REVIEW AND AUGMENTATION OF THE INF CODE

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Summary

The Code for the Safe Carriage of Irradiated Nuclear Fuel, Plutonium and High-Level Radioactive Wastes in Flasks on Board Ships (INF Code) was adopted by IMO Assembly Resolution A.748(18) (1) in November 1993 as a voluntary code of practice for application by IMO Member States. Its historical development and background has been described in an earlier presentation to PATRAM 95. This paper reports on the latest activities in IMO on the review and augmentation of the INF Code as requested by the eighteenth session of the IMO Assembly and reiterated by its nineteenth session in November 1995, including the outcome of the Special Consultative Meeting (SCM) in March 1996 and the twentieth IMO Assembly in November 1997.

As instructed by the eighteenth IMO Assembly, the Maritime Safety Committee (MSC) and Marine Environment Protection Committee (MEPC) and their subsidiary bodies concerned undertook work on matters complementary to the INF Code and a progress report was submitted to the nineteenth Assembly, which endorsed the Secretary-General's proposal to convene a Special Consultative Meeting (SCM). The Assembly further approved a resolution on the review of the INF Code (A.790(19)) (2), requesting the MSC and MEPC to continue reviewing the INF Code, as a matter of urgency. The resolution specified a number of specific issues to be addressed, which are referred to below.

Special Consultative Meeting (SCM)

The Special Consultative Meeting of entities involved in the maritime transport of materials covered by the INF Code and was held, in consultation with IAEA and UNEP, under the chairmanship of Mr. G.A. Dubbeld (Netherlands) at the Headquarters of the Organization from 4 to 6 March 1996. It was attended by representatives from 34 Member States, two United Nations specialized agencies, one intergovernmental organization and four non-governmental organizations. Twenty different presentations were made by twenty-eight speakers.

The Meeting was opened by the Secretary-General, who referred to the events which had led him to propose the convening of the Meeting whose main objective was to examine in some detail the carriage of irradiated nuclear fuels by sea, a matter which had caused considerable concern and had given rise to discussion at various fora over recent years. He hoped that, as a result of the Meeting, everybody would benefit from sharing information, concerns and ideas and would gain a better understanding of the safety and environmental factors involved.

The Secretary-General emphasized what the Meeting was not about, namely not to discuss the pros and cons of the use of nuclear energy itself; instead the Meeting was solely concerned with how the materials resulting from the generation of nuclear energy could be transported safely by sea. It was expected that the outcome of the Meeting would greatly assist IAEA, IMO and UNEP in reviewing and amending the INF Code itself.

During the Meeting's closing session, the Chairman summarized his observations on the Meeting's outcome specifying the relevant bodies, within and outside the Organization, which had either been tasked or should be tasked with work to respond to the concerns aired during the Meeting. That summary was considered, as a matter of urgency, by the relevant bodies of IMO and IAEA and the action taken are given in the following specific items listed in accordance with the operative sub-paragraphs 2(b)(i to xi) of resolution A 790(19).

Specific hazards associated with the maritime transport of flasks, and consequences of severe accident scenarios

At MEPC 38 (July 1996), it was suggested that an informal inter-agency group be established, in co-operation with IAEA and UNEP and other organizations with relevant expertise, since the GESAMP/ EHS Working Group lacked expertise necessary to evaluate of the potential hazards of radioactive substances. The initial task for this informal group would be to conduct a literature review for the purpose of facilitating further discussion of this issue and identifying linkages with, for example, emergency preparedness and response planning and protection requirements for particularly sensitive sea areas. MEPC 38 therefore agreed, as a first step of this possible undertaking, that a desk study, reviewing information available, could be carried out for submission to a future session of the Committee. IAEA and UNEP have tentatively responded positively to the proposal to establish such an inter-agency group with the initial task of conducting the literature review.

MEPC 40 (September 1997) noted that this Group had been established and had developed some draft terms of reference to be used as a basis for the literature review. Whilst some concern was expressed that the terms of reference may be more extensive than originally envisaged, MEPC 40 agreed that the review should initially focus on identifying and reviewing appropriate technical reports and that an interim report should be made at the earliest appropriate time before any substantive evaluation of these reports is undertaken.

The IAEA convened an Advisory Group Meeting (AGM-940) in November 1996 to specifically consider modal issues related to radioactive material transport. The matters identified by MSC 66 (May 1996), particularly those on which the IAEA was requested to take action, were considered by a Working Group on the Sea Mode. The Working Group observed that the CRP on Accident Severities at Sea During the Transport of Radioactive Material will produce information and analyses that will support evaluation of maritime accident forces and potential consequences. The Advisory Group recommended continued close coordination between IMO and IAEA on radioactive material transport safety matters.

In this respect, IMO's Dangerous Goods, Solid Cargoes and Containers Sub-Committee (DSC 2, February 1997) recognized that to date none of the fire scenarios applied to the test ships had resulted in package temperatures which called into question the IAEA testing requirements. Since it had, for the time being, no new information to review or to comment on, it agreed to await completion of the CRP, which is expected during 1998. This was endorsed by MSC 68 (June 1997).

Ship structural design requirements for securing flasks to avoid separation from the ship in the event of an accident

IMO's Ship Design and Equipment Sub-Committee (DE 40, February 1997) considered ship structural design requirements for securing flasks to avoid separation from the ship in the event of an accident, bearing in mind relevant international conventions, treaties, standards and regulations already in force, and recommended IAEA data on acceleration/tie-down forces.

DE 40 considered table 1 in the IAEA consultants' report CS-88 (3), which is a compilation giving acceleration factors for transport, adopted in the various standards for similar applications; compared the acceleration values for permanent securing devices in the INF Code with the relevant ISO standards; and concluded that, at present, there was no need to amend the current provisions concerning acceleration loads in the INF Code. MSC 68 concurred with that view.

DE 40 agreed that structural design requirements for securing flasks to avoid separation from the ship in the event of an accident should be considered in the future on the basis of firm proposals founded on research and/or experience.

Adequacy of existing requirements for marking, labelling and placarding of the flasks

DSC 2 (February 1997) agreed that the existing requirements for marking, labelling and placarding of the flasks are as adequate as they are for all the other dangerous goods in packaged form, as set out in sections 7 and 8 of the General Introduction to the IMDG Code (4), and for radioactive materials, as set out in Class 7 of the IMDG Code, which equally applies to materials covered by the INF Code.

Route planning, notification to coastal States, and availability of information on the type of cargo being carried, including its hazards

IMO's Safety of Navigation Sub-Committee (NAV 42, July 1996) noted that a general requirement for voyage planning is currently included in the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW) (5). However, the Sub-Committee was of the opinion that provisions for voyage planning on all ships engaged in international voyages should be further developed to include principles, criteria and guidelines. MSC 67 (December 1996) instructed NAV 43 (July 1997) to give further consideration to voyage planning for INF ships and the need to extend such planning to include all ships.

At NAV 42 a majority of delegations opposed prior notification to coastal States for voyages of ships carrying materials subject to the INF Code. The reasons stated included that prior notification could endanger the physical protection of INF Code materials; it might lead to States trying to veto or prevent the passage of such ships through their territorial sea or Exclusive Economic Zone (EEZ); and could establish a precedent so that prior notification could be required for the passage of all classes of ships. Some delegations noted that, if a requirement for such notification was imposed, it should be for all ships carrying hazardous or polluting cargoes and not just INF Code materials.

MEPC 38 recognized that there was an inter-relationship between these issues and the emergency response planning, both on sea and ashore and that therefore, the outcome of the considerations of the NAV Sub-Committee should be taken into account when considering the emergency, preparedness and response measures.

With regard to voyage planning, DSC 2 noted that information of this kind is required in sections 8.1 and 8.2 of the Introduction to Class 7 of the IMDG Code. The Sub-Committee recognized that this referred to the particulars of the consignment contained in the transport documents and the emergency arrangements appropriate to the consignment and agreed that this information was sufficient. MSC 68 concurred with that view.

NAV 43 considered general guidance on the development of provisions on voyage planning for all ships engaged on international voyages which would include those ships carrying INF Code materials. A draft

Assembly resolution and preliminary guidelines for voyage planning were developed for further consideration at NAV 44 (July 1998). The Sub-Committee also agreed that, if appropriate, a reference to the resolution adopting the guidelines for voyage planning could be made in the INF Code, which was noted by MEPC 40.

Whilst there was some support for a proposal on voyage planning requirements in the INF Code, MEPC 40 agreed that it was premature to include such a requirement at this stage but it would be reconsidered once the NAV Sub-Committee had finalized the Guidelines on voyage planning.

NAV 43 again considered the issue of prior notification and consultation and a majority of delegations restated their opposition to this concept. The Sub-committee requested member Governments that support this concept to submit concrete proposals."

At MEPC 40 there was considerable support for the requirement of *Prior Notification* of the passage of INF vessels or cargoes through *Concerned Coastal States* as a means of facilitating that State's emergency response capability, though some delegations were of the opinion that this requirement need only apply to INF 3 ships. In support of the proposal, some delegations were of the opinion that *Prior Notification* would not impinge on either the freedom of navigation or the right of innocent passage.

However, several delegations were concerned that, if such a requirement were to be included in the INF Code, it may result in some States vetoing the transport of INF Code materials through the waters under their jurisdiction, ships carrying other forms of dangerous goods could be subject to the same restriction and the notification process might lead to interference by terrorists. Some delegations expressed the view that, in contrast to the point made in paragraph 2(b)(iv)13 above, *Prior Notification* could be in contradiction with UNCLOS with regard to freedom of navigation and right of innocent passage. Whilst there was general support for the INF Code becoming mandatory, concerns were expressed that if such a provision were to be included in the Code, it may cause this support to be reversed.

MEPC 40, noting the different views expressed on the issue of *Prior Notification* and *Consultation*, agreed that delegations should work together to resolve this issue.

Restriction or exclusion of the ships from particularly sensitive sea areas

MEPC 38 noted that so far only one PSSA (Great Barrier Reef) has been established by IMO and the Guidelines for the designation of special areas and the identification of particularly sensitive sea areas has made no reference to INF material; but PSSAs could make such a reference. In this connection, it was suggested that this matter could normally be addressed if proposals from individual Member States were submitted for consideration by appropriate IMO bodies, on the basis of criteria developed by the Organization.

Adequacy of existing emergency response arrangements

MEPC 39 (March 1997) considered the draft Guidelines for the Development of Shipboard Emergency Plans for Vessels Carrying Material Subject to the INF Code (6), the proposed amendments to the Code requiring shipboard plans and notification of an incident, and a draft Assembly resolution relating thereto, as amended. MEPC 39 noted that the content of the guidelines and the proposed amendments to the INF Code addressed both safety and environmental protection issues and therefore, whilst approving, in principle, the draft guidelines, amendments and the resolution, agreed that they should be submitted to the MSC 68 which generally endorsed the draft Assembly resolution. MEPC 40 finally approved amendments to the INF Code to include the Guidelines therein, for submission to the twentieth session of the Assembly (November 1997) for adoption.

MEPC 40 noted that the OPRC Working Group had not been able to reach consensus on a proposal to amend paragraph 1.6.3 of the Guidelines to include a requirement for the flag State to keep a copy of the plan and ensure that a copy is lodged with the IMO Secretariat in order to make it available to any Member State on request. However, it was also noted that the Group intended to consider this issue further during MEPC 41.

The IAEA has prepared a draft revision of its document "Emergency Response Planning and Preparedness for Transport Accidents Involving Radioactive Material", Safety Series No. 87 (7) and has circulated it to Member States and international organizations, including IMO. The IMO Secretariat has invited MEPC 40 to comment on the IAEA document and the IAEA will be considering the draft Guidelines to ensure consistency between the two documents.

Establishment of bilateral or multilateral agreements in relation to emergency preparedness and response arrangements in the event of an accident in international waters involving cargoes subject to the INF Code

MEPC 39 noted that its Working Group on Oil Pollution Preparedness, Response and Co-operation (OPRC) would consider, at its next session, on the basis of an expected submission by Solomon Islands, a proposal related to the requirement of a shore-based emergency response plan to complement that of the shipboard one. It also noted that the Working Group would consider the principles and policy issues associated with the retrieval of an INF cargo container/flask in the light of existing recommendations and activities, including study programmes and activities under way, *inter alia*, in IAEA. MEPC 40 noted the Working Group's discussions on shore-based emergency response plans which the Group would be considering further at MEPC 41.

Measures to locate and identify a sunken ship or flasks which might have been lost

MEPC 38 suggested that the OPRC Working Group consider the possibility of undertaking, in co-operation with other bodies, as appropriate, the development of a new chapter to the *Manual on Chemical Pollution - Section 2* (8): *Search and Recovery of Packaged Goods Lost at Sea*, including specific guidance, which might be required in the location and recovery of INF Code material.

Availability of suitable salvage equipment and expertise for the recovery of sunken flasks

DSC 2, considering the provision of lifting attachments on packages to assist with salvage operations and recognizing that such attachments were a feature of packages used to transport materials carried under the INF Code, noted that the design of such lifting points must be designed so as not to fail when used in the intended manner and that features which could be used to lift the package, but which are not designed to support its mass (like lid lifting devices), must be rendered incapable of use during transport.

Monitoring the progress of the ship throughout the voyage by a shore-based facility

NAV 42 noted that ships carrying INF Code materials are, in general, tracked throughout the voyage, either by the shipowner or a shore-based authority of one of the countries involved in the transport activity. The majority of the delegations had no objection to the development of provisions for the tracking of ships carrying INF Code materials, based on the present practice. No further views were

expressed in this context at NAV 43.

With regard to route planning and tracking of ships carrying INF Code materials, NAV 42 invited the MSC to consider expanding its terms of reference for voyage planning to include all ships and, if appropriate, to review the Guide to the planning and conduct of passages. This was endorsed by MSC 67.

Notification of the coastal States concerned in the event of an accident or any other event which could endanger the safety of the ship

MSC 66 noted that the notification of coastal States in the event of an accident was regulated by existing reporting requirements under both the SOLAS and MARPOL Conventions and, therefore, no further action was required in this regard at present.

MEPC 38, MEPC 39 and MSC 68 subsequently considered this issue further and took action as reflected under the adequacy of emergency response arrangement paragraphs above with respect to a draft amendment to the INF Code on notification in the event of an incident.

Report to the twentieth session of the Assembly

The preceding text summarizes the response of the various technical bodies involved in the preparation of the progress report on the review of the INF Code requested by resolution A.790(19), as at the time of writing. MSC 68 approved the draft progress report on the INF Code, subject to the outcome of NAV 43 on issues referred to it, for completion and endorsement by MEPC 40, for submission to the twentieth Assembly in accordance with resolution A.790(19).

Other matters arising from the SCM and relevant discussions

Adequacy of existing liability regimes covering maritime accidents with INF materials

IMO's Legal Committee (LEG 74, October 1996), following discussion as to whether IMO should establish an adequate regime for liability and compensation in connection with the carriage of INF nuclear material by sea, noted the discussion of the subject at the HNS Conference (April 1996), which had decided that the HNS Convention (9) should not cover radioactive material. Furthermore, it took note of the amendments to the Vienna Convention being considered in IAEA. It was considered that IAEA should be given the time to complete its work and that it would not be a useful employment of the Legal Committee's time to work on the same issues. The Secretariat was requested to contact the Secretariat of IAEA in order to obtain a report on the progress and extent of the work and to encourage the Agency to make such information available in a form that it could be submitted to the Legal Committee. Finally, the observation was noted that the Vienna Convention was open to non nuclear States and that, where this was possible, delegations should contact their national delegations participating in IAEA negotiations to supplement the information.

LEG 75 (April 1997) noted information provided by IAEA reporting on the progress and extent of the work undertaken at present by IAEA on revision of the 1963 Vienna Convention on Civil Liability for Nuclear Damage (10) and preparation of a Convention on Supplementary Funding and that a diplomatic conference be held, if possible before the end of September 1997, to adopt a protocol to amend the Vienna Convention and the Convention on Supplementary Funding.

There was general consensus at LEG 75 that the information and explanations provided by IAEA

removed significant concerns regarding the availability of adequate compensation for victims of nuclear incidents and the Committee agreed to put this matter on the agenda for its next session and invited the IAEA to present a report on the outcome of the possible diplomatic conference.

Materials being transported under the INF Code

DSC 2 noted that all these materials are transported by sea in Type B(M) and Type B(U) packages as prescribed by the IAEA Regulations and that the provisions for these package designs accommodate the physical form of the radioactive contents, because the same high level of protection is provided, regardless of whether the radioactive material is in solid, liquid or in gaseous form.

Stowage and segregation provisions for materials covered by the INF Code in the IMDG Code

DSC 2 was of the opinion that the IMDG Code provided satisfactory stowage and segregation provisions for all radioactive materials. The INF Code supplemented these requirements by specifying minimum securing provisions suitable for the heavy package weights involved. The Sub-Committee, noting IAEA's work on advice on package, stowage and retention during transport , recognized that segregation from other dangerous goods is provided by the current table in the IMDG Code (Section 15 of the General Introduction), which is also included in the IAEA Advisory Material, currently under preparation to support IAEA's Safety Standards. DSC 2, therefore, agreed that no changes to the IMDG Code or the INF Code were required in relation to stowage and segregation provisions, which was endorsed by MSC 68.

Mandatory application of the INF Code

At LEG 74, there was general consensus that the decision on whether the INF Code should be mandatory was exclusively a policy matter, not a legal matter, to be addressed by the technical bodies concerned. At MSC 68 proposals for, in particular, the mandatory application of the current INF Code were widely supported in general. Some delegations also supported the review, in close co-operation with the IAEA, of criteria for testing and design of INF flasks for sea transport. In this respect, IAEA was invited to make available the interim results of its Consultant Research Programme (CRP) on accident severity scenarios at sea as far as confidentiality requirements permitted.

The Secretary-General expressed satisfaction with the progress made thus far with respect to the augmentation and improvement of the INF Code. He was confident that the Organization would find the right solution for the mandatory application of the Code and would, in close co-operation with the IAEA, respond satisfactorily to the desire for the review of the criteria for INF flask design to address the specific needs of sea transport.

The IAEA Secretariat has meanwhile agreed to invite IMO's participation at the above CRP. A Research Agreement was duly signed and the Secretariat participated in the last Research Co-ordination Meeting in Albuquerque in September 1997.

MSC 68 concurred in the consensus reached by LEG 74 and reiterated by LEG 75 that the mandatory application of the INF Code was exclusively a policy (not a legal) matter and, after considerable discussion, decided that the INF Code, as set out in resolution A.748(18) together with the draft amendments once adopted, should be made mandatory. To this effect, it instructed the DSC Sub-Committee to prepare appropriate amendments to SOLAS chapter VII for consideration and approval by MSC 69 (May 1998).

Realizing that change of the text and updating of the INF Code would be needed in its mandatory status, the Committee instructed the Secretariat to prepare a document containing an appropriate draft text of the INF Code, as well as draft amendments to SOLAS chapter VII, for consideration by DSC 3 (February 1998). DSC 3 was requested to advise MSC 69, as appropriate, on the proposed text.

Future developments

Work on other matters complementary to the INF Code is ongoing. The twentieth session of the Assembly will consider the progress report on the review of, and the draft Assembly resolution on amendments to, the INF Code for adoption. The DSC Sub-Committee will prepare draft amendments to SOLAS, aiming at making the INF Code mandatory, for consideration by MSC 69 for approval and earliest possible adoption at MSC 70 (December 1998). An inter-agency group with the initial task of conducting a literature review has been established. The OPRC Working Group is considering shore based emergency preparedness and response planning and a new chapter to the Manual on Chemical Pollution. The NAV Sub-Committee continues to consider voyage planning, tracking and notification of INF shipments. IAEA cooperates closely with IMO on these matters and is continuing the Coordinated Research Programme (CRP) on accident severity at sea during transport of radioactive material and the revision of its Emergency Response Planning and Preparedness for Transport Accidents Involving Radioactive Material (SS 87). Both activities should be completed by 1998.

References

(1) IMO, Code for the Carriage of Irradiated Nuclear Fuel, Plutonium and High-Level Radioactive Wastes in Flasks on Board Ships (1993)

(2) IMO, Review of the Code for the Carriage of Irradiated Nuclear Fuel, Plutonium and High-Level Radioactive Wastes in Flasks on Board Ships (1995)

(3) IAEA, Report of the Consultants Services Meeting 88 to prepare the Advisory Material for the Securing of Radioactive Material, Packages to Conveyances (CS 88, 1996)

(4) IMO, International Maritime Dangerous Goods (IMDG) Code Amendment 28-96 (IMO-200E, 1996)

(5) IMO, International Convention on Standards for Training Certification and Watchkeeping for Seafarers, 1978 (IMO-997E, 1993)

(6) IMO, Draft Guidelines for the Development of Shipboard Emergency Plans for Vessels Carrying Material subject to the INF Code (1997)

(7) IAEA, Emergency Response Planning and Preparedness for Transport Accidents Involving Radioactive Material (SS87, 1988)

(8) IMO, Manual on Chemical Pollution- Section 2 (IMO-560E, 1995)

(9) IMO, International Convention on Liability and Compensation for Damage in Connection with the Carriage of Hazardous and Noxious Substances by Sea (HNS) (1996)

(10) IAEA, Protocol to amend the Vienna Convention on Civil Liability for Nuclear Damage (1997)