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Contract DHR-0039-C-00-5080-00
Metcalf & Eddy Project 102145

Global Environment Facility Transboundary Pollution Reduction in Three Danube Tributary Basins

Final Project Report

September 2001

Metcalf & Eddy

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September 28, 2001

Mr. Gerald Gold
Contracting Officer's Technical Representative
USAID/ENI/EEUS/ENR
5-10-012 Ronald Reagan Building
1300 Pennsylvania Avenue, N.W.
Washington, DC 20523

Subject: GEF/Danube Transboundary Pollution Reduction Project, USAID Contract DHR-0039-C-00-5080-00 Final Project Completion Report

Dear Mr. Gold:

Enclosed are 15 copies of Metcalf & Eddy's final report on the GEF/Danube project. In addition, at your request, we have sent one copy of the report to the USAID offices in Budapest, Bratislava, and Bucharest.

This report incorporates responses to comments received from you and others at USAID on our draft final reports submitted in March 2001 and September 18, 2001. One copy of the enclosed report also includes the compact disk containing scanned copies of the key Danube project reports listed in Section Six. A copy of this CD has been included in the reports sent to the USAID offices in Budapest, Bratislava, and Bucharest. The other report copies enclosed include a plastic pocket to accommodate the CD. For your convenience, we have enclosed a sheet of CD labels for you to apply to the additional copies you plan to make of the CD.

We appreciate the opportunity to work with USAID and the governments and industries in Hungary, Slovakia, and Romania on this important project. Metcalf & Eddy is proud of the project's achievements, including significant infrastructure improvements, measurable reductions in pollution in the Danube tributary basins, and sustainability through training and other institutional and cultural changes.

Please do not hesitate to contact me if you have further questions about the attached report. We look forward to continuing to work with USAID on future projects in the region.

Sincerely,

METCALF & EDDY

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Section One
PROJECT OVERVIEW

Between September 1995 and March 2001, Metcalf & Eddy (M&E) and local subcontractors provided services to the United States Agency for International Development (USAID) to perform the Global Environment Facility Project for Transboundary Pollution Reduction in Three Danube Tributary Basins (GEF/Danube project).

Sponsored by the World Bank, the United Nations Development Program, and the United Nations Environment Program, the GEF was created in 1990 to address four global environmental issues: reduction of greenhouse gas emissions, protection of biodiversity, protection of international waters, and reduction of ozone layer depletion. The GEF/Danube project was part of the United States' $150 million contribution to the GEF.

The GEF/Danube project has achieved its objective of monitoring and reducing pollution transfer across three international boundaries: Slovakia/Ukraine, Hungary/Slovakia, and Hungary/Romania.

This project demonstrated how pollution can be reduced over the long term from key municipal wastewater plants and industrial plants. The project:

- **Sponsored municipal wastewater treatment improvements** at Oradea in Romania and at Kosice in Slovakia
- **Established four automatic water quality monitoring stations** along three international boundaries, three in Hungary and one in Slovakia
- **Assisted government agencies** in developing the institutional capacity and communications network to warn downstream users when pollution may threaten them
- **Assisted six Romanian industries** in adopting cleaner production techniques and in developing and implementing environmental management programs
- **Provided industrial wastewater treatment improvements** at industries in Romania

Hernad River, Danube Tributary

1.1 BACKGROUND

The Danube River basin covers 817 square kilometers in Central Europe, including all of Austria, Hungary, Slovakia, Romania, and Serbia, and parts of eleven other countries. Beginning at the Danube's source in the farmlands of western Germany, fertilizers, pesticides, and manure drain into the river system. Cities and towns discharge sewage into the river without treatment, and industrial discharges from smelters, paper mills, chemical plants, and tanneries have contaminated tributaries and water supplies.

Eight Danube countries, the European Commission, the United Nations, and international financing organizations established the Environmental Program for the Danube Basin, a multilateral program to strengthen and coordinate comprehensive environmental management across the entire basin. The Environmental Program created the Program Coordination Unit (PCU),

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located in Vienna, to oversee activities to be implemented in the Danube River basin countries. As early as 1991, studies conducted through the Environmental Program identified sources of pollution in major Danube tributary systems. The thirteen Danube tributary countries affiliated with the PCU joined together in an international network through which they can alert each other when pollution incidents occur. Principal International Alert Centers (PIAC) were set up in each country to receive warnings of international transboundary pollution and relay those alerts to neighboring PIACs as well as to the PCU. Information on the type and severity of the pollution is disseminated to downstream receptors through a network of national, regional, and local telecommunications equipment. The PCU programs also establish monitoring, laboratory analysis, and Information Management (MLIM) standards.

The Accident Emergency Warning System (AEWS) associated with the monitoring in the GEF/Danube project is integrated with the international network of the thirteen Danube tributary countries affiliated with the PCU. Sampling, monitoring, and analytical methods developed in the project were in accordance with the AEWS and MLIM standards. Figure 1-2 shows how the AEWS operates at local, district, regional, and national levels.

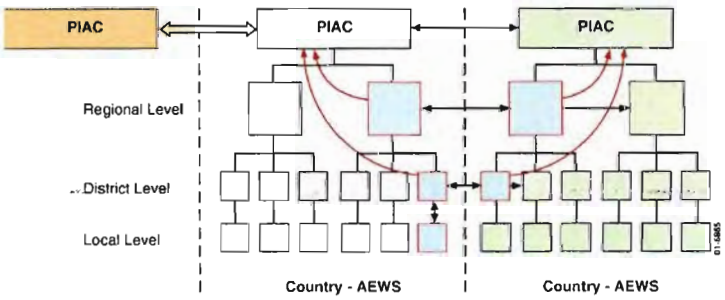

FIGURE 1-2. INTEGRATED OPERATION OF THE AEWS

1.2 PROJECT AREA

Figure 1-3 shows the three river basins with which the GEF/Danube project was concerned:

- Hornad/Hernad in Slovakia and Hungary
- Bodrog/Upper Tisza (including the Uh and Szamos/Somes) in Romania, Slovakia, and Hungary
- Cris/Koros (including the Berettyó) in Romania and Hungary

Rivers in these three basins carry pollutants into the plains of Hungary and into the Tisza, a tributary which joins the Danube in Yugoslavia. The GEF/Danube project addressed pollution in the Hernad, Uh, Szamos, and Berettyó rivers. The project also included a study to guide development in the watershed of a fifth river, the Maros. The map in Figure 1-4 shows the rivers in more detail. It also shows the locations of the various project activities.

Hernad/Hornad River Basin

The Hernad River (as it is called in Hungary) originates in Slovakia (where it is called the Hornad), and almost all of its catchment area is in Slovakia. Flowing south, it transports the discharge from municipal wastewater treatment facilities and mining and steel activities. The pollutants of concern include oil, cyanide, metals, phenols, formaldehyde, toxics, and pathogens. Two particular sources of pollution have been the Eastern Slovak Ironworks, a source of phenol, and the Kosice municipal wastewater treatment plant, a significant source of pathogens, nutrients, and other pollutants because of its partially treated effluent. The river quality at the Slovakia-Hungary border along the Hernad fluctuates between Class IV (polluted) and Class V (heavily polluted).

This GEF/Danube project built and equipped a water quality monitoring station on the Hernad at Hernádszurdok in Hungary, 16.5 kilometers downstream from the border with Slovakia. The project also provided wastewater treatment improvements at the Kosice plant.

Bodrog/Upper Tisza Basin

The Uh River, with headwaters in Ukraine, flows through southeastern Slovakia, where it joins the Bodrog River as it enters Hungary. Ukraine has approximately 4,000 km of crude oil pipelines and 4,500 km of pipelines for petroleum products. The primary pollution problem in the Uh River is contamination from frequent oil spills (on average, two spills per year) from Ukrainian pipelines and fuel storage facilities. This discharge of crude oil and fuel travels across the Ukraine-Slovakia border

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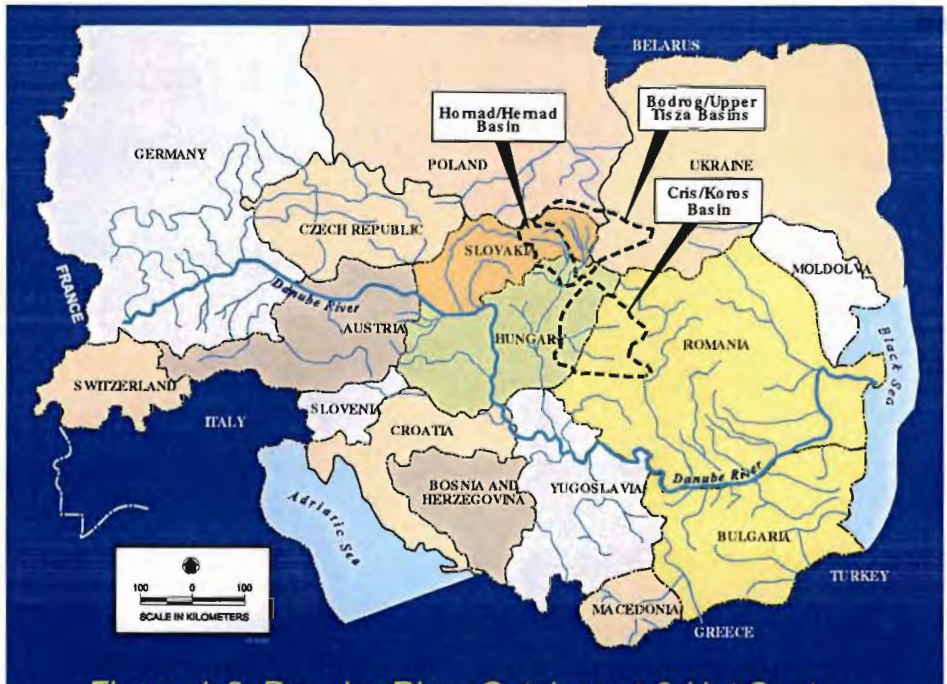

Figure 1-3. Danube River Catchment & Hot Spots

and into Slovakia. The contaminants continue to follow the course of the river and enter Hungary via the Bodrog River. The project built a water quality monitoring station at Levarovce, in Slovakia near the border with Ukraine.

The largest river in the upper Tisza/Tisa system, the Szamos/Somes, originates in Romania, and about 90 percent of its catchment area is in the Transsylvanian part of Romania. Contamination includes municipal wastewater effluent, industrial effluent, and agricultural runoff. The pollutants of concern include oil, metals, nitrates, phenols, toxics, and pathogens. The GEF/Danube project built a water quality monitoring station at Csengar, Hungary, at the border with Romania.

Cris/Koros Basin

The Berettyó/Barcau River originates in Romania, and about 90 percent of the catchment area is in the Transylvanian part of Romania. The Berettyó/Barcau transports a variety of pollutants from industrial sources, wastewater treatment facilities, and metal mining. However, the primary pollution problem on the Berettyó/Barcau River is oil spills. Between 1987 and 1995, at least 25 spills occurred. The largest (in 1995) required over 40 days of cleanup and spill containment, with 460 tons of oil removed. Downstream water use has been curtailed for an average of one week per spill event. The project worked with petroleum extraction and oil refinery industries in the area to help them minimize waste production and reduce industrial pollution to the Berettyó/Barcau.

The Rapid Cris River registered high levels of zinc, BOD, ammonia, and total phosphorous. Monitoring of the Rapid Cris in the Oradea area typically registered high levels of chromium. The project sponsored improvements at the Oradea wastewater treatment plant and also sponsored cleaner production and wastewater treatment improvements at pigment, pharmaceutical, and metalworking industries to reduce pollution of the Rapid Cris before it enters the Berettyó in Hungary.

The Black Cris River typically exceeded allowable thresholds for zinc, BOD, and ammonia and exceeded limits for copper in the vicinity of uranium mines and non-ferrous metal mines located on the Black Cris. The GEF/Danube project worked with mining industries in the area to reduce pollution to the Black Cris before it enters the Berettyó in Hungary.

The Barcau River water quality violated established standards for a variety of parameters, especially BOD and ammonia. The project worked with petroleum industries in the area to minimize their waste production and improve their environmental management practices.

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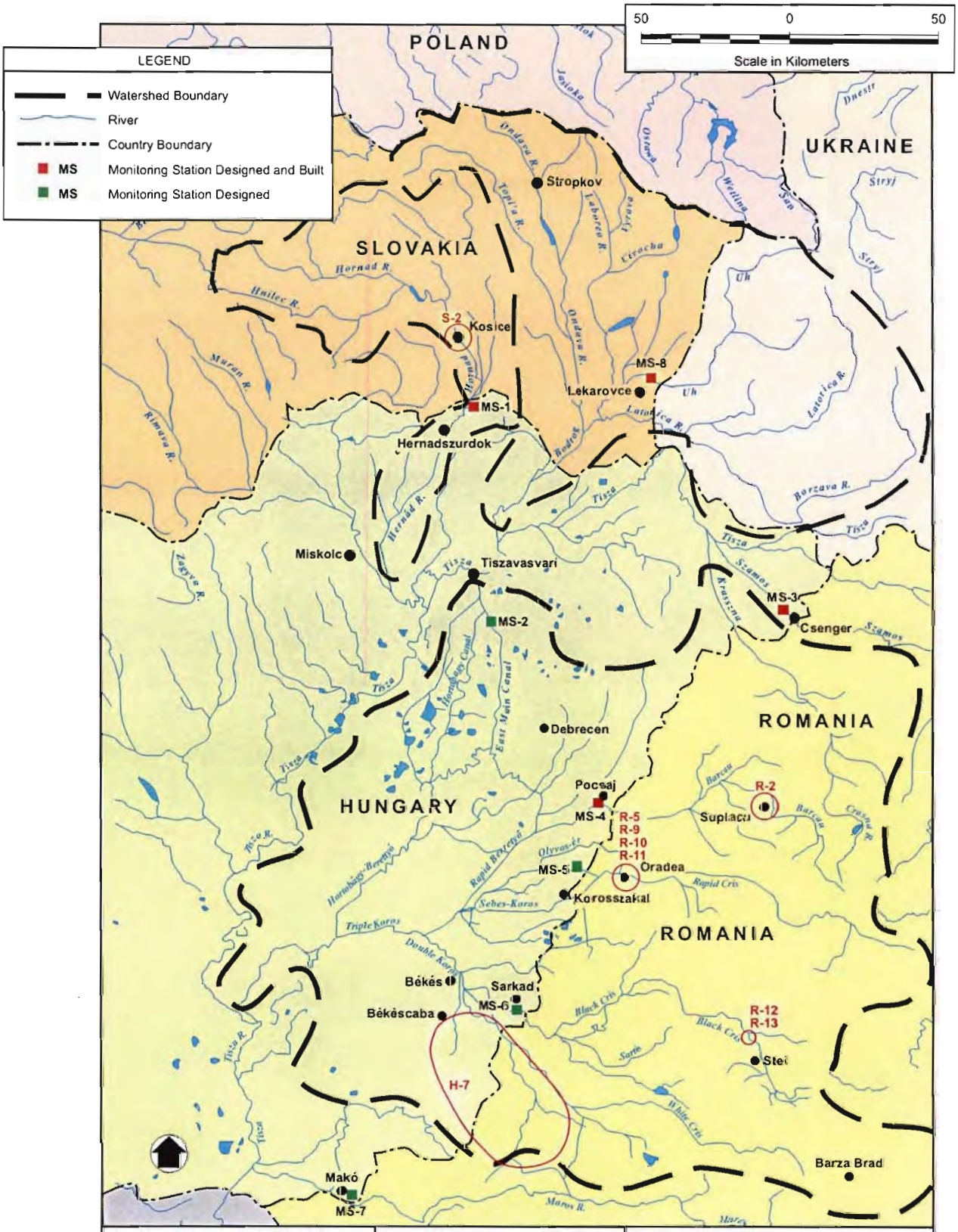

ACTIVITIES IN HUNGARY	ACTIVITIES IN SLOVAKIA	ACTIVITIES IN ROMANIA
MS-1 Hernard River at Hernadszvurdok	MS-8 Uh River at Lekarovce	R2 Petrom, Petrolsub Petroleum Industries
MS-2 East Main Canal at Tiszavasvari	S2 Kosice Wastewater Treatment Plant	R5 Oradea Wastewater Treatment Plant
MS-3 Szamos River Station at Csenger		R9 Pigmenti Pigment Manufacturer
MS-4 Berettyo River at Pocsaj		R10 Chimprod Pharmaceutical Industry
MS-5 Kapid Koros at Korosszakal		R11 UAMT Metal Finishing
MS-6 Black Koros at Sarkad		R12 Uranium Mining
MS-7 Moros River at Mako		R13 SmBaita (Non-ferrous Metals Mining)
H7 Maros Aquifer		

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FIGURE 1-4. PROJECT ACTIVITIES IN THE CHRIS/KOROS HORNAD/HERNAD, AND BODROG/UPPER TISZA RIVER BASINS

Maros River

The Maros/Mures River joins the Tisza at Szeged in southern Hungary. With over 90 percent of its watershed in Romania, the Maros/Mures transports a wide variety of effluent waste from chemical, mining, food processing, and other industries as well as from agriculture. The project conducted a study of the Maros aquifer, including the preparation and use of a hydraulic model, and developed a plan for protecting the aquifer.

1.3 PROJECT CHALLENGES

When the GEF/Danube project began, water quality monitoring, emergency response, and pollution prevention were hampered by limitations in physical infrastructure, under-funded institutions, competition with other pressing social problems for funding and priority, lack of environmental awareness and insufficient environmental monitoring capability. Although an international framework had been established for emergency response, facilities were not in place to allow Hungary, Romania, and Slovakia to participate fully in that system.

Another challenge within the GEF/Danube project was the sheer complexity of managing over 20 smaller projects, employing 15 local subcontractors and many local suppliers, and interacting with multiple governmental and non-governmental entities in three countries and three different languages. Figure 1-5 shows the project organization and the primary subcontractors.

Additional challenges were posed by the need to renegotiate the Memoranda of Understanding (MOUs). These memoranda were negotiated between USAID and host countries between 1995 and 1997. Ironically, due to the extended time frames needed to execute the agreements, the scopes of services within the memoranda needed to change by the time the project actually got underway. The MOUs were signed by the environmental ministry of each country. However, since these commitments were not from the Ministry of Finance, and because these countries were in dire financial straits with many other pressing social and environmental problems, they were not able to allocate the funds USAID had anticipated.

PROJECT ACHIEVEMENTS

Specific Investments

- Constructed 4 water quality monitoring stations on international boundaries (Uh, Szamos, Berettyo, and Hernad Rivers)
- Improved laboratory capabilities for water quality testing in five of the 13 regions of Hungary and in Bihor Country in Romania
- Upgraded 2 wastewater treatment plants (Kosice and Oradea) to provide secondary treatment and partial nitrogen removal
- Constructed wastewater treatment and cleaner production improvements in six key types of Romanian industries

Training

- Trained 80 personnel representing these countries in emergency planning/response across international borders
- Trained 20 environmental inspectors in Bihor County, Romania, in environmental enforcement and laboratory QA/QC
- Trained laboratory staff of APM, Apele Romaine, water treatment plant, Oradea wastewater treatment plant, and several industries, in a two-day training session tailored to their needs

Industrial Culture Change

- Trained 25 industry managers Romania in cleaner industrial production approaches and development of environmental management plans
- Transferred knowledge of cleaner production technology to local industries
- Together with local environmental protection agency, implemented environmental management plans at six Romanian industries

Funding Innovations

- Obtained local cost-sharing and commitment from governments and industries
- Developed combined implementation plans for bidding and segregating costs into USAID and locally funded contracts. This resulted in a single general contractor cost, effectively implementing all work at each facility yet with separate contracts for USAID and locally funded work.

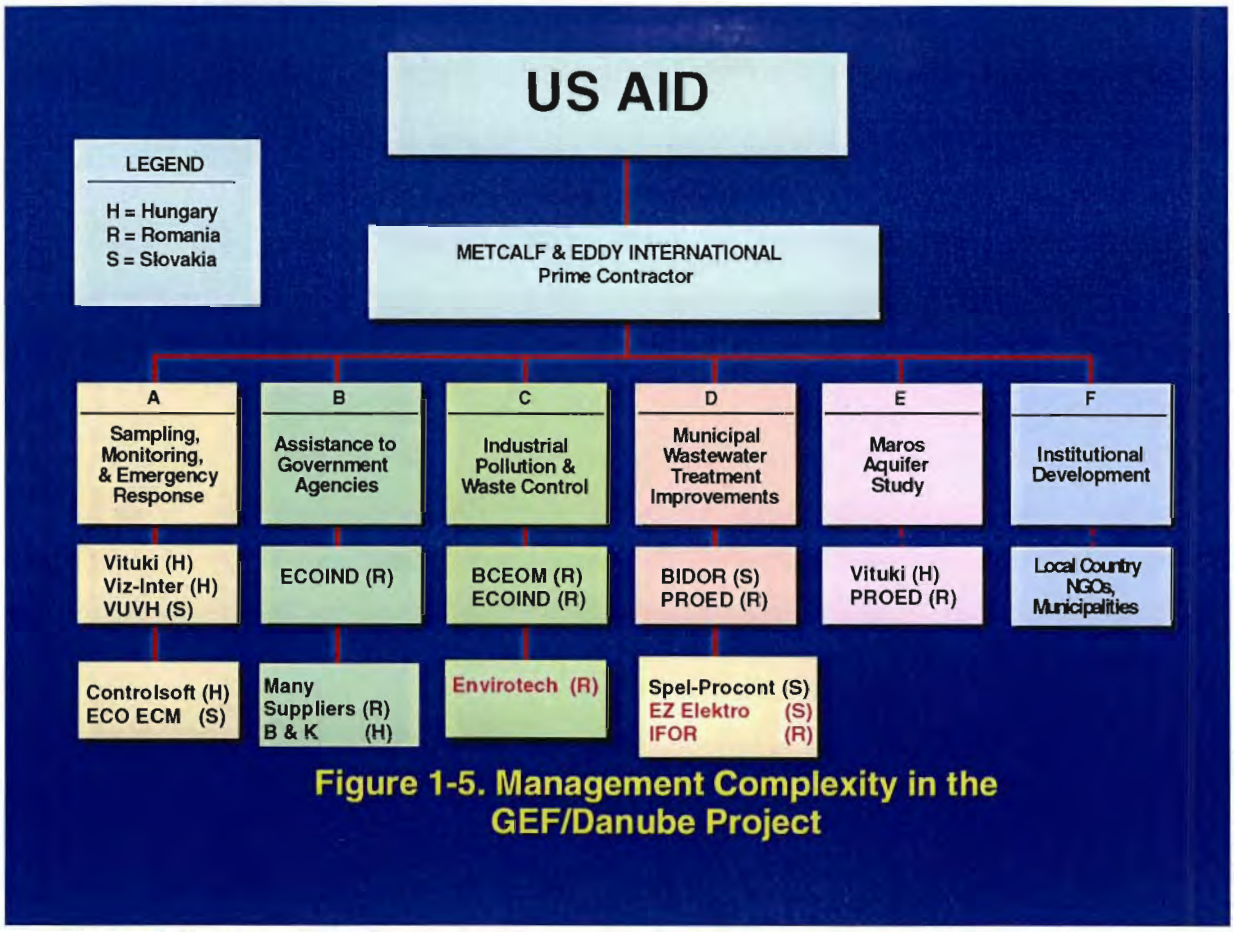

Figure 1-5. Management Complexity in the GEF/Danube Project

Thus M&E had a two-fold challenge: (1) reestablish local priorities and obtain local commitment for the agreed-upon actions, and (2) find a local source for funding. M&E had to raise more than $2.7 million in local funds to implement the projects. Owners of wastewater treatment plants and industrial plants financed part of the work. Some had to obtain loans, and those efforts were time-consuming. Shared funding responsibility brought a high degree of local commitment, but it also meant that financial difficulties of the owners delayed completion of some improvements. Special measures were also needed to meet both local and USAID contractual requirements and to keep separately funded portions of an overall project coordinated but contractually separate.

1.4 OBJECTIVES AND CRITERIA

As Figure 1-6 shows, project activities met USAID strategic objectives for the three countries.

GEF projects in the international waters category must meet at least two of six general GEF criteria:

- Development of basin-wide monitoring and inventories of pollution sources
- Management plans for pollution reduction, integrating basin land use, water extraction, waste and sediment flows
- Interventions to improve institutional capability to enhance human well-being, especially through maintaining and enhancing the productivity of water ecosystems
- Sustainable maintenance of water-based biodiversity
- Adaptation of local water-based ecosystems to global warming in order to protect water systems and their biodiversity
- Monitoring and assessment of port and traffic-based pollutants and management plans for their reduction

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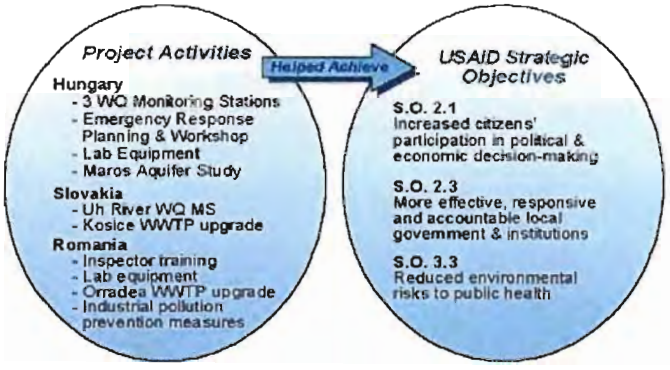

FIGURE 1-6. USAID STRATEGIC OBJECTIVES

The monitoring stations in Hungary and Slovakia met the first criterion; the wastewater treatment improvements and the industrial projects met the second and third.

The project met the three regional benefit goals presented in the original scope of work. The industrial projects met #1, the wastewater treatment improvements met # 2, and the monitoring station projects met #3.

(1) Reducing direct and indirect discharges of toxic chemicals through waste minimization and improved treatment of wastes at industries

(2) Reducing discharge of toxic pollutants and pathogens through improvements in municipal wastewater treatment plants

(3) Providing the ability to monitor accidental and chronic cross-border contamination and developing strategies to respond to periodic spikes or contamination through modification of irrigation and/or drinking water withdrawals or improved treatment

The demonstration value and replicability of the projects and sustainability were also USAID goals for this project. Several aspects of the project have particular demonstration value and replicability.

- The experience gained in the design and installation of the river monitoring stations (see Section 2) can be used for other monitoring stations that may be constructed.

- The methods and analyses used to identify each wastewater project (see Sections 3 and 4) can serve as a guide for similar situations; studies were conducted and priorities established at each plant to get the most value for the available funds.

- The innovative, quick, economical design/build approach used with the industries (see Section 4) can also be replicated in other projects.

- The sustainability of the projects was enhanced by that fact that they were executed with a high percentage of local funds (see sections 4 and 5). The total local share – approximately $2.8 million – represents almost 50/50 financing between USAID and local funds. This local investment will be a driving force to operate and maintain the new facilities.

The successful operation and sustainability of all the new facilities will also depend on annual appropriations of sufficient funds to adequately staff, maintain, and operate the system. We understand that such funds are being made available. In addition, at both the Kosice and Oradea plants the plant owners assess user charges to all properties connected to the plants. These user charges will provide a base of funding for sustainable operations.

Furthermore, each entity that received equipment funded by the project was required to execute a letter of understanding. These LOUs typically list the equipment and systems transferred, indicated the value of the assets, and state conditions governing the use and care of the equipment. In the LOUs, the recipients agreed to use the equipment only for the purposes stated and to exercise appropriate care in the use and maintenance of the equipment and systems. Appendices C and D include examples of these agreements, which will contribute to the sustainability of the project.

The measurability of environmental improvements was an important goal of the project and is demonstrated in the following achievements.

The **monitoring stations** have been operable for 16 months. As Section 2 explains, the following river water quality parameters are continually monitored and recorded automatically:

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Dissolved oxygen	ammonia
pH	chlorophyll A
Conductivity	Total organic carbon
Turbidity	(surface and subsurface)

Information is relayed to the local water and environmental inspectorates. When a change in a parameter takes place, appropriate responses can be made by governmental officials. The improvement in this case *is the ability to measure changes*, not the necessarily changes in the measurements themselves.

The **wastewater treatment plants** (Figure 1-7) sample and test plant effluent every day. Each subsystem that has been installed under this project has a measurable function that was tested prior to acceptance. These results can be repeated from time to time. Sections 3 and 4 discuss measurable changes in test results at the plants.

Measurable performance data was taken at existing subsystems prior to startup of the new **industrial facilities**. Final measurement test data were taken when the new systems were placed in operation; the data were used as acceptance tests. Data sampling and testing are done during operation so that the effectiveness of the improvements can be measured and assessed every day of operation. Figure 5-1 (see Section 5) summarizes the pollution reduction achievements of the project.

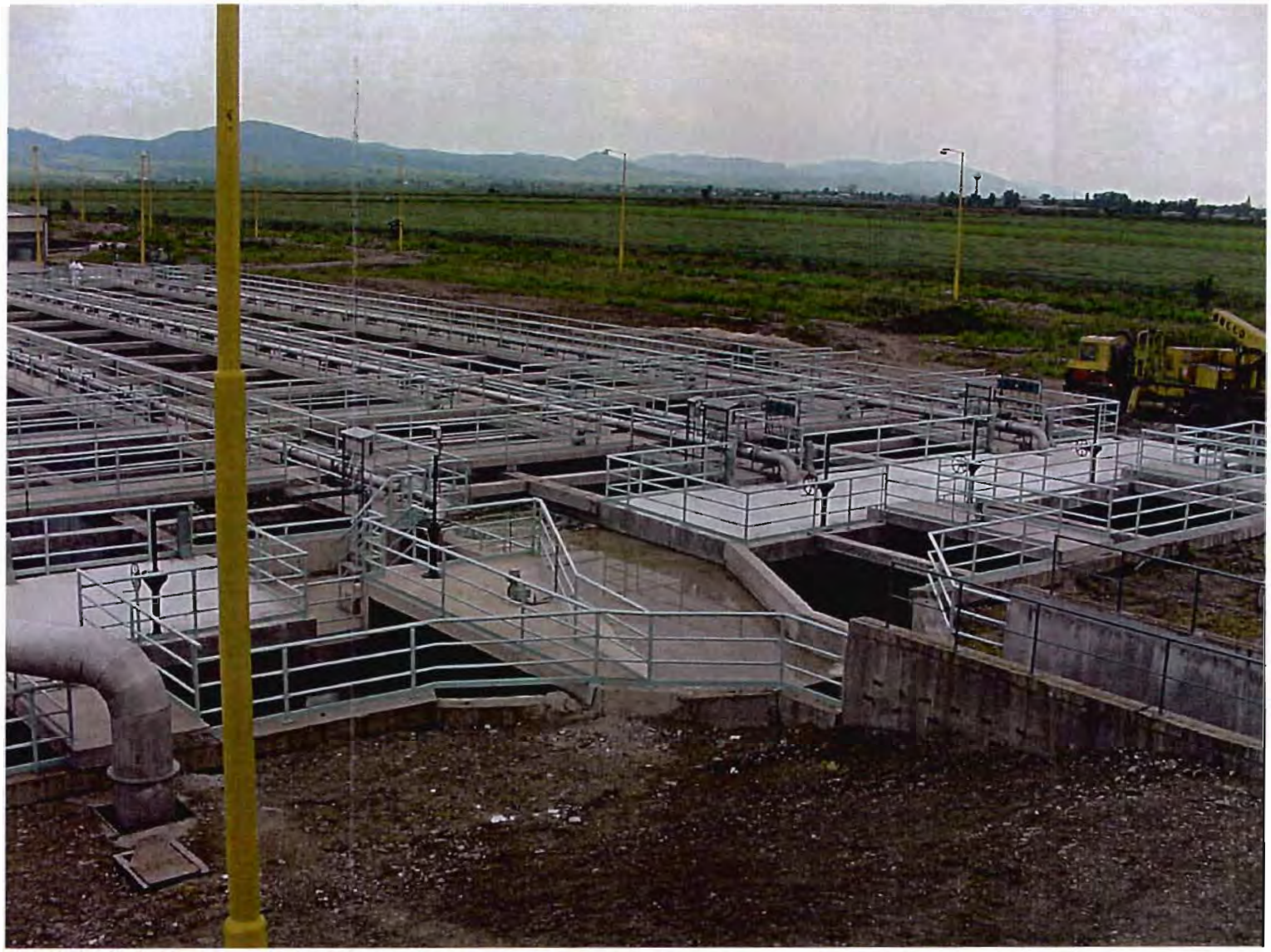

Figure 1-7. Danube GEF Project Aeration Tanks at New Kosice Biological WWTP, Slovakia

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Section Two
PROJECT ACHIEVEMENTS IN HUNGARY

In Hungary, oil and nutrients pose the most serious threats to water quality. The Hernad River is subject to frequent algal blooms, the Szamos River is subject to both algal blooms and oil spills, and the Berettyo River has suffered 26 oil spills since 1987. To address these problems, the GEF/Danube project performed the following activities:

- Rehabilitated and/or constructed an automatic water quality monitoring station on each of these three rivers
- Designed four additional stations to be constructed at a later date
- Equipped laboratories to test water quality
- Trained local personnel in monitoring and emergency response
- Conducted a study of the Maros Aquifer

A letter of understanding was signed on October 21, 1996, by the Hungarian Minister of the Environment and Regional Policy, the U.S. Ambassador to Hungary, and the USAID representative to Hungary. This letter outlined the project's scope of services on Hungary and an implementation plan.

Subcontractors made significant contributions to the project work in Hungary. **Vituki Innosystem** provided planning, preliminary design, and final design for five water quality monitoring stations, three of which were constructed. The firm also helped organize a project-sponsored workshop on the AEWS emergency warning system and conducted the Maros Aquifer Study. **Viz-Inter** provided planning, preliminary and final design for two water quality monitoring stations, which have not yet been built. **Controlsoft** was the contractor for the USAID-funded construction of the three water quality monitoring stations.

Figure 2-1 Szamos River Station (MS-3), at Csengar

2.1 WATER QUALITY MONITORING STATIONS

Table 2-1 summarizes the pollution problems in the Hungarian rivers on which the GEF/Danube project built automatic water quality monitoring stations.

Figure 2-2 Hernad Station (MS-1)

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TABLE 2-1. WATER QUALITY PROBLEMS - HERNAD, SZAMOS, AND BERETTYO RIVERS

Monitoring Station	Primary Problems	Sources	Major Users
Hernad River Station (MS-1, at Hernadszurdok)	Nutrients (Algal blooms noted, dissolved oxygen low) *History:* 1986. Chernobyl nuclear accident resulted in increased radioactivity for two months. 1991 – 1997. River quality at border fluctuates between Class IV (polluted) and Class V (heavily polluted).	Eastern Slovak Iron works Kosice WWTP Domestic settlements, mining, industry, agriculture, and transportation	*Surface:* Power stations Agricultural irrigation Sport fishing Water sports, recreation *Subsurface:* Water supply
Szamos River Station (MS-3, at Csengar)	Algal blooms during summer low flow months, depleting the river of dissolved oxygen.	Municipal WW facilities Industrial effluent Agriculture	Irrigation for cooperatives Recreation at beaches Water supply
Berettyó River Station (MS-4, at Pocsaj)	Oil Spills *History:* 1987: 10 oil spills, low volume but user disruption 1988: 6 oil spills 1989: 4 oil spills 1990: 1 oil spills 1992: Major spill required 8 days of cleanup & spill containment 1993: 3 occurrences. Fish kill observed 1995: Largest spill ever. Over 40 days of cleanup & spill containment. 460 tons of oil removed.	Oil wells Refineries Oil storage	Primarily irrigation, but also bathing, fish farming, groundwater uses, swimming, recreational fishing, industry

To make use of existing river gaging facilities, the GEF/Danube project elected to rehabilitate existing flow monitoring stations in Hungary and add additional capabilities to monitor water quality and point sources over time. The Hernad River Station was constructed at Hernadszurdok; the Szamos River Station was constructed at Csenger; and the Berettyo River station was constructed at Pocsaj.

Because the letter of understanding did not include any localcost contribution, one of the first challenges of the project was to convince local authorities to fund infrastructure-related improvements at the existing monitoring stations. To implement the agreed-upon cost sharing with local authorities, VITUKI prepared two separate tender documents, one for the civil works, and one for the equipment installation. At all three stations, civil works and telecommunications connections were financed by the Ministry of Environment, and the equipment and data transmittal facilities were financed by USAID.

Total investment by USAID for the three monitoring stations was $467,700, and the total investment by Hungary for civil improvements was approximately $100,100.

At all three, the project installed sampling stations and installed new water quality instrumentation, including basic instrumentation for dissolved oxygen, pH, conductivity, and turbidity. Additional analysers included ammonia, chlorophyll A, and TOC (surface, subsurface). An automatic sampler and accidental emergency warning system equipment were provided, and communications networks were established among the local water directorates and the local environmental inspectorates.

Renovations included work to improve the existing buildings, such as replacing roofs and windows, as well as work related to the monitoring functions, such as constructing new intake structures and pipelines.

The three stations were completed in the fall of 1999. After a trial operating period from late 1999 until March 2000, the monitoring stations were officially transferred to local inspectorates. Figures 2-4 and 2-5 show typical data gathered during the initial months of operation.

The monitoring stations measure selected water quality parameters and forward the information to regional telemetry centers. The stations operate automatically, without the presence of an operator, though local and remote control are possible. Certain test results automatically initiate alarms and alert others in the emergency warning network. The equipment is also used to track water quality during and after emergencies.

2.2 EMERGENCY RESPONSE TRAINING AND NETWORK

In conjunction with renovating and equipping the three monitoring stations, the GEF/Danube project trained personnel to operate these stations and fostered cooperation and communications among agencies to improve transboundary emergency planning and response.

The urgent need for an effective transboundary emergency response system was illustrated powerfully by a cyanide spill in Romania in February 2000, shortly before the Hungarian monitoring stations downstream began operation. A dam broke at a gold mine in northwest Romania, near Oradea. A cyanide solution is used at the mine to separate gold from the surrounding rock, and the waste rock or tailings were stored behind the dam.

Figure 2-3 Szamos River Sample Point (near MS-3)

When the dam broke, cyanide poured into streams which flowed west into the Tisza in neighboring Hungary, killing large numbers of fish, and then flowed into Yugoslavia and Serbia. The cyanide posed a risk to wildlife and to people who use the water from wells near the riverbed. Had the monitoring stations been operative at that time, downstream users would have received faster notification and would have been able to act sooner to take protective actions, such as closing off irrigation and potable water canals. Automatic monitoring of Chlorophyll A would have given an indirect measure of toxicity.

In March 2000, USAID sponsored a two-day workshop in Miskolc. Vituki Innosystem helped organize the workshop. The 80 participants included representatives of environmental inspectorates, water directorates, ministries, and nongovernment organizations from all three countries. Prior to the workshop, project staff met with numerous representatives of nongovernment organizations to discuss public and nongovernment roles in the emergency response network. Fourteen representatives were invited to the workshop.

Participants welcomed the opportunity to discuss the recent cyanide spill and resultant fish kill with officials from other countries. Representatives from the DAEWS explained the overall warning system and the roles of the alert centers. Representatives of the Danube Task Force also were speakers at the emergency response planning workshop. The workshop also addressed how the three monitoring

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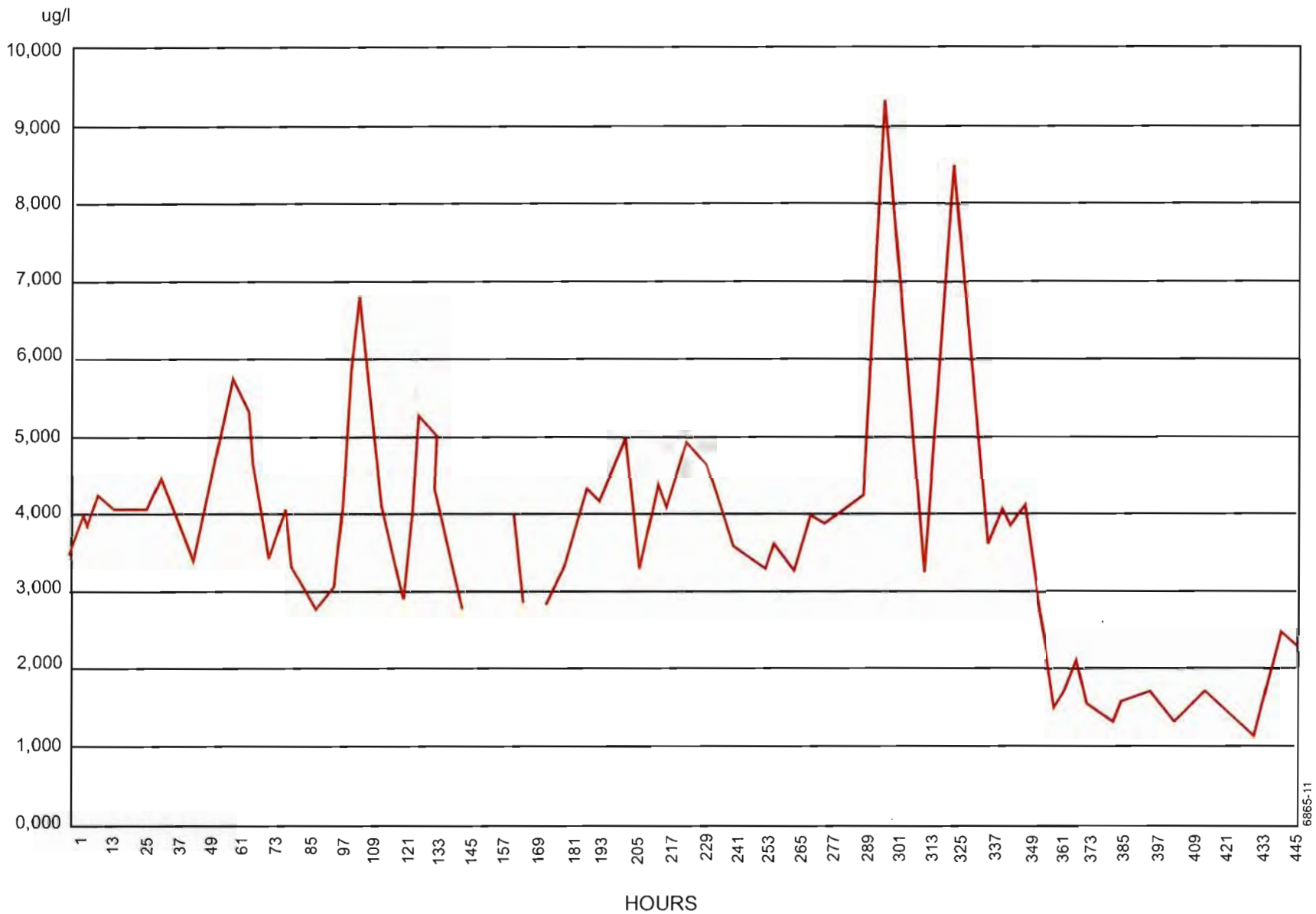

FIGURE 2-4. CHOROPHYLL-A CONCENTRATION (ug/l) IN HERNARD RIVER, MAY 5 - JUNE 11, 2000

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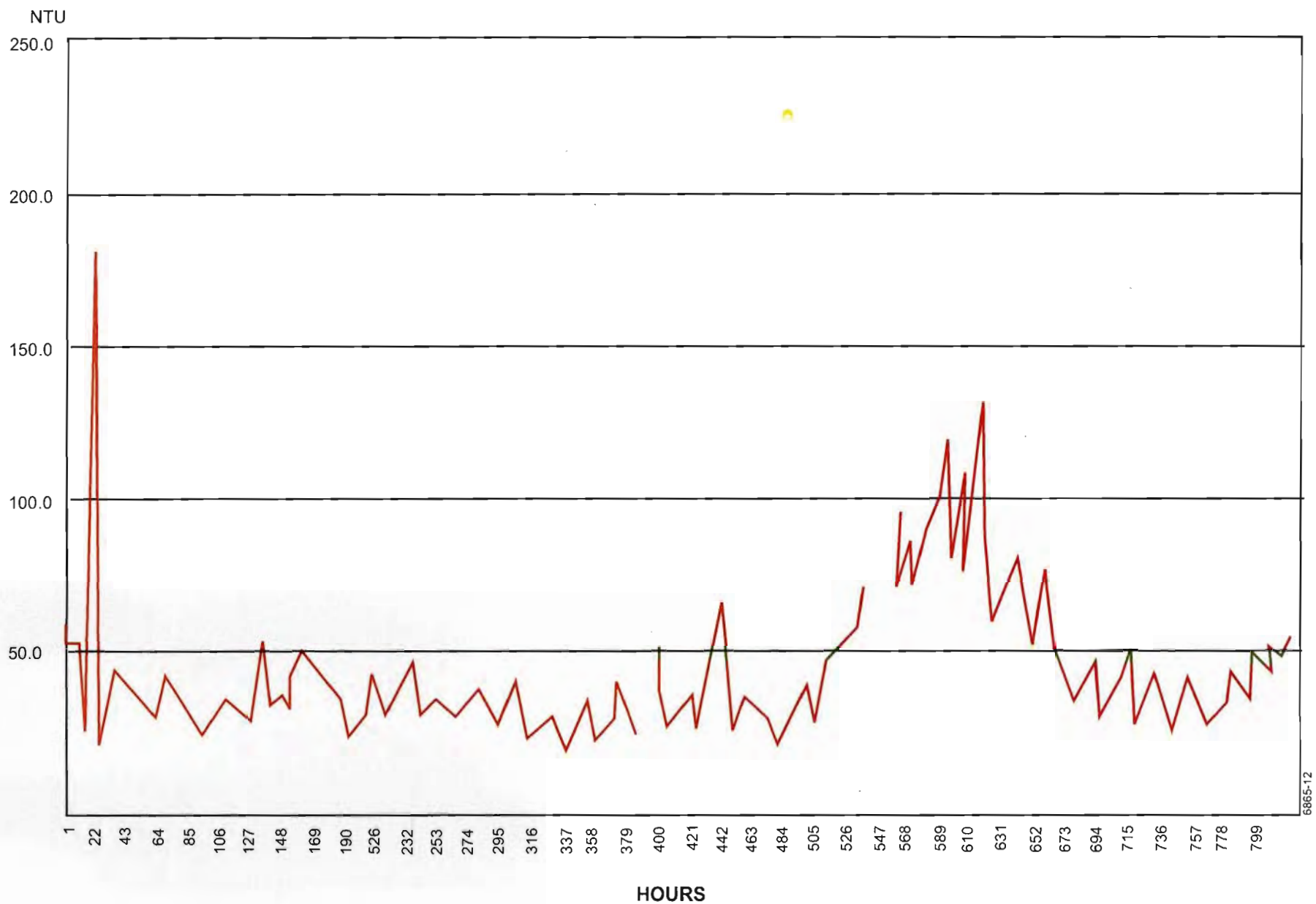

FIGURE 2-5. TURBIDITY (NTU) IN BERETTYO RIVER, MAY 17 - JUNE 18, 2000

stations would be integrated with the overall system. Figure 2-6 shows this integration. Participants also discussed an action plan presented by VITUKI, local emergency response plans, and communications issues. Participants also visited the Hernad monitoring station.

This infrastructure and communications network enables officials in Hungary, Slovakia, and Romania to alert people within and across national boundaries when river pollution occurs. They communicate through the existing Danube network, by fax. When people are alerted that an accidental release of pollution has occurred upstream, they can alter or discontinue their use of the contaminated river water until the threat has dissipated or has passed the users' supply intakes.

Appendix E provides a report on the workshop, including a summary, agenda, and list of attendees.

2.3 LAB EQUIPMENT

To assist Hungarian environmental agencies in monitoring the rivers, the project team met with them to assess their equipment needs and develop a set of priorities. The GEF/Danube project procured water quality laboratory equipment for the following five regional environmental inspectorates in Hungary:

- Gyula
- Debrecen
- Nyiregyhaza (associated with the Csengar monitoring station)
- Szeged
- Miskolc (associated with the Hernad monitoring station)

The following types of equipment were provided:

- Gas chromatograph
- Portable samplers
- Balances, desiccators
- Distilled water units
- Replacement AA lamps
- Incubators

This equipment will allow the regional inspectorate laboratory to better accomplish their mission of monitoring discharges and stream water quality.

The total USAID investment for the laboratory equipment and a vehicle to service the three new water quality monitoring stations was approximately $139,200.

2.4 MAROS AQUIFER STUDY

The Maros Aquifer straddles the Romania/Hungary border, and transboundary pollution has the potential to occur through groundwater movement. Local subcontractor VITUKI, with assistance from M&E's Romanian subcontractor PROED, carried out a study of the Maros Aquifer, to obtain information to help protect it. This study summarized existing studies, defined the primary sources of pollution in Romania and Hungary, and defined water users and their locations in Hungary. Vituki prepared a regional hydraulic model of the aquifer, using Modflow, which show water quality and the quantity of withdrawals. It also simulated changes that would occur under various future conditions. During the summer and fall of 1999, the shallow surface aquifer was sampled for pesticides and organic solvents at 15 sites in Romania and 11 in Hungary.

Project staff attended the Water for People conference held on May 26 and 27, to discuss inter-agency cooperation and other issues pertaining to protecting the aquifer. The project supported the conference participation of a representative from the Center for Sustainable Environmental Economic Policy (CSEEP), a Romanian NGO, with a grant of $750.

Note: The project assisted in developing possibly the first inter-county transboundary agreements between Arad and Bekes Counties. These agreements regarding the aquifer are still under review. Bekes County is in Hungary, and Arad County is in Romania.

Study Findings

The study found that pollution from agricultural pesticides application in the region is moderate. The other types of analyzed organic micropollutants (volatile and semi-volatile aromatics, volatile chlorinated hydrocarbons) were found in insignificant concentrations. The nitrate concentrations are below 20 mg/l in the production wells. Higher nitrate concentration can be found in the shallow phreatic groundwater, which is the

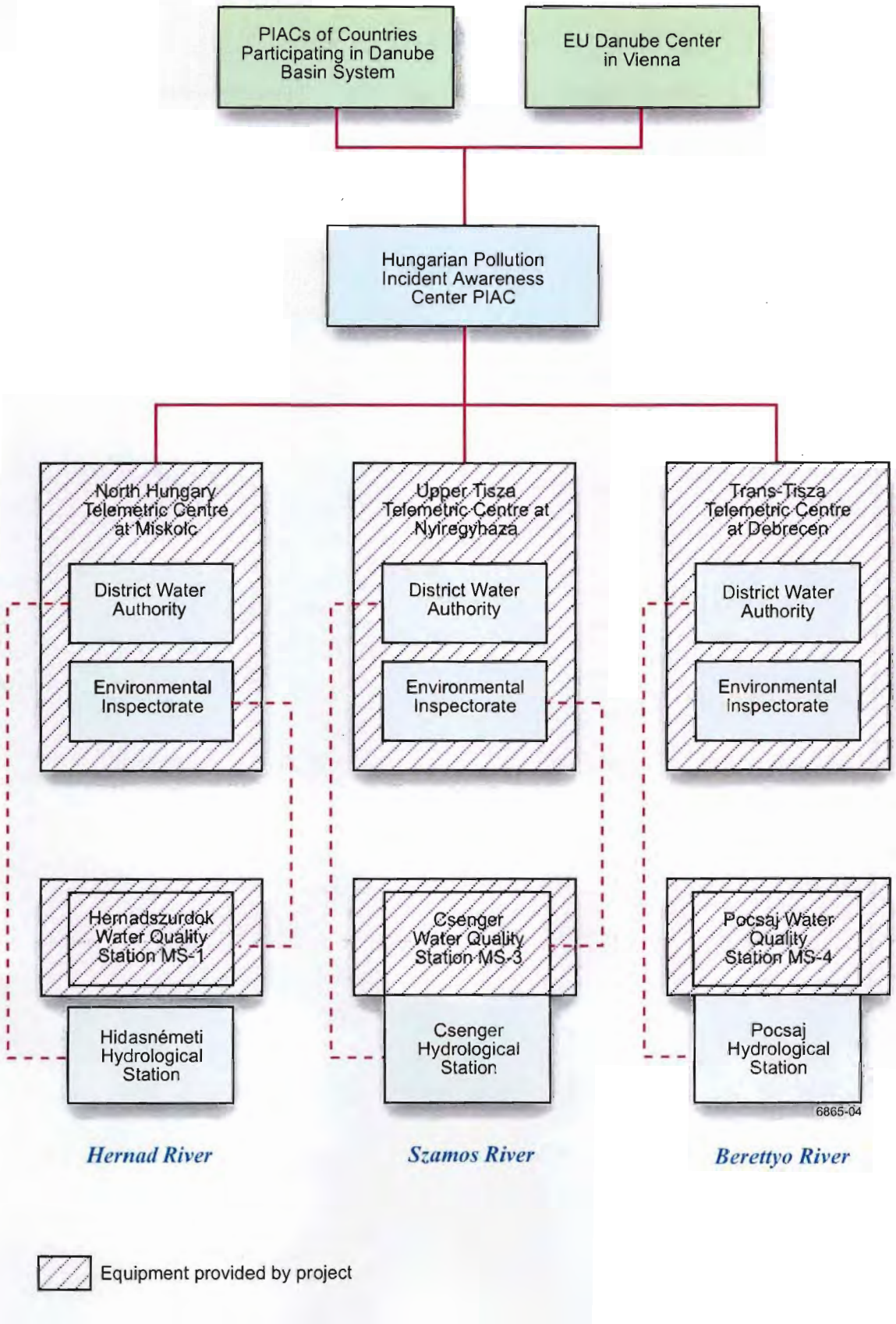

FIGURE 2-6. NEW MONITORING SYSTEM AND INTERCONNECTION

recharge source of the deeper groundwater only in some regions of the study area.

The very long vertical travel times of the infiltrating water and pollutants in the dominant part of the study area mean low vulnerability for the aquifer. The area where the vertical travel time is less than 50 years is 40 km^2 or less.

Study Conclusions

The study concluded that the Maros aquifer can provide good quality groundwater appropriate for drinking water supply but that a formal protection program is needed. Vituki developed a program that allows activities in the surface and subsurface zones if they do not affect the quality or quantity of existing or planned sources and if they do not interfere with extraction of the water. The program also includes recommendations regarding future land use in the hydrological safety zone, within which the travel time to the point of extraction is less than 50 years.

Section Three
PROJECT ACHIEVEMENTS IN SLOVAKIA

In Slovakia, the primary issues addressed by the project were water quality problems in the Uh and Hornad Rivers (See Table 3-1). The Uh River faces pollution from oil-related industries upstream in the Ukraine, and the Hornad is polluted largely by incomplete wastewater treatment at Kosice.

To help local officials alert downstream users when pollution is accidentally released into the Uh River, the GEF/Danube project:

- Built a shelter and provided equipment for a monitoring station on the Uh River
- Provided training and networking for emergency planning and response

To improve water quality in the Hornad River and thereby reduce threats to public health, the project:

- Made improvements to the Kosice wastewater treatment plant

A letter of understanding was signed on August 19, 1996, by the Slovak Ministry of the Environment, the American Ambassador to Slovakia, and the USAID representative to Slovakia. The letter outlined the scope of and implementation plan for project activities in Slovakia.

Water Research Institute (WRI) provided planning and design for the water quality monitoring station. ECM/ECO Monitoring supplied and installed the instrument shelter and the water quality monitoring instruments.

BIDOR performed the planning and engineering for improvements at the Kosice wastewater treatment plant. Spel-Procont supplied and installed the plant's computer process control equipment. EZ Electro Monitoring Systems performed the electrical improvements at the plant.

Figure 3-1. Uh River, upstream of MS-8 Station

3.1 UH RIVER WATER QUALITY MONITORING STATION

The Uh River in Slovakia flows south, joins other streams, and eventually discharges into the Bodrog River before crossing the Slovakian border into Hungary. In Hungary it joins the Tisza and then the Danube. The GEF/Danube project modified an existing bridge for utility pipelines and retrofitted a new instrument shelter, water quality instrumentation, and communications equipment. This new monitoring station is located on the Uh River at Pinkovce, approximately three kilometers downstream from the eastern border with the Ukraine. Slovakia contributed approximately $25,000 for civil improvements such as a new access walkway and instrument platform as well as electrical connections. The investment by USAID was $139,500.

GEF/Danube project staff worked with the Slovak Ministry of the Environment, the Slovak Inspectorate for the Environment, the Slovak Hydrometeorological Institute, local inspectorate officials, and our subconsultant, Water Research Institute, to establish locations and criteria for

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TABLE 3-1. WATER QUALITY ON THE UH AND HORNAD RIVERS

River	Problems	Remarks	Uses
Uh River (monitoring station MS-8)	Frequent oil spills from Ukranian pipelines. Reported average of two per year. Pollutants of concern include petroleum products, phenols, nitrates, toxins, pathogens, PCBs.	Other Ukranian industries also contributed to pollution due to outdated equipment and improper disposal. Chernobyl/accident also contributed to problems (radioactive materials from plume seeped into groundwater)	Water supply Irrigation Bathing Fishing Well recharge
Hornad River	Oil, cyanide, metals, formaldehyde, toxins, and phenols pollute the river	River quality at the Slovakia/Hungary border fluctuates between Class IV (polluted) and Class V (heavily polluted)	Irrigation Recreation Bank-filtered well water, for drinking Subsistence and recreational fishing

sampling. As Table 3-1 indicates, principal pollutants of concern in the Uh River include petroleum, petroleum products, and nutrients. The GEF/Danube project provided instrumentation to monitor water quality in terms of temperature, pH, ORP, conductivity, dissolved oxygen, turbidity, NO_3, NH_4, and oil on the surface. Staff was trained in using the equipment.

The monitoring station includes:

- Continuous on-line petroleum monitor affixed on the tube bridge over the river
- 11.5-m long loosely suspended steel protection tube for water quality sampling
- Steel platform anchored into the concrete pillars of the tube bridge
- Electric connection from the municipality Pinkovce
- Steel footbridge situated between the tube bridge and dike
- Radio link to local water plant

The GEF/Danube project also provided the following communications equipment at the water treatment plant in Lekarovce:

- Computer for local alarm annunciation and water storage for water quality monitoring
- Link to mobile phone network and local offices of the system operator at the Slovak Hydrometeorological Institute
- Satellite relay to Bratislava PIAC

Satellite communication is with the Slovak Inspection of the Environment Department of Water Management Inspection Headquarters, Bratislava (SIE dpt. WMI – PIAX 04 SLOVAKIA).

The monitoring station and early warning system will benefit the area in several ways. Continuous on-line petroleum monitoring will detect refined petroleum products, solvents, and crude oil on the water surface. When the warning system reports advancing petroleum pollution, water pumping from downstream irrigation and drinking water supply wells can be stopped. This action will help protect groundwater resources and surface waters downstream, in East Slovakia and Hungary. This partial protection against the infiltration of petroleum substances into drinking water wells can safeguard the public against health hazards from contaminated drinking water.

3.2 KOSICE WASTEWATER TREATMENT PLANT IMPROVEMENTS

The discharged effluent from the wastewater treatment plant in Kosice violates permitted discharge standards, including biochemical oxygen demand (BOD), total suspended solids (TSS), and ammonia. After 2004, the permitted effluent concentration limits will become more stringent. Compliance with these new, more stringent standards would not be possible without the implementation of this program. The GEF/Danube project goal was to assist in the improvement of treatment efficiency and capacity to bring the effluent into compliance with the 2004 discharge standards, thereby improving water quality downstream.

Figure 3-2. Mothballed equipment and piping at Kosice prior to GEF/Danube project

Figure 3-3. New instrument wiring to motorized gates to fine-screen influent channels

for 112,320 m^3/d and a population equivalent of approximately 400,000. However, due to lack of funding, construction of the new plant was stopped before it was completed. A failed digester resulted

Figure 3-4. Aeration blowers at new Kosice WWTP

in a sludge spill in 1994, causing dramatic water quality impacts in the Hornad River.

The GEF/Danube project, as initially envisioned, was to replace the failed digesters and provide sludge handling and digestion capabilities to accommodate expected higher sludge production from the new treatment plant. However, because of delays in the GEF/Danube project (discussed above in Section 1), VVAK independently constructed new digester tanks and dewatering facilities, including a sludge handling and digestion system and four sludge holding tanks.

In 1997, the new anaerobic digesters were completed and put into operation along with the primary clarifiers in the new wastewater treatment plant. The effluent quality improved, but the discharged effluent was still not in compliance with permitted standards. Completion of the secondary treatment facilities was an urgent priority for VVAK, because one third of the plant's effluent was not receiving secondary treatment. The GEF/Danube project, together with VVAK, developed a two-step program to provide full treatment of all wastewater at the Kosice wastewater treatment plant:

- **Biological treatment completion.** Funding to complete the entire new Kosice treatment plant was beyond both the financial scope of VVAK and the GEF/Danube project. However, financial resources were sufficient to finish a portion of the new plant, a portion sufficient to fully treat the one third of the influent wastewater flow that was being bypassed to the Hornad River after partial treatment. Thus in a combined effort with VVAK, construction of four aeration basins, one sludge aeration tank, two secondary clarifiers,

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return sludge pumping, aeration blowers, and all associated mechanical, piping, and electrical facilities were accomplished. The result was the capability for full secondary treatment of all influent wastewater at Kosice, with the added benefit of partial nutrient removal.

Figure 3-5. New aeration tank at the Kosice WWTP

Control System modernization. This system consisted of a programmatic logic controller (PLC) system, including new field wiring, new instrumentation/operations cabinets in the process area, and a data highway. The project supplied new instrumentation/control stations in the following areas: mechanical treatment, sludge storage, digester, biological treatment; dispatching center, laboratory, and engineers center work station.

The installation of the instrument and control system improves the control of the plant by enabling the operator to observe the current operating status of the plant equipment regardless of weather conditions. The system detects mechanical failures, which could result in the release of untreated or partially treated wastewater to the Hornad River. Water quality indicators such as dissolved oxygen, pH, and ammonia are also monitored by the new control system. The monitoring of these parameters enables operators to adjust the flow of the aeration system according to the strength of the wastewater. The manual intervention of the aeration flow system results in optimum power consumption due to the reduction in flow under diluted wastewater conditions.

Benefits

The present average daily flow reaching the plant is about 1300 L/s. Of this amount, 870 L/s is directed to the old activated sludge plant, where it receives secondary treatment. Effluent averages 12.3 mg/L BOD and 11 mg/L TSS. These values are well below the current standards: 30 mg/L BOD and 25 mg/L TSS.

The remainder of the flow – 430 L/s – is directed to the primary clarifiers of the unfinished new plant, where it receives primary treatment. Effluent averages 65 mg/L BOD and 60 mg/L TSS.

When a portion of the new plant is on line, approx. 850 L/s will continue to be directed to the old plant, where it will receive secondary treatment. The remaining flow of 450 L/s will be diverted to the activated sludge portion of the new plant. This flow will receive secondary treatment, and nitrogen and phosphorus removal. The expected effluent would be 10 mg/L BOD, 33 mg/L COD, 20 mg/L TSS, 2 mg/L ammonia, 8 mg/L total nitrogen and 1.5 mg/L phosphorus. The overall benefits of the Kosice WWTP improvement are summarized in Figure 3-5 for the new plant. By providing secondary treatment for the one-third of the plant's influent wastewater that was bypassed, dramatic improvements in discharge effluent quality are achieved. Effluent quality improvements in the secondary treated effluent from the new plant include an 84% reduction in BOD_5, 79% reduction in COD, 74% reduction in TSS, 59% reduction in total nitrogen and 42% reduction in total phosphorus.

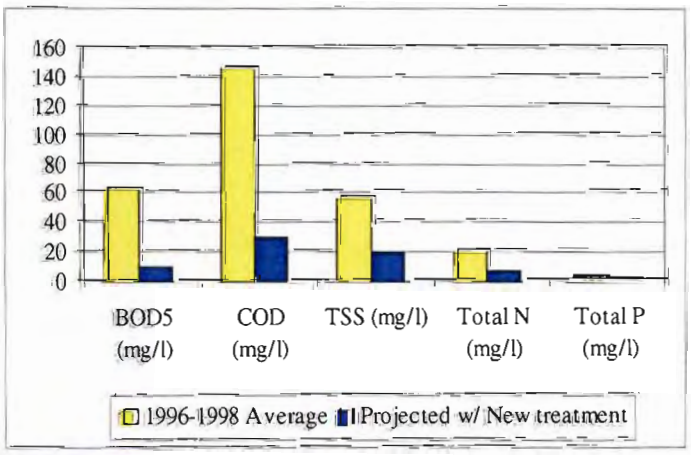

Figure 3-6. Projected Improvement in Effluent Quality at the New Section of the Kosice WWTP

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This project is an excellent case study in the benefits of cost sharing with local partners. The Eastern Slovak Water Authority provided $1,089,100 for mechanical improvements and to complete the biological treatment process. USAID provided $584,000 for the plant-wide control system modernization and $605,100 for electrical work associated with the biological treatment completion. Altogether, USAID contributed $1,189,100

3.3 PROGRAM CLOSING WORKSHOP – SLOVAKIA

The GEF/Danube project sponsored a program closing workshop in Slovakia on September 7, 2001. The 20 participants in the workshop included representatives from all the stakeholders. These included the Slovak Ministry of the Environment, Eastern Slovak Water Authority, Slovak Hydrometeorological Institute, city of Kosice, USAID, Metcalf & Eddy, and M&E's local subcontractors.

Appendix E provides the workshop agenda, invitation, and list of attendees. Also included are details on the presentations by Metcalf & Eddy and three of the local consulting engineers and equipment contractors.

The workshop provided an overview of the project, summarized project activities and results, and provided an opportunity for discussion of problems encountered and lessons learned. As an example of the Slovak's commitment to environmental improvement, VVAK announced at the workshop its intention to complete the entire new biological treatment plant by the end of 2002. Additional bank loans of approximately 100 million korunas (approximately US $2 million) are being pursued.

Participants expressed their appreciation of the project's achievements and USAID financial support and their satisfaction with the project's results. Letters of appreciation are included in Appendix F.

Section Four
ROMANIA – CHALLENGES AND ACHIEVEMENTS

In Romania, industrial sites and municipal treatment plants near Oradea in Bihor County were significant contributors of pollution within the Danube tributary basin. Table 4-1 outlines the water quality problems in the Cris River basin.

As shown in Figure 4-1, Bihor County is located on the western border of Romania on the Hungarian border.

A letter of understanding was signed between the Romanian Minister of Water, Forest, and Environmental Protection, the U. S. ambassador to Romania, and the USAID representative to Romania on November 24, 1997.

GEF/Danube project activities within Bihor County included:

- **Government assistance.** The project provided training in the fundamentals of environmental regulatory inspection and quality control and assurance for water quality laboratories. Financial assistance was also provided for procurement of critical laboratory equipment. These actions will result in improved regulatory monitoring by the regional environmental protection and river basin management agencies.
- **Municipal wastewater treatment improvements.** The project also upgraded the Oradea wastewater treatment plant, thereby reducing pollution to the Rapid Cris River and lowering pollution transfer across the international border with Hungary.
- **Industrial pollution reduction and waste minimization.** The project worked with six industries to improve their environmental management, pollution prevention, and wastewater treatment facilities, and thus greatly reduce the pollution from their operations. Changing the existing attitudes towards environmental protection, as evidenced by the collaborative funding for these industrial projects, was a major achievement of the project.

Figure 4-2. Oradea WWTP - New Primary Effluent Pump Station

Subcontractors made significant contributions to the work in Romania. BCEOM, a French environmental consulting firm, assisted with planning on the industrial tasks and spearheaded the project's cleaner production efforts. ECOIND (formerly ICPEAR), a Bucharest based environmental services firm, assisted with planning, design, and implementation of the industrial wastewater treatment improvements, assessment of regulatory, industrial and municipal environmental monitoring needs, laboratory equipment procurement, and training for laboratory QA/QC and environmental inspections. PROED, a Bucharest consulting engineering firm, provided preliminary and final design for the municipal treatment plant at Oradea.

4.1 GOVERNMENT ASSISTANCE

Background

The two government agencies with which the project worked are the Bihor County branch of the Agentia

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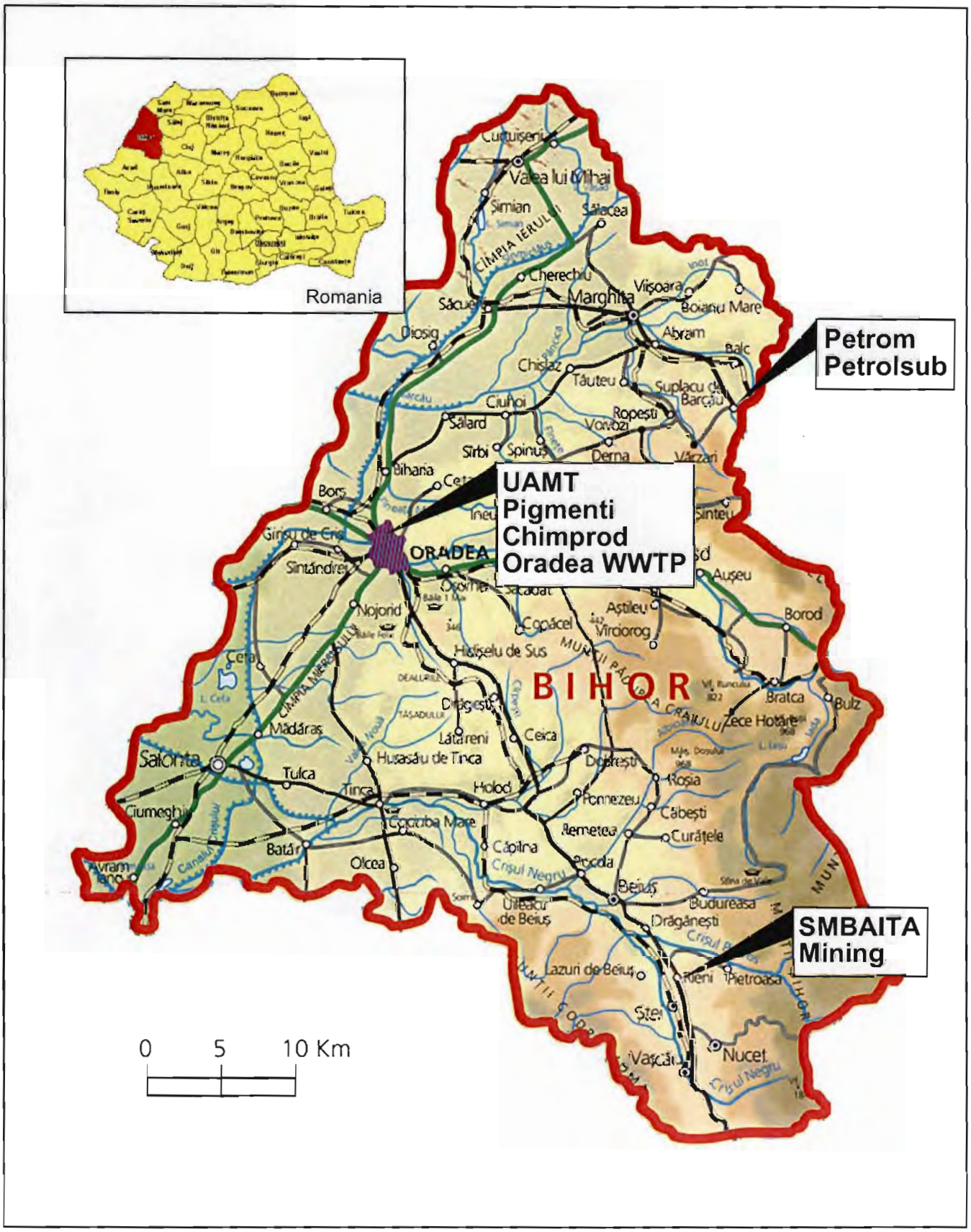

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FIGURE 4-1.
SITES OF PROJECT ACTIVITIES IN BIHOR COUNTY

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TABLE 4-1 WATER QUALITY ISSUES IN THE CRIS RIVER BASIN

River	Source	Pollutants	Users
Rapid Cris	OradeaWWTP Pigment, pharmaceutical, metal works industries	Chromium Zinc BOD Ammonia Total phosphorus	• Irrigation • Commercial and sport fishing • Shallow well recharge (potential)
Black Cris	Uranium mines Non-ferrous metal mines	Zinc BOD Ammonia, copper	• Irrigation • Commercial and sport fishing • Shallow well recharge (potential)
Barcau	Petroleum production facilities Crude oil refineries	BOD Ammonia Other parameters	• Irrigation • Commercial and sport fishing • Shallow well recharge (potential)
Remarks	• 1992-94 World Bank study reported that 64% of the Cris River system violated water quality standards • Rapid Cris demonstrated the poorest water quality • Over 90% of water users in the Cris River basin rely solely on these surface waters • Industries diluted wastewater to meet permitted thresholds • Oradea municipal WWTP discharged partially treated wastewater containing pathogens and toxic compounds		

de Protectia Mediului (the Romanian environmental protection agency, APM) and the river basin commission, Apele Romaine. These agencies are responsible for inspecting and monitoring the discharge from the industrial and municipal facilities identified as significant contributors of pollution to the Cris Basin. Key priorities of these agencies were to train their staff better and modernize their laboratory support capabilities.

Goal

The reason for strengthening the capabilities of regulatory agencies in the Oradea area was to help them monitor environmental compliance more effectively in both the industrial and municipal sectors. More effective environmental regulation together with improved self monitoring by industry are basic building blocks towards the long-term goal of achieving compliance with Romanian standards for discharged effluent.

Project Activities

Project activities were organized into three overall efforts: strengthening governmental environmental agencies in Bihor County; improving government laboratory quality assurance and quality control; and modernizing laboratory equipment.

Stronger Inspection Training. To begin the inspector training, experts from ECOIND worked together with inspection teams from APM to conduct inspections at 10 major industries in the Oradea area. This was followed by two sets of inspector training sessions organized by M&E and ECOIND. This training was based on US EPA practices but tailored to the Romanian reality. Part One was given on July 14 to 15, 1998 and Part Two on August 4 to 6, 1998. The training was conducted for the inspectors of APM Oradea, Apele Romaine, the Oradea Municipality, the Public Health Inspectorate (Sanitary Police), and the Oradea WWTP. All training was conducted in Oradea.

The inspection courses were tailored to the needs of Romanian environmental agencies, beginning with methodologies and practice described in several US publications, including the USEPA Compliance Inspection Manual. The fundamentals and experience with compliance inspections were mixed with interactive exercises in which inspectors worked together to solve their inspection problems efficiently and effectively. Following the presentation on inspection procedures, experiences,

and learning-related exercises, the inspectors successfully developed their own inspection exercise, which was conducted at S.C. ALOR, S.A. in Oradea. This inspection was completed in almost half of the time presumed by the present methodology, and the inspectors used lessons learned to develop an excellent set of recommendations. These were included in their inspection report and presented to ALOR's President and technical directors at the closing meeting of the real inspection exercise.

Special training sessions were dedicated to demonstration and use of field instruments (photometers, pH meters, and individual colormetric test kits.) Both the July and August training sessions were covered by local newspaper and television media.

Laboratory QA/QC Training. ECOIND inspected laboratories in Romania and then developed and delivered a training course for laboratory staff, for the purpose of improving the QA/QC in analytical laboratories.

ECOIND inspected laboratories of APM, Apele Romane, the water treatment plant, the Oradea Wastewater Treatment plant, and several industries (Sinteza, Pigmenti, and UAMT). ECOIND evaluated the equipment status, the expertise of the personnel, and the QA/QC methods being used. ICPEAR then identified the equipment and training needs.

ECOIND used the information gathered in the laboratory inspections to develop a training manual and a two-day training session, specifically tailored for these laboratories. The manuals reflected both European and U.S. methods and standards and covered the following topics:

- Introduction to quality management
- Laboratory accreditation standards and bodies
- Water analysis legislation and standards
- QA in testing
- QC in testing
- Sampling techniques, sample pretreatment, preservation, and handling
- Analytical control – chemical and instrumental methods
- QA/QC for field monitoring equipment

The topics were covered by presentations, discussions, and group exercises.

A special session was allocated to QA/QC for field instruments. In response to participants' interest, equipment distributors were invited to present information at the coffee breaks.

Delivered in Oradea, the session was covered by local newspaper and television media. The 22 participants - from APM, Regia Apele Romane, the Public Health Inspectorate, the Oradea Wastewater Treatment plant, several industries (Sinteza, Pigmenti, and UATM), the municipality, and the Oradea Environmental University – received certificates.

Laboratory Equipment. Approximately $81,800 of laboratory and monitoring equipment was delivered to the APM:

- Atomic adsorption spectrometer (AAS)
- Colorimeter
- Computer
- Vehicle
- Portable sampler and flowmeter
- Portable water quality analyzers (pH, DO) and photometer type test kits for cyanide & heavy metals
- Portable air quality analyzers

In addition to the investment at APM, approximately $72,800 of laboratory equipment was provided for Apele Romaine. This investment furnished Apele Romaine with an atomic absorption spectrophotometer with a graphite furnace. The graphite furnace provides a lower detection level for metal analysis that is needed by Apele Romaine for their mission of monitoring river and stream water quality within Bihor County.

Results

Inspector Training Results:

- Greater efficiency in inspection procedures, methods, and reporting, such as through incorporation of checklists and questionnaires
- Greater effectiveness through use of portable instruments, such as by incorporating monitoring results into discussions during inspections and using them on the spot to develop solutions
- Firm commitment by inspectors to recommend and enforce pollution prevention and control

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- Better communication and cooperation between inspectors and laboratory staff, agencies, and officials
- Development of integrated environmental policy
- Heightened staff interest in further training, to assist APM/Oradea in assuming leadership among Romanian agencies

Laboratory Staff Training results:

- Improved QA/QC methods in laboratories
- Improved communications among various laboratories
- Better cooperation between laboratory staff and inspectors
- Development of integrated (government and private labs) QA/QC policy
- Heightened staff interest in improving laboratory QA/QC, to achieve laboratory accreditation
- Heightened staff interest in further training, to improve their own skills and knowledge and assume leadership in Romanian environmental laboratories
- Heightened staff interest in scientific and technical information

4.2 ORADEA WWTP IMPROVEMENTS

Background

The Oradea Wastewater Treatment Plant is on the banks of the Rapid Cris River, approximately 1.5 km downstream and west of Oradea. Sewer pipes in Oradea collect both separate sewer flows and combined sewer and stormwater flows and convey these flows to the treatment plant. Due to bottlenecks from aging and out of service equipment and hydraulic capacity limitations, existing wastewater treatment plant facilities could not accommodate the volume of wastewater it received, so over 60 percent was diverted to lagoons after primary treatment. Discharge from the lagoons did not meet effluent standards, thereby polluting the Rapid Cris River.

The infrastructure failures identified by USAID included:

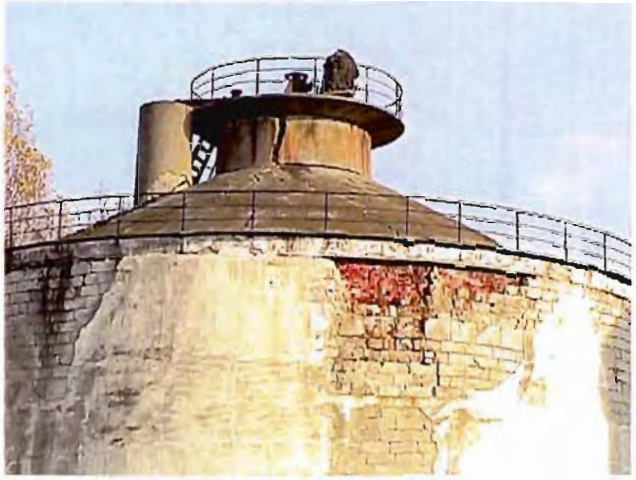

Figure 4-3. The Danube/GEF project refurbished digesters at the Oradea WWTP

- Primary effluent pumps did not have the capacity to pump primary effluent to recently constructed aeration tanks
- Wastewater pumped into the primary distribution box frequently would overflow
- Only one of four secondary clarifiers was functioning
- The facility had an ineffective return activated sludge system
- The plant's digesters were not in service, because of the inoperable transfer pump, heat exchangers, and mixing systems.

These infrastructure limitations resulted in secondary (biological) treatment being provided for less than 40 percent of the plant's influent flow. This bypassing of an essential step in the treatment process results in discharge of effluent high in BOD,

Figure 4-4. Oradea WWTP – Old Sludge Pump

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ammonia, phenols, and suspended solids and persistent non-compliance with the Romanian water quality standards.

In addition to water quality impacts, groundwater impacts were occurring due to seepage from the lagoons and land application of undigested sludge. Because of the inoperative digesters the plant did not receive the benefits of the 40 to 60% volatile solids destruction which anaerobic digesters can typically provide, resulting in greater amounts of poorly stabilized sludge being applied to sludge drying beds.

The projects at Oradea were originally selected to coordinate with improvements being considered by the European Bank for Reconstruction and Development.

Goals

The overall project objective at the Oradea wastewater treatment plant was to eliminate the discharge of inadequately treated wastewater to the Rapid Cris River and thereby decrease the risk of pathogens and other pollutants reaching the food chain downstream in Romania and Hungary.

Project Activities

The Oradea wastewater treatment plant is owned and operated by a Romanian government agency called R.A. Apaterm. As funds became available, R.A. Apaterm had been making improvements to the plant before the GEF/Danube project improvements took place.

Working together with R.A. Apaterm, The GEF/Danube project made key improvements to facilitate reliable treatment of all of the plant's influent wastewater. The plant improvements were designed for a 24-hour design flow of 2,200 liters/second (L/s), and the peak-hour design flow is 4,000L/s.

The improvements included:

- Addition of a new primary effluent pumping station with a capacity of 4000 L/s and reconstruction of the existing distribution box to prevent overflows.
- Rehabilitation of two return activated sludge (RAS) and waste activated sludge pumps. Included were new pumps, an electrical system, ventilation systems, and repairs to the building.
- Rehabilitation of two primary sludge pump stations. Included were new pumps, electrical systems, ventilation systems, and repairs to the buildings.
- New equipment for two sludge digesters, consisting of three pumps and grinders, two heat exchangers, two digester mixers, and repairs to the existing structures.

Figure 4-5. New Aeration Basin with Automatic Dissolved Oxygen Control

The primary effluent pumping station improvement was separately funded and constructed by R.A. Apaterm. This work was completed in November 1999 for a construction cost of $ 587,800.

IFOR SA, of Oradea, did the construction of the joint USAID/R.A. Apaterm funded improvements. When the improvements are completed, the plant will have a capacity of 2200 L/s. The construction cost was originally $1,215,300, of which USAID financed $858,300 and Apaterm financed $357,000. Apaterm also provided additional improvements valued at $178,600. These construction add-ons increased the Apaterm share from $357,000 to $535,600. Considering the overall improvement program, R.A. Apaterm funded $1,123,400 or 57% of the total investment.

Results

Improvements to the Oradea WWTP achieved their objective of reducing pollution of the Rapid Cris River. Together with other improvements undertaken by the plant owners, these improvements

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will enable the plant to provide full secondary treatment and improve the reliability of the plant's performance.

The present average daily flow reaching the plant is 1800 L/s to 2200 L/s. When completed, the new plant facilities will eliminate the need for flows to be normally bypassed to the lagoons.

All of the plant's effluent will receive the higher quality level of secondary treatment plus ammonia removal. Projected effluent quality for the new plant is compared to pre-improvement effluent quality in Figure 4-6. The new plant will have to be capable of producing an effluent of 15 mg/L BOD_5, 45 mg/L COD, 25 mg/L TSS, and 10 mg/L ammonia, in accordance with the Romanian water quality standards. In addition, the plant will lower effluent ammonia levels and reduce phenols levels to below water quality standards. Reduced loads into the river will be about 56% less BOD_5, 56% less TSS, 89% less ammonia and 96% less phenols.

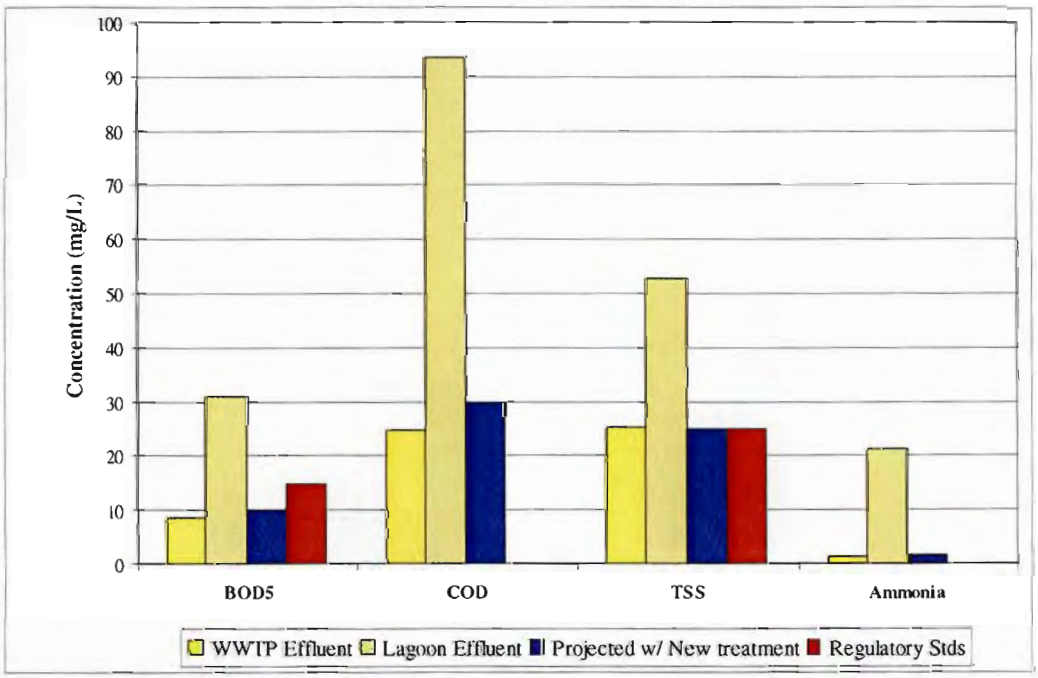

Figure 4-6. Effluent Quality Improvements at the Oradea WWTP

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4.3 INDUSTRIAL POLLUTION CONTROL

4.3.1 Overview of Industrial Activities

Background

In the early 1990's, USAID project design team identified seven industries in Bihor County, Romania as significant sources of transboundary pollution. These industries included: Petrom and Petrolsub, an oil production facility and a refinery in Suplacu de Barcau; three industries in the Oradea area, Pigmenti (an inorganic pigment manufacturer), Chimprod, (a pharmaceutical company) and UAMT (a metal finisher); and two mines in the vicinity of Stei, one a uranium mine and the other a non ferrous metals mine (copper, zinc, lead and molybdenum). When the GEF/Danube Transboundary Pollution reduction project work was awarded in 1995, pollution reduction at these seven Romanian industries was a substantial component of the overall program. Table 4-2 outlines the pollutants and issues at these industries.

M&E and USAID worked with a French engineering consultant (BCEOM) and with a local subcontractor (ECOIND, formerly ICPEAR) to promote cleaner production techniques and reduce industrial pollution.

Goal

The intent of the industrial pollution and waste control component of the project was to reduce pollution of the river from industrial wastewater and mining operations. Improving environmental management at these facilities was also intended to result in the generation of less waste and in lower energy consumption.

Project Activities

Working with each industry, project staff and subcontractors identified the most efficient, cost-effective improvements these seven industries could make to reduce industrial pollution and waste. The team then worked with the industries to find funding for the improvements. All work was performed under the general framework established in a letter of understanding (LOU) between USAID and the Romanian Ministry of Water, Forest, and Environmental Protection.

The principal steps in implementing the industrial program included initial environmental assessments, initial stakeholder agreements, final stakeholder agreements, contract bidding, contract negotiation, and construction.

Initial Assessments. Initial environmental studies (pre-assessment) were made by the M&E/BCEOM/ECOIND project team in the summer of 1997. One or two day site visits were made to each industry and this formed the basis of a detailed assessment report that was prepared in October 1997 with an update in March 1998. Work began in earnest for the Romanian industrial tasks after the November 1997 signing of the LOU. A second program of site visits to each industry occurred during the summer and fall of 1998, followed by a cleaner production workshop. Conceptual engineering reports were prepared for each of the seven industries. Each report included the findings of the on-site investigations and a prioritized list of recommendations.

Initial Stakeholder Agreements. In July 1999, representatives of Metcalf & Eddy, USAID, and the Romanian Industries met to agree upon priority investments, cost sharing, and the best means of implementation. Priority actions were identified by the Industries and by the GEF/Danube Project. Based on this initial agreement, the M&E team prepared scope of works for implementing the agreed upon actions at each industry using a design build approach to final design and construction. (Investments at one of the seven industries, a uranium mine, was cancelled due to the pending closure of the mine and very low potential for transboundary pollutions impacts)

Final Stakeholder Agreements. In early November 1999, M&E and each of the six industries met to formally sign the agreement on cost sharing and approach to project implementation. The agreement on cost sharing included a budget ceiling and an agreed upon percent of the total cost to be borne by each party. In general, the M&E (USAID) share is approximately 60% of the total. Each industry also agreed to have their share of the work implemented by a single general contractor selected through a competitive bidding process.

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TABLE 4-2. WATER QUALITY ISSUES AT SELECTED INDUSTRIAL FACILITIES IN ROMANIA

Facility	Pollutant(s)	Receiving Water Body	Environmental Issues/Comments
Petrom	Petroleum products	• Barcau River	• Products 1,400 tons per day of heavy crude oil • Phenols generated by extraction process • Exceeded permitted levels of pherols in wastewater discharge • No spill containment or runoff prevention around 140 injection wells and/or 660 production wells (40 wells closed per year) • Process wastewater discharged to municipal sewer
Petrolsub	Phenols, suspended solids BOD_5 Petroleum products	• Barcau River	• Processes over 400,000 tons of crude oil annually • Phenols enter refinery with crude oil received from Petrom
Pigmenti	Zinc Chromium	• Rapid Cris River	• Production of Milori blue, chromium yellow, and chromium green pigments • Operating at 10-30% design capacity • Treatment plant receives wastewater high in zinc and phenols from other upstream industries
Chimprod	Phenols	• City Sewer	• Only salicylic plant in Romania exports more than 150 tons per month of salicylic acid product • Total production is exceeding design capacity • Industrial process wastewater is approximately 80 percent by volume of the total wastewater discharged from Chimprod • Using volumetric method to determine wastewater discharge
UAMT	Heavy metals	• City Sewer	• Operating at full capacity and plans to increase capacity by 15 percent within 2 years • In situ treatment of neutralizing and rinse water • Inadequate laboratory monitoring of acidity/alkalinity, cyanide, hexavalent chromium
Uranium mining	Radioactive substances	• Black Cris	• Soil samples exhibit radioactivity • Runoff from solid waste deposits is transported to river • Wastewater effluent does not meet Romanian standards
SM Baita	Copper, zinc, cyanide, and hexavalent chromium	• Black Cris	• Produces approximately 50,000 metric tons of ore per year • Total capacity of 250 tons/day • 8 tons of cyanide used for 40,000 tons/year of zinc-containing ore processed

Contract Bidding. M&E issued a Bid Document to four general contractors in January 2000. The scope of the Design-Build Contract covered all the Industrial wastewater treatment and cleaner production improvements at each of the six industries. A fixed price proposal was requested for the total design, equipment procurement, construction, start-up and testing of all of the proposed improvements. Detailed cost estimates (schedule of values) were required as part of the bidding process to allow the work to be subdivided later between industry and M&E (USAID) funded portions of the work. After receipt of a "Best and Final" offers, M&E selected Envirotech S.A to design and construct the industrial pollution control improvements.

Contract Negotiation. M&E awarded a contract to Envirotech in March 2000 for specific portions of the work at each Industry. Each industry also entered into a separate contract with Envirotech for the remainder of the work at each facility. Using the financial breakdown in the bids, M&E negotiated with the stakeholders and subdivided the general contractor's work into industry funded and M&E (USAID) funded contract packages. M&E's goal in subdividing the work between M&E (USAID) and the industries is to preserve the financial allocations established in the Agreements and to preserve as much sub-project independence as possible. Although work will be implemented by the same general contractor, work will be paid for by multiple contracts, one by M&E and one by each Industry. This allowed the USAID work and the other work at each industry to be coordinated, but not be dependent on each other.

Construction. Design and construction activities began in April 2000 and extended into the fall. Startup and testing began in September and were mostly completed that fall within the allocated budget.

In addition to the pollution - reducing improvements that were financed by the project at each of the industries, special attention was also paid to improving cleaner production, environmental management, and self-monitoring capabilities:

Cleaner Production Training. Recognizing the fundamental importance of waste minimization and advantages of cleaner production in an increasingly global economy, the project sponsored a two-day training session in September 1998. The session was hosted at the Oradea Chamber of Commerce and participants included 20 attendees from Oradea industries and regulatory agencies. The workshop focused on cleaner production techniques and technologies, the development of corporate environmental management systems, and the principles of ISO 14000 standards. Participants gained a clearer understanding of cleaner production concepts and implementation, and the workshop also served to improve cooperation between inspectors and industrial environmental specialists.

Environmental Management Plan Training. The project sponsored another workshop in September 1999, attended by representatives from the six industries. The workshop addressed how to develop and implement environmental management systems. The purpose of developing these systems was to help the companies gain greater control over the environmental impacts of their activities, products and services, particularly the impacts on water. This training was conducted as a first step for the industries towards compliance with the requirements of ISO 14000.

Self-Monitoring Improvements. An adequate laboratory capability for routine monitoring of key pollutants is an essential ingredient in minimizing pollution discharges. As part of the needs assessment at each industry, the highest priority laboratory analytical equipment was also identified. As part of the cost sharing agreement for project implementation, a total of $90,000 was spent by industry for laboratory equipment upgrades.

4.3.2 PETROM

Background

Located 75 km northeast of Oradea, Petrom's main activity at the Suplacu de Barcau facility is petroleum production. Approximately 1250 t/day of asphalt-base petroleum is extracted from underground oil fields through underground combustion and cyclic steam injection. The extracted crude contains 55% water and other impurities and is refined into an asphalt crude with less than 1% impurities by thermochemical processing. There are three main steps in the petroleum extraction-separation process: extraction, separation, and crude petroleum purification. The

main wastewater sources include the oil rigs, separation tanks, crude petroleum demulsifying/ separation, compressors, and steam condensation. The plant has 1400 workers.

Existing wastewater treatment facilities include physical-chemical treatment facilities in two locations:

- Demulsification/Oil Separation. The high water content in the crude oil is reduced by freeing emulsified oil and then separating the oil water mixture by gravity. Polymers are added to the crude oil/water mixture to assist in the separation. Recovered oil is sent on for further purification and the separated water routed for additional wastewater treatment.

- General wastewater treatment. Wastewater from the separation process and other sources receive equalization, free oil separation, coagulation and flocculation for emulsified oil removal, clarification, and sand filtration. Treated effluent is discharged to the Barcau river.

Goals

The objective of USAID involvement at Suplacu Petrom was to reduce the contamination of the Barcau River from petroleum products and phenols, both of which were released through point discharges and through nonpoint surface runoff over land contaminated by spills and leaks.

Project Activities

The project procured equipment to improve the extraction-separation and wastewater treatment processes and installed concrete aprons around wellheads to control runoff.

Wastewater treatment improvements focused on the demulsifying and coagulation-flocculation processes, to increase the efficiency of oil removal from the wastewater. For demulsification, a new automated polymer makeup and feed system was added. The addition of the chemical, which is essential for removing oil from the oily water fraction, will be paced by new flow meters to meet the varying flowrates in the oil production process.

For the coagulation/flocculation process, new equipment included flow measurement, alum feed pumps, and a polymer makeup and feed system maintain the appropriate dosing of cationic polyelectrolyte solution and aluminum sulfate to catalyze the demulsifying and flocculation processes. These were intended to increase removal efficiency of petroleum products, formerly 60 - 80 percent, to 98 percent.

In separate action funded entirely by Petrom, additional concrete aprons with curbs were constructed around new wellheads to minimize the conveyance of spilled oil, via surface runoff, to the river. Petrom had previously installed spill collection pads at 75 of their 300 oil production wells and had agreed to install another 75 as part of their contribution to the project.

Results

Tests were run in October 2000 to compare the old technology with the new technology.

Figure 4-7 shows the improvements to the oil-water separation in demulsification. Residual oil product in the range of 60 to 70 mg/L before the treatment modifications was reduced to less than 20 mg/L, an average reduction of more than 70 percent.

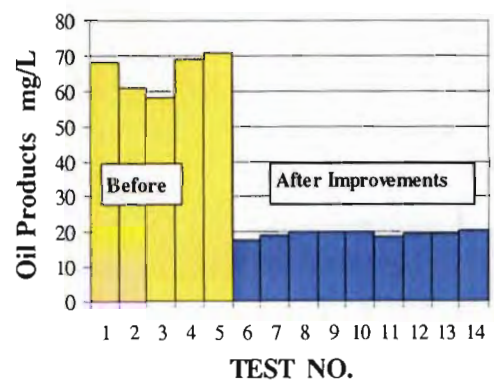

Figure 4-7: Oil Product Recovery at the Demulsification Step at Petrom

Figures 4-8 and 4-9 show the improvements to the flocculation process at the main wastewater treatment plant. More than a 90% reduction in oil product content and 68% reductions in total suspended solids (TSS) were achieved when compared to the pre-improvement conditions.

The new equipment and training achieved sustainable pollution reduction at this plant. In

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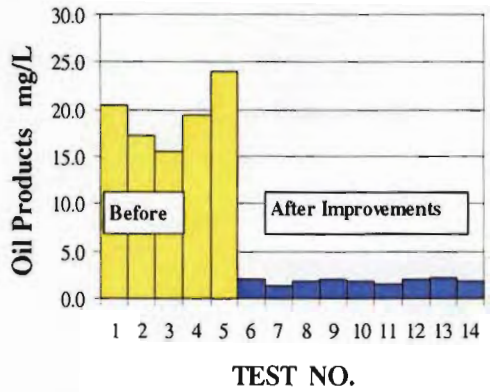

Figure 4-8. Oil Reduction from Flocculation Improvements at Petrom

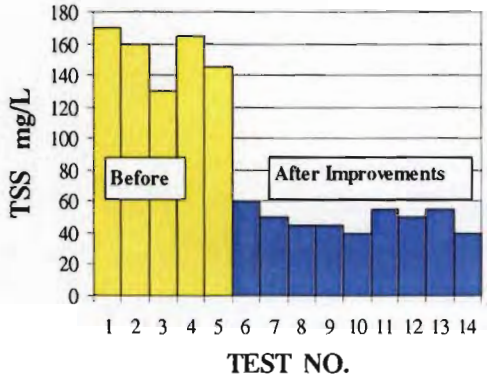

Figure 4-9. Suspended Solids Reduction from Flocculation Improvements at Petrom

addition, ecological awareness was increased among industry staff. The total cost of the project was $134,700, of which USAID financed $110,100 and PETROM provided $24,600. In addition to sharing in the costs of the treatment improvements, Petrom also committed to $10,000 of additional spending for essential laboratory equipment.

4.3.3 PETROLSUB

Background

The final product from the Petrom oil extraction unit, which includes petroleum with less than one percent water, is transported from Petrom to the Petrolsub refinery. The refinery has a processing capacity of 400,000 tons of petroleum per year. The refinery produces oils and fuels by distillation and asphalt oxidation. Wastewater from these processes is conveyed to the wastewater treatment plant.

The main treatment steps at the **Petrolsub wastewater treatment plant** are equalization, oil-water separation, coagulation-flocculation (lime milk + aluminum sulfate), dissolved air flotation, and biological treatment. Wastewater from the treatment facility is discharged to the Barcau River. The treatment system has a design capacity of 60 m^3/hour.

Before the project began, the wastewater treatment plant operated with only manual addition of the chemicals used to release emulsified oil during the treatment process. Also, the biological treatment step was not fully functional due to the inoperable aeration and sludge return equipment. As a result, the biological treatment basins were used as a supplementary settling step, rather than for the intended biological treatment.

Project Activities

At Petrolsub the project made improvements to the physical/chemical process and renovated the biological process at the wastewater treatment plant. The equipment installed included a tank and vacuum pump for the preparation of the lime milk suspension and storage tanks, meter pump, and pH meter for the storage and appropriate dosing of the The renovation of the biological treatment process required new equipment for the aeration system, nutrient preparation-dosage equipment, and sludge recycling pumps. The equipment provided included two air blowers to supply air to the existing activated sludge basins, dissolved oxygen meter, nutrient preparation vessel, meter pump, transfer pump, and a flow meter. The new air blowers required the construction of a new building near the aeration tanks.

Results

Results of the investments in the Petrolsub physical chemical treatment improvements are shown in Figures 4-10, 4-11, 4-12, and 4-13, BOD_5, COD, and TSS. Depending on the parameter, a 67 to 80 percent reduction in pollutant levels were achieved when compared with the pre-investment condition. Similarly positive results are expected once the renovated biological treatment step begins operation in the Spring of 2001. The investments at Petrolsub were relatively evenly divided between local and USAID funding. The total investment in WWTP improvements was $346,129 of which USAID

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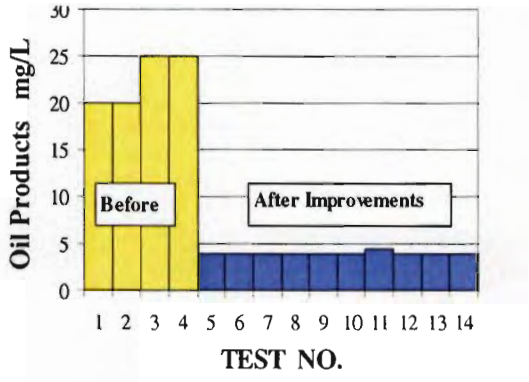

Figure 4-10. Oil Product Reduction at Petrolsub

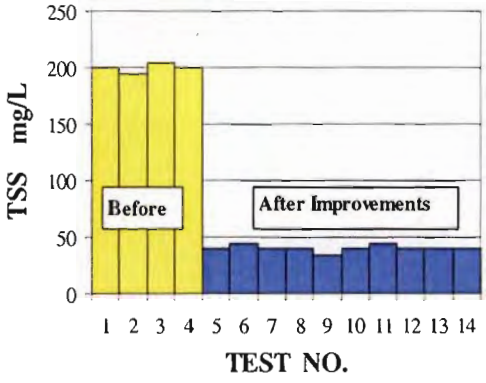

Figure 4-11. Suspended Solids Reduction at Petrolsub

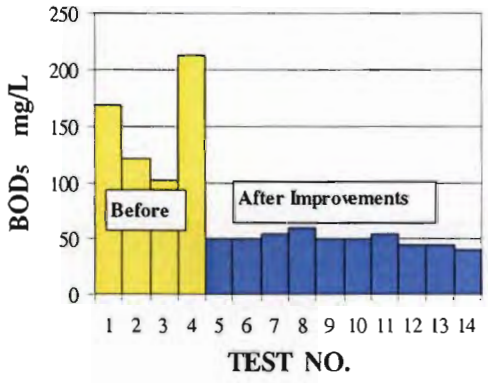

Figure 4-12. BOD_5 Reduction at Petrolsub

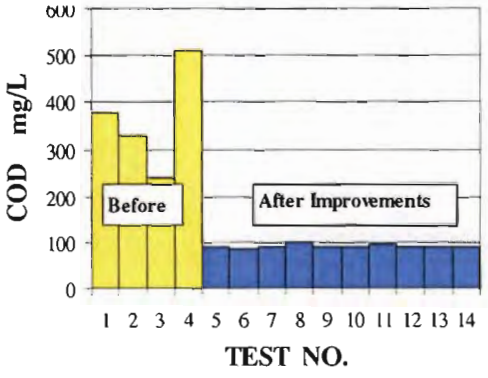

Figure 4-13. COD Improvements at Petrolsub

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contributed $161,700 and Petrolsub $184,800. Petrolsub also committed to $10,000 of additional spending for essential laboratory equipment.

4.3.4 PIGMENTI

Background

Pigmenti manufactures inorganic pigments, zinc-based materials, stabilizers and additives for plastics, coating products, and chemical products for domestic use. The 450 employees at Pigmenti manufacture 1,250 tons per year of inorganic pigment and stabilizer products. Formerly part of Sinteza Chemicals, Pigmenti was privatized in 1992 but is still located on Sinteza property and downstream of other production facilities operated by Sinteza. The Pigmenti wastewater plant receives wastewater high in contaminants from a number of sources in addition to the its own pigment production facility.

Current production is only 15 to 30% of the facility capacity. Thus the volume of wastewater produced at the Pigmenti operations is approximately 1000 m^3/day. The wastewater treatment plant was originally designed to process 150 m^3/hour, or 2,329 m^3/day of wastewater. Production is normally done over 12 hours per day, five days per week.

Existing wastewater treatment processes involve the reduction of hexavalent chromium to trivalent chromium with sodium sulfate at a low pH, the precipitation of metal hydroxides, and settling. The sludge generated during the treatment process is conveyed to a receiving basin and then to a liquids dump(USAID, 1999b). The wastewater, as well as neutralized supernatant from the liquids dump, is discharged to the Rapid Cris River. There is frequent non-compliance for chromium, zinc, and lead concentrations.

The old equipment in the wastewater treatment plant included a reagent preparation room, wastewater receiving basin, wastewater storage basin, pump station, reaction basin, neutralizing basin, vertical decanter, and sludge receiving basin. The equipment was antiquated and typically resulted in an inefficient reduction reaction for chromium due to an inability to regulate the pH during the reactions. The facility also demonstrated a low efficiency of metal hydroxide precipitation and subsequent separation of suspended solids. Finally, the facility lacked the ability to adequately control and monitor the effluent discharged to the Rapid Cris River.

Goal

The USAID objective at Pigmenti was to minimize the generation of chromium and zinc in production process and to maximize chromium and zinc removal from wastewater.

Project Activities

This project provided improvements at the chromium treatment process and metals precipitation system, such as automatic pH controls and new automatic reagent dosing equipment.

The project replaced the pH automatic control equipment with a dosing pump and a pH control system to control the automatic dosing of sulfuric acid to maintain a pH of 2.5-3 during the chromium (VI) reduction reaction(See Figure 4-14). The reaction requires a low pH in the wastewater to facilitate a complete reduction of chromium.

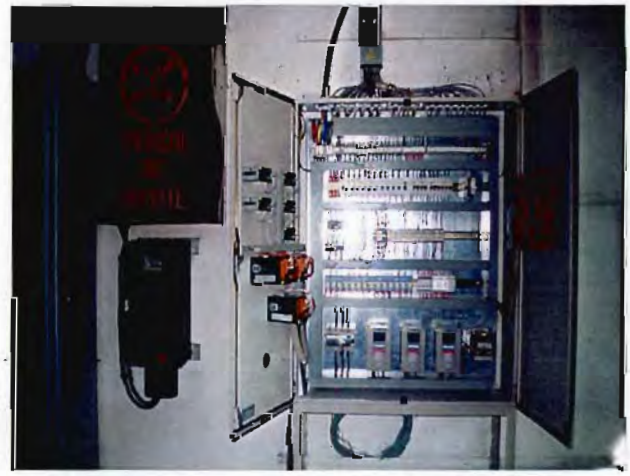

Figure 4-14. New Pigmenti Control Panels

Similar equipment was installed to automatically dose hydroxide solution so the wastewater pH is maintained at a level sufficient to precipitate metallic ions. New equipment also maintains the appropriate dosage of anionic polyelectrolye solution before the clarification step, to improve removal of suspended material and metals.

A total investment of $85,700 was made at Pigmenti. USAID provided $54,900 and Pigmenti contributed $30,800. Other Pigmenti contributions

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to the project was approximately $10,000 of additional WWTP laboratory equipment.

Results

Performance of the new wastewater treatment improvements was monitored after startup in September and October 2000. Results of the testing are summarized in Figures 4-15 and 4-16 for total metals (including chromium, lead, zinc and iron) and total suspended solids. These results demonstrate that an average reduction of 83% for suspended solids and a 95% for total metals when compared to the existing WWTP performance.

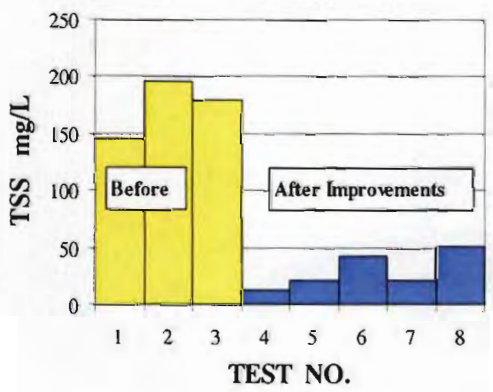

Figure 4-15. Total Suspended Solids Reduction from WWTP Improvements at Pigmenti

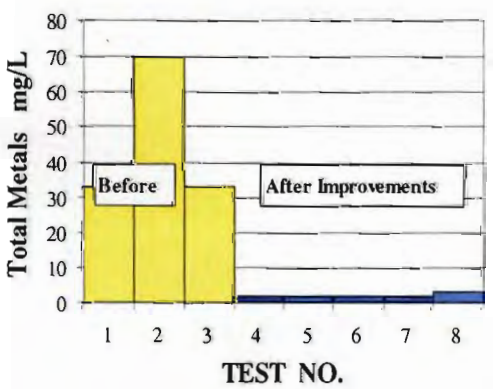

Figure 4-16. Effluent Metal Reduction from WWTP Improvements at Pigmenti

With the new chromium reduction improvements, hexavalent chromium levels in the Pigmenti wastewater discharge have been consistently below the limits of analytical laboratory detection.

4.3.5 Chimprod

Background

Like Pigmenti, Chimprod was originally a part of the Sinteza Chemical Enterprise and has been privatized. The pharmaceutical company produces mostly salicylic acid and derivative products (e.g. aspirin); however, it also produces smaller quantities of benzoic acid and sodium benzoate products, coating products, various chemical conditioning products, and organo-phosphorous pesticides. In 1997, the production of salicylic acid at Chimprod was approximately 1,967 tons/year. In 1998, the production decreased to 1,500 tons/year due to production inefficiency from failing equipment. The plant employs 280 employees. Production is normally done over 24 hours per day, seven days per week.

Before the project began, the salicylic acid production equipment included twelve autoclaves, system of condensers, seven plunger-type vacuum pumps, and centrifuge. About 90% of the wastewater and 75% of the phenols result from centrifugation. Significant inefficiency in production was discovered because of low vacuum levels. The seven vacuum pumps required frequent maintenance and no more than four were typically operating at one time, resulting in insufficient vacuum for the extraction and condensation steps of the batch production process. Higher levels of phenols ended up in plant's discharge due to poor extraction of unreacted phenol and incomplete separation of phenol and water in the condensing system.

Chimprod's existing wastewater treatment facilities consists of an old separator with manual oil collection, neutralization, and aerated equalization. Phenol is the principal pollutant discharged to the Oradea public sewerage system. Very high levels of phenols are allowed by permit (360 mg/l) as Chimprod predecessor Sinteza financed an expansion of the Oradea WWTP in 1981.

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Goal

The USAID objective at Chimprod was to increase efficiency of the plant, thereby minimizing both waste production and raw material consumption.

Project Activities

The project installed four new wet type vacuum pumps with a total capacity of 2,400 m^3/hr (See Figure 4-17). The old vacuum pumps will be kept in reserve for emergency services. The new pumps will operate 24 hours/day all year except for one month during the summer for maintenance.

Figure 4-17. Chimprod Vacuum Pumping Station

Total investment in Chimprod waste minimization was $93,100. USAID contributed $58,200 and Chimprod $34,900. (Note: Chimprod also invested $10,000 in laboratory equipment).

Results

Phenol in the sewer discharge is monitored Monday through Friday. From January 1999 through August of 2000, just before vacuum pump startup, average phenol in the sewer discharge was 292 mg/L. In two months of operation during the fall of 2000 with the new vacuum pumps in service, average concentration of phenol in the discharge was 191 mg/L. Thus an average phenol reduction of 100 mg/L or 150 kg/day was provided through this cleaner production improvement.

4.3.6 UAMT

Background

UAMT is a private, joint stock metalworking company that manufactures a variety of products, mostly for automobiles. The present market is mostly national, but contacts have been made with major European car companies. There are 2,600 employees and the plant has been operating at 85-90% capacity. Electroplating of 250,000 square meters per year of metal parts creates most of the pollution problems with zinc, chromium and nickel exceeding permitting limits for discharges into the Oradea public sewerage system. UAMT has a wastewater treatment plant for heavy metals, cyanide, and hexavalent chromium and about 84% of treated wastewater is recycled into the metal plating rinsing process. UAMT has a Quality System and is preparing for ISO 9001 certification. Many operational procedures refer to environment, but there is no formal Environmental Management System (EMS), and ISO 14001 certification is not yet planned.

The metal plating section of the UAMT plant has two electroplating workshops, designated GI and GII, which include several metal plating processes (zinc, nickel, chromium, and copper plating). The project team noted several inefficiencies in water usage and automation of the process. Water usage was not optimized: cleaner water streams were used for both initial and final rinsing of parts, rather than a more efficient "cascade" flow pattern (e.g. rinsewater flows are first used for final rinses and cascade backwards for use in initial rinsing). The second inefficiency was in the automation of the process. The existing controller for automating the dipping of the metal parts in the various cleaning, plating, and rinsing baths in the plating line was outmoded and lacked modern capabilities for pollution prevention. For example, there was no ability to control the time intervals for part immersion and dripping after immersion to minimize dragout from the concentrated plating solutions.

Unit treatment processes at the existing wastewater treatment plant include equalization, chrome reduction, cyanide destruction and heavy metal precipitation and settling. Settled sludge is dewatered by a plate and frame filter. Wastewater

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sources are segregated for different types of treatment at the WWTP. Recycled wastewater containing chromium and zinc along with acidic wastewater were conveyed to the equalization tank, and then treated in batches in a neutralization tank where the pH is adjusted. Recycled wastewater containing cyanide and alkaline flows were also equalized in a separate tank and then conveyed to the same neutralization tank. In the neutralization tank, the combined flows were treated according to the wastewater composition. However, treatment was typically regulated based on pH. Chromium treatment and cyanide treatment require different pH levels to adequately catalyze each reactions completely. Therefore, the inefficiencies of the treatment plant were twofold: antiquated equipment and insufficient equipment. This resulted in a discharge of metals in excess of permitted thresholds and a high consumption of chemical reagents. In addition, sludge generated during the final filter press process was not properly stored or disposed of (USAID, 1999b).

Goal

The USAID objective at UAMT was for the facility to demonstrate for the ten other metal finishing operations in Oradea the benefits of pollution prevention and for UAMT to achieve compliance with established wastewater effluent discharge limitations.

Project Activities

The project procured and installed new chemical feed and storage equipment that is automatically controlled to assure treatment efficiency and minimize reagent consumption. Specific improvements included:

Chrome Reduction. New sulfuric acid and sodium bisulfite feed systems were provided for chemical reduction of hexavalent chromium to the less toxic trivalent chromium. New pH and ORP controllers were provided to modulate the chemical feedrates.

Cyanide Destruction. New sodium hydroxide and sodium hypochlorite feed systems were provided for chemical oxidation and destruction of cyanide at a high pH. New pH and ORP controllers were provided to modulate the chemical feedrates (See Figure 4-18).

Final Neutralization. After the chrome and cyanide pretreatment, wastewater is neutralized to promote precipitation of heavy metals. Neutralized wastewater is filtered by the existing filter press and reused or discharge to the Oradea sewer system. A new pH meter was provided by the project for monitoring the final neutralization process.

Figure 4-18. Cyanide Destruction System, UAMT

The project also invested in two cleaner production initiatives:

Cascade Rinsing. Four new rinsing tanks were added to an existing Cu-Ni-Cr line along with two automatic recycle pumps. Another cascade rinse tank was added on the Zinc 1 plating line. Flow meters were also provided to allow direct monitoring of water usage.

Process Automation. Two plating lines, Zinc 1 and the Cu-Ni-Cr line were selected for the supply of a new central processing unit. This included supply of a programmable robot, field sensors, and all required software.

Total investment in the UAMT improvements implemented through the Envirotech contract was $95,000. USAID contributed $84,700 and UAMT $10,300. UAMT made an additional contribution by separately funding the process automation improvements (approximately $20,000).

Results

The new waste minimization and wastewater treatment improvements were tested during a 14 day

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period in October 2000. Conclusions of the testing were that:

A 50% reduction in water usage was achieved by cascade rinsing. Associated savings in plating chemicals will save more then $20,000 per year and reduce losses nickel and copper by more than a metric ton per year.

Testing of the improved wastewater treatment plant demonstrated consistent hexavalent chromium and cyanide levels that were below detection in the treated effluent.

UAMT also completed the planned process automation improvements. It is expected that this improvement, together with the cascade rinsing, will result in a 30% reduction in heavy metal discharges from the modified plating lines.

In cooperation with the National Research Institute for Labor Protection and the Environment Protection Department, UAMT prepared documents for an environmental management system, with the ultimate objective of attaining ISO 14001 certification.

4.3.7 Uranium Mining

The old open pit uranium mine called Cariera Centrala Baita, now decommissioned, was started up under Russian management in the early fifties. With ore grades reported up to 2% U_3O_8, it was a high-grade operation that produced a significant volume of the waste material now existing in the Cariera Centrala itself, as well as along the entire valley of the Vala Plaiului, a small stream which is a tributary of the larger Crisul Baita River.

The Avram Iancu underground uranium mine is the only one now in operation in this region. It employs 550 persons. The E.M. Avram Iancu mine is located to the west, between the Crisul Poiana and the Aries Rivers. Ore is sorted and then trucked to the mill at Feldiora, several hundred kilometres away, where ore preparation and concentration take place. There are no uranium mine mill tailing disposal sites at or near the E.M. Avram Iancu mine site. The laboratory located at the mine carries out ore chemical analysis and radon emissions checks. It also monitors radioactivity both underground and on the surface.

The open pit mining operation is closed for several years. In surface, there remains a small activity of re-treatment of some old stockpiles, which will be stopped soon to rehabilitate the region.

Romania does not have standards for wastewater discharges of uranium (U) and radium (Ra), so Romanian regulatory authorities had been using Romanian drinking water standards (0.021 mg/l U and 0.088 Bq/l Ra) for the Uranium mining operations (Exploaterea Miniere Avram Iancu). These standards are much more stringent than standards applied to similar receiving waters in Western Europe, which are 1.8mg/l U and 0.38 Bq/l Ra where dilution is greater than 5 to 1.

Monitoring data collected by M&E subcontractor BCEOM showed very low concentrations of uranium (U) and radium (Ra) for all discharges associated with the mine. These concentrations are consistently below even the drinking water standards. The area around the site is uninhabited, and the mine is expected to be closed in about ten years.

For these reasons, the GEF/Danube project took no actions at the site, choosing to spend resources where they would do more good. The project did recommend that the mining company and the Central Environmental Protection Authority (ACPM) consider modifying the environmental permit for the mine, based on more appropriate environmental standards. Uranium mining operations are located adjacent to the Baita River, a tributary to the Black Cris River.

4.3.8 SM Baita (Nonferrous Metals Mining)

Background

The SM Baita non-ferrous mining industry is located along the Baita River, a tributary to the Black Cris River, near the city of Stei. The small-scale sub-level mine produces approximately 50,000 metric tons of ore per year (USAID, 1999c). The mining operation was identified as contributor of pollution to the Baita River. Cyanide, used during the processing of the ore, and copper levels frequently exceeded established discharge limits. Hexavalent chromium and zinc occasionally exceeded permissible thresholds. Wastewater from the mining operations (approximately 3500 cubic meters/day)

was pretreated with calcium hydroxide and hypochlorite prior to conveyance through a 6.5 km pipeline to the tailings pond located adjacent to the river. There is no monitoring of treatment process to modulate chemical feed rates and maintain treatment efficiency. Supernatant from the tailings pond overflowed into a discharge pipe and entered the river. The remaining liquid in the pond seeped through the soils and into the freshwater aquifer located below the pond. The tailings pond contains more then 4 million metric tons of tailings (i.e. waste rock). Because the method of the ponds construction, fluctuations in the groundwater table and erosion of the sideslopes over time could lead to structural instability and potential failure of the tailings pond dike.

Goal

The USAID goal was to reduce the discharge of cyanide into the Black Cris from the nonferrous metals mining industry and institute operational changes to protect the integrity of the tailings pond dikes.

Project Activities

The project procured and installed equipment to neutralize cyanide by the addition of lime milk and hypochlorite and provide for the automatic regulation of the neutralization process. The new facilities are targeted only for cyanide bearing flows from the flotation process and have a design flow of 300 cubic meters/day (See Figure 4-19). The equipment included two tanks to house the reactions and pumps to dose the appropriate reagent into the tanks.

Monitoring wells were installed around the existing tailings pond to monitor the fluctuation of groundwater levels, which may undermine the stability of the dike.

Total investment in the mining improvements implemented through the Envirotech contract was $117,400. USAID contributed $79,100 and the mine $38,300. The mining company made an additional contribution by separately funding the tailings pond monitoring wells and purchase of a water quality related laboratory equipment (approximately $50,000).

Figure 4-19. Baita Cyanide Destruction System

Results

Performance testing of the new system was accomplished in November 2000. During fourteen days of consecutive testing, 123 mg/L of average influent cyanide from the flotation tanks was routinely reduced to below analytical detection (0.02 mg/L).

Further reduction in heavy metal discharges can be expected from the improved process control provided by an enhanced on-site laboratory capability. Lowering of environmental risk from the tailings ponds is provided through new plant environmental management system sponsored by the project and commitment from the mining company to regularly monitor groundwater levels and tailing pond slope stability.

4.4 PROGRAM CLOSING WORKSHOP – ROMANIA

The GEF/Danube project sponsored a program closing workshop in Romania on September 5, 2001. Of the 90 people invited to participate in the workshop, 48 attended. Participants included representatives from all the stakeholders, including Apele Romane; the Inspectorate for Environmental Protection; Romanian Ministry for Water, Forest and Environmental Protection; Bihor County; the city of Oradea; participating industries; USAID (both Romania and Washington, D.C.); Metcalf & Eddy; and M&E's local subcontractors.

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Appendix E provides the agenda for the workshop and a list of attendees. The workshop provided an overview of the project and summarized project activities and results. Representatives of the project's beneficiaries made a presentation summarizing the project's achievements in reducing both municipal and industrial pollution. Each participant also described the need for future work on environmental protection in Romania.

Letters of appreciation from project participants are included in Appendix F.

Section Five
GEF/DANUBE ACHIEVEMENTS AND LESSONS LEARNED

The overall achievements of the GEF/Danube project included significant improvements in infrastructure and building sustainability by promoting institutional and cultural changes. These overall results are briefly summarized with additional information provided on project funding and the reductions in transboundary pollution that were actually achieved. Finally, lessons learned from the project are described to provide a basis for better implementation of future projects.

5.1 RESULTS

Infrastructure Improvements

- Four monitoring stations constructed; four more designed
- Secondary treatment completed and partial nutrient removal achieved at two of the largest wastewater treatment plants in the region
- Laboratory equipment installed on both sides of the Hungary/Romania border
- Industrial pollution control and cleaner production improvements put in place

Institutional and Cultural Changes

- Environmental inspector training: 25 attendees in Bihor County, Romania
- Preparation of an aquifer protection plan for the transboundary Maros aquifer, including development of an international county-to-county agreement
- Environmental laboratory training: 28 participants in Bihor County, Romania
- Emergency planning workshop: 80 trainees from six countries
- Cleaner production workshop: 22 trainees from Bihor County industries and regulatory agencies
- Environmental management training as a first step towards ISO 14000 compliance: 15 trainees from Bihor County industries
- Industrial environmental management plans implemented at six Romanian industries
- Transfer of U.S.-based environmental engineering practices to local consulting firms; Appendix A lists, by country, the consulting engineering firms who participated in the project; Appendix B lists the equipment contractors who participated
- Local commitment demonstrated by providing 100 percent matching funds for key infrastructure improvements

5.2 POLLUTION REDUCED

The annual average reduction in transboundary pollution is approximately 8800 metric tons. Figure 5-1 presents a breakdown of this pollution reduction achievement by source, and Figure 5-2

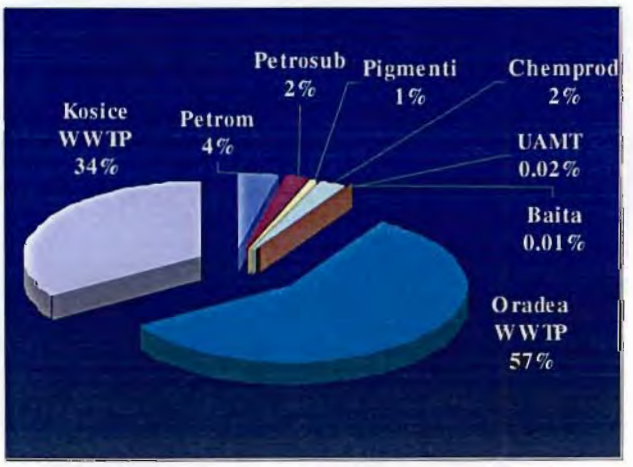

Figure 5-1. Pollution Reduction by Source

presents a breakdown by type of pollutant. These reductions illustrate the key investments of the project in municipal wastewater treatment and consequent major reductions in organic loading (COD and BOD_5) and nutrients. This improvement

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will result in long-term improvement to downstream water quality by lowering the potential for low dissolved oxygen and eutrophication.

Note that this simplified analysis adds the sum of all pollutants equally without consideration of their differing environmental impacts. For example, the project achieved relatively modest reductions in the tonnage of cyanides and heavy metals. However, considering that the toxicity of these compounds is orders of magnitude higher than for the toxicity of conventional pollutants, these reductions achieved are quite significant in terms of water quality.

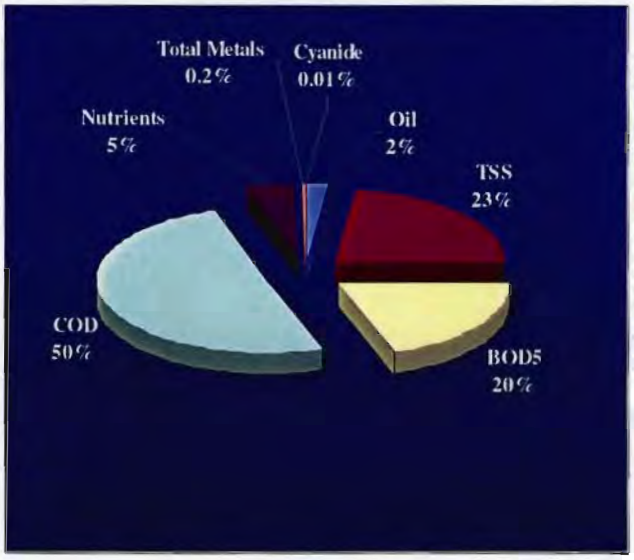

Figure 5-2 Annual Pollution Reduction by Type of Pollutant

5.3 PROJECT FUNDING

The total funding for the project included $6.45 million (of cost) from USAID and $2.77 million from local sources for a combined project budget of $9.22 million. Figure 5-3 presents this

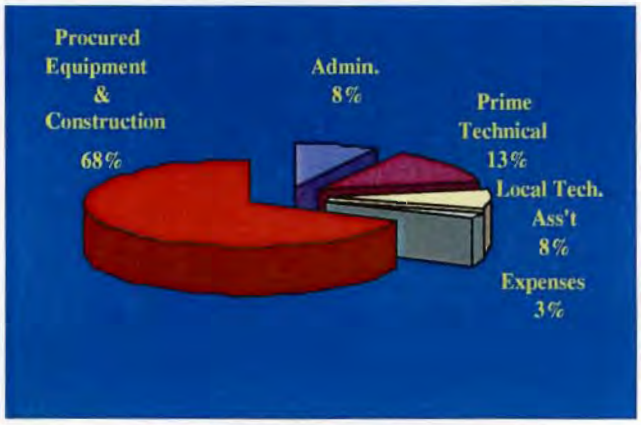

Figure 5-3. Overall Project Budget

overall budget. Approximately two thirds of funding was allocated to equipment procurement and infrastructure improvements. The remaining third provided conceptual, preliminary, and final design; training and other technical assistance; and project management.

It should be noted that local funding includes only $100,100 of national government funds. All the rest of the $2.77 million was raised through loans and in-kind arrangements at the local level.

Figure 5-4 presents a breakdown of the $6.27 million capital budget. The major recipients of this funding were the two municipal wastewater treatment plants. Other key investments included industrial pollution control, industrial cleaner production, online water quality monitoring stations, and laboratory assistance. The laboratory investments include both laboratory equipment for government agencies in Hungary and Romania and technical assistance for improving self-monitoring capabilities at the Romanian industries.

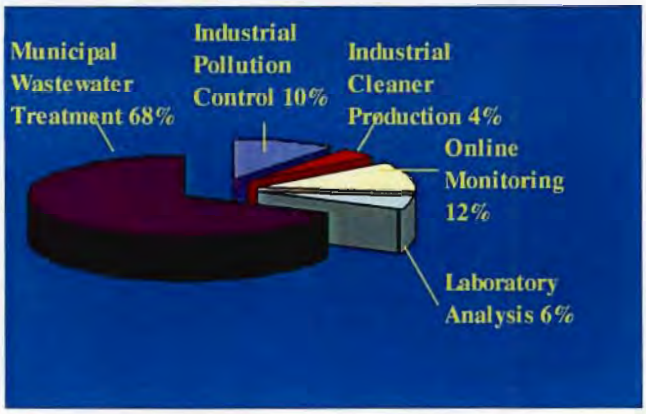

Figure 5-4 Breakdown of Combined Capital Budget

Figure 5-5 summarizes the $3.5 million of USAID investment by donor. The average investment was approximately $100,000 and the largest approximately $1.2 million.

5.4 LESSONS LEARNED

The GEF/Danube project was complex and challenging, and the lessons learned from this project may be useful in guiding the development and implementation of other USAID projects in the Newly Independent States.

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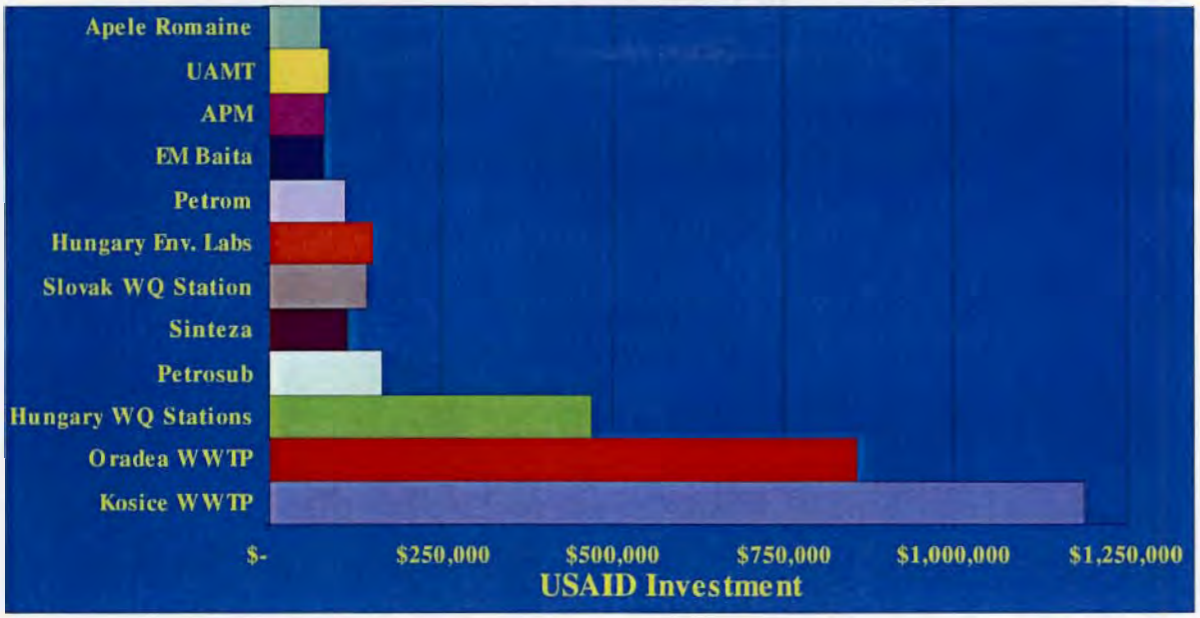

Figure 5-5. Breakdown of USAID Spending by Recipient

Table 5-1 summarizes the equipment expenditures in each of the three countries. The table provides a breakdown of both USAID grants and local-share costs.

Lesson #1: Letters of understanding can be effective if followed by rapid project implementation.

LOU agreements with the host countries were negotiated concurrently by USAID at the beginning of the project. These agreements were complicated by an absence of bilateral agreements at the start of the project. Experience from the GEF/Danube project clearly indicates that long delays from extended LOU negotiations allow too much time for changes to occur at the local level. The end result is shifting local needs and even further delays caused by the need to redirect, reevaluate, and revise project activities.

At the Kosice wastewater treatment plant, for example, by the time the project team made its initial surveys, the plant's owner had already implemented the improvements that formed the core of the planned project activities in Slovakia. A second example lies in Hungary, where the signatory of the LOU, the Ministry of the Environment, cancelled its participation in four of the seven water quality monitoring stations because of changing financial conditions.

A sample letter of understanding with a Romanian industry is included in Appendix C.

Lesson #2: Keep approaches flexible and USAID financial commitments undefined.

The detailed financial commitments from USAID in each of the LOUs were no secret at the local level. Every industry we visited in Romania, for example, appeared to be very familiar with the investment dollars targeted for its facility. Thus, to avoid the risk of not meeting local expectations, investment targets should be set in only the most general of terms, with dollar values provided at only a program or national level. Investment targets should also be accompanied by a clear outline of investment criteria, with the inference clear that the dollars will be spent only where the greatest benefit will be obtained.

With this approach, initial survey work can more freely rank potential investments, and decisions on the recommended project investments can be made without the constraints of changing prior commitments. An example of this is the more than $400,000 that was targeted in the LOU for the Romanian uranium mine. The actual investment – after several years of visits, detailed assessment studies, and a conceptual engineering report – was zero because of the relatively low environmental risk, consequently low environmental benefits, and likelihood that the mine would close in the near future. A less awkward approach would have been to avoid mentioning these upfront dollar commitments.

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TABLE 5-1. SOURCES AND AMOUNTS OF EQUIPMENT FUNDING

	USAID	Local	Total
Hungary			
• Monitoring station at Hernadszurdok, Csenger, and Pocsaj	$467,700	$100,100	$567,800
• Lab equipment for Gyula, Debrecen, Nyiregyhaza, Szeged, and Miskolic and vehicle	139,200	--	139,200
Subtotal	$606,900	$100,100	**$707,000**
Slovakia			
Uh River Monitoring Station	139,500	25,000	164,500
Kosice Wastewater Treatment Plant	1,189,100	1,089,000	2,278,100
Subtotal	1,328,600	1,114,000	**2,442,600**
Romania			
• Lab Equipment			
APM	81,100	--	81,100
Apele Romaine	72,800	--	72,800
• Improvements to Oradea Wastewater Treatment Plant	858,300	535,600	1,393,900
• Oradea Primary Effluent Pump Station		587,800	587,800
• Wastewater Improvements at Industries			
– Petrom	110,100	34,600*	144,700
– Petrolsub	161,700	194,400*	356,100
– Pigmenti	54,900	40,800*	95,700
– Chimprod	58,200	44,900*	103,100
– UAMT	84,700	30,300*	115,000
– Baita	79,100	88,300*	167,400
Subtotal	1,560,900	1,556,700	**3,117,600**
GRAND TOTAL	3,496,400	2,770,800	**6,267,000**

* Includes lab and process monitoring equipment purchased directly by each industry. See text for each industry.

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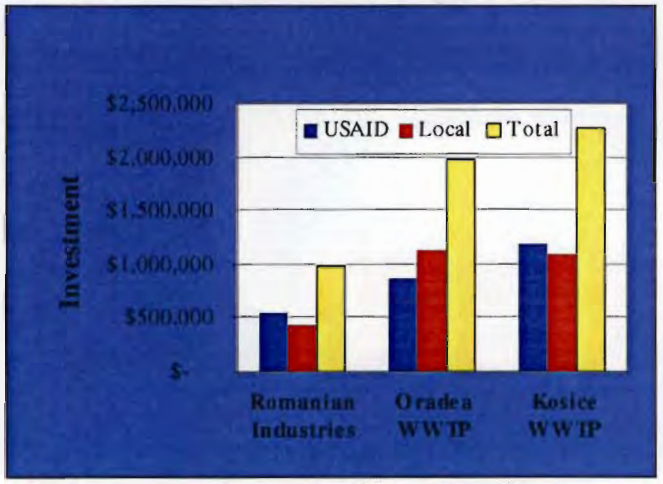

Figure 5-6. Summary of Major Cost Sharing

Another reason for maintaining a flexible approach is that cultural, institutional, technical, financial, and contractual constraints can vary widely, and the project needs the flexibility to choose the most effective means and methods of implementation for a particular activity.

Lesson # 3: Cost sharing is an effective tool and is best implemented at the local level.

Cost-sharing was complicated by changed circumstances, but it turned out to be an effective way to reduce costs and build commitment in the countries and industrial recipients of USAID assistance. When the LOUs in each country were negotiated, commitments on shared funding were agreed upon with each country's environmental ministry. As this agreement was not ratified by the Ministry of Finance in each country, with few exceptions, funds were not budgeted for the GEF/Danube project at the national level. Thus, the M&E team was forced to renegotiate and obtain funding commitments at the local level. This was ultimately successful, as illustrated in Figure 5-6, as more than $2.7 million in local contributions were provided.

Lesson # 4: Local funds can be brought in by having multiple contracts with a single general contractor.

Another weakness of the LOUs was their silence on how local funds were to be brought in to the project. U.S. procurement standards, including the FAR regulations, created further obstacles to local cost sharing. A second concern was that cost-sharing agreements were negotiated based on budgetary costs, with the assumption that each party would contribute a fixed percentage of the total.

The M&E team solved these procurement-related problems by taking bids on a combined procurement - package and splitting up the work later into separate USAID-funded and locally funded contracts that closely approximated the percentages in the cost-sharing agreements. This approach was successful for both the Oradea wastewater treatment plant and the industrial work in Romania.

Lesson #5: A design-build approach saves time and money.

With the relatively small size of the typical GEF/Danube investment (about $100,000), use of a design-build project approach was well suited to the modest size of local engineering and construction firms. By matching the investment size to the capabilities of local firms, the project achieved significant savings in implementation time (e.g., approximately 12 months saved on the industrial work in Romania).

A second benefit of the design-build approach was in accelerating the design process and more quickly obtaining the input of specialized equipment vendors. Because of the limited depth of local engineering firms, detailed design expertise often resided in equipment vendors. Appendix B lists, by country, the equipment contractors who participated in the project. Early involvement of these vendors as part of the successful bidders' team contributed to the almost zero dollars in change orders observed for the Romanian industrial work and the Slovak and Hungarian water quality monitoring stations.

Lesson #6: Allow extra time for contract negotiation.

Delays in executing contracts with local engineering or construction subcontractors were caused by a number of factors, including general unfamiliarity with American business practices, the burden and inaccuracies of translation, and the often complicated flowdowns from USAID's contract with M&E. Other problems included repeat negotiation for insurance and bonding provisions as a result of variations in availability from country to country. The best advice for future projects to

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minimize delays is to simplify contracts as much as possible, beginning with the USAID prime contract.

Lesson #7: Minimize study, and rapidly implement obvious infrastructure improvements.

Much of the necessary pollution control infrastructure in the region is missing or out of service. Using a flexible approach as described in Lesson #2, a skilled team can perform an initial survey, tabulate these deficiencies, rate the overall priority of investments, and then move quickly into stakeholder negotiation and project implementation. A design-build approach is often within the financial capabilities of local firms and can offer the fastest way to get the investments online.

Lesson #8: Rely on professional judgement in the absence of performance data.

Regular logs of facility performance have not been kept in these countries, and records are generally nonexistent or missing. Routine inspections have not been performed, or the results of inspections have not been recorded. In the absence of historical data, project implementation needs to rely on the judgement of professional staff.

Section 6
REFERENCES

Report numbers at the end of each entry refer to the numbering system used in the Danube project reports library at Metcalf & Eddy, Wakefield, Massachusetts, USA. Reports in this section are organized by country and then by author. Most of the documents listed below are reproduced on the compact disk enclosed at the end of this section. Exceptions are the sets of design drawings marked with an asterisk (*).

FINAL REPORT

Metcalf & Eddy, Inc. September 2001. *Global Environment Facility Danube Transboundary Pollution Reduction in Three Tributary Basins. Final Project Report.* Report No. 281.

HUNGARY

Metcalf & Eddy, Inc. April 1998. *Global Environment Facility Danube Transboundary Pollution Reduction in Three Tributary Basins. Draft Detailed Assessment Hungary.* Report No. 211.

Metcalf & Eddy, Inc. October 1999. *Global Environment Facility Danube Transboundary Pollution Reduction in Three Tributary Basins – Environmental Assessment, Hungary.* Report No. 243.

Vituki Innosystem, Budapest. February 1998. *Transboundary Pollution Reduction in Three Danube Tributary Basins – Design Report: Monitoring Station on the River Szamos at Csenger.* Report No. 156.

Vituki Innosystem, Budapest. February 1998. *Transboundary Pollution Reduction in Three Danube Tributary Basins – Design Report: Monitoring Station on the River Hernád at Hernádszurdok.* Report No. 157.

Vituki Innosystem, Budapest. February 1998.*Transboundary Pollution Reduction in Three Danube Tributary Basins – Design Report: Monitoring Station on the River Maros at Makó.* Report No. 158.

Vituki Innosystem, Budapest. February 1998. *Transboundary Pollution Reduction in Three Danube Tributary Basins – Design Report: Monitoring Station on the Eastern Main Canal at Tiszavasvári.* Report No. 159.

Vituki Innosystem, Budapest. February 1998. *Transboundary Pollution Reduction in Three Danube Tributary Basins – Monitoring Station on the River Berettyó at Pocsaj.* Report No. 160.

Vituki Innosystem, Budapest. March 1998.*Transboundary Pollution Reduction Project – Supporting Study for the Development of the Communication System of the Project on Decreasing Transboundary Pollution in the Danube Basin.* Report No. 188.

Vituki Innosystem, Budapest. February 1998. *Transboundary Pollution Reduction in Three Danube Tributary Basins – Detailed Design of the Equipment Installation for the 5 Monitoring Stations on the Hungarian Border Sections of the Rivers Hernád, Szamos Berettyó, Maros and that on the Eastern Main Canal (KFCS) at the Sluice Gate entering from the River Tisza.* Report No. 189.

Vituki Innosystem, Budapest. February 1998. *Transboundary Pollution Reduction in Three Danube Tributary Basins – Design Report and Detailed Design of the 5 Monitoring Stations on the Hungarian Border Sections of the Rivers Hernád, Szamos Berettyó, Maros and that on the Eastern Main Canal (KFCS) at the Sluice Gate Entering from the River Tisza. Summary Report.* Report No. 190.

Vituki Innosystem, Budapest. January 2000.*Danube Transboundary Pollution Reduction Project – Monitoring Stations in the Secondary Tributaries Hernád, Szamos and Berettyó. Water Quality Emergency Action Plan.* Report No. 245.

Vituki Innosystem, Budapest. August 2000. *Danube Transboundary Pollution Reduction Project. Final Report: I. Monitoring Stations; II. Acquisition of Lab Equipment; III. The Maros Aquifer.* Report No. 251.

Vituki Innosystem, Budapest. April 25, 2000.*Transboundary Pollution Reduction Project – Report on the Workshop, Danube Emergency Response, 21-22 March 2000, Held in Miskolc and Hernádszurdok.* Report No. 269

Vituki Plc. August 2000. *Global Environmental Facility – Danube Transboundary Pollution Reduction Maros Aquifer Investigations. Final Report.* Report No. 250.

Víz-inter Ltd. Consulting Engineers. 1998. *Transboundary Pollution Reduction Project – Romania-Hungary Cross-Border Monitoring Feasibility Study–Körös/Cris.* Report No. 180.

Víz-inter Ménökiroda Kft. February 1998. *Transboundary Pollution Reduction Project – Romania-Hungary Cross-Border Monitoring–Rapid-Körös–Körösszakál Design Report.* Report No. 181.

Víz-inter Ménökiroda Kft. March 1998. *Transboundary Pollution Reduction Project – Romania–Hungary Cross-Border Monitoring–Rapid Körös–Körösszakál Water Quality Emergency Action Plan (Draft).* Report No. 182.

* Víz-inter Ltd. Consulting Engineers. August 1998. *Transboundary Pollution Reduction Project – Romania–Hungary Cross-Border Monitoring–Rapid–Körös–Körösszakál Detailed Design (Draft).* Report No. 183.

Víz-inter Ltd. Consulting Engineers. 1998. *Transboundary Pollution Reduction Project - Romania–Hungary Cross–Border Monitoring–Black–Körös–Sarkad-Malomfok Preliminary Study (Draft).* Report No. 184.

Víz-inter Ménökiroda Kft. February 1998. *Transboundary Pollution Reduction Project – Romania-Hungary Cross-Border Monitoring–Black-Körös–Sarkad-Malomfok Design Report (Draft).* Report No. 185.

Víz-inter Ménökiroda Kft. March 1998. *Transboundary Pollution Reduction Project – Romania-Hungary Cross-Border Monitoring – Black-Körös–Sarkad-Malomfok Water Quality Emergency Action Plan (Draft).* Report No. 186.

* Víz-inter Ltd. Consulting Engineers. August 1998. Transboundary Pollution Reduction Project – Romania-Hungary Cross-Border Monitoring – Black- Körös–Sarkad-Malomfok Detailed Design (Draft). Report No. 187.

SLOVAKIA

* Bidor Bratislava. September 1999. *Kosice WWTP: Drawings and Specifications for PS 2-07, Transformer Station; Electrotechnological Part.* Report No. 230.

* Bidor Bratislava. September 1999. *Kosice WWTP: Drawings and Specifications for PS 06, Measurement and Regulation; Biological Part.* Report No. 231.

* Bidor Bratislava. September 1999. *Kosice WWTP: Drawings and Specifications for DPS 2-5.2, Blower Room; Electrotechnological Part.* Report No. 232.

* Bidor Bratislava. September 1999. *Kosice WWTP: Drawings and Specifications for DPS 2-2.3, Activated Sludge Pumping Station; Electrotechnological Part.* Report No. 233.

* Bidor Bratislava. September 1999. *Kosice WWTP: Drawings and Specifications for DPS 2-2.3.2, Secondary Settling Tanks; Electrotechnological Part.* Report No. 234.

* Bidor Bratislava. September 1999. *Kosice WWTP: Drawings and Specifications for PS 2.10, External Cable Distribution; Electrotechnological Part.* Report No. 235.

* Bidor Bratislava. September 1999. *Kosice WWTP: Drawings and Specifications for DPS 2-2.3.1, Aeration Tanks; Electrotechnological Part.* Report No. 236.

Bidor Bratislava. January 1999. *Global Environment Facility Danube Transboundary Pollution Reduction in Three Tributary Basins. Kosice – Completing WWTP, Technical-Economic (Feasibility) Study. Slovakia.* Report No. 241.

Bidor Bratislava. December 1999. *Global Environment Facility Danube Transboundary Pollution Reduction in Three Tributary Basins. Kosice – Completing WWTP, Technical-Economic (Feasibility) Study, Complement. Slovakia.* Report No. 253.

* Bidor Bratislava. February 2001. *Kosice WWTP: Electrical Drawings – Final Version.* Report No. 270.

Metcalf & Eddy, Inc. April 1998. *Global Environment Facility Danube Transboundary Pollution Reduction in Three Tributary Basins. Draft Detailed Assessment, Slovakia.* Report No. 210.

Metcalf & Eddy, Inc. December 1999. *Global Environment Facility Danube Transboundary Pollution Reduction in Three Tributary Basins – Environmental Assessment, Slovakia.* Report No. 255.

Water Research Institute, Bratislava. July 1997. *Transboundary Pollution Reduction Project. Ukraine-Slovakia Cross-Border Monitoring and Lekarovce Well Protection Feasibility Study, River Uh.* Report No. 220.

* Water Research Institute, Bratislava. October 1998. *Design Documentation of the Technological Part – Monitoring Alarm System on the River Uh.* Report No. 222.

* Water Research Institute, Bratislava. January 1999. *Drawings and Specifications: Monitoring Alarm Station on the River Uh. Design for Building Decision.* Report No. 216.

* Water Research Institute, Bratislava. July 2000. *Final Design for Alarm Monitoring Station on the Uh River. Drawings and Specifications.* Report No. 249.

Water Research Institute, Bratislava. December 2000. *Final Report: Alarm Monitoring Station on the Uh River.* Report No. 262.

ROMANIA

BCEOM. December 1998. *Transboundary Pollution Reduction in Three Danube Tributary Basins. Task R12 Report, Uranium Mine.* Report No. 197.

BCEOM. January 1999. *Transboundary Pollution Reduction in Three Danube Tributary Basins. Task R13 Report, Non Ferrous Metals Mining.* Report No. 198.

BCEOM. January 1999. *Transboundary Pollution Reduction in Three Danube Tributary Basins. Task R4 Report, Cleaner Production Program.* Report No. 199.

BCEOM. February 1999. *Transboundary Pollution Reduction in Three Danube Tributary Basins. Task R11 Report, UAMT and Metalworking.* Report No. 200.

BCEOM. February 1999. *Transboundary Pollution Reduction in Three Danube Tributary Basins. Task R9 Report, Pigmenti.* Report No. 201.

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BCEOM. February 1999. *Transboundary Pollution Reduction in Three Danube Tributary Basins. Task R10 Report, Chimprod.* Report No. 202.

BCEOM. February 1999. *Transboundary Pollution Reduction in Three Danube Tributary Basins. Task R2 Report, PETROM/PETROLSUB.* Report No. 219.

BCEOM. January 1999. *Transboundary Pollution Reduction in Three Danube Tributary Basins. Final Report, Chimprod. Action 1: New Vacuum Pumps.* Report No. 240.

BCEOM. October 1999. *Transboundary Pollution Reduction in Three Danube Tributary Basins. Final Report, Baita Non-Ferrous Mines. Action 1: Tailing Pond Piezometers.* Report No. 244.

BCEOM. January 2000. *Transboundary Pollution Reduction in Three Danube Tributary Basins. Final Report, UAMT. Action 1: Improved Rinsing; Action 2, Process Automation.* Report No. 246.

Metcalf & Eddy, Inc. March 1998. *Global Environment Facility Danube Transboundary Pollution Reduction in Three Tributary Basins. Draft Detailed Assessment Romania.* Report No. 209.

Metcalf & Eddy, Inc. March 1998. *Global Environment Facility Danube Transboundary Pollution Reduction in Three Tributary Basins. Oradea, Romania, WWTP, Conceptual Design Progress Report.* Report No. 208.

Metcalf & Eddy, Inc. August 1998 Supplement. *Global Environment Facility Danube Transboundary Pollution Reduction in Three Tributary Basins. Oradea, Romania, WWTP, Conceptual Design Progress Report, March 1998.* Report No. 213.

Metcalf & Eddy, Inc. September 1999. *Global Environment Facility Danube Transboundary Pollution Reduction in Three Tributary Basins. Practical Guide for EMS Implementation. Prepared for Romanian Industrial Tasks..* Report No. 242.

Metcalf & Eddy, Inc. September 2000. *Global Environment Facility Danube Transboundary Pollution Reduction in Three Tributary Basins – Environmental Assessment, Romania.* Report No. 252.

s.c.Envirotech s.r.l. December 2000. *Global Environment Facility Danube Transboundary Pollution Reduction in Three Tributary Basins - R2A Petrom, Project Completion Report.* Report No. 256.

s.c.Envirotech s.r.l. December 2000. *Global Environment Facility Danube Transboundary Pollution Reduction in Three Tributary Basins - R2B Petrolsub, Project Completion Report.* Report No. 257.

s.c.Envirotech s.r.l. December 2000. *Global Environment Facility Danube Transboundary Pollution Reduction in Three Tributary Basins - R9 Pigmenti, Project Completion Report.* Report No. 258.

s.c.Envirotech s.r.l. December 2000. *Global Environment Facility Danube Transboundary Pollution Reduction in Three Tributary Basins - R10, Chimprod, Project Completion Report.* Report No. 259.

s.c.Envirotech s.r.l. December 2000. *Global Environment Facility Danube Transboundary Pollution Reduction in Three Tributary Basins - R11, UAMT, Project Completion Report.* Report No. 260.

s.c.Envirotech s.r.l. December 2000. *Global Environment Facility Danube Transboundary Pollution Reduction in Three Tributary Basins - R13, Baita, Project Completion Report.* Report No. 261.

ICPEAR. September 1998. *Danube Transboundary Pollution Reduction Project. Final Report, Task 1: Strengthening Government Environmental Agencies in Oradea/Bihor County, Romania.* Report No. 169.

ICPEAR. 1998. *Danube Transboundary Pollution Reduction Project. Strengthening Government Environmental Agencies in Oradea/Bihor County, Romania. Stronger Inspections Training Course, July 14-15 and August 4-6. Attachments.* Report No. 170.

ICPEAR. 1998. *Danube Transboundary Pollution Reduction Project. Strengthening Government Environmental Agencies in Oradea/Bihor County, Romania. Annex 4, Course Support, July 1998.* Report No. 171.

ICPEAR. August 1998. *Danube Transboundary Pollution Reduction Project. Strengthening Government Environmental Agencies in Oradea/Bihor County, Romania. Annex 8, Environmental Inspection Manual.* Report No. 172.

ICPEAR. August 1998. *Danube Transboundary Pollution Reduction Project. Strengthening Government Environmental Agencies in Oradea/Bihor County, Romania. Annex 9, Course Support, August 4-6th.* Report No. 173.

ICPEAR. July 1998. *Danube Transboundary Pollution Reduction Project. Strengthening Government Environmental Agencies in Oradea/Bihor County, Romania. Task R3 – Training Materials for Oradea Inspections, Attachment 1.* Report No. 174.

ICPEAR. August 1998. *Danube Transboundary Pollution Reduction Project. Strengthening Government Environmental Agencies in Oradea/Bihor County, Romania. Inspection Manual, APM Training.* Report No. 175.

ICPEAR. September 1998. *Danube Transboundary Pollution Reduction Project. Strengthening Government Environmental Agencies in Oradea/Bihor County, Romania. QA/QC*

Improvement in APM, Apele Romane and WWTP Laboratories, September 22-23rd. Attachments. Report No. 192.

ICPEAR. September 1998. *Danube Transboundary Pollution Reduction Project. Strengthening Government Environmental Agencies in Oradea/Bihor County, Romania. QA/QC Improvement in Laboratories for Environmental Pollution Control. Manual.* Report No. 193.

ICPEAR. September 1998. *Danube Transboundary Pollution Reduction Project. Strengthening Government Environmental Agencies in Oradea/Bihor County, Romania. Annex 3, QA/QC Course Support Document, 22-23 September 1998.* Report No. 194.

PROED. November 1999. *Global Environment Facility Danube Transboundary Pollution Reduction in Three Tributary Basins. Oradea, Romania, WWTP, Final Design. Volume 1 of 6, General Description.* Report No. 223.

PROED. November 1999. *Global Environment Facility Danube Transboundary Pollution Reduction in Three Tributary Basins. Oradea, Romania, WWTP, Final Design. Volume 2 of 6, Technological and Mechanical Equipment and Works.* Report No. 224.

PROED. November 1999. *Global Environment Facility Danube Transboundary Pollution Reduction in Three Tributary Basins. Oradea, Romania, WWTP, Final Design. Volume 3 of 6, Architectural and Civil Works.* Report No. 225.

PROED. November 1999. *Global Environment Facility Danube Transboundary Pollution Reduction in Three Tributary Basins. Oradea, Romania, WWTP, Final Design. Volume 4 of 6, Electrical Works and Equipment.* Report No. 226.

PROED. November 1999. *Global Environment Facility Danube Transboundary Pollution Reduction in Three Tributary Basins. Oradea, Romania, WWTP, Final Design. Volume 5 of 6, Ventilation, Sanitary, Heating and Gas Works and Equipment.* Report No. 227.

* PROED. November 1999. *Global Environment Facility Danube Transboundary Pollution Reduction in Three Tributary Basins. Oradea, Romania, WWTP, Final Design. Volume 6 of 6, Drawings.* Report No. 228.

Appendix A
LIST OF CONSULTING ENGINEERS

Consulting engineers who participated in the project are listed by country below.

HUNGARY

Vituki Innosystem – monitoring stations
Víz-inter – monitoring stations

SLOVAKIA

Water Research Institute (WRI) – monitoring stations
Bidor Bratislava – Kosice wastewater treatment plant

ROMANIA

BCEOM – industrial pollution control
PRO-ED – Oradea wastewater treatment plant
ECO-IND – environmental inspector training and industrial pollution control
Apaterm -– Oradea wastewater treatment plant
ICPEAR

Appendix B
LIST OF EQUIPMENT CONTRACTORS

Equipment contractors who participated in the project are listed by country below along with their roles in the project.

HUNGARY

CONTROLSOFT – monitoring stations

SLOVAKIA

ECN/ECO Monitoring – monitoring stations
Spel-Procont – process control systems at the Kosice wastewater treatment plant
EZ Electro Monitoring System – electrical systems at the Kosice wastewater treatment plant

ROMANIA

IFOR – process equipment at the Oradea wastewater treatment plant
s.c.Envirotech – pollution control equipment at industrial facilities

Appendix C
LETTERS OF UNDERSTANDING

Following is a sample letter of understanding executed by UAMT, an industry who received project-funded equipment.

LETTER OF UNDERSTANDING

between

METCALF & EDDY, INC.

and

UAMT S. A.

Metcalf & Eddy, Inc., acting on behalf of the U.S. Agency for International Development (USAID), and UAMT S.A., agree to cooperate in a project to reduce the emission of toxic compounds and pathogens into international waters in selected areas of the Danube River basin, where potential pathways of human exposure cross national boundaries. The project has been designed to meet Global Environment Facility (GEF) criteria for the international waters category, and was jointly developed in close cooperation with the affected countries and other international donors.

BACKGROUND

The GEF/Danube Project is funded by USAID and is an integrated program for pollution prevention and downstream protection of three international border areas and three tributary basins of the Danube River. The industrial component of the GEF/Danube Project is directed toward UAMT and six other industries in Romania as significant sources of transboundary pollution. Implementation of the GEF/Danube project is the responsibility of Metcalf and Eddy (M&E), a US based environmental engineering consultant. For execution of the industrial tasks, M&E retained a French engineering consultant, BCEOM and a local consultant ECOIND (formerly ICPEAR). All work will be performed under the general framework established in a letter of understanding (LOU) between USAID and the Romanian Ministry of Water, Forest, and Environmental Protection.

On July 13, 1999, representatives of Metcalf & Eddy, USAID and UAMT met to agree upon priority investments, cost sharing, and the best means of implementation. Priority actions were identified by UAMT and by the GEF/Danube Project. Since the meeting, Ecolnd and M&E have been discussing the implementation of the GEF/Danube Project. The details of the UAMT Agreement in Principle and the Implementation Plan are provided below.

AGREEMENT IN PRINCIPLE

ACTION No. 1: Install improved rinsing in the electroplating process to reduce wastewater flow and heavy metals. Cascade rinsing possibly coupled with disassociated sprinkling ramps will improve the quality of washing, optimize water flow and extend the life of the plating baths. The total estimated cost for this action is $25,000.

ACTION No. 2: Process automation in the electroplating process to reduce raw material consumption, wastewater flow and heavy metals. New central processing unit and robot devices, probes, pumps and software to optimize plating process. The total estimated cost for this action is $20,000.

ACTION No. 3: Provide revamped treatment scheme for proper treatment of waste streams from each plating section. Reagent preparation steps, automatic dosing and flow monitoring will increase operating flexibility and treatment efficiency. Includes maintenance of the piping system between plating tanks and the treatment plant and monitoring equipment to optimize use of fresh and recycled water in the rinsing step of the plating process. The total estimated cost for this action is $45,000.

ACTION No. 4: Investment in the highest priority laboratory equipment for improved environmental monitoring of compliance. The total estimated cost for monitoring equipment is $10,000. If the total costs

of Actions No. 1, 2 and 3 are less than $90,000 total, the amount of laboratory monitoring equipment will be increased up to a maximum of $40,000 to keep the total project cost at $100,000.

ACTION No. 5: UAMT agrees to develop an Environmental Management System (EMS) consistent with ISO 14001 including a corporate environmental policy and implementation plan to improve O&M, reduce spills/leaks and reduce use of hazardous chemicals. UAMT agrees to request an APM Compliance Schedule for actions under the GEF/Danube Project. UAMT agrees to maintain financial and environmental monitoring records and authorize representatives of M&E (or USAID) to inspect these records and site of the equipment.

The actions in the UAMT Agreement in Principle are expected to be integrated into an overall sustainable industrial environmental management program at UAMT, including waste minimization and cleaner production, a UAMT Environmental Management System and improved end of pipe treatment. The EMS requirement is addressed in the "Practical Guide for EMS Implementation" which was presented to UAMT at a meeting on September 29, 1999. This overall program is expected to be used as a demonstration model for transfer to other industries in Oradea, Bihor, and other areas in Romania. The basis for this Agreement in Principle was established for an environmental management and investment program at UAMT estimated to cost approximately $100,000 of which $70,000 would be funded by the GEF/Danube Project and $30,000 by UAMT.

IMPLEMENTATION PLAN

A major component of the GEF/Danube Project Implementation Plan is the Design-Build contract for the Wastewater Treatment Plant (WWTP) and Cleaner Production (CP) improvements. The cascade rinsing improvement will be implemented similar to the WWTP improvements after the BCEOM scope of work is completed. UAMT will be responsible for contracting for the process automation equipment (Action No. 2). Laboratory equipment will be procured in a separate contract after the costs and contract requirements for the WWTP are known. Laboratory equipment and the UAMT and M&E (USAID) cost sharing allocations may be adjusted based on the WWTP bids received. There are five phases of the WWTP implementation plan: (1) Agreement Signing; (2) Contract Bidding; (3) Contract Negotiation; (4) Construction; and (5) Operation and Transfer. These phases are described below:

AGREEMENT SIGNING: A meeting between M&E and UAMT is expected in early November, 1999 to formally sign the agreement on cost sharing and approach to project implementation. These needs and cost estimates will be assigned to M&E (USAID) and to UAMT under the cost sharing provision in the Agreement in Principle. UAMT agrees to directly implement Action No. 2, Process Automation. Should additional funding from UAMT be needed to reach the cost sharing requirements, additional funding from UAMT will be provided for either laboratory equipment procurement or for WWTP or cascade rinsing improvements. If UAMT chooses to participate in the WWTP or cascade rinsing improvements, then they must agree to have their share of the work implemented by a single general contractor selected through a competitive bidding process. The UAMT needs which will be part of the design build procurement package include equipment, engineering and installation of (1) cascade rinsing facilities; (2) G I WWTP improvements; and (3) G II WWTP improvements.

CONTRACT BIDDING: M&E will issue a Bid Document for a Design-Build Contract covering all WWTP and CP (e.g. cascade rinsing improvements). Bids will be requested from at least three qualified general contractors. Descriptions of work will cover all WWTP and CP improvements at all five industries (USAID funds and industry funds from UAMT, PETROM, PETROLSUB, PIGMENTI, and CHIMPROD). The Bid Document will also include USAID and M&E contract requirements. The general contractors will be expected to visit each company during this step to help prepare their bids. The goal of a single bid document is lower price and reduced cost for each component. The general contractors will provide a fixed price estimate for the total design, equipment procurement, construction, start-up and testing of the WWTP improvements at all the industries. Bids will include detailed cost estimates (schedule of values) which will allow the work to be subdivided later between industry and M&E (USAID) funded portions of the work. M&E will review all bids and make a recommendation to USAID for selection of a preferred general contractor to begin negotiations. Depending on the results of the bids, M&E may choose to make scope alterations and then request "Best and Final" offers from selected bidders. Completion of the bidding phase

will normally require 6 - 8 weeks.

CONTRACT NEGOTIATION: After successful negotiations, M&E will enter into a single contract with the selected general contractor (winning bidder) for specific portions of the work covering UAMT and work at the other industries. Each industry will also enter into a contract with the selected general contractor for the remainder of the work covered by the description of work. Using the financial breakdown in the bids, M&E will subdivide the general contractor's work into industry funded and M&E (USAID) funded contract packages. M&E's goal in subdividing the work between M&E (USAID) and the industries is to preserve the financial allocations established in the Agreement in Principle and to preserve as much sub-project independence as possible. Although work will be implemented by the same general contractor, work will be paid for by two different contracts, one by M&E and one by UAMT. M&E (USAID) and UAMT work will be coordinated, but will not be dependent on each other.

CONSTRUCTION PHASE: The general contractor holding the contracts at each industrial site will proceed with designing, constructing, testing, start-up, and training of WWTP improvements. Contracts with M&E (USAID) funds will be completed under the supervision of M&E and contracts between the general contractor and UAMT will be managed by UAMT. Work will be coordinated, but close-out will not be dependent on each other. This phase is followed by OPERATION AND TRANSFER of equipment to UAMT.

Details of the contract implementation plan for the cascade rinsing improvement will be completed after the BCEOM scope of work is complete. UAMT will be responsible for contracting for the process automation equipment (Action No. 2). Laboratory equipment will be procured in a separate contract after the costs and contract requirements for the WWTP are known. Laboratory equipment and the UAMT and M&E (USAID) cost sharing allocations may be adjusted based on the WWTP bids received. UAMT and M&E (USAID) enter this cost sharing Agreement in Principle in good faith to implement capital investments and environmental management activities that will reduce transboundary pollution. We expect to complete implementation of all actions by September 18, 2000 when the GEF/Danube Project ends.

RECORDS, AUDIT AND INSPECTION

UAMT shall maintain or cause to have maintained, as appropriate, records relating to the assistance that are adequate to show use and receipt of assistance furnished pursuant to this Letter of Understanding. Records shall be maintained for a period of three years after all of assistance has been furnished. UAMT shall afford authorized representatives of M&E or USAID, or their designees, the opportunity at all reasonable times to inspect the site of the assistance and the records relating to the assistance.

SUSPENSION AND TERMINATION

In the event that M&E determines that UAMT is not making sufficient progress on meeting the commitments outlines in this letter, M&E may take steps to suspend provision of assistance, and may reprogram funds for other USAID projects in Romania. If M&E determines, moreover, that the cause or causes for suspension have not been corrected, M&E may terminate assistance and provide written notice of its action to UAMT.

Either party may terminate this agreement in whole or in part, by giving the other party ninety (90) days written notice. In the event of partial termination, such notice shall specify affected activities.

AUTHORIZED REPRESENTATIVES

The parties shall be represented by those persons holding or acting in the capacities held by the signatories to this Letter of Understanding. Each party may, by written notice to the other, identify additional representatives who are authorized to represent that party for all purposes other than executing formal amendments to this Letter of Understanding. Each party shall notify the other, in writing, of such changes or additions in its authorized representatives.

SIGNATURE

This document is effective this 3 day of November 1999.

APPROVAL OF AGREEMENT IN PRINCIPLE AND IMPLEMENTATION PLAN

POP VASILE		03. Nov. 1999
PRINT NAME OF UAMT REPRESENTATIVE	UAMT SIGNATURE	DATE
Brian Harrington		11/3/99
PRINT NAME OF M&E REPRESENTATIVE	M&E SIGNATURE	DATE

Appendix D
EQUIPMENT TRANSFER AGREEMENTS

Following are sample agreements showing transfer of title to organizations that received project-funded equipment.

TRANSBOUNDARY POLLUTUION REDUCTION
In the THREE DANUBE TRIBUTARY BASINS PROJECT

TRANSFER OF TITLE AGREEMENT

Metcalf & Eddy, the Contractor, under USAID Contract No. DHR-C-00-95-00080, and the U.S. Agency for International Development, USAID, hereby agree to the transfer of title of the equipment/systems listed in Attachment I to the Recipient identified below. In accepting title to said equipment/systems, the Recipient agrees to the terms and conditions set forth in Attachment II governing the use and care of said equipment/systems.

Name of Recipient: Kosice Wastewater Treatment Plant
Telephone No.: 095/63 396 50
Facsimile No.: 095/63 373 00
E-Mail Address: _____
Purpose of Equipment/Systems: Electrical system improvements for activated sludge tank, secondary settling tank, treatment plant and blower plant areas.

Transfer Record No. 251349-1
Date of Transfer: 03/16/2001

This agreement has been signed by all parties and is effective on the sixteenth day of March, 2001.

FOR THE MINISTRY OF ENVIRONMENT OF THE SLOVAK REPUBLIC

_____ Date: 26 February 2001
Milan Matuška
Director, Water Protection Department

_____ Date: _____
Ladislav Mihalko
Východoslovenské vodárne a kanalizácie š.p.

_____ Date: 2/21/01
Brian Harrington
Sr. Project Manager
Metcalf & Eddy, Inc.

ATTACHMENT I

TRANSBOUNDARY POLLUTUION REDUCTION
In the THREE DANUBE TRIBUTARY BASINS PROJECT

TRANSFER OF TITLE AGREEMENT

EQUIPMENT/SYSTEMS TITLE TRANSFER RECORD

Contract No. DHR-C-00-95-00080-00 Transfer Record Nos. 251349-1
Responsible Representative: Ing. Ladislav Mihalko
Address of Recipient: Východoslovenské vodárne a kanalizácie š.p., Komenského 50, 042 48 Kosice, Slovakia
Telephone No.: 095/63 396 50
Facsimile No.: 095/63 373 00
E-Mail Address: _____

LIST OF EQUIPMENT/SYSTEMS TRANSFERRED:

1. Electrical improvements to Activated Sludge tanks inclusive of: machines and equipment; and installation and associated materials. Value US$85,985.68.
2. Electrical improvements to Secondary Settling tanks inclusive of: machines and equipment; and installation and associated materials. Value US$8,566.05.
3. Electrical improvements to Treatment Plant of Activated Sludge inclusive of: machines and equipment; and installation and associated materials. Value US$24,623.13.
4. Electrical improvements to Blower Plant inclusive of: machines and equipment; and installation and associated materials. Value US $44,973.59.
5. Improvements to Biological Treatment Unit inclusive of: field instrumentation; field instrument installation; field instrument start-up; no-load tests; cabling; installation material; accessory material from cabling and installation; loss of wiring from cabling; user manuals and documentation; electrical inspections according to Slovak Standard STN; and preliminary tests. Value US$71,286.00.
6. Improvements to Transformer Station inclusive of: machines and equipment; and installation and associated materials. Value US$165,225.00.
7. Improvements to Outer Cable Distribution Systems inclusive of: machines and equipment; and installation and associated materials. Value US$153,662.96.

TOTAL CUMULATIVE VALUE US$554,322.41.

**Note that other services rendered including program management, transport, training and performance guarantee, valued at US$50 802.60, were performed by subcontractor EZ-Elektrosystémy Bratislava a.s. When the value of these other services is added to the transferred equipment/system value, they yield the total subcontracted value of US$605,125.01 issued to EZ-Elektrosystémy Bratislava a.s.

It is agreed that the above list of equipment/systems shall be transferred to the Recipient within 30 calendar days of a signed Transfer of Title Agreement by all parties:

ATTACHMENT II

TRANSBOUNDARY POLLUTUION REDUCTION
In the THREE DANUBE TRIBUTARY BASINS PROJECT

TRANSFER OF TITLE AGREEMENT
TERMS AND CONDITIONS

Contract No. DHR-C-00-95-00080-00 Transfer Record No. 251349-1
Name of Recipient: Kosice Wastewater Treatment Plant
Responsible Representative: Ing. Ladislav Mihalko
Address of Recipient: Východoslovenské vodárne a kanalizácie š.p., Komenského 50, 042 48 Kosice, Slovakia
Telephone No.: 095/63 396 50
Facsimile No.: 095/63 373 00
E-Mail Address: _____

The Recipient hereby agrees to the following terms and conditions governing the use and care of the equipment/systems listed and described in Attachment I to the Transfer of Title Agreement. Specifically, the Recipient agrees to:

1. Utilize equipment/systems only for the purposes stated in the Agreement;

2. Exercise appropriate care in the use and maintenance of equipment/systems;

3. Take all steps necessary to safeguard equipment/systems from theft, misuse, and factors which might cause damage or excessive wear to equipment/systems;

4. Neither sell, trade or otherwise dispose of the equipment/systems without the prior written consent of USAID/Washington; and

5. As deemed appropriate, acknowledge the donation of this equipment/systems by the United States Agency for International Development. Such acknowledgement shall include prominent display of the USAID emblem.

6. Take title to the equipment/systems in an "as is" condition and indemnify USAID and its Contractor, Metcalf & Eddy, for all contract tort or injury claims arising out of the use and care of such equipment/systems.

7. Recipient agrees to bear responsibility for obtaining any licenses, permits and insurance required for the ownership and use of such equipment/systems.

TRANSBOUNDARY POLLUTUION REDUCTION
In the THREE DANUBE TRIBUTARY BASINS PROJECT

TRANSFER OF TITLE AGREEMENT

Metcalf & Eddy, the Contractor, under USAID Contract No. DHR-C-00-95-00080, and the U.S. Agency for International Development, USAID, hereby agree to the transfer of title of the equipment/systems listed in Attachment I to the Recipient identified below. In accepting title to said equipment/systems, the Recipient agrees to the terms and conditions set forth in Attachment II governing the use and care of said equipment/systems.

Name of Recipient: Kosice Wastewater Treatment Plant, Východoslvenské vodárne a kanalizácie š.p.
Telephone No.: 095/63 396 50
Facsimile No.: 095/63 373 00
E-Mail Address: _____
Purpose of Equipment/Systems: Computer Process Control System

Transfer Record No. 180328-1
Date of Transfer: 03/16/2001

This agreement has been signed by all parties and is effective on the sixteenth day of March, 2001.

FOR THE MINISTRY OF ENVIRONMENT OF THE SLOVAK REPUBLIC

_____ Date: 26 February 2001
Milan Matuška
Director, Water Protection Department

_____ Date: _____
Ladislav Mihalko
Východoslovenské vodárne a kanalizácie š.p.

_____ Date: 2/21/01
Brian Harrington
Sr. Project Manager
Metcalf & Eddy, Inc.

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ATTACHMENT I

TRANSBOUNDARY POLLUTUION REDUCTION
In the THREE DANUBE TRIBUTARY BASINS PROJECT

TRANSFER OF TITLE AGREEMENT

EQUIPMENT/SYSTEMS TITLE TRANSFER RECORD

Contract No. DHR-C-00-95-00080-00 Transfer Record Nos. 180328-1
Responsible Representative: Ing. Ladislav Mihalko
Address of Recipient: Východoslvenské vodárne a kanalizácie š.p., Komenského 50, 042 48 Košice, Slovakia
Telephone No.: 095/63 396 50
Facsimile No.: 095/63 373 00
E-Mail Address: _____

LIST OF EQUIPMENT/SYSTEMS TRANSFERRED:

Division 13-Special Construction

1. Process Station Equipment inclusive of: storage area process station PLC; biological area process station PLC; and mechanical area process station PLC. Value US$171,470.00.
2. Work Station Equipment inclusive of: dispatching center; sludge and gas workstations; engineers center workstation; and laboratory workstation. Value US$65,850.00.
3. Standard Software inclusive of: dispatching center; sludge and gas workstations; engineers center workstation; laboratory workstation; and PLC programming software. Value US$90,600.00.
4. User Software inclusive of: storage area process station PLC; biological area process station PLC; and mechanical area process station PLC; dispatching center; sludge and gas workstations; engineers center workstation; and laboratory workstation. Value US$102,030.00.
5. Spare Parts, value US$16,200.00.
6. Operation and maintenance manuals inclusive of: storage area; biological area; and mechanical area. Value US$10,830.00.

Division 16-Electrical

7. Electrical Services inclusive of: storage area instrument wiring; biological area instrument wiring; mechanical area instrument wiring; and fiber optic lines. Value US$58,750.00.

TOTAL CUMULATIVE VALUE US$515,730.00.

**Note that other services rendered including mobilization, start-up and training, valued at US$68,270.00, were performed by subcontractor Spel-Procont. When the value of these other services is added to the transferred equipment/system value, they yield the total subcontracted value of US$584,000.00 issued to Spel-Procont.

It is agreed that the above list of equipment/systems shall be transferred to the Recipient within 30 calendar days of a signed Transfer of Title Agreement by all parties.

ATTACHMENT II

TRANSBOUNDARY POLLUTUION REDUCTION
In the THREE DANUBE TRIBUTARY BASINS PROJECT

TRANSFER OF TITLE AGREEMENT
TERMS AND CONDITIONS

Contract No. DHR-C-00-95-00080-00 Transfer Record No. 180328-1
Name of Recipient: Kosice Wastewater Treatment Plant
Responsible Representative: Ing. Ladislav Mihalko
Address of Recipient: Východoslvenské vodárne a kanalizácie š.p., Komenského 50, 042 48 Košice, Slovakia
Telephone No.: 095/63 396 50
Facsimile No.: 095/63 373 00
E-Mail Address: _____

The Recipient hereby agrees to the following terms and conditions governing the use and care of the equipment/systems listed and described in Attachment I to the Transfer of Title Agreement. Specifically, the Recipient agrees to:

1. Utilize equipment/systems only for the purposes stated in the Agreement;

2. Exercise appropriate care in the use and maintenance of equipment/systems;

3. Take all steps necessary to safeguard equipment/systems from theft, misuse, and factors which might cause damage or excessive wear to equipment/systems;

4. Neither sell, trade or otherwise dispose of the equipment/systems without the prior written consent of USAID/Washington; and

5. As deemed appropriate, acknowledge the donation of this equipment/systems by the United States Agency for International Development. Such acknowledgement shall include prominent display of the USAID emblem.

6. Take title to the equipment/systems in an "as is" condition and indemnify USAID and its Contractor, Metcalf & Eddy, for all contract tort or injury claims arising out of the use and care of such equipment/systems.

7. Recipient agrees to bear responsibility for obtaining any licenses, permits and insurance required for the ownership and use of such equipment/systems.

Appendix E
AGENDAS FOR FINAL PROJECT WORKSHOPS

Following are the invitations and agendas for the final project workshops in Hungary, Slovakia, and Romania.

Report on the Workshop
DANUBE EMERGENCY RESPONSE
21-22 March, 2000
held in Miskolc & Hernádszurdok

1. Objective

The Workshop was originally aiming at the defensive actions of the competent Hungarian organizations in case of emergency situations alarmed by the automatic water quality monitoring stations established by US AID assistance and by the contribution of the Hungarian Government.

This objective was underlined by the catastrophic water pollutions in the Tisza-Szamos catchment in February-March 2000 caused by Romanian mining companies.

2. Focal issues of the Workshop (see also the Final Program attached)

Though the two-days program outlines the major topics of the Workshop the focal points on the basis of the discussions might be described as follows.

2.1. Integration of the 3 monitoring stations (built at the border sections of Hernád, Szamos and Berettyó rivers) into the System of Accidental Emergency Warning (AEPWS) established in the Danube Basin in 1997 in the scope of the Danube countries cooperation under the flag of the European Union (ICPDR, formerly known as Program Coordination Unit, Vienna).

2.2. The cyanide and heavy metal contamination effect to the Hungarian-Romanian cooperation.

2.3. **The official alert routine** between the neighbours.

2.4. **Prevention methods** against accidental pollution in the upstream countries of Slovakia and Romania.

2.5. **Visiting the Hernádszurdok monitoring station**

2.6. **The set of equipment** in the 3 stations with emphasis on the toxicity measurement and the levels of emergency.

3. Remarks to the Focal Points

The summary of the presentations and discussions in the scope of above issues are given in the above sequence of point 2.

ad 2.1. The participants of AWPWS Expert Group outlined the warning system extending to the total Danube Basin. There are centres so called "PIAC" supplied with serial numbers in the Danube countries. The Hungarian one is PIAC-05 and it is in Budapest within the premises of VITUKI Plc. These centres communicate with the ICPDR in Vienna and with the neighbouring ones concerned in case of emergency situation. The local sub-centres are in the 12 Environmental Inspectorates belonging to the Ministry of Environment in Hungary. The problem raised in the discussion was in connection with the way of communication between the Inspectorates and the PIAC-05. The newly built 3 automatic monitoring stations are equipped with proper telecommunication means to the Inspectorates and to the Water Directorates, however, the flow of information from the Inspectorates to the PIAC-05 is by "conservative" means only, that is by telex, fax or e-mail, while the Water Directorates (responsible for defence actions in case of emergency) are electronically interconnected with the PIAC-05 (hydrological data flow). In the near future the Ministry of Environment should help to establish a similar telecommunication for the Inspectorates. This is a question of software and some hardware procurement with a value of a few hundred thousand Forints.

ad 2.2. The Romanian cyanide contamination of the Szamos and Tisza rivers in February 2000 had a catastrophic effect to the ecosystem of the rivers. For the Tisza it started from the

confluence with the Szamos. The upper section of the Tisza above the confluence saved from contamination, then a heavy metal (most dangerously lead!) shock wave arriving in early March from Romania, through Ukraine it was polluted, as well.

The cyanide contamination flew through as a plug of several 10 kms and killed the biota of the river along its route. Several ten thousand tons of fish cadavers were removed from the river surface, however, the worst devastating effect was the killing of the planktonic and benthic life leaving no food resources for the remaining or immigrating fish population. The Csenger monitoring station was under trial operation in February-March and the chlorophyll-a measuring equipment could not sense the least quantity of algae in the river after the catastrophe.

The heavy metal shock arrived to Hungary with a simultaneous flood-wave and the contaminated suspended solids were spread to the flood-plain between the dykes of the river, as well. Though the flood caused significant dilution to the pollution jet, it is not known how much metals (zinc, copper, lead, etc) settled to the river bed and its surroundings resulting in retarded toxic effects at a later period.

The Romanian experts acknowledged that the mining conditions (gold mine in case of the cyanide release and mining other metals in the second case) were poor mainly because of the improper construction of the dykes of the slurry reservoirs and their government launched an exploratory investigation on the potential pollution sources for setting a data-bank of those. It should be mentioned that the emergency warning through phone connection from Romania to Hungary was duly done and this way the local agencies had been in advanced alert before the arrival of the contamination.

The Romanian expert pointed out that similar automatic monitoring system should be established on their own river sections in different areal distribution as it was in Hungary.

In connection of above events the question emerged what could have been done in Hungary as an emergency response? It was clear that beyond alerting the water intake works, **nothing**. Because of the fact that both the Szamos and the Tisza are great rivers (at the time of the catastrophe with a flow of several hundred m^3 per second) it was absolutely impossible to

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exert any protective measure. Against similar situations the only possible protection is the **prevention**.

In connection of the above emergency cases the participants raised the question of supplying the 3 stations with heavy metals and toxicity measuring equipment. This topic is dealt with later.

ad 2.3. As far as the emergency alert system in the scope of the bilateral agreements is concerned between Hungary and Slovakia this has been laid down. With Romania the accidental water pollution issue has not been previously properly included into the agreement, and it is now under re-negotiation. The latest catastrophic accidents will certainly speed up the legal procedure. It is strange that in contrast to the PIAC-system of the Danube Basin, such a legal-act has been missing.

ad 2.4. As to the prevention of accidental events in Romania, the possible measures were partly mentioned under point 2.2. It should be added that Romania is an absolute upstream country of this part of Europe situated at the top of the Carpathian range. In the framework of the US AID project of Transboundary Pollution Reduction wastewater treatment investment is assisted in the catchment area of the Cris/Körös river system. There is an exploratory study underway in the Maros river valley, as well, aiming at the reduction of pollution of the significant subsurface aquifer utilizing for drinking water supply in South-eastern Hungary.

In Slovakia, once again, in the scope of the common US AID project the main potential polluter of the Hernád river, the Kosice/Kassa wastewater treatment plants are assisted by accessories for upgrading those plants. Simultaneously on the Uh/Ung river, (a tributary of the Tisza) automatic monitoring station has been established at the Slovak-Ukrainian border, where frequent oil pollution was observed in the past years. The structure and equipment of this station was reviewed in the workshop, however, the efficiency of sensing surface oil slick raised some doubts among the participants.

As far as the Hungarian-Slovak common rivers are concerned in Northern Hungary, on the Sajó and Bodrog rivers further actions are waiting. On the Slovak part the prevention of pollution and on the Hungarian part establishing automatic monitoring stations are among the further tasks.

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ad 2.5. The Hernádszurdok monitoring station near the Slovak border on the Hernád river was examined mainly in respect of water intake structure, surface oil sensing and data transmitting. The impression among the participants was positive. No objection was raised in any respects. The reliability of the adapted system is underlined by the similar one in the Zala river being in operation since 1998.

ad 2.6. As pointed out under point 2.2. an interesting issue was the automatic toxicity measurement in the stations. The German supplier of the chlorophyll sensing equipment explained that this (mounted in all 3 stations) is capable to make alert in case of toxic effect in the water. Two participants, the biologist of Miskolc Inspectorate and Mr. Pintér of AEPWS Expert Group expressed the necessity of establishing the Daphnia test apparatus. No support arrived to this idea from the participants of the Inspectorates. They are aware of the cumbersome operation of such an expensive equipment. Consequently no decision was taken as to the future of Daphnia tests.

Direct cyanide measuring equipment was also discussed and the Slovak expert presented the description of such an equipment. The Hungarian suppliers received an Australian offer, as well, however, much more expensive (40 000 USD) than the Slovak one. No decision was made to install later this apparatus to the stations.

April 3, 2000

Dr. Pál Benedek
project coordinator

DANUBE EMERGENCY RESPONSE
AGENDA FOR TRAINING WORKSHOP

Final program

TIME	ITEM	SPEAKER
March 21		
9^{30}-9^{45}	1. INTRODUCTION	Mr.Csaba Kupas, US Ambassy
	• KEYNOTE SPEAKERS	Mr. Gyula Dankó, representing the Ministry of Environment
	• OBJECTIVES OF WORKSHOP	Mr.Brian Harrington, Metcalf&Eddy Inc.
9^{45}-10^{30}	2. OVERVIEW OF TRANSBOUNDARY POLLUTION PREVENTION	
	• OBJECTIVES	Mr. Gyula Dankó, Director, Miskolc Inspectorate
	• BILATERAL AGREEMENTS	Ms.Rozália Kisgyörgy on behalf of Mr. László Balázs, Ministry of Environment
	• ROLE OF ICPDR IN THE DANUBE BASIN	Mr. Igor Liska – Water Management Quality ICPDR
	• THE DANUBE ACCIDENT EMERGENCY WARNING SYSTEM	Mr. György Pinter, AEPWS Expert Group
	• EXAMPLES OF EMERGENCIES ELSEWHERE	
	- Szamos and Tisza River Poisoning	Ms. Kornélia G. Kocsis, Deputy Director Nyiregyháza, Inspectorate
	- Zala River Stations in Hungary	Mr. Miklós Berzsenyi, Director, Controlsoft
	- Uh Station in Slovakia	Mr. Svetozar Luther, Mr. Juraj Kaprinay, WRI, Slovakia
10^{30}-10^{45}	*Coffee Break*	
10^{45}-11^{30}	3. HOW THE SYSTEM IS INTENDED TO WORK	
	• INTERNATIONAL NOTIFICATION & COOPERATION	Mr. Aurel Varduca, AEPWS Expert Group Mr. Septimius Mara, PIAC Expert, Romania
	• LOCAL RESPONSE	Mr. Ferenc Papp, Chief Engineer, VIZINTER
	• HYDROLOGICAL DATA TRANSFER AND STORAGE	Mr. Péter Bartha, Deputy Director, VITUKI Plc.
11^{30}-12^{00}	*Discussion*	
12^{15}-13^{45}	*Lunch*	

TIME	ITEM	SPEAKER
14^{00}-14^{45}	4. SAMPLING & MONITORING STATIONS • WHERE THEY ARE • WHAT THEY DO	Mr. Pál Benedek, Mr. Szilárd Kovács, Mr. Christian Moldaenke (Germany), Designers and Suppliers
14^{45}-15^{30}	5. WHEN AN EMERGENCY OCCURS • NATIONAL LAWS & REGULATIONS - Methods of Response - Categories of Emergency • LOCAL LEVEL - Contain/Abate/Remediate - Community/Downstream User Awareness so They Can Take Protective Action	Mr. József Horváth chief counselor, Ministry of Environment Mr. Tamás Feibermann, Deputy Director, Miskolc, Water Directorate
15^{30}-16^{00}	*Coffee Break*	
16^{00}-17^{00}	*Discussion*	
18^{30}-19^{30}	*Buffet - reception*	
March 22		
	6. BUS TRIP TO HERNÁDSZURDOK MONITORING STATION	
8^{30}	Bus starts from Miskolc	
9^{30}	Arrival at Hernádszurkok	
9^{45}-10^{45}	Presentation of technical details	Mr. Miklós Berzsenyi, Mr. Szilárd Kovács, Mr. István Kurek, Contractors for Building and Installation
10^{45}-11^{15}	Questions and Discussion	
11^{15}-12^{15}	Return to Miskolc	
12^{30}-13^{45}	Lunch	
14^{00}-15^{00}	7. LOCAL EMERGENCY RESPONSE PLANS	Ms. Annamária Konecsny, Nyíregyháza Ms. Tímea Porkoláb, Debrecen Ms. Ferencné Vasas, Gyula Mr. Endre Fekete, Szeged

TIME	ITEM	SPEAKER
	• LIKELY SOURCES & TYPES OF POLLUTION • STATION LOCATIONS & INFORMATION • ENDANGERED USERS – WHO ARE THEY?	
15^{00}-15^{15}	*Coffee Break*	
15^{15}-15^{45}	Continuation of item 7 • IDENTIFYING THE EMERGENCY • RESPONSE TO CONTAIN/ABATE • REPORTING	
15^{45}-16^{15}	8. NEXT STEPS	Representatives of the Ministry of Environment and the Inspectorates
16^{15}-16^{30}	9/ CONCLUDING REMARKS	Mr. Brian Harrington, Metcalf&Eddy Inc.

A Workshop magyar résztvevői / List of Hungarian participants of the Workshop

S.sz.	Név	Munkahely
1	Altrédi István	Észak-Magyarországi KÖFE
2	Ambrus Enikő	Magyar Humánökológus Társaság
3	Augusztiné Cseke Mária	Felső-Tisza-vidéki KÖFE
4	Balázs D. Oszkár Dr.	Észak-Magyarországi KÖFE
5	Balázs Tamásné	Észak-Magyarországi KÖFE
6	Bartha Péter	VITUKI Rt.
7	Benedek Pál Dr.	VITUKI Innosystem Kft.
8	Berzsenyi Miklós	Controlsoft Automatika Kft.
9	Berzsenyi Miklós ifj.	Controlsoft Automatika Kft.
10	Csapó Józsefné	Debreceni Lycium Kör
11	Csercsa Attila	Tiszántúli KÖFE
12	Dankó Gyula	Észak-Magyarországi KÖFE
13	Debreczeni Károlyné	VITUKI Rt.
14	Demeter Antalné	Tiszántúli KÖFE
15	Demeter Zoltán	Zöld Akció Egyesület
16	Dolgos Gergely	Dél-Dunántúli KÖFE
17	Domahidy László	Országos Vízügyi Főigazgatóság
18	Fekete Endre Dr.	Alsó-Tisza-vidéki VIZIG
19	Felbermann Tamás	Észak-Magyarországi VIZIG
20	Fenyvesiné Dr. Szatmáry Erzsébet	B-A-Z megyei Önkormányzat
21	Gál Ágnes	SAVITERV Kft.
22	Gilyénné Hofer Alice Dr.	Környezetgazdálkodási Intézet
23	Gonda Ferencné	B-A-Z megyei Önkormányzat
24	Gulyás Zoltán	Észak-Magyarországi VIZIG
25	Gyarmathi Mihály	B-A-Z megyei Önkormányzat
26	Halászné Bartus Katalin	Észak-Magyarországi KÖFE
27	Harangi János	Körös-vidéki KÖFE
28	Horváth József Dr.	Környezetvédelmi Minisztérium
29	Iván Zoltán	B-A-Z megyei Önkormányzat
30	Kisgyörgy Rozália	Környezetvédelmi Minisztérium
31	Kiss József	Holocén Természetv. Egyesület
32	Kocsis Gáborné Dr.	Felső-Tisza-vidéki KÖFE
33	Konecsny Annamária	Felső-Tisza-vidéki VIZIG
34	Kovács Szilárd	AQUACONTROL Kft.
35	Kukli Emma Dr.	ÁNTSZ H-B. m. Intézete
36	Kurek István	Kurek Bt.

37	Laczkó Lászlóné	B-A-Z megyei Önkormányzat
38	Lenártek András	B-A-Z megyei Önkormányzat
39	Major Veronika Dr.	VITUKI Innosystem Kft.
40	Marek Miklós	Zöld Kereszt
41	Merényi Gyula	Észak-Magyarországi KÖFE
42	Nohse Katalin	Katalin Nohse Srl.
43	Orosz Tamás	Magyar Humánökológus Társaság
44	Pádár István Dr.	Tiszántúli KÖFE
45	Papp Ferenc	VÍZ-INTER Mérnökiroda Kft.
46	Pintér György Dr.	AEPWS
47	Porkoláb Tímea	Tiszántúli VIZIG
48	Raisz Gyula	Észak-Magyarországi KÖFE
49	Rippl Lajos	Dél-Dunántúli KÖFE
50	Sallai Ferenc	Észak-Magyarországi KÖFE
51	Simándi Anita	Észak-Magyarországi VIZIG
52	Szabó Levente	Katalin Nohse Srl.
53	Szöllösi Ferenc	Tiszántúli VIZIG
54	Szövényi Eszter	Környezetvédelmi Minisztérium
55	Tarján Tibor	Országos Vízügyi Főigazgatóság
56	Tóth Erika	Észak-Magyarországi VIZIG
57	Váncsa András Lajos Dr.	Észak-Magyarországi VIZIG
58	Váncsa Andrásné Dr.	Észak-Magyarországi KÖFE
59	Vasas Ferencné Dr.	Körös-vidéki VIZIG
60	Vilimi László	Észak-Magyarországi Reg. Vízm. Rt.

A Workshop külföldi résztvevői / List of foreign participants of the Workshop

	Name	Country / Organization
1	Mr. Csaba Kupas	US Embassy
2	Mr. Brian Harrington	USA
3	Mr. Loren Schultze	US A.I.D.
4	Mr. Aurel Varduca	AEPWS
5	Mr. Igor Liska	ICPDR
6	Mr. Christian Moldaenke	Germany
7	Mr. Daniel Gesbacher	Slovakia
8	Mr. Juray Kaprinay	Slovakia
9	Mr. Novak	Slovakia
10	Mr. Svetozar Luther	Slovakia
11	Ms. Dorkovicova	Slovakia
12	Mr. G. Fürtös	Romania
13	Mr. Gavril Lendeszki	Romania
14	Mr. I. Ciursas	Romania
15	Mr. Miklos Arpad Atilla	Romania
16	Mr. N. Pacala	Romania
17	Mr. Septimius Mara	Romania
18	Ms. Ane-Marie Ciurea	Romania
19	Ms. Fulvioara Cojocaru	Romania

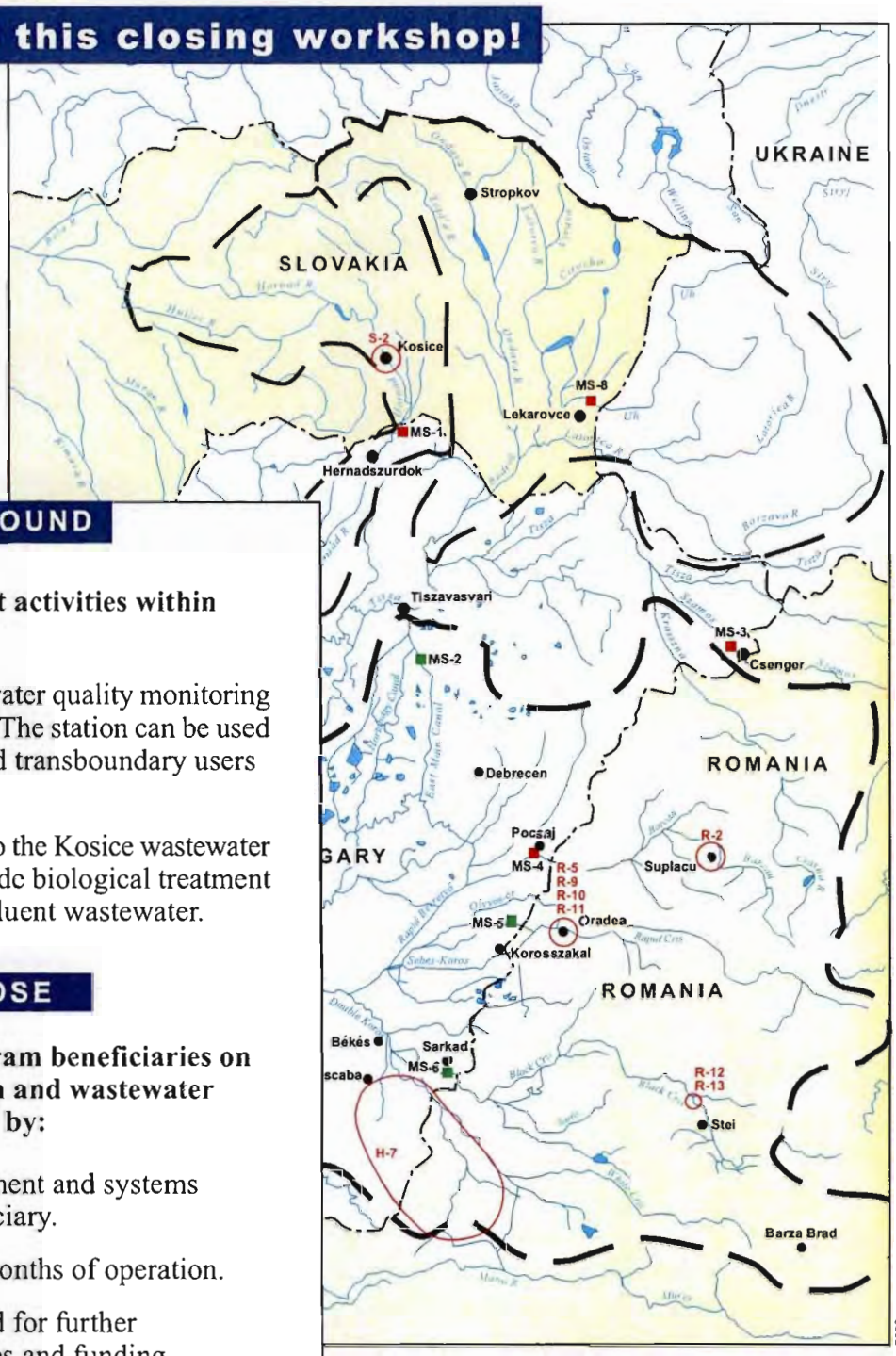
Danube Transboundary Pollution Reduction Project

Program Closing Workshop-Slovakia

Please attend this closing workshop!

September 7, 2001

Hotel Slovan,
Hlavna 1
Kosice, Slovakia
9:30am to 3:00pm
Tel:00421/55 6221 196
Fax:00421/55 6228 413



BACKGROUND

The GEF/Danube project activities within Slovakia included:

- Building an automatic water quality monitoring station on the Uh River. The station can be used to alert downstream and transboundary users of pollution.
- Making improvements to the Kosice wastewater treatment plant to provide biological treatment for all of the plant's influent wastewater.

PURPOSE

Feedback from the program beneficiaries on environmental protection and wastewater treatment improvements by:

- Discussion of the equipment and systems installed at each beneficiary.
- Test results after eight months of operation.
- Any future work planned for further improvements, estimates and funding.
- Technical and financial problems encountered.
- Lessons learned along the program development.

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PRELIMINARY AGENDA

Global Environmental Facility USAID/GEF
Danube Transboundary Pollution Reduction Project

9.30-9.45	Opening remarks - Mayor of Kosice, USAID
9.45-10.15	Review of Project Activities and Accomplishments - M&E; Introductions of Attendees
10.15-10.30	WRI report on Uh River Station planning & design
10.30-11.00	ECM-ECO Monitoring report on Uh River Station design
11.00-11.30	SHMU report on Uh River Station Operation.
11.30-12.00	Coffee break
12.00-12.30	BIDOR presentation on Kosice WWTP design challenges
12.30-12.45	Spel-Procont presentation
12.45-13.00	EZ Elektrosystemy presentation
13.00-13.30	VVak presentation
13.30-14.00	Slovak Ministry of the Environment representative conclusions
14.00-14.30	Open discussion
14.30-14.45	M&E conclusions
14.45-15.00	USAID closing remarks

15.00 USAID-hosted dinner to follow

INVITEES

Representatives from the following authorities, beneficiary of the USAID program and Media

- Slovak Ministry of the Environment
- Eastern Slovak Water Authority (VVAK)
- Slovak Hydrometeological Institute
- Kosice Mayor's Office.
- USAID Washington and Bratislava
- Kosice Wastewater Treatment Plant
- Spel-Procont (M&E subcontractor)
- ECM-ECO Monitoring (M&E subcontractor).
- EZ Elektrosystemy Bratislava (M&E subcontractor)
- Water Research Institute (M&E subcontractor)
- BIDOR (M&E subcontractor)
- Invitees from Hungary
- Invitees from the related program in Romania

- Joachim Bendow, Executive Secretary, ICPDR, Vienna
- ICDPR Delegate from Romania
- ICDPR Delegate from Hungary
- ICDPR Delegate from Slovakia
- Regional Environmental Center, Hungary Representative
- GEF/UNDP, NY
- UNIDO Vienna
- UNEP/GPA
- Danube Environ Forum
- World Bank
- World Wildlife Fund

SPONSORSHIP

Hosted by Metcalf & Eddy and the United States Agency for International Development (USAID)

REGISTRATION

Please favor us with a response by 15 August 2001

Danube Transboundary Pollution Reduction Project-Slovakia Program Closing Workshop

2 Ways to Register: E-mail the following information to: maria_napoli@metcalfeddy.com or fax this form to: 781-245-0823

Name

Company Name & Address

City State/Province Country Zip

Phone Fax E-mail

☐ I am unable to attend but please send me information

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AGENDA

Global Environmental Facility USAID/GEF
Danube Transboundary Pollution Reduction Project

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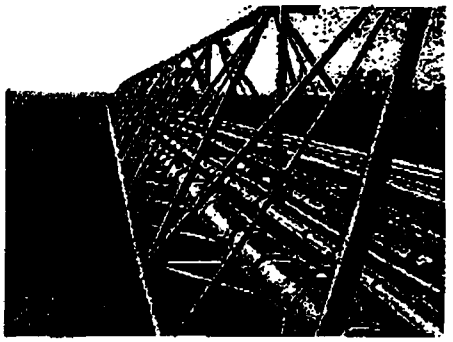

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ATTENDEES AT GEF/DANUBE WORKSHOP, KOSICE, SLOVAKIA SEPTEMBER 7, 2001

No.	Name	Organization	Telephone
1	Mohammad Latif	USAID, Washington, D.C.	202-712-5091
2	Gerald Gold	USAID, Washington, DC	202-712-0263
3	Jana Domenyova	SMMI, Bratislava	421-2-59415318
4	Frantisek Kiselak	Spel-Procont, Presov	421-5-17580611
5	Juraj Billy	Bidor	421-2-45246554
6	Ladislav Mihalko	VVAK	421-5-56339650
7	Rudolf Kocisko	VVAK	421-9-03658088
8	Erika Gasperikova	Min. of Env.	421-2-59562250
9	Pavol Durco	Wak PR Kosice	421-5-56338011
10	Imrich Bugorcik	SHMU Kosice	421-5-56339271
11	Brian Harrington	Metcalf & Eddy	781-224-6160
12	Dr. Maria Palsthyne Arnoth	North Hungarian Environmental Inspectorate	361-4-61517547
13	Katalin Halaszne Bartus	North Hungarian Environmental Inspectorate	361-4-6511112
14	Jan Babela	EZ-Elektrosystemy	421-5-56747102
15	Jan Husak	EZ-Elektrosystemy	421-5-56792817
16	Milan Sindler	EZ-Elektrosystemy	421-7-50241256
17	Peter Kovac	ECM ECO Monitoring	421-2-43429417
18	Svetozar Luther	VÚVH, Bratislava	421-2-59343463
19	Miroslav Holubec	VÚVH, Bratislava	421-2-59343439

Danube River Basin Transboundary Pollution Reduction Project

Project Close-Out Workshop
September 2001
SLOVAKIA

Metcalf & Eddy

USAID

Agenda

- Project Overview
  - History
  - Overall Project Scope
  - Funding
- Activities & Results
  - Hungary
  - Romania
- Activities in Slovakia

Project Overview

GEF Program

- Created 1990
- Sponsored by World Bank, UNDP, UNEP
- Addresses Four Global Environmental Issues
  - Reduction of Greenhouse gas emissions
  - Protection of Biodiversity
  - Protection of International waters
  - Reduction of Ozone layer depletion
- GEF/Danube Project was part of $150 M U.S. Contribution

Project Overview

Danube River Catchment & Hot Spots

Project Overview

Mission- GEF Danube Project

- Reduce Pollution Transfer Across International Boundaries
- Promote Sustainable Environmental Management Practices:
  - Key resource monitoring
  - Early warning & emergency response
  - Laboratory analysis
  - Pollution prevention & cleaner production
  - Wastewater treatment

Project Overview

Broad Scope - GEF Danube Project

- Three Countries:
  - Hungary
  - Romania
  - Slovakia
- 20+ Projects
- Challenges:
  - Infrastructure needs
  - Institutional & cultural
  - Funding
  - Management complexity

Szamos River-Level Gauge, Hungary

Project Overview

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Key Dates - GEF Danube Project

Preinvestment Studies	10/92 to 3/94
M&E Contract Signed:	09/95
Scoping Missions	02/96 to 07/97
Last LOU Signed:	11/97
Completion of Detailed Assessment:	10/97
Issue & Approval of Update:	04/98
First Construction Contract Award	05/98
Design Subcontract Awards:	06 to 09/98
Last Construction Contract Award	4/00

Project Overview

Project Funding - GEF Danube Project

- GEF/USAID Funding $6.4M
- Local Contributions $2.8M [1]
- Total Funding $9.2M

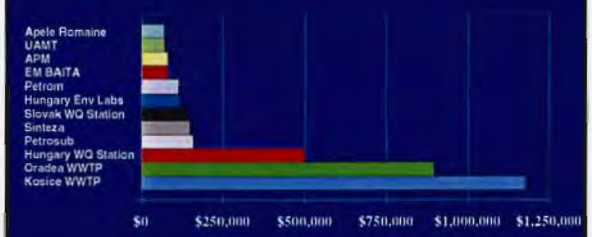
[1] *$125K national government funds*

Project Overview

Combined Capital Budget

Project Overview

Investment Breakdown



GEF Equipment by Recipient

Project Overview

Activities & Results

- Hungary
- Romania

Oradea WWTP, Romania:

Activities & Results

Challenges in Hungary: Oil & Nutrients

- Hernad River (MS-1)
  - Heavily polluted –DO & nutrients
  - Frequent algal blooms
- Szamos River (MS-3)
  - 10 tons heating oil removed in 1993
  - Algal blooms
- Berettyo River (MS-4)
  - Oils spills - (26 since 1987)
  - In 1995, 40 days needed to remove 460 tons of oil
  - One-week water-usage curtailment (average, annual)

Activities & Results: Hungary

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Project Activities in Hungary

- Water Quality Monitoring Stations
- Emergency Planning
- Lab Assistance
- Maros Aquifer Study

Hernad River Monitoring

Activities & Results: Hungary

Activities: Cris/Koros Basin

Activities & Results: Hungary

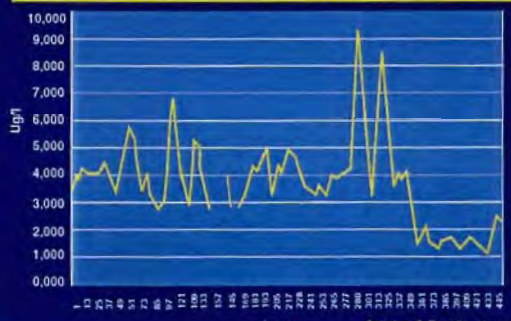
Water Quality Monitoring Stations

MS-1, Hernad

- Refurbished Buildings
- WQ Instrumentation
  - Basic - DO, pH, Conductivity, Turbidity
  - Ammonia
  - Chlorophyll A
  - TOC - surface, subsurface
  - Communications
  - Local Water Directorate
  - Local Env. Inspectorate
  - Relays to Budapest & Vienna PIACs

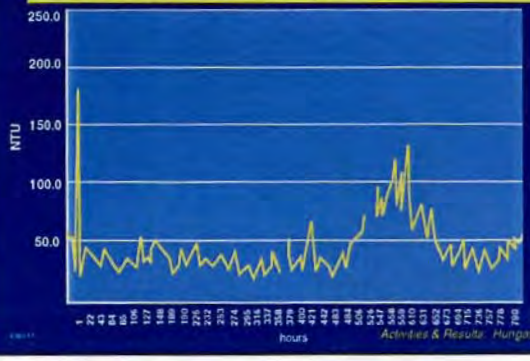
Activities & Results: Hungary

Chlorophyll-a Concentration in Hernad River, May 5 - June 11, 2000



Activities & Results: Hungary

Turbidity (NTU) in Berettyo River, May 17-June 18, 2000



Activities & Results: Hungary

Challenges in Romania

- Industrial Sites
  - Petroleum, phenols, suspended solids, zinc, chromium, heavy metals, copper, cyanide, hexavalent chromium
- Incompletely Treated Wastewater From Oradea Municipal Plant Discharged to Rapid Cris
- Institutional Issues, Inadequate Infrastructure

Activities & Results: Romania

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Bihor County Activities

Activities & Results: Romania

Project Activities in Romania

- Government Assistance
- Oradea WWTP Improvements
- Industrial Pollution Control at 6 Industries

Oradea WWTP - New Primary Effluent Pump Station

Activities & Results: Romania

Oradea WWTP Challenges

- 40% of Influent Flow Received Secondary Treatment
- 60% Received Primary Treatment, Diverted to Lagoons
- Groundwater Impacts From Lagoon Seepage, Sludge
- Inoperative Digesters

Digesters refurbished in project

Activities & Results: Romania

Oradea WWTP Results

New Aeration Basin with Automatic Dissolved Oxygen Control

- Full Secondary Treatment
- Improved Reliability

Activities & Results: Romania

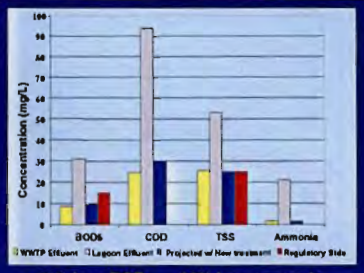
Cost-Sharing

- USAID - $853,303
- Apaterm - $944,849 (52%)

Duckweed-laden secondary clarifier at Oradea WWTP

Activities & Results: Romania

Effluent Quality Improvements at Oradea WWTP



56% less BOD
89% less ammonia
56% less TSS
96% less phenol

Activities & Results: Romania

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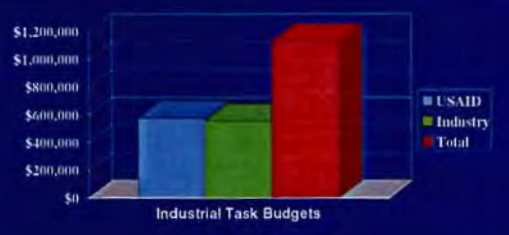
Industrial Pollution Control Cost-Sharing



Activities & Results: Romania

Petrom

- Business: Petroleum Production
- Problem: Petroleum and Phenol Releases to Barcau River
- Approach:
  - Improve extraction-separation and wwt by new equipment
  - Install aprons to control runoff
- Funding:
  - USAID: $110,140
  - Petrom: $24,646, plus $10,000 for lab

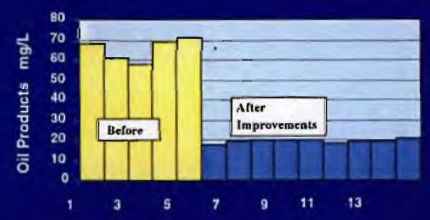
Activities & Results: Romania

Petrom Results - 1

- 90% Reduction in Oil
- 68% Reduction TSS
- Increased Ecological Awareness Among Staff

Activities & Results: Romania

Petrom Results - 1



Oil Product Recovery at the Demulsification Step at Petrom

Activities & Results: Romania

Petrom Results - 2

Oil Reduction from Flocculation Improvements at Petrom

Activities & Results: Romania

Challenges in Slovakia

- Uh River
  - Pollution from oil-related industries
- Hornad River
  - Pollution from incomplete wastewater treatment at Kosice

Slovakia: Challenges & Achievements

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Project Activities in Slovakia - 1

- Uh River Water Quality Monitoring Station
  - Ministry of Env.
  - SHMU
- Kosice WWTP Improvements
  - Eastern Slovak Water Authority (VVAK)

Uh River Upstream from MS-8

Activities: Upper Tisza Basin

Subcontractor Contributions

- Water Research Institute (WRI)
  - Planning & design for monitoring station
- ECM/ECO Monitoring
  - Design & construction monitoring station instrumentation
- BIDOR
  - Planning & engineering for WWTP
- Spel-Procont
  - Process control improvements
- EZ Electro Monitoring Systems
  - Electrical improvements

Summary and Results

- Infrastructure Improvements
- Institutional and Cultural Change
- Pollution Reduction
- Funding Achievements
- Lessons Learned

Infrastructure Achievements Reduce Pollution, Speed Response

- 4 Monitoring Stations Constructed, 4 More Designed
- Secondary Treatment, Partial Nutrient Removal at 2 Plants
- Lab Equipment Installed
- Industrial Pollution Control & Cleaner Production Improvements

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Kosice Biological Treatment

Before

After

Results:

- Full secondary treatment
- Partial nutrient removal

Summary and Results

Cost-Sharing with Local Partner

- U.S.:
  - $605K electrical
  - $584K control system
- Slovak Water Authority:
  - $1M mechanical, biological treatment

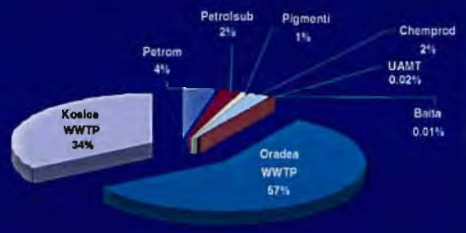
Summary and Results

Overall Pollution Reduction

- Average Annual Pollution Reduction: 8800 Metric Tons
- Major Reductions in COD, BOD_5, and Nutrients
- Long-term Improvement: Lower Potential for Low DO and Eutrophication

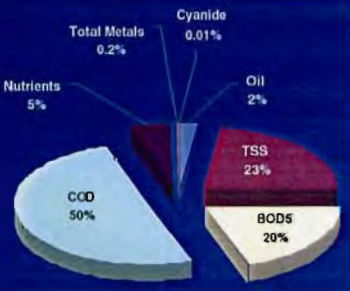
Summary and Results

Pollution Reduction by Source



Summary and Results

Pollution Reduction by Type



Summary and Results

Lessons Learned

- Letters Of Understanding Can Be Effective If Followed by Rapid Project Implementation
  - Delays can change project activities
  - Host countries reevaluate commitments
- Keep Approaches Flexible
  - Cultural, institutional, technical, financial, & contractual constraints can vary widely

Summary and Results

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Lessons Learned, cont.

- Cost Sharing Is an Effective Tool, Best Implemented at Local Level
  - Lowers cost & builds commitment
  - Contractual issues can be managed
- Multiple Contracts With Single General Contractor Can Bring in Local Funds

Lessons Learned, cont.

- Design-build Saves Time & $
  - Limited base of local engineering talent
  - Romanian example: 12 months saved
- Allow Extra Time for Contract Negotiation

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WTP – KOŠICE – COMPLETION OF THE BIOLOGICAL STAGE AND AUTOMATIC SYSTEM OF REGULATION OF TECHNOLOGICAL PROCESSES

Ing.Billý Juraj - BIDOR

Existing construction and operation of WTP Košice

Existing WTP for Košice City and for treatment phenolic waters from VSŽ (Eastern Slovak Ironworks) was put into operation in the year 1964 as the complete mechanical – biological WTP with sludge treatment and gas handling.

Designed capacity data:

Daily quantity of waste water:	60,500 m^3/d
Number of equivalent citizens:	200,000
Phenolic waters from VSŽ:	32 l/s
Treatment efficiency according to BOD_5:	85 %

The treatment plant consisted of the following operational groups for waste water and sludge treatment:

- waste water pumping
- course and fine screens
- sand trap
- sedimentation tanks
- aeration tanks
- secondary settling tanks
- digestion and storage tanks
- gas tanks

- sludge lagoons

WTP was hydraulic loaded in the process of putting into operation for 130 % and BOD loaded for 80 % of designed capacity.

In the seventies there was approved a project for development of Košice City and adjacent localities till the year 2 000 with look-out till the year 2 020.

Based on this project preparation of construction of the new WTP for Košice City began in the area of the old WTP. Construction of the new WTP began in the year 1985 and its realisation and putting into operation was divided into three construction phases.

Designed capacity data for the new WTP:

Daily quantity of waste water:	112,320 m^3/d
Number of equivalent citizens:	391,700
Phenolic waters from VSŽ:	30 l/s
Treatment efficiency according to BOD_5:	90 %

After starting works on the new WTP VSŽ decided to construct their own WTP for the treatment of phenolic waste waters, which was put into operation in 1999.

The first construction phase of the new WTP for Košice City was put into operation in the year 1988 and it consists of the following operational groups for waste water treatment:

- grit chamber
- course screen mechanically raked
- conveyer pumping station
- flow meter
- fine screen mechanically raked
- sand catchers
- sedimentation tanks
- pumping station for raw sludge

After putting into operation of the a.m. operational groups following operational

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groups of the old WTP were set aside:

- waste water pumping
- course and fine screens
- sand trap

After putting into operation of the first construction phase of the new WTP for Košice City – waste waters coming into WTP pass through objects of the new WTP - grit chamber, coarse screen, conveyer pumping station, fine screen, sand traps and stream of treated waste water is divided into two parts.

The first part of waste water passes through the old WTP i.e. sedimentation, aeration and secondary settling tanks and after biological treatment it flows off into the outflow sewer from WTP.

The second part of waste water passes through sedimentation tanks of the new WTP from the outflow sewer from WTP and it is treated only mechanically.

After mixing both streams in the outflow sewer the treated water is mouthed into the recipient.

The second construction phase of the new WTP for Košice City – biological treatment – a part of it thanks also to the finance from USAID was put into operation. It consists of the following operational groups:

- aeration tanks
- blower room of aeration tanks and transformer station
- secondary settling tanks
- pumping station of return and surplus sludge

In the process of biological treatment construction it was changed originally designed aeration of aeration tanks. Originally designed big-bubble aeration system was changed for fine-bubble aeration system in order to save expenses for operation – electric energy.

The third construction phase of the new WTP for Košice City – sludge treatment and gas handling – was partially realised after breakdown of the digestion tank at the old WTP and it was put into operation in the year 1995 – 1996.

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It consists of the following operational groups:

- thickening tanks
- pumping station
- digestion tanks
- machine room for digestion tanks
- gas compressor plant
- boiler
- storage tanks
- machinery room for storage tanks
- mechanical sludge dewatering
- gas tanks and gas handling

After putting into operation of the third construction phase of the new WTP objects for sludge treatment and gas handling were set aside.

Financing of the new WTP construction was planned and realised from investment funds of the state budget and from own investment from VVaK Košice.

The fact that the new WTP Košice was not completed and in particular biological water treatment was caused substantially by limitation of finance from the state investments funds for the construction of the WTP.

When USAID entered through M&E the project of WTP Košice – Completion of the biological stage and ASRTP the scope of works supposed for financing from the funds from USAID and VVaK was defined by M&E, VVaK and BIDOR companies.

One part of the project was the completion of the automatic system of regulation of technological processes, which comprised of autonomous parts of the sludge treatment, mechanical stage, biological stage and central regulation system which was located in the new control room of the new WTP (in the blowing room building). The contract for the agreed scope of works was signed with the subcontractor SPEL PROCONT, Ltd. Prešov.

Definition of the scope of works in the second part of the contract was more complicated whereas it was necessary to fulfil the requirement from the side of M&E to invest into the project the same amount of finance by VVaK as it was supposed by USAID. The next condition with regard to the scope of the works was a requirement of M&E to decrease

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transboundary pollution of the Danube Basin. Upon this condition the considerations about execution of the works on the sludge system were refused and our attention was aimed to the completion of the biological stage so that after its putting into operation all waste waters flowing from the WTP were treated both mechanically and biologically. In the time when M&E entered the project all waste waters were treated mechanically although a part of the waste water flowing onto the new WTP was after mechanical treatment carried into the recipient without biological treatment.

In the preparation phase of the construction (in 1999) the total inlet into the WTP was approximately 1315 $l.s^{-1}$, 900-950 $l.s^{-1}$, from this amount were treated both mechanically and biologically on the old WTP and only mechanically were treated on the new WTP approx. 365 – 415 $l.s^{-1}$.

In order to provide prompt biological treatment of all waste waters BIDOR company elaborated according to the requirements from M&E the technical and economic study (TES) in January 1999. The objective of the study was:

a.) To summarise all available information of:
- quantity and quality of the waste waters flowing into the WTP, flowing off the mechanical stage and flowing off the WTP
- state of supply contracts
- state of the actual deliveries on the site
- state of purchase orders based on the contracts
- state of the design preparation

b.) To specify the current state of waste water discharge with regard to Decision of Discharge and legislative requirements (NV SR No. 242/93 Coll.)

c.) According to information in points a, b to propose alternative solutions for completion of the biological stage.

3 alternatives were proposed in the TES differing in the scope:

1. Alternative

- Treatment on the new biological stage should have been provided by 4 corridors of activation tanks,

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2 secondary settling tanks. Aprox. 455 $l.s^{-1}$ of waste water should have been treated on the new WTP.

2. Alternative

- Treatment of waste water should have been provided by 8 corridors and 4 secondary settling tanks. Treatment of 2/3 of inlet into the WTP should have been provided on the new WTP and 1/3 should have been treated on the old WTP.

3. Alternative

- After full completion of activation, secondary settling tanks, transformer station, switching station, pumping station for sludge all waste waters flowing into the WTP Košice should have been treated biologically on the new WTP.

In that time not only third and second alternative but even the first alternative were not financially covered by the Slovak side. Upon conclusions from several negotiations BIDOR company elaborated the minimum alternative with two activation tanks and one secondary settling tank.

After its preparation VVaK was able to acquire the credit to cover the 1. Alternative i.e.:

- 4 corridors of activation tanks
- 2 secondary settling tanks
- pumping station for sludge
- complete underground services
- complete cable distribution

Subcontractors completed these works in full scope and in very good quality. We can state that by completion of the construction only 1/3 of the biological treatment capacity on the WTP was put into operation but investments made approx. 80% from the total capacity of the WTP i.e. by investing 20% of finance the total capacity of the WTP will be in operation.

Experience from the construction of the WTP and cooperation with USAID and M&E

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Based on the contract with M&E BIDOR company arranged inspection of works and realised supplies with regard to the preliminary invoicing of subcontractors SPEL PROCONT and EZ Elektrosystémy.

We can state that selection of the subcontractors by M&E was right. The work was performed by real experts under professional management. Problems were often with constructional and mechanical unreadiness what caused sometimes delay in supplies of M&E subcontractors.

I would like to appreciate our cooperation with M&E company and colleagues who worked in the background, who did not take part directly on the site. Especially I would like to appreciate the work of Mr. Harrington. His contribution to the success of the whole project was not only in his excellent organisational skills but also in his professional advices which were accepted.

Thanks for the success of this project goes also to USAID and the investor of works VVaK.

Some problems in preparation of contracts and proposals for similar projects:

- it is necessary to compare insurances required by the American side and traditions in the countries of contracting partners (some conditions from the American side were incomprehensible for the Slovak side and some of them unacceptable)
- bank warranties (the subcontractors may inform more about this item)

As we stated before by performance of the abovementioned part of the work 1/3 of the capacity was put into operation but investing only a small amount of finance it will be possible to put into operation 100% capacity of the biological stage.

Putting into operation the completed part of the work and provision of biological treatment of all waste waters from the WTP flowing off the WTP Košice to the Hornád recipient is a considerable contribution to the improvement of the environment in this region with direct impact to the improvement of water quality in the Danube what was the objective of this project.

September 2001

Ing. Juraj Billý

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ENCLOSURES:

- **FLOW DIAGRAM OF WTP KOŠICE**
- **SITUATION – 1. ALTERNATIVE**
- **SITUATION – 2. ALTERNATIVE**
- **SITUATION – 3. ALTERNATIVE**

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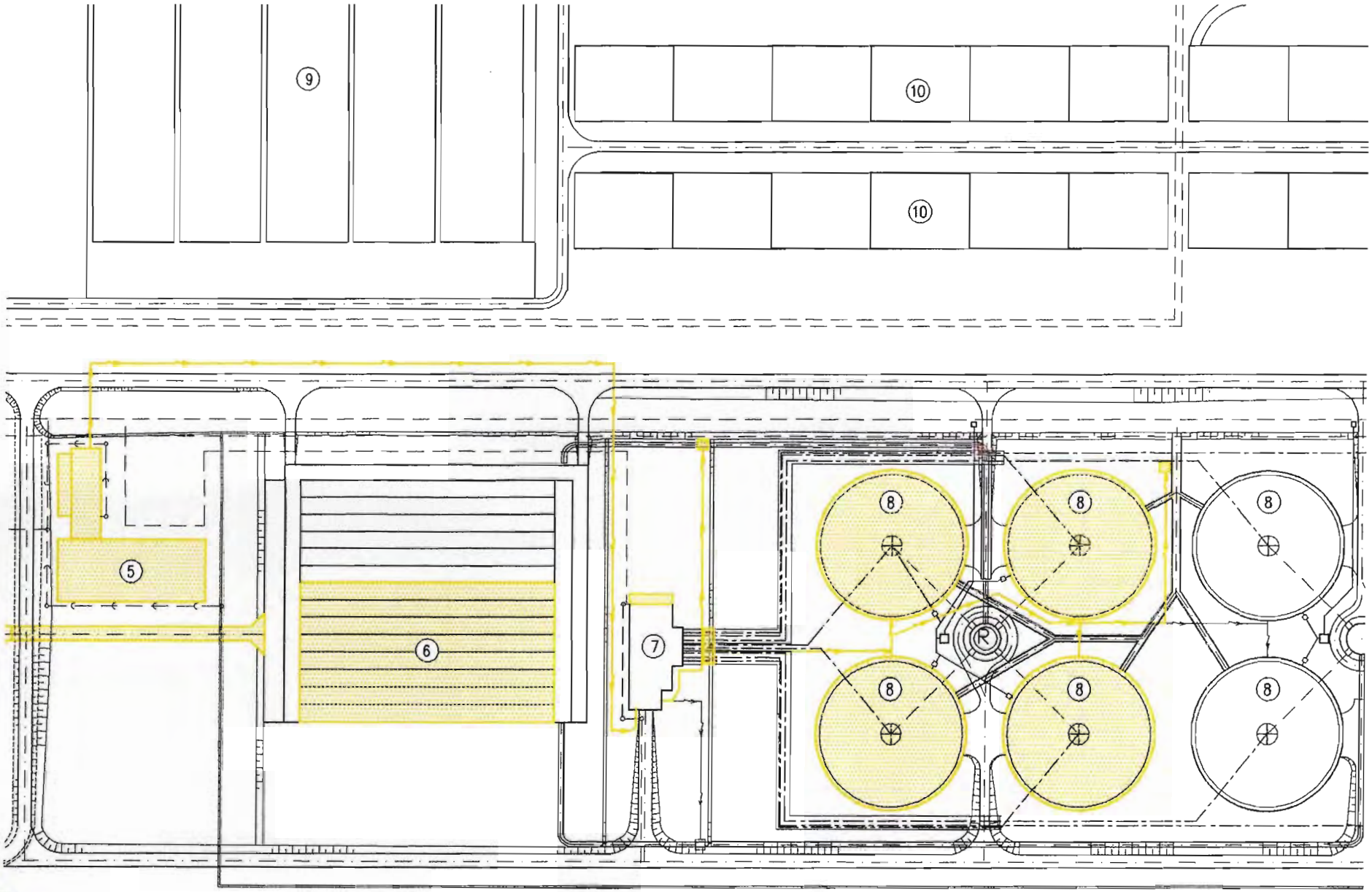
SITUÁCIA M 1 : 1000 LAYOUT M 1 : 1000

2. ALT.



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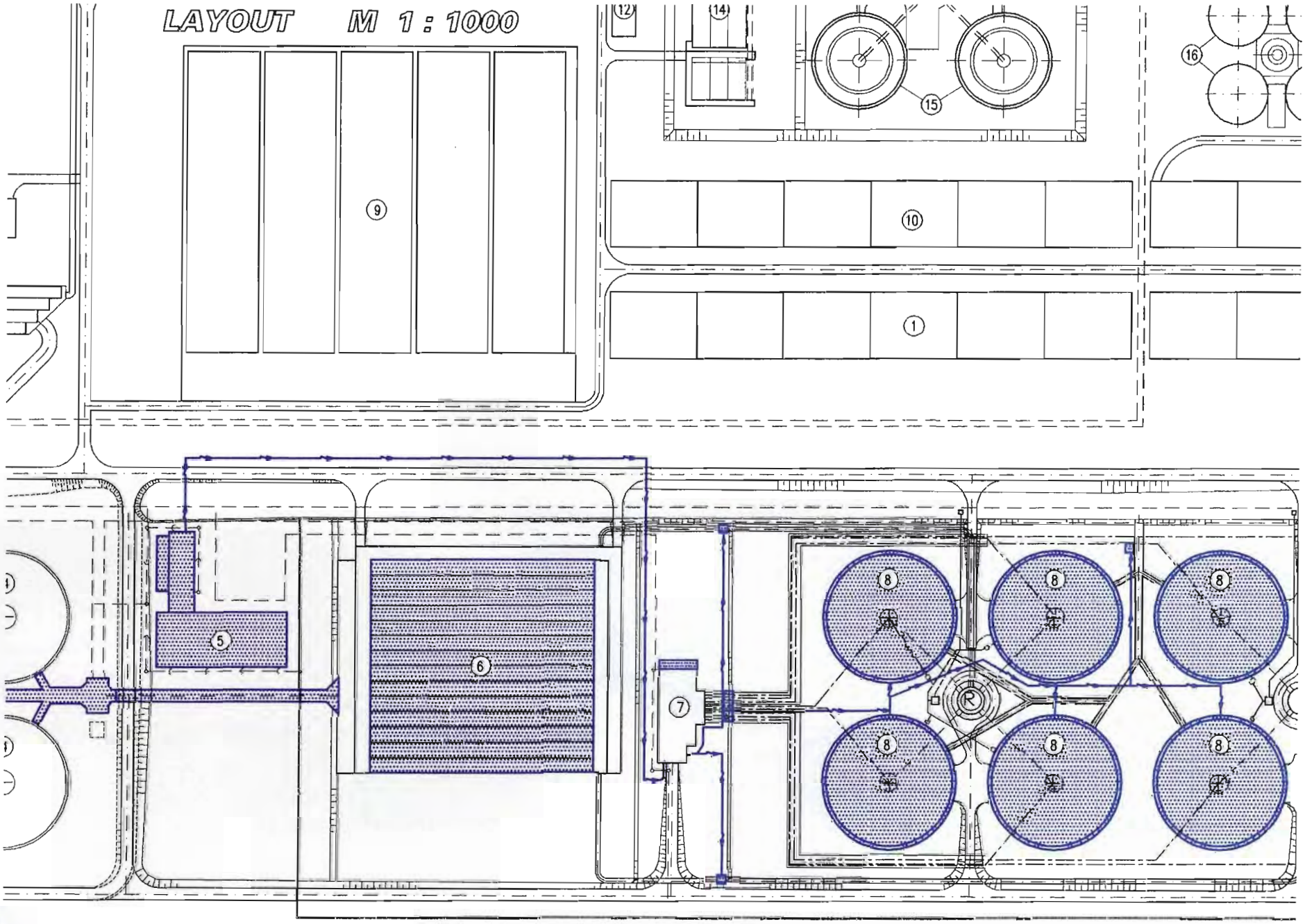
3. ALT.



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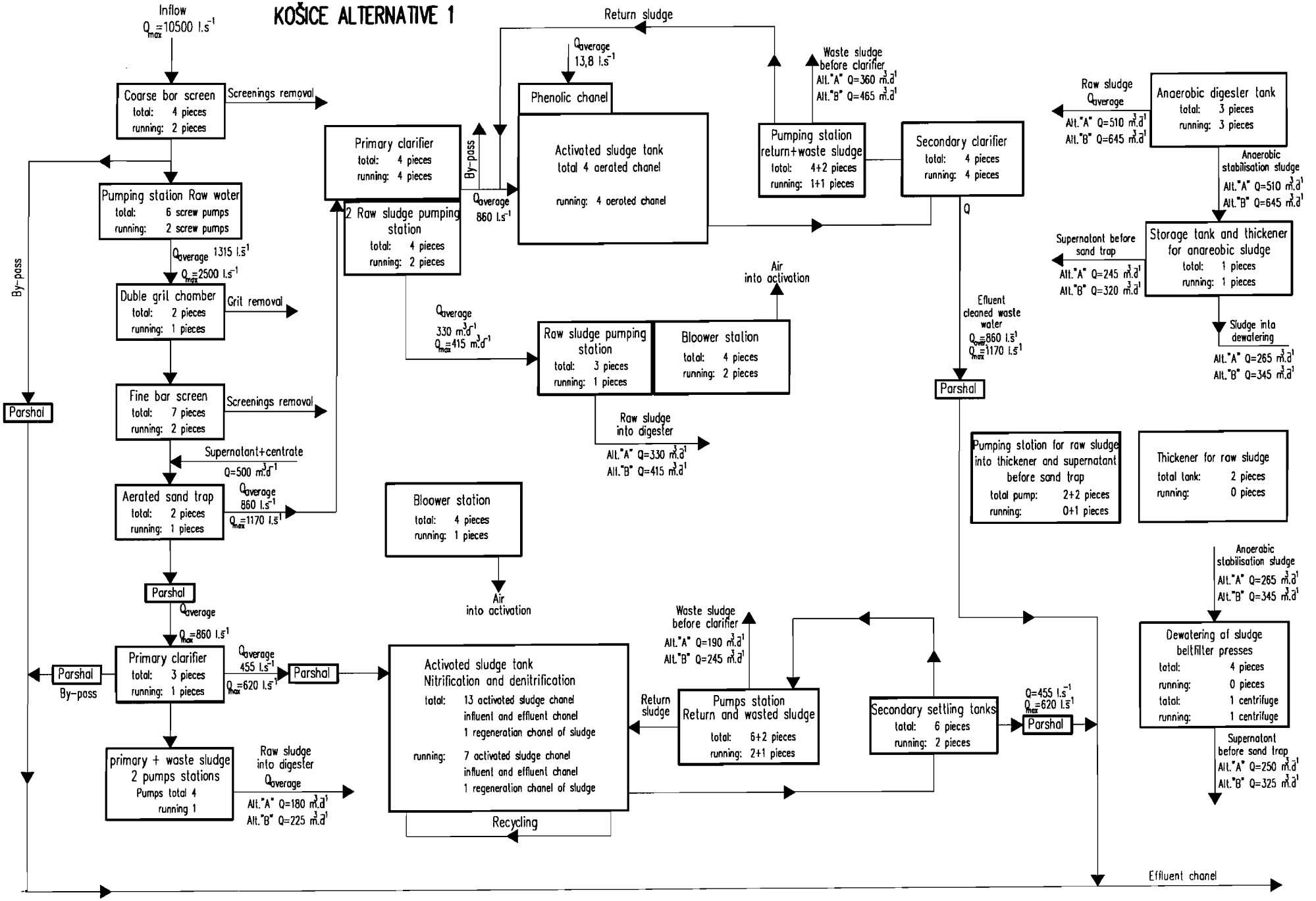
FLOW DIAGRAM FOR WWTP KOŠICE ALTERNATIVE 1



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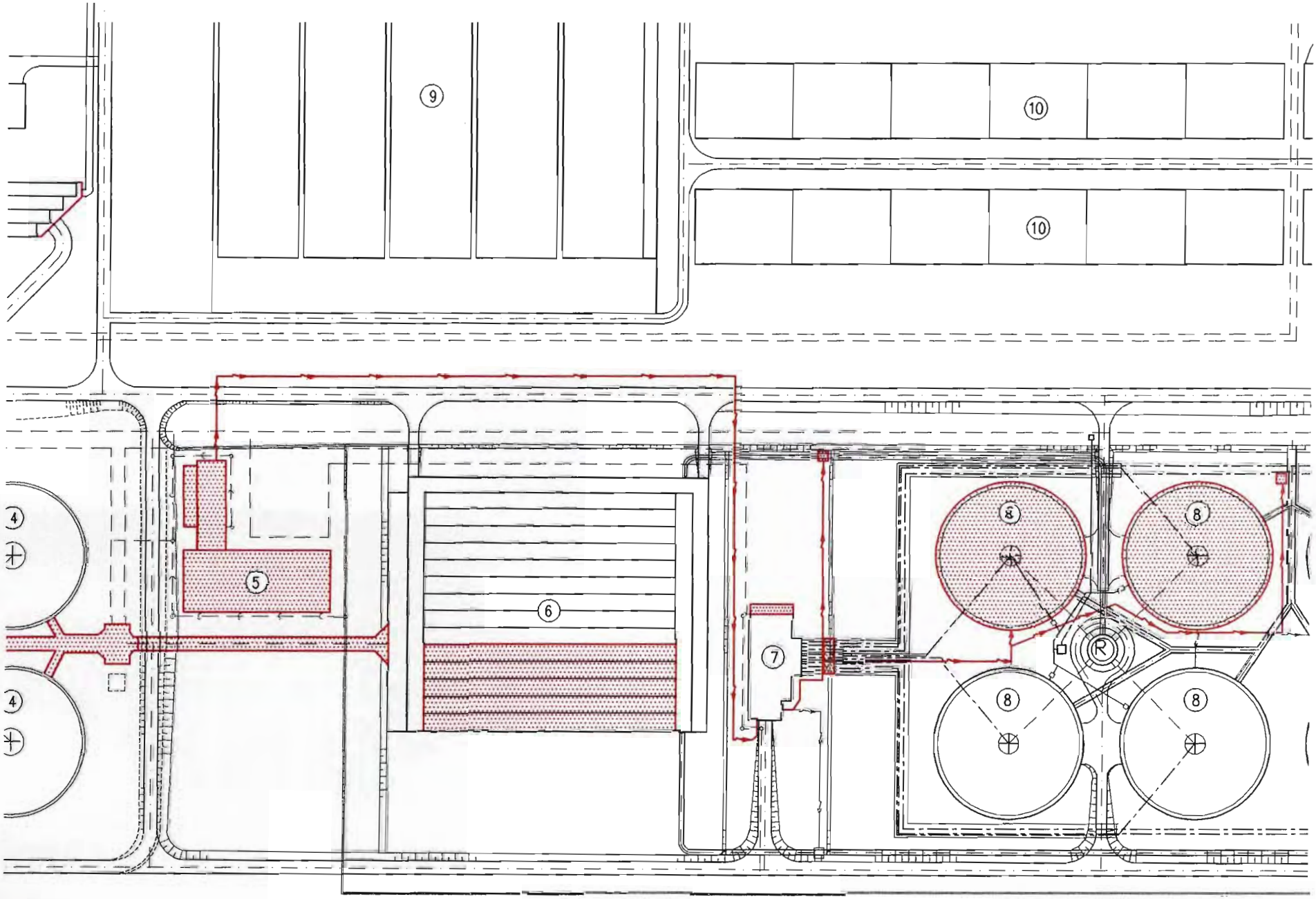
1. ALT.



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ALARM MONITORING STATION
ON THE UH RIVER PINKOVCE

Present emergency conditions existing in the basin of the international river Uh in Ukraine, caused usually by oil and oil products spills, require development of an efficient information system for emergency warning.

Alarm Monitoring Station / further AMS / on the Uh river at Pinkovce provides continuous water quality monitoring and protection of significant water resources on the Slovak and Hungarian territory from pollution with oil products conveyed from Ukraine.

In addition to oil substances also other water guality parameters are observed continuously, as far as water temperature, turbidity, pH, conductivity, redox, dissolved oxygen, nitrates and ammonia.

The continuous water line data are preserved from the near recording station in Lekárovce, by the AMS user – Slovak Hydrometeorological Institute .

The characteristic values (C_{90}) of separated indicators, for the 1992-1999 period and the accident limit values of monitored indicators, which excess will start the system of alert activity, are given in Table 1 (in the end).

The Alarm Monitoring Station on Uh River is built near village Pinkovce, on a pipe aqueduct in r. km 18,3. The pipe aqueduct is used for transport of the pumped ground water from wells in Pinkovce into the Water Treatment Plant in Lekárovce. The location of AMS on Uh River in r. km. 18,3 is shown on the map (Fig. 1) and on the view situation (Fig.2) and on the photos (Fig. 3 & 4) .

Fig. 1

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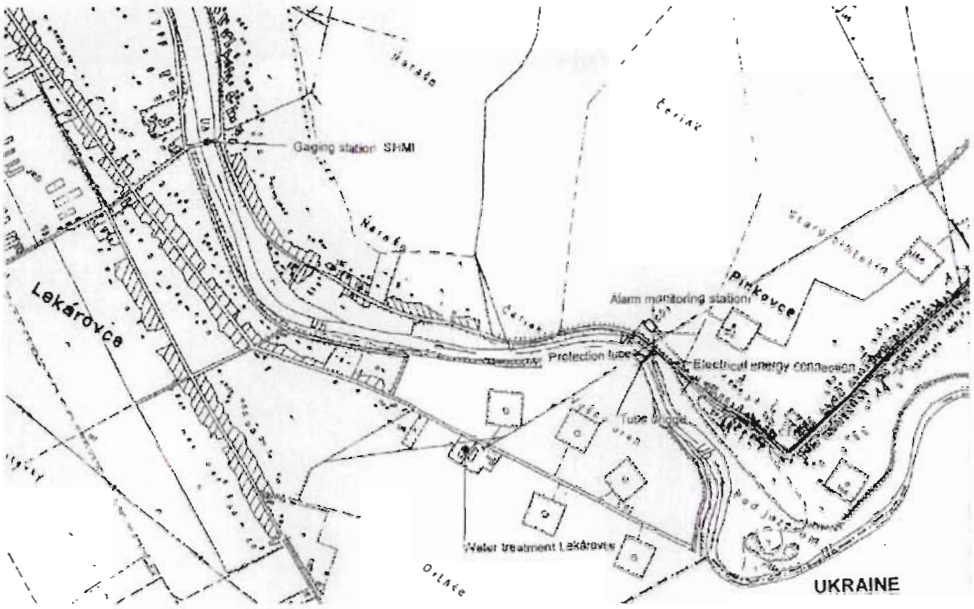

Fig. 2: View situation (appr. M 1: 20 000)

Fig. 3: AMS Pinkovce – piping aqueduct with a container and a steel fender (view from the right side of the dam)

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Fig. 4: AMS Pinkovce – piping aqueduct with an access catwalk, container and a steel fender (view from the right side of the dam)

AMS consist from following main parts:

- floating sampling equipment installed partly in the steel protection pipe on the tube bridge in the stream line
- thermally isolated shelter installed on the right pier of the tube bridge
- central station placed in the water treatment plant at Lekárovce

The block scheme of separated facilities connection is shown in the Fig.5

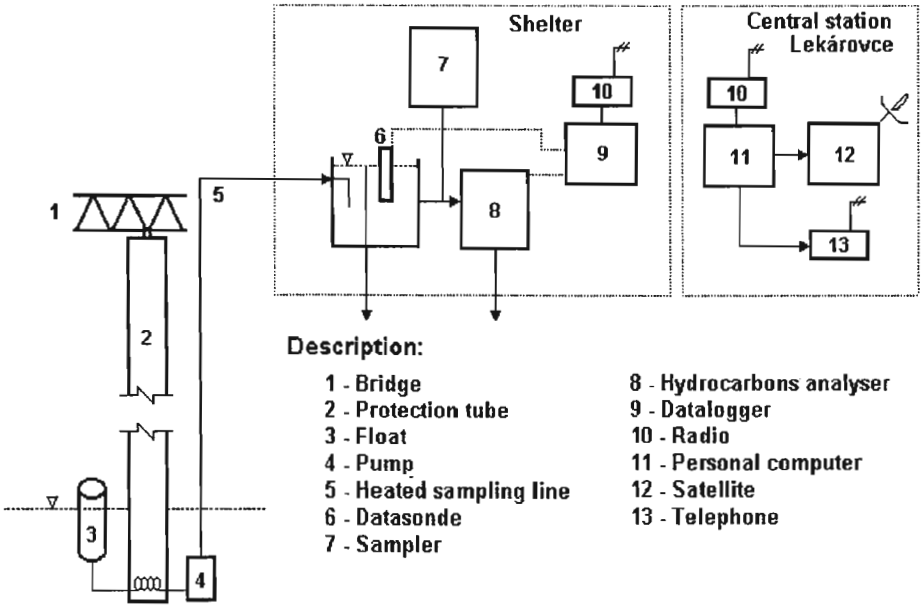

Fig. 5: Block scheme of connection of respective facilities

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Water samples are conveyed from the sampling device into the shelter by means of distribution pipe line. Analysis of oil matters and of other indicators takes place in the shelter. All measuring instruments are connected to the data logger which develops / from analyser outputs / data files and also store them. Information from the data logger is transmissed by means of radio modems into a personal computer for data evaluation in the water treatment plant Lekárovce. This computer proceses and presents values of monitored parameters. The software includes also automatic transmission of reports into the telecomunication network in case when the values of respective parameters are exceed.

Block diagram of connection of respective equipments is presented in Fig. 5

In case of indication of emergency water quality deterioration the information is three times verified prior to activation of the alarm signal from AMS into the telecomunication network. If the information is confirmed water sampling by means of sampler installed in the container is automatically carried out, and at the same time the alarm emergency system is activated. The message on accidental spills is transferred by means of telecomunication system on two levels, the satellite and regional one.

The satellite transmission of reports on accidental oil spills on the Uh river is sent to Slovak Inspection of the Environment Deparment of Water Management Inspection -Central Office / SIŹP-ÚVIU / in Bratislava automatically in following manners:

- satellite system type point-to point to satellite Inmarsat-C terminal
- as SMS reports of the standard service of the satellite Inmarsat-C system to mobile GSM phones to authorized persons.

  The format of the report includes: <u>identification of the location, type of pollution, date and time of the accident</u>.

  The transmission unit of the satellite system, installed in the water treatment plant at Lekárovce, is compatible with the system installed at SIŹP-ÚVIU in Bratislava, which is connected to the International Accident Emergency Warning System / AEWS PIAC-04 /.

  Simultaneously with the satellite information transmission the regional communication is realized as far as automatic transmission of data on the accident / also as SMS GSM reports / by means of mobile phones to following organizations: Slovak Inspection of the Environment, Water Protection Inspectorate Košice, Regional Office Department of State Administration Košice, District Office, Department of State Water Administration Sobrance, Slovak Watermanagement Enterprise, Branch the Bodrog and Hornad River basins Authority Košice, and Slovak Hydrometeorological Institute Košice. A competent

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work group will justify the transmission of the warning report on the international level / PIAC-04 (Principal International Alert Center) /.

Transmission of data only on regional level to mentioned organizations takes place automatically when limiting values of other monitored parameters / except for oil matterss, also as SMS GSM reports / are exceeded.

Operators and service of the central station at Lekárovce are informed on any type of emergency pollution by means of SMS report transmitted on its mobile phone.

In case of emergency pollution, after verification of the actual state, Slovak Inspection of the Environment Deparment of Water Management Inspection - Central Office in Bratislava will send the warning message on the hazardous pollution on the international level. At the same time it will communicate with regional and district offices, departments of environmental protection, which provide activities, aimed at pollution abatement.

Table 1: Characteristic values (C_{90}) and emergency limiting values of selected water quality parameters in the Uh River in the locality Pinkovce in r. km. 18.5 over 1992 - 1999

Parameter	Unit	Characteristic value (C_{90})							Emerg.limit.
Monitored period /years/		92-93	93-94	94-95	95-96	96-97	97-98	98-99	concentr.
Water temperature	°C	21	21	22	21,26	20	20	21,19	>25
Conductivity	mS/m	31,32	26,26	27,626	28,802	27,88	26,28	27,91	>40
pH	-	8,2	8,2	7,9	7,93	8	8	7,83	< 6 or > 8,5
Dissolved oxygen	mg/l	6,4	5,9	5,5	6,55	6,55	7,14	6,64	<5,0
Ammonia	mg/l	-	-	1,13	0,77	0,631	0,253	0,398	>1,5
Ammonia - nitrogen	mg/l	0,633	0,611	0,7	0,6	0,49	0,187	0,31	>0,7
Nitrate - nitrogen	mg/l	2,3	1,9	1,8	1,931	1,779	1,38	1,84	>10
Nonpolar extr. matt.- UV	mg/l	0,2	0,1	0,1	0,091	0,091	0,071	0,058	0,1

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Príspevok k účastiEZ-Elektrosystémy na realizácii ČOV KOŠICE

Ladies and Gentlemen,

My name is Milan Šindler and I wish you good afternoon with EZ-Elektrosystémy Bratislava, joint stock company, which realized electrical and instrumentation part of ČOV (Water Treatment Plant / Sewage Tank) Košice project.
Allow me to discribe the progress of work on this project:
We stopped work on this project in 1992 according to the contract due to lack of finances and project waited for completion 9 years. On January 2000 we were requested by the company BIDOR Bratislava to prepare an offer for project completion within financial help of USAID.
Our company was succesful in the tender and the company Metcalf and Eddy became our partner for contract. Metcalf and Eddy required for contract signature following:

- economic and legal information about EZ-Elektrosystémy
- declaration about goods and materiel purchasing only from "Free Countries"
- accident workmen insurance for this project
- 10 % performance bond for period of project and guarantee period

The biggest problem we met was arrangement of 10 % performance bond. Our financing bank VÚB Košice required following to provide a bond:

- complete economic and financial analysis of our company
- to establish a special bank account in VÚB and deposit the money in value of performance bond
- to advance a creditable receivables of our company to VÚB in a value equal to performance bond value during the period of this bond.

After we have fulfilled these conditions and after approval process of 4 - 5 weeks VÚB has submitted a perfomance bond and consequently we signed the contract for electrical and instrumentation part in duration from april to september 2000.
Technical solution was perfectly managed in project documentation by company ELHYCO Bratislava so there were no technical collision during the execution.
Our long-time experiences and experiences of investor VVaK and other companies have also subcribed to no-problem process of execution. During the last four years we together put in to operation plants ČOV Prešov, ČOV Krompachy and ČOV Svidník.
Scope of electrical and instrumentation part on project ČOV Košice consists of:

- connection to 22 kV public electrical network
- 17 panels of 22 kV substation
- 13 panels of 6,3 kV substation
- 4 pcs of transformers with total power of 5200 kVA
- 49 panels of LV switchgears and 99 pcs of cnotrol boxes
- measurement and regulation
- cable connections, layed, connected and tested for:

22 kV cables	3 286 m
6,3 kV cables	1 686 m
1,0 Kv cables	6 902 m
control and power cables up to 750 V	29 320 m
TOTAL	41 194 m

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During the execution we have used high quality and reliable products, which period of service is according to our experinces more than 25 years. Decisive products we purchased from:

- ABB Brno ČR - HV substations
- BEZ Transformátory Bratislava SR - distribution transformers
- Kablo Kladno and Prakab Praha ČR - cable and conductors
- LV switchgears and control boxes were prodiced by our company
- components for Measurement and Regulation were purchased from ISCO – U.S.A., NIVELCO - Hungary, SENSYT – Czech republic, MERET - Slovakia.

The total scope of work and material was checked and recorded on monthly basis by M & E representative on site. Based on these protocols we issued invoices in US $ for work and material to contractual partner M & E.

23 % VAT resulted from these invoices were monthly invoiced to MŽP SR, which according to the intergovermental agreement with USAID has undertaken all liabilities arising from tax laws of SR.

Today we can say that all finacial volume of this project has been paid to us and our partners M & E and MŽP SR were paying for invoices promptly within the due date.

By contract stipulated date of completion -september 2000 was postponed to february 2001, due to work process delay of other suppliers of civil and technological part.

The course of execution has shown how properly USAID has chosen the way of financing through the electrical part whereas it has forced other supplier to proceed within the time schedule of financial help.

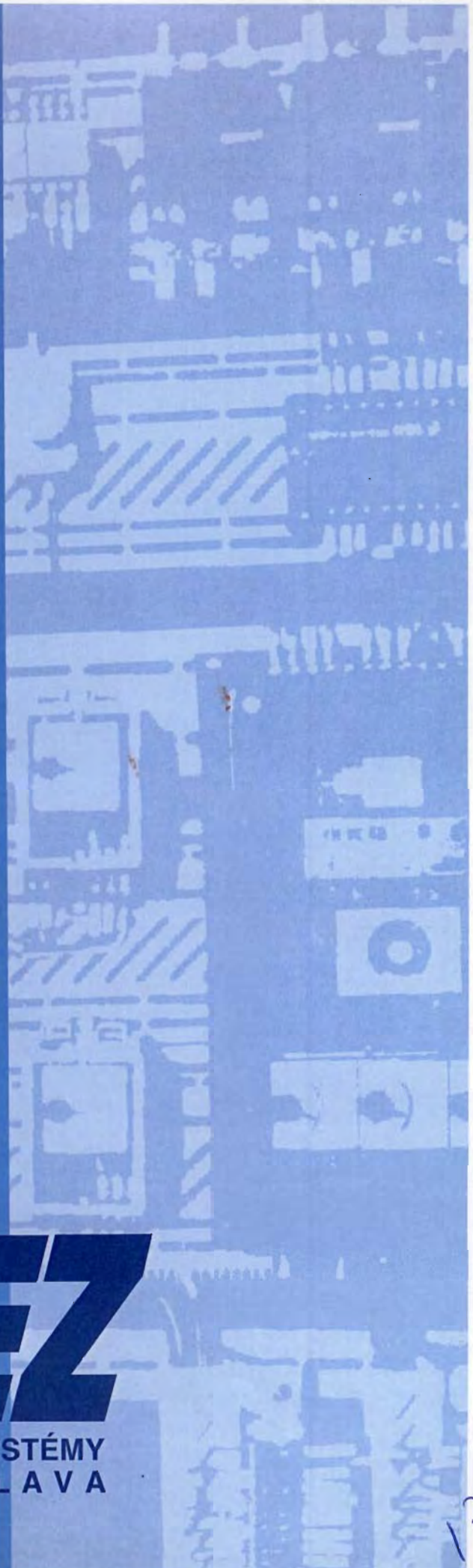
This project besides the significant ecological effect has redounded to employment of workers from all companies in this area with extremely high unemployment.

It has also redounded to mutual acquaintance of commercial standards and creation of personal relations between american and slovak side.

Thank you

Prepared by: Ing. Milan Štndler
tel.: 00421 2 50241256

Bratislava, 07.09.2001



ELEKTROSYSTÉMY
BRATISLAVA

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History

1949 Foundation of the ELEKTROMONTÁŽNE ZÁVODY Bratislava through the separation of the ČKD Kriváň enterprise (former SIEMENS and AEG) and joint stock company ELEKTRA.

1958 Attaching of the ELEKTROMONTÁŽNE ZÁVODY Bratislava as a factory to the Elektromontážne Závody Praha company.

1968 Releasing and returning to its original name EZ Bratislava.

1985 Fusing of the former ELEKTROMONTÁŽNE ZÁVODY Bratislava enterprise with the ZPA DP Bratislava plant creation of the new enterprise ELEKTROMONT Bratislava.

1990 Dividing of the ELEKTROMONT Bratislava into independent companies, returning to the traditional abbreviation EZ plus new title ELEKTROSYSTÉMY Bratislava, state enterprise.

1995 Transformation to the joint stock company. The shareholders are management and employees of the company.

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Company Profile

EZ-ELEKTROSYSTÉMY Bratislava,
Joint Stock Company, is providing wide range of activities with high volume offer in the following spheres:

- **heavy current electrotechnics**
  all types of substations and transformer stations with voltage up to 400 V - distribution networks - outdoor lines 6 kV, 22 kV and 35 kV - heavy current power distribution networks - outdoor and indoor lighting - lightnings - earthing networks
- **automation and regulating technics**
  complete automations of industrial establishments and mills - procurement of domestic and foreign equipment
- **automation control systems**
  control of technological processes
- **security systems and lightnings**
  fireproof signalling of all types of buildings and sites
  - security systems - sensing of the moving
  - attending and cameras systems
  - protecting and informing videorecords

Skilled collective of our specialists and wide technical base guarantee to our clients quality and complete range of our services.

Main targets of our services:

- **Design activity**
  studies - analyses - aims - detail designes for electrical equipment without voltage limitation - industrial control systems - software and hardware - instrumentation technics - lightnings
- **Manufacture by the order**
  switchgears up to 1000 V - substations up to 35 kV - control systems for industrial purposes - installation parts - supplementary production - single-purposes machines and equipment
- **Installation, commissioning and putting into operation**
  heavy - current equipment without voltage limitation - control systems - measuring and regulating technics - securing equipment - lightning conductors for objects of classes A, B and C
- **Repairs, maintenance and service**
  electrical equipment without voltage limitation - lightning conductors - and others all throughout the range of activities
- **Inspection of the electrical equipment**
  for objects in classes A and B without voltage limitation - lightning rods by supply form in scope of activity

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Company Profile

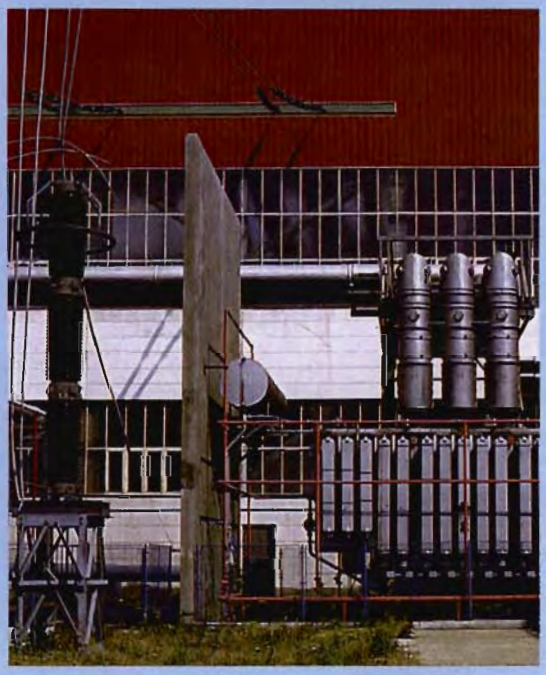
• direct foreign trade activity

design works - installation works - engineering - commercial representative activities (for example distribution of Raychem products - cable accessories, surge arresters, auto trace cables with accessories) - direct import and export of electrical equipment - cooperation and licences

Important part of EZ-ELEKTROSYSTÉMY Bratislava activities are science-technical and economical information and consultation service in standardization sphere. We keeping up the database of the installation material and price list of the installation works.

As above standard activities we consider using of the calculation program for electrical installation works ETTOS, software AUTOCAD and EL-CAD for design works.

Client could order all kinds of our activities and services separately or as complete delivery including design and installation in whole.



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First contact with our Joint Stock Company

GENERAL DIRECTOR
Tel.: 07/5557 4860
Fax: 07/5542 2765

Economical Section
Tel.: 07/5557 5102
Fax: 07/5542 2765

Commercial and Technical Section
Tel.: 07/5557 5280, fax: 07/5556 2115
e-mail:michalik@ezelsys.sk

Human Resources Section
Tel.: 07/5024 1162
Fax: 07/5542 2765

Organis. and Adminis. Management
Tel.: 07/5024 1370
Fax: 07/5542 2765

Quality System Department
Tel.: 07/5024 1245, fax: 07/5542 2765
e-mail:zabar@ezelsys.sk

Sekretariat GD
Tel.: 07/5024 1522
Fax: 07/5542 2765

Specialists GD
Tel.: 07/5024 1135
Fax: 07/5542 2765

Control Department
Tel.: 07/5024 1370
Fax: 07/5542 2765

Assembly Division Bratislava
Ružová dolina 10, 824 77 Bratislava 26
Tel.: 07/5557 5019
Fax: 07/5542 2765

Assembly Division Banská Bystrica
Nám Š.Moysesa 3, 975 90 Banská Bystrica
Tel.: 088/725 116
Fax: 088/723 335

Assembly Division Košice
Teplárenská 5, 040 12 Košice
Tel.: 095/747 102
Fax: 095/747 100

Division Engineering
Ružová dolina 10, 824 77 Bratislava 26
Tel.: 07/5557 4659
Fax: 07/5542 2765

EZ-ELEKTROSYSTÉMY Bratislava L.t.d.
Subsidiary company for Czech Republic
Tel./fax: 00420 69 568 34 87

EZ-ELEKTROMATERIÁLY, L.t.d.
Pestovateľská 13, 821 04 Bratislava
Tel.: 07/4342 0402, fax: 07/4342 0298

EZ-ELEKTROSYSTÉMY Bratislava, joint stock company
Ružová dolina 10, 824 77 Bratislava 26, Slovak Republic

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e-mail:michalik@ezelsys.sk
http://www.ezelsys.sk

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Sphere of activities

POWER INDUSTRY
- Nuclear power plants
- Hydro power plants
- Thermal power plants
- Boiler houses
- Heating plants
- Refuse incinerating plants
- Distribution networks of the electrical energy

CHEMICAL AND PETROCHEMICAL INDUSTRY
- Chemical and petrochemical plants
- Petroleum refineries
- Rubber factories

FUEL INDUSTRY
- Oil pipe lines
- Gas lines
- Compressor plants
- Open pit mines and underground mines
- Mines plants

WATER SERVICES
- Water works
- Waste water treatment plants
- Wetting stations
- Pumping stations
- Water reservoirs

PAPER AND PULP INDUSTRY
- Pulp factories
- Paper factories

CONSTRUCTING INDUSTRY
- Cement works
- Lime works
- Crushing and milling plants
- Ceramic production
- Production of the industry glass

METALLURGY AND MECHANICAL ENGINEERING
- Metallurgical plants
- Rolling mills
- Coking plants
- Blast furnances
- Ore preparation plants
- Forges
- Oxygen plants
- Engineering plants
- Air conditioning equipment

LEATHER AND TEXTILE INDUSTRY
- Leather plants
- Cotton plants

FOOD INDUSTRY
- Diary plants
- Butchery
- Sugar mills
- Breweries
- Food silos
- Canneries and destilleries

TRANSPORT
- Feeding stations of the electric traction
- Feeding stations of the town transport
- Railway stations and junctions
- Mine transport
- Ropeways
- Airports

CITIZEN BUILDING AND FACILITIES
- Administrative centres
- Research laboratories and test rooms
- Telecommunications
- Transformer and distribution stations
- Electrical equipment for hospitals
- Sport facilities
- Hotels, schools
- Air conditioning equipment
- Theatres and congress halls

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Certificate of Approval

CERTIFICATE OF APPROVAL

This is to certify that the Quality Management System of:

EZ - ELEKTROSYSTÉMY Bratislava, a. s.
Bratislava, Slovak Republic

has been approved by Lloyd's Register Quality Assurance to the following Quality Management System Standards:

ISO 9001:1994

The Quality Management System is applicable to:

Design, engineering, procurement, project management, site supervision, installation, commissioning and servicing of equipment for weak and heavy current distribution, instrumentation, process control systems, fire protection and security systems in civil engineering, power, chemical, petrochemical, metallurgical, food and related industries.

Approval Certificate No: 280168

Original Approval: 23rd July 1999

Current Certificate: 23rd July 1999

Certificate Expiry: 31st July 2002

on behalf of LRQA (Prague)

LLOYD'S REGISTER QUALITY ASSURANCE

This approval is carried out in accordance with the LRQA assessment and certification procedures and monitored by LRQA.
The use of the UKAS Accreditation Mark indicates Accreditation in respect of those activities covered by the Accreditation Certificate Number 001

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References Slovakia

1995 - 1999 PERIOD

- NPP Jaslovské Bohunice
  - progressive reconstruction of V1, persons and buildings protection system
  - „turn-key" project (AKOBOJE)
- NPP Mochovce
  - design, supplies, electrical installation for 1-st and 2-nd Unit of NPP, persons and buildings protection system - „turn-key" project (AKOBOJE)
- National Bank of Slovak Republic
  - complete supply and electrical installation
- Combine cycle TPP II Bratislava
  - lighting, electrical operating distribution system, lightnings
- HPP Gabčíkovo-Nagymaros
  - HV, LV connections, 22 kV transformer station, lightning
- Polyfunction centre of Bratislava
  - power installation, lighting, electrical operating - distribution system, socket distributions
- National Oncological Institute Bratislava
  - power installation, lighting, electrical - operating distribution system, socket distributions
- new Slovak National Theatre Bratislava
  - transformer station, area electrical distribution system, power installation, air conditioning system
- Airport of M.R.Štefánik Bratislava
  - reconstruction of the runways
- Palma-Tumys Bratislava
  - electrical operating distribution system, lighting, control and visualisation system
- Palma-Tumys Sečovce
  - complete supply and electrical installation of oil pressing shop
- Baumit-Hirocem Rohožník
  - production of dry plaster compositions
- SCP Ružomberok
  - reconstruction of the boilers and pulp machines
- Matador Púchov
  - modernization of the extruding line
- SAUER Považská Bystrica
  - reconstruction of the halls
- Železiarne Podbrezová
  - permanent casting process and reconstruction of cable distribution systems
- East Slovakia Iron Works, Košice
  - modernization of the heat rolling mill
  - reconstruction of the substation VN T52
  - general reconstruction of the main cable HV distribution system and other electrical installation works
- Dopravný podnik mesta Košic
  - reconstruction of converter stations for tram transport
- Transpetrol Budkovce
  - reconstruction HV substation R1 incl. HV cable distribution system
- Chemosvit Svit
  - construction of 22kV substation, HV leeding cables
- Slovenské magnezitové závody Ľubovnik
  - hydrocyclone finishing
- Slovenské magnezitové závody Jelšava
  - complete delivery and installation of electrical parts of sewage plant
- Čistiareň odpadových vôd Prešov
  - complete delivery of electrical parts of sewage plant
- Slovenská sporiteľňa Banská Bystrica
  - electrical and instrumentation works

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References Slovakia

IN COOPERATION WITH FOREIGN COMPANIES

- STORCK COMPRIMO Holland, JGC Japan, MITSUBISHI HEAVY INDUSTRIES Japan, FLUOR DANIEL Holland, CHIYODA Japan
  - EFPA project in Slovnaft Bratislava - 110 kV substation HT IV, HV and LV distributions, electrical operating distribution system
- HYDROALUMINIUM Norway
  - SLOVALCO Žiar nad Hronom - modernization of the aluminium production
- VOLKSWAGEN Wolfsburg, Germany, ALSTOM Germany, HERMAN BARKAS, Germany
  - design works, electrical installation in production areas VW Bratislava, JSC

ELECTRIC POWER PLANTS

- NPP Jaslovské Bohunice
- WPP Gabčíkovo
- NPP Mochovce
- EVO Vojany
- ENO Nováky

HYDRO POWER PLANTS

- Orava
- Krpeľany
- Sučany
- Hričov
- Nosice
- Madunice
- Čierny Váh

METALLURGIC PLANTS AND ROLLING MILLS

- ŠŽ Podbrezová
- VSŽ Košice
- OFZ Istebné
- SLOVALCO Žiar nad Hronom
- OFZ Široká
- Kovohuty Mokraď
- Kovohuty Krompachy

MINES

- Cígeľ - Prievidza
- Handlová
- Nováky
- Veľký Krtíš
- ŽELBA Spišská Nová Ves

PAPER AND PULP INDUSTRY

- SCP Ružomberok
- PC Žilina
- JCP Štúrovo
- HP Harmanec

MECHANICAL ENGINEERING

- ZVL Považská Bystrica
- ZVL Bytča
- ZŤS Dubnica nad Váhom
- ZVL Veľký Krtíš
- ZVL Kysucké Nové Mesto
- LIAZ Zvolen
- ZVL Dolný Kubín
- BAZ Bratislava
- VOLKSWAGEN Bratislava
- TAZ Trnava
- SAM Myjava
- Drôtovňa - Hlohovec
- SAMSUNG - CALEX Zlaté Moravce
- TATRAVAGÓNKA Poprad
- VIHORLAT Snina
- TATRAMAT - WHIRPOOL Poprad
- Slovenské lodenice Komárno

MAGNESITE PLANTS

- SMZ Ťahanovce
- SMZ Jelšava
- SMZ Hačava
- SMZ Lubeník

WOODWORKING INDUSTRY

- Smrečina Banská Bystrica
- Drevokombinát Polomka
- Bukóza Vranov
- Preglejka Žarnovica
- Bučina Zvolen
- Drevokombinát Pezinok

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References Slovakia

CHEMICAL INDUSTRY
- SLOVNAFT Bratislava
- ISTROCHEM Bratislava
- DUSLO Šaľa
- CHZ Nováky
- MATADOR Púchov
- CHEMKO Strážske
- PETROCHEMA Dubová
- CHEMOLAK Smolenice
- CHEMLON Humenné
- CHEMOSVIT Svit
- PLASTIKA Nitra
- PCHZ Žilina
- SKLOPLAST Trnava
- Sklárne Lednické Rovné
- Technické Sklo Dúbravka
- Transpetrol Bratislava

CEMENT WORKS
- Banská Bystrica
- Ladce
- Lietavská Lúčka
- Bystré
- Turňa nad Bodvou
- Rohožník
- Horné Sŕnie

HEALTH CARE
- SLOVAKOFARMA Hlohovec
- BIOTIKA Slovenská Ľupča
- Hospital Košice
- Hospital Bratislava - Petržalka
- Národný onkologický ústav Bratislava

FOOD INDUSTRY:

BREWERY
- Hurbanovo
- Nitra
- Trnava
- Topoľčany

SUGAR MILL
- Trnava
- Dunajská Streda
- Sládkovičovo
- Šurany

BUTCHERY
- Bratislava - Rača
- Komárno
- Trebišov

DIARY
- MILEX Bratislava
- Nové Mesto nad Váhom

OTHERS
- PALMA - TUMYS Bratislava
- PALMA - HENKEL Bratislava
- PALMA - AGRO Sečovce
- DEVA Trebišov
- SLOVLIK Trenčín
- SLOVPAK Malacky

EKOLOGICAL BUILDINGS
- ČOV Bratislava
- ČOV Žilina
- ČOV Trnava
- ČOV Prešov
- ČOV Košice
- VN Starina
- OPV Čierna nad Tisou

CITIZEN BUILDINGS:

ICE STADIUM
- Bratislava
- Piešťany
- Trnava
- Košice

PRINTING HOUSE
- Bratislava
- Martin

AIRPORT
- Bratislava
- Košice

THEATRE
- Bratislava
- Nitra
- Prešov

OTHERS
- ISTROPOLIS Bratislava
- SNR Bratislava
- Film KOLIBA Bratislava
- Národná Banka Slovenska - Košice
- Československá obchodná banka Bratislava

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References Europe

GERMANY

- Eisenhüttenstadt
  EKO blast furnance (1984)
- Schwarzepumpe
  power plant (1972)
- Erfurt
  power plant (1970)
- Brandenburg
  wire rod mill (1980-1983)
- Boxberg
  power plant (1982)
- Bad Salzungen
  rolling mill (1986-1988)
- Lichtenberg
  power plant (1980-1990)
- Berlín
  DEPO - running shed (1986-1988)
- Berlín
  radio plant (1986-1989)
- Eisenhüttenstadt
  EKO blast furnance (1987-1989)

UKRAINE

- Uzhgorod
  central repair shop (1987-1990)
- Krivoy Rog
  metallurgical works (1989-1995)
  crude oil and gas pumping station, steam reforming (1980-1989)

CZECH REPUBLIC

- Třinec
  rolling mill
- Nová huť Ostrava
  feeding distribution networks
- České lodenice Mělník
- ZKL Brno - Líšeň
- Moravské chemické závody Ostrava
- Hranice na Morave
  cement works
- NPP Dukovany

RUSIA

- Artemovsk
  copper sheet welding line supervision (1982-1983)
- Kamyšin
  central repair shop (1985)
- Sumgait
  petrol pyrolisis and ethylene production(1986-1988)

BULGARIA

- Kremikovci
  blast furnance (1989-1991)

ROMANIA

- Braila
  pulp mill (1979)

HUNGARY

- Pécs
  power plant (1988-1992)
  car washing plant (1965)

YUGOSLAVIA

papermachine, cellophane (1963-1965)

POLAND

- Plock, Wloclavek
  silos and driers (1990-1991)

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References World

MONGOLIA
- Darchan Sum
  cement works (1971)
- Ulanbatar
  tannery supervision (1975)

CHINA
- Jia Ngou
  lighting of coal handling
  in power plant (1988)

VIETNAM
machine works
supervision (1977)

INDONESIA
- Tonassa
  cement works (1968)
  Diesel-electric power station
  supervision (1965)
- Java, Borneo
- Diesel-electric power station
  (1963-1968)

AFGHANISTAN
- Herat
  cement work (1976)

INDIA
- Smi Ranchi
  metallurgic works (1970)

IRAN
- Tabriz SMK
  machine works (1969)
- Isfahan
  machine works (1981-1983)
- Iranshahr
  power plant (1990-1996)

IRAQ
- Ramadi
  ceramic works
  (1990-1995), (1975-1976)

SÝRIA
- Ibisseh
  gas treating plant (1985-1990)
- Homs
  power plant (1985-1995)
- Homs II
  rafinery plant (1985-1994)

NIGERIA
Diesel-electric power stations
supervision (1983-1991)

GHANA
supervision (1989-1992)

CUBA
cement works (1965-1973)
machine works (1965-1973)

BOLIVIA
- La Paz
  antimony processing plant (1980)
  Diesel-electric power plants
  (1979-1988)

PERU
- Lima
  Diesel-electric power plants
  (1972-1975)

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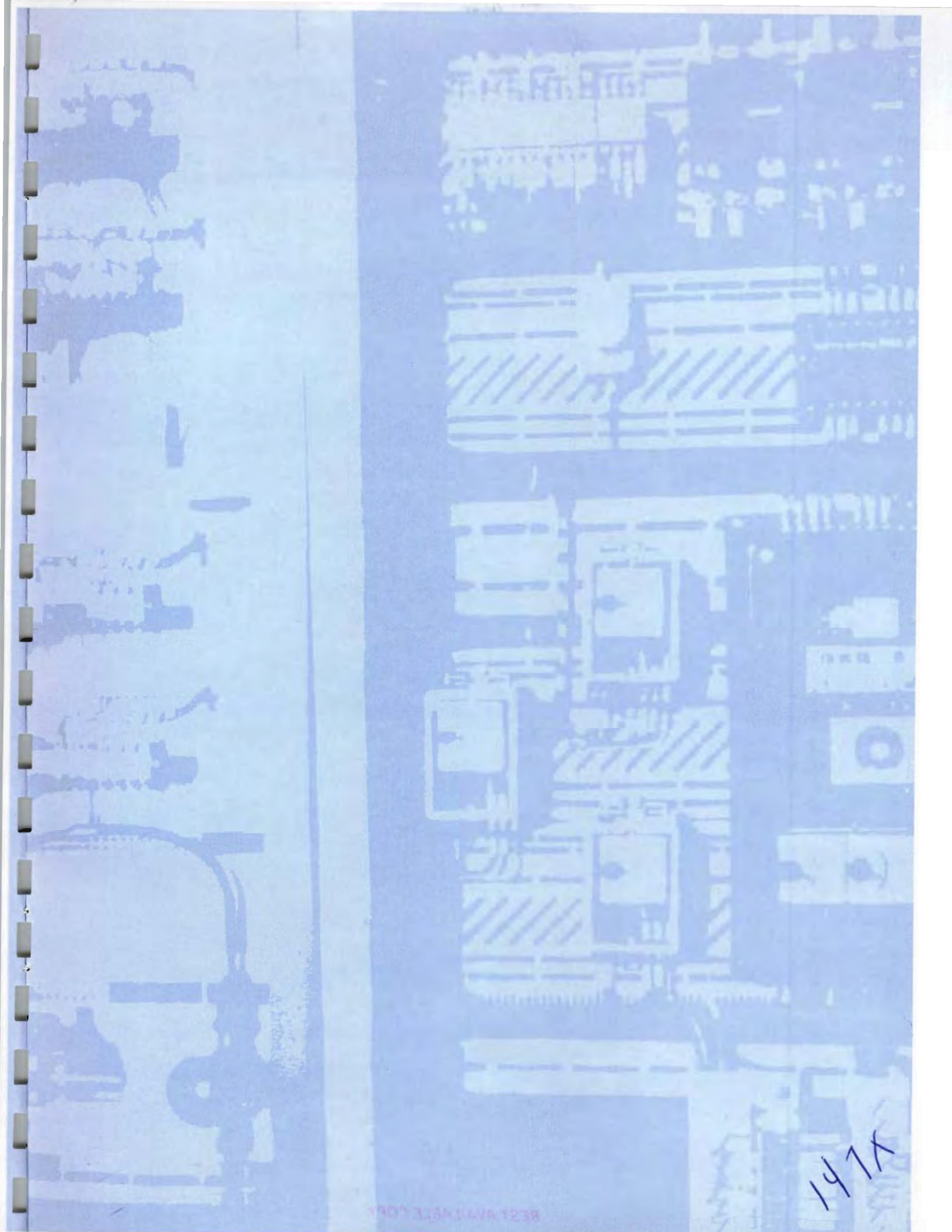

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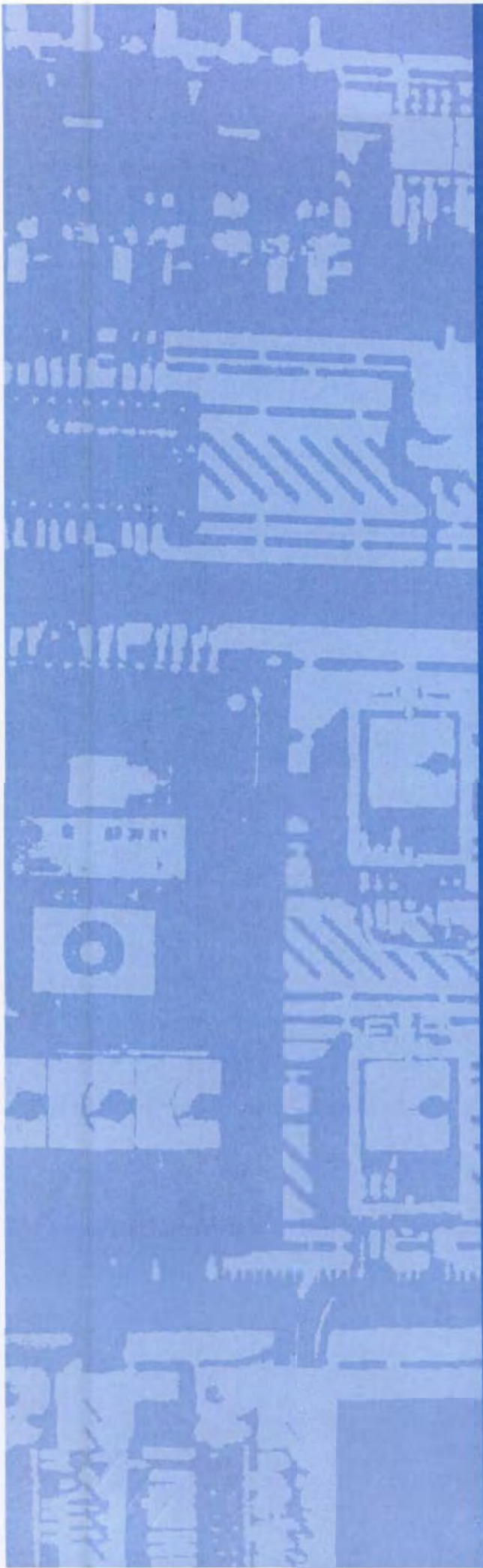

EZ-ELEKTROSYSTÉMY Bratislava, corp.
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Danube Transboundary Pollution Reduction Project

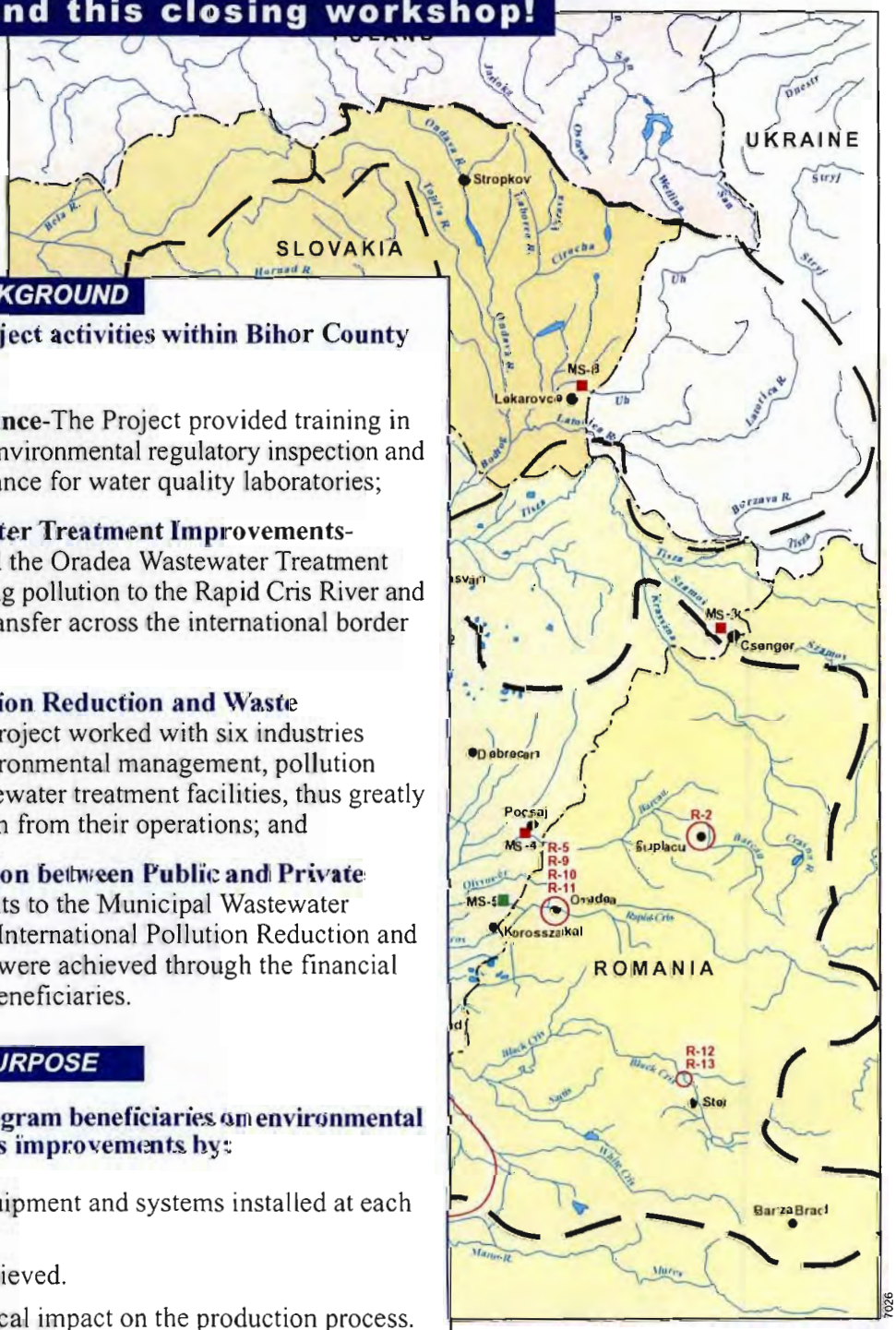
Program Closing Workshop-Romania

Please attend this closing workshop!

September 5, 2001

Hotel Dacia Continental
Str. Aleea Strandului Nr. 1
Oradea, Romania

Tel: 059/418656
Fax: 059/411280
9:30am to 3:00pm



BACKGROUND

The GEF/Danube project activities within Bihor County included:

- **Government Assistance**-The Project provided training in the fundamentals of environmental regulatory inspection and quality control/assurance for water quality laboratories;
- **Municipal Wastewater Treatment Improvements**-The Project upgraded the Oradea Wastewater Treatment Plant, thereby reducing pollution to the Rapid Cris River and lowering pollution transfer across the international border with Hungary;
- **International Pollution Reduction and Waste Minimization**-The Project worked with six industries to improve their environmental management, pollution prevention, and wastewater treatment facilities, thus greatly reducing the pollution from their operations; and
- **Fostering Cooperation between Public and Private Sectors**-Improvements to the Municipal Wastewater Treatment Plant and International Pollution Reduction and Waste Minimization were achieved through the financial participation of the beneficiaries.

PURPOSE

Feedback from the program beneficiaries on environmental protection and process improvements by:

- Discussion of the equipment and systems installed at each industry.
- Operating results achieved.
- Quality and economical impact on the production process.
- Any future work planned for further improvements, estimates and funding.
- Each industry's program for management of the environment protection, as instructed in previous training sessions.
- Lessons learned along the program development.
- Technical and financial problems encountered.

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PRELIMINARY AGENDA

9.30-9.45	Meeting opening by Prefect of Bihor County or Mayor of City of Oradea
9.45-10.00	USAID introductory presentation
10.00-10.15	Metcalf & Eddy presentation
10.15-10.30	Apele Romane report on wastewater quality improvements
10.30-10.45	Inspectorate for Environmental Protection report
10.45-11.00	Coffee break
11.00-11.15	Apaterm presentation
11.15-11.30	Envirotech technical overview of the project
11.30-11.45	Petrom presentation
11.45-12.00	SM Baita presentation
12.15-12.30	Sinteza/Pigmenti presentation
12.30-13.30	Lunch
13.30-13.45	Sinteza/Chimprod presentation
13.45-14.00	UAMT presentation
14.00-14.15	Petrolsub presentation
14.15-14.30	Discussions
14.30-14.45	Coffee Break
14.45-15.00	Romanian Ministry for Water, Forest and Environmental Protection Representative's conclusions.
15.00-15.15	M&E conclusions
15.15-15.30	USAID conclusions

Other speakers representing various international organizations may be included in the final agenda after receiving appropriate confirmation.

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INVITEES

Representatives from the following authorities, beneficiaries of the USAID program and Media:

- Romanian Ministry for Water, Forest and Environmental Protection.
- Regia Apele Romane (Local Water and Wastewater Authority).
- Bihor County Inspectorate for Environmental Protection.
- The Bihor County Administration.
- Oradea Mayor's Office.
- USAID.
- Apaterm (Oradea Wastewater Treatment Plant).
- Petrom, Suplacu de Barcau.
- Petrolsub, Suplacu de Barcau.
- Pigmenti, Oradea.
- Chimprod, Oradea.
- UAMT, Oradea
- SM Baita.
- Envirotech (M&E subcontractor).
- IFOR (M&E subcontractor).
- Joachim Bendow, Executive Secretary, ICPDR, Vienna
- ICDPR Delegate from Romania
- ICDPR Delegate from Hungary
- ICDPR Delegate from Slovakia
- Regional Environmental Center, Hungary Representative

- GEF/UNDP, NY
- UNIDO Vienna
- Arad County
- UNEP/GPA
- Danube Environ Forum
- World Bank
- World Wildlife Fund

SPONSORSHIP

Hosted by Metcalf & Eddy and the United States Agency for International Development (USAID)

REGISTRATION

Please favor us with a response by 15 August 2001.

Danube Transboundary Pollution Reduction Project; Program Closing Workshop - Romania

2 Ways to Register: E-mail the following information to: harry_blumenfeld@metcalfeddy.com or fax this form to: 781-245-0823

Name

Company Name & Address _____

City | State/Province | Country | Zip

Phone | Fax | E-mail

☐ I am unable to attend but please send me information.

7026

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ATTENDEES AT GEF/DANUBE WORKSHOP, ROMANIA
SEPTEMBER 5, 2001

Name	Organization
Mohammad Latif	USAID – Washington
Jerry Gold	USAID – Washington
Gianina Moncea	USAID – Romania
Danny Robertson	USAID – Romania
Fred Kirschstein	USAID – Romania
Angela Anta	Apele Romane Bihor
Maria Magyari	Apele Romane Bihor
Daniela Miere	Apele Romane Bihor
Marin Ghita	Apele Romane Bihor
Claudiu Oros	Apele Romane Bihor
Viorel Traian Lascu	Bihor County Prefecture
Lucia Surdu	Bihor County Prefecture
Aurel Tarau	Bihor County Prefecture
Stefan Seremi	Bihor County Council
Maria Rodica Cimpean	S. M. Baita
Angela Dume	S. M. Baita
Ileana Lup	S. M. Baita
Viorel Patroescu	Ecoind – Bucharest
Dr. Veronika Gitye	Envirotech – Romania
Ladislau Gitye	Envirotech – Romania
Dr. Gaspar Paller	Envirotech –Hungary
Dr. Josef Lessner	Envirotech – Hungary
Gyorgy Szocs	Envirotech – Hungary
Dumitru Lele	IFOR
Augustin Dudas	Environmental Protection Inspectorate
Mircea Ghitea	Environmental Protection Inspectorate
Janos Wagner	Koros Valley Environmental
Istvan Kapy	Oradea City Hall
Mihaela Botis	Oradea City Hall
Octavian Sava	Oradea City Hall
Lucian Dascalu	PROED
Mariana Barna	R.A. Apaterm
Constantin Tomulescu	R.A. Apaterm
Gheorghe Popa	R.A. Apaterm
Ioan Ciursas	R.A. Apaterm
Radu Ciursas	R.A. Apaterm
George Curan	REC – Romania
Olimpiu Dan Gabudean	S.C. Sinteza
Mihaela Craciun	S.C. Petrolsub
Ghe. Nistor Furtos	S.C. Petrolsub
Victoria Angelescu	S.C. Petrolsub
Marian Iliescu	S.C. Sinteza
Silvia Ardelean	S.C. Sinteza
Arpad Miklos	S.C. Sinteza

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Name	Organization
Liviu Dragan	S.C. Sinteza
Flavia Cighar	S.C. UAMT
Emil Bentan	S.N.P. Petrom
Gheorghe Gozman-Pop	S.N.P. Petrom
Gavril Lendeczki	S.N.P. Petrom
Mirela Sabau	S.N.P. Petrom
Keely Clifford	U.S. Embassy – Hungary

Appendix F
LETTERS OF APPRECIATION

Following are letters of appreciation received from project participants.

ECOIND INSTITUTUL NATIONAL DE CERCETARE-DEZVOLTARE PENTRU ECOLOGIE INDUSTRIALA
NATIONAL RESEARCH AND DEVELOPMENT INSTITUTE FOR INDUSTRIAL ECOLOGY (ex ICPEAR)

BUCURESTI: Sos. Pandurii 90-92; sector 5; 76231 RM. VALCEA: Str.Uzinei 1; Tel/Fax:40.50 73.75.43
Telefon:40 1.410 67.16 / 410.03.77; Fax: 410.05 75 TIMISOARA: Piata Victoriei 2; Tel/Fax:40.56.22.03.69

E-mail: icpear@sunu.rnc.ro; http://www.rnc.ro/ICPEAR
Registrul Comerciului 340/6851/1999, Cod fiscal R 3268360, Cont virament: 2511 1-108.1/ROL; BCR Filiala Sector 5

973/29.03.2001

cc ICPEAR file
Chalas
Blumenfeld
Kelley
Cote
Gorgone
Harrington

To: Metcalf & Eddy
Fax: 0017812246546
Attn.: Mr. Brian Harrington
Ref.: GEF/Danube Project

Dear Mr. Harrington,

Being very close to the successful (we say) finishing of the "GEF/Danube Project", in the name of the entire INCD-ECOIND Bucharest team, I wish to thank you and also to Mr. John Chalas, Mr. Harry Blumenfeld, Mrs. Ellen Kelley, Mrs. Linda Cote and Mrs. Bonnie Gorgone for the opportunity that you offered us, of taking part in this project, and for the very good collaboration and the support you permanently provided to us during the project implementation.

Hoping that we have done a good job, we hope in future collaborations.

Best regards and wishes,

ECOIND Manager
Margareta Nicolau

ECOIND BUCURESTI ROMANIA

Eng. Viorel Patroescu
Eng. Maria Teodorescu

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VÝCHODOSLOVENSKÉ VODÁRNE A KANALIZÁCIE
ŠTÁTNY PODNIK
Podnikové riaditeľstvo , Komenského 50 , 042 48 Košice

Mr. Jerry Gold
USAID
E&E/EEST/ENR, Rm.5.10-008 RRB
1300 Pensylvania Ave.
N.W. Washington, D.C. 20523
USA

Subject: Water Treatment Plant Košice – Action Evaluation

Dear Mr Gold,

Let me thank you this way for the financial means that were provided by your agency for the construction of the Water Treatment Plant in Košice - biological treatment. By joining your and our means, conditions were created for the completion of the 1st alternative of the biological stage. We can state that, by the realisation of this part of the construction, the water discharged from the Water Treatment Plant Košice is now fully cleaned mechanically and biologically, in line with the project documentation, compiled by the company BIDOR. By the full biological purification of wastewater, the surface water in the river Hornád, and thereby the river Danube, has become healthier, which was the goal of our environmental project.

We highly estimate the participation of the company Metcalf&Eddy in this project, and, at the same time, we would like to thank Mr. Harrington, who, precious to us not just because of his excellent organising skills but also because his highly valuable technical advice, has helped a lot to complete the construction successfully.

On 29th May - 1st June, commissioning of the construction took place right at the site, where it was stated that the financial means that were invested into the construction by your organization were fully used for the agreed purpose, in line with the project documentation and contracts. During the commissioning it was also stated that Metcalf&Eddy's subcontractors (EZ Bratislava, SPEL-PROCONT Prešov, BIDOR Bratislava) fully completed their work in excellent quality.

Yours sincerely

Ing. Ladislav Mihalko

VÝCHODOSLOVENSKÉ
vodárne a kanalizácie
štátny podnik
KOŠICE 3

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M.I.C.-C.N.C.A.F."MINVEST"S.A. DEVA
"DEVAMIN" S.A. DEVA SUBSIDIARY
BĂIȚA MINING BRANCH

RECEIVED - M&E INTERNATIONAL
FILE:
APR 0 6 2001
KDK | MM | JP | SA
EK | CW | JANET | C
TC
BH

IN ATTENTION OF MRS. JANINA MONCEA,

We gladly announce you that on the November 20th the Neutralization Installation of the Cyanides in the Residual Waters Provided from the Fânațe Tailing Pond has been started up.

The fulfillment of this project represents for us and we hope for the American partners too the beginning of the other projects fulfillment for the environment and waters protection.

As a continuation of the USAID programme Băița Mining Branch has prepared a new project which regards the equipping of the ore processing lines with X ray belt analysers, but the lack of the financial resources keeps us from making this possible on our own. It is also very important to replace the tailing transport pipe line from the Preparation Plant to the Fânațe tailing pond which, due to the wear can anytime cause an environment accident.

Once this objective is reached it will solve one of the most important problems that have a high risk on the environment, particularly on the water.

We thank you once again and we deeply regret that the former ambassador of the USA, Mr. Rosapepe, couldn't see right here the way this project was done. We hope that the future startings of the objectives included in the USAID programme (related to Băița Mining Branch) will be officiate by the next USA ambassador.

No matter what happens it will be a great pleasure for us to have here once again the extraordinary American team which made possible the realization of this project.

SINCERELY YOURS
MANAGER ING. MARIA CÎMPEAN

Ministerul Apelor, Padurilor şi Protectiei Mediului

COMPANIA NATONALA APELE ROMÂNE S.A.
DIRECTIA APELOR CRIŞURI - ORADEA
Oradea - str. Ion Bogdan nr. 35
Telefon: 059-142 033
059-143 892
Fax: 059-444 237
E-mail: dao@rdsor.ro

Fax: 1534/22.11.2000

cc Danube File
V. Chalar
H Blumenfeld
J. Gold USAID
L. Schultz USAID

TO: Metcalf & Eddy – USA
ATTN: Mr. Brian Harrington
Fax: 001 – 781-224-6546

FROM: Directia Apelor Crisuri – Oradea
Octavian Streng Technical Manager
Fax: 099-444237

DATE: November 22, 2000

I am writing to thank you for your many efforts in developing the GEF Project and I wish to express my gratitude to you for the help you are rendering us.

The Atomic Absorption Spectrometer you have appropriated to us is very useful and makes our work easier and more reliable. We are very contented because it offers us the possibility of working with a very common method of determination of metals.

I should be very much obliged if you could let me have more details of the further development of the GEF Project. If it is concerning us I should be most grateful if you were able to refer us in getting a Reverse Osmoses Device for water, recommended in Atomic Absorption Spectrometry and a WTW Incubator for Biological Oxygen Demand (BOD). Your help would be most highly appreciated

Allow me to take this opportunity and wish you

Merry Christmas
and
A Happy New Year

With best regards, Yours faithfully

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R.A."APATERM" ORADEA
Investment Department
NO. 4243 of 15.03, 2001

DRAFT REGARDING
THE WORKS COMPRISED IN
THE USAID PROGRAM „REDUCTION OF TRANS-FRONTIER POLLUTION IN DANUBE'S THREE TRIBUTARY BASINS – WASTEWATER TREATMENT WORKS ORADEA "
CONTRACT NO. DHR 039 – C – 00 – 5080 – 00

On 28th February 2001 the state of program objectives achievement is as follows:

- Object 1. Primary sludge pumping station SPNP 1 .

This one is completely achieved, being operational starting 15th December 2000. And it is fully operational at the designed parameters.

- Object 2. Primary sludge pumping station SPNP 2.

This one is completely achieved, being operational starting 28th February 2001. And it is fully operational at the designed parameters (set).

- Object 3. Active sludge pumping station SPNA 1.

This one is completely achieved, being operational starting 21st November 2001. And it is fully operational at the designed parameters.

- Object 4. Active sludge pumping station SPNA 2.

This one is completely achieved, being operational starting 28th February 2001. And it is fully operational at the designed parameters (set).

- Ob. 5. Metantancuri nr. 1 şi 2.

The equipments and devices required by the operation are fully purchased and ready for mounting.

At the construction part the works are part finished ca. 50% restricted by the technological execution conditions due to the cold weather.

Considering the amount of outstanding works, according the execution chart that was forwarded by the constructor, the start-up of this objective will be done until 31st August 2001.

The USAID Program worth USD 1,215,352, co-funded by USAID and R.A. „APATERM" Oradea, is fully achieved, the USAID funded share being USD 858,303.

R.A."APATERM" Oradea funded share worth USD 357,049 is under progress, and to be finished at the end of August 2001.

The delay at Object 5, was due to:

- Cold weather for technological execution of works

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- Operation condition of Wastewater Treatment Plant, that cannot provide the total protection against flood of objectives under progress.

By starting up the Objectives 1 – 4, the following succeeded:

1. Processing the whole primary sludge quantity obtained in the mechanical Stage, thus avoiding the clogging of pipes of taking over the sludge from the primary settling tanks, their drowning, resulting a higher yield of primary settling.
2. Provision of excess sludge quantity required for the biological treatment for the whole used water flow that runs into the station.
3. Optimal control of automatic re-circulated active sludge, required to provide the further operation of biological treatment process at nominal rate.

Therefore these improvements may provide a continuous treatment of whole waste waters inflow, the station's yield increasing by ca. 30% that is insufficient for reaching the designed operation parameters, according to the report as presented in appendices.

Unachievement of a higher yield is due to the fact that the other objectives on the technological flow of the station are fitted with old equipments, real and morale worn, at low yields leading to operation and maintenance weaknesses.

Thank you for the efforts and help both in know-how and financial in the progress oft this project.

We consider that thanks to these efforts one step more has been achieved in solving the many environment problems that concern the riverside area of the Oradea City with important area and trans-frontier influences.

GENERAL MANAGER
Dipl. eng. Ioan Ciursaş

CONSILIUL LOCAL AL MUNICIPIULUI ORADEA
Regia Autom. „APATERM"
R.A. „APATERM"
1
ORADEA

CHIEF OF INVESTMENT DEPT.
Dipl. eng. Radu Ciursaş

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S.C. UAMT S.A. ORADEA
ROMANIA

SR EN ISO 9001
Nr. 016

Str. Uzinelor nr. 8
3700 ORADEA
ROMÂNIA

Nr. Reg. Com. J 05/173/1991
C.F. R 54620
Cont: 2511 1-5 1/ROL - BCR Oradea

Tel. 40-59-15 10 26 Tx 034265
Fax 40-59-46 20 66
e-mail: uamt@rdsor.ro

RECEIVED - M&E INTERNATIONAL
FILE:
APR 0 2 2001

KDK	MM	JP	SA
EK	CW	JANET	C

TO: **USAID ROMANIA - Bucharest**
Bulevardul Natiunilor Unite nr.1, Bl. 108 A, sector 5
ATTN.: **Mrs. Geanina Moncea**
FAX NO.:
PAGES: 1
DATE: 2 April 2001

Dear Mrs. Moncea,

Relating to the Transboundary Pollution Reduction Project in the three basins tributary to Danube (the GEF project, initiated and supported by USAID), through the contract no. DHR - C - 95 - 00080, our company, S.C. UAMT S.A. Oradea benefited by a project of upgrading two galvanization lines (implementing the cascade rinsing system and modernization of the waste water treatment plant).

We are informing you that we are very pleased of the operation and profitability of the entire project and we take this opportunity to thank you for all your support.

Yours sincerely,

Vasile POP
Executive Director

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AUTOMATIKA SZOLGÁLTATÓ KFT.

DNV ISO 9001

Ikt.sz: Kf- 184 /2001

Metcalf & Eddy, Inc.

Fax: 00 1 781 245-0823

Összeállította: ifj. Berzsenyi Miklós

Ellenőrizte: Csepi László

Melléklet: Statement

Veszprém, 2001. 03. 05.

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File 036-1 02145
MAR 07 2001

	WM	JP	SA
EK ✓	CW	JANET	C ✓

Harrington
Chalas

To: Ms. Ellen Kelley

Subject: Transboundry Pollution Reduction in the Three Danube Tributary Basins Project, Subcontract Number 180383

Dear Ms Kelley,

We were glad to hear that you closed the subcontract cited above. That is why we ask you to sign the attached Statement and please send us back along with the original copy of our Bank Guarantee.

It was a pleasure to work with you, and we hope that in your future projects in this part of the world, we will have the chance to work for you, again.

With the best wishes, Yours Sincerely,

Berzsenyi Miklós
Managing Director

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A SIEMENS PARTNERE

A Víz és Csatornaművek Országos Szakmai Szövetségének társult, nem üzemeltető tagja.
8200 Veszprém, Csillag u.1.
tel: (88) 422 282, 429 677 fax: (88) 429 078
Citibank Rt.: 10800021-00000001-81165006
E-mail: ugyvitel@controlsoft.hu

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