

1 Component task 1 - Working out an International Warning and Alarm Plan for the Neman/Nemunas catchment area

The objective of this task consisted in the development of a reliable alarm system for Belarus, Russia and Lithuania that would alert the environmental protection authorities of these three countries involved in the project in the event of a major water contamination accident and provide them with relevant key information. Main warning centres were to be established for the exchange of relevant information between the countries. Hence, the primary task of the International Warning and Alarm Plan is to create a functioning system for transmitting information about the place, time, type and extent of water contamination resulting from a major accident in the Neman/Nemunas catchment area. Authorities and offices responsible for averting of danger must have the necessary information to be able to carry out the following tasks:

- Averting of danger
- Determine cause of accident
- Identify those responsible for causing the accident
- Take action to eliminate causes and damage
- Prevent consequential damage
- Warn the river's users

The IWAN (International Warning and Alarm Plan for the Neman/Nemunas catchment area) was modelled on similar plans drawn up for the Rhine, Elbe and Danube Rivers and on the reporting system of the UNECE. The process of drawing up the alarm plan was supported and accompanied by the consultation project. Existing alarm plans of various European river commissions as well as the alarm plan draft of the UNECE Industrial Accident Convention were integrated into the draft. Coordinated action in assessing the scope of water contamination resulting from accidents is decisive for the effectiveness of an international system. The IWAN contains recommendations for emission- and immission-oriented alarm thresholds. The immission-oriented alarm thresholds have not been standardised yet, i.e., different alarm thresholds are in effect between Lithuania and Belarus on the one hand and Lithuania and Russia on the other. The IWAN should be regarded as a „living document“. In the end, the task of adapting the International Warning and Alarm Plan for the Neman/Nemunas catchment area, which is being tackled by a group of experts constituted within the framework of the project, is incumbent on the experts and authorities of the countries concerned. The IWAN is structured as follows:

Text section:

Chapter 1: Description

Definition of objectives, tasks and status (progress made and integration into national warning and alarm systems) of the IWAN

Chapter 2: Organisational structure

Definition of reporting zones, of main international warning centres (MIWCs) and their tasks and of authorities to be notified at national and international levels

Chapter 3: Reports of the International Warning and Alarm Plan for the Neman/Nemunas Catchment Area

Establishing the operating procedures to be followed in transmitting alarms (technical means: telephone, fax, email; organisational procedure: alarm transmission scheme, see Fig. 1 - 1), definition of warning stages (initial report, information report, all-clear message, request for help), reference to appropriate reporting forms, definition of emission- and immission-oriented alarm thresholds, definition of interfaces with the UNECE Industrial Accident Convention. The forwarding scheme was adopted for alarm transmission, with redundant reports being sent to the third MIWC in each case to achieve a higher measure of security.



Fig. 1: Alarm transmission scheme

Annexes to the Neman Alarm Plan:

Annex 1: Address list

Telephone, fax, email, addresses of MIWC contacts and of the participating national and international offices (referred to as focal points in the UNECE Industrial Accident Convention).

Annex 2: Report forms

Annex 2 includes: warning report forms (combined report consisting of the early warning report and information report, the early warning report with all immediately available information being sent first, which is then supplemented with additional information (analysis, etc.) as it becomes available), all-clear message, request for assistance (UNECE Industrial

Accident Convention form) and report confirmation, which is used to confirm the receipt of messages listed above.

Annex 3: Instructions for assessing water contamination resulting from industrial accidents (emission-oriented alarm criteria)

The instructions for assessing water contamination resulting from accidents worked out by the International Commission for the Protection of the Danube River (IKSD) were adapted to the River Neman. Alarm thresholds corresponding to the water hazard class are laid down for substances hazardous to water (Tab. 1). In the case of mixtures of substances, the Water Risk Index (WRI) is determined and assessed. The WRI is determined on the basis of substances hazardous to water that have entered a body of water.

The polluting substance emanating from an extraordinary pollution event is first to be classified in a Water Risk Class (WRC - are available at <http://www.umweltbundesamt.de/wgs/wgs-index.htm> or Katalog wassergefährdender Stoffe, LTWS Nr. 12, Umweltbundesamt 1991). For the assessment of the WRI the given substances are first expressed in equivalents, based on WRC 3 according following algorithm:

<u>Substance quantity in kg</u>	<u>WRC value</u>	<u>WRC 3 equivalent quantity</u>
M	"0"	$M \times 10^{-3}$
M	1	$M \times 10^{-2}$
M	2	$M \times 10^{-1}$
M	3	M

The **WRI value** is the 10 based logarithmic value of the summarised WRC 3 equivalent values.

Additional the instructions describe an approach of determination of WRC 3 equivalent values with the help of R-phrases (according Directive **67/548/EEC** on classification, packaging and labelling of dangerous substances).

Due to the hydrological conditions were defined two categories according the of middle flow rates per year, taking in consideration extreme low water periods.

Table 1: Emission-oriented alarm criteria

Substance classifications	Alert thresholds	
	Flow rates $Q_m < 500 \text{ m}^3/\text{s}$	Flow rates $Q_m \geq 500 \text{ m}^3/\text{s}$
Water Risk Class (WRC)	WARNING [kg] or [l]	WARNING [kg] or [l]
"0"	$\geq 50\ 000$	$\geq 100\ 000$
1	$\geq 5\ 000$	$\geq 10\ 000$
2	≥ 500	$\geq 1\ 000$
3	≥ 50	≥ 100
Water Risk Index (WRI)	$\geq 1,7$	≥ 2

For mixtures of substances the following 2 shall apply.

Table 2: Emission-oriented alarm criteria (substance mixtures)

Released substance mixture	Alert thresholds	
	Flow rates Qm < 500 m ³ /s	Flow rates Qm ≥ 500 m ³ /s
	WARNING [kg] or [l]	WARNING [kg] or [l]
Oils (non-specified)	≥ 500	≥ 1 000
Quench water (fire extinguishing water)	≥ 5 000	≥ 10 000
Slurry, and Sewage (animal)	≥ 5 000	≥ 10 000
Suspended ash	≥ 50.000	≥ 100.000
Water Risk Index (WRI)	1,7	2

Annex 4: Immission-oriented criteria

Immission-oriented criteria are listed in Annex 4 of the IWAN. Alarm criteria have been laid down in a bilateral agreement between Lithuania and Belarus. Russia has its own alarm thresholds (normally they are lower), with different alarm thresholds applying in areas of responsibility of different authorities (ROSHYDROMET and ROSTECHNADSOR). The Lithuanian-Belarussian immission criteria apply to the Belarussian and Lithuanian catchment area. Lithuania uses the Lithuanian-Belarussian criteria for reporting threshold breaches; Russia applies its own national (more stringent) warning criteria, the more stringent of the two sets of criteria (ROSHYDROMET and ROSTECHNADSOR – columns 5 and 7) being applicable in the event of a breach.

Table 3: Immission-oriented alarm criteria

		Criteria Lithuania/ Belarus	Russian Federation ROSHYDROME T	Russian Federation ROSTECHNA DSOR
			„High contamination“	
1	2	4	5	7
<i>I) Physical characteristics and dissolved gases</i>	1. pH	mg O ₂ /l	< 6-9 >	< 6-9 >
	2. dissolved oxygen	mg O ₂ /l	< 2,0	3,0-4,0 < 2,0
<i>II) Organic substances</i>	1. BOD ₅	mg O ₂ /l	18	10-40 4
	2. COD _{Cr}	mg/l	70	150-750 120
	3. Petroleum derived hydrocarbons	mg/l	0,7	1,5-2,5 2,5
	4. Tenside anionic	mg/l	1,0	1-5 5,0
	5. Phenols (sum)	mg/l	100	0,05
<i>III) Biogenous substances</i>	1. Ammonium	mg/l	3,9	4-20 25
	2. Nitrate	mg/l	12,0	400-2000 40,0

		Criteria Lithuania/ Belarus	Russian Federation ROSHYDROME T	Russian Federation ROSTECHNA DSOR	
			„High contamination“		
	3. Nitrite	mg/l	0,2	0,2-1	4
	4. Phosphates	mg/l	1,0	0,5-2,5	2,5
	5. Phosphors total	µg/l	1,5	1,75-7,5	1,5
IV) Elements (cumulative concentration in non-filtrated sample)	1. Copper	µg/l	50	30-50	50
	2. Zinc	µg/l	1000	100-500	500
	3. Nickel	µg/l	50	100-500	500
	4. Chromium	µg/l	50	200-1000	1000
	5. Lead	µg/l	100	18-30	30
	6. Cadmium	µg/l	10	15-25	25
	7. Mercury	µg/l	5,0	0,03-0,05	5,0
V) Radionuclides	1. Caesium 137	Bq/l	10		
	2. Strontium 90	Bq/l	0,37		

Annex 5: Immission-oriented criteria (visual criteria)

Visual alarm criteria (oil slick covering more than one third of the area of a body of water, large quantities of fish killed) are defined in Annex 5 of the IWAN.

Annex 6: Forms of the UNECE Industrial Accident Convention used for reporting

Any water contamination resulting from major accidents falling under the UNECE Industrial Accident Convention are to be reported to the focal points using forms included in IWAN. In the event of an accident in which the amount of contamination is twice the threshold amount laid down for the emission- or immission-oriented alarm criteria mentioned above, apart from the IWAN report an additional report must be submitted to the point of contact in accordance with the UNECE Industrial Accident Convention. When requesting help, a UNECE form described in Annex 6 is to be used.

Annex 7: Alarm transmission scheme

The reporting paths described in the text are illustrated in Annex 7 of the IWAN (see Fig. 1).