"**The OPRC-HNS Protocol and its practical implications**"

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Good Day esteemed delegates, it is an honour to be addressing such an important gathering and I hope my paper will give you an insight into the Protocol on Preparedness, Response and Co-operation to pollution Incidents by Hazardous and Noxious Substances 2000, known as the OPRC-HNS 2000 Protocol, and in turn its practical applications.

The OPRC-HNS Protocol follows the principles of the International Convention on Oil Pollution Preparedness, Response and Co-operation, known as the OPRC Convention. The OPRC-HNS Protocol was formally adopted by IMO member States, who were already signed up to the OPRC Convention at a Diplomatic Conference held at the IMO headquarters in London in March 2000.

However it does not come into force until 12 months after it has been ratified by at least 15 member States, who in turn are already party to the OPRC Convention. To date the HNS Protocol has been signed up to by 11 member states that have between them 16% of the worlds shipping tonnage.

The OPRC Convention was adopted in November 1990, but it was 5 years before it came into force in November 1995, so there is still some way to go for the OPRC-HNS Protocol to come into force, but that does not mean we should be complacent and do nothing until it does.

The OPRC Convention of 1990 has been a success; there has been a steady reduction in the level of marine oil spills in the reduction of spills and an increased level of preparedness and response cooperation throughout the world.

There was a part of the OPRC Convention that was however left out in 1990 when the Convention came into being, it was deliberate left out on the understanding that inside 10 years it too would be addressed. This was the part of the OPRC Convention that dealt with Hazardous and Noxious Substances or HNS for short.

Like the OPRC Convention, the HNS Protocol aims to provide a global framework for international co-operation in combating major incidents or threats of marine pollution from Hazardous and Noxious Substances.

Countries that sign up to the HNS Protocol will be required to establish National, Regional and International preparedness, response and co-operation measures for dealing with HNS pollution incidents.

Similar to the OPRC Convention, ships carrying HNS will be required to carry a shipboard pollution emergency plan to deal specifically with incidents involving HNS, in a similar way that they have shipboard pollution emergency plans for dealing with oil pollution.

When considering hazardous cargoes, the definition and the implications of the term HNS should be understood. Many cargoes can be hazardous without the cargo itself having dangerous properties, for example, logs can deplete the oxygen level in a ship's hold making it dangerous for personnel to enter but the logs themselves are not a HNS.

Broadly speaking, hazardous and noxious substances, known as HNS, are those substances that due to their intrinsic properties may, if released, endanger human life, the environment or property.

For the purpose of the OPRC-HNS Protocol, HNS means any substance other than oil, which, if introduced into the marine environment is likely to create hazards to human health, to harm living resources and marine life, to damage amenities or to interfere with other legitimate uses of the sea.

HNS are further defined by reference to lists of substances included in various IMO Conventions and Codes, such as in Annex 2 of MARPOL 73/78, the International Maritime Dangerous Goods (IMDG) code and various other Codes of Practise, such as the International Bulk Chemical Code (IBC Code) and the Code of Safe Practise for Solid Bulk Cargoes (BC Code).

HNS include liquid substances defined as noxious or dangerous; liquefied gases; liquid substances with a flashpoint not exceeding 60°C; dangerous, hazardous and harmful materials and substances carried in packaged form; and solid bulk materials defined as possessing chemical hazards.

There are well over a million hazardous substances, materials and articles produced worldwide and some 50,000 are shipped commercially, and in ever-increasing numbers. Specific substances should not be stowed in certain places or in certain combinations next to each other.

The IMDG Code gives more than 3000 United Nations Numbers for the purpose of substance identification, about 200 of these are for 'Generic' or 'Not Otherwise Specified (NOS)' substances, and these numbers are the most commonly used when goods are being transported. For all goods shipped as 'NOS', a recognised chemical name in current use and readily available in scientific and technical handbooks should be given, while trade names alone should not be used.

Because not everyone is following these procedures; ships' crews, port operators, salvors and responders are being put at risk.

The table below shows some examples of hazardous and noxious substances according to the IMDG code.

Class number	Description	Examples
1	Explosives	Trinitrotoluene (TNT)
2	Gases	Acetylene
3	Flammable liquids	Ethyl alcohol
4	Flammable solids (including self-reactive solids and liquids), Substances liable to spontaneous combustion and those which in contact with water, emit flammable gases	Calcium carbide
5	Oxidising substances and organic peroxides	Sodium chlorate
6	Toxic and infectious substances	Sodium cyanide
7	Radioactive substances	Radium
8	Corrosives	Caustic soda
9	Miscellaneous dangerous substances and articles	Polychlorinated biphenyls

In recent years, there has been a rapid growth in the transportation of HNS. If allowed to escape, these substances can present a significant danger to the vessel, its crew, coastal and harbour populations, and the surrounding environment.

There are many types of ships that can and do carry HNS:

- Dry bulk carriers: solid bulk cargoes, e.g. ores, fishmeal, manufactured powders.
- Oil/bulk/ore or combo carriers: multi-purpose carriers of solid or liquid cargoes.
- Containerships: boxes for dry cargo, powders and/or liquids in portable ISO tanks.
- General cargo ships: cargo in consignments e.g. crates, boxes, drums, sacks, bags.
- Roll-on/roll-off ferries: road vehicles carrying internally unitised, packaged or bulk cargoes.
- Chemical carriers: specialised vessels designed to carry liquid chemicals in bulk.
- Gas carriers: specialised vessels designed to carry liquefied gas.

The International Maritime Dangerous Goods (IMDG) Code describes how to pack, label, document, transport, stow and segregate dangerous goods in packages.

Many incidents involving HNS are relatively minor: leaking drums, broken glass, failed packaging and similar. In cases such as these, there is a tendency to call upon the local fire brigade or response contractor to make the site safe, contain the suspect package and then remove it in an overdrum or tranship it into another suitable package.

HNS is also mentioned in another convention, known confusingly as the HNS 1996 Convention, which as the date suggests was adopted earlier than the OPRC 200 Protocol, but it too has not yet come into force.

The International Convention on Liability and Compensation for Damage in Connection with the Carriage of Hazardous and Noxious Substances (HNS) by sea, known as the HNS 1996 Convention, provides for a compensation and liability regime for incidents involving HNS.

The simple difference is that the HNS Convention deals with compensation from HNS, whilst the HNS Protocol deals with preparedness and response measures for dealing with HNS spills.

Similarly there is compensation for oil pollution incidents that are covered by an International Civil Liability Convention for Oil Pollution Damage, and by an International Fund Convention for Compensation for Oil Pollution Damage, both in turn are supplemented by Protocols.

Compensation and Liability for HNS and Oil Pollution are subjects in their own right and are not covered in this paper.

So having set the framework of what is the HNS Protocol and how it leads to other conventions and codes, we can turn our attention to the practical implications.

By now I am sure you are be starting to get the picture about dealing with HNS matters; there is a lot to consider. There is a considerable difference between being prepared and responding to oil spills, as to dealing with HNS spills.

A major difference is that HNS can kill and be radically more harmful and toxic than oil. A 100 litre spill of toxic chemical can do more harm than a 100 litre heavy fuel oil spill.

Another difference is that oil is in a liquid form, although of varying viscosities, whilst HNS can come in solid, liquid or gas forms.

Therefore consideration in the different types of operational handling and modes of transport of HNS will impact upon considerations of how to handle a HNS incident.

Note, I have changed the wording from “spill” to “incident”; this is how personnel must consider dealing with HNS in a situation where it can be released in an uncontrolled manner, ie an incident, either an actual one or the potential risk of one.

HNS incidents do not necessary have to be an uncontrolled release of cargo from a ship onto the water as an oil spill is invariably considered. The HNS incident can be during cargo handling or transportation of a HNS which is a liquid, solid or gas form, and either stays immobile or moves or changes state.

The HNS can start out in one form and evolve into another form by changing conditions acting upon the released or contained HNS, which in turn has implications on the surrounding community, workers and response personnel.

The risks of an uncontrolled release of a HNS is one or more of the following:-

Explosion, **F**ire, **R**eactivity, **T**oxicity

Organisations must therefore make every **EFRT** (said as effort) to prevent an HNS incident from happening, and should it do so, to have in place a level of preparedness to be able to take the right action to minimise the immediate and long-term effects on the community and surrounding property.

As in all response matters, preparation, preparation and preparation in that order will be the most effective tools for dealing with an HNS incident.

Preplanning and contingency planning as shown in the success of the OPRC Convention and other conventions dealing with marine pollution from oil, such as the Marpol 1973 Convention and its 1978 Protocol, in reducing the number of tanker accidents and amount of oil spilt, indicates how effective the rapid implementation of the HNS Protocol could be.

Marine authorities, ports and transportation companies need to have in place a separate section or appendix to their National Contingency Plans and OPRC Port plans, similarly ships carrying HNS will need to have shipboard emergency plans; but why wait until the HNS Protocol comes in, action can be started now.

There needs to be a process where all hazardous materials and hazardous sites within the relevant area of responsibility are identified, this will assist emergency services and HNS incident response crews in having guidance for when planning their responses to an uncontrolled release of HNS as soon as they arrive on site.

Additionally by preplanning with identified and pre-agreed response strategies and actions to be taken for those materials and /or sites, valuable time will not be lost in making those considerations or seeking approvals when a real incident occurs, especially as HNS incidents can escalate so very quickly.

The natural follow on from this is to develop exercises followed by post exercise review (and post incident reviews) to ensure the plan is kept up to date and relevant for the HNS substances and site under consideration.

Fortunately HNS incidents and spills occur less than oil spills, which means that Port and marine personnel are unlikely to have the same degree of experience and practice in the right procedure for dealing with an HNS incident, it is therefore essential that personnel have training and exercise on what to do in times of a HNS incident.

A major implication of dealing with an HNS incident is that the material can kill, it may be colourless and may have rapid reaction or movement capability, therefore personnel must realize the first action is to get away and raise the alarm and evacuate others from the danger area.

Any response to a HNS spill must only be undertaken by well trained and experienced personnel, who clearly understand the chemical behaviour, physical behaviour, effects, dangers and implications of the HNS to be dealt with, this immediately means others rather than the day to day personnel will be called upon to deal with the situation.

However the management and day-to-day operational personnel of the port or installation can be trained in what to do if they come across a HNS incident or potential incident.

Escaping and raising the alarm will be natural, however the identification of what the HNS is and any other HNS's in the vicinity or the conditions in which the HNS incident is occurring will be extremely useful to the emergency services and HNS incident response crews attending the incident.

An employer has the duty of care to ensure the well-being of their employee at their place of work, therefore it is essential only trained personnel deal with an HNS incident and it is essential that personnel know what HNS substances they are handling, transporting or loading. There must be an appropriate level to training given to all personnel likely to come in contact with HNS in their place of work.

The training should not be detailed otherwise personnel may become over confident of their capabilities and put themselves or others into danger.

The following are suggested as being part of a one day briefing session for those that will be directly involved in the handling of HNS in ports or installations.

1. What is a HNS, the chemical and physical behaviour, effects, dangers and implications of a HNS
2. How is HNS handled and transported by sea and on land, what are the potential hazards that these present to the employee.
3. How is HNS identified and labeled externally, what does it mean.
4. Understanding safe stowage, securing and incompatibilities.
5. Where can you get information on the HNS, explanation of material safety data sheets (MSDS) and the IMDG.
6. What are the procedures to follow within the contingency plan for the particular port or installation the personnel work in.
7. The employee should clearly understand the role and report actions the employee should take in finding a potential or actual HNS incident.
8. Look at various incidents and see how they occurred and lessons to be remembered for the employees in relation to their own work site.

This training requirement therefore requires the ship owner, port / installation and employer to have undertaken the relevant risk analysis for dealing with HNS and putting in place procedures to maximise the safe handling and minimise any risks to an acceptable level.

To do so means the employer needs to understand the potential problems and implications in dealing with HNS. I hope this paper has given on oversight and an introduction to HNS and the importance of contingency planning, preparedness and training to be ready to handle an HNS incident safely when it occurs.

In concluding my paper I intend to go through the outcome of some HNS incidents that have occurred in the past, which hopefully will benefit others in the future.

Acknowledgments

International Tanker Owners Pollution Federation Limited

International Oil Pollution Compensation Fund

DV Howells Ltd

IMO Publications and Library

IMarEST Marine Information Centre

Examples of incidents involving Hazardous and Noxious Substances

Location and year	Vessel	HNS	Quantity involved	Incident consequences
Halifax, Canada, 1917	Montblanc	Explosives	2,600 tons	Explosion, 3000 killed 9000 injured
Texas City, 1947	Grandcamp	Ammonium Nitrate	2,200 tons	Fire and explosion, 468 killed, 2nd vessel caught fire and exploded carrying sulphur and ammonium nitrate
Italian Coast, 1974	Cavtat	Tetraethyl lead Tetramethyl lead	150 tons in drums 120 tons in drums	Collision and sinking
Landskrona Sweden, 1976	Rene 16	Ammonia	180 tons	Hose rupture, 2 dead showered by ammonia
North Sea, 1979	Sindbad	Chlorine	52 one ton flasks	Flasks lost at sea due to rough weather
Adriatic coast, 1984	Brigitta Montanari	Vinyl chloride	1300 tons	Sinking
Mogadishu port, 1985	Ariadne	62 IMDG-classed chemicals	Over 750 tons in teus	Grounded, fires, local population at risk. Sunk
North Sea, 1987	Herald of Free Enterprise	Undeclared ro-ro freight packages	Over 500 tons	Capsized, hazards to salvage divers
Cape Finisterre, 1987	Cason	Mixed dangerous cargo in packages	1,000 tons	Fire and grounding, 23 crew members perished
Dutch Coast, 1988	Anna Boere	Acrylonitrile, Dodecylbenezene	547 tons 500 tons	Collision and sinking
Italian Coast, 1991	Alessandro Primo	Acrylontrile, Dichloroethane	550 tons 1000 tons	Sinking
Greek Islands 1994	Tus	Sodium hydroxide (Caustic soda)	4,200 tons	Grounding
Chinese coast 1995	Chung Mu	Styrene	310 tons	Collision

English Channel, 1995	Grape 1	Xylene	4000 tons	Sinking
North Scottish Coast, 1999	Multitank Ascania	Vinyl acetate	1750 tons	Fire, left abandoned, threat to villages
Thames Estuary, 1999	Ever Decent	Sodium cyanide, potassium cyanide	Various teus in vicinity with other flammables	Collision with pax ship, fire, extensive fire fighting, coastal threat
English Channel, 2000	Iveoli Sun	Styrene, methyl ethyl ketone, iso-propylic alcohol	4000 tons, 1027 tons, 997 tons	Sank under tow, sunken cargo recovered following year
North Sea, 2001	AB Bilbao	Ferro silicon	3300 tons	Cargo hold explosion
Bristol Channel, 2001	Dutch Navigator	Hydrofluorosilicic acid	Two damaged ISO tanks	Damaged in hold during storm
South Africa, Sept 2002	Jolly Rubino	Fungicides, phenol, voronate, ethyl acetate, methyl iso-butyl ketone	Various tons in containers	Eng room fire spread to ship, abandoned, then grounded. Fire, oil and chemical incident
English Channel, Sept 2002	Wester Till	Various chemicals adjacent to hold fire	Approx 200 tons	Fire threat to adjoining hold with chemicals
Japan, October 2002	Eiwa Maru	Xylene	500 tons	Sank after collision with container ship