Western Balkans Environmental Programme

FINAL REPORT

2007–2010


Western
Balkans
Environmental
Programme

Western Balkans Environmental Programme

FINAL REPORT

2007–2010

Publisher
UNDP Montenegro

For Publisher
Alexander AVANESSOV
UNDP Montenegro Resident Representative

Authors
Klodiana MARIKA, UNDP Albania
Raduska CUPAC, UNDP Bosnia and Hezegovina
Borko VULIKIC, UNDP Montenegro
Dobrila SIMIC, UNDP Serbia
Anita KODZOMAN, Aleksandar NACEV, UNDP Macedonia
Esad JUSUFI, Ismail DERGUTI, UNDP Kosovo,
Snezana DRAGOJEVIC, Snezana MARSTIJEPOVIC, UNDP Montenegro – *Regional Management Unit*

Editor
Snezana DRAGOJEVIC

Photography
UNDP Albania, UNDP Bosnia and Herzegovina, UNDP Macedonia, UNDP Montenegro, UNDP Serbia, UNDP Kosovo.

Proofreading
Peter STONELAKE

Design
Suzana PAJOVIC-ZIVKOVIC

Printed on Recycled paper in "Publikum", Belgrade
700 copies
October 2010

The Western Balkans Environmental Programme was funded by the Government of the Netherlands

ISBN 978-9940-9245-8-4
COBISS.CG-ID 16739600

This publication presents a brief summary of the results of the Western Balkans Environmental Programme implemented in the period from 2007 to 2010. UNDP Country Offices from the Western Balkans who were part of this programme (Albania, Bosnia and Herzegovina, Montenegro, Serbia, The FYR of Macedonia and UNATSCR 1244 Kosovo) and the Regional Management Unit (UNDP Montenegro) provided essential support to the programme implementation and the process of developing this publication in particular through the involvement of:

UNDP Albania:
Adriana MICU, Klodiana MARIKA, Lirim SELFO, Ilda MALILE, Eneida SHULI
UNDP Bosnia and Herzegovina:
Goran VUKMIR, Raduska CUPAC, Sinisa RODIC, Nikola AREZINA, Djordje STEFANOVIC
UNDP Montenegro:
Milica BEGOVIC, Borko VULIKIC, Ana DAKOVIC
UNDP Serbia:
Radivoje STANCIC, Dobrila SIMIC, Vera CVEJIC, Aleksandar MACURA
UNDP Macedonia:
Anita KODZOMAN, Vladimir STAVRIC, Aleksandar NACEV, Ardian SKIKULI, Samir MEMEDOV
UNDP Kosovo:
Krenar LOSHI, Kazuki MATSUURA, Lisa MATTSSON, Esad JUSUFI, Ismail DERGUTI, Agron BEKTASHI
Regional Management Unit (UNDP Montenegro): **Sanja BOJANIC, Stewart WILLIAMS, Snezana DRAGOJEVIC, Snezana MARSTIJEPOVIC, Ljiljana RADOVIC, Radivoje NEDOVIC, Sladjan MASLAC.**

In addition to the UNDP Country Offices listed above, the inputs, involvement and suggestions from a number of individuals from the Kingdom of the Netherlands (programme donor), programme partners, participating countries'/territories' ministries and institutions and consultancies employed in the course of this programme are gratefully acknowledged throughout the programme implementation.

FORWARD

Environmental issues are amongst the most challenging in the Western Balkans. During transition period in 1990s and beginning of 2000s, national policies focused heavily on the economic and political reforms, security issues, improvement of general living conditions, very often leaving environmental aspects on the periphery of national agendas.

As a result, much-needed investment in the environmental infrastructure such as wastewater treatment, air-pollution abatement and monitoring, and industrial and communal waste management are still awaiting their turn. Many industrial towns in the Western Balkans face a complex challenge of past industrial development and the legacy of pollution. The environmental situation in these hot spots is a direct cause of poor health and related poverty and presents a major barrier to future investments and related economic opportunities for the local population. On one hand they need environmental clean-up, and on the other they are struggling with the problems of poverty, lack of infrastructure, quality services and prospects for the younger generations, especially in terms of jobs availability.

Against this background, the UNDP Country Offices in Albania, Bosnia and Herzegovina, Montenegro, Serbia, the FYR of Macedonia and the UN-Administered Territory under Security Council Resolution 1244 Kosovo have developed a regional programme "*Strengthening Capacities in the Western Balkans Countries/Territories to Address Environmental Problems through Remediation of High Priority Hot Spots*".

The programme has been developed around demand-driven projects in selected locations in the Western Balkans suffering from the legacy of polluting industries and requiring industrial renewal, and environmental cleanup, which have already been identified as high-priority sites, but have achieved limited progress so far, due to the complexity of issues and the costs involved.

Step-by-step clean up of polluted areas, investment in cleaner technologies to reduce waste, wastewater and air pollution must be combined with stronger integration of environmental concerns in sector policies and cross-border cooperation. It seems that investment in effective mechanisms and mobilisation of already existing domestic expertise for sustainable environmental management could provide significant benefits to all in the short to medium term. This programme provided a significant step forward in this direction aiming to transform the environmental pollution legacies into development opportunities.

Alexander AVANESSOV
UNDP Montenegro Resident Representative

CONTENTS

SERBIA

THE FYR OF MACEDONIA

UNATSCR 1244 KOSOVO

EXECUTIVE SUMMARY

The approach of the 36-month, approximately USD 15 million programme was to achieve an improvement in the environmental situation and quality of life for citizens living in and around polluted areas through least-cost measures, improved local and national policy dialogue and the supply of domestic professional services in the environmental sector.

The programme was structured to contribute to the achievement of the following overall objectives in the region:

- To increase capacity of the national and local governments in the Western Balkans to implement sustainable environmental policies in accordance with EU standards.
- To strengthen regional co-operation in the Western Balkans to solve problems of cross-border contamination due to industrial and mining activities.

The concrete project objectives were to:

- Secure progress in the cleanup of eleven priority environmental hot spots, to raise awareness and strengthen capacities for good environmental management at local and national levels;
- Enhance regional co-operation through improved information-sharing progress and the supply of professional consultancy services regarding good environmental management.

The programme was implemented in six countries/territories of the Western Balkans: Albania, Bosnia and Herzegovina, Montenegro, Serbia, the FYR of Macedonia and the UN-Administered Territory under Security Council Resolution 1244 Kosovo, and was dealing with remediation of 11 environmental hot spots.

In each of the participating countries/territories programme activities were divided into three main components:

- Clean up of environmental hot spot locations;
- Institutional strengthening and capacity development in relation to improving environmental management;
- Public awareness raising at the local level about the necessity of environmental protection and planning.

On the regional level, the Programme aimed:

a) To enhance regional cooperation in the Western Balkans (by showing added value and by influencing the way that people perceive initiatives, and also the way they act in regional cooperation),
b) To improve living conditions in communities around the targeted environmental 'hot spots', through progress in cleanup activities in selected locations (making progress and communicating this effectively to stakeholders),
c) To ensure control of existing pollution and to prevent similar environmental problems occurring in the future, through building up knowledge and capacity both in local communities and at a national level.

This publication is a summary of the results achieved in each of the countries/territories as well as at the regional level in the period from September 2007 to September 2010. Aware that the impact of the results can be barely visible immediately after the programme implementation, this publication aims at comparing the baseline situation in each of the programme constituents, with the situation in the closing period of the programme when this publication was created.

Divided into seven sections (regional component and six participating countries/territories), the Final Report provides a summary of the activities that have been implemented in the last 36 months, at a cost of approximately USD 20 million (including donor funds and countries'/territories' contributions), the results achieved, partners involved, as well as lessons learned during the programme implementation.

The regional section has grouped regional activities into 5 main categories: I) expert workshops, II) study tours, III) programme progress meetings, iv) advocacy and communications and v) effective programme implementation and coordination. Special attention has been given to the innovative approach in management of the regional programmes, which is, we believe, added value in the implementation of the environmental programmes in the Western Balkans region.

International and especially EU experience in the revival of former industrial regions further shows that development breakthrough in polluted hot spots can only be achieved through integrated initiatives at the local level, addressing the local environmental, social and economic needs. Such initiatives cannot be successful if they are undertaken by one of the sectors such as the environment, welfare, health or economy alone. They require creative cross-sector solutions based on stakeholder dialogue and public participation and very often the most effective actions are not directly related to the sources of pollution but to future environment-oriented activities or infrastructure. Therefore, the projects implemented in each of the countries/territories were divided into three main components explained further bellow.

I Clean-up Component

The clean-up component includes remediation works in eleven environmental high-priority hot spots in the region. The programme initially started with nine locations, and two more were included at the later stage of programme implementation.

The hot spot locations were selected during the programme preparation phase from those already identified by the "Environment and Security Initiative" or by national authorities through National Environmental Action Plans as top-priority hot spots. Local authorities and/or site owners at the potential project sites were also invited to take part in the identification phase. Based on the interest expressed (in the form of letters of commitment), particular hot spots were selected in each participating country/territory through consultation between the UNDP, relevant national authorities, the local Embassies of the Netherlands and civil society. The criteria used for selection were as follows:

- Considerable impact on human health and the environment;
- Cross-border effects of the hotspots;
- Availability of relevant technical documentation, researches, studies, etc.;
- The possibility to provide 50% of the funds allocated for clean-up;
- The possibility to establish partnerships, including public-private partnerships;
- The readiness of local authorities and relevant stakeholders to take leadership in the sustainable environmental management of their community.

Based on these criteria the following hot spot locations were selected for intervention under this programme:

a. Clean up of the chemical storehouse in Bajza, Albania.
b. Closing down of the obsolete heat production facilities at two clinics and one community centre which had been creating serious in-town air pollution, by connecting the users to a significantly less polluting energy source (the district heating system) in Tuzla, Bosnia and Herzegovina.
c. Construction of (i) collection and treatment system for mine and waste rock dump drainage and other waste water, (ii) re-vegetation of tailings and (iii) installation of a fugitive dust control system – Bucim Mine in the FYR of Macedonia.
d. Emergency capping and containment of arsenic (As) contaminated mineral processing waste close to a school and local villages in Lojane, the FYR of Macedonia.
e. Construction of a wastewater treatment plant and stabilization of lead and zinc mine tailings in the tailing mine impoundment in Mojkovac, Montenegro.
f. Construction of main water collector connecting industrial and communal waste waters in Vrbas and Kula to prevent ongoing pollution of the Grand Backa Canal, Serbia.

g. Emergency capping and containment of uncontrolled lead, cadmium, arsenic and zinc-contaminated mine tailings dumped on the banks of the River Kriva, which had slumped into the waters – Artana, Novo Brdo Mine, UNATSCR 1244 Kosovo.
h. Emergency capping of arsenic, lead and cadmium-contaminated dam crest located above the city of Mitrovica, UNATSCR 1244 Kosovo.
i. Classifying, repackaging and removing of approx. 216 tonnes of hazardous waste stored in government and military storage facilities at 6 different locations for export and destruction at international disposal facilities, Balez, Albania.
j. Rapid risk-reduction works at the tailing mine impoundment, rehabilitation of the mine tailing facility in Reps, Albania.
k. Rapid risk-reduction works at the tailing mine impoundment, rehabilitation of the mine tailing facility in Rreshen, Albania.

Seven of the eleven locations (c, d, e, g, h, j, k) are *mining hotspots*, most of them also identified as the highest-priority clean-up sites by the EnvSec Initiative desk study and proposal on environmental security risk reduction from mining. Three of those seven (Mojkovac in Montenegro; Reps and Rreshen in Albania) concern *abandoned* mining operations, and four (Bucim and Lojane in the FYR of Macedonia, two locations in Trepca/UNATSCR 1244 Kosovo) addressed *re-opened* mining and minerals processing activities.

The project in Bosnia and Herzegovina concerned changing the local energy supply system for a particular user group (two health clinics and a residential community) at the municipal level in order to close down heavy polluting plants for the (public health) benefit of its own urban population.

The project in the Kula – Vrbas section of the Danube – Tisza – Danube or Grand Canal in Serbia addressed just one component of a multi-year, large investment (more than USD 50 million) in Water Resources Rehabilitation. Without such prior rehabilitation a desirable level of integrated WR Management could never been achieved.

Two projects (Bajza and Balez in Albania) addressed the issue of relatively simple hot spots – careless storage of a mix of toxic chemicals and other materials – with possibly long-lasting negative effects on a very valuable ecologic system and surrounding area.

Altogether, this package is believed to represent a good ' cross-section' of the hotspot problems in the 'six nations' region, each calling for tailor-made corrective actions – or at least a first step in the right direction.

The establishment of a water and/or air pollution *monitoring* regime and system – a fundamental responsibility of the hotspot 'owner' – was a common requirement for all locations.

For each of the participating countries/territories an amount of USD 1.6 million was allocated for clean-up interventions. The target overall matching funds from the hot spot site owners/

managers for each location is up to 50% (in actual work or cash), which constituted a criterion for the selection of the location in the first place.

Detailed information about remediation activities in each of the selected locations (including timing, costing, partners, etc) have been presented in "Case Studies on Remediation of Environmental Hot Spots in the Western Balkans", while the Final Report covers the summary of the works conducted.

Both publications will serve as a knowledge base for implementation of future similar programmes.

II Capacity Development

This component of the programme was aimed at:

a) promoting the necessity for countries/territories to move from legislation to implementation in protecting the environment and managing natural resources[1];
b) demonstrating concrete results of the benefits of good environmental management to local communities through concrete demonstration projects.

It involved, mostly through workshops/trainings/meetings/study visits, etc, the relevant institutions of national governments for environmental management and sustainable development, including environmental ministries, but also core 'economic' ministries such as finance, industry and labour, public institutions and civil society organizations.

Capacity development programmes were tailored for each of the participating countries/territories, based on national Need Assessments on Capacity Development and Policy Integration reports developed for each of them. Some of the topics covered within the capacity development programmes include: energy efficiency, IPPC, SEA/EIA, strategic planning, mine site rehabilitation, chemical management, water pollution, air pollution, etc.

The Final Report presents more detailed information about all CD programmes implemented in each of the countries/territories.

1 Although most environmental legislation is in place, implementation has been slow and therefore progress in protecting the environment and managing natural resources is not yet evident throughout the region.

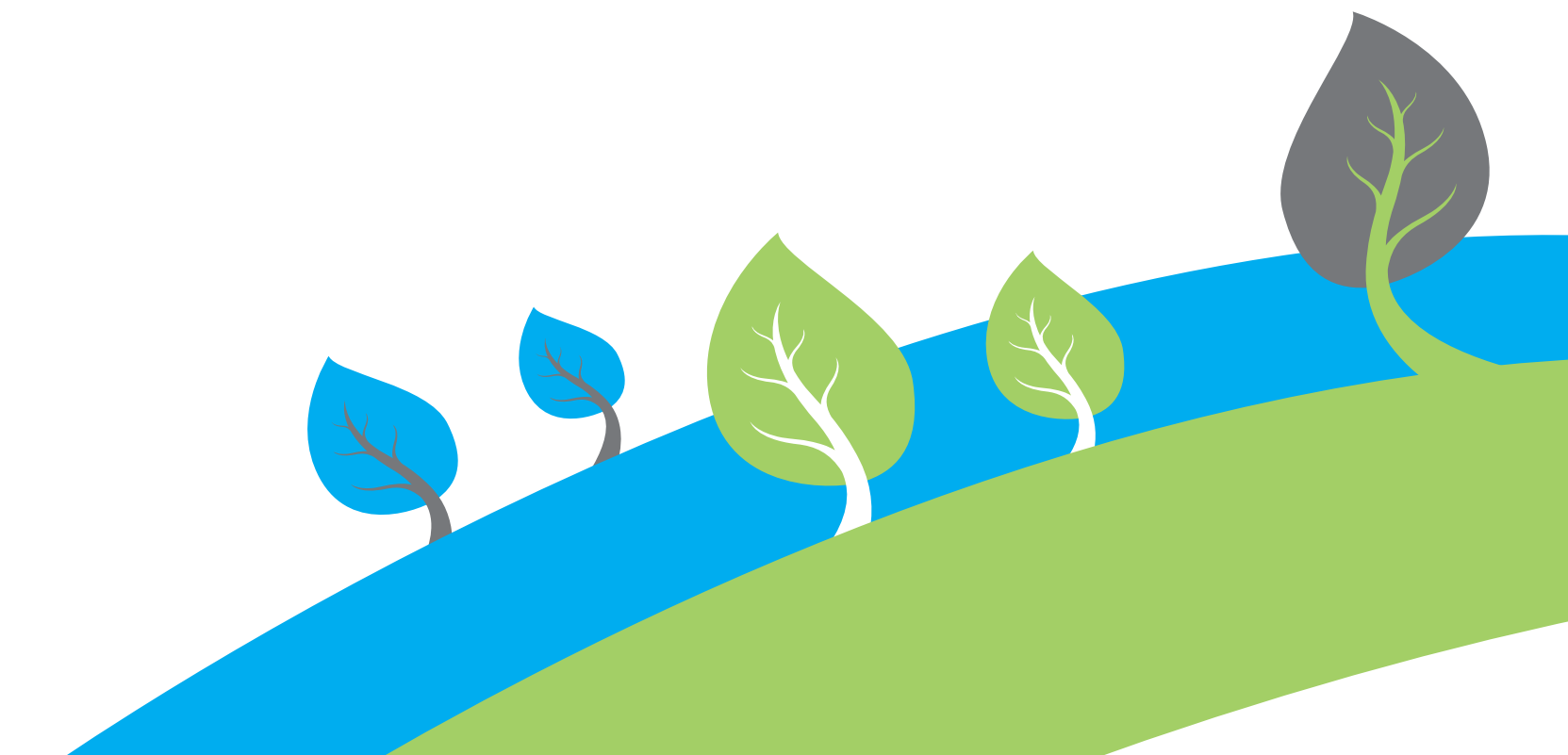
III Public Awareness Raising

The programme supported free access to information and environmental data collection in order to enable countries/territories to adopt, implement and/or enforce policies and legislation in an effective and efficient manner.

The successful implementation of clean-up and capacity-development components, with relevant data available on the programme web site, were expected to provide an important contribution to further developing free access to information mechanisms in a way compatible with the national and local instruments.

In addition to the programme web site, several other communications tools have been used throughout the programme implementation in order to transfer the message to the target audience about the programme goals and objectives, the works conducted, but also about the tools they can use in active participation in environmental decision making.

REGIONAL COMPONENT



ABSTRACT

Main goals of the Regional Component of the Western Balkans Environmental Programme:

a) To enhance regional cooperation in the Western Balkans (by showing added value and by influencing the way that people perceive initiatives, and also the way they act in regional cooperation),
b) To improve living conditions in communities around the targeted environmental 'hot spots', through progress in cleanup activities in selected locations (making progress and communicating this effectively to stakeholders),
c) To ensure control of existing pollution and to prevent similar environmental problems occurring in the future, through building up knowledge and capacity both in local communities and at a national level.

In order to deepen and extend regional cooperation, defined as one of the main goals of the project, a whole set of different regional events were organized, with the aim of exchanging experiences, knowledge, information and expertise among professionals from all the participating countries/territories.

In addition to this, different information exchange tools were used in order to provide free access to information and establish a platform for improving access to professional consultancy in the region.

The Regional Management Unit, as overall responsible for the programme implementation, established contacts with various relevant international organizations in order to search for synergies and encourage future wider use of the regional programme results.

All the regional activities/events organized in the last 36 months can be grouped into five main categories:
I) expert workshops, II) study tours, III) programme progress meetings, IV) advocacy and communications and V) programme implementation and coordination.

Environmental Monitoring and Field Surveillance Workshop

Having in mind the vital importance of environmental monitoring and field surveillance in order to demonstrate whether and to what extent the conducted physical works have contributed to improving the environmental situation in each of the remediation sites, a two-day workshop on Environmental Monitoring and Field Surveillance was organized in May 2009, in Montenegro. It hosted seventeen participants/practitioners involved in conducting, planning and/or assessing environmental monitoring and field surveillance in their countries/territories involved in the WBEP. The training was led by an international consultant and the Chief Technical Advisor of the RPMU, in cooperation with relevant UNEP expertise.

The purpose of the workshop was to present a regional snapshot of the participating countries/territories in relation to the environmental monitoring and field surveillance conducted and needed, and to provide participants with further skills through training in environmental monitoring and provision of tools and resources. The workshop supported the exchange of regional experiences by organizing teamwork activities during which the training participants prepared together field surveillance plans and environmental monitoring programmes. Apart from the monitoring plans and programmes, the specific outcomes of the teamwork activities were identification and better understanding of common needs, challenges and other specificities.

Detailed information about all three training modules covering: i) Environmental Monitoring Principles and Rationale, ii) Environmental Monitoring Techniques and Standards and iii) Applications and Implementation Strategies, as well as countries'/territories' and experts' presentations can be found at: http://westernbalkansenvironment.net/content/view/60/46/lang,en/ .



After the workshop, training and guideline handbooks were prepared, containing information about the aforementioned detailed training modules (Training Handbook on Environmental Monitoring and Field Surveillance), as well as more specific information on existing EU, WHO



and other international standards, guidelines, tools on environmental monitoring and field surveillance (Guideline Handbook). Both handbooks were widely distributed in all participating countries/territories, and electronic versions are available at: http://westernbalkansenvironment.net/content/view/73/46/lang,en/

Exchange Workshop on Capacity Development and Policy Integration Need Assessments

In line with the main programme objective – to strongly promote the importance of regional networking, by enhancing regional communication and exchange of information, experience and resources among experts, civil servants and communities in the Western Balkans region – the exchange workshop on Capacity Development and Policy Integration Needs Assessments was organized in May 2009, in Montenegro. The purpose of the workshop was to present the existing situation in all participating countries/territories in relation to the existing mechanisms on policy integration, to identify topics where further improvements are needed, as well as to find common ground for possible future joint work on developing capacities on selected topics.

The recommendations and suggestions for follow-up actions/exchanges on a regional level (Western Balkans) and/or on a bilateral level (between the involved countries/territories) in relation to future capacity-building programmes have been summarised in the Regional Report. The working documents for preparation of the Regional Report were the national Capacity Development and Policy Integration Need Assessments Reports developed for each of the participating countries/territories, which presented functional analysis of the specific mechanisms



of the environmental management policies and practices in each of the countries/territories. The national Needs Assessments were developed by engaged experts, in consultation with a wide group of stakeholders including government ministries, regional and local authorities, NGOs, private sector and international donors. The studies represented a summary of the existing good practices, problems, bottlenecks, opportunities for improvements and capacity development needs and were used for preparation of specific CD programmes in all participating countries/territories.

The Regional Report highlighted that a lack of administrative and human capacities is evident, and that it would take a lot more work and learning in order to improve the situation. The report confirmed once again that an integral approach is of the utmost importance and that environmental protection should be included at all levels of social action and life in the Western Balkans. Based on the country/territory needs assessment reports, the following topics were recognised as thematic areas where possible joint capacity development could be beneficial: I) Strategic Planning and Environmental Policy Integration, II) Remediation of Environmental Hot Spots and III) Implementation of SEA, EIA, IPPC. In addition, several topics were recognized by individual countries/territories where further capacity development is needed, such as: energy efficiency, waste management, air pollution, climate change, cleaner production, environmental education, etc.

The Regional Report, together with the national needs assessments report, has been published and distributed in all participating countries/territories, and an electronic version of the reports can be found at: http://westernbalkansenvironment.net/content/view/74/46/lang,en/

Regional Expert Meeting

The Regional Expert Meeting was organized in November 2009 in Montenegro and hosted more than 50 environmental experts from six countries/territories involved in the Western Balkans Environmental Programme. Programme beneficiaries and partners such as representatives of the national and local governments, management authorities of the remediated sites, civil society organizations, as well as representatives of the international community, had an opportunity to discuss the importance of regional cooperation in reducing pollution and remediating the "brownfield" sites located in the Western Balkans, to present the results and achievements of the Western Balkans Environmental Programme, and to discuss the national challenges and priorities in this area.

The Expert Meeting was divided into two sections. The first section was dedicated to visual presentations of the results achieved within the WBEP in all participating countries/territories and the regional component, through short films, pictures and direct communication with the relevant National Project Coordinators. An interactive presentation of the Database of Practitioners provided a separate segment of the visual presentation.



The second part of the Expert Meeting covered two working sessions:

I) The importance of regional cooperation in addressing environmental and "brownfield" issues in the Western Balkans, including presentations on the current state and next steps in the remediation/management of "brownfields" in the Western Balkans, the experience of the UNDP, results and lessons learnt in addressing environmental "hot spots" under the WBEP, and current and planned efforts by the Regional Cooperation Council (RCC) in the Western Balkans.

II) The second working session was dedicated to the countries'/territories' presentations of the identified national challenges and priorities and suggested next steps in relation to remediation of "brownfields".

According to the evaluation forms filled in by the participants and the follow-up communication with participants, the Regional Expert Meeting satisfied their expectations and significantly enhanced the exchange of experiences and knowledge, as well as the creation of new networks and the strengthening of existing ones between experts in the region.

All information related to the Regional Expert Meeting (including presentations and conclusions) are available on the programme web site, while video materials were posted on the UNDP web sites – New York, Bratislava and Montenegro.


The regional programme has been structured and resourced to provide 3 regional study tours per participating country/territory over the program life with the aim at increasing environmental management capacity in the Western Balkans through an exposure to the best practice and innovative ideas that were used to solve similar environmental problems in other countries.

A. The first round of study tours was organized during late September and the beginning of October 2008. Based on the discussion between the Regional Programme Management Unit, led by the Chief Technical Advisor, UNDP country offices and national project coordinators while taking into account the diversity of sites in the environmental 'hot spot' portfolio, three themes have been identified under the umbrella of the first regional study tour:

a) Mine Site Rehabilitation and Management – representatives of Albania, the FYR of Macedonia and UNATSCR 1244 Kosovo visited several mining sites in the Czech Republic, including: coal mines, uranium mines and coal mine remediated sites;

b) Cleaner Production and Integrated Pollution Prevention and Control (IPPC) – relevant representatives of Bosnia and Herzegovina and Serbia visited several related sites in Austria, such as: a few wastewater treatment plants, incinerators for communal and hazardous waste and sugar and milk factories;

c) The potential for tourism development on rehabilitated mine sites – participants from Montenegro visited two former mining sites in Slovenia (Idrija and Mezica), which are nowadays used for tourist purposes.

These themes were based on the ideas and needs discussed and supported by the countries'/territories' representatives at the previous programme progress meetings, as well as during the PMU's visits to the sites. The aim with the three-theme approach was to have a more targeted study tour(s) specifically relevant to the environmental hot spots being worked on in each country/territory. The sites/locations visited were a 'showcase' on how the application of best practice has changed a site from being an environmental problem to an asset, and provided transferable approaches, contacts and resources that each project was then able to take back and apply.





To make the best use of the information that were collected on each study tour theme, to ensure regional exchange/information sharing and to expose countries to the largest number of environmental management ideas, a follow-up 'information exchange' workshop was organized at which each country/territory presented and shared its ideas, experiences and lessons learnt with all the other countries/study tour groups.

More information about each of the selected study tour themes is available at the Regional PMU in Podgorica, Montenegro.

B. The second study tour to the Slovak Republic was organized in October 2009 and it provided an opportunity for 14 people from the Western Balkans region including ministry, industry/private-sector representatives and experts to learn from Slovak experience in environmental management and remediation of priority mines. The main topics covered during the study tour were:

a) Observation of the methods by which common mining problems have been identified and addressed in Slovakia and which can be applied within the Western Balkans to similar problems.
b) Networking with the Slovak mining and environmental protection community and facilitating information exchange between Slovakia and the countries/territories of the Western Balkans in order to improve the situation at the mine sites and related industries.
c) Observation of the full range of environmental problems that have occurred in Slovakia and learning about the specific management approaches and technologies that have been applied with a special focus on acid mine drainage and heavy metal management/ treatment.
d) Learning about the legislative framework and policy framework, capitalization costs of works and breakdown of responsibilities that are used within Slovakia as a reference point for managing mine remediation and environmental management within the Western Balkans.





Participants visited following mine sites: the Pezinok – Kolarsky vrch, Trojarova and Augustin adits; Dubrava Antimony Mine; Rudnany Mine; Smolnik Mine; Jelšava Magnesite Mine; Hodruša – Hamre Gold Mine; Šobov Mine.

C. The subject of **the third** and last **study tour** was "Financial Mechanisms for Remediation of Environmental Hot Spots" related to relevant financial instruments that can be established and used for remediation of priority environmental hot spots. A regional study tour to Poland was organized in May 2010 and it provided an opportunity for five experts from the Western Balkans region, including representatives of the line ministries, Eco-Funds and Environment Protection Agency, to exchange information, experiences and ideas on the situation related to environmental funding in their countries/territories.

The main topics covered during the study tour were:

a) The structure and competence of the environmental administration in Poland, and more specifically, the Department for International Co-operation of the Ministry of the Environment, related to financial instruments in the environment.
b) Polish experience with the European Economic Area's financial mechanisms and Norwegian financial mechanisms in funding environmental projects.
c) The administrative structure of the Polish National Fund and EcoFund, and which financial mechanisms have been utilized in order for them to gain revenue or get access to international funds, and how the funds collected have been used for the funding of priority environmental projects within the country.


Participants had meetings with representatives of the Polish Ministry of the Environment, the National Fund and EcoFund. In addition to this, they also visited the hot spot site to be remediated with funds secured through the National Fund. Remediation of the hot spot location in the vicinity of the town of Sieradz, where 40 tonnes of various pesticides are stored, has commenced recently. Representatives of the Municipality of Sieradz and the company which is contracted to conduct the clean-up works welcomed the study tour participants and explained in more detail the project itself, how it would be financed and the specific physical works that would be conducted.

Materials related to all of the aforementioned study tour (agendas, fieldtrip reports and presentations) are available on the programme web site:
http://westernbalkansenvironment.net/content/blogcategory/15/45/lang,en/

PROGRAMME PROGRESS MEETINGS

Regular programme progress meetings were held every six months during the programme lifetime (five in total) in order to:

a) Facilitate regional cooperation between the programme/project teams from participating countries/territories, as one of the prerequisites for successful programme implementation,
b) Enable exchange of information/knowledge between the country/territory teams about the environmental problems addressed by the programme,
c) Feature presentation and discussion on the planned regional activities that provided inputs to the Regional PMU that facilitate its future work.

The meeting participants were relevant representatives of the main national stakeholders, beneficiaries and partners, as well as Programme Management Board members, Advisory Board members, donor representatives and programme/project teams from all participating countries/territories. Those meetings provided an opportunity for participants to present the current situation related to the project implementation at each site, to share their experiences, as well as to discuss future programme implementation. The special sessions were dedicated to the forthcoming regional activities, the study tours and other regional events, where a consensus would be reached on further implementation steps and the roles and responsibilities of all involved parties. Participants specifically discussed the following:

a) How implementation of different remediation activities within the programme is affecting/changing environmental management practices in the countries of the region;
b) How, as individual countries/territories or in groups, to follow up on contacts, knowledge and information gained on the regional study tours attended;
c) How to use this regional programme to raise awareness and knowledge about environmental issues locally (in communities), nationally (in countries/territories) and in the region (the Western Balkans).

The last programme progress meeting was held in June 2010, where national project coordinators presented the results of the hot-spot projects in their countries/territories, compared the situation before and after the interventions, emphasized the benefits and impact of the programme results, the lessons learned during the project implementation and showed the change that the Western Balkans Environmental Programme had made during the 36 months. Consequently, the programme beneficiaries and stakeholders, as well as Advisory Board members had an opportunity to discuss the results of the hot-spot programme.

All the programme progress meetings significantly contributed to information and knowledge exchange between representatives of the participating countries/territories, and proved to be a useful tool in strengthening regional cooperation.



ADVOCACY AND COMMUNICATIONS

The programme, through its regional component, paid special attention to advocacy and communications, in order to disseminate the programme objectives and results to a wider audience, but also to draw their attention to nature protection issues and the necessity of their active involvement in environmental protection.

In order to define effective communications strategies in all participating countries/territories, as well as on a regional level, an Advocacy and Communications Meeting of the

UNDP regional team was held in February 2008 in Montenegro. Participants at the workshop were communication officers from each of the participating countries/territories, together with the National Project Coordinators/Assistants and Portfolio Managers. Expert input at the workshop was provided by the Regional Communications Specialist from the UNDP Regional Office in Bratislava (also a member of the Programme Advisory Board). The purpose of the workshop was to discuss the ways of communicating the main programme/projects messages to different stakeholder groups, as well as to define the main communications/advocacy actions for each of the countries/territories and for the regional component. After the workshop, each country/territory, as well as the regional PMU, developed an Advocacy Strategy for their part of the programme including several main elements: objectives, target audience, messages (hooks) and actions. During the meeting an agreement was made about several tools to be used to promote and facilitate information sharing, access to information at the regional level and, through that, regional cooperation as well as visibility of the programme. These were: its visual identity, the programme web site, a documentary film and the regional database of practitioners.

Visual Identity

The visual Identity of the Programme was developed with the aim of transferring the values and goals of the Western Balkans Environmental Programme into a visual representation creating a consistent, strong Programme-wide identity, while embracing the individual character and goals of each Programme segment. A programme logo, together with the slogan "Your Environment, Your Decision" was used throughout the programme implementation in all participating countries/territories and regional activities.

Web Site

www.westernbalkansenvironment.net

The main goal of the regional web site was to facilitate access to information, promote regional information sharing and programme visibility; to offer adequate and timely information and to encourage positive interaction among stakeholders, partners and citizens in the Western Balkans region and wider. The web site consists of seven components presenting project

activities in all participating countries/territories, as well as on the regional level. Each country/territory provided relevant information about the advancement of programme implementation in all three components (clean up, capacity development and public awareness raising), in English and their local language.

A lot of relevant information, document, studies, video clips, photos, etc. from all the remediation sites was used by different interested experts, companies, international organizations, journalists and the media which all contributed to better communication.

According to the statistics, the regional component of the web site has had 80,000 individual visits, while the whole web site recorded 282,711 individual visits.

In order to make this information available even after the programme is over, i.e. in order to provide sustainability of the programme results, negotiations have taken place with the EnvSec project "Transforming Risks into Cooperation in SEE" dealing with remediation of environmental hot spots to continue using the same web site and to update it regularly with the results to be achieved within their programme.

Database of Practitioners

The Database of Practitioners is an integral part of the regional web site and gathers information about practitioners in different environmental fields, especially related to the remediation activities from each of the participating countries/territories.The main aims were to:

a) Provide access to the roster of practitioners, i.e. individuals and organizations/institutions who are directly or indirectly related to the remediation of environmental hot spots from all participating countries/territories;
b) Enable the practitioners to offer their services;
c) Promote free access to information.

Note: Within this database the term "Practitioner" represents both individuals and legal entities from all participating countries/territories relevant to the Programme scope of work and the main Programme objectives.

The database is divided into three segments:

A. Western Balkans Practitioners
B. Practitioners from Other Regions
C. Are You an Expert?

Western Balkans Practitioners part presents the core of the Database. It has 800+ practitioners, including individuals and legal entities, from six participating countries/territories. The database provides relevant data available at the moment of creating the database about each database member. Regarding individual practitioners, the database provides the following information:

- Name
- Country/territory
- E-mail
- Fields of Expertise, including:
  - EIA/SEA practitioners,
  - environmental scientists,
  - environmental engineers,
  - waste water engineers/specialists,
  - civil engineers,
  - environmental lawyers,
  - environmental policy and economics practitioners,
  - environmental education and awareness raising practitioners,
  - geotechnical engineers,
  - hydrogeologists,
  - hydrologists,
  - geologist/earth scientist,
  - ecologists (i.e. biologists/flora and fauna specialists, etc).

Additionally, the database contains other pieces of information, which are optional, such as: job title, company, contacts, working language, awards and other attached files (e.g. CV or any other document they would like to make available).

Regarding legal entities, the database provides: type of legal entity, fields of expertise, employees and contacts. Types of legal entities cover following:

- Companies: environmental, engineering, GIS, consulting, etc;
- Chambers of Commerce;
- Universities;
- Research Institutes (usually affiliated with the universities, but also private ones);
- NGOs (environmental, relevant CSOs); and
- Laboratories.

The database has a search engine through which a user can look for the particular practitioner according to: name, country/territory, fields of expertise and legal entity type.

Practitioners from other regions – During the process of data collection, different practitioners outside of the Western Balkans region expressed their wish to be part of the database. All these practitioners found their place in this section of the database. Moreover, this part of the database provides information on companies/institutions which were engaged in remediation of the environmental hot spots in participating countries/territories.

Are You a Practitioner? – The third part of the database provides the possibility and information on how practitioners can update their own data within the database (if data has already been entered) or how they can become part of it.

Documentary Film "Western Balkans – 8 Steps Forward"

The objective of creating a documentary film was to address the issues and problems tackled within the Programme. As part of this effort, the documentary brought to the forefront the achievements and contributions made by each Programme segment, with highly compelling stories in an effort to put a human face on the magnitude of the problem.

The documentary film "Western Balkans – 8 Steps Forward" was produced with the aim of depicting cooperation in solving common problems at eight environmental hot spots that threatened human health and the environment in the WB region. The film was made in the period 2008-2010 at eight locations included in the WBEP by the "Media centar" from Sarajevo.

The highlights of the documentary were moving and motivational, colourful and fast-paced, noting the stories of eight hot-spot locations and the stories of dozens of regional community members of all profiles as they work to remediate the hot spots, strengthen cooperation or raise awareness of the need for education and support for this important cause.

The promotion of the film "Western Balkans – 8 Steps Forward" was held on June 11th 2010 in Podgorica, Montenegro. Programme beneficiaries and stakeholders such as representatives of the national and local governments, management authorities of the remediated sites, the expert community and NGOs from six participating countries/territories, as well as representatives of the Embassy of the Netherlands in Belgrade attended the first showing of the documentary film. The event was hosted by the Montenegrin Minister of the Environment and Spatial Planning.



The documentary film was distributed to all participating countries/territories to be broadcast on their national and other TV stations (format: Betacam SP colour; duration: short version 29 min; long version 55 min 30 sec).

In Montenegro, the documentary film was broadcast on national TV (RTCG) on 4th July, with an announcement on the national evening news. Moreover, it was broadcast on RTCG SAT (a satellite channel broadcast worldwide) on 13th July. The movie was also distributed to all private TV stations and during July it was broadcast on TV "Vijesti".

The Regional Programme Management Unit, through effective planning and coordination of the regional programme, technical support and quality control (by continuous monitoring and evaluation through virtual contacts and field visits), has been dealing with technical and capacity development issues related to sustainable environmental management at the regional level. This has enabled the RPMU and the entire regional team to deepen its understanding of environmental policy issues/gaps and capacity development needs in the Western Balkans and, through information sharing, has contributed to the creation of targeted capacity development programmes that add to improving sustainable planning and management of natural resources in the region.

The RPMU team led by the Chief Technical Advisor organized regular visits to remediation sites/UNDP offices to provide technical support in tendering and executing clean-up works and designing/implementing public awareness raising campaigns and capacity development programmes/activities. More detailed reports on the site visits related to the technical support provided and issues covered are given in the six-monthly progress reports prepared by the Chief Technical Advisor which are available at the programme web site (under the Monitoring and Evaluation section)– www.westernbalkansenvironment.net

The RPMU team, led by the Regional Programme Manager, regularly organized meetings with ministries, Embassies of the Netherlands, UNEP, REC and other partners in relation to implementation of the regional programme activities: organization of thematic workshops, preparation and execution of regional expert meetings, study tours for national stakeholders, etc.

Regular visits to the remediation sites and UNDP implementation teams were organized with the aim of: a) meeting and discussing with the national stakeholders about the activities that the project would do in order to address the existing problems; b) providing technical support for preparing and reviewing technical and/or tender documentation; c) providing support for project teams in developing public awareness raising campaigns and capacity development programmes; and d) discussing and soliciting inputs for planned regional activities from

UNDP teams as well as from government partners in the region. The RPMU further assisted and supported country offices in the reprioritization of physical works, preparation of ToRs, assessment of requests for proposals, tender documents and provision of ongoing on-the-field and technical expertise.

In line with its mandate to build partnerships with other ongoing regional and relevant national initiatives, the Regional Management Unit has fostered relationships and coordinated efforts with relevant UN and other agencies (UNEP, REC, EC, UNIDO, DAI network, Slovak Trust Fund, etc.) to maximize its impact through the exchange of best practices (UNEP, UNIDO), leveraging resources (Slovak TF, UNEP, EC) and making synergies (REC, DAI network).

In addition to the funds from the Programme, Regional PMU applied and was awarded an additional USD 36,000 from the Slovak Trust Fund, to organize the second regional study tour organized in Slovakia.

INNOVATIVE INITIATIVES – MANAGEMENT ARRANGEMENTS

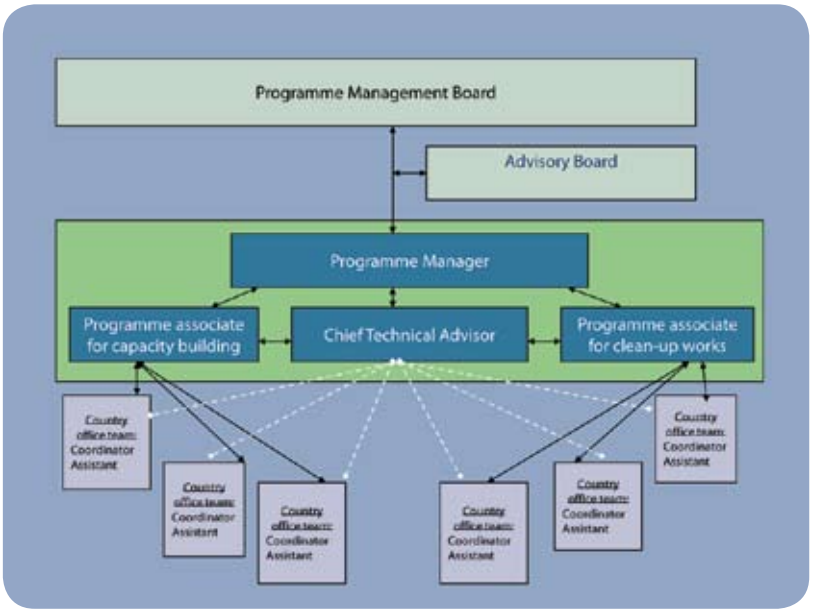
The development, set-up, management and financial arrangements of the USD 15 million regional Environmental Hot Spots Programme working on remediation of eleven environmental hot spots in six countries/territories represent an innovative approach and model that has effectively supported regional cooperation in the Western Balkans, created opportunities to leverage/mobilize additional resources and has inspired the UNDP and donors to address development issues at the regional level using this model.

The added value of this model is related to the ability to:

a) absorb significant funds while diversifying the risk to six UNDP country offices involved;
b) leverage provided donor funding (as done by the RPMU, UNDP Kosovo and Montenegro);
c) have a single reporting, monitoring, evaluation and technical support unit;
d) facilitate closer cooperation, pooling of resources and expertise from the six UNDP country offices, other UN agencies, international organizations, governments, etc, ensuring synergies and cost effectiveness;
e) manage significant funds, but in a decentralized manner which allows the implementer/UNDP to stay close to the beneficiary and make an impact on the ground and

f) ensure significant development impact and, with its resources (database and other programme products such as assessments, reports, etc.), create interest and a basis for other targeted regional interventions.

Apart from the UNDP implementation teams (both regional and national), a significant role in the programme has been given to the Programme Management Board and Advisory Board.



The Programme Management Board (PMB) was responsible for making management decisions for the overall programme by consensus. The Board consisted of the UNDP Montenegro Resident Representative (as chairperson) and one high-level government representative (Deputy Minister/State Secretary-level or Focal Point) from each participating country/territory, with the Regional Environmental Sector Specialist from the Embassy of the Netherlands in Belgrade attending as an observer. The Management Board had regular virtual meetings approving progress reports, action plans and timetables of activities prepared twice a year (on a six-month basis), covering the implementation of the programme in all countries/territories and at the regional level. Upon approval being obtained from all PMB members, request for payment for the subsequent tranche of money would be submitted to the budget holder. In addition to that, PMB members were meeting (physically) once a year, at a suitable time, e.g. as a side event of one of the regional workshops or similar.

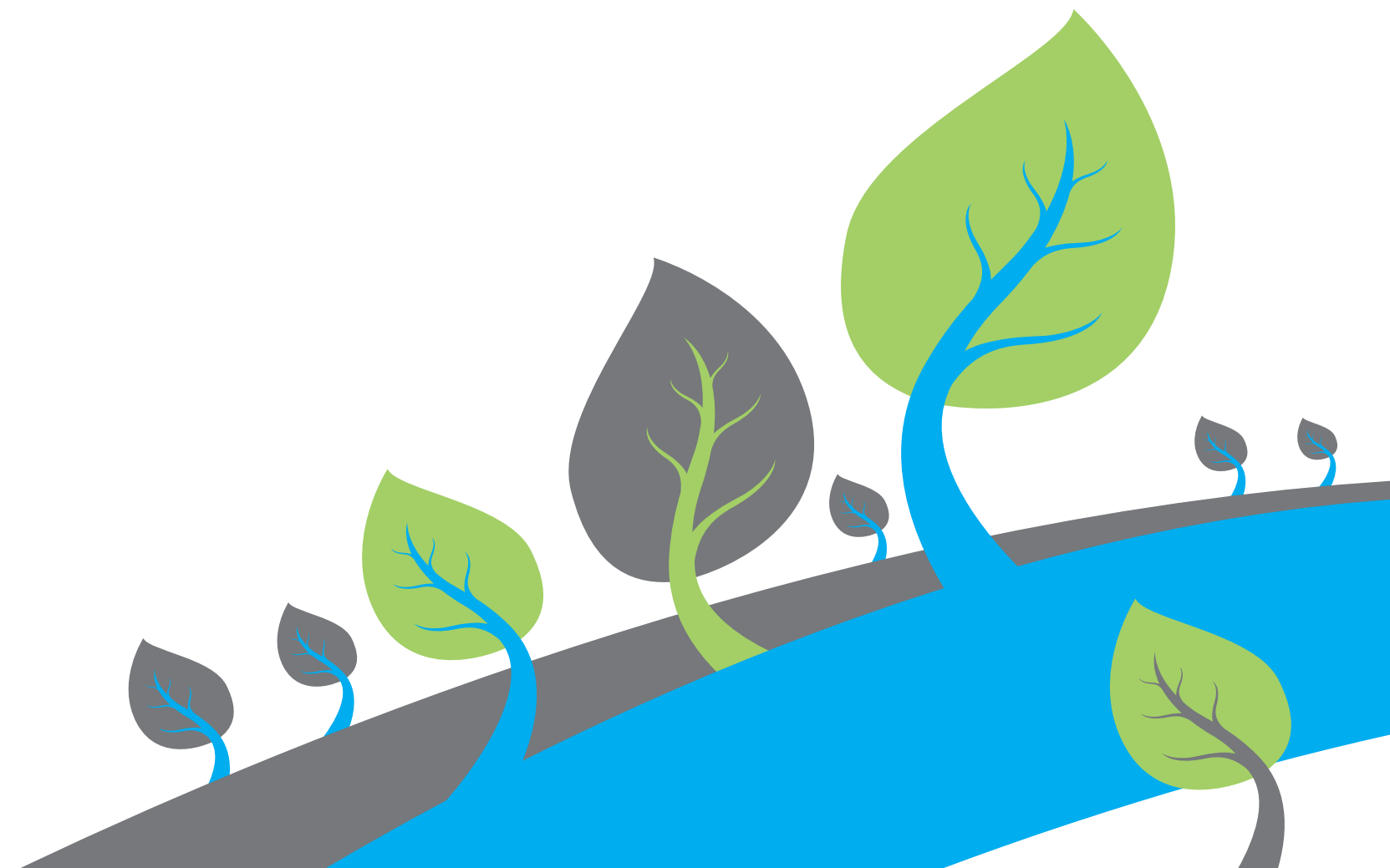
The major function of the Advisory Board was to support the project – the Regional Programme Manager and Chief Technical Advisor in particular – primarily on technical and quality assurance matters. The Advisory Board consisted of three selected international experts (covering technical, capacity development and communications issues), who interacted with

the Regional Programme Manager and Chief Technical Advisor primarily via e-mail exchanges and actively participating and providing advice during the programme progress meetings.

One of the lessons learned during the programme implementation was that active participation of all relevant stakeholders (the UNDP, governments, donors, the private sector, civil society) in the process of developing a regional programme (including selection of hot spots, ensuring co-financing, etc.) and then the setting of clear management and financial arrangements at the beginning has proved to be very important for the effective implementation and coordination of the regional programme. In the programme implementation this approach ensured efficient involvement of relevant stakeholders in the decision-making and governance of the regional programme while allowing necessary flexibility.

In the contacts so far this Programme has been perceived as a success story in terms of the ability to build on existing desk research to implement concrete clean-up works and in terms of programme set-up and management arrangements that ensure quality and timely delivery of significant funds, while staying close to direct beneficiaries. This model has so far been well received and supported by governments and UNDP offices, and it has proved to be a good approach/model in developing and implementing new regional environment initiatives.

ALBANIA



ABSTRACT

The aim of the Albanian hot-spot project "Cleanup and Rehabilitation of the Bajza Hot Spot" was to clean up the storehouse at Bajza Railway Station from chemical waste and thus improve the environmental situation and quality of life for citizens living in this area. In line with this, the preliminary site assessment, repackaging and disposal of the chemical wastes at Bajza Railway Station were finished in September 2009.

In addition to this, three new cleanup locations were identified: i) the Balez chemical storehouse, where chemical waste was cleaned up in August 2010, and ii) two tailings at the Reps and Rreshen mine sites, remediated by the end of September 2010.

Apart from cleanup works, a series of activities were organized in the area of capacity development and raising public awareness, including topics such as: chemical management, air pollution, water pollution, mine site rehabilitation, public participation in environmental decision making, etc.

BACKGROUND

The UNDP Albania Country Programme Document (CPD) for 2006–2010, prepared within the framework of the UN Development Assistance Framework (UNDAF) for the same period, highlighted the fact that environmental hotspots remain the biggest challenge with other related socio-economic factors posing immediate risks to human health and the environment. The CPD 2006–2010 committed the UNDP to assisting the government in dealing with the 'pervasive problem of persistent organic pollutants (POPs) as well as environmental hotspots' as an integral part of the Country Programme Outcome 2: "Policies Developed and Implemented that Support the Achievements of the MDGs."

As a partner of the regional hot spot programme, following criteria described in the introduction, the Albanian Government identified one environmental hot spot in Albania, and committed itself to supporting the programme by providing financial support through cost-sharing (either in-kind or in-cash).

In line with the overall objectives set by the regional programme for the three-year timeframe, Albania aimed to achieve the following outputs:

1. Full cleanup and site remediation of the stockpile of toxic chemicals at Bajza Railway Station, Shkodra, enabling the local government and Bajza Railway Station to fully utilize the rehabilitated storehouse and improve sustainable development in the area.
2. Strengthen the mechanisms of good governance and policy integration at the central and local levels.
3. Strengthen and mobilize the national capacity for policy development, integration, implementation and evaluation at the national and regional levels.

CLEANUP

BAJZA

Site Situation

Bajza is a small town in Kastrat Municipality, situated in the northern part of Albania, about 15 km from the city of Shkodra. It is the last railway station in Albania before the frontier with Montenegro, and it acts as a customs control point. The station is located on the shore of Lake Shkodra – the largest lake on the Balkan Peninsula–which itself forms a border between

the countries. Both Albania and Montenegro have officially designated it as a cross-border protected area of Lake Shkodra/Skadar. In addition to this, Lake Shkodra is also included on the Ramsar List of Wetlands of International Importance.



During 1991–1992, the German company Schmidt-Cretan, as a donation to Albania, exported and temporarily stored in Bajza 480 tonnes of hazardous chemicals, including toxaphene and phenyl mercury acetate, both of which had been banned in the EU since 1983. Unloading was stopped when it was noted that the pesticides were out of date. Complaints were made, and the German authorities agreed to take the load back, which they did. However, in the interim, local Albanians had emptied some of the drums in order to use them for household purposes. Some drums were emptied directly onto the ground, and the contents dispersed towards Lake Shkodra, reportedly killing cattle. A substantial number of dead fish in the lake were also reported in 1993, although there were no proven records that this could be linked with the incidents that took place at Bajza Railway Station.

Preliminary Environmental Assessment (PEA)

In order to investigate the state and nature of chemicals stored at Bajza Railway Station it was advised and decided to proceed with the preliminary environmental assessment. The scope of the PEA was to conduct a thorough assessment of the hot spot area including screening the level of risk to human health, identification of the chemical composition of the storehouse stockpile and preparation of an Action Plan for removing the hazardous chemicals inside and outside of the building, their repackaging, transporting, treatment and safe disposal.

Based on the PEA performed by the German company "Montec" none of the organic compounds identified in the soil material along the railway tracks were pesticides. Those compounds could not be quantified, and according to the available information they did not pose any hazard to the environment or human health which would demand remediation or mitigation measures. As a result of the PEA it was detected that most of the stored materials were leather waste, e.g. leather rags (from shoe production) which were mainly stored loose with some packed in plastic bags. The hazardous chemical material, sodium hexafluorosilicate, had been dropped on top of the leather waste. A small quantity of a grey-white powder which contained at least

traces of the pesticide tetradifon was found in one railway wagon in the vicinity of the railway storehouse. Based on the analyses performed on water results the quantitative analysis of chlor-organics did not reveal any pesticide concentration above the limit of quantification of 0.0025 µg/L.

Interventions

A UK company "Arundel" was contracted in June 2009 to remediate the site, i.e. to clean up the chemical waste stored in one of the storehouses of the station. Within the timeframe June 2009–September 2009 the chemical waste was safely repackaged and transported to a final treatment and disposal site. The waste included 4.5 tonnes of sodium hexafluorosilicate, 12 tonnes of contaminated shoe leather pieces (which were mixed and contaminated with sodium hexafluorosilicate) and 65 tonnes of regular shoe leather waste, which was collected in drums and in specialized transport bags, with 65 tonnes transported to a landfill in Albania and 16.5 tonnes to be exported internationally (by the end of 2010).

Total clean-up costs were USD 346,000 with a contribution from the Government of the Netherlands of USD 222,000 and from the Albanian Government of USD 109,000 (USD 94,000 in cash and USD 15,000 in kind).



THREE NEW SITES

Since the funds required for full remediation of the Bajza hot spot site were less than anticipated in the original programme document, the remaining amount of approx. USD 1,000,000 was reallocated to be used for further interventions that met the agreed criteria. Based on the UNEP/UNDP project on emergency risk reduction at the tailings dams, three (3) sites were identified for priority actions due to the imminent risks they pose to human and environmental health and infrastructure: i) Balez storehouse, ii) Rreshen tailing site and iii) Reps tailing site. Proposals for remediation of additional three sites in Albania were approved by the budget holder in July 2009, after which preparation of necessary technical documentation started.

Site Situation

The chemical depot is located in a small village called Balez, 5 km north of the city of Elbasan. The store at Balez is owned by the METE, and managed on their behalf by NFIM. The storage started in the nineties when most industries where closing down. The first chemicals stored at this depot came from an uncontrolled stock of chemicals in a tunnel near Balez. The site covers approximately 10,000 m^2 in total, and comprises of:

- A semi-cylindrical storehouse of 100m in length, in good condition with a concrete base. This depot has been constructed/adjusted for storage of chemicals;
- A large timber shed with a surface area of 500m^2 in very poor condition;
- A house for the site staff, together with an orchard and beehives;
- A significant open space suitable for the temporary location of containers.

On the perimeter of the site there are two large 2-storey buildings, one of which houses a wood processing business on the ground floor, and the local school on the first floor. The second building appears derelict, but may be in use. On the east side of the site there is a small stream (distance<100 m) that is connected to the River Shkumbin. Agricultural land and family houses surround the site, and the village school is situated 200 m from the village.

The materials contained in the depot, in accordance with a Government order, were collected from a wide range of industrial sites around Albania:

- a metallurgical complex at Elbasan,
- an industrial site at Lac,
- a fertiliser plant at Fier,
- a copper smelter at Rubik,
- a geological service laboratory in Tirana and
- smaller industrial activities including textiles, ceramics, rubber, leather and shoes.

Chemicals were collected in the late 1990s by the military, to ensure security during the difficult period following the disturbances of 1997-1998. The chemicals were stored in a variety of packages, including drums, boxes, sacks, bottles and pressure vessels, and in a wide range of sizes, down to gram quantities in bottles. In 2006 there were 68 different kinds of chemicals stored in the depot and in the shed.

Interventions

The company "EPE SA" from Greece, contracted to conduct remediation works in Balez, started the works by organizing and conducting training for the NFIM staff employed at the Balez storehouse, and continued with repackaging, transportation and final disposal of the chemicals.

Taking into consideration that the quantities of chemical waste provided by METE were less than previously envisaged (only 100 tonnes as opposed to the previously envisaged 210 tonnes), UNDP Albania in collaboration with the OSCE supplemented the missing quantities of chemical waste from the Ministry of Defence storehouses. With the agreement signed by the Minister of Defence and the ambassador to the OSCE, the waste from different military sites was packaged, transported and collected in the Port of Durres, and made ready for shipment (an amount of 110 tonnes).



The cleanup work in Balez was finished by the end of July, and the waste was shipped to Greece, Belgium and Germany in September 2010.

REPS

Site Situation

According to the UNEP study prepared under the EnvSec Initiative, four abandoned tailings facilities continuously pollute the local River Fani, and the subject of the programme remediation works was tailing № 3, which posed major problems due to the presence of surface water and non-functionality of existing channels and lack of regular maintenance of this mining facility.

The site is located in the vicinity of the settlement of Reps, near the Merdare-Morine Motorway. The dressing plant of Reps and its 4 dams are located close to the town Reps, 100 km north of Tirana. There are houses near the dams. The dressing plant and the storage at dam № 1 entered into operation in 1970 and were closed down definitively in 1996. The total amount of tailings disposed is 2,800,000 tonnes of tailings, out of which approximately 800,000 tonnes

were discharged into the Small Fani River as a result of rain water and over flow. Dam's № 3 water diversion channel was completely out of operations due to destruction and in some places due to blockages.



The major problems revealed at the location are related to the presence of surface water due to a damaged buried pipe (on the right hillside) and a failed open channel (on the left hillside) which formerly served to dewater the watershed present at this tailings facility. The respective failure of both of these systems has resulted in a build-up of water within the tailings dam watershed to the extent that the runoff reached the tailings beach and at times reached the dam crown which leads to overtopping. The overtopping caused gully erosion on the right side of the embankment and there is slope failure on the left side of the tailings dam with a weak slope on the right abutment.

Interventions

The intervention at Reps was aimed at protecting human health and the environment by restoring the geotechnical integrity of the tailings dam structures. This would help minimize the chronic loss of tailings materials and contaminated water to the surrounding environment and waterways, but also protect against the ongoing degradation of the tailing dam itself which, if left unchecked, could result in a collapse which would seriously impact the local infrastructure, property, human lives and the environment.



After all the necessary analysis, calculation and site visits had been completed, the conclusion was made that the best and most effective solution was to control the surface waters by creating open channels. The planned civil works involved the construction of a retaining

dam near the crest of the tailings dam, construction of water runoff structures formerly used for dewatering the catchment area and running beneath the tailings dam. The contracted company "Kirchberger" from Albania conducted the remediation works at Reps TMI with the works being finished by the end of September 2010.

RRESHEN

Site Situation

According to the UNEP study for Rreshen, the stability of the tailings dam was endangered due to the presence of surface water and non-functioning of existing channels and lack of regular maintenance of this mine facility. Two sink drainage holes were visible in the surface of the dump, created due to failure of the water diversion structure, because of which the tailing material was transported to the River Fani.



Rreshen TMI site is located in the vicinity of the Municipality of Rreshen near the Merdare-Morine Motorway and close to the River Fani. In relation to site conditions, the tailings dam facility at the Rreshen site was identified as 1 of 3 sites requiring emergency civil engineering repairs to secure the dam from eventual collapse and stop the chronic loss of tailings materials and contaminated water from the site and into the adjacent river. The dressing plant of Rreshen and its dam are located near the town of Rreshen, 76 km north of Tirana. The dressing plant and dam operation started in 1984 and was closed down definitively in 1996. 300,000 tonnes of tailings were deposited in total, and 250,000 tonnes are still there. The contaminated tailings are discharged directly into the Small River Fani due to erosion caused by rainwater, because the water diversion structures no longer function and because of damage to the main collector. There were two dangerous holes created because of the failed structures within the surface of the tailings dam that were widening.

Interventions

The intervention at Rreshen aimed to protect human and environmental health by restoring the geotechnical integrity of the tailings dam structures which were in poor condition. This helped minimize the chronic loss of tailings materials and contaminated water to the surrounding environment and waterways, but also protected against the ongoing degradation of the

tailings dam itself, which if left unchecked could result in the collapse of the tailings dam, seriously impacting local infrastructure, property, human lives and the environment.

The planned civil works involved the construction of a retaining dam near the crest of the tailings dam, construction of water runoff structures and permanent closure of the buried pipe, which had previously been dewatering the catchment running beneath the tailings dam. The Albanian company "Trema" was awarded the contract and conducted the site works in accordance with the instruction of an International Supervisor (a German tailings dam specialist) assisted by a National Supervisor (an Albanian engineer). The works were finalized in the first half of September 2010.



CAPACITY DEVELOPMENT

Considering the significant negative effect which badly maintained tailing mine facilities have on the environment and human health, and based on the comprehensive Needs Assessment Report on Policy Integration and Capacity Development, the following topics were identified as areas where further capacity development is needed:

- chemical management and risk assessment;
- mine site rehabilitation and risk assessment and
- environmental monitoring related to air and water pollution.

In line with the cleanup works at the Bajza and Balez storehouses, which were related to chemical removal and destruction, training on Chemicals Management was organized in the second half of 2009. The main topics covered during the training were: basics of toxicology, basics of REACH, risk assessment, preparing the work under REACH, PIC procedures, socio-economic aspects of REACH. Participants at the training were representatives of the relevant Albanian institutions/organizations, including the Institute of Public Health, Ministry of Health, Ministry of Agriculture, Ministry of the Economy, Trade and Energy, Regional Environmental Agencies and the Agency for Natural Resources.



The specific topics covered at the Training on Mine Sites Rehabilitation were: hazards in copper mining, elimination of dust, pollution from mine waters, mining waste, public participation in environmental matters, the impact on human health, risk assessment on contaminated sites, etc. The Conceptual Site Model was introduced along with the relevant legislation and best practices currently used in managing investigation and development of contaminated sites. Examples of chromium sites in Glasgow, with particulars details on SEA and EIA were presented. At the proposal of the consultants and due to the interest of the participants, an additional session on the new area of Medical Geology was included in the agenda. Future legislation was also discussed along with specific relevance to the regional mining industry sector, with examples from accession or pre-accession countries. Participants at the training were representatives of relevant Albanian institutions/organizations, including the Institute of Public Health, Ministry of Health, Ministry of Agriculture, Ministry of Economy, Trade and Energy, Regional Environmental Agencies and the Agency for Natural Resources, which have responsibility in the above fields of interest.

In relation to environmental monitoring, two trainings were organized on the topics of air pollution and water pollution.

Training for experts and environmental practitioners on Water Quality Monitoring was held in February 2010, in Tirana, Albania. The overall aims of the training were: to provide participants with the skills to raise awareness of the issues surrounding water monitoring; to design and implement cost-effective schemes suitable for purpose; to agree a set of key parameters and core indicators for future monitoring.

The training was conducted in an interactive manner, allowing the delegates to test and share their understanding and knowledge in each area as it is delivered, providing the opportunity at that point to highlight or explore areas of further interest. The course covered the need for monitoring, the requirements of relevant EC Directives, international standards and WHO guidelines. It also included the design of monitoring systems, selection of sampling points, key parameters to monitor; sampling methods and field procedures; sample handling and traceability; laboratory procedures, data checks, storage, presentation and assessment according to purpose.

Participants at the training were: practitioners involved in conducting, planning or assessing environmental monitoring and field surveillance as well as representatives of the Ministry of Health, Ministry of Agriculture, Ministry of the Economy, Trade and Energy, Regional Environmental Agencies and the Agency for Natural Resources.

The training on Air Quality Monitoring was conducted in May 2010 in Tirana, Albania. The objective of this training was to raise the air pollution monitoring standards in Albania towards internationally accepted standards through a 3-day training course for practitioners and experts from environmental monitoring institutes. After the training, the participants were expected to be able to provide higher quality services to clients in the public and private sector, and to train junior colleagues in internationally accepted monitoring methodologies.

The key topics covered in the training were: air quality management; monitoring programme design; instrumentation; monitoring and sampling; air quality legislation; network operation; quality systems; air quality assessment and reporting; data dissemination; air quality management planning.

Participants at the training were practitioners involved in conducting, planning or assessing environmental monitoring and field surveillance as well as representatives of the Ministry of Health, Ministry of Agriculture, Ministry of the Economy, Trade and Energy, Regional Environmental Agencies and the Agency for Natural Resources.

As a result of regional cooperation, knowledge exchange and networking, with the support of the Regional PMU, all trainings organized by UNDP Albania (training on chemicals management, training on mine site rehabilitation, water quality monitoring and air quality monitoring) were attended by participants from the Ministry of Environment and Ministry of the Economy from the FYR of Macedonia and from the Ministry of Environment of UNATSCR 1244 Kosovo.

PUBLIC AWARENESS RAISING

Albanian company "R&T Advertising" was engaged to implement a campaign to raise public awareness in the communities of Bajza and Mesi with the aim of informing their inhabitants about remediation activities in Bajza Railway Station (as a prerequisite for future local development), but also to present them with tools they can use in environmental decision making and to emphasise the necessity of including environmental issues in any sustainable local development planning.

Various series of activities (TV debates, workshops, meetings, site visits, etc.) were organized within the campaign to raise public awareness, actively involving different stakeholder groups (primary and secondary school children, teachers, local authorities, civil society organizations from the northern part of Albania, etc). All activities were aimed at sending the message to the target audience that Bajza Railway Station poses no threat to human health and the environment, e.g. during several events organized with schoolchildren from Bajza, environmental consultants, together with the NPC, presented information about cleanup interventions, as well as the positive influence of those interventions on human health and the environment.



Activities to raise public awareness organized for the Bajza community in relation to the chemical waste at Bajza Railway Station (organized during 2009), continued in the first half of 2010 with the purchase of a garbage truck and waste bins to support local utility services in upgrading the municipal waste management system in Bajza and Mesi. In addition to that, a system for waste disposal created in Prroi i Thatë has been formally established as a local landfill for the Kastrat Municipality (covering Bajza and Mesi) and for four other communities around it. As part of those activities, two Cleaning Days (in Bajza and Mesi) were organized gathering high school pupils, representatives of the high school senate, teachers, community representatives, as well as utility services. This initiative was further strengthened by an awareness-raising campaign in the school, local community administration and among the general public of Mesi. The NGO "ERDI", engaged for the implementation of those activities, distributed promotional and educational materials, with information about common and proper waste management systems, the proper separation of solid waste and its collection.

BOSNIA AND HERZEGOVINA

ABSTRACT

The Bosnia and Herzegovina hot spot project "*Strengthening Capacities in BiH to Address Environmental Problems Through Remediation of High Priority Hotspots*" was initially designed to address two hotspot sites in Tuzla and Ugljevik. However, after cancelling the project in Ugljevik TPP, two additional locations in Tuzla were included in the programme. Physical works on connecting the Gradina University Clinic Centre to the Tuzla Central Heating System finished in January 2010. Connection of the two new locations, Slavinovici Hospital and the Dragodol/Tusanj community, to the Tuzla Central Heating System finished in July 2010. Supporting the vision of Tuzla municipality to become the first energy efficient municipality in BiH, the campaign to raise public awareness and activities related to institutional strengthening and capacity development organized throughout the project implementation, all addressed and were closely related to the subject of energy efficiency.






The UNDP in BiH, through the UNDAF and CPAP for BiH, clearly committed itself to supporting BiH's progression towards European integration, where the environment is one of the priority areas for support.

The main policy document on environmental issues in BiH, used for the development of the hotspots project, is the National Environment Action Plan (NEAP) prepared by ministry officials, scientists and NGOs, with the support of the World Bank. The document was adopted in 2003 in both entities. It identifies 8 priority areas: water resource management and wastewater treatment, sustainable development in rural areas, environmental management (information systems, integral planning and education), protection of biological and landscape diversity, waste and waste management, the economy and sustainable development, public health and de-mining. This all corresponded to the BiH Country Programme Outcome "Strengthened national capacity in sustainable environmental management" and the UNDAF Outcome "Strengthened accountability and responsiveness of government to pro-active citizens", as they both aim at supporting environmental protection activities in BiH, especially in relation to the lack of environmental policy, legislation and its implementation, poor public participation in environmental protection and sustainable development, and unsustainable rural and urban development.

One of the challenges in the field of environment protection in BiH has been also related to its complex administrative structure. With up to three levels of autonomy (state, entity, cantons) and up to four administrative levels (state, entity, cantons, municipalities) the Bosnia and Herzegovina environmental administration, and notably its regulatory, executive and control aspects, are very complex. This requires enormous cooperative efforts resulting in cost inefficiencies, considerable delays, gaps in administrative coverage and unequal application of standards.

Based on the more detailed information submitted by the local authorities and/or site owners about the potential project sites and the interest expressed (in the form of letters of commitment), the "Gradina" University Clinic Centre in Tuzla and the Thermo Power Plant in Ugljevik were selected for the cleanup works through consultation between the UNDP, the relevant national authorities, the Embassy of the Netherlands in BiH and civil society. However, on 2nd June 2009 the Memorandum of Understanding with the Ugljevik Coal Mine and Thermo Power Plant (UCMTPP) was terminated after UCMTPP failed to sign the proposed Cost Sharing Agreement (CSA).

During June 2009, UNDP BiH started assessment in Tuzla Municipality on potential new sub-projects that fitted the overall goal of the project, that could be completed with the remaining funds from Ugljevik and that could be finalized within the project timeframe. After donor approval of Plan B (July 2009) these funds were allocated for two additional locations in Tuzla – connecting "Slavinovici" Hospital and the local community of Dragodol/Tusanj to the district heating system.

Therefore, the hotspot project in BiH addressed the following locations in Tuzla:

- University Clinic Center, Gradina
- Hospital for Pulmonary Diseases and Tuberculosis, Slavinovici
- Local Community of Dragodol/Tusanj

The concrete objectives of the project "Strengthening Capacities in BiH to Address Environmental Problems Through Remediation of High Priority Hot Spots", were as follows:

- Secure progress in cleanup of priority "hot spots" in Tuzla, raise awareness and strengthen capacity for good environmental management at the local and national levels.
- Enhance regional co-operation through improved information sharing and supply of professional consultancy services regarding good environmental management.

CLEANUP

Site Situation

The area of Tuzla municipality is one of the most polluted areas in BiH, especially in three following segments:

- The worst air quality – due to emissions from the thermo power plant, industrial heat production facilities and individual heating systems;
- The most polluted water streams – due to the enormous discharge of waste waters;
- Significant areas with degraded soil – due to the uncontrolled exploitation of coal, salt and quark sand.

According to previous data and estimations, the pollution from industrial heat production facilities and individual heating systems is the second major pollutant in the area. According to available data there are around 50 active heat production plants with a total installed capacity of 42 MW. This data does not include individual house heating systems. The air quality in the urban part of Tuzla during the heating season is mostly category II and III (polluted or very polluted air), and very often there are episodes of critical air pollution especially with sulphur dioxide at a concentration of 400 µg/m^3, which is 3–4 times more than the maximum allowed amount.



The Gradina Medical Centre (Gradina Complex) is located at the eastern section of the town of Tuzla, on a slightly elevated hill between the Solina and Brcanska Malta neigbourhoods. There are numerous apartment lock buildings and individual residential houses in the surroundings of the Gradina Complex. The closest watercourse is the Solina stream, a tributary of the River Jala, which is at a distance of some 100 metres east of the complex. The heating system was coal-fired and it covered the heating energy demand for the Medical Centre's interior heating, sterilization steam production and provision of hot sanitary water. The scope of works defined in the technical documentation was the connection of the clinic to the district heating system, decommissioning of the coal-fired boilers and construction of heating substations and network.

The Slavinovici Hospital is also located on a slightly elevated terrain, approximately 300 metres south of the River Jala. The heating system was coal-fired and it covered the heating energy demand for heating and warm water production purposes. The scope of works defined in the technical documentation was the connection of Slavinovici hospital to the district heating system, i.e. shutting down the coal-based boilers and their replacement with natural gas boilers for sanitary hot water and process steam.

The communities of Dragodol and Tusanj were previously covered by individual and separate residential heating systems. The local community of Dragodol has a total of 29 apartment buildings units with 650 individual apartments (households) that were previously using solid-fuel heating systems (almost 100% based on coal). The scope of works defined in the technical documentation was the connection of the local community of Dragodol to the district heating system and the shutting down of coal-based boilers in 29 apartment blocks. By connecting them to the district heating system, the reduction of air pollution from these households will be 100%, as the district heating system provides heating from waste energy (cogeneration process).

Interventions

The heating system in both hospitals was based on coal-fired boilers, which represented a significant source of pollution in very centre of the town of Tuzla. The total consumption of coal by the two hospitals is 11,000 tonnes per year and they generate approximately 2,000 m^3 of slag and ash per year. The coal used has the highest sulphur content of all coals sourced in BiH. The coal's total sulphur content is approximately 2.3% of mass, of which approximately 1.5% is combustible. During the heating season, the total emission of SO_2 from these three hot spots amounts to approx. 258 tonnes, 77 tonnes of NO_x, 165 tonnes of particulates, and 16,730 tonnes of CO_2 .

In order to eliminate the emission of gases specified above, the central heating system in two hospitals has been completely restructured and connected to the district heating system for winter-season heating and winter-season sanitary hot water.

The works at Gradina Clinic Centre were completed in January 2010, and in Slavinovici Hospital in July 2010.

Collective residential units with 650 households in the local community of Dragodol/Tusanj were connected to the district heating system (an additional 100 individual residential units can be connected to the new network). The works were completed in July 2010.

With the works described above, sources of air pollution at Gradina and Slavinovici Hospitals were completely eliminated and significantly decreased in Dragodol.

All cleanup works amounting to more than USD 2,000,000, including the feasibility study and supervision, were awarded to local companies, which promoted entrepreneurship in the environmental services market, local capacity development and provided important inputs for the generation of local income and employment.

It is estimated that by connecting the Gradina Clinic Centre, Slavinovici Hospital and the Dragodol/Tusanj community to the Central Heating System will reduce harmful air emissions in the city core by an estimated 500 tonnes per heating season (SOx, NOx, and Particulate Matter (PM)), decrease CO_2 by 16,730 tonnes per year and reduce coal use by 7,500 tonnes/year, and that approximate annual savings of USD 550,000 can be achieved.

Based on the priority needs identified in the Policy Integration and Capacity Development Need Assessment Report developed during 2008, energy efficiency has been recognized as one of the priority areas for intervention and further work at the national level. Some of the other topics recognized within the needs assessment report include: update of NEAP, further policy and capacity development in the area of IPPC, SEA, sound management of chemicals, as well as the challenges of including environmental issues in the privatisation process.

A comprehensive capacity development action plan was developed by the consultants engaged, covering five municipal regions and two sectors (public and private). Those were: Bijeljina, Tuzla, Banja Luka, Livno and Trebinje.

The aims of the training were: to improve the energy performance of products, buildings and services, to improve the field of energy production and distribution, to promote and increase usage of renewable energy sources and recommend technical and strategic methods for efficiency improvements (increase profits, reduce financial risk, improve service quality, and boost worker productivity).

The training programme was organized in two modules: one for the public and one for the private sector.

MODULE 1: Energy efficiency in the public sector

- Sub-module 1.1: Energy Management and Energy Assessment in the Public Sector
- Sub-module 1.2: Energy Audits & ROI (Return on Investment) Analysis
- Sub-module 1.3: Energy and Environmental Legislative
- Sub-module 1.4: Project Designing and Energy Optimization/Revitalization in Building

MODULE 2: Energy efficiency in industry

- Sub-module 2.1: Energy Management and Energy Assessment in Industry
- Sub-module 2.2: Energy-Saving Technologies and ROI Analysis
- Sub-module 2.3: Obtaining Funding
- Sub-module 2.4: Energy Audit exercise

The capacity development training covered 21 municipalities and was attended by representatives from 90 different institutions/companies, which showed the high level of interest and need for this type of knowledge. The trainings were rated highly by all participants.



Mobilizing and enhancing professional capacity at all levels

Professional capacity and the supply of market-based environmental services are important factors for policy development and implementation, and at the same time provide important economic opportunities. A market survey was conducted of local experts from business and the NGO sector already working in the field of environment policy development and implementation, with particular emphasis on those with experience relating to environmental management and sustainable development.

Based on that survey and a call for expressions of interest, a regional database of practitioners has been developed, including practitioners from BiH. The database served to efficiently identify, select and contract experts for specific assignments under the various project activities. The database was also made available to local/national authorities for use in their own procurement procedures, and also to other donors and the private sector.

PUBLIC AWARENESS RAISING

One of the goals Tuzla Municipality set as its development direction is to become an energy-efficient city. With the aim of supporting this goal, the campaign to raise public awareness in the municipalities of Tuzla was focused on energy efficiency and environmental protection issues. The campaign sent the message about energy saving and consumption to the citizens of Tuzla using different communication tools, such as: TV and radio broadcasts, leaflets (widely distributed with electricity and water bills), round tables and interactive educational workshops. Apart from the general public, the target audience included representatives of local communities, high school students, key construction stakeholders and key stakeholders in energy management, budgeting and investment. Approximately 500,000 citizens have been informed about ways of saving energy in their homes, while approx. 300 people participated in the educational workshops and 40 stakeholders participated in the round table.

To define the ways of approaching different target groups, but also to measure the impact of the campaign, the focus groups meetings were conducted at the beginning and at the end of the campaign. The baseline report of the focus groups meetings held in Tuzla before a detailed campaign action plan was developed showed a low level of awareness and knowledge about energy efficiency and usage of renewable energy sources, as well as a low level of efficiency being practised in energy consumption.

The baseline findings were used to define communications tools to approach different target groups, but also influenced the development of a capacity development programme.

Pilot Projects

Two pilot projects were implemented in the Municipality of Tuzla as in-the-field support for the campaign activities, clearly demonstrating the implementation of small-scale energy efficiency activities.

The first project dealing with the active promotion of energy efficiency and solar energy in the municipality of Tuzla through public campaigns and demonstration activities resulted in the increased knowledge of 400 citizens about environmental protection, energy savings of 8,000 kWh per year through the installation of a solar-powered system for heating water in the Public Health Institution in Tuzla and energy savings of 1,62 kWh for 9 light units though the installation of LED lights in the street lighting system of Tuzla municipality.

The second project was dealing with youth as the target audience and resulted in the increased knowledge of 600 students and 160 children about ways of saving energy, a 75% reduction in energy consumption for lighting through replacement of 600 light bulbs with energy-saving ones in student dormitories, a 100% reduction in water losses through replacement of 90 faucets and 37 toilet flushing units in the Home for Children without Parental Care.

MONTENEGRO

ABSTRACT

The aim of the Montenegrin hot spot project "*Remediation and Re-cultivation of the Mojkovac Lead and Zinc Tailings Mine*" was to improve the environmental situation in the Municipality of Mojkovac through remediation of the tailing mine impoundment (TMI), as well as to make efforts to introduce an area-based approach that would facilitate an integrated and supportive environment for sustainable economic and environmental development in the northern part of Montenegro. Consequently, the second phase of the Mojkovac TMI remediation works was conducted during 2009 and finished by the end of January 2010. The public awareness campaign and activities related to institutional strengthening and capacity development were organized throughout the project implementation, contributing to the economic and social development of this region.

The commitment of Montenegro to environmental protection through the constitutional designation as an Ecological State marked the beginning of the journey towards creating and implementing innovative sustainable development principles that would focus on fostering economic growth while preserving the country's unique ecosystems. One hurdle on this journey is the remains of the "Brskovo" Lead and Zinc Mine, the open pit and the tailing mine impoundment (TMI) located in the northern municipality of Mojkovac. The TMI as an industrial hotspot was the main barrier to investment in the municipality's great development potential.

Considering the state of the TMI and risk of eventual breakdown of dam stability, which could cause run-off of the impounded material from the TMI into the River Tara, the Ministry of Environmental Protection and Physical Planning of the Republic of Montenegro requested in 2003 development of a technical design project for tailings impoundment remediation and re-cultivation.

The "*Remediation and Re-cultivation of the Mojkovac Lead and Zinc TMI*" technical design project was prepared by the Faculty of Civil Engineering and associated institutions in 2004 and it divided planned activities and works into two phases. The estimated value of works for remediation and re-cultivation of the Mojkovac Lead and Zinc TMI is approximately USD 11 million.

Activities for the remediation and re-cultivation of the Mojkovac Lead and Zinc TMI started in 2003 and by the end of 2007 approximately USD 5.3 million had been spent. Funds for the works were provided by the Government of Montenegro, the Ministry of Tourism and Environmental Protection, the Agency for Public Works (approx. USD 3.6 million), the Government of the Czech Republic (approx. USD 1.3 million), and the Government of the Netherlands financed part of the works on Phase 1 of the project to the amount of USD 360,230.

Within the Western Balkans Environment Programme, the national Montenegrin component included technical remediation works in the area of the tailing mine impoundment (TMI) of the Brskovo Mine and capacity development of local and national stakeholders in the area of the effective environmental management.

The concrete project objectives were the following:

a) to secure progress in the cleanup of the Mojkovac lead and zinc tailings mine;
b) to raise awareness and strengthen capacity for good environmental management at local and national levels through demonstration projects in the area of environmental protection, sustainable development and management of natural resources;
c) to enhance regional cooperation through improved information sharing, progress and supply of professional consultancy services regarding good environmental management.

Site Situation

The Brskovo Lead and Zinc Mine was in operation from 1976 to 1991. Historically, mining operations have been conducted in this area for centuries, including the extraction of silver since ca. 1270. However, intensive mining operations took place from 1976 to 1991. These operations, i.e. industrialization which did not take adequate environmental safeguards, without clearly allocating and implementing environmental management responsibilities led to the creation of an environmental hot spot. The negative influences of the Brskovo Lead and Zinc Mine were divided into two parts. The main problem concerned the tailing mine impoundment formed in the area between the right bank of the River Tara and the west side of the urban zones of Mojkovac. The TMI occupied an area of 19 ha and approximately 2 million m^3 of disposed tailing-impounded materials. From the beginning to the end of the technological processes in the mine, all of the flotation tailings were impounded into this area. According to data on the total production in the Brskovo Mine, approximately 2,600,000 tonnes of tailings were produced. Taking into consideration the vicinity of the TMI to the urban area and the extremely negative influence on human health, as well as the permanent threat posed to the River Tara, the TMI was identified as a priority environmental hot spot in the country. In 2003, the Government of Montenegro committed resources and prepared a full technical design project, which started with implementation in 2005 and continued until nowadays.



Interventions

The remediation works at Mojkovac TMI were divided into three phases.

Phase I – In the timeframe 2005–2008, as part of Phase I, the following activities were implemented:

i) additional research works, in order to provide more precise data on mud volume and its suitability for stabilization;

ii) commissioning of the existing control manhole and drainpipe, construction of a new section of a drainage canal to the River Tara;

iii) construction of facilities for tailings impoundment protection from external storm waters (a storm water collector and other facilities);
iv) reconstruction and completion of the sewerage system for wastewater in the area of the TMI;
v) construction of a wastewater treatment plant.

Phase I of works was concluded at the beginning of November 2008 when the Wastewater Treatment Plant (WWTP) became operational. The WWTP in Mojkovac is the first treatment plant of this kind in Montenegro. With its current capacity it will satisfy the needs of the population of Mojkovac at least until the year 2020, and then (if needed) with minor upgrades (additional sludge collectors and tanks) it can provide a modern system of treatment for decades.



Funds for Phase I of the remediation works at the Mojkovac TMI were provided by the Government of Montenegro, with donations from the Government of the Czech Republic, and partially by the Government of the Netherlands.

Phase II – Based on the selection procedure run by the Agency for Public Works (national implementation partner) and with the participation of the Chief Technical Advisor (RPMU, UNDP Montenegro), the Czech company "Vodni Zdroje" was selected as the company that would conduct remediation works within Phase II. The contract was signed on September 19, 2008. Prior to the solidification process, the company "Vodni Zdroje" performed a controlled release of water from the TMI into the River Tara (in accordance with the technical design and under the supervision of the relevant state authorities) and 19 ha of land was released.



At the end of September 2008 the contracted company "Vodni Zdroje" started the stabilization works which included two main activities on the TMI site:

i) Excavation of muddy material using excavation equipment with transportation to a collection basket, mixing with an additive (hydration lime), transport and disposal at a temporary disposal location and when the process of solidification was completed, restitution of the material to the area from which material had been excavated, and
ii) Excavation of free dry material in order to finely place the material and achieve the planned and projected geometry of the TMI.

In the final stage of Phase II, works at the TMI and in line with the activities undertaken towards capacity development and the raising of public awareness, an international competition for an architectural solution of the 19 ha remediated area at the TMI and in the surrounding area was organized in order to select the best idea for future usage of this area.



The competition was organized in cooperation with the Municipality of Mojkovac and aimed at promoting the remediated area of the TMI as a future sports and recreation centre. The competition provided two sets of prices – the first one for teams formed of experienced architects, and the second one (in order to ensure interest among the younger population for this part of the country) for teams formed of students. 17 solutions were received and 7 of them were adopted under the ownership of the Municipality of Mojkovac. The first-place solution "Metamorphosis" was part of the Montenegrin presentation in the Architecture section of the Venice Biennale (Mostra di Architettura di Venezia).

Phase III – Further Government work on remediation of the TMI started in October 2010 representing the final phase of TMI remediation, which includes the creation of a drainage layer and final covering of the TMI with a soil layer. The contracted company is "Bemax" and the approximate value of the works is EUR 1.7 million.

Additional Initiatives

During the ongoing remediation activities in Mojkovac area, it was identified that several problems had not been treated during the period of the closure of the mine and preparation of the technical design for the TMI. Up until the initiation of the Programme implementation, the level of risk to human health and safety had been unknown. The Project team secured additional resources for the identification of risks, and later on, for the preparation of documentation that would facilitate remediation of identified problems. The additional resources were secured from:

i) the Czech Government for:
   a. Preparation of the study : "Rehabilitation and Re-cultivation of the Mining Complex of the Brskovo Lead and Zinc Mine, Mojkovac, Montenegro"
   b. Preparation of a Remedial Action Plan for the Brskovo and Zuta Prla Processing Plant.

ii) the Government of the Netherlands for:
   a. Preparation of Study "Reprocessing Assessment of the Mineral Processing Potential of Semi-processed Lead and Zinc Ores and Similar Materials Remaining at the Brskovo and Zuta Prla Mines, Municipality of Mojkovac, Montenegro";
   b. Preparation of the Report "Recommendations for a Pilot Treatment System for Acid Mine Drainage (AMD) for the Brskovo and Zuta Prla Mines, Municipality of Mojkovac, Montenegro";
   c. Repackaging and temporary storage of laboratory waste in the Brskovo Mine processing plant.

iii) the Montenegrin Government for:
   a. Preparation of a detailed urban plan for the area of the TMI and urban part of Mojkovac.

CAPACITY DEVELOPMENT

At the beginning of the programme implementation, one of the significant problems identified as an obstacle to local development was the image of Mojkovac as an environmental hot spot, due to the tailing mine impoundment in the city area. This led to neglect of the significant development potential that the area has, not only by the local population, but by national decision makers as well.

Taking into consideration available resources and time, the project team, in close cooperation with local partners, agreed that maximum efficiency would be obtained through focusing on enhancing the capacities of the municipality for long-term planning and project development, as well as development of proposals for IPA and other funds/donors. At the same time, part of the

activities focused on activities that, while enhancing the capacities of local stakeholders, would strongly promote the entire area of Mojkovac and its natural resources and their responsible and sustainable usage.

Based on a request received from municipalities, capacity development activities focused on training and preparation of projects that could be submitted for funds available under the Instrument for Pre-Accession Assistance (IPA).

The programme focused on training an initial group of 11 persons (municipality manager, administrator and heads of different municipality departments) with the intention of increasing the number of beneficiaries. The result of the training was the Strategic Development Plan (the existing Strategic Development Plan expired in 2005), taking into consideration EU requirements and planned integration. The teams responsible for preparation and implementation of cross-border projects from three municipalities: Berane, Bijelo Polje and Mojkovac received on-the-job training that resulted in the preparation and submission of 3 projects for cross-border projects (Mojkovac and Berane for Serbia–Montenegro, Bijelo Polje for Bosnia and Herzegovina–Montenegro).



In addition to this, in order to prepare the ground for the more efficient implementation of funds, in cooperation with the Business Start-up Centre in Bar (an organization financed by the Government of the Netherlands), a competition for the best business idea was organized. The process started with a collection of the business ideas, followed by a shortlist of the received ideas (12 for Mojkovac) and organization of training for the people submitting these ideas. One of the basic criteria was that the person submitting the idea was currently unemployed. Training lasted 5 days and focused on the preparation of business plans that could be used for requesting bank loans, in case the idea was not supported through the small grants available within the project. Participants were also informed about the processes of business registration and legal aspects of business start-up. Five grants were selected and supported by the programme.

In addition to the area of local development, capacity building was organized for institutions working in the area of environmental monitoring, primarily the Agency for Environmental Protection. The training exercise for personnel of the agency responsible for issues relating to monitoring was delivered by an international environmental monitoring expert, after which the monitoring and evaluation plan for the Mojkovac TMI was prepared. The selected consultant

prepared and supervised the environmental monitoring plan for the Mojkovac rehabilitation site and in parallel prepared and implemented a 6-day in-class and in-field environmental monitoring training for the relevant staff of the Agency for Environment Protection of Montenegro. The Environmental Monitoring Plan will be used both as the baseline for the completion of works and as a performance indicator for the containment of contaminants within the TMI.

Pilot Projects

In-the-field support for local development efforts was provided through the pilot projects. Based on the Capacity Development and Policy Integration Needs Assessment Report, prepared in April 2008, pilot projects were identified and for some of them detailed project documents were developed. Taking into consideration the resources available and the number of possible pilot projects identified, it was not possible to develop all the suggested ideas. Therefore, the UNDP Economy and Environment Cluster (within which the Mojkovac hot spot project was implemented), brought about synergy between several projects implemented in this region, in order to produce the best possible results. Therefore, several important topics/ideas identified through the Needs Assessment were financed through other UNDP projects (e.g. spatial planning, "Leave No Trace" training, etc). Taking into consideration that agriculture and tourism are considered to be major potentials for the development of the Mojkovac region, two pilot projects on kayaking and organic agriculture were supported through the project.

Kayak Reintroduction onto the River Tara

In collaboration with the Tourist Organization of Mojkovac, kayak training was organized for 16 participants from Mojkovac, aged 15 to 20, in June 2008. Connections were established with the Slovenian Kayaking Clubs and Association. Taking into consideration the potential for the development of tourism and with kayaking being an important part of this development, a study tour to Slovenia was organized for 10 representatives of Mojkovac (from the Tourist Organization, the municipality and the kayaking club) in August 2009. Young kayakers had the opportunity to be trained in Tacen, Ljubljana by Europe's best kayakers during the Slovenian Open (the final test for the Slovenian Kayaking Association organizing the World Cup in 2010). In Nova Gorica, during a training camp for children aged between 10 and 14 years, participants had the opportunity to have an insight into Slovenian kayaking clubs and the association's organization and activities, as well as additional training opportunities.



Following a series of activities on the development of kayaking on the River Tara, the Municipality of Mojkovac is now seen as a tourist destination for kayaking. This has been confirmed by an increase in the number of visitors arriving in Mojkovac exclusively for kayaking. The project offered income and job generation possibilities for local stakeholders. Consequently, several agencies and NGOs procured kayaks and were planning to continue with the development of kayaking as part of the tourist offer in Mojkovac. In addition to that, in cooperation with the Slovenian Kayaking Association, one representative from the Mojkovac Kayaking Club undertook a month and a half training in Slovenia and became the first kayak instructor with an international licence in Montenegro in the last 20 years.

Rural Development – Organic Farming

Organic farming has been recognized as another development area for the municipality of Mojkovac. 10 households interested in organic farming were selected for participation in this project. Since these farmers had not had any training in this kind of production, initial training began in 2008 and activities focused on strengthening capacities of selected households in the area of food production, as well as meeting criteria requested by legislation and regulation in the areas of marketing and selling of the products.

In addition to gaining information and knowledge about alternative ways of food production and standards that have to be met, the households received small "in-the-field" support for their activities (e.g. organic seeds for specific sorts and similar).

In addition to this, information about the farmers interested in this sort of production has been disseminated among other donors and organizations able to provide assistance and training, making this kind of support more accessible to farmers in Mojkovac.

Mine closure and the possibility of using the mine for tourism purposes – study tour

Having in mind the advantages that the Municipality of Mojkovac has in relation to tourism development, its geographical position, its proximity to two national parks (Durmitor and Biogradska gora), its closeness to the River Tara, important transportation routes etc, a study tour to Slovenia was organized in relation to the possibilities of using former mining sites for tourism purposes. Representatives from the Municipality of Mojkovac, the Geological Institute and Local Tourism Organization had the opportunity to exchange experiences and information with representatives from 5 different Slovenian municipalities about the concepts of utilizing former mines as museums and tourism destinations with different tourist services. Two former mines in Slovenia – "Idria" (a former mercury mine) and "Mezice" – were excellent practical and functional examples. The importance of this capacity-building exercise lies in the provided possibility to exchange specific experiences in the area of tourism development, re-cultivation and reutilization of abandoned mining sites, organization of municipality management, preparation

and implementation of projects for EU and other donor funding. The visit was evaluated as being highly useful by all participants and provided valuable information on alternative development paths available for post-industrial and underdeveloped areas. As a consequence of these activities the municipality strongly supported archaeological research in the area of Brskovo, where mining activities were initiated in the 12th century.

Supply of professional consultancy services

The objective of this activity was to establish a database of national experts who are competent to carry out consultancy services in the field of environmental management. A call for Expressions of Interest was advertised on several occasions, based on which relevant data was collected. Data was entered into the regional Database of Practitioners, which is available on the programme's web site.

The workshop on the exchange of experience regarding the first year of implementation of the Law on Environmental Impact Assessment for representatives from all 21 municipalities and the Ministry of Tourism and Environmental Protection was organized in December 2008. Conclusions from this workshop were disseminated to all relevant stakeholders involved in the process of strengthening capacities in EIA implementation in order to prepare an adequate response to fill in gaps and areas where capacity strengthening was needed. The exchange workshop was evaluated as being timely and highly useful and one of the major suggestions was that similar events should be organized on a regular basis.

PUBLIC AWARENESS RAISING

Using Media in Transforming the Image of Mojkovac

During Phase II of the physical works at the TMI in Mojkovac, several promotional activities were organized with the aim of changing the image of Mojkovac from a hot spot site to a tourist destination, and promoting the necessity of environmental protection and sustainable development in the region.

In the very early stage of project implementation in April 2008, a field visit for media representatives (national daily newspapers and TV stations, and representatives from prominent British, German and other international dailies, magazines and TV stations), was organized in Mojkovac, including the TMI, but also the River Tara as part of the tourist potential of the region. The main aim of the field visit was to present plans for the development of nature-based tourism and economic revitalization of the area of northern Montenegro, specifically in the Municipality of Mojkovac, planned project activities and to invite the local and national community to take an active part in the sustainable development of this area. In the media coverage that followed the event, for the first time the focus of the media in the presentation of the Municipality of Mojkovac was shifted

from the presence of the TMI as an ecological hot spot to the re-cultivation of the hot spot, as the first step towards the economic revitalization of the area, elimination of investment barriers and the usage of the available potential for sustainable development in the area of tourism and agriculture. An open communication link was established with representatives of different media, providing the opportunity for easier dissemination of information important for project implementation.

Regular public hearings for the general public in Mojkovac were organized during 2009 in order to provide adequate information on remediation progress. Public hearings included: 5 round tables, one local TV presentation and two radio presentations, all organized by the municipality, the UNDP and the company "Vodni Zdroje".



As part of the promotional activities, the visit of a team from the production company "Pilot Film and Television Productions Ltd." was organized in August 2009. This production company recorded two promotional documentaries for the series "Globe Trekker" and "Treks in a Wild World", which was broadcast via the most influential global TV channels. A team of cameramen recorded scuba-diving in Kotor Bay and then moved to the Municipality of Mojkovac to record mountain biking on Mount Sinjajevina, organized by the local tourist organization in Mojkovac and the UNDP, then, rafting down the Tara Canyon, Zabojsko Lake, horse racing organized especially for this purpose and the traditional Montenegrin dance called "Oro", etc. Globe Trekker was broadcast in over 40 countries, through the following channels: Channel 4, BBC, LWT, The Travel Channel, Discovery International, PBS in USA, OLN in Canada, ABC in Australia and other satellite and cable channels, including Voyage and France 5 in France, Mediaset in Italy, NRK in Norway, Denmark Radio TV in Denmark and TVE in Spain. This show has over 30 million viewers and has won over 20 international TV awards. The serial "Treks in a Wild World" was broadcast on the National Geographic channel.

Northern Challenge – as part of another project implemented by the Economy and Environment Cluster, the **"Northern Challenge Race"** was used as promotional event for the Municipality of Mojkovac. Taking into consideration the development of adventure sports and tourism on a global level, the UNDP supported the organization of a two-day event (the first day in Mojkovac and the second day in Kotor Bay, October 2008) that gathered 58 competitors from Montenegro, UK, Serbia and Croatia. The races consisted of running, kayaking and biking, focusing and promoting those activities that could be developed in Mojkovac. Since preparation and organization of this event started in March 2008, the available time period was used for strengthening local stakeholders in the area of organizing and promoting events.

"Leave No Trace" is another activity organized within other projects of the Economy and Environment Cluster, involving stakeholders from Mojkovac. Leave No Trace (LNT) is an international programme designed to assist outdoor enthusiasts with their decisions about how to reduce their impact on the environment when they hike, camp, picnic, snowshoe, run, cycle, hunt, paddle, go horseriding, fish, ski or climb, and is best understood as an educational and ethical program, not as a set of rules and regulations.

In October 2008, 12 persons where trained to Master Educator Level and 12 persons to Trainer Level. Participants were representatives of cycling and mountaineering associations, national and local tourist organizations, the Faculty of Tourism in Kotor and the private sector. All participants evaluated this programme and training as being highly useful. The UNDP received requests for support in forming training centres on the coast and in Mojkovac. Representatives of the Faculty of Tourism proposed introducing this programme as a part of the faculty's curriculum, while the National Tourism Organization strongly supports and encourages further development and the establishment of a training network in Montenegro.

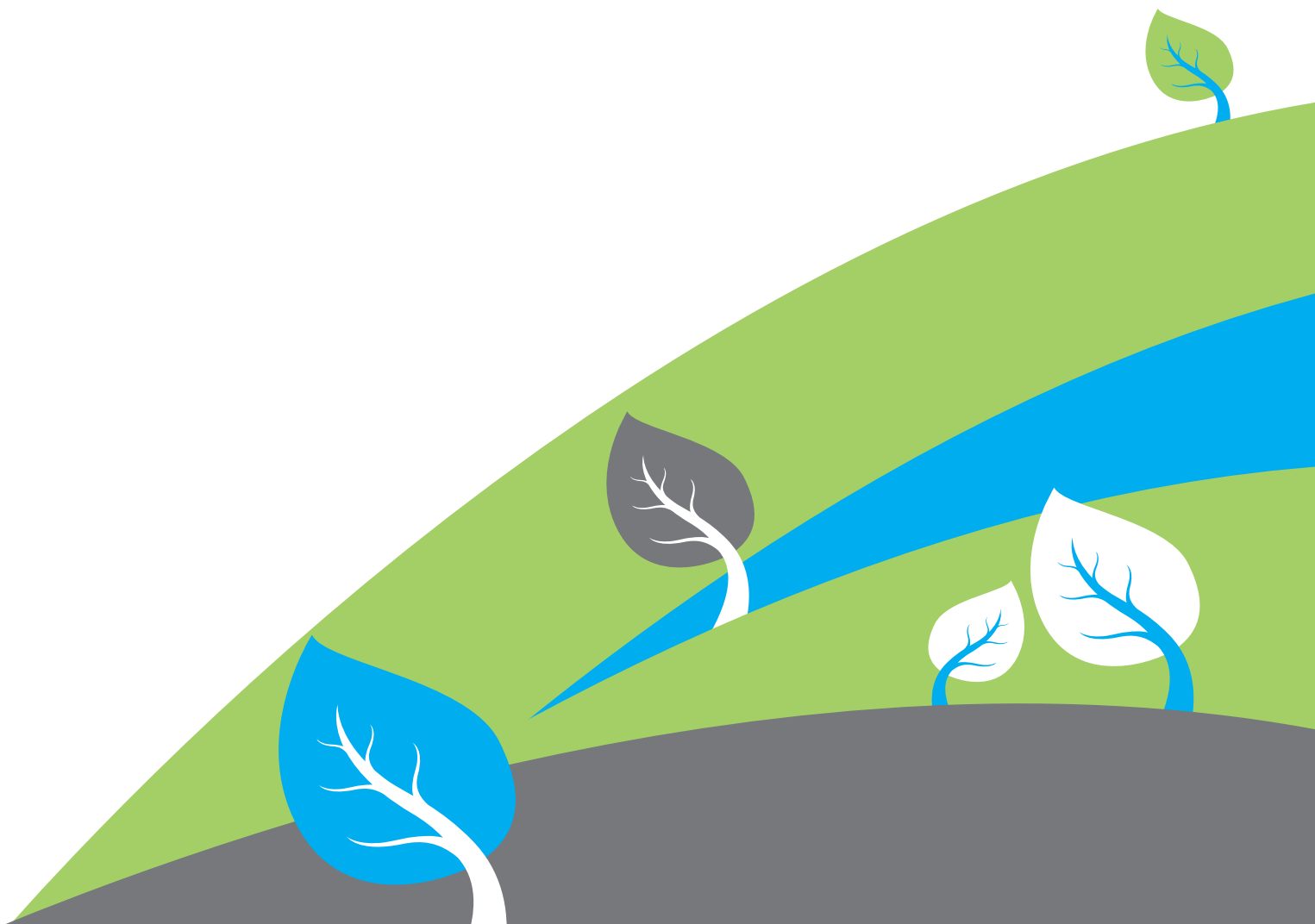
Since 2005, the National Tourism Organization of Montenegro, under the auspices of the President of Montenegro, has organized the annual award presentation ceremony of the "Wild Beauty Award" for contribution to the quality, recognition and promotion of the Montenegrin tourism offer. The selection process goes through several stages, the first one being online voting, followed by evaluation committees making their selection from shortlisted events. For the Wild Beauty Award 2009 Kayaking, "Northern Challenge" and "Leave No Trace" where shortlisted in 2009 in 3 different categories.

Other initiatives

Within the project "Transfer of Good Practice of Sustainable Development under the Alpine Convention to the Municipality of Mojkovac" funded by the Ministry of Foreign Affairs of Slovenia, representatives of the Slovenian Kayaking Federation visited Mojkovac in June 2009. During the visit, the mayors of Idrija and Solcava and the director of the Regional Park "Logarska dolina" had the opportunity to present the experiences and achievements of those Slovenian municipalities (former mining cities) in the area of nature-based tourism. These presentations were well received by local stakeholders, to the extent that UNDP received a request from the mayor of Mojkovac for support exploring the possibility for the establishment a regional park on the territory of Mojkovac.

Media analysis conducted in August 2010 proved that a significant shift has occurred in reporting about Mojkovac. After three years of project implementation, the Municipality of Mojkovac is not considered any more an environmental hot spot, but rather an area that offers significant potential for nature-based tourism and local growth based on sustainable development principles.

SERBIA



ABSTRACT

The Serbian hot spot project "Remediation of the Grand Backa Canal" supported the Republic of Serbia in resolving one of its key environmental hot spots, a part of the Grand Backa Canal that runs through the Municipality of Vrbas, Autonomous Province of Vojvodina, which has been considered the most polluted waterway in Europe. Phase IV.1 and IV.2 were the subject of the project remediation works, while Phase V followed, with the support of the Government of Serbia. The works in Phase IV.1 were finished in September 2008 and in Phase IV.2 in May 2010, connecting industries to the future wastewater collector. The works on the main collector that would serve as a recipient of pre-treated industrial and communal wastewaters have commenced. The topics covered through capacity development programme included IPPC, relevant by-laws and regulations, hydrological aspects of hot spots, etc. Public awareness-raising activities were focused on information sharing among various stakeholder groups in the Municipality of Vrbas in relation to remediation of the Grand Backa Canal, but also to the protection of nature, with the emphasis on protected areas in the vicinity of the Municipalities of Vrbas and Kula.






BACKGROUND

When initial discussions (in April 2007) between the representatives of development partners from the Embassy of the Netherlands, the UNDP and the Directorate for Environmental Protection took place, the potential contribution of the Western Balkans Environmental Programme to the sustainable development of the country was recognized.

Although the Grand Backa Canal has been heavily polluted, with significant influence on the health of the population, the activities undertaken in the previous period have not resulted in remediation of the canal itself. The constraints which prevented full remediation were mainly financial, organizational and technical. In order to bring canal back to life, according to preliminary estimations, an amount of more than EUR 40 million was needed, and this amount was significant, given the state of the economy in the country at that time. In addition to this, close cooperation between at least two municipalities (Vrbas and Kula) and authorities from the AP of Vojvodina and at the national level was needed to create an enabling environment for remediation activities. In 2007 the newly established Ministry of Environmental Protection of Serbia with the support of involved municipalities and authorities of the AP of Vojvodina managed to gather all relevant stakeholders in the Task Force for the Remediation of the Grand Backa Canal. The ministry highlighted this particular environmental hot spot as one of three hot spots in Serbia that require the most immediate attention, the other two being Pancevo and Bor. Some of the activities required in the process of remediation of the Grand Backa Canal needed a level of technical expertise that had not been previously deployed in Serbia.

Based on all the above, Grand Backa Canal was included in the WBEP as a national priority hot spot, satisfying the criteria for selection of the locations.

CLEAN UP

Site Situation

The Municipality of Kula belongs to the West Backa Region and lies at its geometric centre, and the Municipality of Vrbas lies more to the southeast and belongs to the South Backa Region. This part of Backa is in the northwest of Vojvodina in the Republic of Serbia. These cities are near the junction of the Novi Sad – Subotica (part of the European road network), the Novi Sad – Sombor and Subotica – Backa Palanka roads. Along this connection and through all three cities in question there run a railroad, motorway and the Grand Backa Canal. These lines of communication represent a very good connection between all three cities, which are not only close to each other, but are also in a line along the canal.

The cities as well as twelve mainly food processing industries are situated along the important waterway called the Grand Backa Canal connecting the River Danube in the west with the River Tisza in the east. "The Grand Canal of the Territory of Backa" (formerly named the Franz Canal) between the cities of Bezdan and Becej has a total length of approximately 130 km flowing west-east. The canal stretch from Crvenka to Vrbas is 18 km long. The part of the canal which was the subject of the remedial works runs through Vrbas for a distance of 6 km.

The canal was built for navigation, drainage of marshy areas and is also used for irrigation as well as for supplying water for special purposes. The canal on certain stretches has the potential for recreational purposes such as swimming and fishing and, once cleaned, may facilitate water-based transportation of goods, enabling small-margin industries to develop, which may reverse current trends of decreasing employment in this region.

On the banks of the canal there is an industrial basin with the towns of Crvenka, Kula and Vrbas. Intensive economic growth in the second half of the last century caused an increase in wastewater from both the industries and the population. Due to the lack of treatment of most industrial waters, the section of the Grand Canal running through Vrbas for six kilometres, has been degraded so much that it is the most polluted water flow in Europe today. The surrounding area is rich agricultural land with long traditions. The industries in question are the sugar, alcohol and biscuit factories in Crvenka; a tannery, textile and faucet factories in Kula; sugar, meat, pig-farming, and vegetable oil factories in Vrbas.

The three cities have a total population of 57,000 people with an estimated hydraulic load of 11,400 m^3/day.

The area of influence starts in Crvenka, a village belonging to the Municipality of Kula, 17 km to the west of Vrbas, and ends 23 km downstream, at the so-called "Triangle", which is the point of confluence of the Grand Canal from the north-west and the Bogojevo Canal from the west. From there on, the resulting canal has the name the Grand Canal and runs for 12 km before entering the River Tisza that flows from Romania and Hungary into the Danube downstream of the city of Titel. The entire canal network is designated the DTD (Danube–Tisza–Danube) Canal System since it receives its water from the Danube at Bezdan, and discharges the water back into the Danube via the River Tisza. The canal system is operated and run by Vode Vojvodine, a public utility under the auspices of the AP Vojvodina. Vode Vojvodine has played and will play an increasingly important role in the water resources management of this part of Serbia.



The main environmental issue is the volume and content of the sludge sediment on the bottom of the canal. Findings of site investigation performed by Dekonta Company showed that the total volume of contaminated sludge sediment in the 6 km of the canal which is the subject of the cleanup works is approx. 403,000 m^3, and that the sludge sediment is highly contaminated with coliform bacteria (indicating an extreme fecal contamination), heavy metals (Cr, As, Cd, Ni), with petroleum hydrocarbons and PCB in the upper part of the GC.

Interventions

The intervention was to construct a main water collector connecting the 12 industries and the local sewerage to a centrally located water treatment plant for treatment. The other intervention was to monitor the water before and after each of the 12 discharge points at an upstream and downstream location. This will provide the current baseline for each of the industries' discharge points and permit a characterization of their current wastewater discharges.


The overall remediation of the Grand Backa Canal project consisted of 3 subprojects:

1. Construction of a new sewerage network, for collection of pre-treated industrial waste waters, communal waste waters of Vrbas and surrounding settlements.
2. Construction of a Central Wastewater Treatment Plant for Vrbas and Kula (CWWTP).
3. Cleanup and remediation of the Grand Backa Canal.

The project intervention was covered by Subproject 1, and finalization of the main wastewater collector (DIA 800 and 1000) was the expected output of this project. The wastewater collector will allow all polluters from Vrbas and Kula to connect to the CWWTP, which is necessary for the achievement of the overall goal - complete remediation of the Grand Backa Canal.

The intervention included construction of the missing part of the main wastewater collector of the Vrbas – Kula sewerage network:

- Phase IV.1 Ch. km 5+999 – km 8+057 (project clean-up component)
- Phase IV.2 Ch. km 8+057 – km 9+600 (in-kind contribution from the Government of Serbia)
- Phase V Ch. km 9+600- km 12+000 (in-kind contribution from the Government of Serbia)

The construction works in Phase IV.1 included shallow and deep excavations (at intercepts with the railway and the road), installation of the HDPE pipes and the intercept of the collector with the lateral canal KC III as defined by the project documentation.

The company "Graditelj NS" from Novi Sad, Serbia which was awarded the contract commenced works on Phase IV.1 in June 2008 and completed them in September 2008.

The construction works in Phase IV.2 included earthworks, excavation and installation of the HDPE pipe. The company "Graditelj NS" from Novi Sad, Serbia which was awarded the contract commenced works on Phase IV.2 in March 2010 and completed them in May 2010.



The construction company for Phase V has been selected, and the works are planned to commence by the end of 2010. The works should last approximate 40 days.

Technical Monitoring

The technical monitoring programme included monitoring of the water and sediment quality of the Grand Backa Canal (GBC) at 10 profiles along 6 km of the most polluted section.

The selected institute for technical monitoring was the accredited national laboratory, the Institute for Public Health of the City of Belgrade. The Institute conducted monitoring for the autumn-winter 2008[1] hydrological season according to the following monitoring programme:

1. Physical-chemical analysis of the surface water (38 parameters),
2. Microbiological analysis (7 parameters),
3. Physical-chemical analysis of the sediment (25 parameters),
4. Biological analysis (4 parameters).

The project was coordinated and managed to provide sustainability by continuing to monitor the quality of the surface water and sediments in an additional 7 hydrological seasons, from 2008-2012. This monitoring is being financed by the MESP (38 %) and "Ekofond" (62 %).

1. The monitoring results for the autumn-winter 2008 hydrological season are available at http://rs.westernbalkansenvironment.net/content/blogcategory/15/44/lang,en/

Technical monitoring results will serve:

- to Initiate environmental monitoring of the hot spot (GBC) for the needs of the MESP and other institutions;
- as guidance (baseline) data regarding the quality of water for the CWWTP design;
- to provide data on the quality of canal sediments in the early phase (baseline) of developing technical documentation for the remediation of the GBC in Vrbas;
- to inform the general public on environmental status of the hot spot.

The technical monitoring, laboratory tests and interpretation of results were completed for the spring-summer and autumn–winter 2009 hydrological seasons. The final monitoring report for 2009[2] was submitted in February 2010 to the MESP and to the Serbian Hot Spot Project. The results of the technical monitoring for the spring–summer 2010 hydrological season were completed as well.

All test results were compared with the limiting values of the relevant Serbian regulations and ICPDR criteria, both for water and sediment.

CAPACITY DEVELOPMENT

The Environmental Policy Integration and Capacity Development Needs Assessment report provided an overview of the most important aspects of the enforcement of environmental policies and identified key thematic areas for capacity development and demonstration projects. The report included four parts: i) policy making, planning and implementation of the legal framework; ii) status of policies, strategies and plans; iii) institutional capacity for environmental management and iv) capacity development needs assessment.



The identified thematic areas for potential CD projects were: legal areas, strategic areas, SEA, EIA, and IPPC, cleaner production, air protection and climate change, water protection, waste and chemicals management, risk management and inspection (accident response), project

2 . The 2009 results are published at www.ekoplan.gov.rs

management (general), cross-sector link and cooperation. The findings and thematic areas for potential CD projects were approved by the PMB on 4th of November 2008 and specific capacity development projects were further developed, focusing on increasing capacities of employees of national, regional and municipal institutions dealing with environmental issues. Target institutions predominantly included MESP, the Environment Secretariat of the AP Vojvodina, and national institutions like the Public Health Institute, Water Directorate, "Vode Vojvodine", the Environmental Secretariat of Pancevo, Municipalities of Vrbas and Uzice, etc.

Four (4) capacity development projects were implemented.

A. **EU Water Directive Project** and drafting technical part of the decree on limiting values of dangerous substances in water, harmonized with EU directives

The main beneficiary of this activity was the MESP, the Department for Water and Land Protection. A three-day seminar, was organized in July 2009 about implementation of the Water Framework Directive (WFD) and its requirements related to Priority Substances and Priority Hazardous Substances (Directive 2008/105/EC), followed by discussions on the drafted sub-law regulating surface water quality with regard to priority pollutants. About 30 participants from a variety of institutions dealing with water protection participated in the workshop on the EU Water Project. The first outline of the by-law on surface waters was presented to the stakeholders and direct beneficiaries, while comments resulting from an intensive discussion with the beneficiaries and a wide spectrum of stakeholders (workshop participants) were used as an input for drafting the sub-law. The workshop materials and the EU Directives translated into Serbian are available on the project web site http://rs.westernbalkansenvironment.net/content/view/65/46/lang,en/

B. **Integrated Pollution Prevention and Control** – simulation of the issuance of two permits, for regional landfill and pesticide industry (real facilities)

The focus of this activity was on upgrading the institutional capacities of the line ministry and AP of Vojvodina in the IPPC process through simulating the issuance of the IPPC permits for the pesticide industry "Duochem" and for the Regional Landfill "Duboko" in Uzice. During the inception phase it was decided to start a simulation IPPC process for two facilities (rather than real licences), and it was left to the ministry and operator to decide when to formally initiate the real process, which is a legal obligation with strict formal deadlines both for the operator and for the ministry. Expertise was provided by one international and one national consultant available throughout the whole process of licensing. The IPPC department within the Ministry of the Environment and Spatial Planning and personnel from the Department of the Environment of the region of Vojvodina were given intensive support and capacity development over the two missions. In the initial phase they were provided with a significant number of technical guidance documents. In addition to that, the consultants had a number of meetings to discuss the content of these documents and to clarify their use and applicability to the Serbian IPPC permission process.

Two working groups were established:

a) consisting of the IPPC Department and Vojvodina Regional Environment staff involved in assessing the IPPC application and preparing the permits and;

b) a working group consisting of wider departments within the ministry and other competent authorities involved in the IPPC permitting process e.g. the EIA Department, Waste Department, Water Works Department of the MAWWF etc.

Training in IPPC issues was organized for all participants involved in the process, after which the process of filling in the application started. The facilities participating in the IPPC permission process received clear guidelines on the requirements of the permit application process. In addition to that, both consultants were available to answer any queries which arose during the application process.

Ministry and regional staff were provided with draft BAT documents for both landfill activities and the manufacture and formulation of pesticides. In addition, a substantial amount of guidance documentation was provided on site selection, design, operations and monitoring of landfills. Evaluation of BAT was undertaken on a site-by-site basis and the final interpretation of BAT for each activity licensed under this project would be defined by the conditions of the permits issued. The draft BAT documents provided to the ministry and regional officials served as the basis for the discussion on the applications received.

"Duboko" regional landfill submitted the application to the ministry on 26th June 2009, and "Duochem DOO" to the Vojvodina regional officials on 7th July 2009. Both applications were evaluated by the ministry's IPPC Department and Regional Environment Department with the assistance of the consultants.

The consultants further worked closely with all parties on the drafting of the (simulated) IPPC permits and provided drafts to the ministry and regional officials to amend as appropriate. The subsequent drafts prepared by the ministry (different departments) and regional authorities were discussed in detail and written comments on these drafts provided to both parties.

Having in mind that the role of the Technical Commission (TC) has not been fully defined in the IPPC law and as such was open to different interpretations, the training on the role of the TC was held during June 2009. It was clear that the Technical Commission's role in the IPPC differs greatly to that in the EIA process, since in the IPPC the Technical Commission acts as an arbitration body focusing on submissions received for the draft IPPC licences, whereas in the EIA process the Technical Commission acts as an Expert Body for the assessment of the Environmental Impact Statement. Based on this workshop the recommendations for the operation of the Technical Commission were provided in the Final Report. In addition, a template for the technical commission report was provided to the ministry and regional officials, as well as the guidance on the procedure which should be followed for consideration of the Technical Commissions report and recommendation of the final permit to the minister.

C. **Assessment of Environmental Hot Spots - Hydrogeological Aspect,** Pilot South Industrial Zone, Pancevo (technical report, geo-database, trainings)

The project was implemented by a team of three national consultants: a hydrogeologist, GIS expert and water quality expert in the period December 2009 – April 2010. The project consisted of four parts, and in the set timeframe the following was achieved:

i) a report on summarized hydrogeological conditions and groundwater quality in the Pancevo South Industrial Zone was developed, printed and disseminated to relevant stakeholders;
ii) a geo-database for the Pancevo South Industrial Zone has been established;
iii) capacity development of relevant focal points in the MESP and Environmental Secretariat of Pancevo on "The Assessment of Environmental Hot Spots – Hydrogeological Aspect". The "hands on" training on using the geo-database was organized in March 2010, while the results of the pilot project were thoroughly discussed with relevant stakeholders (industries, etc.) in Pancevo in May 2010.

As a result of all the aforementioned activities, a comprehensive technical report "Assessment of Environmental Hot Spots – Hydrogeological Aspects of the Pancevo South Industrial Zone" has been provided, including the following chapters: implementation methodology, project location and boundary description; previous investigations and background documents; geological structure; hydrogeological characteristics; groundwater quality; theoretical grounds for polluters' behaviour and migrations; remediation options; the geo-database; conclusions and recommendations; the situation maps, geological, hydrological and groundwater quality reports; control groundwater quality monitoring programme; the geo-database user guidelines

More detailed information about this pilot project is available on the project web site: http://rs.westernbalkansenvironment.net/content/blogcategory/17/46/lang,en/

D. **Guideline on EIA for Wind Farms**

The Guidelines are designed as a tool for employees that approve EIAs and for other stakeholders. The Guidelines provide information on: policies of the Republic of Serbia (RS) in the field of environmental protection and harnessing wind power, the basics of technology for the use of wind energy and the possible impact of wind farms on the environment. It also provides a review of the regulations in the field of wind-farm development (energy, environment, planning and construction) in the RS. The Guidelines are based on EU practices and are tailored to Serbian legal requirements.

The document has been developed in line with the consultations with three focal points: EIA, SEA and the Department for Renewable Energy. 300 copies were printed and disseminated through the line ministry. The document is available on the ministry's web site – www.ekoplan.gov.rs.

E. Cleaner Production

Apart from the aforementioned capacity development activities, the Hot Spot Project supported and facilitated the presentation of the UNIDO's Cleaner Production Project to industries from Vrbas and Kula in November 2009. After the presentation, the meat industry "Carnex" from Vrbas, one of the major polluters of the Grand Backa Canal, enrolled on this 8-month capacity development project. The outcome was that the Carnex meat processing industry from (Vrbas) was certified by the UNIDO in 2009 to introduce Cleaner Production.

Supply of Professional Consultancy Services

A Market Survey of Professional Environmental Practitioners was conducted in the period July 2008 – January 2009. Since the overall programme promotes good environmental practices, successful environmental management, and integration of the environmental policy and capacity development of all relevant stakeholders, one of the programme objectives was to strengthen the supply of professional consultancy services in the participating countries/territories of the Western Balkans. The market survey was conducted in order to provide input to the regional database about individual practitioners and companies/institutions/organizations in the field of professional environmental services including those with experience in environmental management, policy development and implementation.

The purpose of the Western Balkans database is to help all interested parties to efficiently identify, select and contract experts and companies/institutions/organizations for specific assignments in the field of environmental protection in the Western Balkans and to enable better utilization of the environmental expertise in the region.

The methodology for collecting the data was based on the dissemination of structured questionnaires to relevant experts and organizations through mailing lists. The questionnaires contained open questions to applicants on environmental issues and potential upgrade in the field of professional environmental services in Serbia.

The total number of inputs collected and inserted in the database for Serbia was 538 (111 organizations, 427 individual practitioners). The database applicants responded well and provided detailed answers to the posed questions. The processed answers outlined gaps, capacity development needs and potential areas of capacity development related to professional environmental services in Serbia. The applicants of various professions belonged to a wide range of disciplines that were directly or indirectly related to the environment.

Based on the summarized answers, 8 capacity development areas were identified by environmental practitioners:

- Legal areas (revision of old, adoption and implementation of new legislation);
- Environmental awareness and education (on the environment, environmental management, environmental legislation);

- Upgrade and development of different kinds of databases;
- Networking and cooperation;
- Institutional capacity development of municipal authorities;
- Introduction of cleaner production, new technologies and energy efficiency;
- Licensing of companies and service providers;
- Financing incentives for the environment (individuals, companies)

For all the aforementioned areas, it would be possible to select and further develop various capacity development projects, both for institutions and/or experts/organizations. While institutional capacity development would allow larger beneficiary groups and would have an "umbrella" significance to all stakeholders, expert/organization capacity development would be focused on a narrow field of expertise and smaller groups of beneficiaries.

In addition to that, there is a very good match of the main identified thematic issues, needs and CD areas from this survey with the ones identified in the "*Environmental Policy Integration and Capacity Building Needs Assessment Report* (August, 2008)". The latter report was based on detailed consultation with senior staff and line managers from the Ministry of the Environment and Spatial Planning, while the Market Survey Report was based on the participation of environmental practitioners and organizations from all over Serbia.

PUBLIC AWARENESS RAISING

Public Awareness Raising Campaign

In the first stage of project implementation in Serbia in June 2008, the first round of the focus group meetings were organized for representatives of the government, stakeholders and representatives of civil society and citizens, to serve as a baseline in relation to the awareness of the citizens in Vrbas and Kula regarding the environmental situation of the Grand Backa Canal. Comments from the focus groups ranged from positive statements and satisfaction related to project implementation and expected results, to concern expressed that remediation of polluted sediments is a high-risk task. In both group discussions, it was considered that a broader project would be significant in achieving a clean and healthy environmental situation in Vrbas, Kula and the surrounding area. Baseline focus group discussion results underlined the fact that the synergy of various institutions such as the UNDP and the Government of the Netherlands, the Ministry of the Environment and Spatial Planning, the AP of Vojvodina and the municipal authorities, but also citizens and civil associations fundamentally contribute towards achieving the goals in this key environmental issue. Based on the inputs received, and having in mind different target groups, a comprehensive public awareness raising campaign (PARC) was developed.

The main target audience of PARC were citizens and major corporate stakeholders situated in the municipalities of Vrbas and Kula, and the campaign activities were implemented during a six-month period.

On December 2nd 2009, the presentation of the campaign materials, implementation plan and announcement of the start-up date was communicated to representatives of the Municipalities of Vrbas and Kula, JKP Standard, NGOs and the media.

The specific objectives of the public awareness campaign were:

a) Broadening public ***awareness*** of the project and desired outcomes;
b) Leading to public ***understanding*** of key issues being addressed by the overall technical project;
c) Producing broad public ***support*** for project activities as well as for the related engagement of key stakeholders; and
d) Contributing to the continuous ***commitment*** of key stakeholders to project outcomes and broader objectives in turning the canal from an environmental "hot spot" to a valuable development resource.



The whole campaign was divided into two phases addressing different topics:

- The first phase addressed the issue of saving drinking water and was implemented from 5th December 2009 – 15th February 2010
- The second phase promoted connection to the new sewerage network (and the Central Wastewater Treatment Plant) and was implemented from 15th February – 15th May 2010.

The communications tools used throughout the campaign were: billboards, radio jingles (1 month, 5 times/day), posters, postcards, flyers to accompany utility bills for each household (three months) in Vrbas and Kula, advertisements in Kula's and Vrbas's newspapers, t-shirts and notebooks.

As the Municipality of Vrbas is multinational, the campaign messages were disseminated in three official languages (Serbian, Rusyn and Hungarian) on each piece of literature.

Ekopokret Vrbas, the contracted NGO for implementation of one of the two demonstration projects, assisted in organizing the exhibition of the photographs of the protected areas of Jegricka and Carnoc and demonstration projects, and assisted in the distribution of the campaign materials in Vrbas.

Communications Forums

During implementation of the hot spot project, three communication forums were organized, with the aim of increasing knowledge about the project activities, to ensure the sustainability of the project by raising awareness on key issues that the project was dealing with, and to provide a platform for the sharing of information between various stakeholders in relation to the remediation of the Grand Backa Canal. For project implementers and partners, the forums were a platform to communicate the project's achievements, while civil society representatives had the opportunity to raise their concerns and put forward their demands. The first forum dealt with sharing information about the main wastewater collector, the Central Wastewater Treatment Plant (CWWTP) and roles of different stakeholders in the process of project implementation. The panellists were representatives of relevant nation/local institutions, while the audience was the general public, residents of Vrbas and Kula. The second forum was organized with the representatives of industries-polluters of the Grand Backa Canal. This forum aimed to show the industries that the most beneficial and feasible way is to connect pre-treated wastewaters to the CWWTP. The third forum focused on the promotion of a clean environment–protection of nature and protected areas, including relevant national/local institutions and management authorities of the natural resources, as well as people living along the protected areas and NGOs. This forum was also used to disseminate information about two demonstration projects implemented by the Environmental Movement of Vrbas and "Pokret gorana", both dealing with upgrading management of the protected areas in Vrbas and Kula.



Demonstration Projects

After a consultation process with stakeholders (institutions, civil associations and NGOs) from Vrbas and Kula two thematic areas for demonstration projects were recommended: a) improvement of nature protection – education of children and young people about environmental protection (Vrbas and Kula) and b) support to the integral system of waste management in the Municipalities of Vrbas and Kula.

Two demonstration projects were selected and grants awarded for the projects:

1. Protection and Development of the "Jegricka" Nature Reserve – Eco-Awareness and Conscience, implemented by the NGO "Environmental Movement of Vrbas"

2. Protection and Development of the "Carnok" Natural Monument, implemented by the NGO "Pokret Gorana Opstine Vrbas".

The main goal of the projects was the promotion of good environmental practices at the local level by improving the management of protected areas in the Municipality of Vrbas: the "Jegricka" Nature Reserve and "Carnok" Natural Monument. Activities conducted by the NGOs were: construction of visitor's points (wooden tables, benches, info panels, waste bins, a bird watching tower, etc.) and the organizing of lectures and events for children in both protected areas.



In addition to the NGO activities, the surveying company "Geokrulj" (Belgrade) conducted works on the marking of Jegricka and Carnok's protected areas' border lines by installing 718 concrete beacons at each corner of the border line. Concrete beacons mark the whole length of the border lines in the Municipality of Vrbas for a length of approx. 32 km on both sides of the River Jegricka and around Carnok.

In March 2010, the final focus groups meetings were organized in order to see the effects of the campaign and the impact of the project activities. The findings of the final focus group were compared to the initial, baseline report conducted in June 2008. The key results of the final focus groups indicated a higher level of knowledge about the project objectives and impacts of the project results. The remediation works were evaluated as being extremely significant, with overall positive effects on the environmental situation in Vrbas and Kula, and were properly understood as the necessary prerequisite for future remediation of the Grand Backa Canal sludge.

THE FYR OF MACEDONIA

ABSTRACT

Being identified as the priority hot spots in national strategies and plans, Bucim Mine and Lojane Mine were selected as pilot locations in the FYR of Macedonia within the framework of the Macedonian hot spot project *"Sustainable Mining Cleanup and Pollution Management in Bucim and Lojane Mines"*. Proposed project interventions were directed towards addressing historical pollution and prevention of future pollution of waters, air and soil resulting from past and current mining processes. In line with this, at Bucim Mine, water protection and dust mitigation measures were conducted and air and water protection systems put in operation, all facilitiated by establishing a successful public-private partnership between the state and the new owner of the mine. At Lojane Mine, the antimony and arsenic waste dump was capped and contained, which significantly reduced the risk to human health for Lojane's population. In addition to that, the campaign to raise public awareness and a number of activities related to institutional strengthening and capacity development were organized throughout the project implementation. Some of the topics covered included: IPPC, environmental management standards, cleaner production, free access to environmental information etc.






In the last few decades the FYR of Macedonia, as in other countries in the Western Balkans, has been dominated by the high-pollution industries of mineral extraction, metal processing and energy production which, combined with a low level of environmental awareness, have left a legacy of historical pollution. A number of industrial regions and settlements are suffering from poor health due to the high level of air, water and soil pollution and related poverty. In addition, because the companies have obsolete technologies and are overstaffed and thus not attractive in business terms, the government bodies responsible for privatization were reluctant to integrate conditions related to cleaning up and other environmental measures into privatization agreements. This situation is often further complicated by uncoordinated or even conflicting plans and demands from various sectors of the government, business and society.

The status of an EU-accession country puts new obligations on the government regarding environmental protection. In the last decade the Ministry of Environment and Physical Planning has developed a new set of environmental laws which transpose the a*cquis communautaire* into the national legislation.

Due to the old legislation or the lack of appropriate legislation and somewhat overlapping institutional framework, environmental burdens left behind by the state-controlled industry have been transferred to new owners, in most cases without clear specification of environmental responsibility. Although there is some progress in the identification of hotspots and a rough estimation of the related remediation costs, there is no systematic approach or policy for addressing historical pollution and remediation of the environmental hotspots. Their impact is not fully known, cleanup costs have not yet been systematically estimated (although some attempts to do this were done within the Second National Environmental Action Plan(2006), the National Waste Management Plan 2006–2012 (2005) and the Environmental Investment Strategy (2009), and funding, either from the state or the mine owners and donors, for the most severe environmental hotspots is very limited.

The Second National Environmental Action Plan and the National Waste Management Plan 2006–2012, identified 16 environmental hot spots resulting from unsustainable industrial processes in the past. The main criteria for selection were: a) hazardousness of the pollutants (toxicity of the waste, leachability), b) extent of the site i.e. volume and surface area of the dumpsite; c) site characteristics and hydro-geological conditions (local morphology, permeability, and depth of the groundwater table); d) sensitivity of the location (distance to surface water or groundwater extraction well, location land use, and possibility of dispersion of airborne pollutants).

Out of the sixteen (16) identified hotspots in the key national strategic documents, Bucim and Lojane Mines were selected as pilot locations for the project interventions.

As part of this regional programme, UNDP Macedonia implemented the national project component titled "*Sustainable Mining Clean-up and Pollution Management in Bucim and Lojane Mines*". The goal of the project was to contribute to the sustainable development of the country by providing support for an increased environmental performance by the mining sector and introduction and implementation of cleaner production based on the principles of the best available technologies.

In line with the overall objectives of the regional programme, the specific objectives of the national component were:

- Securing significant progress in mitigation of the negative impact of the mining operations on environmental media (air, water, soil) in Bucim and Lojane Mines;
- Enhancing capacities for good environmental management at local and national level;
- Increasing public awareness/knowledge of issues related to environmental hotspots;
- Contributing to regional cooperation through improved information sharing and supply of professional consultancy services regarding good environmental management.

The intervention in Bucim was closely coordinated with the mine owner which also provided the co-financing, and in Lojane the key partner was the Ministry of Environment and Physical Planning, supported by the local government of Lipkovo.

CLEANUP

BUCIM MINE

Site Situation

Bucim Mine is located in the Municipality of Radovis, in the south-east of the FYR of Macedonia. It is a copper mine which has been operating since 1979. The mine and the accompanying facilities were built with state capital and until 2001 they had been state-owned. In 2001 the mine was sold to the foreign company "Semcorp". Mining operations were stopped when the company went bankrupt in 2003. The mine was restarted again in May 2005 after being bought by the Russian company Romtrade Ltd., which was later transformed into Solway Industries Ltd, registered in the FYR of Macedonia as a local company with foreign capital.

In Bucim the structures created by mining operations (waste rock dump and tailings dam) are the most prominent artificial structures in the eastern part of the FYR of Macedonia. The total

area of the surface that is degraded is approximately 2,755 ha of which the open pit covers 65.2 ha, the ore waste dump occupies 152.6 ha, the mining tailings dam takes up 38.7 ha and 1 ha is occupied by buildings, roads and pipes. The hazards/risks and pollution produced by Bucim are as follows:

WASTE – The tailings dam (38.7 ha) with over 80,000,000 tonnes of solid residuals from the flotation process (containing traces of Cu, As, Ni and other heavy metal minerals) is the biggest sand dam (body volume over 60,000,000 m^3) in the wider region. Also, there is a large waste rock dump with over 110,000,000 tonnes of waste rocks containing copper oxide ore, built along a busy regional road (Stip –Strumica). The acid mine drainage (AMD) from the dump has a pH of 3 (water with pH of 4 or below is referred as acid water) and contains 200–400 ppm Cu (clearly visible blue/green tint). Almost no flora and fauna can survive in acid water and therefore all rivers in the vicinity of the mine are dead rivers.

SURFACE WATER – Leakage water from the mine and the waste damp are extremely polluted by heavy metals, mostly Cu, Zn, Ni, Cd and As. The measurements done within the Environmental Impact Assessment Study for Bucim showed that the presence of heavy metals is over 50,000 times the Threshold Limited Volume (TLV) which classifies these waters as V category waters according to the current national classification. Waters of category V cannot be used for drinking or for irrigation because they will negatively affect human health. These waters drain into the River Topolnica making the water from the river a very dangerous source of pollution for all water recipients along the river's flow, as well as for the Rivers Lakavica and Bregalnica. The polluted waters are the main sources for irrigation water in the central eastern part of the country (i.e. the area between Stip, Radovis and Negotino). Crops irrigated with these waters will absorb the heavy metal from the water and its consumption could cause various health effects such as stomach irritation, food poisoning and allergies, and even cancer in the case of prolonged consumption of agriculture products.

The waters of the artificial lake (Lake Bucim) located near the mining pit are also very polluted, because the water from the pit (underground and atmospheric waters) are pumped into the

lake. In dry periods (summer time) the flow of the water is in the range of –10 l/s, rising to as much as 30 l/s during the rainy season. The waters of Lake Bucim flow into the River Topolnica thus contributing to the further pollution of this river. In addition, the sediment at the bottom of the lake contains extremely high concentrations of copper and other elements.

AIR – Air contamination by dust, gases (SOx, NOx, CO) and noise, which are also reported, directly endanger the personnel and inhabitants of the settlement in the immediate vicinity of mining operations. Due to the very fine structure of the material disposed, erosion processes are extremely pronounced, especially wind erosion at the tailings dam. The airborne particulate pollution poses a direct risk to the health of the inhabitants of the nearby settlements especially of the development of lung diseases.

SOIL – Contamination of the soil is much higher than the Threshold Limited Volume recommended in NOAA standards, rising to 50 times for Cu and 30 times for As. Soil salination processes are reported in the wider surroundings of the mining area, as well as in the very fertile land along the Rivers Lakavica and Bregalnica, where water from these rivers is used for irrigation.

Interventions

Water Protection Measures

The Environmental Impact Assessment (EIA) Study for Bucim Mine that was developed by the Faculty of Mining and Geology, Stip, in June 2006, proposed a number of activities for the mitigation/prevention of the negative impact of the mining operation such as:

- Water quality control measures:
  a) A collection system for waters from the pit zone,
  b) A collection system for the waters from the industrial yard.
- Water management system:
  a) Construction of a pump station, pipelines and sparing systems,
  b) Construction of a collection pond.
- Water quality control (purification of water effluents):
  a) Passive control system,
  b) Cementation systems.
- Air quality control:
  a) Dust suppression in the ore processing process,
  b) Dust control on transportation roads,
  c) Re-vegetation of the tailings dam,
  d) Binder application on the active part of the dam.
- Establishment of Environmental Department and Management System enforcement.

Upon completion of the EIA Study, the mine owner implemented several activities that were foreseen in the study such as: construction of a collection system for the tailings pond seepage, some dust control measures (re-vegetation of the tailing dam), establishment of a department for environmental and management systems, and development of technical documentation for the clean-up of the sediment from Lake Bucim. Still the biggest problem for the company, for which they had already requested technical support from the line ministry, was the system for water quality control, i.e. a system for the proper and economical treatment of toxic leakages and effluents from the waste rock disposal landfill. Therefore, it was jointly decided that the project would focus on implementation of the key remaining intervention that would at the same time address both the historical pollution and the prevention of the future pollution. While it was very difficult to estimate the exact percentage of pollution resulting from the new waste that had been deposited at the old waste pile, the expert estimate clearly showed that the majority of the existing waste was of a historical nature.



Clean-up works at Bucim Mine were focused on controlling water and dust pollution. The first step in the initiation of the activities was the preparation of a feasibility study and technical designs for the project interventions. Special attention within the feasibility study was paid to innovativeness, effectiveness, efficiency, sustainability and the investment cost. Major beneficiaries and other key stakeholders selected an alternative with sorption of copper from the polluted waters, production of liquid regenerate with a copper content of 20–25 g/l, copper cementation from the regenerate with iron for the production of a copper concentrate with a copper content of 65-70%. This is state-of-the-art technology, the treatment process yielding a marketable product providing, besides pollution prevention, also long-term sustainability. Consequently, the technical design for this alternative was developed providing for the prevention of a discharge of polluted waters outside the concession area of Bucim Mine, ensuring maximum possible runoff and self-treatment of the river downstream as well as drainage and supply of the groundwater with fresh waters, which would gradually lead to a clean-up of the groundwater, soil and downstream watercourses. However, the estimated value of the water protection interventions proposed in the Technical Design for this Alternative by far exceeded the available project funds. Therefore, at the Project Management Board meeting it was decided to proceed with completion of the design and construction of an Alternative 0 (so-called Water Management) as a first phase. This Alternative encompassed all water collection and transport facilities except for the wastewater treatment plant (WWTP). It prevents any release of polluted

water into the environment by recirculation of the waters in the technological/production process. Amendments to the Technical Design were made for a self-contained Water Protection Structures – Bucim Mine – Alternative 0, necessary for completion of documentation for a construction permit.

Quality control was provided by internal and international expert review, and by the legally required Review of the Technical Design of both Alternatives 2.2 and 0. The civil engineering part was reviewed locally by a certified company/engineers, in line with the relevant national legislation. The technological part of the design was reviewed by an international expert.

Water Pollution Mitigation Investments

The newly constructed water recirculation structures include facilities for collection and short term storage of the polluted surface waters around the perimeter of the waste rock dump and their evacuation/pumping via buried pipelines to the tailing pond. Two small dams with associated structures have been erected and two pumping stations are fully functional. Simultaneously 2.2 kilometres of buried pressurized pipes connecting the new reservoirs through the pumping stations to the tailings pond were installed and the pipeline is now evacuating the polluted water.

Now that this system is being utilized, all of the polluted surface water discharges from the Bucim Mine have been eliminated, and the environmental conservation benefits for the regional and downstream water bodies are expected to be rather substantial. The evacuation and the recycling of the polluted waters through the tailings pond will also substantially reduce the abstraction of pure fresh water for refilling the tailings pond.

This investment eliminates the enormous past environmental burden of approx. 900,000 m^3 of acidic water (pH>4) discharges per annum, including about 200 tonnes of copper and other metals. Such quantities were taken up by the recipient surface waters each calendar year and their elimination enables natural restoration of these heavily polluted rivers. Predictive hydro-geological models prepared by consultants indicate that in a period of about 27 months it is very likely that natural removal of the pollutants from the River Topolnica bed will occur. It is to be expected that the natural restoration and cleanup of the River Lakavica will take longer (at least 3 to 5 additional years), but significant water quality improvement will happen immediately after the pollutant load is terminated.

Bucim Mine contributed to the construction of the polluted water evacuation system with the purchase and installation of pumps for the pumping stations built in the scope of the project and by extending the electrical power grid to the pumping stations. Bucim Mine also provided electrical power transformers for powering the pumps and the other equipment installed in the pumping stations.

Bucim Mine prepared a preliminary design and an action plan for the cleanup of Lake Bucim (in-kind contribution). Preliminary cost estimates are around EUR 100,000. The lake was emptied over the summer months of 2010 and – weather permitting – they would start pond sediment removal in September 2010 because the sediments need to dry off prior to excavation. Moreover, Bucim Mine contracted out the preparation of a feasibility study and preliminary technical designs for the cleanup of the polluted river bed of River Lakavica. This is a rather encouraging development that confirms the beneficiary's dedication to take additional far-reaching cleanup efforts that go well beyond what had been agreed upon when the project started.

The feasibility study for possible alternative solutions for additional utilization of waste rocks by extraction of the copper, thus increasing the financial sustainability triggered the planning by the mine owner of new investments that are expected in a near future. These investments will further contribute to mitigation of the pollution resulting from mining operations and consequently to an improvement of the soil, water and air in the broader area around Bucim Mine.

Dust Protection Measures

Dust protection measures in Bucim encompassed reforestation of bare parts of the tailings and the Topolnica tailings dam and system for irrigation and sprinkling. Part 1 was comprised of intake, the pumping station, pipeline and a new water reservoir V=300 m^3, and Part 2 was comprised of pumps, static and mobile irrigation equipment, water cannons for wetting the dry surfaces, and connection of the existing pipeline and equipment with newly designed equipment.

Afforestation of the tailings dam was done on several occasions and as a result of the afforestation and soil cover of bare parts of the dam, the production of dust has been significantly reduced, thereby reducing the air pollution downstream in the settlements.

Implementation of the major civil works and equipment supply contracts was completed successfully and become fully operational by end May 2010. Also by the end of June 2010 more than 30 ha at the tailings dam was covered by topsoil and vegetative cover.



Air Pollution Mitigation Investments

Based on the EIA findings, the project's responses to air-pollution challenges include:

a) the supply and spreading of fertile soil on the uncovered part of the tailings dam;
b) the establishment of vegetative cover by planting seedlings and seeding grass;
c) improvements to the existing irrigation system for vegetative covering of the tailings dam;
d) construction, supply and installation of a water-spraying system for wetting the dam crest.

All of the above objectives were accomplished by the end of June 2010 – namely, an additional 11 ha at the tailings dam was covered with topsoil and vegetative cover was established where possible i.e. on about 5 ha. Over the life of the project more than 30 ha was covered with topsoil, which is another joint effort with the Bucim Mine and now all of the barren parts of the tailings dam are covered and therefore dust propagation is being minimized.
Construction and equipment installation works for improving the irrigation system for the vegetative cover and the installation of a spraying system for wetting the dam crest were successfully completed by the end of April 2010. This investment included a complex seepage water recirculation system comprising intake, the pumping station, pipeline and a new water reservoir (V=300 m^3) as well as fixed and mobile irrigation equipment, water cannons for wetting the dry surfaces, and connection of the existing pipeline and equipment with the newly designed equipment/reservoir. The system was operational by the end of May 2010.

The above air quality improvement investments have significantly reduced fugitive dust emissions from the dam surface. The installed spraying system, combined with the vegetative cover, has notably reduced wind erosion from the dam crest and dry beaches. In essence, implemented investments have already reduced the dust emissions in the affected areas and are ensuring healthier living conditions for the people who live in the vicinity of the dam. This investment also reduced the contamination of public surfaces and nearby agricultural fields.

The mine owner additionally undertook activities to prevent/reduce pollution resulting from the mining operation. The company has already installed five (5) monitoring stations and data obtained from the monitoring is regularly sent to the Ministry of Environment and Physical Planning. In addition the company is making an extra effort to keep the historical pollution under control by maintaining the cultivated part of the tailing dam and re-cultivating additional parts of the dam.

The investments made at Bucim Mine introduced the concept of a private-public partnership in the context of the mitigation of historic pollution in the FYR of Macedonia, and therefore this is likely to be used as a model approach for resource mobilization and cleanup project implementation in the future. Project funds were used as seed money to attract the interest of the new Bucim Mine owners to demonstrate their social and environmental responsibility by co-financing 50% of project contribution. This arrangement is a substantive achievement because the investment addressed past damages that continued to discharge pollutants into the environment for which no liability was attached to the new owners when they purchased the mine.

Site Situation

Lojane Mine and its associated processing facilities are located in the Municipality of Lipkovo, in the north-east of the FYR of Macedonia. It is a chromium and antimony mine that was active in the period from 1923 to 1979. In January 2007 the Government issued a concession for the exploitation of antimony from Lojane Mine to "Farmakom MB Zajaca", Serbia.

Until its closure in 1979 Lojane was a small-scale underground mining operation (room and pillar) and with primitive technology (in today's terms), probably engaging human power with a limited application of mechanical tolls (powered by compressed air) and horses. The total quantity of materials excavated during the period when the mine was active (1923–1979) is estimated to amount to approx. 1,300,000 tonnes. The annual production capacity was between 25,000 and 30,000 tonnes, i.e. the operation was classified as relatively small.

The total quantity of waste rocks generated by extraction operations are estimated at approx. 90,000 tonnes. The composition of the ore was chromium, antimony and arsenic minerals which were commercially extracted by a flotation process and used commercially. The total mine area is approx. 10 km^2. The area of consideration includes several locations where old production, storage and transportation facilities exist.

Abandoned and orphaned mines have a particularly high potential to adversely impact the environment and human health, since all mining facilities and structures are left unprotected and without any mitigation measures. Until the concession for the exploitation of antimony was issued to "Farmakom MB" (January 2007), Lojane was treated as an abandoned mine. After the cessation of mining activities in 1979, the complete infrastructure i.e. production facilities, beneficiation facilities, ore waste dumps and tailing ponds, as well storage yards, silos and workshops were abandoned without undertaking any conservation measures.

The most critical issues are the following:
SURFACE WATER – the River Suva collects drainage water from the mine and the waste dumps which are washed with intense runoff from the steep slopes of the valley. This process is intensified during the high-water periods when the river floods the ore waste dumps. Therefore the content of arsenic (As) in the River Suva is up to 40 times higher than the threshold limit value (TLV) for effluent waters in the FYR of Macedonia. Such high pollution could be explained by the high As concentration in the ore waste and the extreme mobility of this metalloid. Extremely elevated As concentrations in the water of the River Suva certainly have a detrimental effect on the aquatic life/biota in this water. Additionally this water is occasionally used for irrigation, thus polluting the plants/food produced, inasmuch as the soil is irrigated. Wildlife in the area is even more exposed to the negative effects of these waters since wild animals can more easily come into contact with the waters and use the water for drinking. The situation is similar with farm animals kept in the open.

SEDIMENTS – the extremely high values of heavy metals in the sediment (As – up to 30 times, Cr – up to 10 times, Ni – up to 40 times, Cd – up to 10 times the TLV) taken from the river bed of the River Suva are obviously the result of long-term deposition of leached metals due to the long period of uncontrolled pollution of the river flow.

SOIL – the soils in the immediate vicinity of the pollution sources are also highly contaminated with heavy metals. For example, the arsenic concentration is 50 times higher than the NOA (Netherlands Standard for Soil, since there are no national standards for soil). The most critical points are along the River Suva and the soils near the tailing dump.

AIR – due to very fine structure of the disposed material, erosion processes are present, especially wind erosion at the tailings damp sites. Airborne particulate pollution poses a direct risk for the health of the inhabitants of the villages, especially those living or working in the immediate vicinity of the arsenic ponds (e.g. the primary school in Lojane).

WASTE – approx. 90,000 tonnes of waste rocks that contain low-grade antimony and arsenic (1–2%) and 5,000 tonnes of ore stockpile containing high-grade antimony and arsenic (5–10%) are located in the upper part of the valley. These dumps are prone to mechanical disintegration, wind and water erosion thus presenting a significant source of contamination in the area between the villages of Lojane and Vaksince.

The tailings dump near the old flotation plant contains around 1,000,000 tonnes of fine-sized material with an average concentration of arsenic and antimony of up to 1%-2%. The concentrate storage pond contains around 15,000 tonnes of high-grade concentrate of arsenic oxides (>50%). Just near to the tailings dump the local school and a few residential and commercial buildings are located, posing a significant threat to the health of children and adults working in these facilities.

Another source of contamination by toxic metals is located near the international railway station in Tabanovce where 4,000 tonnes of arsenic concentrate is stored in the open storage yard, left completely unprotected. In addition, there are around 2,500 barrels, almost disintegrated, filled with As_2O_3 situated at the same location.



Given all the above, there is acknowledgement among environmental authorities on the urgent need to focus on resolving the problems related to the environmental hotspots through the cleanup activities, capacity-building measures that will strengthen the national institutions responsible for these issues, as well as improvement of the respective legislation and its enforcement.

Interventions

The detailed design and the procurement process for Lojane Mine intervention were completed by the end of 2009, while the physical works were conducted during 2010.

The intervention is based on the findings of a feasibility study for remediation of Lojane Mine's historical pollution, funded by UNDP Macedonia and a Czech Trust Fund. The recommended approach for preventing air pollution from the hazardous waste dump close to the primary school was for the area to be capped with an appropriate capping system (clay) and a layer of topsoil and planted with suitable vegetation. The study also envisaged the construction of diversion ditches and channels for minimizing water flow through the dump body, thus preventing the mobilization of toxic elements and their spreading though the field below the dump. Another intervention proposed by this study was to replace the contaminated topsoil in the school yard. All of these recommended remedial works for the dump site near the Lojane Primary School were completed.

The newly-built cap literally eliminates fugitive dust emanation from the dump surface, thus eliminating the main route of human exposure to toxic arsenic particles, especially exposure of school children as the most sensitive category. The newly-built diversion ditches and channels minimize water flow through the dump body, thereby significantly reducing surface and ground water contaminant loads, which used to be the main food-chain penetration pathway for those contaminates. The capping system is sustainable for the foreseeable future for the following reasons: the dump site is relatively small; the bottom of the dump has low permeability (clay); and the position of the bedrock is flat, so there will be minimal or zero contaminant migration into the nearby recipients.



The primary beneficiary (the Municipality of Lipkovo) assigned two municipal employees to tend and irrigate the newly-established vegetative cover. The project donated small-scale irrigation

equipment to the municipality which is being utilized by the municipality to assure the survival and development of the newly-planted trees over the dry summer months.

Due to the limited project funds, the amount of available matching co-financing from the government, as well as the concessionaire's plans for utilization of some of the mining tailings (waste), the project intervention in Lojane was limited only to the site in the vicinity of the primary school and not to other spots that are affected by past mining operations. However, it is expected that this will provide a good example and that the Ministry of Environment and Physical Planning, together with the Municipality of Lipkovo, will continue to resolve the problems. The feasibility study and other technical documentation prepared by the project, and the capacity-building and public awareness activities that were carried out during the life of the project provide a good basis for the continuation of the activities.

The Lojane Mine interventions remediated one of the most toxic waste dumps in this mine, which ceased to operate three decades ago (1979), and the dump itself is located next to a regional primary school. The capping of the dump has eliminated the now 30 consecutive years of dump-surface wind erosion, which often deposited toxic waste particles on the nearby school, households and agricultural fields. This investment is also a major contribution to the reduction of local and downstream surface and groundwater pollution. .

CAPACITY DEVELOPMENT

The Assessment of the Capacity Building Needs was compiled by the project team, based on more recent strategic national documents and project reports. The assessment was made on the needs regarding policy issues, legislation, institutional setup and capacity, communication and information sharing, as well as the financial needs and possible sources of environmental financing in the country in general and for remediation of historical pollution in particular. The findings and recommendations of the report were further confirmed at a round table with the key stakeholders and environmental public that was organized on the topic of Historical Mining Pollution in the FYR of Macedonia. The round table attracted significant media attention and thus it was used for advocacy purposes and raising awareness of the importance of resolving the issue of environmental hotspots in the country.

Following a thorough needs assessment and consultations with stakeholders, the details of the Capacity Development (CD) Programme were completed by mid-2009 and were grouped into five (5) areas. All of the activities envisaged under this programme were successfully completed by the end of June 2010.

In essence, the project's capacity development investments empowered key public sector officials, private sector decision makers and civil society representatives with the knowledge necessary to implement national environmental legislation and to make informed decisions about the associated compliance requirements. This project component fostered programme-level inter-country knowledge and information exchange as well as exposure to the best international practices in the areas that were of interest to each target group. This component also put particular emphasis on supporting civil society organizations in their efforts to obtain timely information about the state of the environment and related public health matters including access to justice, if and when needed. Moreover, focus was also put on harmonization of the national Environmental Liability regulations with the relevant EU legislation and thus the achievement of this project has systemic ramifications.

Environmental Impact Assessment (EAI) and *Integrated Pollution Prevention and Control (IPPC)*

The objective of this training initiative was to strengthen the capacity of the Local Government Units (Municipalities) in their initial phase of assuming responsibilities for conducting Environmental Impact Assessments and issuance of Level-B Integrated Pollution Prevention Control Permits. The target groups for this capacity development effort were the Municipal Environmental Inspectors and the Heads of the Environmental Departments.

Three one-week training sessions took place between December 2009 and February 2010 and were attended by representatives of all municipalities that have designated staff to oversee environmental conservation issues. A total of 67 participants attended these training sessions. Quality control checks carried out by UNDP staff and evaluation forms filled in by the attendees confirmed that this training initiative was timely and fully relevant to the needs of the participants.

Environmental Management Standard ISO 14001, Occupational Health and Safety Management Systems OHSAS 18001, and the core requirements for introducing environmental management system (EMS)

The objective of this training programme was to cover the following topics:

a) Establish a programme of internal Environmental Management System and Health and Safety Management System audits;
b) Plan, conduct and report on the results of internal audits;
c) Develop and implement the necessary documents and forms to manage an internal audit programme;
d) Review and improve the Environmental Management System and Health and Safety Management System audit programme.

Thus the target group for this training programme were the operators of the major mines in the FYR of Macedonia. A total of 15 participants attended the two one-week workshops that were organized in January and February 2010, and the attendants confirmed their satisfaction with the quality of the training materials and the way the training sessions had been conducted.

Training for Civil Society Organizations and Local Authorities on Access to Information and Public Participation

The main objective of this assignment was to increase the knowledge and strengthen the capacities of civil society organizations (with special focus on community-based organizations) and Local Government Authorities, regarding the legislated core human right to live in a healthy environment, the techniques of public participation in environmental decision-making processes and procedures. This assignment also produced a detailed analysis of the current state of access to environmental information as well as the rights of public participation and access to justice in the context of the Aarhus Convention. It also delivered two trainings for Civil Society Organizations and Local Government Authorities on access to information, justice and public participation.

Cleaner Production

The objective of the Cleaner Production training was to increase the theoretical knowledge of the target group (engineers and managers from energy, production and environment departments of the major mines in the FYR of Macedonia) as well as to explore the possibilities of reducing the risks to the environment and human wellbeing and to improve the overall efficiency of the company. All participants were familiarized with the basic steps for developing a Cleaner Production Strategy and with what needs to be done to implement such a strategy in their own companies. A total of 8 participants attended the two training sessions organized in January and March 2010 and acquired the following skills: better energy utilization, water and materials resources usage, better waste management and minimization of waste generation, preventive chemicals management, green procurement and occupational health and safety of their workers.



Technical Support to the MoEPP for Environmental Liability Legislative Assessment and Capacity Building

This technical assistance assignment strengthened the capacities of the relevant national authorities in the areas of: (a) environmental damage regulations (damage to species and habitats, water and human health) including the most appropriate remediation measures

and (b) regulations on the management of waste from extractive industries. The contractor successfully performed the following tasks: (a) carried out a legal gap-analysis between EU Directives on Environmental Liability and Waste Management with the relevant Macedonian legislation; (b) provided technical assistance for drafting two pieces of Macedonian secondary legislation in these fields; and (c) drafted a booklet titled "The Key Challenges Associated with the Implementation of the EU's Environmental Liability and Waste Management Directives in Macedonia".



Expert Training

Representatives of national institutions, beneficiaries and experts participated in several study tours that contributed to the exchange of information, increased knowledge on up-to-date pollution prevention and remediation practices, and establishment of professional contacts with relevant counterparts. The beneficiaries assessed the study tour to Bulgaria as being particularly useful. Representatives of Bucim Mine, the Municipality of Radovis and the Ministry of Environment visited one remediated copper mine and one treatment plant. The sites were selected due to their similarity to planned interventions in Bucim Mine. A visit to the Bulgarian Ministry of the Economy and Energy and a meeting with the Director for Natural Resources and Concessions was also very useful for the participants due to the insight gained into the administrative and organizational setup, financial implications and solutions regarding historical mining waste in a country recently accepted into the EU, and in the process of harmonizing its legislation.

The project also took advantage of the specialized training sessions organized by the Albanian Hot-Spots project and funded the participation of MoEPP staff at the following training sessions:

- Six MoEPP experts at the Water Training (held in Tirana, Albania, 15th–17th February, 2010) covering the following topics: the most frequently used water-monitoring methods and methodologies; the most frequently used water-monitoring equipment and sampling methods and methodologies; and the laboratory and other needs for proper water monitoring and analysis.
- Two MoEPP officials at the Air Quality Monitoring Seminar that was organized in Tirana from 19th to 21th May, 2010.

The public awareness raising component put particular emphasis on supporting vulnerable groups in the project intervention areas in their efforts to adapt to the polluted environment and actively participate in the decision-making processes regarding the present and future environmental remediation investments that directly affect their wellbeing. It also supported nationwide dissemination of the lessons learned.

Several communications tools were used to promote and facilitate information sharing, access to information as well as the visibility of the project/programme, such as: a web site, database of practitioners, articles in local media, etc. Framework contracts were concluded and articles on Hot Spots Project were regularly published in the environmental monthly "Ekologija". In addition, support was provided by EKO-NET, an NGO which is maintaining a web portal for environmental information, and has access to a large number of environmental practitioners and supporters. Among other things, this portal was used to promote the Regional Database of Environmental Practitioners.

The project web site has been available in Macedonian and English and it has been used to promote the programme and project activities, and to share relevant information with the wider public. In order to improve the visibility and to promote the achievements of the energy and environment programme, a communication specialist was engaged to support the project team in planning and implementing the advocacy-related and specific public awareness activities.

One of the major environmental NGOs in the country was contracted to work together with NGOs based in Radovis and Lipkovo to implement activities that were aimed at raising the general public awareness about the project activities and accomplishments, to strengthen the capacities of several focus groups in the municipality of Radovis and Lipkovo and to disseminate the lessons learned at the national level. These activities were closely correlated with the work contracted out to two NGOs that carried out public opinion surveys regarding the state of the environment and related human health implications in the municipalities of Radovis and Lipkovo.

This comprehensive public awareness effort included the following major activities:

- Training for local educational institutions about the impact of industrial pollution on the environment and human health;
- Training for primary healthcare providers about the public health implications of industrial pollution;
- Training on initiatives and campaigns for the local NGOs;
- Seminar on Environmental Investigative Journalism for specialized journalists and training for students of journalism;
- Visit to the Bucim project site for national and local media journalists;
- Public debate about the consequences of environmental hotspots.

In relation to the remediation works at Bucim Mine and the Lojane tailing dump and within the framework of the public awareness activities implemented in the course of the project, the national public TV service – Macedonian Television – prepared a documentary about the project's physical interventions in the Bucim and Lojane hotspots. This TV station has recorded all the construction phases for the structures built at Bucim and Lojane Mines including statements from the key stakeholders. The final product was included in their regular educational programming schedule. The project also contracted a media expert to produce short clips for each of these two sites based on the footage taken by Macedonian TV.



Pilot Projects

The Small Grants Programme aimed at increasing public awareness and civic engagement related to environmental hotspots and improvements in living conditions through implementing practical environmental demonstration projects in the areas located in the vicinity of the sixteen environmental hotspots identified in national strategy papers. In response to a public announcement, six proposals were submitted by civil society institutions, of which three were evaluated as meeting the agreed quality requirements. Project-funded activities under this programme were implemented in three towns that are substantially affected by nearby mining operations i.e. Radovis, Kratovo and Probistip.

Small-grant-funded activities in Radovis – which is affected by Bucim Mine operations – were implemented jointly by an NGO based in the neighbouring municipality of Kavadarci and Radovis Primary School. This project tested the relevance of phytoremediation as a new approach to preserving the environment by using specific plants that have ability to absorb and retain pollutants from the air, water and land. Because of the short-term nature of the small grants programme, this project obtained preliminary results that set the stage for longer-term in-depth exploration of this potentially effective pollution mitigation approach.

The project implemented in Kratovo by a local NGO produced a geo-referenced map of the illegal waste dump sites in the municipality including remote and hard-to-access areas. The collected data was used to raise public awareness about the adverse effect of those dump sites i.e. soil and water pollution. The collected information has been presented and distributed to schools, public forums of local citizens, local government and other interested institutions.

The activities funded in the town of Probistip, which is a mining town where the major employer is the nearby lead and zinc mine, were implemented by a local NGO and focused on household organic waste management. This project set the stage for introducing town-wide domestic waste segregation and composting of organic waste for further use as manure.

UNATSCR 1244 KOSOVO

ABSTRACT

Through implementation of the UNATSCR 1244 Kosovo hot spot project "Strengthening Capacities in Kosovo to Address Environmental Hotspots", the UNDP Kosovo, along with the Ministry of Environment and Spatial Planning, the Ministry of Energy and Mining, and the Trepca Group of Mines under UNMIK Administration, implemented a set of activities to improve the environmental sustainability of the Stan Trg/ Stari Trg and Artana/Novo Brdo hot-spot sites. Mine tailing containment and rapid risk reduction at the Zarkov Potok tailing of Stan Trg/Stari Trg Mine was conducted and the works finished in December 2008. At the tailings at Artana/ Novo Brdo Mine, the works finished in November 2008 at tailing T.2, and in August 2010 at tailing T.1. In line with the main project objectives, a set of various activities aiming at raising public awareness as well as capacity development were organized over the course of the project. Some of the topics covered through those activities included: mine-site rehabilitation, IPPC (general information), training on investigative environmental journalism, etc.

Since 2006, UNDP Kosovo has been involved in the Environment and Security Initiative (ENVSEC), implemented jointly by the UNDP, UNEP, NATO, OSCE and REC. In view of the request from the Regional Ministerial Conference in Milocer, and other ongoing initiatives in the region such as (REReP, ENVSEC and PEIP), through the Western Balkans Environmental Programme and its component "Strengthening Capacities in Kosovo to Address Environmental Hotpots", the UNDP was focusing on sustainable development of polluted industrial hot spots that have already been identified as high priorities from an environmental point of view, but have seen limited progress so far due to the complexity of the issues and costs involved.

Through the implementation of the project, UNDP Kosovo, along with the Ministry of the Environment and Spatial Planning, the Ministry of Energy and Mining, and the Trepca Group of Mines under UNMIK Administration, have implemented a set of activities to improve the environmental sustainability of the Stan Trg/Stari Trg and Artana/Novo Brdo Mines.

The three main objectives of the project were:

- remediation of the selected hot spot locations, including monitoring and maintenance training for local stakeholders;
- capacity development related to environmental policy integration and environmental economics;
- raising the awareness of general public in relation to environmental sustainability in all sectors of development.

During the project implementation, apart from the national legislation, standards and guidelines set out in various EU and international directives and other legislative documents were taken into consideration, including: EU Mine Waste Directive (2006/21/EC); EIA Directive 1997/11/EC; the BREF document on Tailings and Waste-Rock in Mining Activities (MTWR 2004); Water Framework Directive (2000/60/EC); the Pollution Prevention and Abatement Handbook, World Bank (1999), etc.

The project contributed to the increased capacity of the local government to implement environmental policies and sustainable development in accordance with EU standards. Specifically the project objectives were to:

- Secure significant progress in the clean up and sustainable development of the "hot spots" of Stan Trg/ Stari Trg and Novo Brdo/ Artana Mines;
- Strengthen the mechanisms of good governance and policy integration in local institutions;
- Strengthen and mobilize the indigenous capacity for policy development, integration, implementation and evaluation at the national and regional level.

STAN TRG/ STARI TRG MINE

Site Situation

Geographically, the Trepca Lead and Zinc Mine at Stan Trg/Stari Trg and the processing complex of Prvi Tunel, to which the Zharkov Potok tailings impoundment belongs, are located in the north-eastern part of UNATSCR 1244 Kosovo, approximately 9 km east of Mitrovica with a population of 75,600 people in the urban core and 105,000 in the whole municipality.

The Stan Trg/Stari Trg Mine commenced with the exploitation of lead and zinc ore in 1930. The mine operated at full capacity until 1989. From then until 1998 production continued at approximately 20% capacity as a result of political difficulties. During the lifetime of the mine, a total of nearly 35 million tonnes of ore were extracted with dominant metal concentrations of Pb 6.07%, Zn 3.89% and Ag 103 g/t.

Operation of the Zharkov Potok tailings impoundment started in 1968. The tailings impoundment is located in the valley of a tributary of the River Ibar and consists of a main dam, a dam on the western side and a pond area filled with tailings from the processing of lead and zinc ores at the Prvi Tunel concentrator. To a minor extent, gold processing residues have also been discharged into the tailings pond. The tailings at Zharkov Potok cover an area of about 20 ha. In addition, the footprint of the main dam is about 4.2 ha. The total mass of solids discharged to date is estimated at about 9 to 11 million tonnes. A dam was erected along the western part of the tailings impoundment perimeter. According to the findings of the Environmental Assessment and Rehabilitation Action Plan (EARAP) it is up to 30 metres high. Untreated mine water from the Stan Trg/Stari Trg Mine, tailings and other process effluents from the process plant are discharged into the Zharkov Potok tailings impoundment.



Currently only the central part of the tailings impoundment is covered by water. The surface water table of the pond in the Zharkov Potok tailings impoundment is controlled by two decant outlets (so-called "collectors") located on the slopes east and west of the central area of the tailings impoundment. Only the eastern decant outlet is currently intact. The tailings impoundment is surrounded by a large runoff catchment area. The total surface of the catchment area was

estimated at 180 ha. No drainage system for the separate diversion of undisturbed runoff from the catchment area is currently present along the perimeter of the pond. Surface runoff from the catchment area is collected in the pond and mixed there with mine water and process water. The pond water is diverted sporadically by the two decant outlets via tunnels into the trench located in the front part of the dam toe. The recipient stream is the River Ibar, at a distance of about 300 m from the dam toe. The dam seepage and decant pond water are discharged without treatment into the River Ibar, adding to its pollution.

The tailings impoundment and the dam are free from any vegetation, no cover has been placed on the surface of the tailings and the dam, which makes them a source of dust storms. Therefore, in addition to the water pollution, the tailings pond is a source of severe health hazards to the nearby residents of a small village north-east of the tailings caused by the dust pollution, particular during the hot, dry summer with strong winds blowing across the dam and bare dry tailings beaches in the direction of the village. Dust from the tailings is also a source of soil contamination in the vicinity of the Zharkov Potok tailings impoundment, which local inhabitants use for agriculture.

Interventions

The emergency remediation measures included:

- Construction of a drainage system to divert surface runoff from the catchment area around the tailings pond and discharge it into the River Ibar;
- Spraying of dust suppressants onto the dry tailings beaches and onto the dam area as a temporary emergency measure to improve the air quality for the residents living in the vicinity of the tailings impoundment.

The major activity involved excavating and transporting clean fill from the area of the tailing to create a new crest and then protecting that material with a 50 cm layer of clay and a 10 cm layer of earth. This both capped the contaminated material beneath the clean fill and provided a substrate suitable for revegetation.

The company "Kosova ERH & Kotori" was awarded the contract and conducted the site works in accordance with the instructions of the national supervisor. The works started in November 2008 and were finalized in the second half of December 2008.



Site Situation

The Artana/Novo Brdo ore field has two mines, Artana Mine (Novo Brdo Mine) and Farbani Potok Mine. Mining activity has taken place since Roman times, with intensive production of lead and silver in medieval times. Modern mining started after 1945 at Artana and 1963 at Farbani Potok. So far about 1 million tonnes has been mined from these deposits.

Two large tailings impoundments are located on the embankments of the River Kriva Reka. Tailing Pond No.1 is situated immediately next to the old Marec Concentrator (close to the Artana Mine), while Tailing Pond No.2 is located further downstream from the Marec concentrator. The tailings ponds No.1 and No.2 present sources of severe pollution, with large amounts of material being transported to the river via surface runoff and/or leaching. They present an enormous threat to land-based species in the immediate vicinity and to aquatic species in the River Kriva Reka. Large amounts of heavy-metal loaded solid material and seepage water continued to contaminate the river making remediation ever more difficult and costly.

The tailings surfaces of both tailings impoundments have been severely eroded and significant amounts of waste were transported into the river in the past. This process would continue with each significant precipitation or snow-melt event. The tailings are probably a source of dissolved metals and most probably generate acid seepage. Additionally, the mine water bisects the tailings heap No.1 and serves as an additional conduit for tailings to be transported to the river.

The river downstream of the mine water discharge into the River Kriva Reka is murky brown and the riverbed grossly stained. This condition persists over many kilometres downstream. The mine discharge is strongly acidic (pH around 2.3), despite the reported carbonate content of the ore, and contains a significant metal load (mainly zinc and iron) as evidenced by the stained mine water channel bed and in the riverbed downstream of the confluence.

Slope failure of the tailings slopes of both tailings ponds might temporary cover the Kriva Reka riverbed and would lead to additional contaminant load in the river water.



Interventions

Tailing T.1

Tailing T1 is located below the 6th level adit, between the hillside and the River Kriva Reka. Due to the complete lack of protection measures, the tailings material which contains percentage levels of heavy metals such as lead and zinc, have slumped into the stream bed, and added considerably to the pollution of the river. The tailing was severely eroded, and significant amounts of waste have been transported into the river in the past.

Movement of contaminated water from the tailings to the river was contributing to the contamination. This discharge carried both solid particle loadings and also acid drainage and dissolved metals into the river. In addition, this tailing is currently dissected by the acidic mine water stream running down from adit No 6. This water is bright orange, completely turbid and has a pH as low as 2 to 3. The site still presents a significant risk of exposure to toxic elements for all of the residents in the area immediately adjacent to the concentrator tailings from dust and contaminated water.

The planned remedial work consisted of several tasks:

i) site cleanup;
ii) excavation of contaminated soil from the vicinity of the nearest tailings dump;
iii) backfilling of the excavations with inert material;
iv) construction of diversion ditches around the perimeter of the upper side to prevent upstream runoff water from entering the containment, thereby flushing and spreading contamination via water erosion;
v) construction of a protective embankment to divert river flow and prevent water flushing the tailings material;
vi) temporary capping construction to minimize wind erosion and water penetration inside the tailings body;
vii) reshaping the tailings dump body to:
   a. optimize the total area to be covered;
   b. optimize the slopes to achieve long-term stability (length, dip);
   c. minimize wind and water erosion;
   d. eliminate ponding and
   e. maximize runoff.

The national company "Asfalti" was awarded the contract and conducted the site works in accordance with the final design. The works started in April 2010 and were finalized in July 2010.



Tailing T.2

Tailing T.2 is located approximately 1.6 km downstream of the Marec concentrator on the embankment of the River Kriva Reka. The mass of the tailing is estimated to be 1.6 million tonnes and the area is approximately 2.8 ha. The tailing was exposed to air and uncovered, and was subject to strong erosion by surface runoff. The tailings surface showed deep erosion channels (gullies) particularly on the steep slopes which were up to approximately 10 to 12 m high and located virtually on the embankment of the River Kriva Reka.

The planned remedial work consisted of several tasks:

i) site cleanup;
ii) excavation of contaminated soil from the vicinity of the nearest tailings dump;
iii) backfilling of the excavations with inert material;
iv) construction of diversion ditches around the perimeter of the upper side to prevent upstream runoff water from entering the containment, thereby flushing and spreading contamination via water erosion;
v) construction of a protective embankment to divert river flow and prevent water flushing the tailings material;
vi) reshaping the tailings dump body to:
   a. optimize the total area to be covered;
   b. optimize the slopes to achieve long-term stability (length, dip);
   c. minimize wind and water erosion;
   d. eliminate ponding and
   e. maximize runoff.

The national company "Bejta Commerce" was awarded the contract and conducted the site works in accordance with the final design. The works started in September 2008 and were finalized in November 2008.



Based on the report on the Policy Integration and Capacity Development Need Assessment a whole list of topics was recognized where further capacity development was needed. The topics that the project was dealing with included environmental monitoring, mine site rehabilitation and IPPC, with the aim of improving the capacities of national stakeholders in managing and monitoring the industrial sites. The training sessions held provided knowledge and understanding on the main principles of transposition and implementation of EU environmental legislation with a focus on mining and air quality and enforcement of the legislative environmental requirements.

Training for institutional practitioners on "Risk Reduction in Mining" was organized in June 2010. It was designed as an interactive workshop, involving all participants into the discussions and using many examples of mining and environmental protection problems and risks from Kosovo.

Training for institutional practitioners on "IPPC and Air Quality and Control" was organized in July 2010, focusing on general principles of IPPC and air quality and control-related Directives, and the transposition principles used and implementation of the legislative requirements.

The project also took advantage of the specialized training sessions organized by the Albanian Hot Spot project and funded the participation of the Ministry of the Environment and Spatial Planning (MESP) staff at the training session on Water Monitoring, held in Tirana, Albania in February 2010. The training covered the following topics: the most frequently used water monitoring methods and methodologies; the most frequently used water monitoring equipment and sampling methods and methodologies; and the laboratory and other needs for proper water monitoring and analysis.

In relation to the remedial works at all three hotspot sites and in line with the results of the public awareness raising campaign, a three-day training on Investigative Journalism on Industrial Pollution with journalists from UNATSCR 1244 Kosovo was carried out by a journalism consultant from Croatia and the regional Chief Technical Advisor. A field monitoring visit to Mitrovica, advocacy and raising of awareness on industrial pollution was conducted the same week that the journalist training took place. A TV documentary film presenting the life cycle of construction works in two locations in UNATSCR 1244 Kosovo (before, during and after results) was produced and aired on national TV.

In co-operation with other projects implemented within the UNDP Energy and Environment cluster, the following events were organized:

- a Climate Change Conference – conducted in 2009, with over 120 participants, including representatives from the UNEP, IPCC, KfW, World Bank, etc.
- a Climate Change workshop – conducted in 2009, with over 70 participants from the Ministry of the Environment and Spatial Planning and the Ministry of Energy and Mining.

Supporting the results of the remedial works, the public awareness raising campaign highlighted the benefits to the community of the work being done, the negative impacts that past mining and industry activities have on human and environmental health and actions that the community can take in reducing the effects on their health and in engaging in the decision-making process.

The aim of the campaign was to empower the community by informing them of the situation, advising what actions can be taken to reduce the impact with reference to other "Living with Lead" – style campaigns conducted in other similarly impacted areas in the world and to identify what else can be done and how the community can be involved in the ongoing improvement and monitoring of the situation.

In order to develop a "tailor-made" campaign that would address the existing needs of the inhabitants of the Municipality of Mitrovica, a set of round tables were organized at the beginning of the PARC activities. The round tables showed that citizens of Mitrovica, regardless of their professional background and/or age, were not happy with the environmental situation in their municipality. The most threatening problems to them are environmental issues related to sewage water, communal waste, heavy traffic, lack of green surfaces, while the lead pollution was emphasised as the key problem. As specified in the Report on round tables and public debates prepared by the Regional Environmental Centre, engaged to develop and implement the PARC, the following were identified as major sources of lead pollution: heavy industry, ore, agriculture and mines.

A set of activities was organized in the course of the PARC to inform the citizens of Mitrovica how they can live with lead, and what actions they can take to improve their quality of life. The communications tools used to convey that message to the public were: meetings, public debates, lectures in schools, promotional materials, guideline, etc. In addition to this, a handbook on living with lead has been produced and distributed during the lectures in schools.
In addition to this campaign, several other small-scale activities were organized at the national level, conveying the message of the necessity of environmental protection and active participation of all citizens in environmental decision making, i.e. local development.

Some of the activities included:

- Celebration of World Environment Day in 2009 and 2010 – a series of activities was organized with different stakeholders in order to raise awareness about the necessity of environmental protection, with special emphasis on environmental hot spots.
- Environment Film Week – in cooperation with a local school, 4 films related to the environment where shown.
- Journalist Award – competition was organized for journalists regarding their media contribution in relation to environmental issues.
- Planting trees in Mitrovica – in collaboration with the Municipality of Mitrovica, around 750 trees were planted in the City of Mitrovica.
- Recycling of paper for the parliament building – introduction of a system of paper recycling in the Parliament of UNATSCR 1244 Kosovo, with the aim of encouraging all other institutions in their efforts to protect the environment, as well as to support the creation and implementation of basic environmental laws.

REFERENCE

1. Programme Document "Strengthening Capacities in the Western Balkans Countries to Mitigate Environmental Problems through Remediation of High Priority Hot Spots", UNDP Montenegro, 2007.
2. Programme Document "Cleanup and Rehabilitation of Bajza Hot Spot', UNDP Albania, 2007.
3. Programme Document "Strengthening capacities in BiH to address environmental problems through remediation of high priority hotspots", UNDP Bosnia and Herzegovina, 2007.
4. Programme Document 'Remediation and Recultivation of the Mojkovac Lead and Zinc Tailings Mine', UNDP Montenegro, 2007.
5. Programme Document "Remediation of the Grand Backa Canal", UNDP Serbia, 2007.
6. Programme Document "Sustainable Mining Cleanup and Pollution Management in Bucim and Lojane Mines", UNDP Macedonia, 2007.
7. Programme Document "Strengthening Capacities in Kosovo to Address Environmental Hotspots", UNDP Kosovo, 2007.

LIST OF ABBREVIATIONS

Ag – Silver
AP – Autonomous Province
AQI – Air quality Index
As – Arsenic
BAT – Best Available Techniques
BiH – Bosnia and Herzegovina
BREF – Best Available Technique Reference Notes
Cd – Cadmium
CD – Capacity Development
CPD – Country Programme Document
CPAP – Country Programme Action Plan
CSA – Cost Sharing Agreement
CSO – civil society organization
CTA – Chief Technical Advisor
Cu – Copper
CWWTP – Central Waste Water Treatment Plant
DAI – Dinaric Arc Initiative
EARAP Report – Environmental Assessment and Remedial Action Plan Report
EC – European Commission
EIA – Environmental Impact Assessment
ENVSEC – Environment and Security Initiative
EPE – Environmental Protection Engineering
EU – European Union
FYR Macedonia – Former Yugoslav Republic of Macedonia
GBC – Brand Backa Canal
GIS – Geographic Information System
GDP – Gross Domestic Product
IPA – Instruments for Pre-accession Assistance
IPPC – Integrated Pollution Prevention and Control
MESP – Ministry of Environment and Spatial Planning
METE – Ministry of Economy, Transport and Energy
MoEPP – Ministry of Environment and Physical Planning
NEAP – National Environment Action Plan
NFIM – Company NFI Maniera in charge of managing Balez Storehouse
NGO – non-governmental organizations
Ni – Nickel
NOAA standards – National Oceanic and Atmospheric Administration standards
NOx – Nitrogen oxides
NPC – Nation Project Coordinator
NWMP – National Waste Management Plan
OSCE – Organization for Security and Cooperation in Europe
PARC –Public Awareness Raising Campaign
Pb – Lead

PCB – Polychlorinated biphenyls
PEA – Preliminary Environmental Assessment
PEHD pipes – Polyethylene High Density pipes
PEIP – Priority Environmental Investment Programme
PMB – Programme Management Board
POPs – Persistent Organic Pollutants
PS – Pumping Station
RCC – Regional Cooperation Council
REACH – European Community Regulation on chemicals and their safe use (EC 1907/2006), dealing with the Registration, Evaluation, Authorisation and Restriction of Chemical substances
REC – Regional Environmental Centre
REReP – Regional Environmental Reconstruction Programme for South East Europe
RoI – Return on Investment
RPMU – Regional Programme Management Unit
SEA – Strategic Environmental Assessment
SOx – Sulphur oxides
T1 – Tailing 1
T2 – Tailing 2
TC – Technical Commission
TF – Trust Fund
TLV – Threshold Limit Values
TMI – Tailing Mine Impoundment
ToR – Terms of Reference
TPP – Thermo Power Plant
UK – United Kingdom
UNATSCR 1244 Kosovo – UN Administrative Territory under Security Council Resolution 1244 Kosovo
UNDAF – United nations Development Assistance Framework
UNDP – United Nations Development Programme
UNEP – United Nations Environmental Programme
UNIDO – United Nations Industrial Development Organizations
USD – United States Dollar
WBEP – Western Balkans Environment Programme
WHO – World Health Organisation
WWTP – Wastewater Treatment Plant
Zn – Zinc

ISBN 978-9940-9245-8-4