

NOWPAP MERRAC

Northwest Pacific Action Plan
Marine Environmental Emergency Preparedness and Response
Regional Activity Centre

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(c/o Daedeok Branch/KORDI)

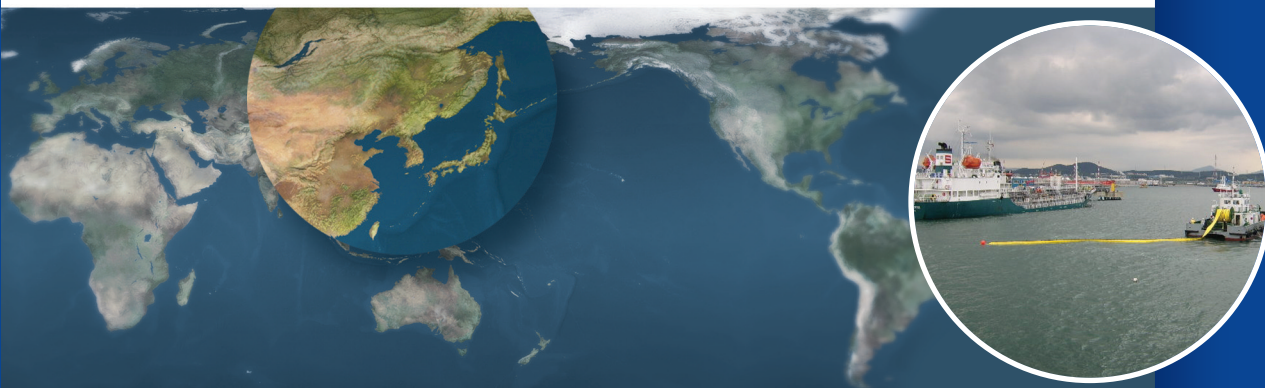
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Regional Report on HNS Preparedness and Response



MERRAC Technical Report No. 9



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Foreword

MERRAC, the Marine Environmental Emergency Preparedness and Response Regional Activity Centre, is one of four Regional Activity Centres of the Northwest Pacific Action Plan (NOWPAP) which was adopted in 1994 as a Regional Seas Programme of the United Nations Environment Programme (UNEP) by the People's Republic of China, Japan, Republic of Korea, and Russian Federation. MERRAC is responsible for regional co-operation on marine pollution preparedness and response in the NOWPAP region.

With technical support from the International Maritime Organization (IMO), MERRAC is currently functioning as secretariat for the NOWPAP MERRAC Focal Points Meeting (FPM) and Expert Meeting, and Competent National Authorities (CNA) Meeting for the NOWPAP Regional Oil and HNS Spill Contingency Plan. The Centre is also carrying out other activities including the management of regional information system, organization of training courses and exercises, and co-ordination of research and development on the technical aspects of oil and HNS spill preparedness and response.

As one of major outcomes of MERRAC activities, the NOWPAP Regional Oil and HNS Spill Contingency Plan had been adopted by all NOWPAP member states and officially come into effect in 2008. The purpose of the Plan is to provide an operational mechanism for mutual assistance through which the member states can co-operate during major marine oil and HNS pollution incidents in the NOWPAP region.

In order to provide practical and technical guidelines to promptly and effectively respond to major oil and HNS spill accidents within the framework of the Plan, the 9th NOWPAP MERRAC FPM (June 2006) agreed to develop the Regional Report on HNS Preparedness and Response, which provides information on national status and identifies the future activities on regional cooperation.

Through this MERRAC Specific Project, the technical report was developed by NOWPAP MERRAC, compiling the National Reports prepared by Expert Group consisted of four experts who were nominated by MERRAC Focal Points as follows: Mr. Xudong CONG (China), Mr. Takashi SHIOIRI (Japan), Dr. Dong-Hyun CHOI (Korea), and Dr. Natalia KUTAEVA (Russia). MERRAC staff (Dr. Seong-Gil KANG, Dr. Jeong-Hwan OH, Ms. Hye-Mi LEE, and Ms. Jae-Im

LEE) finalized and edited the report with technical support of MERRAC Focal Points, NOWPAP Regional Co-ordinating Unit (RCU), and International Maritime Organization (IMO).

As Director of MERRAC, I would like to thank the MERRAC Focal Points and all experts of the Expert Group for their support and contribution to finalizing this MERRAC Technical Report.

Seong-Gil KANG
Director of MERRAC

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Chapter 1. Introduction

According to the Protocol on Preparedness, Response and Co-operation to Pollution Incidents by Hazardous and Noxious Substances, 2000 (OPRC-HNS Protocol), Hazardous and Noxious Substances (HNS) is a term used to describe a 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 spill incident could result in fire, explosion, suffocation, toxic effects, corrosion, etc., depending on the physical and chemical characteristics of various types of HNS. It is hard to predict the amount of HNS spilled when accidents occur. Therefore, governments, local authorities and international organizations are trying to build an efficient control system for prevention, preparedness and response to pollution incidents by HNS. Internationally, OPRC-HNS Protocol was adopted by a diplomatic conference convened by International Maritime Organization (IMO) in March 2000, and entered into force in June 2007.

The Northwest Pacific Action Plan (NOWPAP) Members have been exposed to high risk of HNS spills, as well as oil spills, but there is generally low level of preparedness for HNS incidents. As the risk of the HNS accidents increases in the NOWPAP region, the NOWPAP Members are now trying to enhance their respective national/regional capabilities related to HNS spill preparedness and response.

Recognizing the need for safe and effective contingency arrangements for HNS spills at the regional level, the NOWPAP Members recently started regional co-operation on HNS spill preparedness and response in the NOWPAP region, within the framework of NOWPAP MERRAC, with the support from IMO and UNEP.

The Tenth Intergovernmental Meeting of NOWPAP held in November 2005 decided to expand the scope of MERRAC activities, indicating that MERRAC should cover the regional co-operation related to the HNS spills in the NOWPAP region, in addition to existing oil spill issues. In response to this request, MERRAC started to develop the HNS regional contingency plan by expanding existing NOWPAP Regional Oil Spill Contingency Plan.

At the Tenth NOWPAP MERRAC Focal Points Meeting (Daejeon, 15-18 May 2007), the draft text of NOWPAP Regional Oil and HNS Spill Contingency Plan was reviewed in detail. The draft text of the Resolution on the NOWPAP Regional Oil and HNS Spill Contingency Plan was prepared at the Eleventh NOWPAP MERRAC Focal Points Meeting (Daejeon, 10-13 June 2008). The Plan and related Resolution had been finally adopted at the Thirteenth Intergovernmental Meeting of NOWPAP (Jeju, Republic of Korea, 20-21 October 2008) and formally come into effect.

In order to review the current state of HNS spill preparedness and response in the NOWPAP Members, the National Reports were prepared by national experts after the decision of the Ninth MERRAC Focal Points Meeting (Daejeon, 5-7 June 2006). Based upon the National Reports, this Regional Report was compiled to provide the NOWPAP countries with information and recommendations regarding the future actions to be taken, in terms of increasing response capabilities for HNS incidents in the NOWPAP region.

Chapter 2. Bulk transport of chemicals in the NOWPAP region

2.1. Major chemicals transported in bulk

In the NOWPAP region, a wide variety of HNS were transported in bulk and the total volume was estimated over 62.9 million tons in 2007. HNS transported over one million tons were 14 substances such as Ammonia, Styrene, Xylene, Benzene, Methyl alcohol, p-Xylenes, Sulfuric Acid, Coals, Acrylonitrile, and o-Xylenes, Ethylene glycol, Toluene, m-Xylenes, Sodium Hydroxide. These substances are corresponding to 46.7 million tons and accounted for 74.3% of the total volume transported in 2007 (Table 1).

The information on major HNS transported at sea from each member state is attached at Annex I.

Table 1. *List and contents of major chemicals transported in bulk over one million tons in the NOWPAP Region*

Rank in Volume	Chemical Name	Volume of Traffic (Tons)	Ratio (%)
1	Aqueous Ammonia	14,276,000	22.7
2	Styrene	6,739,771	10.7
3	Xylenes	4,922,851	7.8
4	Benzene	4,678,440	7.4
5	Methyl Alcohol (Methanol)	2,757,288	4.4
6	p-Xylenes	2,265,320	3.6
7	Sulfuric acid	1,565,089	2.5
8	Coals	1,500,000	2.4
9	Acrylonitrile	1,495,372	2.4
10	o-Xylenes	1,485,805	2.4
11	Ethylene glycol	1,407,848	2.2
12	Toluene	1,376,750	2.2
13	m-Xylenes	1,173,000	1.9
14	Sodium Hydroxide	1,126,855	1.8
Sub total		46,770,389	74.3
Others (< 1 million tons)		16,165,722	25.7
Total		62,936,111	100.0

2.2. Principal shipping routes for bulk chemicals

Based upon the data of vessel movement and port data in 1997 obtained from LMIS (Lloyd's Maritime Information Service Ltd), the Japan Association of Maritime Safety analyzed the shipping routes of the HNS Transport Vessels (Fig. 1) and the density of the number of navigating vessel in a unit area which has the mesh size of 0.5° both in latitude and longitude (Fig. 2).

Chemical tankers almost take typical routes allowed for the whole HNS Transport Vessels. Their routes are seen all in the NOWPAP region showing concentrated routes especially along the Pacific coast, and between Taiwan and Korea Strait / Tsushima Kaiyo, although it is shown sparsely in the northern areas of the NOWPAP Sea and the Okhotsk Sea.

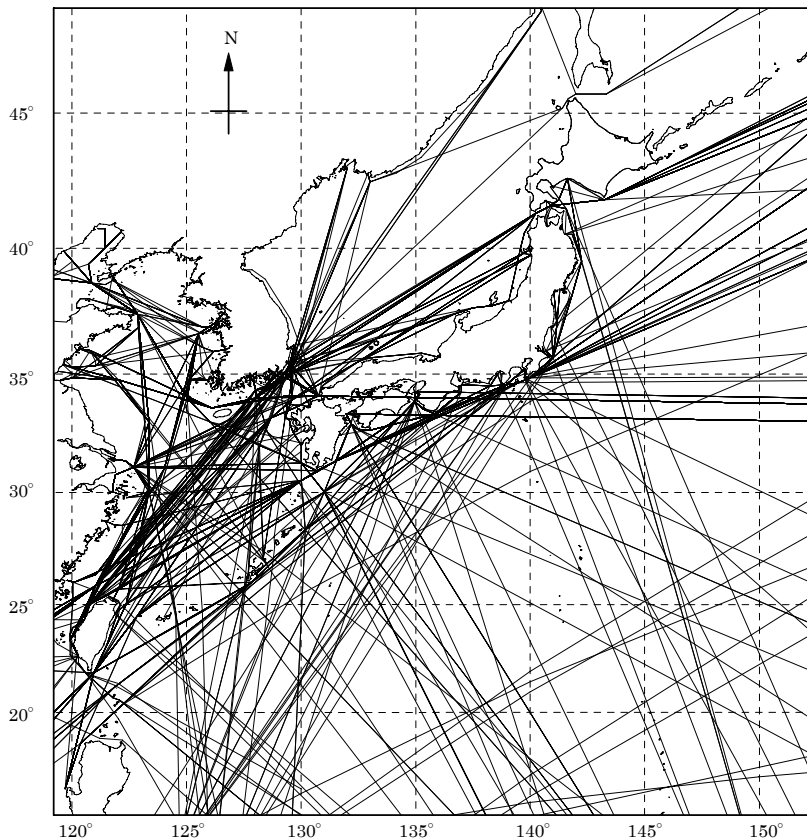


Fig. 1. The shipping routes for the navigation of the HNS Transport Vessels (FY 1997)

The coastal zones of the region have heavy traffic transporting HNS to China, Japan and Korea as shown in Fig. 2. Areas where more than 1,000 HNS transport vessels reach per mesh are as follows:

- Pacific coast between the Tokyo Bay entrance and Osumi Kaikyo
- Traffic lanes from the south of Korean Peninsula to Taiwan Strait
- Offshore of the mouth of Yangtze River
- Kii Suido and Bungo Suido
- Area to the Southwest of Korean Peninsula
- Traffic lanes from Osumi Kaikyo to Taiwan Strait
- Luzon Straits,
- Genkai Nada
- Korea Strait
- West coast of Luzon
- Taiwanese coast

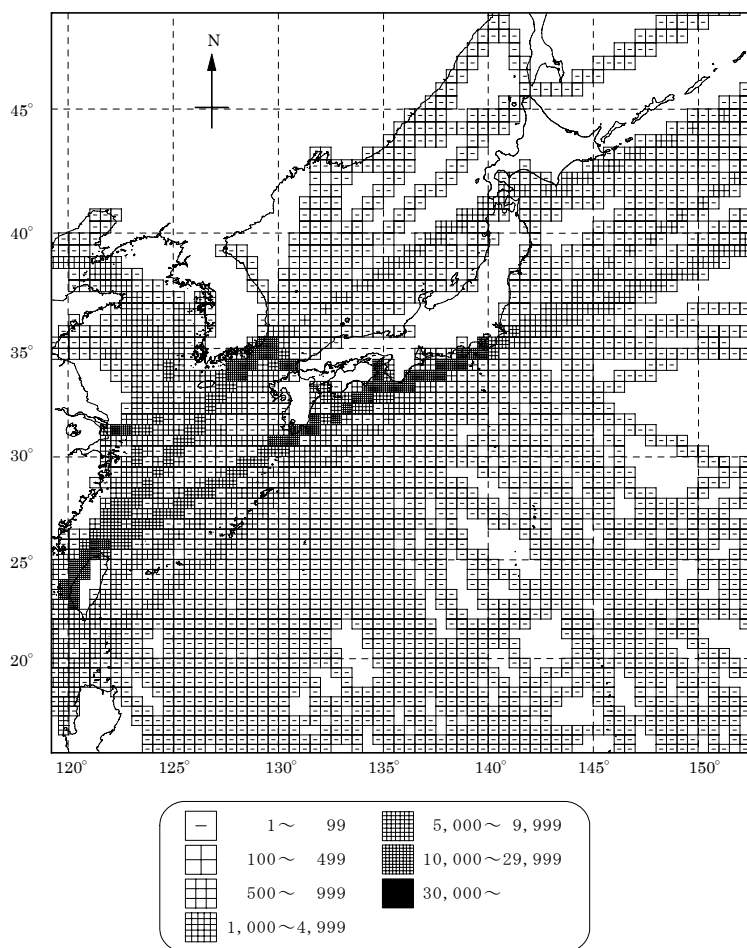


Fig. 2. The density of the number of navigating vessel in a unit of divided area (FY 1997)

From the view point of size of HNS Transport Vessels, vessels of 3,000~9,999 Gross Tonnage (GT) take the lead in both the number of voyages and vessels (Table 2). 10,000~29,999 GT class vessels are almost the same in number of 3,000~9,999 GT class vessels and the two classes account for 81.3% of total. Vessels of 1,000~2,999 GT rank second in the number of voyages. With regard to the number of voyages per vessel, a 1,000~2,999 GT class vessel is engaged in the largest number of voyages.

Table 2. *Number of the vessel and the voyages of each vessel's size*

Size of Vessels (Gross Tonnage)	The Number of Vessels	The Number of Voyages	The Number of Voyages of Each Vessel
500 ~ 999GT	15	491	32.7
1,000 ~ 2,999GT	53	2173	41.0
3,000 ~ 9,999GT	151	3385	22.4
10,000 ~ 29,999GT	150	1887	12.6
30,000 ~ 99,999GT	1	13	13.0
>100,000GT			
Total	370	7949	121.7

Chapter 3. Risk of chemical spills in the NOWPAP region

3.1. Statistics of HNS spill accidents

In the NOWPAP region, 46 HNS spill incidents more than 10 tons totally occurred including unknown spillage incident during the period of 1992-2007. Table 3 shows that more than one HNS spill incident has occurred every year since 1992 And the list of major HNS spills greater than 1,000 tons is presented in Table 4.

The list of the HNS spill more than 10 tons from each Member state is attached in Annex II. There were 18 chemical spill incidents more than 10 tons from 1996 in China and 18 spill incidents occurred from 1990 in Japan. There were 10 chemical spill incidents with quantity over 50 tons from 1990 to 2000 and with quantity over 10 tons from 2001 in Korea. It was reported that no incident occurred in the zone of responsibility of the Russia.

The major reasons are collision of 20 cases (44%) and grounding of 10 cases (22%), which have the potential possibility of HNS spill incidents to happen constantly.

Table 3. *The number of HNS spill Incidents and the quantity of HNS spillage*

Year	Number of Incident (Unknown Spillage Incident)	Quantity of HNS Spill (Tons)
1992	1	1,600
1993	1	8,320
1994	1	116
1995	2 (1)	4,970
1996	4 (1)	4,426
1997	6 (2)	719
1998	2 (1)	108
1999	1	988
2000	5 (3)	214
2001	3	992
2002	4	1,169
2003	2	856
2004	6	3,360
2005	4	479
2006	1	254
2007	3 (1)	992
Total	46(9)	29,663

Table 4. *The list of major HNS spill accidents over than 1,000 tons occurred in the NOWPAP region (1990-2007).*

No.	Date	Location	Name of Ship	Nationality	Type of Ship	Quantity (Tons)	Type of Oil	Cause
1	93.10.01	37° 00'N, 127° 45'E	Frontier express	Panama	Tanker	8,320	Naphtha	Grounding
2	95.12.22	35° 24'N, 129° 25'E	Danita	Panama	Tanker	4,970	Kerosene	Collision
3	96.02.09		Sunny Breeze	Panama	Tanker	3,794	Gas oil	Explosion Fire
						226	Solvent	
4	04.09.11	36° 45'N, 122° 31'E	JINDA 266	China	Chemical Tanker	2,000	Hydrochloric Acid	sinking
5	92.05.10	34° 53'N, 128° 57'E	Stainless princess	Greece	Non-Tanker	1,600	MFP/MDO	Grounding
6	04.05.26	34° 39'N, 127° 57'E	Mornong Express	Panama	Tanker	1,200	Naphtha	Collision

3.2. Case studies of major HNS spill accidents

Based upon their respective national reports, several cases of HNS incidents are described with response activities in the NOWPAP region.

1) “DAE MYONG” Styrene Spill Accident

At 0800 hrs on April 17, 2001 the bulk chemical tanker “DAE MYONG” with Korean nationality collided with another vessel near the estuary of Yangtze River (31°03.4'N, 122°46.5'E) on her voyage from Tokuyama port, Japan to Ningbo port, China. Two cargo tanks were damaged and 638 tons styrene contained therein was totally spilled out. The spilled cargo spread out rapidly in a shape of stripe within a spreading radius of 20 nautical miles. The smell of styrene was very heavy on the sea surface near the accident spot.

Main emergency actions have been taken as follows:

- An alarming area with a radius of 3 nautical miles was set, and patrol vessels from China Maritime Safety Administration (China MSA) were patrolling around the alarming area to take the responsibility of alarming and surveillance to prevent passing-by vessels from coming into the alarming area
- The hazardous characteristic of the chemical and emergency actions were consulted, and an expert group was sent to the accident spot to provide assistance for emergency response decision
- China MSA contacted with CEDRE in France to seek technical assistance. CEDRE once provided emergency response measures for the tank "Levoli Sun" styrene spill accident occurred near France coastal area in October 31, 2000
- Environmental monitoring agency sampled the air and seawater and measured them
- A chemical first-aid team was sent to accident spot to provide medical service for people in need
- Oil boom was deployed to enclose the accidental vessel to restrict the continuous spread of spilled styrene
- Absorbent powder was used to absorb and recover the spilled styrene on the seawater surface
- Cargos contained in other tanks were transferred to other vessels

2) “JINDA 266” Hydrochloric Acid Spill Accident

“JINDA266” capsized by the gale wind force of 8 at about 10 nautical miles on the southeast of Shidao (36°45'N, 122°31'E) at 1715 hrs on September 11, 2004, which caused 73 plastic barrels on board with 2,000 tons of hydrochloric acid dropped into the sea.

Main emergency response actions have been taken as follows:

- On-spot surveillance by patrol vessel from China MSA
- Oil boom was deployed to enclose the accident vessel to prevent the spread of probable fuel oil spill
- Environmental monitoring agency sampled seawater and measured them
- The local government instructed coastal inhabitants and fisher folk that they report to government immediately at sight of plastic barrels and keep far away from barrels to prevent human health damage
- Fishery activities near the sinking ship were prohibited
- Require fisher folk to tow back plastic barrels to appropriate wharf. At last, more than 20 barrels were recovered.

3) “GG CHEMIST” Toluene Spill Accident

Republic of Korea bulk chemical tanker “GG CHEMIST” collided with another vessel on the sea area near estuary of Yangtze River at 0708 hrs on April 8, 2005, which caused the cargo tanks and fuel oil tanks of the ship to damage and about 67 tons of toluene and part of fuel oil to spill out.

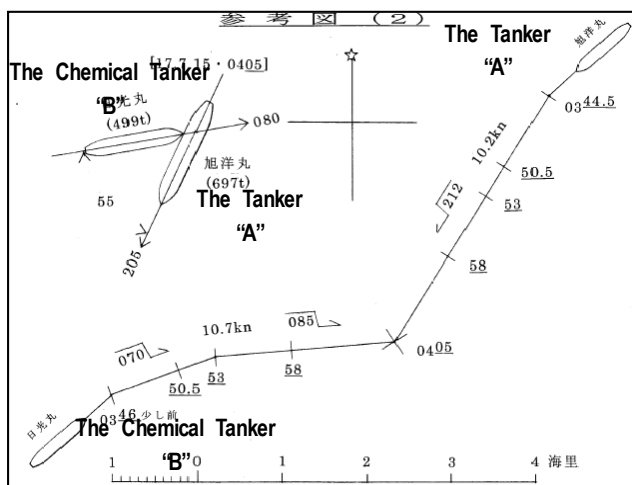
Main emergency response actions:

- An alarming area with a radius of 3 nautical miles was set, and patrol vessels from China MSA were patrolling around the alarming area to take the responsibility of alarming and surveillance to prevent passing-by vessels from coming into the alarming area
- Environmental monitoring agency sampled air and seawater and measured them
- Oil boom was deployed to surround the accidental vessel to restrict the continuous spread of spilled toluene and fuel oil
- Absorbent powder was used to absorb and recover the spilled toluene, and dispersant was sprayed to disperse spilled oil on the seawater surface
- Cargos left in damaged tanks were transferred to other vessels

4) Reformate Spill Accident

The tanker “A” transported approximately 2,000 kl of Reformate which is mixture of Benzene, Toluene and Xylene. This vessel and the chemical tanker “B” collided and a fire broke out on the tanker “A” on July 15 in 2005, and the tanker “A” sank on July 23.

Fig. 3 is geometrical relation of the two vessels when the collision took place. The bow of the chemical tanker “B” collided with starboard-side bridge of the tanker “A”. Two of the 7 crew members of the tanker “A” jumped into the sea. The remaining five crew were missing, and search and rescue operation were undertaken at sea by the Special Rescue Team.



Source: <http://www.mlit.go.jp/maia/03houdou/houdou18/180126yhr.pdf>

Fig. 3. Geometrical relation of the two vessels when the collision took place

Fig. 4 shows the track chart of the tanker “A” from collision to submersion. The collision happened at point 1, about 23 km south-southeast off Mikisaki. Point 2 is nearest point from the coast at about 6 km southeast off Mikisaki. In the meantime of born low, a special rescue team boarded the tanker “A”, and towing wire was fixed and started towing at point 3. At point 4, it was confirmed that the fire was controlled. Because of approach of a typhoon and high possibilities of second accident, the tanker “A” was towed out at sea and then sank at point 5 about 110 km southeast off Mikisaki with about 4,400 m depth of water.

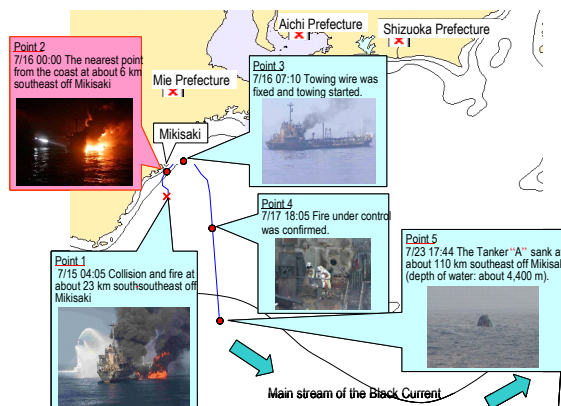


Fig. 4. Track chart of the tanker "A" from collision to submersion

Main emergency response actions:

- Before fire-extinguishing was implemented some actions were considered. At the first setout, 5,000 m in radius dangerous area was set on the basis of the assumption of that 2,000 kl Reformate was discharged. Secondly, the possibility of explosion was evaluated in accord with the characteristics of Reformate and the situation of fire, in consequence it was evaluated as low-potential. Thirdly, method on fire-extinguishing was considered, and using spraying form and powder fire-extinguishing agent were assessed as essential.
- As the fire-extinguishing strategy at the beginning, spraying water for cooling down, spraying foam fire-extinguishing agent for control a fire at deck and above sea, spraying powder fire-extinguishing agent for control fire at crack on deck were implemented, but it was unable to extinguish the fire, because of wind, etc.
- At 0430 hr on 2nd day, the fire began to die down. The reason was estimated that the Reformate in the damaged tank which causes the fire was replaced to water. At 0543 hr, the fire had not been extinguished yet, but a special rescue team boarded the vessel and fixed the towing wire. At 0710 hr, the Patrol Vessel "ISUZU" started towing the tanker "A" toward the open sea.
- There was however possibility of re-ignition due to continued leakage of flammable gas from the cracks on the hull. Joint investigation of the status of the hull structure by the National Strike Team, a salvage company, and specialists assigned by the ship owner was implemented after the fire was extinguished. As a result of the survey, it was estimated that emergency repairs and transshipment of cargo were difficult, because of heel to the starboard side, risk of overturning and submergence. In the last result, towing was started off the coast on July 22 at the request of the ship-owner.



5) Jeong-il Stolt Heaven, Inc.

Jeong-il Stolt Heaven, Inc., an HNS storage company, was running a storage facility of capacity of 478,300 kl consisting 114 storing tanks in total in Port Onsan in 2004. While installing industrial water pipes at 0555 hr on December 24, 2004, an underground transferring pipe for HNS was damaged, resulting in leaking 10.15 kl of Xylene.

Main emergency response actions:

- By the use of weir-type oil reclaimer, vacuum vehicle, pad-type oil absorbent and gel-pack, Xylene was absorbed and reclaimed.
- The drainpipes were cleansed and the polluted soil was decontaminated.

6) M/V Morning Express Collision

At 0440 hr on May 26, 2004, Morning Express, a Panama oil tanker of 56,285 tons, was collided with a Panama iron ore carrier of 10,593 tons away from about one mile from the coast of Namhae while entering into the port. It appeared that the accident resulted from negligent navigation. The portside of the 6th oil freight tank (5×5 m) of Morning Express was damaged, and 1,200 kl of Naphtha was leaked and the pollutant was spread up to 10 miles radius from the point of accident.

Main emergency response actions:

- Naphtha is a very volatile petrochemical material, and thus, at the time of the accident, most of Naphtha was vaporized and naturally exhausted.
- However, three workers were burned by the fire from the over-heated motor, while retrieving Naphtha with oil absorbent on a rubber boat.
- A thick layer of oil was retrieved with oil absorbent. 5,116 kl of loaded oil was transferred to 3 chemicals carriers.
- The degree of damage on the bottom of the ship was investigated with help from divers, and it appeared that the bottom was intact.

Chapter 4. Laws and regulations related to preparedness and response for chemical incidents at sea area

HNS incident, in comparison with oil related pollution incidents, has not often occurred. However, NOWPAP region has been exposed to high risk of HNS spills due to high maritime transportation of HNS resulting from prosperity of petrochemical and/or chemical industries. Because HNS is also transported in bulk like oil, a major HNS spill incident has a potential to cause huge marine pollution and damage human life and property.

Internationally, OPRC-HNS Protocol was adopted in 2000, and entered into force in June 2007. In order to satisfy the international requirement and to respond to oil and HNS spill incidents immediately and effectively, the NOWPAP Members have established their respective national laws and regulations for prevention, preparedness and response to oil and HNS spill incidents on sea. Detailed laws and regulations of each NOWPAP member are described below.

4.1 People's Republic of China

China attaches much importance to marine environmental protection as a basic national policy and establishes comprehensive legal and administrative systems. China enacted the Marine Environmental Protection Law and the relevant regulations, including the Regulations on the Prevention and Control of the Vessel-induced Marine Environment Pollution. The following national laws and regulations are related to the preparedness and response on HNS incidents at sea.

1) Marine Environment Protection Law of the People's Republic of China, which was revised and effective as of April 1, 2000.

Article 18: The state shall, in accordance with the necessity to prevent marine environment pollution, draw up state contingency plans to deal with major marine pollution accidents.

Article 69: Ports, docks, loading and unloading spots and shipyards must, in accordance with relevant regulations, be equipped with proper facilities to accommodate and deal with vessel-induced pollutants and wastes, and shall keep these facilities in good conditions. Ports, docks, loading and unloading spots and shipyards must draw up contingency plans to deal with oil spill pollution and shall be equipped with corresponding contingency equipment and devices to deal with oil spill.

Article 71: For vessels involved in maritime incidents causing or possibly resulting in major pollution damages to the marine environment, the competent state administrative department in charge of maritime affairs shall have the right to adopt forcible measures to avoid or reduce pollution damage. For maritime incidents on the high seas resulting in major pollution damage to the sea areas under the jurisdiction of the People's Republic of China or vessels and facilities on the sea possessing pollution threat, the competent state administrative department in charge of maritime affairs shall have the right to adopt necessary measures corresponding to pollution which have actually happened or may possibly happen.

2) Port Law of the People's Republic of China, which was effective as of 1st January 2004.

Article 32: The port operators shall by force of law formulate the pre-plan on incident emergency of the dangerous cargos of the port, the urgent passenger scattering and rescue pre-plan in case of incidents and natural disasters, safeguarding the organization and implement thereof.

Article 33: The port administrative department shall by force of law formulate the pre-plan on incident emergency of the dangerous cargos of the port potentially having the detriment of social public interests, the urgent passenger scattering and rescue pre-plan in case of material production security incidents and the pre-plan on prevention of natural disasters, and establish and perfect the urgent rescue system in case of material production security incidents on the ports.

3) The New Regulations on the Prevention and Control of the Vessel-induced Marine Environment Pollution, which was effective as of 1st March, 2010

China MSA is the competent national maritime authority, which is responsible

for the prevention and control of ship-source pollution to marine environment, implementing national marine environment protection policies and monitor ship's compliance with national marine environmental protection laws and regulations, and related international conventions China ratified or is party to.

As a contracting state of the OPRC convention as well as its HNS protocol, China has established a complete system of Contingency Plan (CP) to deal with ship-source pollution incidents of different scales and aspects. The system is consisted of tiered CPs with internal linkage, from the national level, provincial and municipal level, port level, to ship level. Currently, China has 1 National CP, 4 Regional CPs, 9 Provincial CPs and 58 Municipal and Port CPs.

On the national level, China's emergency response system is consisted of the National Emergency Response Program, specific response plans, and the Plans of the related departments. At the end of 2010, the State Council designated the Ministry of Transport as the commanding agency in the case of major marine OIL/HNS spill incidents. Upon the adjustment, Chinese Government is enacting specific response plans and related department plans for the prevention and control of ship-source marine pollution.

At present, China holds the general plan to build a pollution response mechanism participated by the Central Government, Local Governments, and the related sectors of society. According to the plan, the Central and Local Governments are required to develop capability building plans, and to build response stockpiles and establish professional strike teams; ports, terminals and clean-up companies are also required to invest in the building of response facilities and equipment.

The investment of the Central Government mainly goes to the capacity building programs against major incidents in the sea areas with high risk, while the Local Governments mainly deal with common incidents within their respective jurisdiction areas or ports. For the ports and terminals, the objective is the small incidents within port water areas; Ships, in the end, are required to keep appropriate capability or sign response contracts with local professional strike teams.

On the national level, the Central Government has already set up two dedicated strike teams, i.e. Yantai Oil Spill Response Technical Center and Qinhuangdao Oil Spill Response Center, and is now building oil spill response

stockpiles in major ports, and sites of high risk along the coast and the Yangtze River. Besides, dedicated or non-dedicated clean-up companies funded by industry and port authorities are located in all ports and are in operation. They are very important parts of the whole response capability.

The New Regulations put forward the contract system on the clean-up of ship-source pollution, in order to urge the shipping companies to fulfill their duties of environment protection and to shoulder their liability of pollution response. The system requires that ships are to sign response contracts with competent clean-up companies of appropriate level, before entering port, leaving port and operations with pollution risk. The clean-up companies qualified for the contracts are classified into four levels, each of which should satisfy the corresponding requirements on response capability as provided by the New Regulations. At present, the clean-up companies in the coastal ports of China have been speeding up their capacity building for the qualification approval by China MSA.

Moreover, the new Regulations also provide that ports, terminals and other units engaging in ship repairing, salvage and recycling are subject to inspection and approval, to make sure that their response capacity is fitful to the risk of pollution. These measures will promote the coordination of governmental departments and social response resources, improving the overall response capability of China in the near future.

The relevant articles in the new regulations are as follows:

Article 4 The competent transport department of the State Council shall be in charge of the prevention and control of marine environment pollution from non-military ships within the port waters under its jurisdiction, or from non-fishing and non-military ships beyond the said port waters.

The maritime safety administrations shall, in accordance with the provisions of these Regulations, be specifically responsible for the supervision and administration of the prevention and control of marine environment pollution from ships and their relevant operations.

Article 6 The competent transport department of the State Council and the coastal local people's governments at or above the level of a city divided into districts shall establish a sound emergency response mechanism for the

prevention and control of marine environment pollution from ships and their relevant operations, and formulate the contingency plans for the prevention and control of marine environment pollution from ships and their relevant operations.

Article 7 The maritime safety administrations shall, in light of the need to prevent and control marine environment pollution from ships and their relevant operations and in conjunction with the competent oceanic administration department, establish a sound mechanism for monitoring and surveillance of marine environment pollution from ships and their relevant operations, and strengthen the monitoring and surveillance of marine environment pollution from ships and their relevant operations.

Article 8 The competent transport department of the State Council and the coastal local people's governments at or above the level of a city divided into districts shall, in accordance with the emergency response capacity-building plan for the prevention and control of marine environment pollution from ships and their relevant operations, establish professional emergency response teams and maintain stockpiles of emergency equipment with specialized facilities, equipment and devices in place.

Article 9 Any unit or individual shall, upon detecting actual or potential marine environment pollution from ships and their relevant operations, report the matter immediately to the nearby maritime safety administration.

Article 13 Any port, dock, loading and unloading spot or unit engaged in ship repairing, building, salvaging or recycling shall develop management rules on safe operation and prevention and control of pollution in accordance with the relevant rules and standards of the State on the prevention and control of marine environment pollution from ships and their relevant operations, equip itself with appropriate equipment and devices for the prevention and control of pollution, and pass the special acceptance inspection by the maritime safety administration.

Any port, dock, loading and unloading spot or unit engaged in ship repairing, building, salvaging or recycling shall regularly inspect and maintain its equipment and devices for pollution prevention and control so as to ensure that they meet the requirements for the prevention and control of marine environment pollution from ships and their relevant operations.

Article 17 The reception of ship garbage, residual oil, oily water, or waste water containing hazardous and noxious substances by a ship pollutant reception unit shall be subject to the approval by the maritime safety administration in accordance with law.

Article 33 The operator of a ship carrying bulk liquid pollution hazard cargo or the operator of any other ship with a gross tonnage of not less than 10,000 shall, before commencing operations or entering or leaving a port, conclude a pollution clean-up agreement with a unit that has obtained the qualifications for pollution clean-up operation, whereby the rights and obligations of both parties for pollution clean-up in case of a ship-source pollution accident are clearly stipulated.

Upon occurrence of a ship-source pollution accident, the pollution clean-up unit that has concluded a pollution clean-up agreement with the ship operator shall perform the pollution clean-up operation in a timely manner in accordance with the agreement.

Article 35 The term “ship-source pollution accident” in these Regulations means a marine environment pollution accident caused by the leakage of oils, oil mixtures or other hazardous and noxious substances from a ship or its relevant operations.

Article 36 Ship-source pollution accidents are categorized as follows:

- (1) a devastating ship-source pollution accident is one that results in the spill of not less than 1,000 tons of oil or the direct economic loss of not less than 200 million yuan;
- (2) a major ship-source pollution accident is one that results in the spill of not less than 500 tons but not more than 1,000 tons of oil or the direct economic loss of not less than 100 million yuan but not more than 200 million yuan;
- (3) a serious ship-source pollution accident is one that results in the spill of not less than 100 tons but not more than 500 tons of oil or the direct economic loss of not less than 50 million yuan but not more than 100 million yuan; and
- (4) an ordinary ship-source pollution accident is one that results in the spill of less than 100 tons of oil or the direct economic loss of less than 50 million yuan.

Article 37 Where a ship causes a pollution accident in the sea area under the jurisdiction of the People's Republic of China, or causes a pollution accident in the sea area beyond the jurisdiction of People's Republic of China that results in, or is likely to result in, pollution in the sea areas under the jurisdiction of the People's Republic of China, the ship shall activate the corresponding contingency plan immediately, take measures to control and eliminate the pollution, and report the accident to the nearby maritime safety administration.

Upon finding that a ship or its relevant operations are likely to cause pollution to the marine environment, the ship, the dock or the loading and unloading spot shall take proper emergency response measures immediately and report the matter to the nearby maritime safety administration.

Upon receiving the report, the maritime safety administration shall verify the situation immediately, report the matter to the maritime safety administration at a higher level or the competent transport department of the State Council, and at the same time report the matter to the relevant coastal local people's governments at or above the level of a city divided into districts.

Article 39 In case of a devastating ship-source pollution accident, the State Council, shall set up a headquarters for emergency response or authorize the competent transport department of the State Council to do so.

In case of a major ship-source pollution accident, the people's government of the relevant province, autonomous region or municipality directly under the Central Government shall, in conjunction with the maritime safety administration, set up a headquarters for emergency response.

In case of a serious or an ordinary ship-source pollution accident, the relevant people's government at the level of a city divided into districts shall, in conjunction with the maritime safety administration, set up a headquarters for emergency response.

The relevant departments or units shall, under the unified organization and command of the headquarters for emergency response, conduct relevant emergency handling in accordance with their respective responsibilities specified in the contingency plan.

Article 43 The oil dispersant used in the handling of a ship-source pollution accident shall meet the relevant standards of the State.

The maritime safety administration shall, in a timely manner, promulgate the list of the oil dispersant that meet the relevant standards of the State.

The application of oil dispersant in the emergency handling of a ship-source pollution accident by a ship or the relevant units shall be in compliance with the relevant provisions of the Marine Environment Protection Law of the People's Republic of China.

4) Regulations on the Safety Control over Dangerous Chemicals, which revised and shall be effective as of 1st Dec. 2011.

For the transportation of dangerous chemicals through shipping channels such as inland rivers and other enclosed waters, consignors shall have no option but to entrust the water transportation enterprises with a professional level good enough to transport such chemicals, go through formalities in accordance with the provisions of the administrative department in charge of transport of the State Council, and be subject to the supervision and administration of the relevant administrative departments in charge of transport (maritime safety administrations and port administrations).

Ships used to transport dangerous chemicals and containers shall not be put into use unless they are manufactured in accordance with the standards of the state, and pass the inspection organized by the ship inspection institutions admitted by the administrative departments in charge of maritime affairs.

Article 43 The enterprises that engage in transportation for dangerous chemicals through highway and waterway shall obtain the licenses for transportation of dangerous chemicals through highway and waterway according to the provisions of laws and regulations on transportation through highway and waterway, and shall go through the registration of administrative department of industry and commercial.

The enterprises that engage in transportation for dangerous chemicals through highway and waterway shall allocate specialized safety management personnel.

Article 44 The drivers, crewmen, loading and unloading management personnel, transport escorts, declarers, and on-site container stuffing inspectors from the enterprises that engage in transportation through highway and waterway shall take the examination by the administrative department of communication, only the persons who passed the examination can hold the qualification of the posts. The detail administrative methods shall established by administrative department of communication of the State Council.

The load and unload of the dangerous chemicals shall in accordance with standards, procedures and systems of safety operation, and shall be conduct under the command and control of on-site loading and unloading management personnel. The container stuffing operation of dangerous chemicals with waterway shall be conduct under the command and control of on-site container stuffing inspectors, and shall be in accordance with the requirements of regulation on stowage and isolation; The on-site container stuffing inspectors shall sign the packing certificate.

Article 45 when transporting the dangerous chemicals, the relevant protections for safety shall be took in accordance with the dangerous characteristics of dangerous chemicals, and necessary protective products and facilities for emergence rescue shall be also allocated.

The trough containers and other containers for transporting dangerous chemicals shall be sealed tightly to protect the dangerous chemicals from leakage and sparkle leakage because of the change of temperature, moisture or pressure; The overflow and pressure relief device shall be set accurately and be easy to work.

The drivers, crewmen, loading and unloading management personnel, transport escorts, declarers, and on-site container stuffing inspectors for transporting of dangerous chemicals shall understand the hazardous characteristics of the transported dangerous chemicals, the requirements for the use of packing materials and containers, and the disposal methods in case of emergency problems.

Article 52 The transportation of dangerous chemicals through waterways shall be compliance with the relevant laws, administrative regulations and provisions of the administrative departments in charge of communications of the State Council for safety transportation of dangerous materials through waterway.

Article 53 The administrative department of marine shall determine the relevant transporting conditions for transportation of dangerous chemicals by ships depending on the kind and hazardous characteristics of dangerous chemicals.

For chemicals that will be transported by ships with uncertain relevant transporting conditions shall be evaluated by qualified institutions with the administrative department of marine, after the relevant transporting conditions for safety transportation were clear and confirmed by the administrative department of marine, they can be delivered by ships.

Article 54 The transportation of hyper-toxic chemicals and other dangerous chemicals whose transportation has been prohibited by making use of shipping channels such as inland rivers with the national provisions shall be prohibited by making use of shipping channels such as inland rivers and other enclosed waters.

The transportation of hyper-toxic chemicals and other dangerous chemicals whose transportation has been prohibited with the national provisions by making use of shipping channels such as inland rivers excluding which in the preceding paragraph shall be prohibited.

The scope of hyper-toxic chemicals and other dangerous chemicals whose transportation has been prohibited by making use of shipping channels such as inland river shall be issued by the administrative departments of communication of the State Council jointly with the administrative departments of environmental protection, industry and information technology, and supervisions on safety manufacturing of the State Council depending on the factors including hazardous characteristics of the dangerous chemicals, the hazardous degrees of dangerous chemicals to human body and aquatic environment, and the degree of difficulty of eliminating the hazardous results.

Article 55 The dangerous chemicals other than those for transportation through shipping channels such as inland river as specified in Article 54 herein (refer to as the dangerous chemicals that transported through shipping channels such as inland river) shall be conducted classified management by the administrative department of communications of the State Council depending on the hazardous characteristics of the dangerous chemicals, and the transportation way, regulation on package and protective measures of safety of all kinds of dangerous chemicals shall be specified and supervised.

Article 56 For the transportation of dangerous chemicals through shipping channels such as inland rivers, the carriers shall be the transportation enterprises with the license to transport such chemicals, no other units and individuals shall be such carriers. The consignors shall have an option but to entrust the water transportation enterprises with the license to transport such chemicals, no other units and individuals shall be responsible for this transportation.

Article 57 For the transportation of dangerous chemicals through shipping channels such as inland rivers, the ships for transportation shall be with the certificate of packing for dangerous chemicals legally. The enterprises for transportation through shipping channels such as inland rivers shall set up the emergency plan for accidents of transportation of dangerous chemicals with ships depending on the hazardous characteristics of the dangerous chemicals that transported, and allocate adequate and effective rescue equipments and facilities for the transporting ships.

For the transportation of dangerous chemicals through shipping channels such as inland rivers, the owners or operators of the ships shall obtain the liability insurance certificate for ship pollution damage and proof document for financial guarantee. The copies of the liability insurance certificate for ship pollution damage and proof document for financial guarantee shall be carried on board.

Article 58 For the transportation of dangerous chemicals through shipping channels such as inland rivers, the materials, type, intensity and packing way of packages for dangerous chemicals shall in compliance with the requirements of the provisions on packages for dangerous chemicals that transported through waterway. If the amounts of dangerous chemicals that transported per ship have limits by the administrative department of communications of the State Council, the carriers shall transport the quantities in compliance with the provisions.

Article 59 The inland pier and berth for transportation works of dangerous chemicals shall be in compliance with the relevant national provisions of safety, they shall be kept prescribed distance away from intake place for drinking water with the relevant national provisions. The relevant units shall set up emergency plan for accidents of dangerous chemicals within pier and berth, and allocate adequate and effective rescue equipments and facilities for pier and berth.

The inland pier and berth for transportation works of dangerous chemicals shall be inspected by the administrative departments of communications according to the relevant national provisions, only the qualified inland pier and berth shall be put to use.

Article 60 When the ships carried the dangerous chemicals arrival or departure the inland port, the details of items name, their hazardous characteristics, packages and the times of arrival or departure the port of the dangerous chemicals, etc. shall be submitted to the administrative department of marine. The agree or disagree decision shall be made within the prescribed time by the administrative department of communications of the State Council, the reporter and the administrative department of marine shall be notified at same times.

The ships with the dangerous chemicals that shall sail in inland river, or pass the navigation structure, the applications shall be filed to the administrative department of communications, and they shall be accepted the management of such department.

Article 61 When the ships with the dangerous chemicals sailing, loading or parking within the inland river, the special warning signs shall be hung, and the special signals shall be visible in accord with provisions.

When the ships with the dangerous chemicals sailing in the inland river, the applications for pilotage shall be filed according to the provisions of the administrative department of communications of the State Council it shall be done so.

Article 62 When the ships with the dangerous chemicals sailing in the inland river, the law, administrative regulations and other national provisions on protection of source of drinking water shall be respected. The development of the inland river shall coordinate with the approved protection zone plan legally.

Article 63 When consigning dangerous chemicals, the consigners shall state the kind, quantity, hazardous characteristics and emergency measures for accidents of such chemicals to the carriers, proper packing the articles in compliance with the relevant provisions of the State shall be applied, and the relevant signs shall be affixed on the external of package.

When the depressors or stabilizers need to be added for the transportation of dangerous chemicals, consignors shall add them upon the consignment, and inform the carriers.

Article 64 Consignors shall neither carry secretly dangerous chemicals in consigned common goods, nor withhold information about dangerous chemicals, nor report dangerous chemicals as common goods.

Any units and individuals shall neither consign dangerous chemicals or carry secretly dangerous chemicals in consigned post and express goods, nor withhold information about dangerous chemicals, nor report dangerous chemicals as common goods for post. The post office and express units shall not accept and post such goods.

For involving violation of 1 and 2 of Article herein, the package of goods shall be opened to inspect by the administrative department of communications and post office legally.

Article 66 The State carries out the system of registration of dangerous chemicals, and provides the technical and information support for the safety control over dangerous chemicals, accident prevention, and emergency rescue.

Article 67 Enterprises that manufacture or import dangerous chemicals, shall register dangerous chemicals with the organ responsible for registration of dangerous chemicals of the administrative department in charge of work of safety supervision and management of the State Council (hereinafter to be referred as registration organ of dangerous chemicals).

Registration of dangerous chemicals includes the following items:

- (1) Classification and labeling information;
- (2) Physical and chemical properties;
- (3) Main purpose;
- (4) Hazardous characteristics;
- (5) Safety requirements on storage, use and transportation; and
- (6) Emergency measures in a dangerous situation.

For dangerous chemicals of the same kind manufactured or imported by the same Enterprise, registered once only. If enterprises that manufacture or import dangerous chemicals have found any new hazardous characteristic for its

registered dangerous chemical, the alteration procedure for registration content shall be handled with the registration organ of dangerous chemicals.

The specific measures for registration of dangerous chemicals shall be formulated by the administrative department in charge of work of safety supervision and management of the State Council.

Article 68 The organ responsible for registration of dangerous chemicals shall regularly provide the information and data about registration of such chemicals to the administrative departments in charge of industry and information technology, environmental protection, public security, health, transportation, railway, quality supervision inspection and quarantine, etc.

Article 69 The administrative departments in charge of the work of safety supervision and management of the local people's governments at or above the county level shall jointly with other departments in charge of industry and information technology, environmental protection, public security, health, transportation, railway, quality supervision inspection and quarantine, etc. formulate the emergency pre-proposals on the basis of the actual situation in the region, and submit them to the people's governments at the same levels for approval.

Article 70 Units of dangerous chemicals shall formulate their own emergency pre-proposals, assign the emergency rescue personnel, be equipped with necessary emergency apparatus and equipment, and organize the drilling at regular intervals.

The pre-proposal for emergency rescue in case of dangerous chemical accidents shall be submitted to the administrative department in charge of the work safety supervision and management of the people's government at the municipality level (with districts) for record.

Article 71 In case of a dangerous chemical accident, the person chiefly in charge of the accident unit shall, in accordance with the emergency pre-proposal formulated by this unit, organize the rescue, and make a report to the local administrative department in charge of the work of safety supervision and management, and the environmental protection, public security and health administration organ; In case of a dangerous chemical accident occurred during the highway and waterway transportation, the drivers, crewmen or

transport escorts shall report to the local administrative department in charge of the traffic and transportation also.

Article 72 In case of a dangerous chemical accident, the local people's government concerned shall organize the administrative departments in charge of the work of safety supervision and management, and the environmental protection, public security and health, traffic and transportation etc. forthwith, in accordance with the local emergency contingent proposals, organize the rescue without any delay or prevarication.

The local people's government and its departments concerned shall, in accordance with the following provisions, adopt the necessary measures to reduce the loss caused by the accident, and to prevent the accident from extending:

- (1) They shall organize the rescue and cure of the victims, organize the evacuation, or adopt other measures to protect other personnel in the hazard areas forthwith;
- (2) They shall promptly control the hazard sources, determine the properties of dangerous chemicals, hazard areas and extent of the accident.
- (3) They shall promptly adopt measures of enclosing, isolation, disinfections, etc. against the actual hazards caused to the human body, animals, plants, soil, water sources, and air caused by the accident and the contingent hazards;and
- (4) They shall monitor and evaluate the environmental pollution and ecological destruction caused by the accident, and take the appropriate environmental pollution control and ecological restoration measures.

Article 73 Relevant units of dangerous chemicals shall provide the technical guidance and necessary assistance for the emergency rescue against accidents caused by dangerous chemicals.

Article 74 The administrative departments in charge of environmental protection of the people's government at the municipality level (with districts) shall announce in a unified way the information about the environmental pollution caused by dangerous chemical accidents.

4.2 Japan

Act on Prevention of Marine Pollution and Maritime Disaster which reflects an international convention relating to marine pollution such as MARPOL convention, OPRC convention and London convention, etc, was amended in accordance with request of the OPRC-HNS protocol which Japan has acceded on March 9, 2007.

Act on Prevention of Marine Pollution and Maritime Disaster divides substances into specific oils (heavy oil, lube oil, etc), oils with the exception of specific oil (gasoline, coal oil, etc), Noxious Liquid Substances, Hazardous Substances and others. It obligates a ship-owner who transports specific oil in bulk to keep certain equipment to respond to an incident. Due to the amendment of Act on Prevention of Marine Pollution and Maritime Disaster, a ship-owner who transports certain Noxious Liquid Substances and oils in bulk should be obligated to respond to an incident from 1 April 2007 and keep certain equipment from 1 April 2008. The followings are the examples prescribed on the Amendment of Act on Prevention of Marine Pollution and Maritime Disaster:

- A ship-owner transporting a certain amount of Noxious Liquid Substances and oil as cargo has to keep certain equipment to do response measures and persons who have knowledge on HNS. In addition, it is possible for a ship-owner to charge these obligations with someone who satisfy necessary requirement.
- The authorities or operators in charge of sea ports and Noxious Liquid substances handling facilities have to have pollution incident emergency plans.
- A captain, upon occurrence of an incident by Noxious Liquid substances and Hazardous substances, has to implement necessary measures as first-aid measures.
- The JCG, in the case of an incident by Noxious Liquid substances and Hazardous substances, is able to order a ship-owner and/or an operator of a handling facility to implement necessary measures.
- The JCG has to develop oil and Noxious Liquid substances spill incidents emergency response plan for 16 sea areas.

The Ordinance of Act on Prevention of Marine Pollution and Maritime Disaster will be amended in conformity with the amendment of Act on Prevention of Marine Pollution and Maritime Disaster. The Ordinance prescribes the detail items followed by the regulation of Act on Prevention of Marine

Pollution and Maritime Disaster. With regard to the equipment which a ship-owner will be obligated to keep by Act on Prevention of Marine Pollution and Maritime Disaster, the Ordinance prescribes the concrete kind and quantity of equipment which a ship-owner has to keep, as below: Substances of which gravity is less 1.010, and steam pressure is over 2.67 pa at 20 degrees temperatures.

- . Measurement equipment for getting hold of danger area
- . A ship which has tail water ability over 1,000 kl/min
- Substances of which gravity is less 1.010, steam pressure is less 2.67 pa at 20 degrees temperature, and solubility is less 1.0 g out of 100 g water, and substances of which gravity is over 1.027, solubility is less 1.0 g out of 100 g water.
 - . Measurement equipment
 - . Oil boom
 - . A ship which has tail water ability over 1,000 kl/min
 - . Oil recovery equipment
- Substances of which gravity is less 1.010, steam pressure is less 2.67 pa at 20 degrees temperature, and solubility is over 1.0 g out of 100 g water, and substances of which gravity is over 1.027, solubility is over 1.0 g out of 100 g water.
 - . Measurement equipment
 - . A ship which has tail water ability over 1,000 kl/min
- Substances of which gravity is over 1.010 to less 1.027
 - . Measurement equipment
 - . Oil boom
 - . Ship which has tail water ability over 1,000 kl/min
 - . Oil recovery equipment

The Ordinance of Act on Prevention of Marine Pollution and Maritime Disaster also prescribes that the above mentioned equipment has to be delivered in 2 hours an incident. A ship-owner transporting certain Noxious Liquid Substance has to keep persons who satisfy necessary requirements, and the Ordinance prescribes desired requirement of the persons. They have to have knowledge about how to use equipment, aspect of spilled substances, and get certain seamen's competency certificate. In addition, the Ordinance prescribes that a ship-owner is able to entrust the above mentioned obligations to an authority which keeps certain equipment and persons who have necessary knowledge of and abilities in an incident by HNS.

4.3 Republic of Korea

1) Marine Pollution Prevention Law:

This Law is to prevent the pollution to the marine environment by the discharge of harmful substance or industrial wastes. This has been amended by Marine Environment Management Act reflecting an international convention relating to the OPRC-HNS protocol, which Korea has acceded on January 1, 2008.

2) Marine Environment Management Act amends the definition, which replaces existing “harmful liquid substance, packed harmful substance and volatile organic compound” with “pollutant.” In addition, this includes the following two clauses:

- Subparagraph 11 (Pollutant) of Article 2 (Definition): Pollutant is defined as “Substance and its energy (of waste, oil, noxious liquid, toxic materials used for packaging), within corporeal or incorporeal substance that is likely to harm and damage the marine environment by being discharged to the ocean.” It appears that HNS is prescribed extensively.
- Article 61 (Establishment and Execution of National Emergency Response Plan): The Director of Korea Coast Guard is responsible for establishing and executing strategies of prevention and emergency response for marine pollution, to prevent marine pollutant from being discharged to the ocean. Therefore, a legal basis for establishing and implementing HNS Emergency Response Plan on National Level is prepared, in accordance with Presidential Decree.

The two major laws and regulations about marine pollution preparedness and response on chemicals leakage in Korea are related to Article 3 (Emergency plans and reporting) and Article 5 (International cooperation in pollution response) of OPRC-HNS as described in the Table 5 and 6, respectively.

Table 5. *List of laws and regulations for pollution emergency plan for vessel and marine facilities related to Article 3 of OPRC-HNS.*

Relevant Laws	Regulations	Remark
Marine Environmental Management Act	- Pollution emergency plan for vessels - Pollution emergency plan for facilities	Article 31 Article 35
- High-pressure Gas Safety Supervision Act - Safety Supervision and Enterprise Act for Liquid Petroleum Gas - City Gas Enterprise Act	Rules and regulations of safety supervision	
Noxious Chemicals Supervision Act, etc.	Damage control plan against noxious substance for responding to marine pollution accidents	

Table 6. *List of laws and regulation for the international cooperation on marine pollution preparedness and response related to Article 5 of OPRC-HNS.*

Relevant Laws	Regulations	Remark
▪ Customs Law	- Admission of export (import) cargo bring-in * Effective customs entry as well as tax-exemption of pollution response equipment and resources for damage control and response	Article 14
▪ Immigration Law	- Immigration and customs of native and foreigner (Crew included) - Admission of Foreigner (crew) entry: Crew identification: Passport - Quarantine of aircraft and vessel - Verification on entrance and clearance of native and foreigner - Acceptance of entrance and clearance for native and foreigner - Quarantine of vessel, etc.	Article 7
▪ Quarantine Act	- Inspection of vessel entry, aircraft, passenger, crew, cargo	Article 4
▪ Plant Protection Act	- Quarantine of imported plant: Import declaration and quarantine application for imported plant, contraband goods - Prohibition of importing contraband goods - Quarantine of foreign plants, passing Korea - Quarantine of crew and vessel	Article 6
▪ Aviation Act	* Effective procedures of entry and navigation in the aviation-restricted zone, when receiving aircraft support from other nations	Article 38-2 Article 4
▪ Port Opening Regulation Act	- Notice of entrance and clearance (Principle of Notice) - Permission of ships entrance and clearance (Principle of Permission) * Expedient port facility usage by foreign vessels of pollution response support (Foreign vessels are given permission more efficiently in order for them to provide timely response support)	Article 5

Source: The official website of relevant ministry/office
(Excerpted and summarized from relevant laws)

4.4 Russian Federation

In national legal and institutional frameworks on preparedness and response for chemical incident at sea area there are very limited law, Decree of the Government of the Russian Federation or Ministries Relevant Normative Acts which is directly related to the issue of preparedness and response for chemical incident at sea area.

1) About continental shelf, the Federal law № 187- FS, 1995

- The law establishes legal relationships of conducting activities on the continental shelf; requirements for marine environment protection from pollution with oil and oily wastes that come from its transportation and utilization, and nature protection requirements for oil transportation and utilization.

2) About the exclusive economic zone, the Federal law № 191-FS (1.3)

- The state ecological supervisory control in the exclusive economic zone (hereinafter - the state ecological supervisory control) represents the system of the measures directed on prevention, detection and elimination of violations of applicable international norms and standards or laws, standards and rules of the Russian Federation on protection of marine environment, and living and non-living resources.
- The state ecological supervisory control is carried out by the specially authorized federal law enforcement agency on environmental protection with participation of other specially authorized federal law enforcement agencies according to legislation of the Russian Federation (Federal Service of Supervision of Environment (Rosprirodnadzor)).
- Investigation of ecological offences aimed at reimbursement of harm to marine environment and living resources is carried out by specially authorized federal law enforcement agency on environmental protection, federal law enforcement agency on fishery, and federal law enforcement agency on boundary service within the limits of their authorities (Federal Service of Supervision of Environment (Rosprirodnadzor) and Federal Service for Veterinary and Phytosanitary Supervision (Rosvetnadzor)).

3) About internal marine waters, territorial sea and adjoined zone, the Federal law № 155-FS, 1998(1.4)

- Clause 33: Maintenance of marine environment in the condition corresponding to ecological requirements is ensured by establishing and

compliance with norms of maximum concentration limit and maximum permissible discharge rates, and also by other requirements and measures.

- Clause 34: The state ecological assessment of economic activities - an obligatory measure on protection of marine environment and natural resources. All kinds of economic and other activities are subject to examination. A subject of examination is prior-project and project documentation concerning creation of artificial features, cables and pipe lines lying.
- Clause 38: In case of marine accidents followed by oil spills, Russian Federation has the right to implement all necessary measures to protect pollution of coast.

4) About environment protection, the Federal law № 7-FS, 2002(1.7)

5) About industrial safety of dangerous manufacturing objects, the Federal law № 116-FS, 1997

- The law establishes legal, economic and social basis for providing safety of dangerous manufacturing objects, and defines that while operating the dangerous manufactures, legal entities have to prepare contingency plans in case of emergency situation, declaration of industrial safety that has to reflect the rules of working on the manufacture and storage of dangerous substances, and also safety requirements to technical facilities, operating manufactures, manufacture control, technical investigation of the reasons of the accident and industrial safety expertise.

6) About rescue and salvage services and status of rescue parties, the Federal law № 151-FS, 1995 (1.13)

- determines the general organizational, legal and economic basis for salvage and rescue services on territory of the Russian Federation, and regulates relations in this area among governmental bodies, local government institutions, and also enterprises, establishments, organizations, country (farmer) facilities, other legal persons irrespective of their organizational and legal forms and ownership, public association, and officials and citizens of the Russian Federation;
- establishes the rights, duties and liability of workers of life-saving service, and determines bases for state policy in the field of legal and social protection of workers of life-saving service, other citizens of the Russian Federation who are taking part in emergency situations of natural and technogenic origin response, and members of their families.

7) About adopting the Regulations on the Federal Agency of Maritime and River Transport, Decree of the Government of the RF, № 371, 2004 as amended № 600, 2006

- The agency organizes and conducts works in prevention and response to oil spills at sea and on internal waterways from vessels and objects of marine and river transport

8) About the declaration of safety of industrial objects, Decree of the Government of the RF, № 675, 1995

- Decree adopts the Declaration of safety of industrial objects of the RF for highly dangerous objects.

9) About a unified state system of prevention and combating emergency situations, Decree of the Government of the RF, № 794, 2003 (3.8)

- This Regulation determines the procedure of organization and function of unified state system of emergency situation prevention and response (ESPR), hereinafter called unified system. Coordination bodies of unified system are: Ministry of Russian Federation for Affairs for Civil Defence, Emergencies and Elimination of Consequences of Natural Disasters (EMERCOM) at federal level, at territorial level - commission for emergency situation prevention and response and provision of fire safety of subject of Federation or municipality, and at object level - commission for emergency situation prevention and response and provision of fire safety of organization.
- Engaging of salvage and rescue services, and rescue parties to emergency situations response is carried out: according to plans for emergency situations prevention and response on objects and territories serviced by specified services; according to plans of coordination during emergency situations response on other objects and territories;
- Financing of unified system is carried out at each level on account of funds of the appropriate budget and organizations.
- Financing of target programs on protection of the population and territories from emergency situations, and provision of steady functioning of organizations is carried out according to laws of the Russian Federation and laws of subjects of the Russian Federation.
- Financing of measures on emergency situation response is carried out on account of the organizations which are situated in emergency situation area, funds of federal law enforcement agencies, and also on account of appropriate budgets, insurance funds and other sources.

10) About the measures to improve safety at sea, to develop search and rescue at sea and on oil spill and noxious chemicals response at sea.

Decree of the USSR Soviet of Ministers, № 48, 1991 (3.14)

- In an effort to promote unified policy in the field of safety of navigation, rescue service and organization of oil and oil products, and other harmful chemical substances emergency pollution response at sea, the Council of Ministers of the USSR decides to organize, at the Ministry of a Merchant Maritime fleet of the USSR on the basis of the state, specialized service on oil and oil products pollution response in the sea, rescue parties, and ship-raising and submarine-technical works of the Ministry of the State Marine Pollution Control Administration of the USSR (SMPCA), having assigned on it organization and realization of rescue, ship-raising and submarine-technical works, operations on oil and oil products and other harmful chemical substances emergency pollution response in the sea.
- SMPCA was nominated as a Competent National Authority and National Contact Point in case of oil spill response at sea.

11) Ministries Relevant Normative Acts Instructions on the order of transmission of announcements about marine environment pollution. 1999. Registered by the Ministry of Justice №598 from 14.06.94

- The instruction establishes the general procedure of the message transmitting stipulated by the laws of the Russian Federation, as well as by the international agreements on oil discharge or other hazardous substances discharge into the sea from vessels and other objects.
- Regulations of this Instruction are compulsory for persons supervising work on artificial islands and structures operated or created within the limits of territorial sea or economic zone of the Russian Federation.
- Messages on marine pollution should be transmitted in cases of:
 - . Incident with a vessel or other objects resulted in or may result in oil and other hazardous substances discharge;
 - . Detection of oil and other hazardous substances spill from vessel (irrespective of flag) or other objects in violation of applicable international or National rules;
 - . Detection in sea of oil or other hazardous substances spill.

Chapter 5. Institutional arrangements related to preparedness and response for chemical incidents at sea

Based upon their respective national reports, detailed institutional arrangement and their roles are described below.

5.1 People's Republic of China

In the past few years, with the fast development of social economy and increasing of living standards, China has been attaching great importance to the preparedness and response to public emergencies, put forward and revised relevant laws and regulations, established emergency response system, and provided investment to build up the preparedness and response capability.

The National Contingency Plan is harmonized with other national plans such as National General Contingency Plan on Public Emergencies, the National Special Contingency Plan, the State Department Contingency Plan as well as Provincial and Municipal Level Contingency Plan. Based on the classification of public emergencies by "The National General Contingency Plan on Public Emergencies ", ship-source HNS accident is grouped as environmental pollution accident under disaster incident.

As the competent authority responsible for dealing with ship-source HNS accident, China MSA is now working on the revision "National Ship Pollution Contingency Plan" which includes the treatment of oil spill and HNS spill accidents by vessels. Coastal MSA directly under China MSA have already developed or are developing the contingency plan on the response of ship-source HNS accidents.

Contingency Plan at provincial and municipal level involved with HNS transport at sea is integrated into the Local Government Contingency Plan. In dealing with public emergencies in China, local authorities take a leading. The major incident at sea is managed by China MSA and local government. The coastal MSA directly under China MSA acts as the leading player in coordinating response effort.

State shall establish special response system for major dangerous substances relying on the response team in big enterprises, and national special contingency plan to provide support and aid for incidents that are difficult for local governments to deal with.

The relevant governments and agencies with their major missions are described as follows:

1) State Administration of Work Safety

- organizing and coordinating the emergency rescue for the dangerous chemical accidents

2) Ministry of Transport

- the safety control of the highway and waterway transportation for dangerous chemicals and their means of transport, and the supervision over safety in the waterway transportation of dangerous chemicals,
- determining the professional levels of highway and waterway transportation units for dangerous chemicals, drivers, shippers, loading and unloading personnel, and transport escorts,
- the supervision and examination of the aforesaid matters.

3) Ministry of Environmental Protection

- providing the guidance, co-ordination and supervision of nation-wide marine environment protection work.

4) State Oceanic Administration

- organizing survey, surveillance, supervision, assessment and scientific research of the marine environment.

5) China Maritime Safety Administration and the coastal MSA

- the supervision and administration of marine environment pollution caused by non-military vessels inside the port waters, and non-fishery vessels and non-military vessels outside the port waters under their jurisdiction,
- the investigation and handling of the pollution accidents in the event of a pollution caused by a foreign vessel navigating, berthing and anchoring and operating in the sea area under the jurisdiction of the People's Republic of China, and officers in charge shall board the vessel in question to examine and handle the case.

6) Chemical Registration Center of State Administration of Work Safety

- registration of dangerous chemicals
- the technical and information support for the safety administration, accident prevention, and emergency rescue over dangerous chemicals.

7) Eight Emergency Rescue Center of Chemical Incidents under State Administration of Work Safety

- the rescue and salvage of major chemical accidents,
- the training of emergency rescue and salvage for the chemical accidents,
- the consultation of emergency rescue and salvage for the chemical accidents.

8) Yantai Oil Spill Response Technical Center of China MSA

- development and application of vessel oil spill response technology, research and study on the national technical criterion and standard for oil spill response,
- establishing the oil spill information and decision-making system, building and maintaining the website of China Oil Spill Prevention (<http://www.osp.cn/>),
- compilation of oil spill response training material and nation-wide oil spill response training
- the technical identification of ship pollution sources and marine incidents, the inspection of the capability of oil spill response equipment and material, the evaluation of cleanup capability of the oil spill response team, managing Yantai oil spill response equipment store, and the technical tasks on international cooperation of oil spill response at sea.

9) Dalian Dangerous Goods Research Center of China MSA

- compilation of oil spill response training material and nation-wide oil spill response training
- the research, technical consultation and service of dangerous goods transported in waterway,
- the evaluation, examination and analysis of dangerous goods,
- the translating, printing and tracking research of IMO International Maritime Dangerous Goods Code and the related technical information on dangerous goods, collecting and translating international and national technical information on dangerous goods, establishing the information network, providing the information consultation, participating in research and study of national technical criterion and standard on supervision over safety transportation of dangerous goods in the waterway, and research of the drawing up and amending of the related international conventions and codes,

- the training material compilation of the dangerous goods transported in waterway and the training work, developing the technical research of the safety transportation of dangerous goods.

5.2 Japan

In case of huge incident by HNS, ministries concerned, in accordance with the National Contingency Plan, respond cooperatively. Fig. 5 shows concept of cooperation of ministries concerned. The role of ministries concerned is described on the National Contingency Plan.

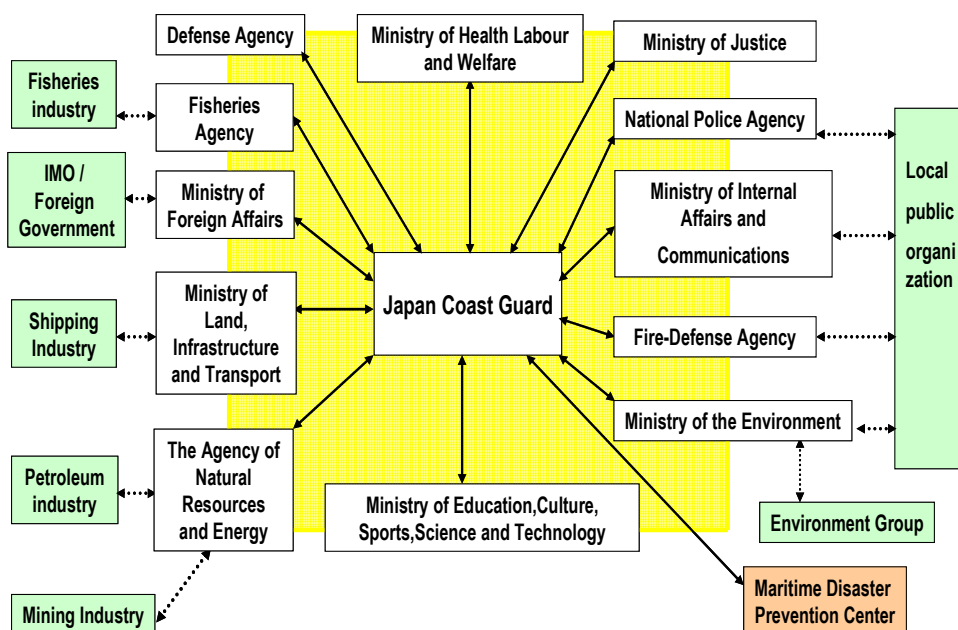


Fig. 5. The basic concept of collaborative relationship based on the national contingency plan

In addition, “The Meeting among the national Government Agencies for Oil and HNS Pollution Preparedness and Response (hereinafter referred to as “The Meeting”) which collects and shares foreign and domestic information on Oil and HNS pollution has been established.

Fig. 6 shows the flow on concrete response to a pollution incident. A captain is obligated to respond to an incident as first-aid measures, and a ship-owner is obligated to respond to an incident primarily. The Law on Marine Pollution Prevention also prescribes response by authorities concerned in order to make certain of implementing response. Concretely speaking, it is prescribed in the text of the response by the JCG, authorities concerned based on request by the JCG, the Maritime Disaster Prevention Center (MDPC) based on contract between a polluter and the MDPC, or order from the JCG.

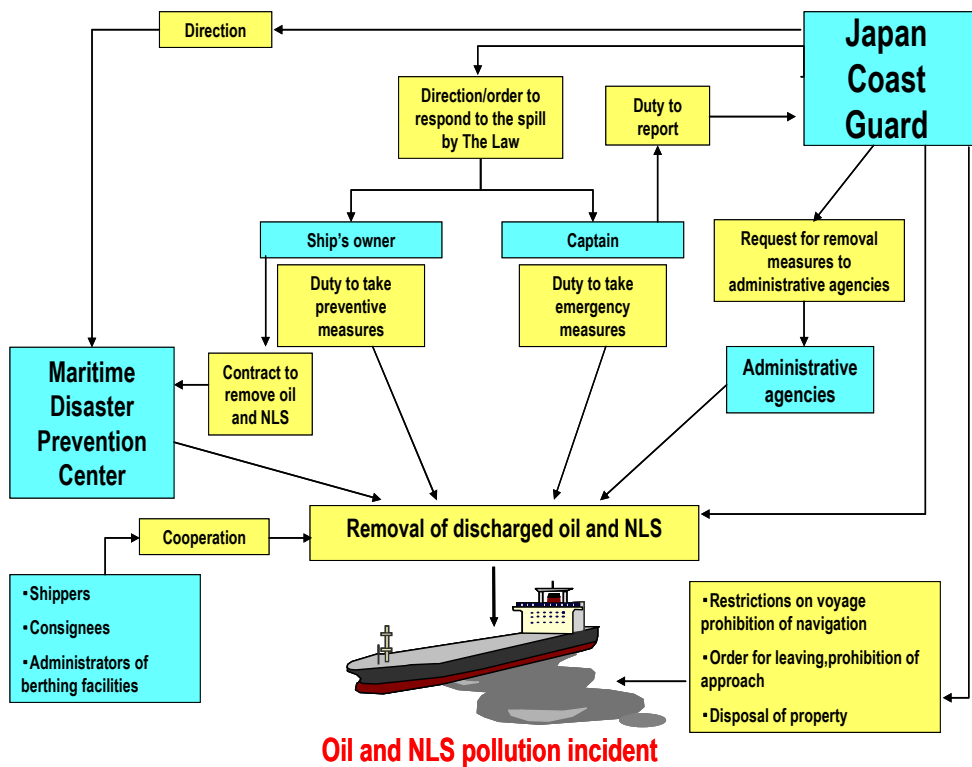


Fig. 6. The flow on response to a pollution incident

5.3 Republic of Korea

National Contingency Plan was established after accommodating OPRC. For accommodating and applying the OPRC-HNS Protocol, Korea Coast Guard is amending the National Contingency Plan for HNS spill incident at sea (Fig. 7 and Fig. 8).

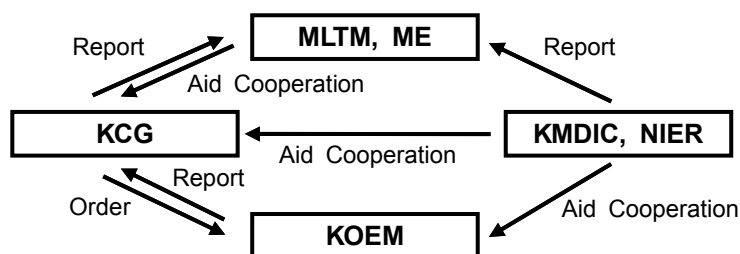


Fig. 7. Communication System on HNS spill incident

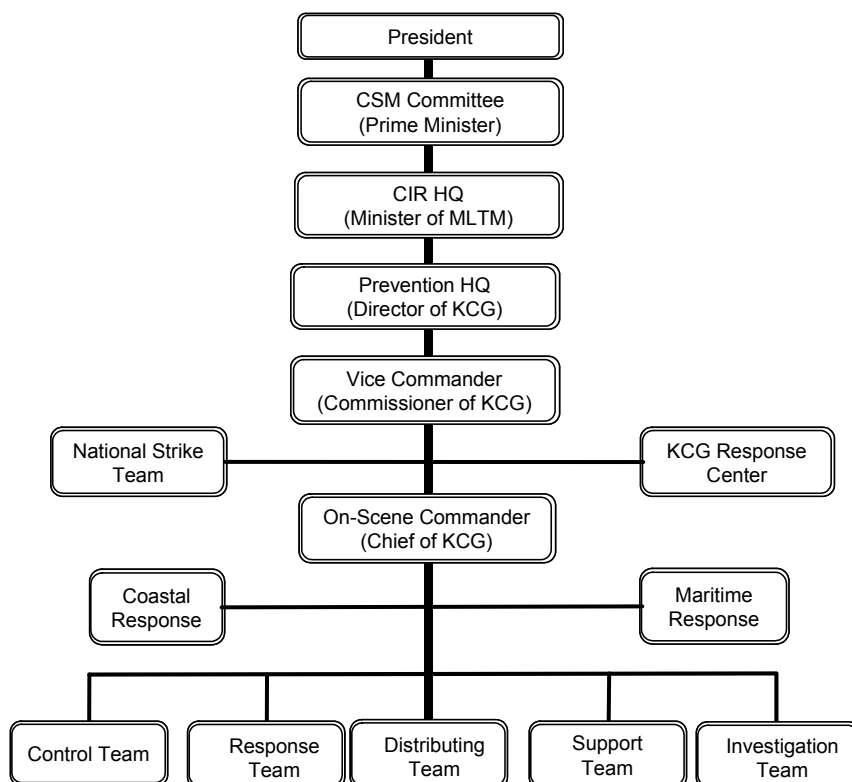


Fig. 8. Response System for marine pollution incident including HNS

There are more than 20 government agencies, local governments and institutes involved with implementing OPRC-HNS Protocol in Korea. The key missions for these organizations are the following:

1) MLTM (Ministry of Land, Transport and Maritime Affairs)

- constitution and amendment of relevant laws and regulations
- accommodative response in IOPC Fund for HNS
- issue of guaranteed insurance policy for HNS
- colligation of database management system for HNS
- management in share of expenses for HNS fund
- management of compensation for HNS incidents
- service in developing damage control technology for HNS incidents

2) KCG (Korea Coast Guard) under MLTM

- planning of national level marine pollution prevention, preparedness and response for HNS incidents
- establishment of international cooperation system for HNS incident management
- development of HNS response technology and its tools
- initial HNS response activity for damage control and site supervision
- authorization in approving HNS handling vessel and coastal facility emergency plan

3) KOEM (Korea Marine Environment Management Corporation)

- operation of HNS marine pollution preparedness and response
- maintenance of HNS response equipment and facilities
- education and training for HNS marine pollution preparedness and response staff
- development and establishment of training program for HNS Preparedness and Response for the potential trainees of management level staff from KOEM, oil refineries, shipping companies, facilities, insurance companies, private response enterprises and government employees, etc. who are in charge of HNS response.

4) KMDIC (Korea Marine Dangerous Goods Inspection Corporation)

- carrying out researches relating to HNS, such as validity of joining OPRC-HNS, establishment of HNS institutes as well as management system.
- operating and maintaining database management system for HNS
- investigating cargo volumes of HNS freight

5) KMI (Korea Maritime Institute)

- design of an establishment plan for HNS damage control and claiming system in 2000
- proposal of an affiliation plan for OPRC-HNS Protocol in 2006.

6) NIER (National Institute of Environmental Research)

- as a government agency under MOE (Ministry of Environment), implementing Chemicals Safety Management Center in November 2001. The Center is engaged in researching for establishment of policies on preparedness and response for chemicals incidents and terror. It also operates technical support and training programs. The main function of the Center is to provide: i) list of HNS that are likely to be involved in incidents as well as research and investigation of the center's own response plan, ii) research and investigation for after-incident effect, iii) provision of information and response preparation for HNS, iv) emergency response plan for HNS leakage incidents and chemicals terror crisis regulated by the execution manual.
- conducting the following collaboration, under the Memorandum of Understanding with KCG, in regard with HNS incidents: i) including 130 types of HNS into chemicals response information system in the selection guideline of KCG, ii) providing technical support and specializing in educational programs for HNS incidents.

7) KORDI (Korea Ocean Research and Development Institute)

- carrying out research projects for establishing National and Regional HNS Preparedness and Response Plan

There is a need to negotiate with Customs Service (Customs House), Ministry of Justice (Immigration Office) and Ministry of Agriculture and Forestry (Plant Quarantine Station), in order to make efficient arrangements (i.e., simplification of entry, immigration control, quarantine) for transferring work force, equipment, vessels, etc. in case of overseas support for HNS incidents in Korea. List and responsibilities of relevant government agencies in implementing OPRC-HNS Protocol are shown in Table 7.

Table 7. *Collaboration between each relevant organizations*

Name of Organization	Details of Collaboration Request
MLTM	- Protection of marine resource and marine safety procedure
MOGAHA	- Mobilization of response personnel (Fire Dept., Civil Defense Corps, etc.)
ME	- Response information on characteristics of HNS and response process - Investigating on degree of damage and wildlife animal rescue
MOL	- Provision of safety manual and health guide for response staff
MOHW	- Provision of medications and medical treatment - Efficient quarantine in receiving support from foreign response agency
MOND	- Provision of military force and equipment - Response equipment and staff support
MOCIE	- Establishment of safety contingency plan for gas, etc.
MOIC	- Emergency communications equipment support for HNS site
MOAF	- Prevention of agricultural and stock-breeding products from pollutant and its spread
MOJ	- Efficient entrance and clearance customs for foreign response personnel
MOCT	- Simplification of foreign response aircraft operation procedure - Vehicle support for emergency transpiration
MOFAT	- International cooperation for HNS response
MOEF	- Speedy customs procedure for foreign response equipment
NFA	- Provision of aircraft for response
NEMA	- Lifesaving and rescue activities - Response personnel support from fire department
NPA	- Police support and site control, guiding residents to shelter
KCS	- Speedy customs procedure for foreign response equipment
Provincial Government	- Provision of Lifesaving, fire suppression, response equipment
Municipality	- Seashore response procedure, fisheries and aquaculture protection procedure - Guiding residents to shelter, mobilization of Civil Defense Corps

5.4 Russian Federation

The decree of the USSR Soviet of Ministers №48 dated on January 15, 1991 on “measures to improve safety at sea, to develop search and rescue at sea, and on oil spill and noxious chemicals response at sea” under the USSR Ministry of Merchant Marine Fleet there was established the State Marine Pollution Control Administration (SMPCA). This SMPCA was responsible for organization and carriage at the sea basins of salvage and rescue works and underwater works as well as oil and chemical spill response operations at sea.

The successor of SMPCA is the State Maritime Pollution Control, Salvage Rescue Administration of the Russian Federation (SMPCSA), which presently is under Federal Agency Maritime and River Transport.

The Decrees of the Government of the Russian Federation № 794 dated 23 July 2004 and № 600 dated 3 October 2006 charged Federal Agency Maritime and River Transport with responsibility to organize the works on prevention and response of emergency oil spills from ships and facilities regardless of their agency and national jurisdiction.

SMPCSA of Russia, which includes the basin emergency divisions, divisions of rescue and underwater works (hereinafter - BASU), maritime specialized rescue-coordination centers and subentries, represents the system of means and resources on organization of work to response to oil and chemical spills at sea, including conduction of works under international responsibilities of the Russian Federation (Fig. 9).

At the BASU zone of responsibility, there is on a standby a multipurpose salvage and tugboat vessel with oil spill response equipment on board, oil spill strike team (MSP) with relevant equipment, auxiliary vessels and boats. In spite of the lack of sufficient funding, SMPCSA organizes the standby of oil spill response in zone of responsibility of the Russian Federation and regularly conducts trainings and exercises, inclusive international exercises.

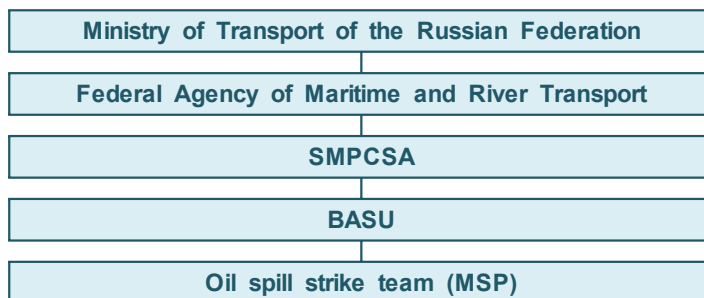


Fig. 9. *The structure of cooperation during oil and HNS spill response*

1) Ministry of Transport of the Russian Federation

- federal body responsible for state policy in the field of transport, including maritime transport as well as response as the membership of IMO

2) Ministry of Civil Defense Issues and of Emergency Situations and Response to Natural Disasters

- conduct coordination of works on elimination of consequences of all emergency situations of trans-border nature.

3) Ministry of Natural Resources

- carry out the state ecological control, as well calculates the damage to the environment as a result of pollution.

4) Federal Agency of Maritime and River Transport

- organize and conduct works in prevention and response to oil spills at sea, and on internal water ways from vessels and objects of marine and river transport

5) SMPCSA

- represent the system of means and resources on organization of works to response to oil and chemical spills at sea

6) BASU

- provides a standby with a multipurpose salvage and tugboat vessel with oil spill response equipment on board

7) Oil spill strike team (MSP)

- conduct oil spill and HNS response operation at sea

Chapter 6. Response resources and technologies in the NOWPAP region

6.1. Equipment and response resources for chemical incidents

There are a number of HNS, and characteristics of HNS are widely varied. Therefore, responder, upon occurrence of an incident, has to know the name and characteristics of HNS and should decide quickly efficient equipment in accordance with characteristics of spilled substances.

In the case of an incident by HNS, there is high possibility that equipment designed for oil spill incident would be used, as appropriate, because chance of using specialized equipment only for HNS is nonexistent or extremely rare.

HNS spill response measures include surveillance and monitoring, on-scene alertness, traffic control, personnel evacuation, personnel rescue, leakage control, pollution control, contamination recovery and cleanup. Therefore, there is a need of response equipment such as airplane, vessel, fire-fighting vessel, surveillance equipment, monitoring equipment, personnel safety equipment, rescue and medical treatment equipment, barge equipment, containment and recovery equipment, chemical disposal and so on.

Surveillance airplane and vessel, barge equipment, containment and recovery equipment are consistent with the information on the oil spill response equipment. Member states have established the equipment for only oil spill response and the relevant information is annually provided to MERRAC.

Regarding the specialized equipment for HNS spill response, member states are establishing the equipment such as personal chemical protection suit, gas detector, HNS response vessel, HNS gel pack, etc.

6.2. Training courses and Exercises related to HNS response

In China, the maritime competent authorities at various levels are in charge of the training of chemical spill response from vessel, which is usually organized with the training of supervision of chemical transportation in vessel or special seminar on typical oil and HNS spill cases. The training course is assigned to Yantai Oil Spill Response Technical Center.

In recent years, the relevant departments of Ministry of Transport and China MSA organized several exercises of search and rescue, and pollution control at sea. The local maritime competent authorities at various levels have periodically organized HNS spill response exercise from vessel in accordance with chemical transportation condition in their jurisdiction areas. Especially, the local governments for HNS transportation have organized response exercises in accordance with the risk of HNS spills:

- In 2000, Shanghai MSA organized chemical spill response and rescue exercise on water,
- In 2004, Shenzhen MSA organized oil and chemical spill response exercise,
- In 2006, Qingdao MSA organized fire and port security exercise on dangerous cargo container.

In Japan, the Coast Guard Academy provides cadets with the education and training which is needed to become JCG executive officers, and has provided training for a JCG officers including National Strike Team, who respond to an incident by HNS.

Maritime Disaster Prevention Center (MDPC) also has a training center furnished with facilities for fire-fighting and oil spill control exercise, and provides various training courses. Hazardous substance control course is one of the examples providing the knowledge on handling noxious substances, including their removal, fire extinguishing and the use of gas detectors.

In Korea, KCG is running a training program and educational curriculums for HNS spill response in Korea as follows:

- Inner Personality-Building Training
- Administration and Policy
- HNS Emergency Response
- Utilization of HNS Response System
- Use of Individual Equipment for Protection
- Discussion within Allocated Task
- Reception and Ice-Breaking Session
- Evaluation Survey and Completion Ceremony
- Coast Guard Identity
- HNS Theory
- HNS Response Manual
- HNS-Related Laws and Regulations
- Use of Portable Detector
- Teamwork Gathering

6.3. Development of technologies for HNS response

When HNS pollution incident happens, it is essential to know the name of spilled substances immediately to figure out its characteristics and to decide response measures. It is therefore very important to establish framework on cooperation between responder and a ship-owner and/or an operator. It is also important to establish a database including characteristics of HNS and information how to handle them, which highly affects decision of strategy to an incident. Member states are developing the HNS database and response manual considering the HNS characteristics and chemical transportation.

Lanshan port in Shandong is the biggest distributing port of NLS (Noxious Liquid Substances) in bulk in the north of China. It is more likely to cause the chemical spill. So Shandong MSA developed the specific project of Study on Dangerous Goods Incidents Response in Lanshan Port. As there are a large number of chemical ports and a large quantity of chemical transportation, Jiangsu MSA developed the specific project of Study on Strategy for HNS Spill from Vessel.

The MDPC of Japan has researched and developed a specialized response measure for an incident by HNS. This measure uses purpose-built deck gun to spray Polymer or Gel Foam with stream. The desired effects are prevention of vapor from spilled substances, solidification of spilled liquid substances to recover spilled substances easily and safely, and fire control. This measure, in particular, is considered to be valuable for an incident which happens in the port area, etc. The MDPC continues research and development to translate this measure into practical applications.

Chapter 7. Framework for claims and compensation for HNS spills

IMO held International Conference in April 2010, adopted a Protocol to the HNS Convention (2010 HNS Protocol). Once the 2010 HNS Protocol enters into force, the 1996 Convention, as amended by the 2010 Protocol, will be called “the International Convention on Liability and Compensation for Damage in Connection with the Carriage of Hazardous and Noxious Substances by Sea, 2010” (2010 HNS Convention), which aims to ensure adequate , prompt and effective compensation for damage to persons and property, costs of clean up and reinstatement measures and economic losses resulting from the maritime transport of HNS,. Russian Federation ratified the HNS Convention on 20 March, 2000.

7.1. People’s Republic of China

In China, there is no framework on claim and compensation for HNS spills, but only for oil spills, taking some articles for example from **the New Regulations on the Prevention and Control of the Vessel-Induced Marine Environment Pollution, which stipulate as follows:**

Article 50 Whoever culpable for causing pollution damage to the marine environment shall remove the hazards and compensate for the damage. Where pollution damage to the marine environment results entirely from the intentional act or negligent act of a third party, that third party shall remove the hazards and compensate for the damage.

Article 53 “The owner of a ship navigating in the sea areas under the jurisdiction of the People’s Republic of China shall, in accordance with the provisions of the competent authority of transport under department of the State Council, arrange insurance or other financial security in respect of civil liability for oil pollution damage from ships, **except for ships with a gross tonnage of less not more than 1,000 that carry cargo other than oils.** The insurance or other financial security in respect of civil liability for oil pollution damage arranged by the ship owner shall be not less than the limits of liability specified in the Maritime Code of the People’s Republic of China or in the international treaties ratified concluded or acceded to by the People’s Republic of China.

The commercial insurance institutions and the mutual insurance institutions that underwrite insurance in respect of civil liability for oil pollution damage from ships shall be determined and promulgate by the national maritime safety administration after soliciting opinions from the insurance regulatory body under the State Council.

Article 55 In case of a ship-source oil pollution accident, the necessary expenses incurred by the relevant units organized by the State for carrying out the emergency handling or the clean-up of the pollution shall be compensated with priority from the amount of compensation for oil pollution caused by the ship in question.

7.2. Japan

There is no original framework on claim and compensation for HNS spills in Japan. Framework on claim and compensation is based on International conventions on claim and compensation and “polluters pay principle.” Act on Prevention of Marine Pollution and Maritime Disaster prescribes that a polluter has to respond to a pollution incident. However, in the case of a polluter who does not respond completely, the JCG is able to order appropriate response measures to the polluter, and ask authorities concerned to respond to pollution incidents. In such a case, the polluter, in accordance with Act on Prevention of Marine Pollution and Maritime Disaster, has a responsibility to cover the cost for response measure implemented by the JCG and relevant authorities.

7.3. Republic of Korea

Regional compensation system and claiming procedure for marine oil pollution is regulated in Oil Pollution Damage Compensation Act, which reflects 1992 FC and 1992 CLC. However, there is no clause pertinent to HNS in the Act and new legislation has being prepared.

7.4. Russian Federation

National law hasn’t direct regulation concerning the issue of damage claim and compensation in case of HNS spills. Decree of the Government of the RF, №

810, 2000 (3.2) "On order of finance assignment from the reserve fund of the Government of the Russian Federation for prevention and combating emergency situations and elimination of consequences of natural disasters" establishes the procedure of assignment from reserve fund of the Russian Federation Government emergency situation prevention and response to acts of nature (hereinafter - reserve fund). Financing of measures for emergency situation of natural and technogenic origin (hereinafter - emergency situations) is made out of the funds of organizations situated in areas of emergency situations, federal law enforcement agencies, funds of appropriate budgets, insurance funds and other sources. In case of insufficiency of the specified means, federal law enforcement agencies and law enforcement agencies of subjects of the Russian Federation can address to the Government of the Russian Federation the request for assignment from reserve fund no later than one month from the date of an emergency situation. Data about quantity of victims and suffered people, the size of material loss, size of allocated and spent on emergency situation response of organizations funds, institutions of local government, law enforcement agencies of subjects of the Russian Federation, federal law enforcement agencies, insurance funds and other sources, and also data on available reserves of material and financial resources should be indicated in this application.

Chapter 8. Recommendations for future regional actions to develop effective regional cooperation system on HNS spills

For the further development of efficient regional system of cooperation in response to HNS spills at sea area, the following arrangements were recommended by NOWPAP members:

- setting up specific projects to study the chemical treatment measures on how to eliminate and mitigate marine pollution and damage after HNS spill
- carrying out the experience exchange and training on HNS spill response
- developing routine tasks related to HNS spill response, such as annual incident statistic of Member States, the lists of institutions and experts related to the HNS spill preparedness and response in the NOWPAP region
- urging the NOWPAP members to ratify, accept or approve OPRC-HNS 2000 protocol as soon as possible
- sharing the information on response ability of the NOWPAP members to an incident by HNS on the information system of MERRAC, as well as response ability to an oil spill incident
- developing specialized equipment for response to incidents by HNS

Annex I. Major chemicals transported in bulk by NOWPAP Members

Annex I-1. *Major chemicals transported in bulk from the People's Republic of China*

Rank in Volume	Chemical Name	Volume of Traffic (Tons)	UN Number	CAS Number
1	Styrene	1,813,492		100-42-5
2	o-xylenes	1,485,805		95-47-6
3	p-xylenes	1,099,320		106-42-3
4	Benzenes	878,285	1114	71-43-2
5	Sulfuric Acid	703,089	1830	7664-93-9
6	Acrylonitrile	456,003	1093	107-13-1
7	Toluene	368,538	1294	108-88-3
8	Xylenes	359,572	1307	1330-20-7
9	Acetic acid	292,512	2789	64-19-7
10	Ethylene glycol	284,354		107-21-1
11	Mixed benzenes	150,690		
12	Methyl alcohol	127,297	1230	67-56-1
13	Methanol	53,166	1230	
14	Chloroform	47,046	1888	67-66-3
15	Tetrahydrofuran	22,830		
16	Phenol	10,961	2821	108-95-2
others		4,425,040		
Total		12,578,000		

Annex I-2. Major chemicals transported in bulk from Japan

Rank in Volume	Chemical Name	Volume of Traffic (Tons)	UN Number	CAS Number
1	Xylene	2,805,279	1307	1330-20-7
2	Benzene	1,779,155	1114	71-43-2
3	Styrenemonomer	1,328,604	2055	100-42-5
4	Methanol	760,825	1230	
5	Toluene	695,212	1294	108-88-3
6	Cyclohexane	466,084	1145	110-82-7
7	Acrylonitrile	370,367	1093	107-13-1
8	Butanol	302,484	1120	71-36-3
9	Methylmethacrylate	274,474	1247	80-62-6
10	Aceticacid	263,329	2789	64-19-7
11	Ethanol	252,413	1170	64-17-5
12	Phenol	243,702	2821	108-95-2
13	Sodiumhydroxide	241,855	1814	1310-73-2
14	Acetone	216,907	1090	67-64-1
15	dichloroethane	214,454	1184	107-06-2
16	Ethyleneglycol	207,494		107-21-1
17	Vinylacetate	190,342	1301	108-05-4
18	Propylbenzene	148,661	1918	165-65-1
19	Octanol	148,392	3082	111-87-5
20	Aceticether	141,813	1173	
21	Cyclohexanol	117,536		108-93-0
22	Methylethylketone	106,230	1193	78-93-3
23	Acrylicacid	100,690	2218	79-10-7
24	Aniline	94,320	1547	62-53-3
25	1-Propanol	78,685	1274	71-23-8
26	Hexane	59,796	1208	110-54-3
27	Isobutylacrylate	58,949	2527	106-63-8
28	Octene	58,750	1993	111-66-0
29	Latex	58,650		9001-33-6
30	Butylacrylate	55,180	1123	141-32-2
31	Diphenylmethane diisocyanate	47,550	2489	
32	Diisopropylbenzene	46,251	3082	25321-09-9
33	Butyleneglycol	46,238		107-88-0
34	Alkylbenzene	42,651	2325	67774-74-7
35	Diethylphthalate	41,619		117-81-7
36	Methylbutylketone	41,299	1245	591-78-6
37	Aceticanhydride	40,947	1715	108-24-7
38	Molasses	40,777		
39	Epichlorohydrin	40,041	2023	106-89-8
40	Naphthalene	36,106	2304	91-20-3
Others		3,970,000		
Total		16,234,111		

Annex I-3. Major chemicals transported in bulk from the Republic of Korea

Rank in Volume	Chemical Name	Volume of Traffic (Tons)	UN Number	CAS Number
1	Aqueous ammonia	14,276,000	1005	7664-41-7
2	Styrene	2,121,000		100-42-5
3	Benzene	2,021,000	1114	71-43-2
4	Methylalcohol	1,816,000	1230	67-56-1
5	Xylene	1,758,000	1307	1330-20-7
6	m-Xylene	1,173,000		108-38-3
7	p-Xylene	1,166,000		106-42-3
8	Ethylene glycol	916,000		107-21-1
9	Sodium Hydroxide	885,000		1310-73-2
10	Sulfuric acid	862,000	1830	7664-93-9
11	Acrylonitrile	669,000	1093	107-13-1
12	Ethylenedichloride	633,000	1184	107-06-2
13	Toluene	313,000	1294	108-88-3
14	Soybean Oil	246,000		8001-22-7
15	Acetic acid	229,000	2789	64-19-7
16	Vinyl acetate	211,000	1301	108-05-4
17	Nitric acid	210,000		7697-37-2
18	Methyl ethyl ketone	180,000	1193	78-93-3
19	Ethylene	177,000	1962	74-85-1
20	Ethylalcohol	164,000	1170	64-17-5
21	Propylene	159,000	1075	115-07-1
22	Butadiene	135,000	1010	106-99-0
23	Acetone	126,000	1090	67-64-1
24	Catalytic cracked clarified Oil	125,000		64741-62-4
25	Propylene oxide	118,000	1280	75-56-9
26	n-HEXANE	117,000		110-54-3
27	Cyclohexane	114,000	1915	108-94-1
28	Fatty acids, Palm-oil, Methyl Esters	107,000		91051-34-2
29	Chloroform	92,000	1888	67-66-3
30	Methyl tert-Butyl ether	92,000		1634-04-4
31	Octanol	86,000	3082	111-87-5
32	Normal Paraffin	82,000		64771-72-8
33	Calcium Lignosulfonate	74,000		8061-52-7
34	EPICHLOROHYDRIN	72,000	2023	106-89-8
35	Methyl Methacrylate	70,000		80-62-6
36	Vinyl chloride	67,000	1902-12-21	75-01-4
37	Sulfur	56,000	1350	7704-34-9
38	Phenol	54,000	2821	108-95-2
39	Ethyl acetate	48,000	1173	141-78-6
40	Phosphoric	37,000		7664-38-2
others		617,000		
Total		32,474,000		

Annex I-4. Major chemicals transported in bulk from the Russian Federation

Rank in Volume	Chemical Name	Volume of Traffic (Tons)	UN Number	CAS Number
1	Coals	1,500,000	1023	
2	Ferrochrom	39,000		
3	Ferrosilicon	31,000	1408	
4	Ferrosilicon slag	3,400		
5	Ferrochrome silicon	1,500		
6	Microsilica	1,400		
	others	73,700		
	Total	1,650,000		

Annex II. List of chemical spill incidents with quantity over 10 tons in the NOWPAP Members

Annex II-1. *List of chemical spill incidents with quantity over 10 tons from 1996 (People's Republic of China)*

No.	Date	Location	Name of Vessel	Nationality	Type of Vessel	Quantity (Tons)	HNS	Cause
1	1997. 07.06	Yangzi River	Chuanliang204, Chuanliang 205	China	barge	330	Concentrated Sulphuric Acid	Sinking
2	1997. 10.08	Yangzi River	Ganfuzhouyou 0005	China	oil tanker	149	benzene	Grounding
3	1997. 10.20	Yangzi River	Nanxi 0016	China	barge	220	Carbon Tetrachloride	Grounding
4	1998. 06.02	Yangzi River	Jiangsu 871	China	tugboat	108	Concentrated Sulphuric Acid	Grounding
5	2000. 06.18	Yangzi River	Hengshanji 0018	China	chemical carrier	49	Organophosphorus Pesticide (methamidophos)	Sinking
6	2001. 04.17	31°03'N, 122°46'E	DAE MYOUNG	Korea	bulk chemical carrier	639	Styrene	Collision
7	2001. 09.04	Yangzi River	Chizhouhuo 178, Zongyanghua 017	China	bulk chemical carrier	203	Concentrated Sulphuric Acid	Collision
8	2001. 09.05	Yangzi River	Yanduguan 9848	China	bulk chemical carrier	150	Concentrated Sulphuric Acid	Collision
9	2002. 07.11	Yangzi River	Ganjinghuo 0005	China	chemical carrier	240	30% Sodium Hydroxide solution	
10	2002. 10.19	30°49'N, 122°38'E	ACCORD	Korea	bulk chemical carrier	225	Methyl Methacrylate (MMA) & Propylene Glycol Methyl Ether Acetate (PGMEA)	Grounding
11	2003. 02.10	Yangzi River	Dongfeng6	China	chemical carrier	300	Concentrated Sulphuric Acid	Grounding
12	2004. 03.15	Yangzi River	Changrun	China	chemical carrier	10	Cyclohexanone	Collision
13	2004. 04.06	22°00'N, 108°30'E	Guiyun1519	China	chemical carrier	100	31% Hydrochloric acid	Grounding & Sinking
14	2004. 09.11	36°43'N, 122°36'E	Jinda266	China	bulk chemical carrier	2,000	32% Hydrochloric acid	Sinking
15	2005. 04.08	31°16'N, 122°52'E	GG CHEMIST	Korea	bulk chemical carrier	67	Toluene	Collision
16	2005. 08.21	31°57'N, 120°02'E	Ocean Queen	Panama	bulk chemical carrier	80	Diethylene Glycol	Hull Crack
17	2006. 06.27	30°57'N, 122°03'E	Zhehuangji701	China	bulk chemical carrier	354	Concentrated Sulphuric Acid	Collision
18	2007. 01.29	36° 52.3'N 122°27.2'E	HUITONG22	China	Chemical tanker	37	Butyl acrylates	Collision & Grounding
19	2010. 03.02	22°8'24"N 113°47'48"E	FRONTIER HACHI	Panama	chemical tanker	1755	Methanol	Collision

Annex II-2. List of chemical spill incidents with quantity over 10 tons from 1990 (Japan)

No.	Date	Location	Name of Ship	Nationality	Type of Ship	Quantity (Tons)	Type of HNS	Cause
1	1994. 02.14	Outside of the Osaka port	Daisyo-maru	Japan	No record	116 kl	Ethyl acetate	Collision
2	1995. 09.06	2.4NM from Honmoku control signal center	HUSUM	Cyprus	Container vessel	Unknown	Sulfur dioxide	Chemical reaction
3	1996. 02.10	Omaezaki	Dai 21 daiho-maru	Japan	Chemical tanker	400 t	Liquid phosphoric acid	Grounding Sinking
4	1996. 02.09	33NM east-southeast from the Cheju, Korea	SUNNY BREEZE	Panama	Tanker	3,794 t	Gas oil	Explosion and Fire Sinking
						226 t	Solvent	
5	1996. 07.03	8NM from the Higashi izu town	Yusei-maru	Japan	Chemical tanker	Unknown	Butyl acrylate	Collision
6	1996. 11.05	5,100m from the lighthouse of the Daikoku dike, Yokohama city	FORMOSA – TWO	Liberia	Chemical tanker	26 t	Styrene monomer	Collision
7	1997. 06.26	Tokyo-bay	Dai 2 takasago-maru	Japan	LPG tanker	extremely small amount	Liquid propylene	Sinking
8	1997. 10.09	Keihin-port, tokyo-bay	BOW – PANTER	Norway	Chemical tanker	20 kl	Mixed xylene (Orthoxylene, Metaxylene, Paraxylene)	Damage of hull
9	1997. 12.12	Keihin-port, tokyo-bay	LODESTAR – SPIRIT	Panama	Chemical tanker	Unknown	Paraxylene	Collision
10	1998. 10.19	Kimizu city, Pref. ChibaOume cotainer pier, tokyo-bay	UNI VITAL	Panama	Container vessel	Unknown	Unknown	Unconnected electric power supply with Cooling machine
11	2000. 05.27	280NM North-west from Naha City	PRATIBHA YAMUNA	Unknown	Chemical tanker	Unknown	Naphtha	Explosion and Fire
12	2000. 08.30	36 NM from the Rishiri Irand	Dai 8 Katu-maru	Japan	Fishing vessel	Unknown	Ammonia gas	Accident to a cooling machine
13	2000. 09.17	1,300m from the Kushirozaki lighthouse	PAO HSIANG No 1	Taiwan	Fishing vessel	Unknown	Ammonia	Grounding
14	2002. 10.05	102 NM west-southwest from Irozaki lighthouse, Pref. Shizuoka	Eiwa-maru	Japan	Chemical tanker	500 t	Xylene	Collision

Annex II.

No.	Date	Location	Name of Ship	Nationality	Type of Ship	Quantity (Tons)	Type of HNS	Cause
15	2003.12.24	10.8 MN from Hoziro light house, Pref. Yamaguchi	SUN VENUS	Panama	Chemical tanker	556 kl	Ethanol	Explosion and fire
16	2005.07.09	Outside of Ube port, Pref. Yamaguchi	Dainisyouturu-maru	Japan	LEG tanker	32 t	Liquefied ethylene gas	Collision
17	2005.07.15	Offing of the Kumano city, Pref. Wakayama	Kyokuyo-maru	Japan	Chemical tanker	300 kl	Crude benzene	Collision
18	2007.01.23	Keisenkita-port, osaka-bay	Sinkawa-maru	Japan	Chemical tanker	Unknown	Phthalic acid	Damage of hull
19	2008.04.02	Unknown (Between Kashima port and Daiozaki)	No.2 Eimei-maru	Japan	Chemical tanker	Unknown	Hydrogen peroxide	Trouble of hull
20	2009.05.15	Outside of Uno port, Okayama Pref.	No.8 Eiifuku-maru	Japan	Chemical tanker	Unknown	Methanol	Collision
21	2009.06.22	Kashima-port	No.29 Kiku-maru	Japan	Chemical tanker	Unknown	Sodium Hydroxide	Sinking
19	2008.04.02	Unknown (Between Kashima port and Daiozaki)	No.2 Eimei-maru	Japan	Chemical tanker	Unknown	Hydrogen peroxide	Trouble of hull
20	2009.05.15	Outside of Uno port, Okayama Pref.	No.8 Eiifuku-maru	Japan	Chemical tanker	Unknown	Methanol	Collision
21	2009.06.22	Kashima-port	No.29 Kiku-maru	Japan	Chemical tanker	Unknown	Sodium Hydroxide	Sinking
20	2010.06.17	Inland Sea, Japan	Keiwa-maru	Japan	Chemical tanker	Unknown	Magnesium Hydroxide	Sinking
21	2011.01.09	off Niigata, Japan	Seiyoh	Japan	Chemical tanker	Unknown	Vinyl acetate monomer	Sinking

Annex II-3. *List of HNS spill incidents with quantity over 50 tons from 1990 to 2000 and over 10 tons from 2001 (Republic of Korea)*

No.	Date	Location	Name of Ship	Nationality	Type of Ship	Quantity (Tons)	Type of HNS	Cause
1	1992. 05.10	34-53°N, 128-57°E	Stainess princess	Greece	Non-Tanker	1600	MFP/MDO	Aground
2	1993. 10.01	37-00°N, 127-45°E	Frountier express	Panama	Tanker	8320	Naphtha	Ran aground
3	1995. 12.22	35-24°N, 129-25°E	Danita	Panama	Tanker	4970	Kerosene	Collision
4	1999. 11.09	N34-54-20, E129-02-30	Young Chemi	Belize	Chemical	988	Chloroform	Collision
5	2000. 04.11	N36-57-36, E126-49-48	No.501 Dae-Lim	Korea	Barge for dredge	164.6	MDO	Explosion
6	2002. 05.13	off Gunsan N35-59-15, E125-50-56	2 Dae-San Pioneer	Korea	Chemical tanker	203.8	Xylene	Collision
7	2004. 05.26	off Tongyeong N34-39-15, E127-57-00	Mornong Express	Panama	Tanker	1,200	Naphtha	Collision
8	2004. 07.08	off Tongyeong N34-36-00 E128-48-05	Xinwanda	Mongolia	Cargo vessel	33.9	MGO	Collision
9	2004. 12.24	Quay for Governmental Vessels, Busan	Jeong-ilStolt heaven, INC (Land Store Facility)			10	T-Xylene (Type C)	Negligence
10	2007. 12.7	off Ulsan N35-27-0 E129-22-6	FOSSANGER	Norway	Chemical tanker	955	Methanol	Collision
11	2009.0 1.08	off Taean 37°02'00"N 126°09'00"	Samho Gloria	Marshall islands	Chemical tanker	8689	Parm oil	Intention
12	2010.0 3.28	off Yeosu 37°27'38"N, 126°36'59"E,	Shinyoung1	R.Korea	Tanker	59	Nitric acid tanker cleaning water and Waste oil	Rupture of hull

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