

Marine Pollution Conducted From Transportation of Nuclear Material

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Introduction

Nuclear materials are used extensively in medicine, agriculture, research, and manufacturing. Places where nuclear is processed are located in various parts of the world and often parties who use processed nuclear are located far away, so need to be transported. There are some 430 nuclear power reactors in operation in 32 countries, but uranium mining is viable in only a few areas.¹ That's explain why transportation for nuclear is an important issue. On the other hand, we understand that sea area; especially in South east Asia which is has rich natural resources spreading in diversity. Thus it is required to protect the sea from various activities that may generate environmental damage. One of the protection that is very essential is the arrangement of transportation for nuclear. Considering that this actually us potential to cause damage to the environment through dumping, land-based sources, and pollution from vessel.

Nuclear material transportation from one state to another could cause environmental damage. About 20 million transports of radioactive material (which

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¹ See. Nuclear Issues Briefing Paper, # 51, www.uic.com.au/nip accessed 3/20/2007

may be either a single package or a number of packages sent from one location to another at the same time) take place around the world each year. (www.uic.com.au/).

National and international environmental law is developing in response to these of distinct but converging of problems. On that account require to be studied how the arrangement can prevent the happening of damage of area of sea specially the effect from activity of nuclear material transportation.

Principle on Protection Marine Environment

General principles and rules of international environmental law were borne from treaties, state practice, and non legal binding form such as declaration and charter. Hereunder some international environmental principles, which is conclude the obligation of state to protect the environment.

- Precautionary principle. This principle provides guidance in the development and application of international environmental law where there is scientific uncertainty. The precautionary principle has been relied in relation to measures to protect other environmental media, especially the marine environment.
- Responsibility not to cause damage. The responsibility not to cause damage to the environment of other state or of areas beyond national jurisdiction has been accepted as an obligation by all states. This principle presented in Stockholm Declaration (Principle 21) and Rio Declaration (Principle 2)

Preventive action principle seeks to minimize environmental damage and state may be under an obligation to prevent damage to the environment within its own jurisdiction, including taking appropriate regulatory, administrative and other measures.

Regulations on Protection of Marine Environment

The regulations of transport of dangerous goods (including nuclear material) by sea are governed in some convention. Hereunder, will be outlined, some conventions arranging the dangerous material transportations.

1. Convention on the Law of The Sea (UNCLOS)

The 1982, UNCLOS was intended to be comprehensive restatement of almost all aspect of law of the sea, including marine environment protection.

It identifies the different maritime zones and legal regime appropriate for each of them. Its Part XII codifies the principles respecting the protection and preservation of the marine environment in all maritime zones.²

Article 192 stated that:

“States have the obligation to protect and preserve the marine environment “and furthermore in Article 194 (1) and 194 (3b) mentioned:

1. States 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 sources, using

² Dinah Shelton and Alexandre Kiss, *Judicial Handbook on Environmental Law*, United Nations Environment Programme, 2005, pg 70.

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.....

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 to the fullest possible extent:
 - (b) pollution from vessels, in particular measures for preventing accident and dealing with emergencies, ensuring the safety operations at sea, preventing intentional and unintentional discharges, and regulating the design, construction, equipment, operation and manning of vessels;

With this existence of arrangement, hence expected every State have the obligation to take all step to protect the marine environment from various activities, included activity of transportation by vessel.³

Article 197 stated that:

“States shall co-operate on a global basis and, as appropriate, on a regional basis, directly or through competent international organizations, in formulating and elaborating international rules, standards and recommended practices and procedures consistent with this Convention, for the protection and preservation of the marine environment, taking into account characteristic regional features”

International rules and standard for marine environment protection should be formulated. Regional co-operation also have the important part such as ASEAN that all ASEAM member state should cooperate to protect and preserve marine environment.

Article 198

“When a State becomes aware of cases in which the marine environment danger of being damaged or has been damaged by pollution, is shall immediately notify other States it deems likely to be affected by such damage, as well as the competent international organizations”

The State’s obligation to notify other states is one of the efforts to protect other state’s environment from transboundary pollution.⁴

2. Convention Relating to Civil Liability in The Field of Maritime Carriage of Nuclear Material, 1971

Convention arranging this liability, also related to two other convention that is Paris Convention, 1960 on Third Party Liability in the Field of Nuclear Energy and Vienna Convention, 1963 on Civil Liability for Nuclear Damage. In the part of “Desirous” in this convention mentioned that the operator of a nuclear installation will be exclusively liable for damage caused by a nuclear incident occurring in the course of maritime carriage of nuclear material.

³ MARPOL or Convention for the Prevention of Pollution by Ships, 1973 also has the general instrument applies to vessels of any type.

⁴ Beside the UNCLOS, Convention on Safety of Life at Sea (SOLAS 1974) as amended, also regulate how to take step to keep safety of life at sea, that also connecting with the transportation of dangerous goods. The provisions of 1974 SOLAS especially chapter VII mentioned that all transportation need special requirement, such as fire protection equipment for the transport of dangerous goods at sea. But for radioactive materials or class 7, there are no specific requirements

Article 1 mentioned:

Any person who by virtue of an international convention or national law applicable in the field of maritime transport might be held liable for damage caused by a nuclear incident shall be exonerated from such liability:

- (a) if the operator of a nuclear installation is liable for such damage under either the Paris or the Vienna Convention, or
- (b) if the operator of a nuclear installation is liable for such damage by virtue of a national law governing the liability for such damage, provided that such law is in all respects as favorable to persons who may suffer damage as either the Paris or the Vienna Convention.

Vienna convention itself in article II b arrange that The operator of nuclear installation shall be liable for nuclear damage upon proof that such damage has been caused by a nuclear accident.

II. b. Involving nuclear material coming from or originating in his nuclear installation, and occurring.....iii. Where the nuclear material is intended to be used in a nuclear reactor with which a means of transport is equipped for use as a source of power, whether for propulsion thereof or for any other purpose, before the person duly authorized to operate such reactor has taken charge of the nuclear material.⁵

Regulations on Nuclear Activity

1. Convention on the Physical Protection of Nuclear Material

This convention was done at Vienna in 1979. In 2005 the Amended Convention was made to amend the Convention and strengthen its provisions. The stressing of the Convention is the importance of the physical protection of nuclear material in domestic use, storage and transport.

Article 3 stated that:

Each State Party shall take appropriate steps within the framework of its national law and consistent with international law to ensure as far as practicable that, during international nuclear transport, nuclear material within its territory, or on board a ship or aircraft under its jurisdiction insofar as such ship or aircraft is engaged in the transport to or from that State, is protected at the levels described in Annex I.

Further more in Article 4 (1) and (6) mentioned that

1. Each State Party shall not export or authorize the export of nuclear material unless the State Party has received assurances that such material will be protected during the international nuclear transport at the levels described in Annex I
6. The responsibility for obtaining assurances referred to in paragraph 1 may be transferred, by mutual agreement, to the State Party involved in the transport as the importing State

⁵ Article 4 c of Paris Convention stated that :In the case of carriage of a nuclear substances, including storage incidental thereto, without prejudice to article 2 :The operator of a nuclear installation shall be liable, in accordance with this convention, for damage upon proof that it was caused by a nuclear incident outside that installation and involving nuclear substances in the course of carriage therefrom, only if the incident occurs

With this arrangement, State shall take the appropriate step to make sure that the nuclear material is safe during transportation. Besides international arrangement, every State is expected to not only have order concerning nuclear material transportation, but also cooperation or agreement of between state related to transportation of the nuclear material.

2. Convention on Early Notification of Nuclear Accident

States should make notification as soon as possible, if there is any nuclear accident Article 1 stated that:

1. This Convention shall apply in the event of any accident involving facilities or activities of a State Party or of persons or legal entities under its jurisdiction or control, referred to in paragraph 2 below, from which a release of radioactive material occurs or is likely to occur and which has resulted or may result in an international transboundary release that could be of radiological safety significance for another State.
2. The facilities and activities referred to in paragraph 1 are the following:
 - a. any nuclear reactor wherever located;
 - b. any nuclear fuel cycle facility;
 - c. any radioactive waste management facility;
 - d. the transport and storage of nuclear fuels or radioactive wastes;
 - e. the manufacture, use, storage, disposal and transport of radioisotopes for agriculture, industrial, medicine and related

scientific and research purposes

- f. the use of radioisotopes for power generation in space objects.

Nuclear material transportation is one of the accidents which could cause transboundary pollution

Article 2

In the event of an accident specified in article 1 (hereinafter referred to as a "nuclear accident"), the State Party referred to in that article shall:

- a. Forthwith notify, directly or through the International Atomic Energy Agency (hereinafter referred to as the "Agency"), those States which are or may be physically affected as specified in article 1 and the Agency of the nuclear accident, its nature, the time of its occurrence and its exact location where appropriate; and
- b. Promptly provide the States referred to in sub-paragraph (a), directly or through the Agency, and the Agency with such available information relevant to minimizing the radiological consequences in those States, as specified in article 5.

With this arrangement, States should make notification to other states which could physically affect from the accident.

Article 5

1. The information to be provided pursuant to sub-paragraph (b) of article 2 shall comprise the following data as then available to the notifying State Party:
 - a. the time, exact location where appropriate, and the nature of the nuclear accident;
 - b. the facility or activity involved;

- c. the assumed or established cause and the foreseeable development of the nuclear accident relevant to the transboundary release of the radioactive materials;
 - d. the general characteristics of the radioactive release, including, as far as is practicable and appropriate, the nature, probable physical and chemical form and the quantity, composition and effective height of the
 - e. information on current and forecast meteorological and hydrological conditions, necessary for forecasting the transboundary release of the radioactive materials;
 - f. the results of environmental monitoring relevant to the transboundary release of the radioactive materials;
 - g. the off-site protective measures taken or planned;
 - h. the predicted behavior over time of the radioactive release.
2. Such information shall be supplemented at appropriate intervals by further relevant information on the development of the emergency situation, including its foreseeable or actual termination.

All necessary data could help other state to make all steps to protect their environment

Article 9 of this convention stated that

In furtherance of their mutual interests, States Party may consider, where deemed appropriate the conclusion of bilateral and multilateral arrangements relating to the subject matter of this convention

3. Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency

This convention was done after Chernobyl disaster, and signed in Vienna in 1986. Article 1: (1),(2) stated that

1. The States Parties shall cooperate between themselves and with the International Atomic Energy Agency (hereinafter referred to as the "Agency") in accordance with the provisions of this Convention to facilitate prompt assistance in the event of a nuclear accident or radiological emergency to minimize its consequences and to protect life, property and the environment from the effects of radioactive releases.
2. To facilitate such cooperation States Parties may agree on bilateral or multilateral arrangements or, where appropriate, a combination of these, for preventing or minimizing injury and damage which may result in the event of a nuclear accident or radiological emergency.

States are expected to work mutually in the event of nuclear accident or radiological emergency. The aid given to lessen effect which generated from accident of nuclear happened in order not to generate loss at property, and take care of human health and the environment.

Furthermore in Article 2 mentioned that:

1. If a State Party needs assistance in the event of a nuclear accident or radiological emergency, whether or not such accident or emergency originates within its

territory, jurisdiction or control, it may call for such assistance from any other State Party, directly or through the Agency, and from the Agency, or, where appropriate, from other international intergovernmental organizations (hereinafter referred to as "international organizations").

2. A State Party requesting assistance shall specify the scope and type of assistance required and, where practicable, provide the assisting party with such information as may be necessary for that party to determine the extent to which it is able to meet the request. In the event that it is not practicable for the requesting State Party to specify the scope and type of assistance required, the requesting State Party and the assisting party shall, in consultation, decide upon the scope and type of assistance required.

With existence of provisions in article 2 the, hence every State Party can have recourse Other State Party either directly and or through IAEA to a nuclear accident , although the accident don't come from his own jurisdiction. Aid which asked, have to be explained in specific especially concerning the form of required assistance.

4. IAEA Safety Standards Series No: TS-R-1

IAEA as international organization under United Nations handling problem of exploiting of nuclear, have duty for

observing nations exploiting nuclear for purpose of peace. Relate to the duty, IAEA make some safety standards such as "Regulations for the Safe Transport of Radioactive Material" known as Safety Standards Series No TS-R-1. Through the worldwide adoption of the IAEA's regulations for all modes of transport, a very high standard of safety in transport has been achieved.

These Regulations establish standards of safety which provide an acceptable level of control of the radiation, criticality and thermal hazards to persons, property and the environment that are associated with the transport of radioactive material. The objective of these regulations is to protect persons, property and the environment from the effects of radiation during the transport of radioactive material.

Shipment in this regulation mean the specific movement of a consignment from origin to destination and vessel shall mean any seagoing vessel or inland waterway craft used for carrying cargo.

Section III regulations number 301 and 302 mentioned that:

301. A Radiation Protection Programme shall be established for the transport of radioactive material. The nature and extent of the measure to be employed in the programme shall be related to the magnitude and like hood of radiation exposures.....

302. In transport, protection and safety shall be optimized in order that the magnitude of individual doses, the number of persons exposed, and the like hood of incurring exposure shall be kept as low as reasonably achievable, economic and social

factors being taken into account, and doses to persons shall be below the relevant dose limits. A structured and systematic approach shall be adopted and shall include consideration of the interfaces between transport and other activities.

In the nuclear safety, doses limits are one of the important parts to protect human health from radiation, so the doses to persons shall be below the relevant dose limits.

Furthermore in regulation number 308 mentioned that:

In the event of accidents or incidents during the transport of radioactive material, emergency provisions, as established by relevant national and/or international organizations, shall be observed to protect persons, property and the environment.

This arrangement will related to other national or international provisions which are regulating emergency provisions such as Convention on the Physical Protection of Nuclear Material and Convention relating to Civil Liability in the Field of Maritime Carriage of Nuclear Material.

Section V of this series arrange about the Requirements and Controls for Transport. Number 501 stated that

Before the first shipment of any package, the following requirement shall be fulfilled:

(a) if the design pressure of the containment system exceeds 35 kPa, it shall be ensured that the containment system of each package conforms to the approved design requirement relating to the capability of that system to maintain its integrity under that pressure.

ASEAN Perspective

The first ASEAN Ministerial Meeting on the Environment and the Meeting of the ASEAN Experts Group on the Environment recognized the need for cooperation amongst ASEAN countries in order to safeguard the ASEAN Environment and in particular its natural resources. With this spirit of cooperation, in 1984 ASEAN declare Bangkok Declaration on the ASEAN Environment. In the Part of Policy Guidelines of this declaration mentioned that: To achieve the objective noted above, the following policy guidelines shall be adopted for application throughout the ASEAN region:

(3) With respect to marine environment develop practicable methods for management of pollution discharge, so that economic development of coastal resources may proceed in coexistence with preservation of the quality of coastal beaches and resorts and the marine environment.

Regard to the nuclear activities, ASEAN has the Treaty on the Southeast Asia Nuclear Weapon-Free Zone, 1995, which is determined to protect the region from environmental pollution and the hazards posed by radioactive wastes and other radioactive material.

Article 3 stated that Each State Party undertakes not to, anywhere inside or outside the Zone: (a) develop, manufacture or otherwise acquire, possess or have control over nuclear weapons; (b) station or transport nuclear weapons by any means (c) test or use nuclear weapons. But in Article 4(1) mentioned that nothing in this Treaty shall prejudice the right of the States Parties to use nuclear energy, in particular for their

economic development and social progress.

ASEAN member States have to conclude an agreement with IAEA for the applicant of full scope safeguards to its peaceful nuclear activities. Furthermore, the arrangement of foreign ships and aircraft is formatted in Article 7.

Each State Party, on being notified, may decide for itself whether to allow visits by foreign ships and aircraft to its ports and airfields, transit of its airspace by foreign aircraft, and navigation by foreign ships through its territorial sea or archipelagic waters, and over flight of foreign aircraft above those waters in a manner not governed by the rights of innocent passage, archipelagic sea lanes passage or transit passage.

Conclusion

From what have been elaborated above, it can be concluded that in general, protection to the environment could be done by having international arrangement and cooperation between states. However the implementation of the regulations could be done optimally if the states obey the order. Willingness of State for obeying convention in good faith is required, because international law doesn't have coherent sanction for the parties which have breach the convention. What is moreover, nuclear law is still a new area in law, so it is not only having international agreement as it resources, but also having IAEA regulations or safety series such as regulation for the safe Transport of Radioactive Material. This thing is related to role of IAEA as commissioned using nuclear. In this case,

states are bond to obey IAEA's order since every states use nuclear technology. They should have an agreement with IAEA, so they have to report periodically the activity using nuclear. In addition, IAEA also have to visit countries that use nuclear technology. ASEAN as a regional organization also have the attention to protect marine environment, so that all ASEAN's State member have the obligation to control activities within their jurisdiction especially nuclear material transportation activities, not to cause environmental damage.

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