

**Final Report of the ad hoc Working Group
on Dumped Chemical Munition (HELCOM CHEMU)
to the 16th Meeting of the Helsinki Commission
(March 1995)**

I BACKGROUND

At its 14th meeting in 1993 the Helsinki Commission established the ad hoc Working Group on Chemical Munition (HELCOM CHEMU) with an aim to elaborate a report on the locations and effects of chemical weapons to the marine environment. The report of the Group was submitted to the 15th meeting of the Helsinki Commission (HELCOM 15/5/1).

HELCOM 15 prolonged the mandate of the ad hoc Working Group on Dumped Chemical Munition by one year and adopted its revised Terms of Reference, which are contained in Attachment 1 to this Report.

HELCOM 15 also requested the ad hoc Working Group to follow and implement the substantial recommendations provided in "The Report on Chemical Munitions Dumped in the Baltic Sea" and all the Baltic Sea States to provide the Commission by 1995 with information and official documentation concerning chemical munitions dumped after 1947.

The Group held two meetings in Copenhagen, Denmark (on 16-17 June 1994 and on 22 September 1994), and a meeting of a Drafting Group of HELCOM CHEMU to elaborate the Final Report was arranged in Hamburg, Germany, on 14-15 December 1994.

The Group confirmed the conclusion of the above mentioned report that according to existing knowledge dissolved warfare agents are not a wide-spread risk to the marine environment. The crews of fishing vessels operating in the dumping areas or in the immediate vicinity could be in danger from the chemical munitions and chemical warfare agents dumped there, if lumps of viscous mustard gas or chemical munitions are caught in bottom trawls and hauled on board.

**II INFORMATION BY THE CONTRACTING PARTIES
CONCERNING DUMPING ACTIVITIES AFTER 1947**

Following the decision by HELCOM 15, Denmark, Estonia, Finland, Germany, Latvia, Lithuania, Poland and Sweden informed that there were no dumping activities of chemical munitions by their respective countries after 1947. Information on the dumping activities by the former GDR after 1947 is included in "The Report on Chemical Munitions Dumped in the Baltic Sea". Russia confirmed that the Russian national report submitted to HELCOM CHEMU 2 contains all available information on dumping activities by the former USSR.

III FOLLOW-UP DECISIONS OF HELCOM 15

The Group identified the following topics for further investigations and development within the HELCOM context:

1. Further search for location of chemical munitions

Russia conducted in 1994 investigations at the dumping sites. Results of these investigations are not yet available.

Estonia in cooperation with Sweden carried out hydrographical surveys for safety of navigation purposes in the Estonian territorial sea in 1994. No chemical munitions were detected during the surveys.

In 1994 Germany conducted investigations on the transport routes from Wolgast to the dumping sites to locate iron objects laying in the sediment. During these investigations several magnetic anomalies were discovered, but with the use of magnetic detectors and a scan-sonar it was not possible to examine whether the detected objects were chemical bombs or other iron objects. Further investigations will be carried out in 1995. The results of the German

. /2 investigations are contained in Attachment 2 to this Report.

The European Commission took a decision on 15 June 1994 (PESCAR) which introduces and supports measures for fishing activities in the fishery zones being under the Commission's responsibility. This decision stipulates, inter alia, that the European Commission will support the financing of procurement of cartographic documentation concerning objects laying on the seabed or other obstacles endangering fisheries. The Group recommends the Helsinki Commission to request the Contracting Parties, also members of the European Union, to work on a possible coverage of the entire Convention Area by this decision.

Regarding a possibility to develop forecasting models for the spreading of chemical munitions in the weather conditions of the time when they were dumped, the Group was of the opinion that it is unrealistic to develop such a model. The material on which such a model could be based is too unprecise, fragmentary, or even missing. That is to say that the exact time and positions of the dumpings, the way the material was dumped and packed, the weather conditions, and especially the strength and direction of the sea currents are not documented with necessary precision. The conclusion is that the development of such a model would not be justified neither in the economic nor in the environmental terms.

In "The Report on Chemical Munitions Dumped in the Baltic Sea Area" provided to HELCOM 15 it was stated that dumpings of chemical munitions south-west of Rønne (Bornholm) are still not verified. This matter may require further investigation and clarification.

The Group concluded that there could be a need for further investigations concerning location of dumped chemical munitions. However, the Group recognized that there is no need for the establishment of a joint HELCOM investigation programme, as such investigations could more appropriately be carried out by the Contracting Parties individually or on the basis of bilateral cooperation.

2. Investigations of the chemical processes of warfare agents and ecological effects of such processes

A reference is made to the relevant paragraphs of "The Report on Chemical Munitions Dumped in the Baltic Sea" which reads as follows:

- Only poorly soluble and poorly degradable warfare agents can persist locally in the sediment at elevated concentrations over a long period of time. Investigations on the chemical processes and ecological effects of warfare agents under Baltic Sea conditions exist only for a few substances. These processes and effects can often only be described qualitatively.

Further investigation on these processes and effects, especially on poorly soluble compounds such as viscous mustard gas and arsenic compounds, should be undertaken (laboratory tests).

- The Group notes that in some of the Contracting Parties investigations on dumping areas have been carried out.

The Group is of the opinion that investigations including water, sediment and biota should be conducted in selected dumping areas (field investigations).

For the time being the investigations concerning these issues are performed by Denmark, Sweden and Russia.

The National Environmental Research Institute in Denmark in cooperation with the National Food Agency has started the following project:

- development of analytical methodology for selected arsenic warfare agents (Clark I and II, adamsite, bis-diphenylarsin oxide, triphenylarsin, triphenylarsin oxide) in the matrices biota and sediment (started in 1994);
- laboratory studies concerning physico-chemical parameters like solubility, dissociation, partitioning and bioavailability as function of time and environmental parameters as temperature, pH, salinity and oxygen content, in the first hand using biomimetic membranes and mussel *Macoma balthica* (to be started in 1995);
- modelkinetic studies leading to further data concerning fate of relevant organoarsenic compounds (partly started).

The project will be accomplished by the end of 1996. The total cost of the project is 2.6 million DKK.

The Swedish National Defence Research Establishment (FOA) has started a preliminary project concerning dumped chemical munition. The aim of the project is to create scientific and financial conditions for a joint project related to investigations of the chemical processes of dumped chemical warfare agents and the ecotoxicological effects of such processes. The experimental work has started at FOA with development of methods for sampling and analysis of arsenic-containing agents, adamsite, Clark I and Clark II. These methods will be fundamental for the future analysis of water, sediment and biota from selected dumping areas. The initial work also included activities to establish contact with universities, authorities and research organizations in order to elaborate schemes for future work.

The Swedish Environmental Protection Agency is conducting a study on the origin of the disturbances of the reproduction systems of wild Baltic salmon (M74). The study consists of,

inter alia, laboratory tests of chlorinated agents and organic arsenic compounds, which were used as additives in dumped chemical warfare agents.

Russia has carried out integrated environmental investigations at the dumping sites in the Bornholm and Gotland areas in 1994. Furthermore, laboratory tests on the chemical and physical processes and the toxicological effects of warfare agents, e.g., mustard gas, lewisite, adamsite, and tabun are carried out in Russia. The results from both projects are under examination and will be submitted to the Commission for consideration when finalized.

The ad hoc Working Group was of the opinion that decisions regarding further actions concerning the above mentioned topics should await the results of the ongoing projects.

Due to the complexity of the field studies, the Group felt that there is a need for further investigations on the following topics:

- ecological and ecotoxicological effects of warfare agents containing arsenic compounds and mustard gas;
- investigations including water, sediment and biota from selected dumping areas with the aim to examine the content of warfare agents. Sediment and biota should be the primary compartments of such investigations for the more persistent and poorly soluble warfare agents.

The Group proposes that these topics should be dealt with by the Environment Committee. Furthermore, the Group is of the opinion that those countries which are carrying out or plan to carry out such investigations should inform Denmark and the Environment Committee on such investigations.

3. Elaboration of the Baltic Guidelines for fishermen on how to deal with dumped chemical munitions

./3 The Contracting Parties are invited to use the HELCOM Guidelines contained in Attachment 3 to this Report when elaborating national guidelines for fishermen on how to deal with dumped chemical munitions. The Contracting Parties should adjust the HELCOM Guidelines to the local conditions and translate them into national languages.

Denmark offered to provide the Contracting Parties during 1995 with pictures to be used in the national versions of the Guidelines.

The financial aspects of decontamination of a fishing vessel not flying the flag of the country undertaking the actual decontamination process should be agreed upon by the Contracting Parties on bilateral or multilateral basis.

It should also be stated that some countries consider that a minimization of risks related to contamination of fishermen caused by chemical munitions could be obtained by prohibiting fishing with bottom trawls at the dumping sites.

4. Elaboration of the Baltic Guidelines on how the appropriate authorities should deal with incidents where chemical munitions are caught by fishermen

The Combatting Committee at its 18th meeting in 1994 decided upon request of HELCOM CHEMU to develop the Baltic Guidelines on how the appropriate authorities should deal with incidents where chemical munitions are caught by fishermen and to include them as a separate chapter in the HELCOM Combatting Manual.

5. Investigations of the state of corrosion of dumped chemical munitions

Information on a theoretical model concerning this issue is contained in the Russian national report provided to HELCOM CHEMU 2. The conclusions were not, however, confirmed by practical experience, which shows that the state of corrosion ranged from intact munitions to completely corroded casings not containing warfare agents. For the time being the state of corrosion should be investigated by inspecting caught munitions and reporting to Denmark.

The Group concluded that at present this topic should be considered of lower priority.

IV FUTURE ACTIVITIES

Denmark offered to act as Lead Country on dumped chemical munitions and to provide all the Baltic Sea States and the Commission every year with a report on catches of chemical munitions by fishermen and scientific and practical studies of its effects to the marine environment, provided that relevant national information is submitted to Denmark.

The Group strongly requested the Contracting Parties to submit the aforementioned information to Denmark by the end of June every year.

The Environment and Combatting Committees of the Commission should coordinate future work on dumped chemical munitions in accordance with the tasks entrusted to them in this Report.

V DECISIONS BY HELCOM 16

The Commission:

- **expressed** its appreciation to Denmark for the offer to act as Lead Country on dumped chemical munitions;
- **requested** all the Contracting Parties to provide Denmark with information on all national and international activities concerning dumped chemical munitions by the end of June every year;
- **welcomed** the investigations on dumped chemical munitions, which have already been undertaken by the Contracting Parties;
- **recommended** to the Contracting Parties to carry out further investigations for location and characterization of dumped chemical munitions;

- **invited** the Contracting Parties to assist the countries in transition in such investigations;
- **encouraged** the Contracting Parties, members of the European Union, to make arrangements with the European Commission for the coverage of the entire Convention Area by projects which may have relevance to dumped chemical munitions;
- **encouraged** the Contracting Parties to proceed with investigations of chemical processes and ecological effects of warfare agents to the marine environment and with field studies at the dumping sites;
- **requested** the Environment Committee to coordinate future investigations of the chemical processes of warfare agents and their ecological effects.
- **requested** the Combatting Committee to develop the Guidelines for appropriate authorities on how to deal with incidents where chemical munitions are caught by fishermen and to include them into the HELCOM Combatting Manual;
- **recommended** to the Contracting Parties to provide the appropriate associations and organizations of fishermen in their respective countries with relevant national guidelines developed on the basis of the HELCOM Guidelines attached to this Report;
- **appreciated** the offer by Denmark to provide the Contracting Parties with pictures to be used in the national guidelines for fishermen;
- **recommended** to the Contracting Parties to conclude agreements concerning financial aspects of decontamination of fishing vessels not flying the flag of the country undertaking the decontamination.

ATTACHMENT 1

TERMS OF REFERENCE FOR THE AD HOC WORKING GROUP ON DUMPED CHEMICAL MUNITION (HELCOM CHEMU) (HELCOM 15/18, Annex 14)

1. The ad hoc Working Group will follow and coordinate the implementation of the recommendations given in the "Report on Chemical Munitions Dumped in the Baltic Sea", within the Area of the Helsinki Convention, including the area off Måseskär, inter alia,
 - to follow and coordinate step-wise research and investigations on the issues dealt with in paragraphs 2, 8 and 9 in the Conclusions of the report;
 - to coordinate further studies on sediment and biota in the selected dumping sites of the Baltic Sea (paragraph No. 11 of the Conclusions);
 - to elaborate a draft for Baltic Guidelines for fishermen, based on existing national guidelines and in cooperation with IBSFC;
 - to elaborate a draft for Baltic Guidelines on how the appropriate authorities should deal with incidents where chemical munitions are caught by fishermen;
 - to continue to compile all kinds of information on dumping activities - especially after 1947.
2. To set up priorities for the above mentioned activities taking into account the availability of financial and other resources as well as offers for lead countries.
3. To report on its activities to the Commission.

**FIRST RESULTS OF TWO MAGNETIC ANOMALY-DETECTION AND
SIDE-SCAN SONAR SURVEYS ON THE GERMAN PART OF
THE TRANSPORT ROUTES FROM WOLGAST TO
THE CHEMICAL MUNITIONS DUMPING AREA EAST OF BORNHOLM**

The Federal Maritime and Hydrographic Agency conducted two surveys in 1994 on the German part of the transport routes from the German harbour Wolgast to the dumping area east of Bornholm. The aim of these surveys was to locate iron objects and accumulations of iron objects lying on or in the sediment. Figure 1 shows a general map of the investigation areas. Measurements were carried out on board the survey, wreck-detection and research vessels ATAIR and WEGA. A proton-precision magnetometer and a side-scan sonar were used for object detection on a dense and systematic profile net. Distance between adjacent ship track lines was about 75 meters.

Results

In the more southern investigation area (WEGA 09/94) which covers a part of the "official" route to the dumping area a lot of magnetic anomalies as well as side-scan sonar contacts were detected. Compared to this result only a few anomalies and sonar contacts were found in the more northern survey area (ATAIR 03/94) which comprises a part of a shortcut to the dumping area that was presumable used occasionally.

Locations showing a magnetic anomaly as well as a sonar contact clearly indicate iron objects lying on the sea bottom. Magnetic anomalies without sonar contacts point out that the corresponding objects are covered by sand. To the contrary a sonar contact not confirmed by a magnetic anomaly is more difficult to interpret. Its source may be a natural object (stone, accumulation of stones etc.) or just as well an iron object if the magnetometer was too far away to measure its magnetic anomaly.

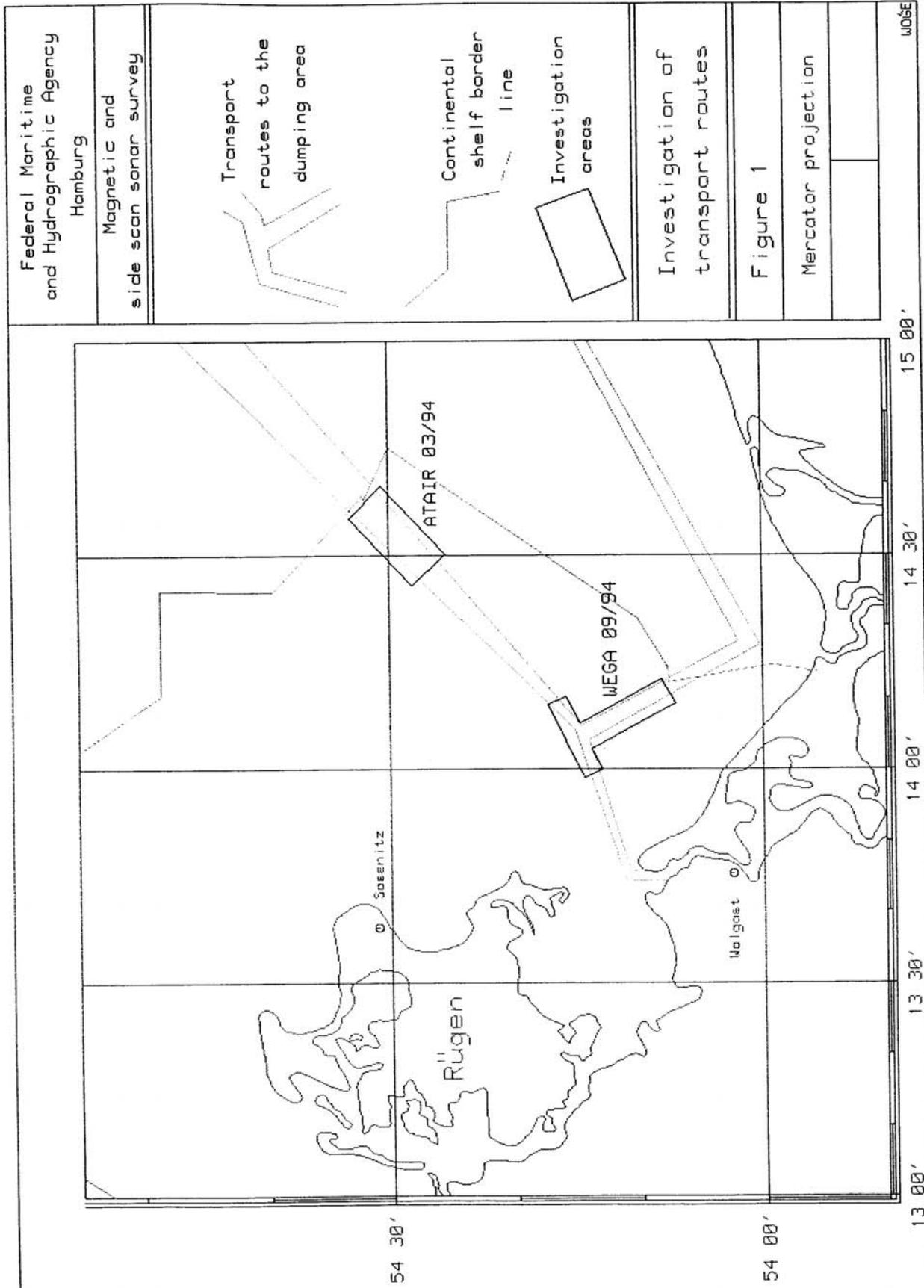
With the use of magnetics and side-scan sonar only it is not possible to examine whether the detected anomalies and contacts indicate chemical bombs or other objects (wreckage, scrap etc.).

Conclusions

Further surveys are necessary

- 1 to identify and classify the detected magnetic anomalies and sonar contacts,
2. to investigate the remaining part of the transport routes.

The Federal Maritime and Hydrographic Agency will continue its investigations in 1995 on board its new survey, wreck-detection and research vessel DENEK, which is equipped with a modern high-resolution object detection sonar system.



**HELCOM Guidelines to be used by the Contracting Parties
when elaborating National Guidelines for Fishermen
on how to deal with caught chemical munitions**

FISHERIES AND WARFARE AGENTS

Preventive measures and first aid

After World War II large amounts of chemical munitions were dumped in the Baltic Sea - see the map.

Simply touching chemical agents or inhaling of the vapours is very dangerous, and fishermen should therefore carefully follow the instructions in this leaflet in the event of chemical munitions being caught.

Chemical munitions may contain explosives and should therefore be treated with great care.

WHAT TO DO ?

- 1.** Read this leaflet before fishing in the risk areas, and pay special attention to the sections on first aid.
- 2.** Be alert for abnormal conditions when bringing in the haul, e.g.:
 - **whether** tackle or fish smell unusual
 - **whether** there is a stinging sensation in the eyes
 - **whether** there are any corroded containers or suspicious clay-like lumps.
- 3.** If there is any suspicion of chemical bombs in the tackle when bringing in the haul, the tackle should be cut away and the position marked. The nearest national contact point or the national contact point of a fishing vessel shall be informed accordingly. The list of national contact points is contained in the summary chart of dumping and risk areas.
- 4.** Contact the national contact point if chemical munition is caught and give all the information you can, including your own opinion about the situation. The national contact point can be contacted via the coastal radio.
- 5.** Anybody who has come into contact with chemical agents must start decontaminating immediately, even if no adverse effects are felt at the start.
- 6.** Crew who have to work in a contaminated area of the vessel must use clean protective gloves and breathing masks. Do not spread the contaminants. Be careful when going to the toilet.
- 7.** Close doors and hatches to the contaminated area, and stop all ventilation systems. If possible, let the wind carry fumes and contaminants away from the area with people. Close the hatch to the hold and leave all fish on deck together with the tackle.
- 8.** Fishing vessels which have come into contact with chemical agents must not bring the fish ashore, including roe, livers and everything else, until the catch has been checked and released by a relevant national authority*). Fish which has been contaminated by chemical agents is unsuitable for human consumption and as animal feed.

9. The vessel and tackle must not be used until they have been decontaminated and approved by a relevant national authority *).
10. All injuries caused by finds of chemical warfare agents must be reported to a relevant national authority*).

SUMMARY CHART *OF DUMPING AND RISK AREAS (rest of the page)*

<The chart should include contact numbers in all the Baltic Sea States >

*) relevant national authority to assign by each Contracting Party

RISK AREAS

Where: Areas A, B, C, D and E shown on the map and delimited between the

	<u>parallels:</u>	<u>meridians:</u>
A.	55° 50' north and 55° 40' north	18° 30' east and 20° 00' east
B.	54° 50' north and 55° 30' north	14° 30' east and 16° 30' east
C.	54° 45' north and 54° 52' north	10° 00' east and 10° 20' east
D.	58° 10' north and 58° 25' north	09° 10' east and 09° 50' east
E.	58° 07' north	10° 47' east

It should be noted that it is recommended not to anchor or to fish with bottom tackle in the risk areas A, B and C and that fishing is prohibited in certain parts of the risk areas as shown by markings on nautical charts.

Why: Mustard gas, sternutators, lachrymators and suffocating agents have been dumped in areas A and B. Nerve agents and suffocating agents have been dumped in area C. Mustard gas and possibly other types of chemical munitions have been dumped in areas D and E. However, the majority of findings has been mustard gas.

How: When fishing with bottom tackle or nets permanently placed on the sea bed in areas A, B and C, it is a requirement that vessels are equipped with protective or first-aid equipment.

In area C the requirement for first-aid equipment also includes atropine/oxime (e.g. obidoxim or oxime) injectors for nerve agents protection.

In areas D and E chemical munitions were dumped at great depths in sunken vessels. For this reason there are **no** requirements for vessels fishing in this area to be equipped with protective and first-aid equipment.

CHEMICAL MUNITIONS CAN OCCUR IN THE FORM OF BOMBS OR CLAY-LIKE LUMPS AND IN ARTILLERY SHELLS

The nature of the objects caught varies a great deal. They can be bombs or parts of bombs. The metal shell of the bombs is usually corroded through. Shells which are relatively intact have also been found.

Bombs which are caught are in one of three stages of decomposition
< this should be illustrated with good quality colour photos >

Type 1: The outer shell of the bomb is only partly corroded, but the metal shell can easily collapse, which would allow the warfare agent to escape. This type of bomb looks like the one shown:

Type 2: The outer shell of the bomb is almost completely corroded away. This type of bomb usually consists of a yellow shell of partly converted warfare agent and/or adhesive substance. Liquid yellow or brown chemicals are often found in the centre of the bomb. The bomb falls apart in small and large pieces very easily, which can open sections with active warfare agent. This type of bomb can look like the one shown:

Type 3: Yellow or brown lumps of varying sizes (up till 100 kg), many with a clay-like consistency. Most of the lump is converted warfare agent and/or adhesive substance, and there is normally no liquid phase. In the case of cracking, sections with active agents will be exposed. Several lumps of varying sizes are often caught at the same time, as the trawl may have broken a large lump into smaller pieces. Lumps can look like the one shown:

The chemical artillery shells can look like this one:

All the above ammunition types may contain explosives and should therefore be treated with great caution, but so far no explosions have occurred.

FIRST AID IS EMERGENCY AID

First aid must be given **quickly** and **correctly** in order to limit the extent of damage and injuries. It is therefore necessary for everyone on board to know where the first-aid equipment is kept.

Medical help is necessary at the latest when the vessel arrive in port, and in some cases it may be expedient to contact a doctor on the radio or, in serious cases, to get medical assistance by helicopter as soon as possible.

FIRST-AID EQUIPMENT FOR CHEMICAL WARFARE AGENTS

At least the following first-aid equipment for such agents must be on board vessels fishing in the risk areas:

1. One (1) "gas box" for every three (3) crew members. The "gas box" should contain the following:
 - 5 tongue spatulas;
 - 4 packets of 10 g containing absorbent cotton;
 - 3 100 ml bottles containing either 5% solution of dichloramine in dichloroethane or 5% solution of 1,3-dichloro-5,5-dimethylhydantoine in dichloroethane. The bottles should be marked clearly "Gas-decontamination liquid" and the composition stated;
 - 3 powder sprays containing 50 g of fine pulverized compound of calcium of lime and magnesium oxide, adjusted to a content of 25% active chlorine. The spray should be marked clearly "Anti-gas powder" and the composition stated;
 - 1 75 ml bottle containing a solution of copper sulphate. The bottle should be marked "Anti-phosphorus liquid" and imprinted with instructions <approved by the appropriate authority > ;
 - 1 copy of the National Leaflet on "Fisheries and Warfare Agents - Preventive measures and first aid".

2. Ten (10) atropine/oxime automatic injectors for every three (3) crew members on vessels fishing in the risk area C and using bottom tackle or tackle which is permanently fixed on the seabed.

"Gas boxes" can be obtained from the following pharmacies, and atropine/obidoxim injectors can be obtained from the following pharmacies < list of national pharmacies > .

The following personal safety equipment must also be on board during fishing in the risk areas:

1. Breathing masks (full-face mask with filter, speech membrane and panoramic screen) and spare filters should be available on board, e.g. one mask and one spare filter, for every crew member. Breathing masks and filters should be appropriately approved.
2. One (1) pair of long isobutylene/isoprene rubber gloves per crew member.

Information about approved breathing masks and filters as well as on dealers who sell such equipment and isobutylene/isoprene rubber gloves can be obtained from the appropriate national authority.

IN CASE OF MUSTARD GAS POISONING:

WARNING: Mustard gas penetrates very easily into the body via the skin, mucous membranes and respiratory tract. An unusual property is that the symptoms do not appear immediately! Often the injuries do not appear until several hours after the exposure! It is therefore of uttermost importance that decontamination starts immediately after contact with mustard gas!

<The following section should be illustrated with many clear and informative drawings: "cartoon-like" >

WARNING: Do not rub your eyes, even if they are stinging.

If there is the least sign of a contamination, the following precautions must be taken:

1. Avoid touching tackle and haul. Do not spread the contaminants on board.

WARNING: Eyes should only be cleaned if they are stinging. If there is no stinging in the eyes, the skin should be cleaned immediately

2. Eye-cleaning

- a) Wash the eye out with plenty of water (e.g. from flushing hose) for at least 15 minutes. Washing out should be done from the root of the nose outwards as shown in the drawing:
- b) Close the eye and carefully clean the surrounding skin area with soap and water.
- c) **Never** rub your eyes, even if they are stinging or itching. Do not use eye ointment and do not dress the eye.

WARNING: Gas cleaning liquid and anti-gas powder must not be used on the eyes

3. Skin-cleaning where the skin is contaminated by grease-like substances

- a) Carefully remove work clothing and leave it where it is.
- b) Remove the grease-like substance from the skin immediately by scraping with a knife or similar instrument. Be careful not to rub the substances into the skin or spread it.
- c) Clean the contaminated skin using cotton wool moistened with gas cleaning liquid.
- d) Rub anti-gas powder into the affected skin area as soon as possible.
- e) Wash the skin thoroughly with soap and water.
- f) Carefully dry the skin with a clean towel and rub gas powder into the affected skin area again.

4. Skin cleaning in other cases

- a) Quickly rub anti-gas powder onto hands, arms and face.
- b) Remove work clothing and leave where it is.
- c) Once again rub anti-gas powder onto the affected areas and wash it off again after half an hour. Be careful not to spread the contamination, e.g. when you go to the toilet.

5. Any blisters must not be punctured. They should only be covered with a clean dressing.

6. Move the vessel into a position which allows the wind to carry any gas fumes away from the affected people on board. Close doors and hatches to the contaminated area.

7. Contact the national contact point via the coastal radio station to get information on what to do next. Medical assistance may be required.

8. Make the vessel ready. If this cannot be done without coming into contact with the contaminated area, the crew must use safety equipment (see pages 5-6).

IN CASE OF NERVE AGENT POISONING:

Nerve agent poisoning has not yet occurred during fishing in the Baltic Sea, but it needs to be treated very quickly if it does occur.

If nerve agent poisoning is suspected or in case of severe difficulty in breathing and/or cramps, **atropine/oxime should be injected into the thigh immediately - through the person's work clothing, if necessary.**

When going to the aid of an injured person, you must wear a protective breathing mask and gloves.

Otherwise follow the same procedure as described for mustard gas (cf. paras 1 to 8 on pages 7-8).

Unless the symptoms of poisoning disappear within **10 minutes, another injection of atropine/oxime in the thigh should be given.** No more than three injections may be given without medical advice. A good sign of the atropine having worked is dryness in the mouth.

If atropine/oxime is taken **without** the person being poisoned by nerve agent, it can cause blurred vision and palpitations. Instructions for use of atropine/oxime can be found on the injector itself.

IN CASE OF SUFFOCATING AGENT POISONING:

Suffocating agents affect the respiratory system. In case of suffocating-agent poisoning, the poisoned person must not smoke, eat or drink, and must stay calm.

IN CASE OF PHOSPHORUS POISONING:

Note: PHOSPHORUS is not a warfare agent and can thus also be found outside the dumping sites.

Extinguish any burning phosphorus particles by keeping the affected area under water. Scrape off the particles using a knife. Then keep the affected area covered with a wet cloth until it can be bathed in anti-phosphorus liquid. Finish by applying a dry dressing.

General precautions

Decontaminating a fishing vessel after contamination with chemical agents must only be carried out by a relevant national authority, never by the fishing vessel's crew. Caught chemical munitions and contaminated hauls must not be moved or touched by the crew. If chemical munitions are caught or this is suspected, work must cease immediately, and only work which is necessary to ensure the safe sailing of the vessel may be carried out in the area of the vessel which is contaminated with warfare agents. During such work, the crew must wear isobutylene/isoprene rubber gloves and breathing masks. This safety equipment must not be used with a view to decontaminate the vessel, etc., but only for the most necessary work in order to ensure the safe sailing of the vessel. The safety equipment can also be used to go for the assistance of injured people.

DESCRIPTION OF THE WARFARE AGENTS

Mustard gas is, in its pure form, a transparent, slightly volatile, oily substance with a sweet smell. Mustard gas normally occurs with impurities which give it a brown colour. The smell is very similar to cress, horseradish or mustard. The smell gradually becomes less noticeable, as one's sense of smell is weakened by the gas.

Mustard gas in liquid form is able to penetrate ordinary clothing and leather. Ordinary rubber and many types of plastic only provide brief protection.

Mustard gas in liquid and vaporised form easily penetrates the skin without it being noticed straight away, because the symptoms do not appear until a few hours later in the form of reddening of the skin, itching or a stinging sensation in the affected areas. The reddening may turn into liquid-filled blisters which can burst and turn into sores which heal very slowly.

In both liquid and vaporised form, mustard gas can affect the eyes. If the gas gets into the eyes in liquid form, it will cause permanent blindness. In its vaporised form, the gas will cause the eyes to close up and result in temporary blindness after a few hours, and it may cause conjunctivitis, reddening and watery eyes.

Inhalation of mustard gas vapours can cause serious damage to the windpipe and lungs. The risk of injury from mustard gas is greatest during warm, calm weather and in enclosed rooms, and the longer one is exposed to the gas.

The symptoms of poisoning are a runny nose, hoarseness, coughing, a sore throat, general unwellness, vomiting, fever and lethargy.

Mustard gas finds off Bornholm and Gotland (Areas A and B) show often high viscosity due to the addition of thickeners. These make the mustard gas sticky and difficult to remove.

Injuries caused by mustard gas can take a very long time to heal - which makes it very important to start first aid as soon as possible.

Lachrymators are volatile substances which affect the mucous membrane of the eyes and cause watery painful eyes. They may irritate the skin and cause local injuries. The effects do not last very long after the affected person has been removed from the gas.

Sternutators affect the mucous membranes of the nose, throat and respiratory passages and causes sneezing, coughing, a runny nose and watery eyes. These effects can last from 15 minutes to a couple of hours after the affected person has moved away from the gas and into fresh air.

Note: Mustard gas has sometimes been mixed with lachrymators or sternutators, and this type of gas mixture will cause the symptoms of all its constituent parts.

Nerve agent of the tabun type is, in its pure form, a transparent and odourless glycerine-like substance. However, impurities sometimes make the liquid dark and give it a fruity smell, and any additives to it may also affect its smell.

Nerve agents are easily absorbed through the skin, respiratory organs, eyes and the gastrointestinal tract. Nerve agents in liquid and vaporised form easily penetrate all textiles and leather. Ordinary rubber and many types of plastic only provide brief protection.

A small dose of nerve agent will cause headaches, painful eyes, blurred vision, pupil contractions, a running nose and a feeling of weight on the chest.

A large dose will cause the above symptoms followed by cramps, difficulty in breathing, a slow pulse, and may be fatal as a result of respiratory or cardiac arrest. If a person is exposed to a large dose, the entire poisoning process is very quick, usually between 5 and 10 minutes, unless the patient is treated.

Suffocating agents. A typical suffocating agent is phosgene, which is a colourless gas. At temperatures of less than 8E C, phosgene is a liquid. In low concentrations it has a rather sweet, not unpleasant smell, which is reminiscent of newly cut hay.

In high concentrations the smell becomes sharper and irritating. The fumes are heavier than air. The substance is very insidious, and harmful quantities can be inhaled without the person noticing anything.

For the first few hours after a person has been exposed to phosgene fumes, the only effect is irritation of the mucous membranes in the respiratory passages. The symptoms of poisoning are difficulty in breathing, coughing, a feeling of suffocation, thirst, vomiting, pain in the chest, lips turning blue, foaming at the mouth, extreme weakness, mental disturbances followed by unconsciousness. The reason for this is that phosgene causes pulmonary oedema and prevents oxygen absorption because of damage to the lung tissue.

The mucous membranes of the eyes are also affected by phosgene, which can result in permanent eye damage, even though there are no symptoms of this at the start.

Smoke-generating agents contain often phosphorous compounds. A mixture of sulphur trioxide and chlorosulphonic acid is another powerful smoke generator. In its liquid form it is extremely corrosive on contact with the skin. In its vaporised form, it consists of small particles of hydrochloric acid and sulphuric acid, which irritate the skin, eyes and respiratory organs.

Phosphorous is found in smoke ammunition where the whole charge or part of it consists of yellow (white) phosphorous. When phosphorous is taken out of the water and comes into contact with the oxygen in the air, it ignites. Phosphorous sores heal very slowly.

This leaflet does not deal with the possible chronic adverse effects of the poisons.