The Cyanide Spill at Baia Mare, Romania

BEFORE, DURING AND AFTER

Spread of the cyanide spill from Baia Mare, Romania

Progress of the spill plume

1. **30 January**
   Cyanide spill occurs at Baia Mare, Romania
2. **1 February**
   Spill plume reaches Romanian-Hungarian border
3. **5 February**
   Cyanide registers in tests at Tiszalök
4. **9 February**
   Spill plume reaches Szolnok
5. **11 February**
   It crosses the Hungarian-Yugoslavian border
6. **14 February**
   The spill plume reaches Belgrade, Yugoslavia.

* PLEASE NOTE ALL PRELIMINARY READERS: Exact date when cyanide plume reached the Danube Delta is required. Other date points can also be added after no. 6. Please include sources.

Sources: MTI, Ministry for Environmental Protection (Hungary) Environmental Inspectorates

The purpose of this brochure is to provide information about the toxic spill that occurred on January 30, 2000 in Baia Mare, Romania.

It briefly summarises a report entitled *Cyanide Spill at Baia Mare Romania*, produced by the United Nations Environment Programme (UNEP) and the Office for the Co-ordination of Humanitarian Affairs (OCHA) after their joint mission to areas that were affected by the spill.

During that mission, people in Romania, Hungary and Yugoslavia complained to UNEP/OCHA about the lack of information they had received about what the spill had done and why it had happened. They were concerned about their future; especially the potential delayed effects on human health and the environment from the spill. They were also very concerned about what the spill meant for local tourism, fishing, agriculture and exports in the future.

In response, this brochure clarifies some of these concerns for individuals, businesses and communities that were or could have been affected by the spill. It is also useful for local organisations that work in and around the areas affected by the spill including local governments, local environmental authorities and local environmental non-governmental organisations (NGOs) in Romania, Hungary and Yugoslavia.

The brochure is divided into three main sections: (1) background information (2) an assessment of the spill, and (3) recommendations for the future.

If you need more information about any of the issues covered in this brochure, please use the contacts provided on page 8. This brochure is also available in Romanian, Hungarian and Serbian.

BACKGROUND

The accident

On January 30 at 22:00, a dam was breached ("broken") at the operations of the Aurul SA Company in Baia Mare, northwest Romania. The result was a spill of about 100,000 cubic meters of liquid and suspended waste containing about 50 to 100 tonnes of cyanide, as well as heavy metals including copper.

The breach was probably caused by a combination of design defects in the facilities used by Aurul, unexpected operating conditions and bad weather.

The contaminated spill travelled into the rivers Sasar, Lapus, Somes, Tisza and Danube before reaching the Black Sea about four weeks later. Some 2,000 kilometres of the Danube's water catchment area were affected by the spill.

Romanian sources said that, in Romania, the spill caused interruptions to the water supply of 24 municipalities and costs to sanitation plants and industries because of interruptions in their production processes. Romania also reported that the amount of dead fish was very small in Romania. Hungary estimated the amount of dead fish in Hungary at 1,240 tons. Yugoslavian authorities reported large amounts of dead fish in the Yugoslavian branch of the Tisza River and no major fish kills in the Danube River.

The mission

On February 18, 2000, Klaus Toepfer, Executive Director of the United Nations Environment Programme (UNEP), announced that a team of international experts would carry out a mission to analyse the damages caused by the spill.

The announcement followed requests made by the governments of Romania, Hungary and Yugoslavia, and consultations with the European Union's Environment Commissioner, Margot Wallström, and the UN Office for the Co-ordination of Humanitarian Affairs (OCHA).

The mission, a joint venture of UNEP and OCHA, lasted from February 23 to March 6. It included sampling, analysis and discussions with national and local experts, national authorities, affected populations and NGOs. The team travelled from Bucharest to Baia Mare in Romania, then through Hungary along the river system down to Yugoslavia, to the mouth of the Danube River at the Black Sea.

Maia Mare and Maramures County

Maramures County, at Romania's northwestern border with Ukraine and Hungary, has a long history of mining, especially in gold, silver, lead, zinc, copper, manganese and salt. Waste at the county's seven key mining sites is stored in ponds and 215 waste ("tailings") dams.

The county has high levels of chronic ("persistently recurring") ground, water and air contamination that came from many pollutants. These were released over decades of past industrial activities that used poor waste treatment processes. This includes an old lead smelter, copper smelter, sulphuric acid plant, and the operations of the mining company, Romanian Compania Nationala a Metalelor Pretiosasi si Neferoase (Remin), established in 1992.

Some Baia Mare residents live within 50 metres of highly toxic, chronically leaking, waste sites. The World Health Organization (WHO) identifies Baia Mare as a health risk hotspot, with the population's exposure to lead being among the highest ever recorded. Lead in the blood of some adults averages almost 2.5 times above safety levels. In some children, it averages nearly six times above safety levels. High lead levels in humans are now thought to be associated with impaired learning ability, mental retardation, problems with kidney and neurological functions, hearing loss, blood disorder, hypertension and death. Baia Mare residents also have a history of complaining about dust.

It is also important to know that the city of Baia Mare's population and urban development are growing, with expansion restricted in some areas by old contaminated tailings ponds.

The company: Aurul SA

Aurul SA is a stock company jointly owned by Esmeralda, Exploration Limited, Australia, and Remin, Romania. Over seven years, Aurul obtained all of the necessary environmental permits required under Romanian law for its plant in Baia Mare, before beginning operations in May 1999.

It was hoped that the Aurul project would meet the needs of both the Romanian authorities and the Australian investors. Aurul would gain profits through its mining operations and local authorities would be benefited through Aurul's management of Baia Mare's old contaminated ponds which blocked further development in the city.

The process and technologies used at the Baia Mare plant for recovering precious metals were completely new to Romania and were expected to be the most modern, safe and efficient in the region and a major environmental improvement.

The Baia Mare plant was designed to process 2.5 million tons of tailings per year — to recover about 1.6 tons of gold and 9 tons of silver per year. The project was to last 10 to 12 years although this may increase due to recent business deals made with Romanian companies.

The tailings, originating from earlier mining activities and stored in old ponds next to Baia Mare, contain small amounts of precious metals, especially gold and silver. Aurul's process uses high concentrations of cyanide to remove the precious metals from the tailings. As part of the process, new waste tailings are transported 6.5 kilometres away from Baia Mare to a new dam near Bozanta Mare village. The process was designed to release no waste to the surrounding environment.

Unfortunately, the mission could not determine how often the plant had been inspected by government authorities before the spill occurred. Soon after operations began in 1999, however, two leaks were reported in Aurul's pipeline system.

Facts on dangerous substances

CYANIDE
Cyanide is acutely and almost instantaneously poisonous ("toxic") to living organisms, including humans. Cyanide harms by blocking the ingestion of oxygen by cells. Acute effects include rapid breathing, tremors, effects on the nervous system, and ultimately death. Chronic effects include weight loss, effects on the thyroid and nerve damage.

Fish are about one thousand times more sensitive to cyanide than are humans. If fish do not die from limited exposure, they can still have reduced swimming ability, problems in reproducing (possibly creating deformed babies), and increased vulnerability to predators. Fish are excellent in gauging the presence of cyanide in water — if fish are living after exposure, then no other form of life will have been harmed.

Cyanide, however, does not remain in the environment for long and does not accumulate in sediments or organisms (including humans).

HEAVY METALS
Heavy metals do not break down and are "bio-accumulative" in species. This means that the level of toxins builds up in an organism over time, increasing its toxicity and threat to local ecosystems. Toxins may also be passed on to other species if a toxic organism is eaten. Therefore, living organisms face high risks with long-term and chronic exposure to heavy metals.

Among the heavy metals used by mining industries, the most harmful to humans include arsenic, cadmium, lead, nickel, manganese and molybdenum, even at small doses. Zinc, lead, aluminum, boron, chromium and iron are also all toxic to plant growth.

The acute and chronic effects of **copper** to humans include stomach and intestinal distress, liver and kidney damage and anemia. Copper is also toxic to most aquatic plants, often contained in river sediments. Copper easily dissolves in water so it is more available for uptake by living things along rivers.

At relatively low levels, health effects from **lead** can include interference with red blood cell chemistry, delays in normal physical and mental development in babies and young children, slight deficits in the attention span, hearing, and learning abilities of children, and slight increases in the blood pressure of some adults. Changes in the levels of certain blood enzymes and in child development may even occur at very low blood lead levels. Chronic exposure to lead has been linked to brain and kidney disease and cancer in humans.

ASSESSMENT

Cause of accident

The breakage in the Aurul dam was partially caused by heavy rains and rapidly melting snows that made the water level in the pond rise. This rise was quicker than the rise of the dam which was intended to "grow gradually over time" through continuous construction.

The newly engineered dam system therefore failed under the circumstances, and this could have been foreseeable. There were no plans to deal with such a rise in water or to catch overflow wastewater, so a completely closed operation with no discharges to the environment was not possible under the conditions. Furthermore, the operation was actually open at two points, at the old and the new ponds, which allowed unmonitored amounts of cyanide to be regularly lost there to air and/or groundwater.

At the same time, Aurul was operating in line with government permits. Under Romanian law, the plant and ponds, categorised as "regular" risk, did not require any special emergency planning or monitoring to detect dangerous situations. Accident plans did exist but were not enough.

The mission therefore believes that both the company and local authorities had inadequate plans and responses in place for emergencies, considering the large quantities of hazardous materials being used close to human populations and the river system.

Government response

In **Romania**, about ten hours were lost between the time the Baia Mare Environmental Protection Agency received notification of the spill from Aurul and the time the local Romanian Waters Authority was informed. As a result, local residents near the source of the spill were not informed as early as possible.

Once the Romanian Water Authority had been informed, however, their regional environment and water authorities, after having been informed of the dam breakage, immediately checked information about the breach and the spill to determine the degree of pollution, and ordered Aurul to stop activities and close the breakage. They also informed the Water and Environmental Protection Agency of Nyiregyhaza (Hungary) about the accident, and alerted local authorities downstream about the spill and dangers in using the river water for activities such as drinking.

The Romanian Principal International Alert Center (PIAC) notified the Hungarian PIAC on January 31 at 20:54. It also informed Bulgaria, Moldova, Ukraine and Yugoslavia. According to international law, PIACs must be informed as soon as there is a sudden increase of hazardous substances in the Danube River Basin. The mission found that this early warning system responded adequately to the spill.

Hungarian authorities confirmed that they were continuously informed about the event and the degree of pollution by Romanian authorities. This allowed them to alert all regional and local authorities in a timely manner and to take the necessary measures to minimise the impact of the spill. Measures taken by the Hungarian side included warnings to the public, operations at dams and ponds to protect aquifers and side branches, temporary closure of the Kiskore dam (along the upper Tisza) to increase the water level (and to dilute the cyanide spill), and temporary closure of the water intake from the Tisza River to the town of Szolnok.

On February 3, **Yugoslavia** received official information about the spill from Hungary. Cooperation with Hungary continued to be good during the spill. Yugoslavian monitoring of the spill began on February 10, as did requests by Yugoslavian authorities for water management companies along the Tisza to inform all water users to stop the operation of water supply facilities. Hydraulic gates prevented the spill from affecting side branches and canals along the Danube River. An announcement on the prohibition of fishing and fish trading was made and preventive measures to protect public health included the closing of the Belgrade water intake.

The mission concluded that timely information exchange and measures taken by the Romanian, Hungarian and Yugoslavian authorities, including a temporary closure of the Tisza lake dam, reduced the impact of the spill.

Environmental assessment

The assessment of the impacts of the spill on the environment is taken from three main sources: background reports by the affected countries; monitoring of impacts, by the affected countries, as the cyanide wave travelled downstream; and information collected by the UNEP/OCHA mission.

The methods used to analyse cyanide and heavy metals in each of the three countries produced comparable data according to international standards. Differences occurred between the measurements from Romanian and Hungarian scientists, but these may possibly be explained because of differences in locations and time intervals for sampling. Furthermore, the UN sampling took place about three weeks after the wave had passed and thus cannot validate any results obtained by the Romanian, Hungarian or Yugoslavian experts.

SURFACE WATER

In general, the data shows that concentrations of cyanide and heavy metals decreased rapidly with increasing distance from the spill.

Regarding cyanide, acute effects occurred along long stretches of the river system down to where the Tisza and Danube rivers meet. Water plankton (plant and animal) were completely killed when the cyanide wave passed and fish were killed in the wave or immediately after. Soon after the wave passed, however, plankton and aquatic micro-organisms recovered relatively quickly (within a few days) due to unaffected water coming from upstream.

As a result, the mission concluded that mud-dwelling organisms in the lower Tisza and middle Tisza regions in Hungary and Yugoslavia were not completely destroyed by the cyanide spill beyond quick recovery. However, the situation in the upper Tisza (north of Tokaj, Hungary) is more complex.

Parts of the Tisza region had been damaged before the cyanide spill by years of chronic pollution (i.e. heavy metals) and dam building. Pollutant safety levels had also often been exceeded. The region has many poorly maintained and operated industrial plants and ponds containing cyanide and/or heavy metals, many of which are leaking continuously. Chronic pollution is also high from sewage and agriculture. Pollution of surface water, groundwater and soils is thus likely to re-occur.

For example, in **Romania**, UN tests of the Sasar River, also known as the "Dead River," showed cyanide concentrations at nearly 88 times Romanian permissible levels. Background information showed concentrations of arsenic and lead in the rivers Sasar, Lapus, Somes and Tisza, at 100 to 1,000 times, respectively, above acceptable concentrations. Cadmium levels in the Sasar and Lapus rivers were also very high.

In **Hungary**, concentrations of lead, copper, manganese and iron were found to be high at certain locations along the rivers Tisza and Maros. In the Maros River, which was not affected by the spill, the lead concentration was found to be more than 4 times above the acceptable level.

In **Yugoslavia**, above where the Tisza meets the Danube, lead levels were found to be high. Manganese and iron levels in certain parts of the Tisza were slightly high, as were levels of zinc in certain parts of the Danube.

In the **Danube Delta** before and after the wave, lead levels were above safety levels, as were cyanide levels during the passing of the wave. Concentrations of other heavy metals were acceptable.

SEDIMENTS ("RIVER BOTTOM SOLIDS" OR "MUD")

In comparison to surface water, the data shows a less negative impact on the ecosystem from sediment pollution.

The spill drastically increased the existing heavy metal contamination (especially copper, lead and zinc) of sediments in the immediate environment of the broken dam. However, heavy metal contamination then dropped rapidly with increased distance from the source. Therefore, the resulting toxic effects on the aquatic ecosystem may not have moved far downstream.

At the same time, many river areas downstream were found to have concentrations of heavy metals in their sediments, including some tributaries that were not even affected by the spill. This was especially true in the Baia Mare area but also further downstream in Hungary as well. These hotspots were probably caused by past industrial, sewage and agricultural activities over a long period of

Chemical hotspot locations in areas affected by spill

Chemical	*WHO Guideline 1993*	*EU Standard 98/83/EG*	*Date of Testing*	*Location*	*Concentration (mg/L)*
Arsenic	10 µg/L	10 µg/L	1992	Baia Mare	0.40
Cadmium	3 µg/L	5 µg/L	1992	Baia Mare/Sasar River	0.02
Copper	2 µg/L	2 µg/L	1992	Busag/Lapus River	2.2
			During spill	Cicarlau	10.5
			During spill	Rom-Hung border	18.0
			UN Mission	Aurul pond	412.3
Cyanide			During spill	Near spill	19.4
			During spill	Satu Mare/Somes River	7.8
			During spill	Csenger	32.6
			During spill	Hun-Yug border	1.5
			UN Mission	Aurul pond	66-81
			UN Mission	Private wells, Bozanta Mare	0.785
			UN Mission	Danube Delta	0.058
Iron			1992	Baia Mare/Sasar River	14.8
Lead	10 µg/L	10 µg/L	1992	Cicarlau/Somes River	0.32
			UN Mission	Maros River	0.022
Manganese	0.5 mg/L	50 µg/L	1992	Satu Mare/Sasar River	2.0

NOTE: UN Mission took place between 23 February and 6 March, 2000.

Source: *Cyanide Spill at Baia Mare, Romania*, UNEP, 2000.

time. The result is that sediment quality is already at a stage where adverse toxic effects on the aquatic ecosystem may occur.

For example, concentrations of heavy metals in the river Lapus and at the site of the spill are very high. The concentrations for lead, zinc, and cadmium upstream and downstream of Baia Mare are at a level where toxic effects in mud-dwelling organisms are likely to occur. Zinc and arsenic concentrations were high in the sediments of certain sections along the river Tisza.

DRINKING WATER

In **Romania**, the village of Bozanta Mare near the Aurul plant has private wells that are shallow and connected with the river. They are thus highly vulnerable, especially to pollution from the Aurul pond which is in the water catchment area of the wells. The wells were affected by the spill with cyanide levels nearly 80 times over permissible limits on February 10. By February 26, cyanide concentrations fell below limits but the concentrations of cadmium, copper, manganese and iron were higher than admissible Romanian values. Also, the mission found ongoing negative environmental impacts from human waste and an excess use of agricultural fertilisers.

Further downstream from Bozanta Mare along the river Somes, the drinking water does not appear to be at risk. However, most wells are also shallow and vulnerable to surface pollution. Consequently, in Romania, immediate human health risk seems to be minimal from the spill, although chronic health impacts due to long-term pollution by heavy metals are possible. Also, there is usually no water monitoring of private wells in Bozanta Mare, or groundwater monitoring downstream of Bozanta Mare, except in Satu Mare.

In **Hungary**, there is no long-term effect of the mining accident on consumers' health through drinking water. Neither cyanide nor heavy metals were found in the water of Hungary's deep wells which are well protected against surface pollution, with probably no connection between the river Tisza and deep groundwater. Hungarian public water supply systems were also not endangered by the cyanide pollution. The surface water treatment plant in Szolnok was stopped during the wave although treated water during the accident showed that the cyanide concentrations remained below the Hungarian standards. The Szolnok plant has a stringent monitoring program of the incoming water for the protection of its consumers. The mission could not, however, describe the situation for private wells along the Tisza River.

In **Yugoslavia**, the Becej public water supply system and probably two assessed private wells were not affected by spill. The vulnerability of the deep wells is very low with probably no connection between the river Tisza and deep groundwater. These wells, however, are not normally monitored and other water companies and private wells along the Tisza River were not visited.

RECOMMENDATIONS

The following are recommendations from the UNEP/OCHA report. They are intended to make people living in the areas affected by the spill more aware of steps they can take in the future to reduce the negative effects from industries around them.

1. Information
There is a great need for more objective and reliable information, especially from local authorities and the media. The spill and mission showed that the level of public knowledge of toxic chemicals, and future risks from mining and related industrial processes is very low. At the same time, people in the Baia Mare area were well aware that soil and groundwater had been polluted before, and that pipes transporting tailings had broken on several occasions, spilling water containing cyanide outside of industrial areas.

2. Communications
Communication between local authorities, NGOs and the public is poor concerning preparations for emergencies and damage prevention options. Communications channels should be improved and NGOs and other interest groups should help to inform the population. UNEP/OCHA could also assist here (*see page 8 for contacts*).

3. Health
The long-term effects of mining activities on public health, especially by heavy metals, is a key concern, especially in Bozanta Mare and Baia Mare, as are dust problems in the summer.

4. Assessments
At Aurul SA, a full risk assessment of operations should be done to make them safer. An emergency plan for the improved system should also be produced and made fully accessible to workers and local stakeholders. The organisational responsibilities off-site for dealing with a future dam breakage should be clear. And dependable early warning systems should be established, especially for Baia Mare.

5. Sediment analysis
Further analysis of the heavy metals in river sediments is urged in all three countries (especially at Aurul SA), to make a reliable assessment of the long-term risks of the spill and chronic pollution. Sediment quality was already found threatening to many local aquatic ecosystems.

6. Drinking water
Improvements should include surveys to plan and develop new water resources (Baia Mare and along Somes river) and new monitoring systems for groundwater and private wells by local authorities. An inventory of current private wells (Romania, Hungary, Yugoslavia) and an inventory of polluted areas that endanger groundwater, surface and drinking water (entire river basin) should be created. Emergency water supplies should be available to the region, a health survey of the population in affected areas should be drawn up, and proper monitoring of diseases caused by water pollution should be established. Finally, the drinking water supply systems for private households in Maramures County should be changed to public collective systems along with required sewage treatment facilities.

7. Biodiversity
Multinational monitoring of the long-term ecological effects of the spill on the region's biodiversity, especially birds, mammals and water vegetation, is urged.

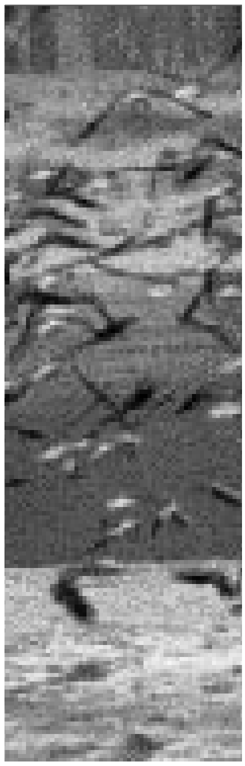
8. Regional industries
An inventory and risk assessment study of all mining and related industries in Baia Mare and the entire Maramures region, including abandoned sites, should be made. Dams containing toxic waste or other liquids should have retention systems for overflow or accidents resulting from breaks in dams. Plants using cyanide should pay special attention to preparing for emergencies, public communication, and special monitoring and inspection by authorities.

9. Local economies
The longer-term economic implications of the spill and other polluting activities in the region need to be assessed. Maramures County, rich in mining and related industries, is of key economic importance to Romania. But it can create environmental problems downstream in areas dependent on the environment for fishing, tourism, agriculture and other economic activities. Many workers and businesses in the area are concerned about a loss of markets, as the image of products from the region has greatly suffered as a result of the spill. (i.e. consumer fear of contaminated food).

10. Regional plans
There is a strong need for a broad, longer-term environmental management and sustainable development strategy for both Maramures County and the entire water catchment area of the Tisza River. This should address mining and related industries, other economic activities, cross-border economic development, biodiversity, social needs, and increased international co-operation and support. UNEP and OCHA could assist here.

11. International objectives
Romania should sign the international *UN/ECE Convention on the Transboundary Effects of Industrial Accidents*. And there should be an international system for addressing the issues of liability and compensation related to such spills and their consequences.

CONTACTS



United Nations Environment Programme (UNEP)
Regional Office for Europe
15, Chemin des Anémones
1219 Chátleaine, Geneva
Switzerland
Tel: (41-22) 917-8111
Fax: (41-22) 917-8024
E-mail: roe@unep.ch
Websites: www.unep.ch, www.natural-resources.org/environment/Baiamare

Office for the Coordination of Humanitarian Affairs (OCHA)
United Nations
Palais des Nations
1211 Geneva 10 Switzerland
Tel: (41-22) 917-1234
Fax: (41-22) 917-0023
E-mail: ochagva@un.org
Website: www.reliefweb.int/ocha_ol/

The Regional Environmental Center for Central and Eastern Europe (REC)
Ady Endre út 9-11
Szentendre 2000, Hungary
Tel: (36-26) 311-199
Fax: (36-26) 311-294
E-mail: info@rec.org
Website: www.rec.org

REC LOCAL OFFICES

REC Hungary
Ady Endre út 9-11
Szentendre 2000, Hungary
Tel: (36-26) 300-594
Fax: (36-26) 302-137
E-mail: pepe@rec.org, maja@rec.org

REC Romania
Bd. I.C. Bratianu 44. bis, Bl. P7
Ap. 23, 2nd floor, Sector 3
Bucharest, Romania
Tel: (40-1) 314-0433
Fax: (40-1) 315-3527
E-mail: rec@fx.ro

REC Yugoslavia
Karadjordjeva 43
11000 Belgrade, Yugoslavia
Tel/Fax: (381-11) 620-633
E-mail: recyu@EUnet.yu

ENVIRONMENTAL AUTHORITIES
(which ones – national and/or local???)
Hungary
Romania
Yugoslavia
Slovakia?
Baia Mare
Maramures County

NGOs

WWF International: Danube Carpathian Programme
Ottakringerstr. 114-116
A -1160 Vienna, Austria
Tel: (43-1) 4881-7257
Fax. (43-1) 4881-7277
Email: dcp@wwf.at

WWF Hungary
Németvölgyi út 78/B
1124 Budapest, Hungary
Tel: (36-1) 175-4970, 214-5554
Fax: (36-1) 175-4790

ASSOCIATIONS

Association of Professional NGOs for Social Assistance in Baia Mare
Unirii Bd. #28
4800 Baia Mare, Romania
Tel: (40-94) 503-715
Fax: (40-62) 222-226
E-mail: assoc@mail.alphanet.ro

Danube Circle
Vadász u. 29
1054, Budapest, Hungary
Tel: (36-1) 132-3321, 153-0100
Fax: (36-1) 153-0100

Development Environmental Foundation (DEP)
Üllői út 66/B
1082 Budapest, Hungary

Tisza Social Club for Environment and Nature
Pf. 148, Szapáry út 19
5000 Szolnok
Tel: (36-56) 375-497
Fax: (36-56) 375-497

Other????

THE REGIONAL ENVIRONMENTAL CENTER
for Central and Eastern Europe

logo to come
United Nations Environment Programme (UNEP)

logo to come
Worldwide Fund for Nature (WWF)

logo to come
Office for the Coordination of Humanitarian Affairs (OCHA)

Published by The Regional Environmental Center for Central and Eastern Europe, June 2000
Editor: Paul Csagoly