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The Procedures for Transit of Ships Carrying Radioactive Materials in Regional Waters and Sea Ports of Egypt

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ABSTRACT

According to the Egyptian Legislation related to the safe transport of radioactive materials, a license is required for transit of ships carrying radioactive materials in the Egyptian territorial water and sea harbors of Egypt including Suez Canal. The License is granted, upon a written application to NCNSRC-AEA. All the procedures and conditions for granting the license have been developed according to the International and Egyptian Legislation.

The procedures for transit of ships carrying radioactive material in Suez Canal are also constructed. The NCNSRC-AEA experts are entitled to accept or refuse the transit of ships carrying radioactive material in the Egyptian territorial water and its sea harbors including Suez Canal according to the national and international regulations.

INTRODUCTION

During the last decades, radioactive material and radiation sources have been widely used in various fields. Nowadays, large quantities are produced by several specialized centers all over the world. The number of consignments of radioactive materials being transported within countries and between countries is likely to increase with the development of nuclear power and the use of other nuclear techniques.

Accidents can happen in all modes of transport, and it is likely that a significant number of accidents will involve packages of radioactive materials. International and national regulations for safe transport of radioactive materials are developed to provide protection of public, transport workers and property from radiation, contamination and criticality hazards during the transport of radioactive materials.

The international law of the sea is commonly used to describe that part of International Law that deals with the relations, activities and interests of states involving the sea. It is distinct from other branches of sea-related laws. Admiralty or maritime law, for example, deals primarily with relations, activities and interests of private persons involved in the transport of passengers or goods. Domestic law generally governs those relations, but various aspects are now regulated by International Agreement.

The International Regulations concerning the Carriage of Dangerous Goods by Rail; RID⁽¹⁾ and by Road; ADR⁽²⁾; the International Maritime Organization Dangerous Goods, IMDG Code⁽³⁾, U.N Recommendation on the Transport of Dangerous Goods (1995)⁽⁴⁾.

The National Center for Nuclear Safety and Radiation Control-Atomic Energy Authority (NCNSRC- AEA) is the independent governmental regulatory body for controlling all activities concerning the transport of both radioactive materials and radioactive wastes. The NCNSRC-AEA is also designated – in the sense of the IAEA regulations as – the national competent authority in all matters concerning the safe transport of these materials⁽⁵⁾.

The IAEA Regulations for the Safe Transport of Radioactive Materials were not formally included in the Legislations in Egypt, but they are clearly recognized since they form the basis of Egyptian safety requirements. Even that Egypt has not signed the Convention on the Physical Protection of Nuclear Material ⁽⁶⁾, the requirements for the level of physical protection in Egypt are consistent with that Convention.

In addition to that Convention, Egypt is a party of (SOLAS) Convention 1974⁽⁷⁾, Vienna Convention 1963, The Joint Protocol Relating to Vienna Convention and Paris Convention 1988 ⁽⁸⁾, Convention on Early Notification of Nuclear Accidents & Assistance in the Case of a Nuclear Accident or Radiological Emergency 1986⁽⁹⁾, and United Nations Convention on the Law of the Sea 1982 ⁽¹⁰⁾.

The regulatory body, NCNSRC-AEA ensures that the requirements on protection are exactly followed since - according to the Egyptian constitution- the international law is more obliged than the national law in Egypt ⁽¹¹⁾.

The passage of radioactive cargo in Suez Canal represents an additional transport activity in Egypt. Radioactive cargo traveling through Suez Canal include fresh and spent reactor fuel as well as uranium hexa-fluoride. Generally, no serious accident with radiological consequences have been reported during the period from 1963 (date of the first ship carries radioactive materials passed through Suez Canal) until now except the accident of the vessel M/V GARNET ⁽¹²⁾.

1- Passage through the Territorial Waters, Sea Harbors of Egypt

The Egyptian Legislation aims to protect the water environment from pollution to achieve the following objectives:

- 1- Protect the sea shores and ports of the Arab Republic of Egypt from pollution hazards in all their forms and shapes.
- 2- Protect the environment of the Territorial Waters and the exclusive economic zone and their living or non-living natural resources by preventing, controlling, and reducing pollution from any source.
- 3- Protect the natural resources in economic zone and the continental shelf.
- 4- Compensate any natural or juridical person for any damage caused due to the pollution of the water ⁽¹³⁾.

According to the International Laws for safe transport of radioactive materials, The Egyptian Legislation forbid the import of the radioactive waste or to allow its entrance into or passage through Egyptian Territories, without a permit from the competent authority. And also it is forbidden to allow the passage of ships carrying radioactive waste through territorial waters or the exclusive zone of the ARE. ⁽¹⁴⁾.

To allow the passage or transit of ships carrying radioactive materials/wastes in Territorial Waters and Sea Ports of Egypt, the following procedures shall be followed:-

- 1- A permit from the competent administrative department either in the Ministry of Maritime Transport or in the Suez Canal Authority (SCA), provided that the Egyptian Environmental Executive Agency (EEAA), is notified accordingly ⁽¹⁵⁾.
- 2- In case of granting the transit authorization, all necessary and stipulated precautions stated in international conventions shall be taken, provided that the ship has a Guarantee Certificate as prescribed by Law ⁽¹⁶⁾.
- 3- The competent administrative department either in the Ministry of Maritime Transport or the Suez Canal Authority shall notify the NCNSRC-AEA by the date of arrival of ships carrying the radioactive material. Also they shall send a copy of all documents related to the shipment for the compliance assurance according to the international regulations ^(17, 18).

4-Prior the ship carrying radioactive material arrival date, the NCNSRC experts shall inspect all radioactive material packages outside the Territorial and Sea Ports of Egypt. The NCNSRC experts are entitled to accept or refuse the ship carrying the radioactive material transit. In case of acceptance, a transit permit is granted.

2- The Safe Transport of radioactive material through Suez Canal

2-1 The Canal and the zone

The Suez Canal is situated at the northeast of Egypt. It extends from Port Said to Port Tawfiek (near Suez) connecting the Mediterranean Sea to Suez Gulf of Red Sea. The Suez Canal is 192-km long, passes through a zone of considerable business, agricultural, and industrial activities. The zone consists of three populated provinces; Port Said, Ismailia, and Suez. This Egyptian waterway is an important international trade rout. Through the Suez Canal, the radioactive materials including fresh fuel elements and spent fuel and about 1000 metric tones of uranium hexa-fluoride are transported every year.

The vessel traffic is controlled by (SCVTCS) system, which is a very accurate system for ensuring safety of transit in the canal. This system consists of:

- 1- Three-station radar net located at Port Said, Bitter Lakes, and Port Tawfiek.
- 2- A wireless, Loran c, position fixing net located at Port Said, 10th of Ramadan City, and Rass Sedre.
- 3- Digital computer networks that aim at collecting accurate and comprehensive data about the traffic situation and displaying them on screens in the control room.
- 4- Several wireless communications networks all along the canal that keep continues contact between one site and another.

2-2 The Suez Canal Authority (SCA) rules of navigation

To regulate the safe passage of the ships-carrying radioactive materials through Suez Canal, the Suez Canal Authority (SCA) rules of navigation ⁽¹⁹⁾ stipulated that the following documents shall be submitted to the NCNSRC for compliance assurance ⁽¹⁸⁾ and prior to the ships-carrying radioactive materials-arrival by at least forty eight hours these documents are:

1. Documents proving that the ship carrying radioactive materials has complied with conditions and prescriptions contained in laws and rules enforced in the exporting country, and with the conditions and prescriptions recommended by both the IMO Code⁽³⁾ and the IAEA regulations⁽⁵⁾.
2. Compensation warranty document covering all direct or indirect damage that may be caused to the environment by the presence of the radioactive materials.
3. documents similar to the declarations of the AEA concerning the shipment with all information required by the IAEA regulations⁽⁵⁾. Each declaration concerns with one of the following three basic groups:
 - Group A: contains all fissile materials, including uranium-233, uranium-235, plutonium-239, plutonium-241 which under certain conditions are capable of undergoing fission, and reactors spent fuel elements.
 - Group B: includes all artificially high activity radioactive sources.
 - Group C: includes non-fissile materials (low-specific activity material LSA, surface contaminated objects SCO,..), uranium ores and concentrates, natural uranium and thorium, radioisotopes for medical, agricultural, scientific or industrial use.

2-3 The NCNSRC-AEA permission for the Transit of the Ships Carrying Radioactive Materials

To obtain the NCNSRC-AEA permission for transit of the ships carrying radioactive materials through Suez Canal, some requirements and procedures shall be followed. These requirements and procedures, which depend on the group type of radioactive materials, are:

- 1- For Group "A" radioactive materials, a prior approval from NCNSRC for the shipment shall be needed. For Groups B and C radioactive materials, such prior approval is not required.
- 2- The agent of the vessel carrying radioactive materials must notify the NCNSRC-AEA by the time of arrival ships carrying radioactive materials at least 48 hours in advance. This notice shall also include all the documents concerning the radioactive material cargo.
- 3- These documents shall include:
 - The declaration mentioned according to the radioactive material group type.
 - A copy of the warrantee document, the origin is kept at Suez Canal Authority. For Group A; the warrantee document is the insurance policy issued by an approved protection and insurance organization. Such insurance policy must cover all kinds of damage due the passage of the ship in Suez Canal. For Groups B and C, the warrantee document shall be a certificate issued by an official recognized authority in charge of the protection and compensation of the ship owners against damage. The compensation warrantee document of whatever kind (insurance / certificate) must explicitly state that the victims shall receive compensation. This compensation shall cover all direct or indirect damage that may occur resulting from the radioactive material load during the ship passage through Suez Canal including the entrance of both Port Saied and Port Tawfik and their vicinities. The Egyptian Courts are the solely and exclusively competent to decide thereof in claims of damage compensation and all that may be connected with the accident or its direct or indirect consequences.
- 4- Special sign shall be hoisted by the ships carrying radioactive material on arriving the Territorial Waters. This sign is either the four red lights or the flag "F" of the International Code between two-ball⁽¹⁷⁾.

2-4 The NCNSRC-AEA Experts Inspection

On the arrival of the ship carrying radioactive material, the experts of the NCNSRC-AEA go on board of the ship to inspect and to examine the radioactive material load. The master of the ship shall handle to them the official stowage plan of radioactive material load-signed and stamped by the ship owner- for sake of the calculation of the Transport Index (TI) and/or the Criticality Safety Index (CSI) according to IAEA regulations⁽⁵⁾.

According to the calculations of TI/CSI and to the inspection of the radioactive materials load, the expert shall issue a certificate to Suez Canal Authority. The certificate includes permission that such ship can safely pass the Suez Canal. The certificate may also include one or more of the following conditions:

- 1- Authorizing the ship to enter the port and transit the Canal.
- 2- Handling of other goods inside and outside the ship during its transit.
- 3- Transporting the radioactive materials load to another ship or to the shore.
- 4- Authorizing the ship to make repair in the port and to take supplies.

The NCNSRC-AEA expert –according to his inspection and calculations for the radioactive materials load- may decide to accompany the ship from the moment it enters the Territories waters of Egypt until it leaves.

3-The Accident of M/V Garnet Vessel in Suez Canal (1981)

On ninth of December 1981, a collision between the Panamin ship "M/V Garnet" and the Liberian ship "Molafinsher" had been occurred near the wave breaker of Port Said. As a result of that collision, the ship Garent had sunk. According to the shipping data and the permission of the ship passage through the Suez Canal issued by the AEA, the ship "M/V Garnet" was carrying two Sr⁹⁰ radiation sources with activity of 0.5 mCi each⁽¹²⁾.

On August 1985, the AEA had been informed that the actions of floating the ship had been started and radiation protection help was needed to restore the two containers containing the radioactive material. The containers were situated in the ship lower chamber since 1981. Water marine herbs and other marine samples were collected from the lower chamber. The samples were analyzed in the laboratories of Radiation Protection Department of the Nuclear Research Center at Inshas. The results showed no evidence for the presence of radiation levels in those samples, reflecting no environmental radioactive contamination⁽¹²⁾.

After restoring the two sources, it was found that they were contained in a wooden box (20x20x40 cm.) and they were in a very bad condition as a result of being under sea water for a long time. The containers were labeled with a metallic plate containing all the data concerning the sources. Radiation measurements were carried out and showed the presence of the two sources inside their containers and the confirmation of non-external contamination. The containers were cleaned and placarded and labeled according to the national and international regulations for the safe transport for radioactive materials, and returned back to its original country⁽¹²⁾.

CONCLUSIONS

- 1-The Egyptian Legislation for safe transport for radioactive materials has been developed based on all the regulations of the IAEA for safe transport of radioactive materials taking into considerations the International Laws, Conventions, Protocols, Codes, and Technical Instructions in this concern.
- 2-According to the IAEA Regulations, the NCNSRC-AEA is the independent governmental regulatory body and the competent authority for controlling all activities concerning the transport of radioactive materials inside the country, through Territorial Waters or the Exclusive Zone of the ARE.
- 3-Egyptian Legislations forbid the import of the radioactive wastes or allowing its entrance or its passage through the Egyptian Territories, Territories Waters of Egypt, without a permit from the NCNSRC-AEA " the competent authority" , and forbid the allowance of passage of ships carrying radioactive waste through Territorial Waters or the Exclusive Zone of the ARE.
- 4-A licensing system concerning the procedures for transit of ships carrying radioactive materials in Suez Canal is also constructed in the present work. The NCNSRC-AEA experts are entitled to accept or to refuse the transit of ships carrying radioactive materials in the Suez Canal, in the Egyptian territories waters, in the sea harbors of Egypt according to the national and international Legislations⁽¹⁵⁾.
- 5-All the documents of the ship carrying radioactive materials shall be submitted to the NCNSRC for compliance assurance prior to ship arrival by at least forty-eight hours to regulate safe passage of such ship through Suez Canal⁽¹⁶⁾.
- 6-The documents required for compliance assurance are:
 - A certificate proving that the ship carrying radioactive materials has to comply with the conditions and prescriptions enforced by laws and rules in the exporting country, with the conditions and prescriptions recommended by both the IMO Code and the IAEA Regulations.
 - A shipment declaration concerning all the information required by the NCNSRC-AEA to classify the radioactive materials load among one of the three basic groups; Group A contains all fissile materials, Group B includes all artificially high activity radioactive sources and Group C includes non-fissile materials.
 - A Compensation warranty document covering all direct or indirect damage that may be caused by presence of the radioactive materials in Suez Canal.
- 7- On the arrival of the ship on board carrying the radioactive materials, the experts of the NCNSRC-AEA go on board of the ship to inspect and examine the radioactive materials load. According to

the calculations of TI/CSI and the inspection of the radioactive materials load, the expert shall issue a permission that the ship carrying the radioactive materials can safely cross the Suez Canal.

8-The accident of the ship M/V Garnet that had sunk in Suez Canal on 1981 was revealed with no environmental radioactive contamination.

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