RAPID ENVIRONMENTAL ASSESSMENT

Capsized ferry 'MV Princess of the Stars' Republic of the Philippines

A joint European Commission/United Nations Environmental Emergency Response Mission

July 2008

European Commission
DG Environment
Monitoring and Information Centre (MIC)

Joint UNEP/OCHA Environment Unit
(JEU)

EUROPEAN COMMISSION

OCHA

Office for the Coordination of Humanitarian Affairs

UNEP
United Nations Environment Programme

UNITED NATIONS

Monitoring and Information Centre (MIC)
DG Environment
European Commission
B-1049 Brussels
Tel. +32 2 29 85060
Fax. +32 2 29 90314
http://www.ec.europa.eu/environment/civil

Joint UNEP/OCHA Environment Unit
Palais des Nations
CH-1211 Geneva 10
Switzerland
Tel. +41 (0) 22 917 3484
Fax +41 (0) 22 917 0257
http://ochaonline.un.org/ochaunep

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Executive summary

The MV Princess of the Stars ferry capsized about three kilometres from the shore of Sibuyan Island, in central Philippines, on 21 June 2008 during the passage of Typhoon Fengshen. Less than 60 of over 850 passengers survived the disaster.

During rescue and recovery operations, it was discovered that the ferry carried a substantial amount of highly toxic pesticides[1] in its cargo. It appears that these and many other chemicals were packed in a 40-foot container and a 10-foot container. The capsized ship also contained 100,000 litres of fuel for the engines.

The Philippines Government requested assistance from the United Nations, and the request was answered by the Joint UNEP/OCHA Environment Unit and the European Commission's Monitoring and Information Centre, who jointly offered to assess and address issues related to the pesticides aboard the ship. The Joint EU/UN Assessment Team deployed to the Philippines from 9 to 20 July 2008. Its primary objective was to gather, consolidate and analyse available data regarding the secondary impacts of the chemicals contained in the capsized ferry, and, on the basis of this information, evaluate on-going and planned response activities (national and international). The assessment also focused on identifying gaps in response activities, and making recommendations on further possible international assistance. The team undertook on-site assessments on land and at sea, and surveyed the wreck by plane. Team members had extensive interaction with relevant national agencies, including the Department of Transportation and Communications, the 'Princess of the Stars' Task Force, the Department of Health, the Fertilizer and Pesticide Authority, the Department of Agriculture, the Coast Guard, the Environmental Management Bureau of the Department of Environment and Natural Resources, the National Disaster Coordinating Council, the Bureau of Fisheries and Aquatic Resources, the National Pesticide Analytical Laboratory, the University of the Philippines, the National Epidemiology Centre and the National Tuberculosis Centre.

The assessment noted the successful efforts made by national agencies to monitor the situation with regard to possible contamination of sea water by chemicals and oil.

It also provided recommendations in a number of areas where improvements can be made concerning crisis organisation (such as contingency planning, and the establishment of a command post), sampling and monitoring (such as sampling procedures, analytical protocols, and bio-monitoring), and the next steps for the salvage operations (especially contingency planning in the event of further damage to the vessel).

Detailed conclusions and recommendations can be found in the report.

[1] Including 10 tonnes of endosulfan and unknown quantities of propineb, methamidophos, niclosamide and carbofuran.

Action Summary

The expert team conducted a general evaluation of the environmental and health risks posed by the wreck in close collaboration with national authorities to identify needs and gaps in aid offered/provided, and to make recommendations on possible further expertise and assistance needed.

As to the situation on site, on the shoreline, no visible impact of the wreckage (no oil) was observed. No oil was observed on the sea surface at the time of the mission. For the time being, no leakage of chemicals or oil from the wreck has been detected. The expert team underlined the many successful efforts made by national agencies to prevent the contamination of sea water by chemicals and oil.

The presence of five pesticides was confirmed in two different containers: one, a 40-foot container, contains only endosulfan; the other, a 10-foot container, contains four other pesticides: carbofuran, propineb, metamidophos, niclosamide.

While the team focused mainly on chemical and oil products (providing advice on properties behaviour, reactivity, and degradation products), the team also underlined that other products and electrical equipment containing environmentally hazardous components such as heavy metals, antifouling compounds in marine paint, and PCBs in transformers were present in the wreck. These chemicals should be included in the analysis and risk assessment programs.

The team commended the Department of Transport and Communications on the technical steps already taken to monitor the situation, which were entirely appropriate. In addition, they suggested means for improving the monitoring of water, sediments, and air, and recommended the establishment of a bio-monitoring program. Experts also provided technical advice on the most appropriate sampling methods, and analyses to be undertaken. This will help detect any leakage of the chemicals during salvage operations that could threaten marine life and, by extension, human populations.

The experts also recommended:

- improved surveillance and preventive pollution measures, and provided technical suggestions for equipment to monitor and contain possible oil slicks;
- drafting of a full health and safety plan for the salvage operators, including hazards linked to all products on board, particularly for personnel who will be in proximity to the vessel;
- preparation of a complete chain of recovery, storage and elimination/disposal of chemicals before salvage operations begin;
- that Philippines authorities establish a contingency plan to enhance preparedness and response to any future disasters;
- that expertise on ocean currents be sought to further enhance monitoring of the situation, which will be crucial for future risk management decisions by Philippines authorities.

The experts also identified numerous information gaps, such as product packaging details which should be requested from the manufacturer(s)/shipper(s), and proposed that experiments be conducted to simulate the behaviour of these materials in similar conditions.

The **Joint UNEP/OCHA Environment Unit,** integrated into the Emergency Services Branch of the Office for the Coordination of Humanitarian Affairs**,** is the United Nations mechanism to mobilize and coordinate the international response to environmental emergencies. It also assists countries with response preparedness activities.

The **Monitoring and Information Centre** of the European Commission facilitates the mobilization and coordination of EU civil protection assistance in response to major disasters. It is the operational centre of the Community Civil Protection Mechanism, through which resources from EU Member States may be mobilized to provide immediate assistance in responding to major emergencies. The Mechanism has developed experience in marine pollution response within the EU and in international marine pollution control operations.

Introduction

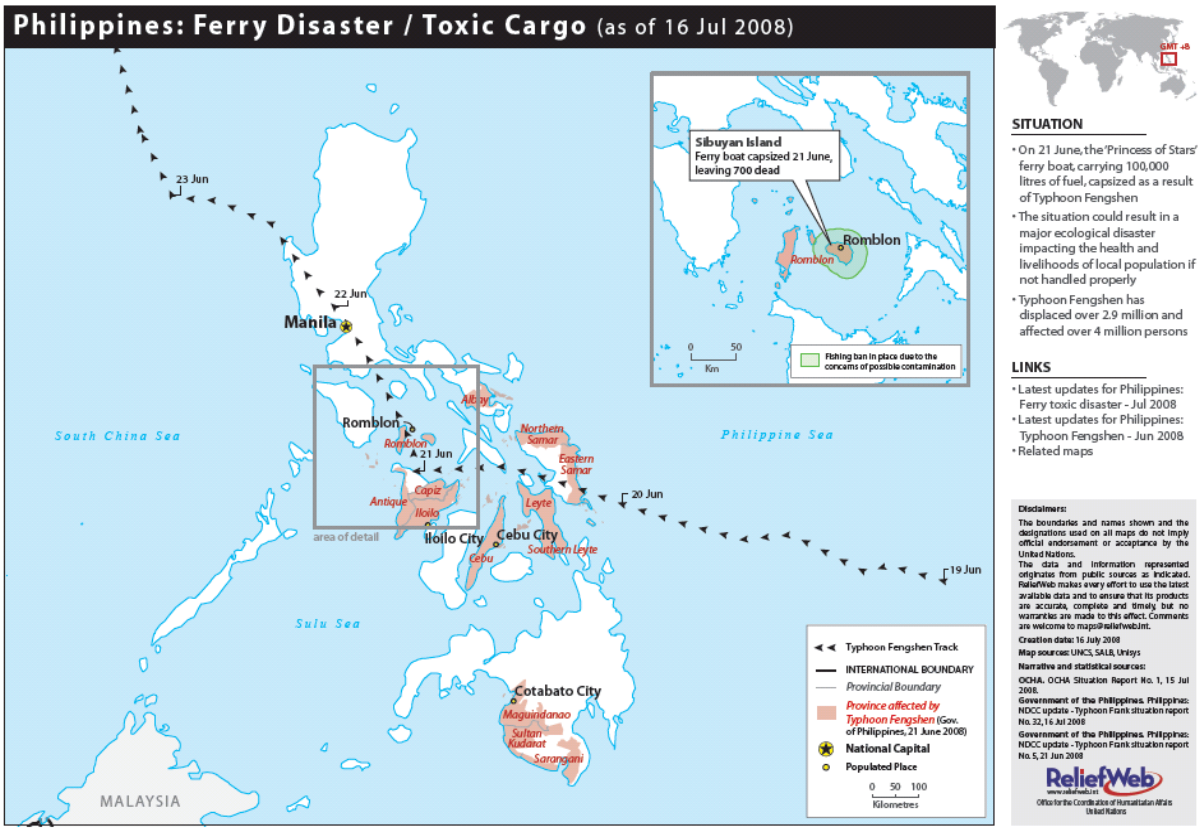
This report describes the environmental implications of the sinking of the vessel MV Princess of the Stars, which sank with a toxic cargo on 21 June 2008. The report is based on the findings of a team of international experts deployed to the site at the request of Philippines authorities. This report is intended as a tool for national decision-makers and international donors as they consider next steps to mitigate risks from this disaster. The report provides an analysis of the situation to provide context; the findings of the assessment; and conclusions and recommendations.

1. Background and Situation Analysis

1.1 Cyclone Fengshen and the MV 'Princess of the Stars'

The *MV Princess of the Stars* capsized off Sibuyan Island in Romblon on 21 June 2008 during the passage of Typhoon Fengshen. Of the more than 850 people aboard, less than 60 survived.

At the time of writing, the 24,000-tonne vessel was positioned upside-down on a reef south-west of Sibuyan with part of its 193-meter hull jutting out from the water. The vessel was confirmed to be resting on the seabed at an angle while listing on its portside, with only between five and ten meters of its bow breaking the surface.



As of 6 July 2008, less than 60 people had survived the tragedy, while 173 bodies had been recovered and the rest were unaccounted for (most are believed to have remained trapped inside the vessel). National coast guard and navy, assisted by the US Navy, tried to retrieve the bodies from the ship but operations were suspended on 28 June after it was discovered that the vessel was carrying a shipment of endosulfan, a toxic pesticide, and other chemicals that risked leaking.

At this stage, the need to perform a rapid environmental assessment of the situation became quite apparent.

> ***Endosulfan*** *is a neurotoxic organochlorine insecticide and it is highly acutely toxic. It is banned in the European Union, Cambodia, and several other countries, while its use is restricted in other countries, including the Philippines. Because of its high toxicity and high potential for bioaccumulation and environmental contamination, a global ban on the use and manufacture of endosulfan is being considered under UNEP's Stockholm Convention.*

Picture 1: Location of the wreck position (12°21'0 N / 122°30'0 E).

1.2 United Nations - European Commission Cooperation

The Joint UNEP/OCHA Environment Unit (JEU) and the European Commission Monitoring and Information Centre (MIC) began monitoring the accident through media reports at the onset of the disaster. Jointly, they offered assistance to Philippines authorities, who accepted on 4 July.

The expert team arrived in the Philippines on 11 July and consisted of the following members:

- Dr Stéphane Le Floch, a marine chemist; assessment expert (France)
- Dr Rune Berglind, an ecotoxicologist (Sweden); and
- Mr. Antonín Petr; MIC liaison officer

On-site, the team was accompanied by Dr John Juliard Go, World Health Organization (WHO) liaison officer.

The expert team received logistical support on-site by the Government of the Philippines, the EC Delegation, the UN Development Programme (UNDP), and the World Health Organization (WHO).

Their objectives, methodology and observations are described in more detail below.

1.3 National Response

A Task Force chaired by the Undersecretary for Maritime Transport at the Department of Transportation and Communications, Maria Elena Bautista, was activated and, in close coordination with WHO, has been providing leadership in managing and coordinating the response.

NPAL has deployed an on-site laboratory to Romblon, Philippines to test water periodically for endosulfan. The Department of Health (DoH) suggests testing for other chemicals, namely metamidophos and carbofuran, given that these were also tested from biological samples from divers who went to the site. Likewise, DoH suggested regular sampling of marine life and sediments. To alleviate the hardship caused by a fishing ban instituted following the disaster, authorities will provide assistance to affected fishing communities on Sibuyan Island. This will include rice distribution of three kilograms per family of four; importation of commercial items like meat and canned goods, to be sold at reduced prices (prices of goods in Sibuyan have risen following the disaster); provision of alternative livelihood means, including distribution of vegetable seeds, piglets, chicken, etc. for extra income and/or food; provision of cash for work; importation of fish from areas not covered by the ban. BFAR will also provide aquaculture training and assistance to communities.

Due to the fact that 10 metric tonnes of endosulfan, recognized as a highly toxic substance, are still submerged in one container inside the wreck, Philippines authorities decided to establish a safety and quarantine zone.

This zone corresponds to the area within a five-kilometre radius from the wreck, which was calculated based on the solubility and the toxicity of endosulfan. In this area, any form of harvesting of fish and other marine life is banned.

In addition, a sampling procedure of water and marine organisms was established in order to determine the presence of contamination. To date, no pollution has been reported.

2. Objectives, methodology and observations of the EU/UN expert team

2.1 Objectives

The objective of the EU/UN expert team was to evaluate the environmental and humanitarian risks and impacts posed by the chemicals in the wreck and to identify outstanding needs. The team also made recommendations on further possible international assistance.

2.2 Methodology

During the mission, the expert team received extensive briefings from Philippines authorities, in particular the Department of Transportation and Communications, the 'Princess of the Stars' Task Force, the Department of Health, the Environmental Management Bureau of the Department of Environment and Natural Resources, the Fertilizer and Pesticide Authority, the National Pesticide Analytical Laboratory, the Bureau of Fisheries and Aquatic Resources, the Coast Guard, the Department of Agriculture, the National Disaster Coordinating Council, the University of the Philippines, National Epidemiology Centre, and the National Tuberculosis Centre.

To support these activities, staff at the JEU in Geneva coordinated their activities with other relevant international organizations, such as the International Maritime Organization, the Secretariat of the Basel Convention and UNEP, as well as with various countries and national focal points. Both the JEU and the MIC in Brussels ensured that information about the mission's progress was disseminated to a wide audience. MIC Messages and OCHA Situation Reports were based on daily updates sent by the team to the MIC headquarters. Information was also shared using the Virtual On-site Operations Coordinating Centre (V-OSOCC), managed by OCHA.

The IMO, upon request of the Government of the Philippines, mobilised a senior salvage expert from 18 to 25 July to further assist the authorities with the salvage operations.

2.3 Observations

2.3.1 On-site assessments

In addition to interviews, the expert team performed surveys conducted by plane, boat, and on land. This chapter describes the general observations from these surveys and interviews. No independent sampling was undertaken by the expert team.

Little information was available on the hydrodynamic parameters of the affected site, which is of importance for any pollution plume modelling and contingency planning. Information on tides (tide amplitude is around one metre in the area), currents and weather at the site of the wreck is of the utmost importance to understand the behaviour of the products in case of a

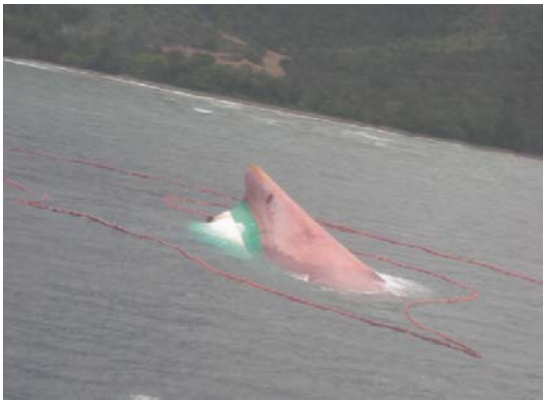
leakage or a spill. In particular, information on local currents would help to adjust the size and shape of the exclusion zone. A visual inspection indicated that the surface current was along the shoreline of Sibuyan Island in a northwest direction.

On 15 July, the national coast guard organised an aerial surveillance (picture 2) and a survey of the wreck (pictures 3, 4 and 5). As an oil slick had been reported, the coast guard's Oil Spill Department deployed a boom around the wreck which is clearly visible from the pictures.

Picture 2

Picture 3

Picture 4



Picture 5

During the aerial survey, no surface oil contamination was observed. However, due to the chemical nature of the fuel (marine diesel oil) and the likelihood that any spill could have evaporated, the experts could not confirm whether or not there had been a leakage of oil.

To further identify possible sightings of oil or sheen on the water, the expert team performed a survey by boat around the wreck in the afternoon (pictures 6, 7, 8 and 9), during which no oil was sighted.

Picture 6

Picture 7

Picture 8

Picture 9

It appeared difficult to maintain the boom in place due to meteorological and oceanic conditions (wind and waves). The coast guard decided to anchor the boom, but did not succeed due to sea depth and weather conditions. In addition, the boom twisted around itself (pictures 10 and 11), and seemed unsuitable for these sea conditions (pictures 12 and 13 and Appendix 1).

Picture 10

Picture 11

Picture 12

Picture 13

Lastly, the expert team undertook a number of shoreline surveillances, whereby no visible impact of any oil was observed either.

2.3.2 Sampling and analysis

A mobile laboratory has been operational since 15 July. The Environmental Management Bureau of the Department of Environment and Natural Resources (EMB-DEHR) took seawater samples once a day with a Niskin bottle (picture 14). Samples are taken at four points, 20 metres from the wreck at constant depth (≈ 33 m), and at one point in the direction of the open sea as a control point. In addition, *in situ* measurements of the following oceanic parameters; water temperature (≈ 29 °C), dissolved oxygen (≈ 6.09 $mg.L^{-1}$), pH (≈ 8.23), salinity (30.2 to 30.4 $mg.L^{-1}$), conductivity and total dissolved matter (picture 15), are taken.

Picture 14

Picture 15

Pictures 16 and 17 show the mobile laboratory in operation. The mobile laboratory can perform sediment and sea water analyses. For biological analysis, samples are sent to Manila.

Picture 16

Picture 17

2.3.3 Cargo

Based on available information including the type of engines on board the vessel and details contained in the Lloyd's ship register, the expert team believes that the vessel uses marine diesel oil. This oil is not considered as persistent: if spilled at sea and not recovered, it evaporates and disperses. However, further investigation is warranted because other fuel oils such as IFOs (Intermediate Fuel Oils) and HFOs (Heavy Fuel Oils) are persistent: if not recovered or dispersed, they will remain in the environment and possibly impact shorelines. They may also emulsify, leading to a drastic increase in viscosity as well as a significant increase in volume. According to the nature of the pollutant and weather/oceanic conditions, the final mixture could contain up to 80 % water.

Additional environmental impacts of diesel oils could include:

- toxicity/vapour cloud in the air due to evaporation;
- potential for fire/explosion;
- impact on marine life and resources due to dispersion in water.

Diesel oil could also damage the divers' suits, in particular the fabric and seals. This has to be taken into consideration when preparing salvage operations.

Behaviour of oils in open sea can be predicted using simple software, like ADIOS, developed by the United States National Oceanic and Atmospheric Administration (NOAA) and available at the French Centre de Documentation, de Recherche et d'Expérimentations sur les Pollutions Accidentelles des Eaux (Cedre). Input parameters needed are the nature of the oil, wind (and current) speed and direction, water temperature, salinity and sediment load.

If oil has been reported on the surface, it is imperative to assess what type and quantity of oil has escaped/is escaping from the ship:

- all the bunker oil;
- part of the bunker oil;

- lubricants;
- various oils in pipes and engines coming into contact with the sea.

The best way to assess the quantity of oil and its evolution is to carry out aerial survey missions using small aircraft (planes or helicopters). Observers should be able to report:

- position of slicks;
- size and thickness of slicks;
- appearance of slicks (emulsification induces a change in colour).

The drift of oil slicks should be monitored through aerial observation. It can be predicted using specific models. Satellite imagery could be also useful in certain weather conditions

2.3.4 Pesticides

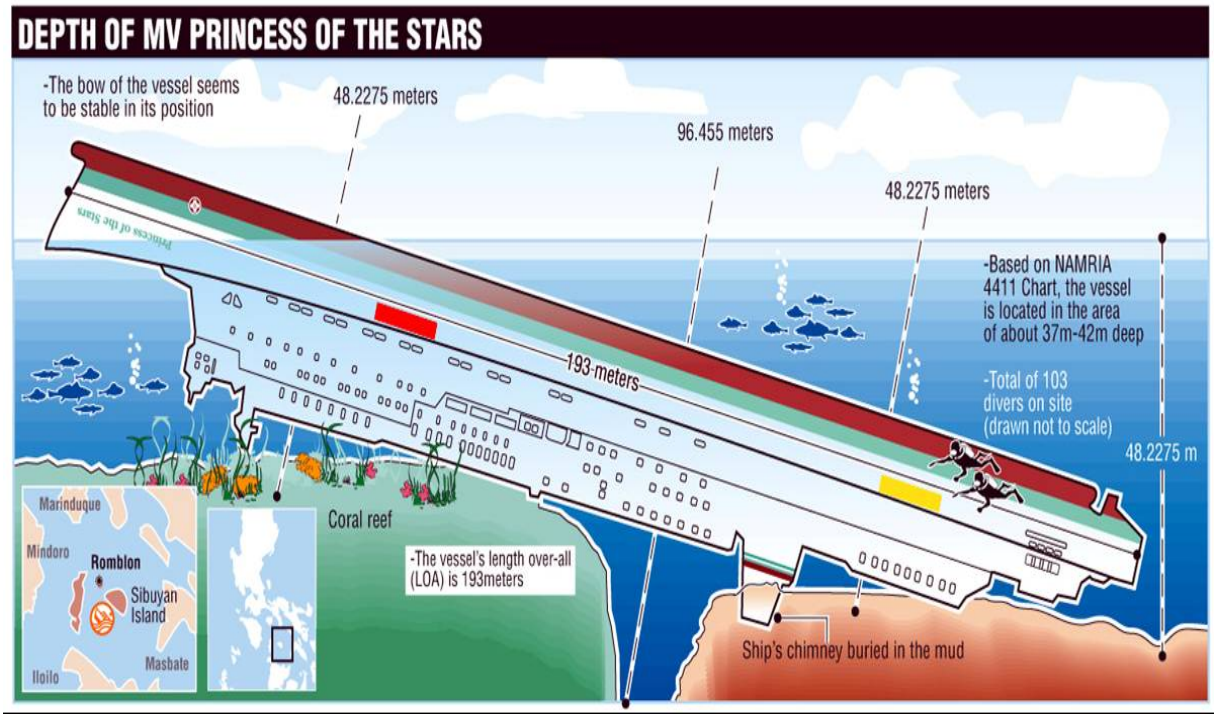
Several chemical products were identified on the ship manifest such as paints and solvent (see Appendix 2). However, Philippines authorities requested the expert team to focus on the pesticides present in the cargo.

2.3.4.1. Names and quantities of identified pesticides

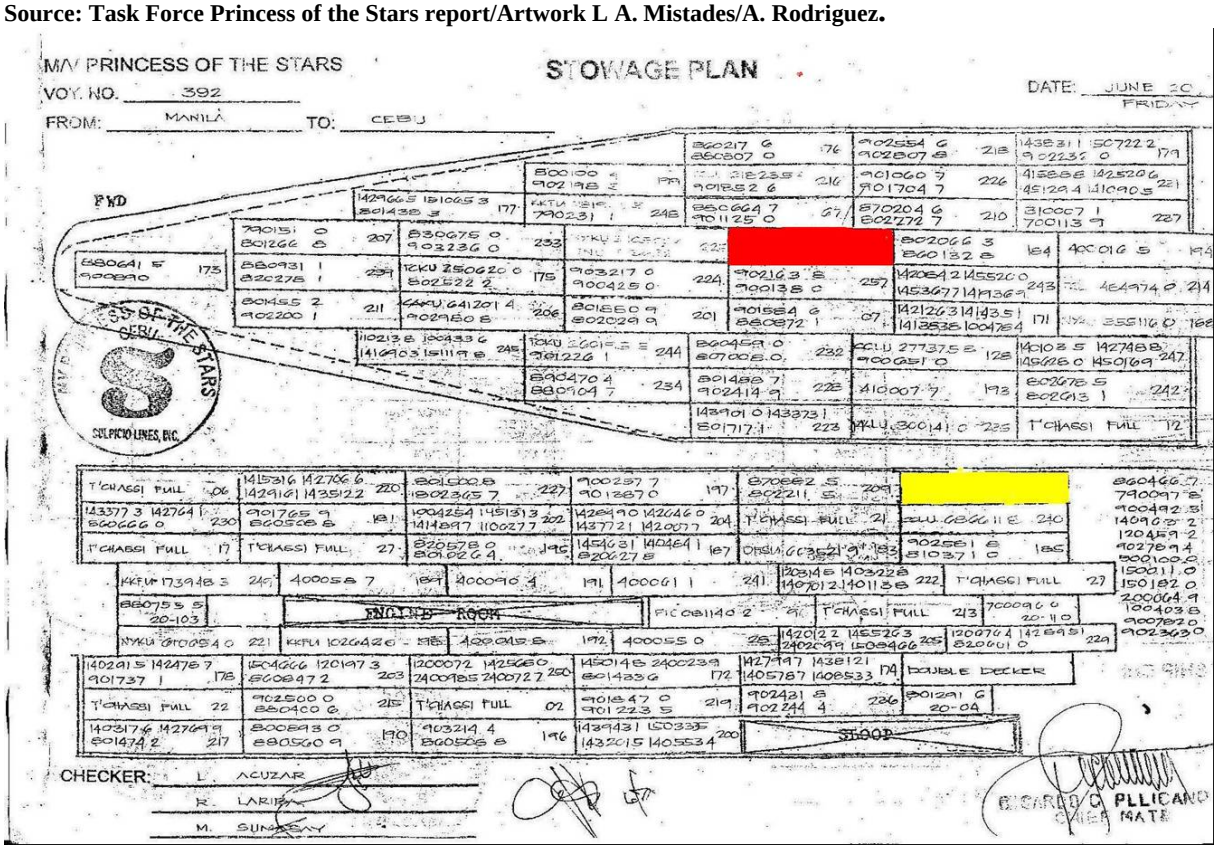
Five pesticides were identified from the manifest in two different containers: container no 1, a 40-foot container, contained only endosulfan; and container no 2, a 10-foot container, contained the four other pesticides. Container no 1 was located at the bow and the container no 2 at the stern.

	Commercial Name	Active agent	Quantity	Packaging
Container 1	Endosulfan (organochlorine pesticide)	Endosulfan (94%)	25 kg x 400 (10 000 kg)	400 Fireboard boxes in a 40-foot container
Container 2	Antracol WP 70	Propineb	392 kg	Sealed aluminium pouches in cardboard outer cartons
	Tamaron 600 SL	Metamidophos	150 litres	Sealed co-ex bottles in cardboard outer cartons
	Trap 70 WP	Niclosamide	17.5 kg	Sealed aluminium pouches in cardboard outer cartons
	Fuerza GR 3	Carbofuran	501 kg	Sealed PE liners and polypropylene outer bags

Annex 3 contains a table summarising the basic data on the five above-mentioned substances.



Source: Task Force Princess of the Stars report/Artwork L A. Mistades/A. Rodriguez.



The preliminary step in the risk assessment process is to understand the behaviour at sea of these pesticides: will they float, evaporate, sink, dissolve or degrade into the water?

After this stage, the knowledge of local currents is imperative to understand the spreading of the chemicals in the environment (dispersion, dilution, sedimentation, flocculation, drifting at

the surface). Strong currents will mean rapid dispersion and dissemination of the products, whereas absence of current will mean stagnation of the products around the wreck. Of course, this will depend on the location of the containers. If these are in a closed, remote part of the ship, dissemination may be negligible even if there are strong currents around the wreck.

Depending on this behaviour, it will be possible to:

- find out in which environmental compartment the product will end up (water, sediment, air) or if the product will stay inside the ship;
- determine a sampling scheme;
- assess the risk for divers;
- assess the risk for coastal populations (vapour cloud);
- assess the risk for marine resources;
- possibly implement pollution response operations.

In case of accidental release, pesticides on board will sink and/or dissolve gradually depending on their physical and chemical properties.

2.4 Biological monitoring of possible impacts

The concentrations of the pesticides should be monitored by taking biological samples close to the wreck and close to the sea bed (several chemical compounds sink). This makes it possible to assess the potential for exposure as well as the level of exposure for marine life in the area.

There were also, according to the cargo manifest, chemicals, products and electrical equipment that contained environmentally hazardous components such as heavy metals, antifouling compounds in marine paint, and PCBs in transformers. These chemicals should be included in the analysis program and the program for risk assessment, because some of them may affect marine life for a long time (endosulfan is very persistent in the environment and is frequently found in environmental compartments, while PCBs have a long term effect).

These parameters warrant a regular sampling close to and inside the wreck, to make sure that salvage operations can be carried out in safe conditions.

3. Conclusion and Recommendations

3.1 Conclusions

- Based on observations made and information available during the time of the joint EU/UN expert assessment mission, there appears to be no major leakage of toxic chemicals from the capsized 'Princess of the Stars' ferry.

- Monitoring of water, sediment and air by national authorities has generally been adequate, although there is room for improvement.

- While there appears to be no major immediate risk posed at present by toxic cargo of the 'Princess of the Stars' ferry, this situation could rapidly change if any further damage occurs to the ship – for example, during the next typhoon to strike the area or during the salvage operation.

3.2 Recommendations

3.2.1 Divers and equipment

According to the results of the investigation carried out by the experts on the scene, it seems that the booms used are not well adapted to the situation. Philippines authorities should ask for specific advice in order to check which types of equipment could be appropriate for their needs (such as booms, sorbent, dispersant).

As regards risks for divers, technical information regarding the resistance of the various parts of the diving suits and equipment (such as fabric and seals) to the chemicals involved should be requested from the manufacturers of such equipment. If the chemicals do not come into contact with the divers because of sufficient resistance of the diving suits, risks for exposure of the divers are then extremely limited.

The effect of other products on diving equipment should also be taken into consideration. Onboard the wreck, there are containers loaded with products such as solvents, light oils, dielectric oils (PCBs), battery acid etc. which could damage the suits and expose divers to pesticides and other toxic products. A full health and safety plan for operators should be designed, including hazards linked to all products on board.

There should also be a health and safety plan, including the possibility for damaged containers/packages to be stored safely on board; an overpacking device large enough to contain chemicals; continuous control of vapours, fumes and fire; an explosion prevention system; etc. A complete chain of recovery, storage, and elimination/disposal of chemicals must be drafted before operations start.

3.2.2 Ongoing monitoring and analysis

It is important to monitor potential pollution by sampling seawater and sediment. The sampling scheme should be designed according to currents and it should include sampling inside, close to and at defined distances from the wreck. It is urgent to obtain data on currents on site to better define the area which may potentially be affected by pollution.

Product analysis should involve initial chemicals, but also decomposition/degradation/ hydrolysis products. Furthermore, the analysis should include the environmentally hazardous chemicals present in the products declared in the cargo manifest. The sum of the concentrations of all these chemicals (pesticides and declared chemical products) in the water at the site of the accident justifies an assessment of the impact the chemicals that could be leaking from the wreck may have on the environment. The help of an expert on pesticide analysis could be requested to establish analytical protocols.

Potential pollution due to leakage/spill from the container(s) should be compared with the background levels of such products in sea water in the area and to the daily input of agricultural chemicals from nearby rivers. For this reason, a control site close to the shoreline should be defined.

In addition, marine life should be monitored. The level of contamination could be determined in the tissues of caged bivalves (i.e. in the hepatopancreas and in the foot separately, if possible, from mussels), which will be placed in the vicinity of the wreck taking into account the current. The sampling procedure (number of cages, number of organisms, and selection of a control site) will be based on the duration of the survey.

3.2.3 Removal of containers

As regards removal of the containers, if this operation is considered necessary, it should be undertaken by a specialised company, such as a salvage company. The salvage master should make a proposal that includes the removal procedures to be considered, as well as a pollution prevention plan to be examined and approved by the authorities.

3.2.4 Further recommendations

Additionally, the following technical recommendations can be made:

1. The sampling procedure tests air, water, and sediment, but this could be improved. For example:

    - each existing point should be sampled at two different depths (near the bottom and also near the surface);
    - a new point inside the area confined by the boom should be added;
    - the control point should be moved from the open sea to the shoreline, as the level of contaminants should be higher in shallow water;
    - more points within the current should be added to cover a larger area.

2. Biological sampling does not seem to be performed regularly yet. To prevent this lack of data, a bio-monitoring program should be defined and implemented by using, for example, caged mussels. Depending on the duration of the bio-monitoring program,

which should at least be linked to the duration of the salvage operation, a number of mussels could be submerged, and three of them sampled once a week.

3. Sediment sampling does not seem to be performed regularly either.

4. Concerning the analytical procedures used, some suggestions can be made:

    - sea water should be stabilised immediately after the sampling to avoid endosulfan degradation. The addition of 10 mL of hydrochloric acid should be sufficient to stop this phenomenon. Furthermore, an internal standard such as pentachloronitrobenzene ($C_6Cl_5NO_2$) should be added to take account of the amount of compound lost during the liquid – liquid extraction. It is important to note that the response strategy is based on the level of sea water contamination, so it is essential to carry out analysis of high quality;

    - biological samples should be dissected and special organs should be frozen as soon as possible. The liver and the kidneys should be extracted independently of the other tissues as these organs are well-known indicators of pollution.

As can the additional following recommendations:

5. The expert team is of the opinion that Philippines authorities should establish a contingency plan at governmental level in order to be prepared to cope with future disasters similar to that of the 'MV Princess of the Stars' wreck. External experts could help in this work.

6. When such accidents occur, all information concerning the emergency response should be centralised at a command post, which could be located in Manila. At this place, it will be possible to obtain information concerning the incident itself; which institutes are involved in the response; who is in charge of the different tasks; and site conditions (such as weather and currents).

7. In this particular case, more precise information about product packaging should be requested from the manufacturer(s)/shipper(s) and the behaviour of the packaging should be taken into consideration. The containers are upside down and water may have infiltrated them. The packaging may therefore have been damaged and water may currently be soaking the cardboard, leading to gradual leakage. One possibility to overcome this lack of information is to perform an experiment by submerging a similar package in a tank of seawater.

8. Philippines authorities and salvage operators should ensure that a comprehensive disposal plan is developed and activated before the start of any salvage operation so that all possible measures may be taken to avoid leakage of toxic materials during the salvage operation. If there is a need for further emergency assistance, the EU and the UN remain on standby to consider any such request.

APPENDICES

Appendix 1: Classification of floating booms, pictures

Appendix 2: Evaluation of Hazardous Chemicals in the Cargo Manifest of Sulpico Lines M/V Princess of the Stars

Appendix 3: Final debriefing meeting at Manila

Appendix 4: Toxic chemicals profile tables

Appendix 5: Request for assistance, Philippines Department of Transportation & Communications

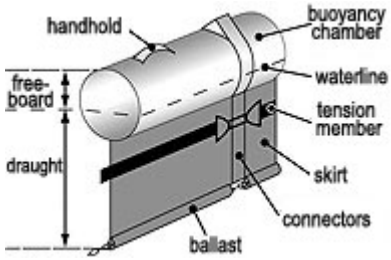
Appendix 6 OCHA Situation Report #1

Appendix 7 Abbreviations

Appendix 1: Classification of floating booms, pictures.

A boom is a mechanical screen used to contain and restrict the movement of floating substances.

A floating boom comprises various elements.

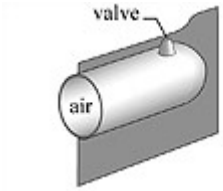


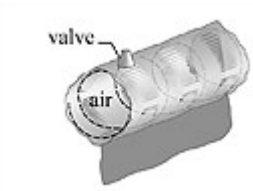
There are several ways of classifying booms according to various criteria:

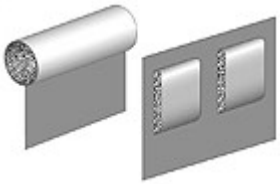
- Size:
  small < 0.60 m 0.60 m <medium < 1.20 m large > 1.20 m

- Type of float:

Inflatable boom Self-inflating boom Permanent boom

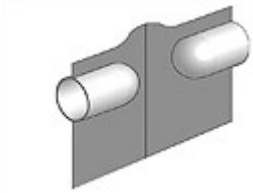


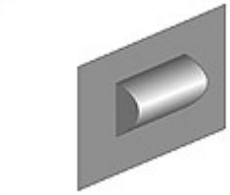


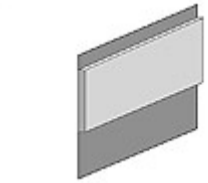


- Behaviour on the water: this depends on the overall flexibility of the boom

Flexible boom Semi-flexible boom Rigid boom

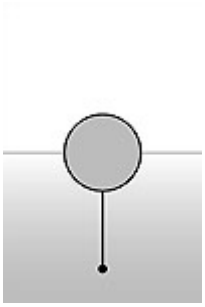


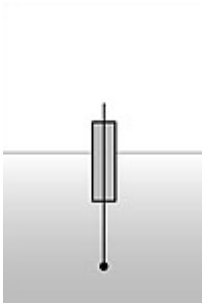




- Type of skirt:

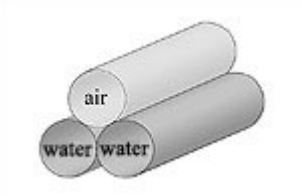
Curtain boom Fence boom





- The specific role that certain booms fill:

Shore-sealing boom



Fireproof boom

Picture of boom well adapted to open sea

Type of boom which could be deployed in open sea

Example of at sea anchorage

Appendix 2: Evaluation of Hazardous Chemicals in the Cargo Manifest of Sulpico Lines M/V Princess of the Stars.

						Issues		
7 CTNS	AGRI Supply	pesticides	MAPECON PHILS					need to secure material
								safety data sheet (MSDS)
1 DRM	Almo Oil	chloroalkanes, chlorine	Carmen Copper Corp	Flash Pt -169 °C	respiratory irritation	avoid excessive heat, high		
		ZDPP				energy sources of ignition		
36 DRMS	asphalt	bitumen, hydrocarbons	Rigid Sales Corp	Flash Pt - 93.3°C	Inh: cough, shortness of breath	when heated hydrogen		
		crystalline silica			eyes: redness, pain,severe thermal burns	sulfide, CO released		
					skin: serious skin burns			
10	batteries	metals (Hg, Cd, Pb, Ni), arsenic	Imarflex Battery	not applicable		Avoid high temperature		need to secure material
		sulfuric acid, antimony, others			Contact with	battery electrolyte will		safety data sheet (MSDS)
1 CTN	battery	metals (Hg, Cd, Pb, Ni), arsenic	Jack Lee		electrolyte battery may irritate the skin	react with water and produce		
		sulfuric acid, antimony, others			May cause corneal damage of the eyes or	heat.		
1 CTN	battery	metals (Hg, Cd, Pb, Ni), arsenic	Jacky Lee		irritation of the mucous membrane and/ or			
		sulfuric acid, antimony, others			inflammation of the upper respiratory			
					system. May cause chronic anemia, kidney			
					and nervous system damage,etc			
3 PACKS	CHEMLOK 218	toluene, glycol ether, isopropanol	Transworld Trdg Co.	Flash Pt - 9 °C	may cause eye irritation	keep away from heat		
		trichloroethylene, ethanol				sparks and other		
						sources of ignition		
58 PLS	CHUGAKU Paint	marine paints, toluene	Maincoat Inc	Flash Pt - 4 °C	headache, dizziness, nausea, irritation	combustible material,		
		modified acyclic amine			central nervous and hematological effects	containers may explode when		
		xylene, isopropanol, ketone				heated, eliminate all ignition		
						sources. Do not get water		
						inside containers		
						harmful to aquatic life		
19 CTNS	Computer Parts	metals (Pb, Cd, Hg)	CF2000					need to secure MSDS
40x400 boxes	endosulfan		Del Monte			information already available	25 kg in fibreboard box	
2 boxes	Flower Inducer	pesticide	Maying Aqua Culture Mktg					need to secure MSDS
1 CRT	Gen Set	oil/diesel or gasoline	Explorer Freight Corp					need to verify witth forwarder
5 DRMS	Glass Cleaner	Ammonia	QBS Cargo Express	Flash Pt -11 °C	corrosive, burning sensation, respiratory			
39 PLS	Glass Cleaner	Ammonia	QBS Cargo Express	Flash Pt -11 °C	irritant, headache, dizziness and nausea			
					redness, blurred vision, severe tissue burns			
35 CTNS	Ink Refill	Volatile organic chemicals	BEM Tabacon/GBC Marketing	Flash Pt -149 °C	irritation and sensitisation on skin contact,			
		metals (Pb, Cr, Cd)			eye and respiratory exposure, vomtiting and			need to secure MSDS
		phenoxy with dye coloring agent			diarrhea; methemoglobinemia			
		1,5 pentanediol, 2 pyrrolidine						
		alkyldiolethoxylate, ethylalkyldiol'						
		metal nitrate, substituted						
		napthylsulfonate						
10 packs	Motor Oil	hydrocarbons, metals	Phoenix Global Energy	Flash Pt -191.5oC	Mild irritation of the skin, eyes,respiratory			
		VOCs			systems			need to secure MSDS
102 CTNS	Paints	Volatile organic chemicals	Charter Chemical Coating	Flash Pt - 32.3 °C	irritation, nausea, headache, weaknees			need to secure MSDS
		metals (Pb, Cr, Cd)			narcosis, liver effects developmental			
					toxicity			
5 CRTS	Parenduit	skin coating paste	WAM/Terence Sypiecco					
1 CRT	Printing Ink	1,5 pentanediol, 2 pyrrolidine	Ideal Mktg & MFG Corp	Flash Pt - 93.3 °C	irritation and sensitisation on skin contact,			
		alkyldiolethoxylate, ethylalkyldiol'			eye and respiratory exposure, vomtiting and			need to secure MSDS
		metal nitrate, substituted			diarrhea; methemoglobinemia			
		napthylsulfonate						
106 packs	Process Oil	hydrocarbons; metals	UNI-Dravo Comm'l Corp	Flash Pt -149 °C	Mild irritation of the skin, eyes,respiratory			need to know whether these
		VOCs			systems			are used oil
2 units	Rolling oil	lubricant base oil (petroleum)	Henkel Phils Inc/Bu of Customs	Flash Pt -360 °C	eye: eye irritation including stinging, watering			
					and redness			
					skin: mild skin irritation including redness			
					and burning sensation; dermatitis			
1 CRT	Sealant	polybutenes,polyethylene	TFE Sales	Flash Pt >149 °C				
7 BDLS	Sealant	silica fumed, aluminum oxide	Sales Glass and Alum					need to secure MSDS
6 boxes	Sealant	antioxidant	General Panels Corp					
1 CTN	Transformer	Polychlorinated biphenyl	Mla United Electl Supply/H12-App		when transformer is overheated, acute efffects			Check if new, retrofitted or
2 CRTS	Transformer	Polychlorinated biphenyl	Delta Star		eye & skin irritation, nausea, chest tightness,			manufactured before 1977
					sore throat, headache			
					long term effects:chloracne, affects liver, potential			
					carcinogen, bioaccumulates			
1 CRTN	Transmition		PSWRI					Check info details with
								forwarder
55 CTNS	Varnish	acrylate copolymer	BS Varnish Product	Flash Pt -36 °C	Ingestion: moderately toxic, may			
		mineral turpentine			cause gastric irritation, nausea,			
		preservative			vomiting and abdominal pain			
					eye: moderate irritation			
					skin: dermatitis			
					inhaled: harmful to the nose and throat			
					chronic: headache, dizziness and nausea			
					Effects are cumulative, chronic dermatitis			
19 packs	Waste Wax	light petroleum distillates	Jose Tuliao	flammable solid	Eye: Redness, swelling, pain, blurring vision			
		heavy naptha, synthetic hydro-			Skin: Redness, swelling, itchiness			need to secure MSDS
		carbons			CNS depression, may be fatal			
*Properties are based on MSDS downloaded from the internet and may have different chemical component(s) and quantity								
** flash point - temperature at which the chemical substance may ignite, heat up or burn. The higher the flash point the more stable is the chemical at high temperatures								

Items Not Evaluated Because of Incomplete Information But Needs to be Considered				
Quantity	Unit	Consignee	Concern	
252 sacks	various	genesis agricultural pdt	Check for pesticides	
1	10 asstd URC Product	URC	Check for VOCs	
1	10 Others	UNILEVER	Check for VOCs	
1	10 Others	UNILEVER	Check for VOCs	
1	10 Others	UNILEVER	Check for VOCs	
864	10 PRC Products	UNILEVER	Check for VOCs/pesticides	
1	10 VARIOUS	Seaquest logistics	Check for VOCs/pesticides	
1	10 VARIOUS	Seaquest logistics	Check for VOCs/pesticides	
1	10 various goods	Seaquest logistics	Check for VOCs/pesticides	
1	20 Unilever Prods	Pambato Cargo Forwarder	Check for VOCs/pesticides	
2218	20 Unilever Prods	JVC & Lgen MDSE	Check for VOCs/pesticides	
1	20 Various Goods	Seaquest logistics	Check for VOCs/pesticides/paints	
3 CRTS	A. BLUE	Excel Coil Coating Corp	Check for VOCs/paints	
28 packs	Asstd Items	Daily Harvest/FK Mart	Check for VOCs/pesticides	
20	Asstd Items	Noly Yang	Check for VOCs/pesticides/paints	
10	Asstd Items	Lito Yang	Check for VOCs/pesticides/paints	
10	Asstd Items	Pennines Intl Ind. Corp	Check for VOCs/pesticides/paints	
20	Asstd URC Products	URC	Check for VOCs	
1 CRT	Bottom	Kane Indl Corp	Check for VOCs/pesticides/paints	
68 boxes	Cosmetic product	PMB salon Specialities Inc	Check for VOCs	
18 boxes	Cosmetics	COSPACHEM	Check for VOCs	
8 boxes	Cosmetics	COSPACHEM	Check for VOCs	
11CTNS	HDWE Items	Mardiz	Check for VOCs/pesticides/paints	
105 packs	HDWE Items	J Thomson Wee	Check for VOCs/pesticides/paints	
10 boxes	HDWE Items	Sales Glass and Aluminum	Check for VOCs/pesticides/paints	
1 CRT	SBR 1502	UNI-DRAVO COMM'L CORP	Check for VOCs/pesticides/paints	
20	URC Products	URC	Check for VOCs	
20	various	Mackenzie Products	Check for VOCs/pesticides/paints	
10 packs	Various	Moises Baal	Check for VOCs/pesticides/paints	
20	various	Seaquest logistics	Check for VOCs/pesticides/paints	
25 packs	various	Airlift Asia, Inc	Check for VOCs/pesticides/paints	
20	various	Seaquest logistics	Check for VOCs/pesticides/paints	
20	various	Seaquest logistics	Check for VOCs/pesticides/paints	
40	various	Seaquest logistics	Check for VOCs/pesticides/paints	
25 packs	various	Tristar Cargo Express	Check for VOCs/pesticides/paints	
40	various	Collins Int'l trading Corp/	Check for VOCs/pesticides/paints	
39 pcks	various	Air Moving	Check for VOCs/pesticides/paints	
10	various goods	Agility Logistics	Check for VOCs/pesticides/paints	
10	various goods	Agility Logistics	Check for VOCs/pesticides/paints	
10	various goods	Agility Logistics	Check for VOCs/pesticides/paints	
20	various goods	Agility Logistics	Check for VOCs/pesticides/paints	
740 ctns	various goods	Pamela Uy	Check for VOCs/pesticides/paints	
252 sacks	various	genesis agricultural pdt	Check for VOCs	

*** items under such category as asstd goods, various goods, products, etc should be checked with the forwarder/owner regarding* content of the cargo, whenever feasible. Check for any volatile organic chemical (VOC), pesticide and paint products

**** MSDS is usually provided by the manufacturer and distributor to the transporter and consignee free of charge

ADDITIONAL INFORMATION:

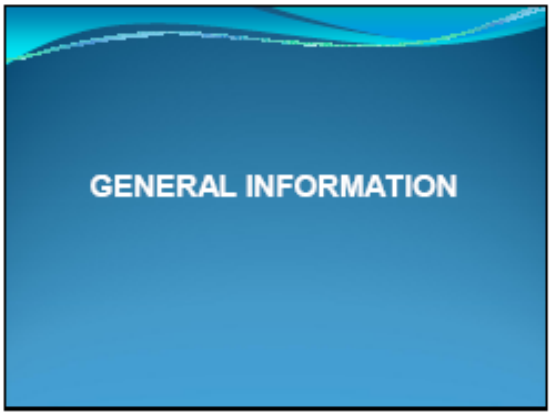
1 Information on antracol wp 70 - dithiocarbamate pesticide,: Signs and Symptoms: allergic reactions, headache, dizziness, vomiting, pale red face
solid powder that contains 70% propineb
Category 4
Quantity: Total of 392 kg
Packaging: Sealed aluminum poucher/foil with outside folding box and packed in corrugated cartons
1 kg size: 94 kgs in 8 cartons; 156 kgs in 13 cartons; 62 kgs in 5 cartons; 62 kgs in 6 cartons
250 g size: 8 kg in 1 carton; 2 kgs in 1 carton; 8 kgs in 1 carton

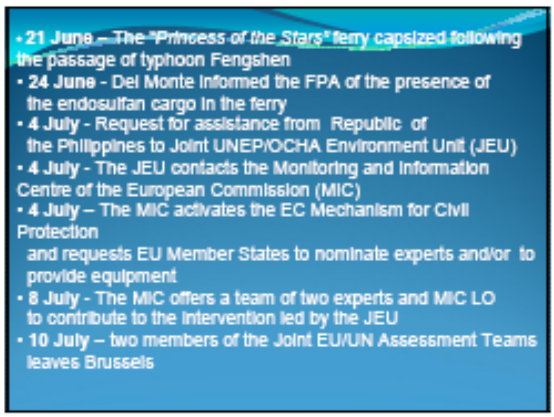
2 Information on tamaron 600 SL : Organophosphate pesticide , active ingredient methamidophos. Hazardous component diethylene glycol
flash point 56 oC, irritating to the eyes, very toxic if swallowed, toxic if in contact with the skin. Signs and symptoms: headache, blurred vision
weakness, sweating, mild chest pain, nausea and vomiting. Severe poisoning is manifested as muscle twitching, cyanosis, spasms, miosis
and respiratory paralysis: Treatment: atropine
Category I: Highly Hazardous
Quantitty: Total of 150 liters
Packaging: Packed in co-ex bottles with tightly sealed caps with inner alum/cardboard pads and packed in corrugated cartons
1 liter size: 60 liters in 5 cartons; 250 ml size: 90 liters in 10 cartons

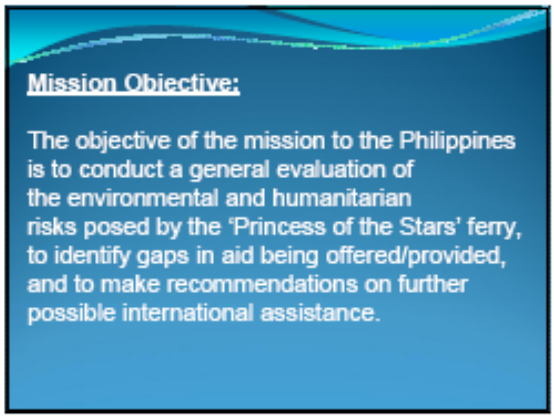
3 Information on Trap 70 WP: Active ingredient: Niclosamide ethanolamine salt: Signs and symptoms: headache, dizziness, irritation of the eyes, nose
and throat, nausea, diarrhea, shortness of breath, chest tightness, weakness, cough, rash. Can cause pulmonary edema, chemical
bronchitis and severe bronchospasm, anxiety neurosis
Category 4
Highly toxic to aquatic organisms: Chemical grouping: salicylanilide/mitrocompund
Quantity: Total of 17.5 kg
Packaging: Sealed aluminum pouch in one folding box with an outer corrugated cartons
350g size, 17.5 kgs in 5 cartons

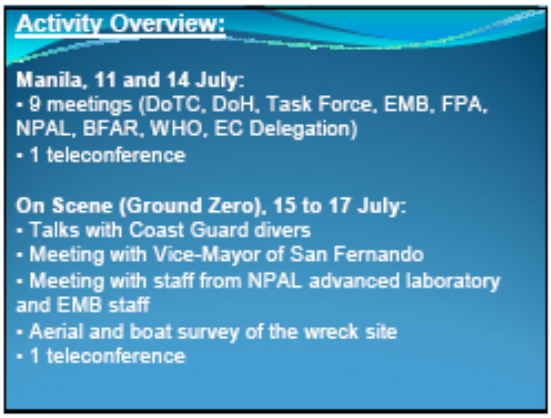
4 Information on Fuerza 3G: Chemical Group: Carbamate: combustible at 130 oC. Headache, lightheadedness, abdominal cramps, nausea
excessive salivation, perspiration, blurred vision, tearing, pin-point pupils, convulsions, tremor and coma. Irritating to the skin. Liver and
and kidney damage
Active Ingredient: Carbofuran
Highly toxic to aquatic organisms
Ctegory 2: : Moderately Hazardous
Quantity: Total of 501 kg
Packaging: Packed in PE bags with outer polypropylene bags
16.7 kg size, 501 kg in 30 bags

Appendix 3: Final debriefing meeting at Manila.







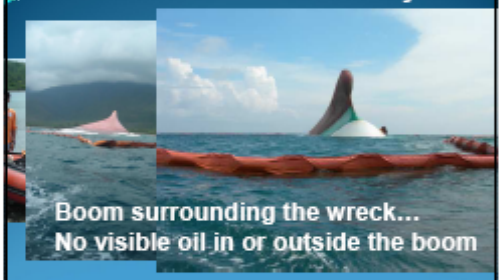


GENERAL OBSERVATION ON SCENE

- Aerial survey
- Boat survey
- Land survey

ON SCENE – Aerial Survey

ON SCENE – Boat Survey



Boom surrounding the wreck…
No visible oil in or outside the boom

ON SCENE – Land Survey

No oil on the shoreline
and no observable effect of a pollution…

and no activities at sea!

To take the opportunity to visit the field laboratory……

SAMPLES COLLECTION

EMB: around wreck (sea water)

BFAR: faraway wreck (Fish, soil sediments, planktons)

ANALYSIS OF SAMPLES

BPI – NPAL:
(Field laboratory)

A lot of successful effort to prevent and to control any kind of pollution

(booms, number of sampling spots and personnel involved, laboratory field…)

But a few comments…

Concerning booms…

Difficult to maintain the boom, not well adapted…

Boom twisting around itself
Each day, CG on scene to re-fix it…

More adapted to calm water…

Boom with a curtain in a container…

which could be fixed to an anchored buoy

Concerning the sampling…

Sea water
- To add sampling spots in the vicinity of the wreck taking into account the current and the depth
- To add an internal standard before the liquid – liquid extraction (i.e. quintozene)

Organisms
- To perform analysis on the fish liver
- To select also benthic organisms

RECOMMENDATIONS…

THREE SCENARIO COULD BE IDENTIFIED…

1- BASED CASE:
Nothing happen until the salvage operation start

2- A MAJOR EVENT COULD OCCURRED:
All chemical compounds are released due to strong weather conditions at sea

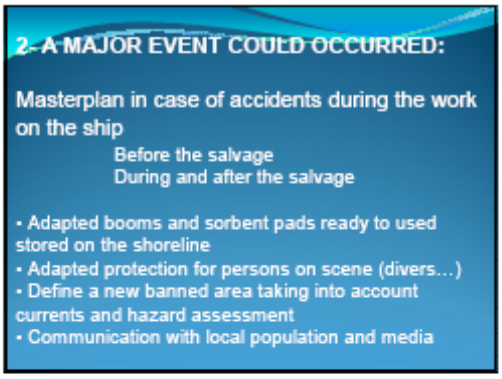
3- THE SALVAGE PERIOD:
Which precaution should be undertaken during this phase

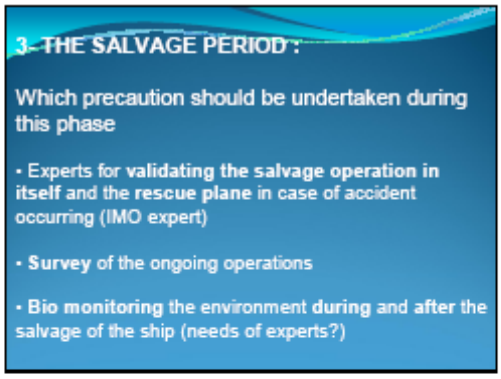
1- BASED CASE:

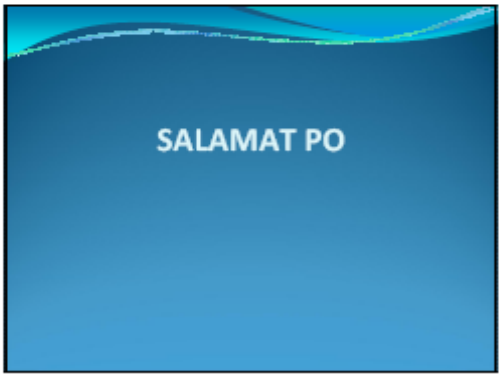
Monitoring the potential leakage of chemicals and the sea-food quality – pesticide content

Research activities
- resistance of the packaging to sea water corrosion
- identify the accumulation of endosulfane and other pesticides on the marine life

On site activities
- follow sampling strategy with additional sampling spots for water, sediment and organisms
- identify the currents for future modelling


2- A MAJOR EVENT COULD OCCURRED:
Masterplan in case of accidents during the work on the ship
Before the salvage
During and after the salvage
• Adapted booms and sorbent pads ready to used stored on the shoreline
• Adapted protection for persons on scene (divers…)
• Define a new banned area taking into account currents and hazard assessment
• Communication with local population and media


3- THE SALVAGE PERIOD :
Which precaution should be undertaken during this phase
• Experts for validating the salvage operation in itself and the rescue plane in case of accident occurring (IMO expert)
• Survey of the ongoing operations
• Bio monitoring the environment during and after the salvage of the ship (needs of experts?)


SALAMAT PO

Appendix 4

The following table sums up basic data on the five main pesticides contained in the two containers: name, classification, behaviour, reactivity, half-life and degradation products. These data come from various sources of information and databases and are not specific to the particular product formulations loaded onboard the ship.

In particular, solubility data are calculated/measured in freshwater, pH 7, at fixed temperature and pressure. The actual behaviour of the product can therefore differ. This is the main reason why environmental and local data will have to be recorded, in particular water temperature, salinity, pH and current.

Chemical Identification	Physical and chemical properties	Packaging / Labelling	Toxic properties	Missing Data
Chemical name: ENDOSULFAN UN n°: 2761 **Substance:** Organochlorine pesticide, solid, toxic **Synonyms:** - Benzoepin - Thiodan® CAS n°: 115-29-7 **Uses:** insecticides, acaricide Marine pollutant (IMDG code): GESAMP Hazard profile: A: + B: 4 C: 4 D: II E: XXX	**Physical state:** solid/ crystals (brown) **Relative density:** 1,745 (20°C) **Water solubility:** 0.32 mg/L **Vapor pressure:** 0.83 mPa (20°C) ☐ Evaporator ☐ Dissolver ☐ Floater ■ Sinker **Boiling point:** **Molecular weight:** 406.95 **Hydrolysis in water:** -First hydrolysis half-life: 9.1 days for alpha-endosulfan, pH 7 (25°C) - 7.8 days for beta-endosulfan at pH 7 (25°C) **Biologically degradable** Degradation product: Endosulfan sulphate* Log Kow: 4.74 Log Pow: 3.55 – 3.62 BCF: NF Endosulfan is a mixture of two stereoisomeres: - alpha endosulfan - beta endosulfan	**UN Hazard Class:** 6.1 **Packing group:** II Marine pollutant EU classification of endosulfan: Symbols: T, N T = Toxic N = Dangerous for the environment R24/25 = Toxic in contact with skin and if swallowed. R36 = Irritating to eyes. R50-53 = Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.	The compound affects the function of nerves **Mammalian toxicity** LD50 rat: 18 – 220 mg/kg b.w.* ADI*: 0.006 mg/kg b.w. **Ecotoxicology** Fish (golden orfe): 0.002 mg/l Crustaceans (Palaemontes pugio) 81-245 µg/l	Manufacturer / Distributor Brand name

* Soluble in water and equally as toxic as the parent compound; NF: Value not found
b.w. = body weight and **ADI** = Acceptable daily intake

Chemical Identification	Physical and chemical properties	Packaging / Labelling	Toxic properties	Missing Data
Brand name: ANTRACOL WP 70 Compound: *WP = Wettable powder* *70 = 70 % of Propineb* **Available MSDS** **Active Ingredient:** **Alkylene**(Dithiocarbamate) CAS reg no :9016-72-6 **UN n°:** 3077 (*source:* MSDS from Bayer Crop Science: Antracol) **Manufacturer / Distributor:** Bayer CropScience **Substance:**Environmentally hazardous substance, solid powder, n.o.s **Synonyms**: PROPINEB **Uses:** fungicide **Marine pollutant (IMDG code):** **GESAMP Hazard profile:** **A:** **B:** **C:** **D:** **E:**	**Physical state:** solid powder **Relative density:** **Water solubility:** dispersible. **Vapor pressure:** ☐ **Evaporator** ■ **Dissolver** ☐ **Floater** ☐ **Sinker** **Boiling point: - (Decompose)** **Molecular weight:** 289.8 (Propineb) **Log Kow:** -0.26 **Log Pow:** NF **BCF:** NF	**UN Hazard Class:** 9 **Packing group:** III	The compound is neurotoxic **Mammalian toxicity** LD 50 (rat) : 3700 mg/kg b.w. ADI : 0.004 ng/kg b.w. **Ecotoxicity** LC50 (rainbow trout) : 1.9 mg/l LC50 (water flea) : 4.7 mg/l	

* Soluble in water and equally as toxic as the parent compound; NF: Value not found

Chemical Identification	Physical and chemical properties	Packaging / Labelling	Toxic properties	Missing Data
Brand name: TAMARON SL 600/10 L VE LT / ABGEF *SL = Soluble Liquid* **Available MSDS** **Active Ingredient:** METHAMIDOPHOS **UN n°:** 3017 **Manufacturer / Distributor:** Bayer CropScience **Substance:** Organophosphorus pesticide, liquid, toxic, flammable **Synonyms**: **CAS n°:** 10265-92-6 **Uses:** Insecticide / Acaricide **Marine pollutant (IMDG code):** **GESAMP Hazard profile:** **A:** **B:** **C:** **D:** **E:**	**Physical state:** liquid (TAMARON) **Density: ~** 1.25 g/cm^3 at 20°C **Water solubility:** soluble **Vapour pressure:** ☐ **Evaporator** ■ **Dissolver** ☐ **Floater** ■ **Sinker** **Tamaron is a mixture of** 49% methamidophos 31% diethylene glycol 5% nonylphenol ethoxylate Log P = - 0.8 à 20°C (Agritox), Half-life in water: Hydrolysis, half life : 10 days Agritox : 660 days pH 4, 5 days pH 7, 3 days pH 9-0.66 (ICSC) **Log Kow -** **Log Pow -** **BCF: NF**	**UN Hazard Class:** 6.1 **Packing group:** II **Symbol(s):** T+, N T+=Very Toxic N=Dangerous for the environment **R-phrase(s):** R24 = Toxic in contact with skin. R 26/28 = Very toxic by inhalation and if swallowed. R50 = Very toxic to aquatic organisms Marine pollutant	The compound is neurotoxic **Mammalian toxicity** LD50 (rat): 13 – 15,6 mg/kg b.w. ADI 0.004 mg/kg b.w. **Ecotoxicology** LC_{50} (Rainbow trout): 25 mg/L LC_{50} (water flea): 0.27 mg/l	

* Soluble in water and equally as toxic as the parent compound; NF: Value not found

Chemical Identification	Physical and chemical properties	Packaging / Labelling	Toxic properties	Missing Data
Brand name: TRAP 70 WP **Manufacturer / Distributor:** Dow Agro Sciences B.V Or Bayer CropScience **Active Ingredient** : NICLOSAMIDE **CAS n°:** 50-65-7	Not very water soluble (5-8 mg/L at 20°C) (Inchem) Log Kow: 1 (pH 9.6) Log Pow: NF BCF: NF	**Source ERMA (New Zealand)** Fish: very ecotoxic in the aquatic environment Crustacean: very ecotoxic in the aquatic environment	**Mammalian toxicity** **LD50 (rat):** > 5000 mg/kg b.w. **ADI (proposed)**: 3 mg/kg b.w. **Ecotoxicity** LC_{50} Petromyzon marinus : 0.049 mg/L (24 h) Gambusia affinis: 0.5 mg/L (24 h) Carp: 0.235 mg/L (48 h) LC50 (waterflea): 0.2 mg/l "based on the bioaccumulation factors and the rapid rate of depuration, accumulation in fish is not expected" (ERMA)	..

Chemical Identification	Physical and chemical properties	Packaging / Labelling	Toxic properties	Missing Data
Brand name: FUERZA GR3 **Manufacturer sent the MSDS of:** CARBOFURAN GR 3 **Active Ingredient:** CARBOFURAN **UN n°:** 3077 **Manufacturer / Distributor:** Bayer CropScience **Substance:** Carbamate pesticide, solid, toxic **Synonyms**: - Furadan - 2, 3-Dihydro-2,2-dimethyl-7-benzofuranyl methylcarbamate **….** **CAS n°:** 1563-66-2 **Uses:** **Marine pollutant (IMDG code):** **GESAMP[2] Hazard profile:** **A:** 0 **B:** 4 **C:** 4 **D:** II **E:** XXX	**Physical state:** Colourless crystals **Relative density:** 1,18 / 1.2 **Water solubility:** 700 mg/L(25°C) **Vapor pressure:** 2.7 mPa (33°C) ☐ **Evaporator** ■ **Dissolver** ☐ **Floater** ■ **Sinker** **Boiling point:** **Molecular weight:** 221.3 Half-life in water: - 11-13 days, pH 6.5, **technical carbofuran** - 60-75 days, pH 6.5, **granular formulation** **Log Kow:** 1.52 **Log Pow:** 2.32 / 1,52 à 20°C **BCF[3]:** Bluegill sunfish = 0.126 mg/L	**UN Hazard Class:** 6.1 **Packing group:** III **Symbol(s):** T+, N T+ = Very toxic N = Dangerous for the environment **R-phrase(s):** R26/28 = Very toxic by inhalation and if swallowed. R50/53 = Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment Marine pollutant	The compound is neurotoxic Mammalian toxicity **LD50 (rat):** 15 mg/kg b.w. **ADI (proposed)**: 0.002 mg/kg b.w. **Ecotoxicity** LC_{50} :Petromyzon marinus = 0.049 mg/L (24 h) Gambusia affinis: 0.5 mg/L (24 h) Carp: 0.235 mg/L (48 h) LC50 (water flea): 38.6 µg/l	.W.

GESAMP profile: A/ Bioaccumulation and tainting; B/ Damage to living resources; C/ Hazard to human: ingestion of water containing the chemical; D/ Risk to human health by skin and eye contact or inhalation; E/ Reduction of amenities

[2] Group of Experts on the Scientific Aspects of Marine Environmental Protection
[3] BCF : BioConcentration Factor

Appendix 5 Request for assistance from the Department of Transportation & Communications

Republic of the Philippines
DEPARTMENT OF TRANSPORTATION & COMMUNICATIONS

04 July 2008

MR. **MATIHEW CONWAY**
Officer-In-Charge
Environmental Emergencies Section
Emergency Services Branch/OCHA
(Joint UNEP/OCHA Environment Unit)
United Nations, Palais des Nations, Room 230

Thru: **MR. ANDREW MACLEOD**
UN Resident Coordinator's Office

Dear Mr. Conway:

Greetings from the Philippines!

We wish to convey our profound gratitude for the offer of the Joint UNEP/OCHA Environmental Unit, through Administrator Glenn J. Rabonza, Office of Civil Defense, to extend assistance to the Philippine Government in the form of providing relevant expertise for sampling, technical advice and/or other related environmental emergency services that would help mitigate the possible adverse effects on the environment and the communities around ground zero of the highly toxic pesticides (endosulfan) and other substances carried by the MN Princess of the Stars which capsized off Sibuyan Island, Philippines on 20 June 2008.

In this regard, Task Force MN Princess of the Stars would like to formalize its request and need for such assistance.

We shall be very willing to coordinate with you or your duly designated representative on the mechanics/requirements of the assistance.

Attached is the list of chemicals being monitored on board the vessel..

Thank very much and best regards.

Very truly yours,

MARIA ELENA H. BAUTISTA
Undersecretary for Maritime Transport and
Chairman, Task Force MN Princess of the Stars

cc: Administrator Glenn J. Rabonza
Office of Civil Defense

Dir. Enrique A. Tayag
Department of Health

THE COLUMBIA TOWER
BRGY. WACK-WACK, ORTIGAS AVENUE
1555 MANDALUYONG CITY, PHILIPPINES

TELEFAX: (632) 723-49-25
TRUNKLINE: 727-79-60 to 79
DOTC ACTION CENTER HOTLINE: 7890

Appendix 6 OCHA Sitrep #1

NATIONS UNIES

BUREAU DE LA COORDINATION DES AFFAIRES HUMANITAIRES

OCHA

UNITED NATIONS

OFFICE FOR THE COORDINATION OF HUMANITARIAN AFFAIRS

OCHA Situation Report No. 1
The Philippines: 'Princess of the Stars' ferry disaster – toxic cargo
15 July 2008

NOTE: *This situation report is based on information received from the Government of the Philippines, International Maritime Organisation (IMO), the UN Resident Coordinator's Office in the Philippines, World Health Organisation (WHO), Monitoring and Information Centre of the European Commission (MIC), and various media sources.*

Key Summary

- **On 21 June, the 'Princess of the Stars' ferry boat capsized in the central Philippines. The ferry was carrying 100,000 litres of fuel and highly toxic pesticides.**
- **The Government of the Philippines and the United Nations agreed that the current situation could result in major ecological disasters impacting on health and livelihoods of the local population if not handled properly.**
- **The European Commission (Monitoring and Information Centre) and the United Nations (UNEP/OCHA Joint Environment Unit) dispatched a joint mission to assess the environmental impact of the incident as well as priority needs and gaps in assistance.**

Situation

1. The 'Princess of the Stars' ferry boat, which left Manila on Friday 20 June at night, went aground on Saturday 21 June. On Saturday night, it began sinking as Typhoon Fengshen was moving through the area, after 16 hours in the 22-hour voyage. The vessel capsized at about 3 kilometres from Romblon on the shore of Sibuyan Island in the central Philippines. More than 700 passengers lost their lives. While divers were conducting rescue and recovery operations, it was reported that the boat was transporting an estimated amount of 100,000 litres of fuel in the cargo. It was also reported that a large amount of highly toxic pesticides such as antracol, tamaron, nicolsamide and carbamate were loaded in the cargo. The chemical substances of particular concern contained in the cargo include endosulfan, carbofuran, and methamidophos. Due to potential hazards, the rescue and recovery efforts were suspended. Meanwhile the hundreds of corpses are still trapped inside the vessel.

2. These chemicals were reported to be packed in a 40-foot container. This suggests that the quantity of toxic chemicals could be more than 10 metric tones. Bulks of the items appear to remain inside the cargo, as there is no indication that the toxic substances leaked outside the non-soluble packaging.

3. The Government of the Philippines and the UN Country Team in the Philippines are in full agreement that the above-described situation could result in a major ecological disaster if not handled properly. The current situation may cause serious effects on health and livelihoods of the people living in the area. The government authorities already imposed fishing ban over the area of 15 kilometres radius around Sibuyan Island due to the concerns of possible contamination. The Philippines Bureau of Fisheries and Aquatic Resources (BFAR) will place buoys and markers and facilitate patrolling in the affected area.

4. As the typhoon season approaches, around 20 typhoons are expected to affect the Philippines over the six months to come. This may wreak havoc on the stability of the capsized vessel.

National Response

5. A Task Force has been activated and chaired by Under-Secretary for Maritime Transport, Ms. Maria Elena Bautista. The Task Force, in close coordination with the UN Country Team, has been providing strong leadership in managing and coordinating the rescue and recovery efforts.

6. The government authorities stated that they planned to remove the toxic chemicals from the ferry within 40 days. At present, the government plans to use machines which suck out the fuel. Then, they will cut the hull of the ferry in order to access the cargo deck. After the chemicals are removed, the corpses will be also removed, decontaminated and brought to a forensics area for DNA testing.

7. BFAR will deploy a research vessel with on-site laboratory facilities to Romblon for periodic testing of water quality, particularly to monitor the level of endosulfan. The Department of Health (DoH) suggests testing of other chemicals, namely metamidophos and carbofuran, by using biological samples collected by the divers who went to the site. Likewise, DoH suggests conducting regular sampling of marine life and sediments.

8. To alleviate the hardships caused by the fishing ban, the government authorities will provide assistance to the fishing communities in Sibuyan Island. This will include distribution of three kilograms of rice per family consisting of four members; importation of commercial items like meat and canned foods to be sold at lower prices (as the prices of goods in Sibuyan have risen following the disaster); provision of alternative livelihoods including distribution of vegetable seeds, piglets, chickens, etc as well as opportunities for cash for work; importation of fish from areas not covered by the ban. BFAR will also provide training and assistance related to aquaculture for the affected communities.

International Response

9. The Government of the Philippines accepted the offer of assistance by the UNEP/OCHA Joint Environment Unit (JEU), which is housed within the Emergency Services Branch (ESB) of OCHA, and the MIC of the European Commission. On this basis, it was decided that a preliminary assessment mission would be dispatched to the wreckage site. The objective of the mission is to support analyzing the environmental impact caused by the incident and to identify priority needs and gaps in assistance, which will be followed by making recommendations for future actions.

10. A team of three comprising of a marine chemist, a toxicologist and an MIC liaison officer was assembled. On Friday 11 July, the marine chemist and the MIC liaison officer arrived in Manila, and the toxicologist arrived in Manila on Monday 14 July. The team plans to move to the disaster site on Tuesday 15 July, return to Manila on Friday 18 July and leave the country on Saturday 19 July. The Task Force approved the TOR of the JEU/MIC assessment mission, and assigned national counterparts to the team. The government authorities have arranged a civilian aircraft on standby for the JEU/MIC mission. Team members will be housed at the disaster site, in the research vessel provided by BFAR.

For more information please contact:

European Commission Spokesperson for the Environment

Barbara Helfferich
Tel.: +32 (0)496/58.38.29
Email: barbara.helfferich@ec.europa.eu

Head of the European Commission Delegation to the Philippines

Alistair MacDonald
Tel.: +63 (0) 859/5100
Email: Alistair.Macdonald@ec.europa.eu

The Joint UNEP/OCHA Environment Unit (JEU)

Matthew Conway, Program Officer, OCHA-Geneva
Office Tel: +41 22 917 2373
Mobile Tel: +41 (0)79 506 1200
Email: conwaym@un.org

Nick Nuttall, Spokesperson, UNEP in Nairobi, Kenya
Office Tel: +254 20 7623084
Mobile Tel: +254 (0) 733 632755
Email: nick.nuttall@unep.org

OCHA Regional Office for Asia and the Pacific

Mr. Terje Skavdal, Head of Office
Tel. +66 81 916 1276
Email: skavdal@un.org

UN Resident Coordinator's Office – the Philippines

Andrew MacLeod, Early Recovery Adviser
Office Tel: +63 2 9010238
Mobile Tel: +63 917 509 3645
Email: andrew.macleod@undp.org

Telephone: +41-22-917 12 34 In case of emergency only:	Fax: +41-22-917 00 23 Tel. +41-22-917 20 10
Desk Officers:	(New York) Ms. Agnes Asekenye-Oonyu, Chief, Asia and the Pacific Section Tel: +1 212 963 1773 Mobile: +1 917 476 6164 E-mail: asekenye-oonyu@un.org Mr. Masaki Watabe Humanitarian Affairs Officer Asia and the Pacific Section Tel : +1 917 367 2832 Mobile: +1 917 324 8379 Email: watabem@un.org (Geneva) Mr. Jean Verheyden Humanitarian Affairs Officer, Geographical Coordination and Monitoring Section Tel: +41 22 917 1381 Mobile: +41 79 509 8116

	E-mail: verheyden@un.org
Press contact: (Geneva)	Ms. Elizabeth Byrs Tel. +41 22 917 2653 E-mail: byrs@un.org
(New York)	Ms. Stephanie Bunker Tel. +1 917 367 5126 E-mail: bunker@un.org

Appendix 7

Abbreviations

BFAR	Bureau of Fisheries and Aquatic Resources (Philippines)
Cedre	Centre de Documentation, de Recherche et d'Expérimentations sur les Pollutions Accidentelles des Eaux (France)
EMB-DENR	Environmental Management Bureau of the Department of Environment and Natural Resources (Philippines)
FPA	Fertilizer and Pesticide Authority (Philippines)
IMO	International Maritime Organization (UN)
JEU	Joint UNEP/OCHA Environment Unit (UN)
MIC	European Commission's Monitoring and Information Centre (EU)
NDCC	National Disaster Coordinating Council (Philippines)
NOAA	National Oceanic and Atmospheric Administration (United States)
NPAL	National Pesticide Analytical Laboratory (Philippines)
UNDP	UN Development Programme
WHO	World Health Organization (UN)