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MEETING OF THE SIGNATORIES TO  
THE CONVENTION ON THE TRANSBOUNDARY  
EFFECTS OF INDUSTRIAL ACCIDENTS

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MEETING OF THE PARTIES TO THE CONVENTION  
ON THE PROTECTION AND USE OF TRANSBOUNDARY  
WATERCOURSES AND INTERNATIONAL LAKES

8 September 1999

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**SEMINAR ON THE PREVENTION OF CHEMICAL ACCIDENTS  
AND LIMITATION OF THEIR IMPACT ON TRANSBOUNDARY WATERS**  
(Hamburg, Germany, 4-6 October 1999)

**ACTION BY THE REPUBLIC OF MOLDOVA TO PREVENT INDUSTRIAL ACCIDENTS  
AND LIMIT THEIR IMPACT ON TRANSBOUNDARY WATERS**

Discussion paper transmitted by the Government of the Republic of Moldova \*/

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The Republic of Moldova became independent on 27 August 1991. It is situated in south-eastern Europe and covers an area of 33,700 km<sup>2</sup>. It borders Romania to the south-west and Ukraine to the north-east. The population numbers 4,353,000; 47% live in towns and 53% in the countryside.

Most of the country (approximately 90%) lies between the Rivers Prut (a tributary of the Danube) and Dniester. These two rivers, both of which rise in the Ukrainian Carpathians, are transboundary waterways. The remainder of the country lies in a narrow strip along the left bank of the Dniester.

The Prut and the Dniester are the country's main watercourses. Together with their tributaries, they comprise the principal hydrographic network, with a total length of some 16,000 km.

The Dniester is 1,352 km long; for 657 km of its length it flows through Moldova. The total area of its drainage basin is 721,000 km<sup>2</sup> and its normal average annual discharge is 10.7 km<sup>3</sup>.

The river may be divided into three sections as regards its valley and bed, namely the upper, middle and lower Dniester. In the upper section, in Ukraine's Lvov and Ivan Franko oblasts, there are large chemical-industry plants for the extraction and refining of oil, sulphur and potassium ores and other raw materials. These include the oil refineries at Drogobych and Nadvornaya, the potassium plant at Stebnik, the "Khlorvinil" chemical plant at Kalush, and the sulphur ore processing plants at Yarivka and Rozdol. They are all potentially hazardous facilities which, in the event of an accident, could pollute the Dniester with transboundary consequences.

In autumn 1983 one such emergency did occur on the Dniester when a dam containing a tailings pond (a facility for storing tailings after flotation) burst at the Stebnik potassium plant, discharging 4.5 million m<sup>3</sup> of salt solutions with a total salt concentration of 250 g/dm<sup>3</sup> into the river near Nikolaev in Lvov oblast. The composition of the discharged salt solutions is shown in table 1.

Table 1. Composition of salt solutions in the tailings pond at the Stebnik potassium plant

Density kg/dm <sup>3</sup>	Concentration of ions of salts, g/dm <sup>3</sup>						Total mineraliza- tion g/dm <sup>3</sup>	Fatty acids g/dm <sup>3</sup>
	K <sup>+</sup>	Na <sup>+</sup>	Ca <sup>2+</sup>	Mg <sup>2+</sup>	SO <sup>2-</sup>	Cl <sup>-</sup>		
1,777	28.06	36.19	2.3	20.78	60.58	97.03	242.67	0.01

In the section of the Dniester where the salt solutions were discharged, the mineralization of the water increased more than a thousandfold, rising to 210 mg/dm<sup>3</sup>. Before the accident, the mineralization of the water in this section of the river did not exceed 200 mg/dm<sup>3</sup>.

Further downstream, these salt solutions were retained by the dam which was then being built to hold the Novodnestrovsk reservoir. Owing to their high density, they settled at the bottom of the reservoir and formed a layer 10-12 metres thick extending over more than 80 km. As a result of dilution by the water from the reservoir and downstream tributaries, the concentration of the salt solutions dropped to approximately 37 g/dm<sup>3</sup>. In the upper strata of the reservoir the water remained unpolluted with a mineralization of approximately 300 mg/dm<sup>3</sup>. All aquatic life, including fish, perished in a stretch of the river extending for over 200 km.

The emergency commission established to deal with this disaster organized efforts to manage the consequences of the accidental discharge.

It was decided to release the accumulated salt solutions into the lower reaches of the river after diluting them with unpolluted water from the surface strata of the reservoir.

The diluted salt solutions were released at a rate such that the concentration of salts in the lower reaches of the Dniester did not exceed 2 g/dm<sup>3</sup>. Applying this procedure, there was controlled discharge of the salt solutions into the Black Sea between October 1983 and May 1985.

The tailings-pond accident caused considerable damage to the ecology of the Dniester. It also harmed the economy of the Dniester basin in Ukraine and the Republic of Moldova.

The Prut is Moldova's second largest river. It too rises in the Carpathians and for approximately 250 km traverses Ukraine in a south-westerly direction. It forms the border between Ukraine and Romania for about 40 km, and then the border between Romania and the Republic of Moldova for some 695 km before flowing into the Danube.

The Prut is 967 km long. The total area of its drainage basin is 27,500 km<sup>2</sup> and its mean annual discharge is 2.9 km<sup>3</sup>. It is Moldova's second most important water supply source after the Dniester. In 1978 a dam and hydroelectric power station with an output of 16 MW was constructed on the middle section of the river in collaboration with Romania. The resulting reservoir has a total volume of 735 million m<sup>3</sup> and a total surface area of 59 km<sup>2</sup>. It is some 70 km long with a maximum depth of 34.2 m. The reservoir and the hydroelectric power station are operated jointly with Romania.

The Republic of Moldova has approximately 900 metres of territory on the left bank of the Danube downstream from the point where the Prut joins the larger river.

The Republic of Moldova is both an agricultural and an industrial country. Its economy and the well-being of its population are totally dependent on the transboundary rivers Dniester and Prut.

The presence of hazardous or potentially hazardous industries in the countries situated in these two rivers' basins imposes on those countries an obligation to develop long-term programmes to protect the rivers and manage water resources.

With a view to protecting life, property and the environment as a whole against natural disasters and to disaster response, the Republic of Moldova has almost completed the establishment of a statutory and regulatory framework and enacted the following instruments:

(a) Statutes of the Republic of Moldova:

- Environmental Protection Act, No. 1515 (16 June 1993);
- Civil Defence Act, No. 271-XIII (9 November 1994);
- Environmental Pollution Penalties Act, No. 1540-XIII (25 February 1998);
- Public Health and Epidemiological Protection Act, No. 1513 (16 June 1993);
- Radiation Protection and Safety Act, No. 1440-XIII (24 December 1997);
- Harmful Products and Substances Act, No. 1236-XIII (3 July 1997);
- Production and Consumption Wastes Act, No. 1347 (9 October 1997);
- Water Code of the Republic of Moldova, No. 1532-XII (22 June 1993).

(b) The following Government decrees have been adopted:

- Decree on the system for monitoring and laboratory control of contamination (pollution) of the environment by radioactive, noxious or potent toxins and bacterial (biological) agents in the territory of the Republic of Moldova (No. 474, 29 August 1996);
- Regulations on the carriage of dangerous goods in the territory of the Republic of Moldova and management of the associated potential accidents (No. 45, 24 January 1994);
- Decree on the collection and centralized stockpiling of unsuitable and prohibited pesticides (No. 474, 21 May 1997).

On the basis of the Civil Defence Act, a Civil Defence and Emergencies Department reporting to the Moldovan Government has been established to implement nationwide measures and coordinate the work of ministries, departments, and local administrative bodies regarding protection of the population and the environment in the event of natural disasters and accidents. Its main organs are the State Civil Defence Inspectorate, the Civil Defence Forces Headquarters and the Accident and Rescue Service.

The Government is in overall charge of protecting the population and the environment. It determines the nature, scope and timing of the measures. The Prime Minister chairs the national Emergencies Commission.

The composition and functions of the Commission are laid down in Government Decision No. 648 (26 November 1996).

In regions, towns and villages, the person in charge of protection is the head of the local authority; in ministries, government departments and enterprises, it is their chief official. These people are ex officio chairmen of the corresponding emergency commissions which draw up annual work plans and hold quarterly meetings on preventing accidents, disasters and other dangerous phenomena and reducing and dealing with their effects.

When an emergency does occur, the Civil Defence and Emergencies Department and the authorities devise and approve appropriate measures reflected in special civil defence plans and programmes. Facilities which present a radiation and/or chemical hazard also have plans for protecting workers, employees and the public in the event of an accidental discharge of potent toxins or a radiation accident.

Government Decision No. 249 (4 May 1996) provided for the grouping of civil defence forces in order to tackle emergencies and natural disasters. Environmental monitoring is carried out by the institutions in the observation and laboratory control network. These are subject to approval under Government Decision No. 474 (29 August 1996) and comprise mainly public health and anti-epidemic centres, veterinary and agrochemical laboratories, hydrometeorological stations, and the laboratories of local environmental agencies of relevant ministries and departments. The principal purpose of monitoring and control of environmental contamination (pollution) is to provide timely and reliable information for use in taking decisions on the scope and nature of protective measures.

Strategic civil defence exercises are scheduled four or five times a year at the regional level (and repeated after five years) under the direction of the Chairman or Deputy Chairman of the national Emergency Situations Commission, which makes contingency plans for the various emergency commissions in every body and at every level with respect to the prevention and management of man-made and natural disasters. Similar exercises, training and studies are factored into contingency plans drawn up by ministries, government departments, towns, regions, villages and individual enterprises at local level.

In this connection, a joint Moldovan-Ukrainian exercise involving ministries, government departments and regions in the Dniester basin was carried out under the direction of the Moldovan Prime Minister from 26 to 28 January 1999. The subject of the exercise was the management of chemical and oil pollution in the Dniester in the hypothetical event of a chemical-plant or transport accident in the upper reaches of the river.

Similar joint exercises had been conducted prior to this with the involvement of representatives of neighbouring States (the Russian Federation, Romania, Ukraine) and international organizations, in accordance with the existing programmes of the North Atlantic Treaty Organization (NATO) and the International Atomic Energy Agency (IAEA) and bilateral agreements.

Exercises of this type, or exercises designed for a particular risk zone, are conducted annually at all potentially hazardous facilities, in line with contingency plans.

In addition, the Civil Defence and Emergencies Department has devised a procedure and methodological recommendations for classifying economic facilities according to their chemical hazard factor.

This classification is based on the impact which an accident involving a leak (or emission) of potent toxins at a hazardous facility would have on the population.

The criterion for assigning a facility to a particular chemical hazard category is the number of people likely to be in the affected area should an accident occur.

The Moldovan Government carries out an annual inspection of chemically hazardous facilities operated by ministries, government departments or public authorities. The inspections are timed to coincide with exercises for chairmen of the emergency commissions of municipalities, regions and economic facilities, and also for civil defence experts. Up to four or five full dress rehearsals for tackling natural and man-made disasters are also organized for civil defence services, rapid response units, and subunits of the accident and rescue service.

Thus, a total of 126 training exercises in locating and managing accidental emissions of chemicals into the environment were held in 1998 for civil defence forces at various facilities.

These exercises have yielded a Strategic Review and Status Report on Hazardous Facilities and Emergency Risk Areas. The section entitled "Hazardous chemical and radiation facilities" reports that there are 227 hazardous chemical facilities in the Republic of Moldova, of which 148 are category-3 hazards and 79 are category-4 hazards. Taken together, these facilities use and store, inter alia, over 400 tons of chlorine, 564 tons of ammonia, 40 tons of methyl bromide, 33 tons of sulphuric anhydride, and 110 tons of strong mineral acids.

Between 1991 and 1998 there were 18 accidents in Moldovan territory involving leakage into the environment of ammonia, oil products, chlorine, pesticides or agricultural waste products. The accidents caused casualties, but were localized and did not affect transboundary waters.

A reliable alarm system is important to warn of industrial accidents, deal with the consequences, and protect the population in emergencies.

The Republic of Moldova has established an automated communications and alarm system, as well as a local alarm system in places where there are hazardous facilities. This permits the timely transmission to the public and workers in the economy and administration of a general alert and of information on threats of pollution, flooding or other hazardous phenomena, plus information on the course of events and recommendations on follow-up action in emergencies. The information is transmitted round the clock by the national television and radio services; it can be sent out at any time of the day or night directly from the desk of the duty officer in the Civil Defence and Emergencies Department.

Table 2 shows the structure of the communications and information system for use in emergencies in the Republic of Moldova.

Table 2  
Structure of the communications and information system for use  
in emergencies

States' points of contact	International organizations
Duty officer in the Civil Defence and Emergencies Department	
National Emergency Situations Commission	The public
	911
Hazardous facilities	Municipal and regional emergencies commissions
Accident response forces	Civil defence services
	Fire brigade
Civil Defence accident and rescue battalions	Medical service
Fire Brigade Accident and rescue units	*Preservation of public order
Special units attached to individual facilities and railways	Protection of fauna and flora
Non-militarized civil defence units	Engineering and other services

#### Monitoring and laboratory control system

In its activities pertaining to the protection and use of transboundary waters, including its efforts to prevent accidents at hazardous facilities and reduce and manage accidental pollution of transboundary waters, the Republic of Moldova is guided by its bilateral and multilateral agreements and other understandings with neighbouring countries. The international agreements in force in the Republic are listed in table 3.

Table 3

No.	Title of agreement	Signatories	Done at
1	Convention on cooperation for the protection and sustainable use of the river Danube	Austria, Bulgaria, Croatia, Germany, Republic of Moldova, Romania, Slovakia, Ukraine, Croatia, European Union	Sofia, 29 June 1994
2	Agreement between the Government of the Republic of Moldova and the Government of Ukraine on the Joint Use and Protection of Transboundary Waters	Republic of Moldova, Ukraine	Chişinău, 23 November 1994
3	Agreement on Cooperation in Protection of the Environment and Sound Use of Natural Resources	Romanian Ministry of Water, Forests and Environmental Protection and Moldovan Environmental Protection Department	Bucharest, 18 March 1997
4	Agreement between the Countries Members of the Black Sea Economic Cooperation on Cooperation in Management of Natural and Man-made Disasters	Black Sea Economic Cooperation member countries	16 April 1998
5	Agreement on Cooperation in the Prevention and Management of Natural and Man-made Emergencies in the CIS Countries	CIS countries	21 January 1993



No.	Title of agreement	Signatories	Done at
6	Agreement between the Government of the Republic of Moldova and the Government of Romania on Cooperation in Civil Defence and the Prevention and Management of Industrial Accidents and Natural and Man-made Disasters	Republic of Moldova, Romania	24 August 1998
7	Agreement between the Government of the Republic of Moldova and the Government of the Russian Federation on Cooperation in Civil Defence, and the Prevention and Management of Industrial Accidents and Natural Disasters	Republic of Moldova, Russian Federation	14 February 1995
8	Agreement between the Government of the Republic of Moldova and the Government of Ukraine on Cooperation in Civil Defence, and the Prevention and Management of Industrial Accidents and Natural Disasters	Republic of Moldova, Ukraine	7 August 1998

On 11 January 1997 the Republic of Moldova joined the International Civil Defence Organization.

At the time of writing, the Moldovan Ministry of Environmental Protection and other relevant ministries and government departments have planned a range of joint measures to enhance their effectiveness in preventing industrial accidents and minimizing their impact on the environment, especially on transboundary waters. These measures envisage:

- The preparation of a draft Government decision on protecting the environment against industrial accidents;
- A joint inventory of facilities which present a potential hazard to transboundary rivers (Republic of Moldova, Romania, Ukraine);
- The development and implementation of programmes to reduce and completely to halt the use of harmful substances in manufacturing processes;

- The inventorying and introduction of advanced low-waste and resource-saving technologies;
- The introduction of international standards governing the import, transport and use of harmful substances.

The Convention on the Protection and Use of Transboundary Watercourses and International Lakes and the Convention on the Transboundary Effects of Industrial Accidents, together with their annexes, have greatly facilitated the Republic of Moldova's efforts to establish a statutory and regulatory framework and develop procedures for preventing, reducing and managing industrial accidents and natural and man-made disasters.

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