European Maritime Safety Agency

*Photo from Irish Coast Guard

Second review and evaluation of the MAR-ICE Network covering its operation from January 2011 to June 2013

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Executive Summary

The MAR-ICE Network was created in 2008 through a 3-Party Memorandum of Understanding (MoU) between the European Chemical Industry Council (Cefic), the Centre of Documentation, Research and Experimentation on Accidental Water Pollution (Cedre) and the European Maritime Safety Agency (EMSA) and became operational in January 2009. The MAR-ICE MoU has been extended in 2011 until October 2014.

A first report evaluating the service provided by the Network during its first two years of operation (January 2009 to December 2010) was published on EMSA's website in 2011. This is the second report evaluating the Network's operations **from January 2011 to June 2013**.

During this period, the MAR-ICE Network has been activated regarding four real incidents involving Hazardous and Noxious Substances (HNS) as well as during four pollution response exercises, as shown in the table below:

Real incidents during which the MAR-ICE Network was activated (January 2011- June 2013)		
Requesting entity & date of request	Substance(s) involved in incident	Request made to MAR-ICE Network
Norwegian Coastal Administration (04.03.2011)	41 t of Portland cement released in a harbour	Request for information regarding immediate measures to be taken and risk evaluation
SASEMAR, Spain (11.03.2011)	Diammonium Phosphate (DAP)	Request for information about Diammonium Phosphate, in particular regarding the product's reactivity, hazards, PPE, precautions, detection and bulk transport risks
Federal Public Service Environment, Belgium (28.10.2011)	1000 t of Ferro-Silicon (FeSi), (UN 1408) carried in bulk	- Concerns about product reacting with water and gas that may be generated - Request for advice on monitoring of presence or not of explosive gas concentrations, analysis of dangerous cargo involved and assessment of risk for responders and environment
MUMM, Belgium (31.07.2012)	Hazardous cargo on board the disabled container vessel *MSC Flaminia*	Request for assistance with risk assessment of dangerous cargo on board the disabled vessel for intervening personnel & the marine environment

Notification exercises during which the MAR-ICE Network was activated (January 2011- June 2013)		
Requesting entity & date of request	Substance(s) involved in exercise scenario	Request made to MAR-ICE Network
Notification exercise by Irish Coast Guard (18.04.2012)	Scenario based on a 45 gallon drum of packaged Sodium Cyanide (UN 1689) lost overboard	Request for information on risk evaluation
Notification exercise by MRCC Riga, Latvia (02.11.2012)	Scenario based on a toxic cloud drifting towards the coast, created after the ship-sourced release of 20,000 t of Methyl Isocyanate (MIC) (UN 2480)	Request regarding possible duration and hazards of toxic cloud
Notification exercise by MCA, UK (26.01.2013)	Scenario based on a collision resulting in the release of cargo from a chemical tanker and the loss of a tank from a RoRo ferry, involving in total 5 chemical substances: 830 t of Aries 32; 750 t of vinyl acetate; 900 t of phenol; 875 t of naphthalene (raw)); sulphuric acid (fuming) (UN 1831)	Request regarding the evaluation of the likely impact of these substances on public health and the marine environment, including fisheries, the surface trajectory of the floating chemicals, the trajectory of any gas clouds generated, and recommendations for response including PPE specifications
Notification exercise by Irish Coast Guard (17.04.2013)	Scenario based on a container lost at sea including drums of formaldehyde solution, liquid, (UN 1198)	Request for information regarding the lost container (incl. risk evaluation for the environment)

The countries that activated the Network have expressed their high appreciation of the service provided. Generally, the EU Member States, coastal EFTA/EEA States and coastal EU Candidate countries acknowledge the importance and benefit of having rapid access to professional product and incident-specific information on chemical substances and their associated hazards and risks, as well as receiving timely expert advice when dealing with maritime chemical emergencies.

Cedre has to date performed its tasks to provide information on chemicals involved in maritime incidents very well and always timely. In addition to the product specific information, Cedre provided additional operationally relevant information and expert advice in almost all cases.

Cefic's crucial role as a partner of the MAR-ICE Network in maintaining the ICE Database with the contact information for the manufacturers of chemicals in Europe, and updating the ICE members of the MAR-ICE Network's activations is greatly appreciated.

Both Cedre and Cefic have made a positive assessment of the Network and the service it provides and have expressed their willingness to continue the MAR-ICE Network and explore its further development.

1. Introduction

The MoU between Cefic, Cedre and EMSA was signed on 17 October 2008 and the MAR-ICE Network became operational on 1 January 2009. As agreed among the parties of the MoU, Cedre serves as the MAR-ICE Contact Point, receiving all requests for assistance to the Network and coordinating the information and advice provided. This task is covered under a Funding Agreement between EMSA and Cedre. The 3-Party MoU between Cefic, Cedre and EMSA as well as the Agreement between EMSA and Cedre, have a duration of three years. In October 2011, both were extended for another three years and now continue until October 2014.

Tasks and activation procedures of the MAR-ICE Network are described in the MAR-ICE Implementation Plan, which has been distributed to the relevant administrations of the EU Member States, coastal EFTA/EEA States and coastal EU Candidate countries. In addition to marine HNS spills, or the threat thereof, MAR-ICE can also be used during pollution response drills and exercises. A leaflet describing the Network's scope and the service it provides, has been recently updated and distributed to the relevant administrations. Information on the Network is also published on Cefic's, Cedre's and EMSA's websites.

Cedre has spent considerable time each year in training its duty officers in the MAR-ICE procedures. In parallel, the procedures related to the service have been incorporated in the EMSA Contingency Plan and the Agency's Maritime Support Services (MSS) operators are regularly trained on its activation procedures, as appropriate.

A first report evaluating the service provided by the Network during its first two years of operation (January 2009 to December 2010) was prepared and published on EMSA's website in 2011. This is the second report reviewing and evaluating the Network covering its operation from **January 2011 to June 2013**.

2. MAR-ICE activations by EU Member States, coastal EFTA/EEA States and coastal EU Candidate countries

During the period covered by this report, the MAR-ICE Network has been activated eight times; four times during real incidents and four times during national marine pollution response exercises (Notification Exercises). A brief summary of the MAR-ICE activations and the main conclusions ('lessons learned') from these are presented below. In all cases, the feed-back received by the requesting parties was positive, in particular regarding the prompt and professional information and expert advice provided regarding the product involved. Comments made by the service's users in improving practical aspects of the activation procedure and facilitating the communication and information exchange have been considered by EMSA in the review of the Network.

2.1. MAR-ICE Network activations for real incidents involving HNS

The Network was contacted and activated three times in 2011 and once in 2012 regarding real incidents involving HNS cargo. In the 2011 incidents, the cargo concerned was transported in bulk and involved relatively small quantities; the 2012 activation was for a much larger incident, involving over one hundred containers with hazardous goods.

2.1.1 Activation of the MAR-ICE Network by Norway, 4 March 2011

The Norwegian Coastal Administration activated the MAR-ICE Network on the night of 4 March 2011 regarding the accidental spill of 41 t of Portland cement (CAS-nr 65997-15-1) into the sea during a loading operation from land to ship in a port in Norway. The depth by the quay where the accident happened was 17 metres and the requested information was if any immediate measures needed to be taken regarding the incident.

The communication between the MAR-ICE Contact Point and the requester continued throughout the night and the information provided to the Norwegian Coastal Administration included the Material Safety Data Sheet (MSDS) and the International Chemical Safety Card of Portland cement, as well as information and advice on actions taken during a similar incident which occurred in France in 2008 regarding the loss of cement.

Based on the timely product-specific information provided by the MAR-ICE Network, as well as information provided by the polluter about the local conditions, the Norwegian Coastal Administration concluded the Network's activation the following day.

This incident highlights the importance of having timely access to expert information and advice 24/7, especially during the night when many emergencies can occur, and how the professional information service provided can assist the responsible authorities in adequately addressing the situation.

2.1.2 Activation of the MAR-ICE Network by Spain, 11 March 2011

On 11 March 2011, SASEMAR (Spain) activated the MAR-ICE Network for the purposes of an exercise by sending the MAR-ICE Contact Form to the MAR-ICE Contact Point. Information was requested regarding Diammonium Phosphate (DAP). Contact with SASEMAR following the activation clarified that the request made to the Network concerned a real incident which was at the time on-going, for which more information was needed regarding the ship's cargo (Diammonium Phosphate, transported as solid in bulk). For this reason, this request is presented in this report under "real incidents".

The information requested by the Network regarded the product's reactivity (water reactivity, solubility and aquatic toxicity), hazard decomposition, precautions to be considered in case of intervention and PPE requirements, detection equipement required and bulk maritime transport specific risks. The requested information, including the product's MSDS and relevant information from the IBC Code, was sent to the requester within one hour. No further advice or information in addition to the documentation provided was offerred, nor requested.

2.1.3 *Wilson Mosel* incident, activation by Belgium, 28 October 2011

The Federal Public Service for the Environment in Belgium contacted the MAR-ICE Contact Point on 28 October 2011 about an incident which occurred on the vessel *Wilson Mosel,* containing 1000 t of Ferro-Silicon (FeSi) (UN 1408), carried in bulk. The ship was expected to arrive in Ostende on the afternoon of that day and the Network was activated by using the MAR-ICE Contact Form. The Belgian administration was concerned because of water ingress affecting the cargo, due to structural failure of the vessel, and that gas may have generated as a result. An analysis of the dangerous cargo involved and an assessment of the risk for responders and the environment was requested by the MAR-ICE Newtork. The vessel's cargo manifest was also provided by Belgium.

The MAR-ICE Contact Point provided Belgium with the product's MSDS in English and in French, as well as a copy of the IMSBC code concerning Ferro-Silicon, and the respective ERICard, including advice on possible hazards and risks within one and a half hours. The information provided by the Network was well received in Belgium. The Network's activation was concluded later that day with the Belgian authorities informing the MAR-ICE Contact Point of the results of the gas measurements conducted on board the vessel and other incident-related follow-up actions taken by Belgium.

2.1.4 *MSC Flaminia* incident, activation by Belgium, 31 July 2012

The Management Unit of the North Sea Mathematical Models and the Scheldt estuary (MUMM), on behalf of the Belgian Federal Department for the Environment, contacted the MAR-ICE Contact Point on 31 July 2012 requesting a risk assessment of the hazardous cargo on board the disabled container vessel *MSC Flaminia*. The *MSC Flaminia* had experienced fire and explosions in the morning of 14 July 2012, while enroute from Savannah, Georgia, USA to Antwerp, Belgium.

Belgium wanted to know what are the most hazardous substances that should be taken into account when evaluating the possibility of passage of the vessel through Belgian waters. The evaluation should cover the marine environmental impacts and the risks for intervening personnel. Additional information regarding the cargo and the status of the fire-impacted parts of the vessel, was also provided by Belgium to the MAR-ICE Contact Point.

Given the large number of containers with hazardous cargo, the MAR-ICE Contact Point involved several engineers in this request and provided the following day a first detailed risk assessment report regarding the unaffected and the heat/smoke affected containers with dangerous cargo on board the vessel. Challenges in drafting this report in such short time included that many containers were registered under generic names and that a deeper risk analysis would require the exact name of the chemicals, in order to also involve and request the assistance of the chemical industry. The containers located in the vessel's fire damaged area were not considered in this report.

A second detailed risk assessment report was provided by the MAR-ICE Contact Point two days later, focusing on the vessel's fire damaged cargo, as requested by Belgium after receipt of the first report.

A third detailed risk assessment report followed six days later, focusing on the cargo's potential impacts and hazards to the marine environment ('marine pollutant' HNS).

In this specific case, and following EMSA's and Cefic's approval, North Sea neighbouring countries including the Netherlands, France, the United Kingdom and later Germany were also informed of and provided with a copy of the detailed risk assessment reports developed by the MAR-ICE Network. At the time the Risk Assessments were prepared, Germany was not considered as a destination for the vessel and therefore not included in the initial distribution of the information.

Belgium's feed-back regarding the MAR-ICE assistance received during this complex incident has been very positive. In particular appreciated was the very good cooperation between the MAR-ICE Network and the Belgian experts; the rapid, well-structured and complete replies and reports received from the MAR-ICE Network and the fact that in less than 24 hours a thorough, 'state-of-the-art' risk assessment and expert advice was provided to the requesting authorities. Such risk assessments can be particularly important in a decision-making process, when dealing with an incident involving HNS.

2.2. MAR-ICE Network activations for HNS pollution response exercises

While in 2011 the MAR-ICE Network was not activated during a drill or exercise, 2012 and 2013 included four pollution response exercises (Notification Exercises) which contacted the MAR-ICE Network testing its activation procedures and the service provided. The MRCC Dublin activated the Network twice and 'new' requesters, such as the UK and Latvia also activated the Network during a Notification Exercise.

2.2.1 Notification Exercise by the MRCC Dublin, Ireland, 18 April 2012

On 18 April 2012, the MAR-ICE Contact Point received by fax the MAR-ICE Contact Form from the MRCC Dublin in Ireland, requesting information on a (randomly chosen) chemical Sodium Cyanide (UN 1689), solid, packaged in a 45 gallon drum, which according to the exercise scenario was lost overboard. Within one hour, the ERICard corresponding to Sodium cyanide, the relevant Spillage Schedule extracted from the IMDG code, and the product's MSDS (from a company listed as a Sodium cyanide producer in the ICE Database) were provided to the requesting party.

The Irish Coast Guard officer handling the exercise, provided EMSA with some feed-back in regard to the exercise, which aimed at familiarising the duty officers of two MRCC Sub-centres in the MAR-ICE activation procedures. The results were positive, with some small practical issues regarding the scenario incident details and the use of the electronic version of the MAR-ICE Contact Form noted. The response from the MAR-ICE Contact Point was very much appreciated, with the first set of information received approximately 30 minutes after the initial call and the second set within an hour.

2.2.2 Notification Exercise by the MRCC Riga, Latvia, 2 November 2012

On 2 November 2012, the MRCC Riga in Latvia activated the MAR-ICE Network during an HNS Notification Exercise by using the MAR-ICE Contact Form. The exercise scenario was based on a toxic cloud drifting towards the Latvian coast, which was created following the ship-sourced release of 20,000 t of the chemical Methyl Isocyanate (MIC) (UN 2480). Additional information regarding the

scenario (toxic cloud map, accident situation and initial assessment) was also provided by the requesting party. The request made to the Network related to the duration of the toxic cloud.

Within 30 minutes, relevant information on the main health hazards, accidental release measures, personal protection, product stability and reactivity was provided from the MAR-ICE Contact Point to the requestng party. This included information from the Emergency Response Guidebook 2012, Response Guide 155 for UN 2480 toxic and/or corrosive substance (flammable/water sensitive) with Initial Isolation and Protective Action Distances. The MAR-ICE Contact Point also offerred to run two chemical release models, ALOHA and CHEMMAP, and provided the requester with the model results within 6 hours, indicating a potential risk area, the toxic cloud extension and product concentration duration. The information provided by MAR-ICE was highly appreciated by Latvia and the exercise was concluded within the day.

2.2.3 Notification Exercise by the MCA, United Kingdom, 29 January 2013

On Saturday, 26 January 2013, the UK Maritime and Coastguard Agency (MCA) contacted the MAR-ICE Network regarding an exercise involving a collision between a chemical tanker and a RoRo ferry in the Irish Sea, resulting in the release of cargo from the chemical tanker and the damaging of one tank onboard the RoRo ferry, which was likely to be lost into the sea. Both vessels were stable. The cargo of the chemical tanker included four substances (830 t of Aries 32; 750 t of vinyl acetate; 900 t of phenol; 875 t of naphthalene (raw)). The damaged tank of the RoRo ferry contained sulphuric acid (fuming) (UN 1831).

The request made to the Network regarded the evaluation of the likely impact of these substances on public health and the marine environment, including fisheries, the surface trajectory of the floating chemicals, the trajectory of any gas clouds generated, and recommendations for response including PPE specifications.

Within one hour, the ERICards and MSDSs of the products involved in the incident were provided to the requester; shortly thereafter an initial evaluation of the environmental impacts of these products and their behaviour in the marine environment (using the SEBC classification) was also provided. Regarding the chemicals' spill trajectory, advice was provided by the MAR-ICE Contact Point concerning the most relevant products (only two) for which spill trajectory modeling could be provided. Shortly thereafter, the exercise was concluded by the MCA, without requesting the use of the chemical spill trajectory modelling (CHEMMAP).

2.2.4 Notification Exercise by the MRCC Dublin, Ireland, 17 April 2013

The MAR-ICE Network was activated again by the MRCC Dublin, Ireland during an exercise on 17 April 2013, by using the MAR-ICE Contact Form, requesting information regarding a container lost at sea including drums of formaldehyde solution, liquid, (UN 1198). Within 30 minutes, the ERICard for formaldehyde solution was sent to the requesting party, highlighting the relevant parts regarding first aid measures, firefighting measures, accidental release measures and PPE. The MRCC Dublin was also asked if they wished to contact through the Network a chemical plant producing the chemical UN 1198 . Ireland replied that they wanted to contact a knowledgeable company producing this chemical.

Shortly thereafter, the relevant MSDS was also provided to the requesting party, highlighting the parts regarding toxicological and ecological information, environmental impacts, disposal considerations and providing advice on the GESAMP profile and the behaviour of the container. Additional information and advice on the ecotoxicological information was also provided by the MAR-ICE Contact Point.

The ICE database was searched for an industrial chemical plant liable to be put in contact with the Irish Authorities; six chemical plants were identified and questioned on formaldehyde. With the requesting party's agreement, the search ended without contacting a manufacturer and the exercise was succesfully concluded by the MRCC Dublin.

3. Cedre's performance as the MAR-ICE Contact Point

3.1. Cedre as the MAR-ICE Network's Contact Point

Since the establishment of the MAR-ICE Network, Cedre has conducted regular training of its duty engineers on the MAR-ICE procedures. This internal training consists of familiarisation with the ICE Database (on which the MAR-ICE Network is based), consulting various other chemical databases, using HNS modelling software (such as CHEMMAP) and keeping up-to-date with the MAR-ICE activation procedures.

In all cases of the MAR-ICE Network's activations, Cedre has acted very efficiently in providing the requested information within 1 hour (except in the complex case of the *MSC Flaminia* Risk Assessments reports). During two occassions, the provision of additional information, following contact with the chemical product's manufacturer, has also been succesfully provided shortly thereafter. In most cases Cedre, provided the requested information based on its own resources and data sources. In almost all cases, relevant documentation (e.g. MSDSs, extracts from the IMDG Code, ERICards) have been provided immediately to the requester, followed in most cases with explanatory information and more specific expert advice. Furthermore, Cedre took the initiative to provide additional chemical marine pollution related information and offered to contact the product's manufacturer in most cases.

Information on the MAR-ICE Network has been incorporated in Cedre's website and when there is an activation of the Network, brief information on the activation is included in Cedre's montly Newsletters.

3.2. Revision of the MAR-ICE Contact Form

Since the revision of the MAR-ICE Contact Form in 2012 and its subsequent availability to the relevant national administrations in editable format (Word), the dedicated form has proven useful and has been used during most of the Network's activation requests.

3.3. Reporting to EMSA

Cedre has always informed EMSA and Cefic in a timely manner of the Network's activations and provided in its subsequent reports detailed description of each activation. EMSA is copied in e-mail correspondence and briefings during an activation and as an incident progresses. A more detailed report is submitted in writing to EMSA shortly after the conclusion of each incident.

The annual reporting by Cedre continues as it contains additional information on MAR-ICE related activities conducted by Cedre in addition to the provision of spill related information (such as training, time spent operating the service, etc.).

4. Cefic's performance as a coordinator of the voluntary ICE partners

Cefic plays a crucial role in the MAR-ICE Network as it maintains the ICE Database, which has the contact information for the manufacturers of chemicals in Europe, and updates the ICE members of the MAR-ICE Network's activations. The database is regularly updated and has user friendly search functions.

Information on the MAR-ICE Network has been incorporated in Cefic's website and the MAR-ICE Network is a standing topic on the agenda of the ICE Integration Group meetings regarding the emergency response to road and rail incidents involving chemicals. Cefic guarantees the chemical industry's awareness of and involvement in the MAR-ICE Network.

Although Cefic's role is not as visible as Cedre's contribution to the functioning of the MAR-ICE Network, Cefic clearly has a critical role and is greatly appreciated as a partner of MAR-ICE.

5. Evaluation of the MAR-ICE Network

The MAR-ICE Network and the expert information and advice service it provides, is highly appreciated by the EU Member States, coastal EFTA/EEA States and coastal EU Candidate countries and is considered providing a real added value. The service is free of charge to the relevant national adminstrations, rapidly available to all as a first or additional information source for chemical spills (or the threat thereof) in case of emergencies. Furthermore the service does not only provide a direct link to the chemical company knowledgeable about the product (manufacturer), but also additional useful marine related information and advice, when available.

In particular, Cedre's role as the Network's Contact Point has proven very beneficial as Cedre has vast experience and expertise relevant to chemical marine pollution response and has taken the initiative to provide this complementary information in an efficient and timely manner to the requesting party.

On several occasions to date, the EU Member States, coastal EFTA/EEA States and coastal EU Candidate countries have expressed highly positive feed-back in regard to the service provided through the MAR-ICE Network and have strongly supported its continuation and further development. This support to the service provided is also evident in the written feed-back requested by EMSA and received by the requesting parties after each activation.

In addition to the desire for continuation of the MAR-ICE Network expressed by the Member States, both Cedre and Cefic have recently expressed their willingness to continue with the MAR-ICE Service. EMSA, Cefic and Cedre are currently evaluating the posibility of the Network also providing expert advice on site of a maritime incident.

MAR-ICE is a cost-effective and well received service provided by the Agency, which provides useful information in cases of chemical spills (or the threat thereof) to the marine environment (that is not always easily or publicly available) to all Member States. EMSA has initiated additional HNS projects such as the development of datasheets of chemical substances for marine pollution response (MAR-CIS project), with the aim of making these available beginning in 2014 through the MAR-ICE Network. These datasheets will add operationally important information to the already good service provided.

Following this second review and evaluation of the Network, covering the years 2011-2013, certain adjustments need to be made to the service, which will be done in cooperation with Cefic and Cedre. It is expected that the service will continue to be used in the future for both real incidents and exercises.

6. Conclusions

The MAR-ICE Network and its service of providing remotely expert information and advice in case of marine chemical emergencies to national maritime administrations has been well received by the EU Member States, coastal EFTA/EEA States and coastal EU Candidate countries. Cedre has performed its tasks well and Cefic has supported the service among its members.

Both Cefic and Cedre have made a positive assessment of the service and expressed their willingness to continue the MAR-ICE Network. Currently the possibility of also providing expert advice on site of an incident is being assessed by the MAR-ICE partners.

Based on the positive feed-back, the results of this second review and the willingness of the MAR-ICE partners Cefic and Cedre to continue the service, EMSA aims to maintain the provision of the current service through the MAR-ICE Network also beyond 2014.