Contiguous Zone and the UNCLOS. Although this right includes passage through territorial seas, it is not limited to passage. The right also includes stopping and anchoring. However, stopping and anchoring must be incidental to ordinary navigation, rendered necessary by force majeure or distress, or for rendering assistance to persons, ships or aircraft in danger or distress. UNCLOS provides that coastal States shall not hamper the innocent passage of foreign ships through the territorial sea except in accordance with the UNCLOS. However, the UNCLOS also vests appropriate right of protection to the coastal State, meaning that the coastal State can take necessary steps in its territorial sea to prevent non-innocent passage.

The UNCLOS takes an objectivity-based point of view in terms of verification standard of the right of innocent passage. This standard bases the right of innocent passage on actual actions rather than subjective purposes. UNCLOS says that passage is innocent so long as it is not prejudicial to the peace, good order or security of the coastal State. Such passage shall take place in conformity with the UNCLOS as well as with other rules of international law. Accordingly, the coastal State has the right to take necessary actions in its territorial sea to prevent any non-innocent passage. With prior notice, the coastal State may, without discrimination in form or in fact among foreign ships, suspend temporarily in specified areas of its territorial sea the innocent passage of foreign ships if such suspension is essential for the protection of its security, including weapons exercises. Furthermore, passage of a foreign ship that is prejudicial to the peace, good order or security of the coastal State shall not be considered innocent passage. Of course, the coastal State has the right to judge the passage of the ship to which a potential incident

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1 UNCLOS, Art. 17.
2 UNCLOS, Art. 18(2).
3 UNCLOS, Art. 24.
4 UNCLOS, Art. 25(1).
5 As declared by the 1930 Hague Conference, “Passage is not innocent when a vessel makes use of the territorial sea of a coastal State for the purpose of doing any act prejudicial to the security, to the public policy or to the fiscal interests of that State.” League of Nations Doc. C. 351 (b). M. 145(b), 1930, p.217.
6 UNCLOS, Art. 25(1).
7 UNCLOS, Art. 25(3).
may occur and which creates a catastrophic disaster to the coastal State.

The sovereignty of the coastal State extends to its territorial sea area and it can enact laws and regulations that are applicable in such areas. It can do so in order to prevent, reduce, or control ship-induced pollution from foreign ships, including those entitled to innocent passage, so long as the laws and regulations do not violate the regime of innocent passage as provided for in Chapter Three, Part II, of the UNCLOS.

2. Passage Regime Applicable to Straits Used for International Navigation – Transit Passage

UNCLOS set forth provisions respecting the straits used for international navigation. These provisions have granted passing ships more freedoms that largely cancel conditional requirements set forth for innocent passage. With certain exceptions, this Convention stipulates that the regime of transit passage is applicable to the straits used for international navigation between one part of the high seas or an exclusive economic zone and another part of the high seas or an exclusive economic zone. The UNCLOS does not allow coastal States to interrupt a ship during transit passage. In addition, it does not set forth “innocence” as a general requirement of transit passage. However, the UNCLOS does put the following limitations on the regime of transit passage:

Transit passage must be the exercise of the freedom of navigation and over-flight solely for the purpose of continuous and expeditious transit. This requirement of continuous and expeditious transit does not preclude passage through the strait for the purpose of entering, leaving or returning from a State bordering the strait, subject to the conditions of entry to that State.

Ships in transit passage shall (1) comply with generally accepted international regulations, procedures and practices for safety at sea, including the International Regulations for Preventing Collisions at Sea; and (2) comply with generally accepted international regulations, procedures and practices for the prevention, reduction and control of pollution from ships. Further, ships and aircraft, while exercising the right of transit passage, shall (1) proceed without delay through or over the strait; (2) refrain from any threat or use of force against the sovereignty, territorial integrity or political independence of States bordering the strait, or in

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8 UNCLOS, Art. 37.
9 UNCLOS, Art. 38(2).
10 UNCOLOS, Art. 39(2).
any other manner in violation of the principles of international law embodied in 
the Charter of the United Nations; and (3) refrain from any activities other than 
those incident to their normal modes of continuous and expeditious transit unless 
rendered necessary by force majeure or by distress.\textsuperscript{11} As part of transit passage, 
it is also required that foreign ships, including marine scientific research and 
hydrographic survey ships, may not carry out any research or survey activities 
without the prior authorization of the States bordering straits.\textsuperscript{12}

When activities irrelevant to the exercise of the right of transit passage are 
carried out, the ship in transit passage shall comply with other applicable provisions 
of the UNCLOS.\textsuperscript{13} Such activity shall be subject to the regime of innocent passage 
that are applicable to the territorial sea, meaning that if the passage is not innocent, 
the coastal State has the right to interrupt passage. If the passage does not comply 
with the requirement of continuous and expeditious passage as set forth in 
Paragraph 2, Article 38 of the UNCLOS, the regime of transit passage will not be 
applicable.\textsuperscript{14}

The UNCLOS stipulates the laws and regulations respecting transit passage 
of the States bordering straits can adopt laws and regulations with respect to transit 
passage through straits in relation to all or any of the following items so long as 
such laws and regulations do not discriminate in form or substance among foreign 
ships, or in their application have the practical effect of denying, hampering or 
impairing the right of transit passage as defined in this chapter. Besides, they shall 
make applicable international law in relation to discharge of oil, oil pollution waste 
and other hazardous substances in straits effective in order to prevent, reduce and 
control pollution.\textsuperscript{15}

States bordering straits can take appropriate actions against ships that have 
cause severe damage or pose threat of causing severe damage to the marine 
environment of straits in violation of the laws and regulations as specified in 
Items (a) and (b), Paragraph 1, Article 42 of the UNCLOS except those entitled to 
sovereign immunity.\textsuperscript{16}

If a foreign ship other than those entitled to sovereign immunity has committed

\textsuperscript{11} UNCLOS, Art. 39(1).
\textsuperscript{12} UNCLOS, Art. 40.
\textsuperscript{13} UNCLOS, Art. 38(3).
\textsuperscript{14} Duncan E. J. Currie, The Right to Control Passage of Nuclear Transport Vessels under 
\textsuperscript{15} UNCLOS, Art. 42(2).
\textsuperscript{16} UNCLOS, Art. 233.
a violation of the laws and regulations referred to in Paragraphs 1(a) and (b), Article 42, the UNCLOS, causing or threatening major damage to the marine environment of the straits, the States bordering the straits may take appropriate enforcement measures.

Overall, although the UNCLOS makes looser provisions than those in respect of the right of innocent passage for straits used for international navigation, it emphasizes the safety rules to be abided by while passing through the straits used for such navigation, in particular, the rules aiming to prevent any pollution at sea.

3. Regime of Archipelagic Sea Lanes Passage

The UNCLOS has set forth special international law regimes for archipelagic States or States constituted by interrelated islands. In pursuance of the provisions of Article 47 of the UNCLOS, an archipelagic State may draw straight archipelagic baselines joining the outermost points of the outermost islands and drying reefs of the archipelago. The waters enclosed by the archipelagic baselines are called archipelagic waters, of which the archipelagic State enjoys sovereignty.\footnote{UNCLOS, Art. 49.} Based on the special provisions of the UNCLOS, archipelagic sea lanes passage is applicable to these waters. An important difference between this right and the right of innocent passage is that ships are only entitled to innocent passage within the scope of sea lanes as designated by an archipelagic State. If an archipelagic State does not designate sea lanes, ships can exercise the right of archipelagic sea lanes passage through the lanes used for international navigation under normal conditions.\footnote{UNCLOS, Art. 53.}

4. Regime of Passage in Exclusive Economic Zone

An exclusive economic zone refers to the waters that do not extend beyond 200 nautical miles from the baselines from which the breadth of the territorial sea is measured. According to the provisions of the UNCLOS, a coastal State has sovereign rights of protecting and preserving the marine environment in this area.\footnote{UNCLOS, Art. 56(2)(c).} Article 58 of the UNCLOS prescribes that in the exclusive economic zone, all States, whether coastal or landlocked, enjoy, subject to the relevant provisions of this Convention, the freedoms of navigation and over-flight referred to in Article 87. The UNCLOS also provides that in exercising its rights and performing its duties under this Convention in the exclusive economic zone, the coastal State shall have due regard to the rights and duties of other States and shall act in a manner...
compatible with the provisions of this Convention. Furthermore, Articles 88 to 115 and other pertinent rules of international law apply to the exclusive economic zone as far as they are not incompatible with this Part. Pertinent provisions in respect to the freedom of navigation on the high seas are applicable to the navigational right of ships in the exclusive economic zone. However, the author argues that this does not mean that the ship carrying nuclear materials enjoys total freedom of navigation because, among other things, the UNCLOS sets forth provisions for the protection and preservation of the marine environment, and the conservation and management of living resources. The transportation of highly radioactive materials by sea can undoubtedly impose destructive influences on the marine environment and its living resources because of leakage due to accidents. Therefore, in the exclusive economic zone, ships carrying nuclear materials need to comply with pertinent rules, especially the constraint under the precautionary principle.

The UNCLOS provides for certain limitations, as well. In particular, it requires that ships granted navigational freedom rights respect the interests of coastal States to protect the marine environment and human safety. The Preamble of the UNCLOS stipulates that, “recognizing the desirability of establishing through this Convention, with due regard for the sovereignty of all States, a legal order for the seas and oceans which will facilitate international communication, and will promote the peaceful uses of the seas and oceans, the equitable and efficient utilization of their resources, the conservation of their living resources, and the study, protection and preservation of the marine environment.” From this perspective, efficient communication as well as preservation and protection of marine environment are important purposes of the UNCLOS. Thus, the extent of navigational freedom allocated to which ships carrying nuclear materials are entitled is an important issue that deserves further discussion.

**B. International Law Respecting the Protection of the Marine Environment and Human Safety**

Presently, the protection and preservation of the marine environment are important contents of jurisdiction of coastal States. According to Article 194 of the UNCLOS: 1. States are obliged to protect and preserve the marine environment

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20 UNCLOS, Art. 56(2).
and shall take, individually or jointly as appropriate, all measures consistent with this Convention that are necessary to prevent, reduce and control pollution of the marine environment from any source, using for this purpose the best practicable means at their disposal and in accordance with their capabilities, and they shall endeavor to harmonize their policies in this connection; 2. States shall take all measures necessary to ensure that activities under their jurisdiction or control are so conducted as not to cause damage by pollution to other States and their environment, and that pollution arising from incidents or activities under their jurisdiction or control does not spread beyond the areas where they exercise sovereign rights in accordance with this Convention; and 3. The measures taken pursuant to this Part shall deal with all sources of pollution of the marine environment. These measures shall include, inter alia, those designed to minimize pollution to the fullest possible extent, including (b) pollution from vessels, in particular measures for preventing accidents and dealing with emergencies, ensuring the safety of operations at sea, preventing intentional and unintentional discharges, and regulating the design, construction, equipment, operation and manning of vessels. The Convention also stipulates that in taking measures to prevent, reduce or control pollution of the marine environment, States shall refrain from unjustifiable interference with activities carried out by other States in the exercise of their rights and in pursuance of their duties in conformity with this Convention.\(^{21}\) Thus, the UNCLOS is balancing the protection of the marine environment and the protection of freedom of activities at sea to safeguard the smooth performance of activities at sea with the precondition of not allowing the destruction of the marine environment.

Additionally, as prescribed in Paragraph 7, Article 220 of the UNCLOS, notwithstanding the provisions of Paragraph 6, whenever appropriate procedures have been established, either through the competent international organization or as otherwise agreed, whereby compliance with requirements for bonding or other appropriate financial security has been assured, the coastal State if bound by such procedures shall allow the vessel to proceed. Pursuant to international law, both customary and conventional, States have the right to take and enforce measures beyond their territorial sea that are proportionate to the actual or threatened damage to protect their coastline or related interests, including fishing, from pollution or threat of pollution following a maritime casualty or acts relating to such a casualty

\(^{21}\) UNCLOS, Art. 194.
that may reasonably result in major harmful consequences.

The provision discussed above are those pertinent under the UNCLOS in order to protect the marine environment. They constitute the counter-restriction of the right of freedom of navigation of the ships carrying nuclear materials.

Human safety is another issue of international law that is contradictory to the freedom of navigation. Relative to the freedom of navigation for ships, interests respecting human safety are more important. Where the transportation of nuclear materials imposes or potentially imposes critical safety interests of any State, such State has the right to discontinue the act of transporting nuclear materials. States have the right to discontinue the transportation of nuclear materials without prior notice, because such an act is either prejudicial to the peace, good order or national security of the coastal State or in violation of pertinent laws and regulations of the international community. The UNCLOS lists the acts that are prejudicial to the peace, good order or national security of the coastal State. Without a doubt, any act listed under Article 19 in the territorial sea of a coastal State are prejudicial to the peace, good order or national security of the coastal State, but this Article does not include all of the harmful acts. Hence, any activity beyond the acts of Article 19 are also prejudicial to the peace, good order or tranquility of the coastal State if it causes catastrophic damage to the environment of the coastal State. The Canadian Arctic Waters Pollution Prevention Act that Canada enacted in 1970 has similar provisions. The Canadian Government considers preventing environmental damage as one of the most important self-defense mechanisms. Primary considerations under traditional principles of international law were given to navigational freedoms of the flag-State ships. But it is these same flag States in the international community, that at present, are transporting highly radioactive spent nuclear fuel accompanied by numerous hazards, which will inevitably pose considerable threats to the peace, tranquility and good order of the coastal State when a maritime casualty occurs. Apparently, in this case, it is not appropriate to invoke

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22 UNCLOS, Art. 25(3).
23 UNCLOS, Art. 19.
24 See 9 ILM 607, 610. The Canadian reply to a United States protest also further stated that “Such concepts are particularly relevant, however, to an area having the unique characteristics of the Arctic, where there is an intimate relationship between the sea, the ice and the land, and where the permanent defilement of the environment could occur and result in the destruction of whole species.” It should be noted that this was over twenty years ago and subsequent to the Rio declaration and the entry into force of UNCLOS the rights and duties of coastal states to protect the environment have been further extended.
the old principles under international law because it cannot protect the interests in connection with the marine environment of the entire international community.

C. Result of Harmonization of This Issue by the International Community – Traffic Separation Schemes

The international community has made great efforts to harmonize the contradiction between the need to transport nuclear materials and the protection of the marine environment and human safety. As a compromise of these interests, UNCLOS created separate sea-lanes for transporting nuclear materials and the right of innocent passage.

The UNCLOS set out special provision in Article 22 because it foresaw the potential conflict between the right of innocent passage of ships transporting nuclear materials and the costal States’ need to protect the marine environment. These special provisions allow costal States to designate certain sea lanes for the passage of ships carrying nuclear substances to enjoy the right of innocent passage only in certain sea lanes. As stipulated in Article 22(2), in particular, tankers, nuclear-powered ships, ships carrying nuclear or other inherently dangerous or noxious substances or materials may be required by the coastal State to confine their passage to such sea lanes. A similar regime of sea lanes and traffic separation schemes are also set forth in the regimes for straits used for international navigation and archipelagic waters.

This separation of sea lanes aims to harmonize the relationship between freedom of navigation and the need to protect the marine environment by coastal States. It not only supports the proposition that ships carrying nuclear substances or materials enjoy the right of innocent passage, but also safeguards the sovereignty over territorial sea areas of coastal States and stands up for the need of protecting interests of the marine environment. Another balance between these interests is found in the provisions set forth by the International Code of Safe Carriage of Irradiated Nuclear Fuel, Plutonium and High-level Radioactive Wastes on Aboard Ships (hereinafter “INF Code”) as well as in the stipulations and safeguard measures of the International Atomic Energy Agency (IAEA) regarding cross-

25 UNCLOS, Arts. 22, 23.
26 The INF Code entered into force officially by being adopted by the International Convention for the Safety of Life at Sea (SOLAS) in 2001 and it mainly sets forth operational procedures and condition requirements in respect of transportation of nuclear materials.
International Law Issues Regarding Clandestine Transportation of Nuclear Materials by Sea

Although disastrous consequences can result from transporting nuclear materials, nuclear energy trade has become necessary due to global energy shortages. Because of this, it is unwise for coastal States and States transporting nuclear materials to stand on opposing ground. Transporting States should not request the entitlement to the right of navigational freedom, including the right of innocent passage, while at the same time, coastal States cannot refuse the passage of ships carrying nuclear substances. States requesting the right of innocent passage should recognize that transporting nuclear materials is anything but innocent. To the contrary, these transports pose the threat of nuclear material leakage that can have a fatal and irreversible threat to the surrounding environment. Insisting on the right of innocent passage in this manner is an irresponsible and irrational argument. By contrast, repeated hampering by coastal States to the passage of ships transporting nuclear materials will force these ships to use clandestine shipping lanes in order to avoid detection and monitoring by coastal States. Thus States transporting nuclear materials and coastal States should cooperate with each other frankly and sincerely, recognizing the necessity of regulation and promotion of the use of nuclear energy. Without any other alternative, the traffic separation scheme currently used is the most suitable solution to transporting nuclear materials by sea.

II. Application of the Precautionary Principle in Transporting Nuclear Materials by Sea

A. Background and Meaning of the Precautionary Principle

No simple and clear legal definition exists for the expression of “precautionary principle.” Some German scholars believe that the precautionary principle first appeared in national legislation of West Germany and Switzerland in the 1980s, when the so called “Vorsorgeprinzip” existed in the legal systems of these two States. 27 Because we lack scientific data on the exact sources of human pollution creating global destruction of the environment and ecosystems, “precautionary methods” with excessive carefulness are preferred for immediate pollution management rather than allowing unmitigated pollution. Such a basic stance is

called “precautionary principle.”

B. Significance of the Precautionary Principle

The precautionary principle is a policy orientation, requiring policy-makers to have foresight. To reduce environmental damage or the threat of such damage, this policy requires immediate implementation, even in the absence of scientific data that shows how serious the damage will be. Accordingly, international law does not allow an excuse of uncertainty to buy policy makers time in the implementation. Similarly, States, even in the face of this scientific uncertainty, should not delay in issuing injunctions against acts that potentially cause environmental damage. The Netherlands has drafted a discussion paper asserting the point of view that implementation of the precautionary principle has two focal points: (1) adopt preventive standards and norms, and (2) activate procedures that have a preventive effect. The later emphasizing on timeliness: implementation of the precautionary principle excludes the practice of waiting for definite scientific data before taking any action. Instead, it requires immediate action in case of any occurrence. Even if there is no certainty of environmental pollution, action should occur beforehand to ensure environmental protection.

In fact, the precautionary principle reverses the burden of proof, meaning that burden of proof is shifted to the actor (the polluter) when environmental damages are uncertain. It requires that the actor prove the acts do not cause environmental pollution. As such, this exempts the burden of proof by the States that could potentially suffer pollution damage. Through theoretical analysis, this is an impartial practice putting forth higher requirements on actors to protect the environment and mitigate potential environmental threats. After all, it is considerably difficult, unrealistic, and infeasible for States suffering damage caused by pollution to bear the burden of proof or estimate the damage to the marine environment caused by an act conducted by another State. Therefore, through the policy of the precautionary principle, States transporting hazardous materials will

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pay closer attention to the safety and prudence of their acts by bearing the burden of proof. Undoubtedly, this burden shifting is conducive to better environmental protections.

Following the provisions of the UNCLOS relating to the protection and maintenance of the marine environment, States shall be committed to, based on national policies, current situations, resources and other factors, striving to prevent, reducing and controlling the worsening of the marine environment. In following the provisions of UNCLOS, these States will be able maintain and improve production capacities. In a final analysis, it is necessary to endeavor to apply the precautionary principle to prevent marine environmental pollution and to prevent the deterioration of marine environments by reducing long-term, irreversible negative influences on the marine environment.  

Similarly, flag State of ships carrying nuclear materials should also adopt the precautionary principle to prevent potentially severe damage to the environment due to nuclear accidents. Flag States and the States transporting nuclear materials shall be responsible for the acts of their ships as coastal States are responsible for their territorial sea, contiguous zones and exclusive economic zones. This means that in accordance with the precautionary principle, the States transporting nuclear materials shall perform an assessment on the environmental influence and work out safe solutions that shall be submitted to the coastal State or relevant international organization in order to confirm compliance of such transportation with the requirements of environmental and safety standards.

### III. Application of the Obligation of Prior Notification

Another dispute of the interpretation of the right of innocent passage and the scope of its application stems from differing points of view on the obligation of prior notification of passage. Nuclear-capable States or the States transporting nuclear materials argue that the obligation of prior notification contradicts the freedom of navigation provided for by the UNCLOS. However, it is necessary to recognize that in practice, these States most often give prior notification when navigating through the waters of trusted States and political allies.  

31 Agenda 21, Chapter 17. 17. 22.
18, 1997, Japan declared that it would announce the shipping route of a ship carrying nuclear materials from France after it set sail in 1998. Similarly, the U.K. gave the Panama Canal Commission prior notification of its transportation activities to pass through the Panama Canal in 1998. However, smaller States throughout the Caribbean did not receive any prior notification. This shows how nuclear-capable States use double standards when it comes to prior notification by considering smaller and weaker States as “second-class members” of the international community. Clearly, such double standards go against the important principle of international law that States are all equal, whether small or large, making the double standard unfair and unacceptable.

A. Necessity of Prior Notification

Prior notification plays two roles: (1) when made to relevant States, transparency is improved by reducing rumors of nuclear material transportation by sea and avoiding disturbance in the international community, and (2) States are able to make effective preparations beforehand for potential maritime accidents resulting from cross-border transport of nuclear materials. Furthermore, pertinent international conventions, such as the Basel Convention, and relevant regulations of the IAEA, prescribe notification as an important obligation of the States transporting nuclear materials.

B. State Practice in Relation to Prior Notification

There are numerous past cases of ships transporting dangerous materials giving prior notification to costal States. Denmark, Norway and Sweden require foreign warships to make prior notification before entering their respective territorial seas. Since 1991, the Canadian Government has approved the United States’ application for passage of nuclear-powered submarines through Canada’s internal waters. Another important example is found in the draft of the Protocol on the Prevention of Pollution of the Mediterranean Sea by Trans-boundary Movements of Hazardous Wastes and Their Disposal, signed in Izmir, Turkey in October 1996. Article 6 of the Protocol requires ships in transit passage to obtain permission from the transit State prior to passage through its territorial sea. According to Paragraph 4, Article 6, the transit State will pay due attention to the act of transit passage of the ship in transit passage based on its prior application. Recent research shows States have
differing practices of prior notification of ships in transit passage. States requiring only prior notification are Canada, Djibouti, Pakistan, Portugal and the United Arab Emirates. States that require authorization before passage include Egypt, Guinea, Iran, Malaysia, Oman, Saudi Arabia, Turkey and the Republic of Yemen. States that do not permit the passage of such ships regardless of prior notification include Argentina, Haiti, Ivory Coast, Nigeria, the Philippines, and Venezuela.\(^3\)

It can be seen that a large number of State practices require ships transporting nuclear materials through territorial seas to give prior notification. If such practices, powerful enough to prevent ships carrying nuclear materials from entering their territorial sea or exclusive economic zones, continues into the future, their significance could considerably change and promote the establishment of a new international law for the obligation of prior notification. Additionally, once relevant lawsuits are filed, these State practices may be considered as evidence of international customary law that establishes the obligation of prior notification by a relevant court or the arbitration court. Furthermore, interpreting the relevant UNCLOS provisions, these State practices may also be considered and recognized by a relevant court or the arbitration court. This is so because, in accordance with the provision of Article 31 of the Vienna Convention on the Law of Treaties, 1969, any subsequent practice in the application of the treaty which establishes the agreement of the parties regarding its interpretation shall be considered an important factor of the interpretation of this treaty.\(^4\)

A large number of State practices have made the ships carrying these substances fearful in choosing shipping routes. In the 1990s, when over 40 States were fiercely opposed, ships gradually began avoiding entering into the territorial sea of any those States. In particular, transportation routes in 1999 bypassed not only the Malacca Straits and territorial seas of Southeast Asian States, but also Panama Canal.\(^5\)

Therefore, the large number of national practices requiring prior notification should pay close attention to the international community. Additionally, relevant States shall require, as they have previously done, ships carrying nuclear materials to give prior notification before entering the territorial sea of States rather than


\(^4\) The Vienna Convention on the Law of Treaties, Art. 31(3)(b).

using a clandestine transport lane. As a transit State for the ships carrying nuclear materials, China shall take the same stance and use the same national practice as Pacific and other coastal States by requiring prior notification and opposing clandestine transportation of nuclear materials.

IV. Influences on China Imposed by Clandestine Transportation of Nuclear Materials by Sea and China’s Countermeasures

A. Influences on China Imposed by Clandestine Transportation of Nuclear Materials by Sea

China is a transit State for Japanese ships carrying nuclear materials. In fact, the shipping routes of navigation used by Japan to carry highly radioactive spent nuclear fuel from nine Japanese electricity companies pass through the Taiwan Straits to the U.K. and France. On at least occasion, the transportation ship traversed the South China Sea after passing Malacca Straits and returned to Japan, bypassing Taiwan Island. China’s South China Sea is a semi-enclosed sea as defined in the UNCLOS, which features poor self-cleaning capacity due to constraints of its special geographic conditions, making it easier to accumulate pollutants and suffer from pollution, classifying it as a “vulnerable ecosystem.” The Taiwan Strait, used for international navigation, measures approximately 350 nautical miles on its south end, making it considerably wider than the north end, which measures only about 135 nautical miles. Currently, pursuant to pertinent laws and regulations promulgated by China Mainland and China Taiwan, respectively, have each delimited their own territorial sea, contiguous zone and exclusive economic zones extending for 200 nautical miles across the Taiwan Strait. Nuclear materials, whether passing through the South China Sea or Taiwan Straits, will cause catastrophic consequences to the marine environment when an incident occurs, with the capability of destroying the living resources found in those waters. These consequences will also impose long-term negative influences on the financial

production and lives of citizens across the Taiwan Strait.

B. China’s Countermeasures

The author advocates that both sides across Taiwan Straits and Southeast Asian States cooperate with each other and take the following measures against Japan’s clandestine transportation of nuclear materials:

1. Delimitation of “Particularly Sensitive Sea Areas”

The author proposes that China and relevant States file an application to the International Maritime Organization (IMO) for delimiting South China Sea Waters and Taiwan Straits Sea Waters as a “Particularly Sensitive Sea Area” (PSSA). Designating these waters as PSSA is a means to manage the seawaters beyond territorial sea of coastal States that have vulnerable navigation environments. The IMO defines a PSSA as “an area that needs special protection through action by IMO because of its significance for recognized ecological, socio-economic, or scientific attributes where such attributes may be vulnerable to damage by international shipping activities.”

Once a sea area is approved as a PSSA, a State can control activities in these waters with special and additional measures regarding shipping routes, compulsory ship reporting systems, and ship traffic service. The author proposes taking this action due to the inherently dangerous characteristic of transporting nuclear materials. The special hydrological features of the Taiwan Straits and the special geological environment of the South China Sea require protection. First, taking action to delimit these two areas as PSSAs is an enforced port regulation measure that is not prejudicial to the principal of the freedom of navigation. Despite the stipulations of execution in Chapter VI of the UNCLOS, that a costal State can only enact laws and regulations that comply with generally recognized global rules and standards, established by acting through competent international organizations or diplomatic conferences for its exclusive economic zone, an exception exists in Paragraph 6, Article 211. This exception allows the costal State to make a proposal to the IMO. The proposal must be a request to take special compulsory measures to prevent pollution by vessels. These measures cannot have the practical effect of denying, hampering, or impairing the right of

Navigational ships. As of July 13, 2004, the IMO has approved three PSSAs, which are the Baltic Sea Waters, Galapagos Islands (Ecuador) and Canary Islands Sea Wasters (Spain).  

As one of the busiest waterways in the world, the South China Sea features concentrated islands, wide and narrow straits used as vital communication lines, crowded and narrow estuaries, densely-populated countries with a high demand for ocean fishes, rich but decreasing coral reefs, sea grass and mangrove resources. These waterways are also home to the phenomenon of clandestine transportation of hazardous substances, including nuclear materials, which create unique environmental characteristics. China has a full standing to apply to the IMO for delimiting it as a PSSA. As a result, help will be offered by international organizations for delimiting special shipping lanes for transporting nuclear materials by sea, taking compulsory port regulation measures or establishing reporting system in addition to attention paid by China and adjacent countries.

2. Regional Cooperation

In addition to applying for delimitation of PSSA to the IMO, another solution is for the regional cooperation of implementing joint regulation measures by port States.

As mentioned above, with its geographic particularity, the South China Sea is consistent with the definition of a semi-enclosed sea as described by the UNCLOS, offering a basis of and conditions for regional cooperation. However, due to historical reasons, territorial controversy over the South China Sea waters exists as well as disputes over islands in South China Sea among neighboring countries. Two important straits connect the South China Sea and the high seas – the Taiwan Straits and the Malacca Straits. The Taiwan Straits is a sensitive area in terms of diplomatic and military affairs due to the “Taiwan Issue.” Malacca Straits is of great military significance. Cooperation in the Malacca Straits is complicated because it is controlled and penetrated by external powers. Accomplishing cooperation in these sensitive areas will involve law enforcement and diplomatic negotiations. However, disputes among States will likely threaten and/or suspend regional cooperation. The fundamental reasons of the controversy are due to diversified historical and cultural backgrounds among this region, as well as present differences of political and economic development levels.

However, this does not mean that southeast Asian States cannot reach common interests regarding the issues of transporting nuclear materials, because nuclear pollution reaches beyond boundaries. Therefore, these States may find common ground for cooperation on the issue of clandestine transportation of nuclear materials by Japan. Cooperation could take the form of “shelving differences.” The Chinese government proposed, “shelving differences and seeking joint development,” as a means for cooperation. The view of this proposal is that joint regulations for transporting nuclear materials by port States and the historically persistent territorial disputes are dealt with separately. By implementing this proposal, States would agree to cooperate by agreeing on transport methods and shipping lanes used for transporting nuclear materials.

The key issue with this proposal concerns Japan. Japan keeps transportation routes of nuclear materials to its cooperating States – France and the U.K. – strictly confidential. As a result, it is impossible to initiate any announcement to the Japanese Government port regulations imposed by China and other coastal States, or emergency actions, if nothing is known about Japan’s transportation of spent nuclear fuel. Therefore, China and other southeastern Asian States must negotiate with Japan to advocate for regional cooperation. Negotiations are also important in order to convey to Japan that joint port regulation will strengthen regulations to prevent any occurrence of a nuclear incident at sea rather than limiting or prohibiting the right of passage of Japanese ships carrying nuclear materials. Where possible, these regulations would require Japan to submit reports and all necessary documents for ships carrying spent nuclear fuel to the coastal States and to accept onboard inspections conducted by the coastal States.

If the application for delimiting the South China Sea or Taiwan Straits as a PSSA is not approved, or before the approval is granted, an alternative would be to use regional cooperation by initiating regional negotiations. By establishing the pattern of joint regulation by port States while exerting pressure on Japan, it might be inclined to join the regional cooperation arrangement.

3. Implementation of Traffic Separation Scheme by Strengthening Cross-Straits Cooperation

Across both of Taiwan Straits, China Mainland and China Taiwan shall cooperate with each other through negotiations to establish a traffic separation scheme (TSS). Article 22 of the UNCLOS provides for that States can “require foreign ships exercising the right of innocent passage through its territorial sea to use such sea lanes and traffic separation schemes as it may designate or prescribe
for the regulation of the passage of ships." Paragraph 2 of the same article stipulates that “in particular, tankers, nuclear-powered ships and ships carrying nuclear or other inherently dangerous or noxious substances or materials may be required to confine their passage to such sea lanes.” The passage of nuclear materials through the Taiwan Straits imposes profound consequences on the people across the Taiwan Straits and the marine environment surrounding the Straits. Professor Kuen-chen FU made this proposal in his discussion about the legal status of Taiwan Straits Sea waters.\textsuperscript{40} The implementation of the TSS will provide the following benefits:

First, designations of special shipping routes can reduce the passage of ships through the territorial sea of transit States. Relevant States can determine the shipping routes for these ships by agreement. Together with the precautionary principle, designation of special shipping routes provides aid for the prompt and timely response of relevant States in the event of any nuclear incident. Quicker response times by States to nuclear incidents can only happen if States are well informed of the shipping routes, which is not possible if transportation routes of ships remain confidential.

Second, special designation of routes will keep ships from entering environmentally sensitive areas thereby minimizing environmental damages of nuclear incidents. Accounting for weather concerns in these special routes will steer ships away from seawater encountering bad weather. For example, the weather in seawater routes located between the Equator and the Tropic of Cancer are better than the Cape Horn and the Cape of Good Hope seawater.

Third, the designation of special shipping routes will reduce of the number of ships in transit passage. Only certain ships would pass through the designated shipping routes while other merchant ships would take ordinary shipping lanes, thereby considerably decreasing the chance of ship collisions.

Therefore, we propose that far-sighted people across Taiwan Straits shall cooperate with each other first with regard to the issue of traffic separation scheme, which is also the most practical and feasible way.

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