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**Flood Emergency Recovery Project**
**(FERP)**

THE PROJECT OF PUMPING OUT WATER AND SEDIMENT AT THE OPEN PIT MINE TAMNAVA – WEST FIELD, MB KOLUBARA

# ENVIRONMENTAL MANAGEMENT FRAMEWORK DOCUMENT

Public Disclosure Authorized

FINAL DOCUMENT BELGRADE,
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**Abbreviations**

| | |
|---|---|
| DoEIA | Department of EIA (within the MoAEP) |
| DWQ | Drinking Water Quality |
| EA | Environmental Assessment |
| EIA | Environmental Impact Assessment |
| SIA | Strategic Impact Assessment |
| EMFD | Environmental Management Framework Document |
| EMP | Environmental Management Plan |
| EMS | Environmental Management System |
| EMU | Environmental Management Unit |
| FEA | Final Environmental Approval |
| FERP | Flood Emergency Recovery Project |
| GEMM | General Environmental Mitigation Measures |
| GoS | Government of Serbia |
| HSE | Health, Safety and Environment |
| IDA | International Development Association |
| INP | Institute for Nature Protection of the Republic of Serbia |
| IPCM | Institute for Protection of Cultural Monuments of the Republic of Serbia |
| LEP | Law on Environmental Protection |
| LOEIA | Law on EIA |
| MoAEP | Ministry of Agriculture and Environmental Protection |
| MoEM | Ministry of Energy and Mine Energy |
| MS | Management Support Consultants |
| NGOs | Non-Government Organizations |
| OP | Operational Policy |
| PC | Public Consultations |
| PE EPS | Public Enterprise "Electric Power Industry of Serbia" |
| PIU | Project Implementation Unit |
| PSC | Project Supervision Consultant |
| RDNEIA | Request for Decision about Need for EIA |
| RONEIA | Request for Opinion about Need for EIA |
| WB | The World Bank Group |
| WMP | Waste Management Plan |

## EXECUTIVE SUMMARY

The Government of Serbia and Ministry of Mining and Energy of the Republic of Serbia (MEM) is initiating a Flood Emergency Recovery Project (FERP) to improve and rehabilitate infrastructure in Serbia including infrastructure in EP Electric Power Industry of Serbia after Flood in May 2014.

The Flood Emergency Recovery Project will support the Government of Serbia (GoS) in the implementation of the first phase of FERP. The FERP has four components related to EPS: Component 1 - The Project of pumping out water and sediment at the Open pit mine Tamnava – west field MB Kolubara; Component 2 - Emergency procurement and import of electricity for the needs of the population and the economy Component 3 - Emergency procurement of mobile power transformers.

### Environmental Management Framework Document

The Environmental Management Framework Document (EMFD) aims to identify the range of required environmental management measures that need to be taken during the planning and operation phases of FERP, in order to ensure compliance with the national and WB requirements.

EMFD provides general policies, guidelines, codes of practice and procedures to be integrated into the implementation of the Project. It defines the steps, processes, and procedures for screening, alternative analysis, assessment, monitoring and management of the environmentally-related issues. In addition, EMFD presents overview of environmental policies and legal regime of Serbia and WB safeguard policies; includes institutional and capacity assessment related to environmental management; and describes the principles, objectives and approach to be followed while designing the site-specific environmental mitigation measures. A generic sample environmental mitigation and environmental monitoring plans are included in the document as annexes. The EMFD is intended to be used as a practical tool during program formulation, design, implementation, and monitoring of FERP related activities.

### Legal and Institutional Framework

Environmental legislation in Serbia has over 100 laws and regulations and the majority of these are harmonized with EU legislation.

The Ministry of Agriculture and Environmental Protection (MoAEP), is the key institution in the Republic of Serbia responsible for formulation and implementation of the environmental policy matters. The other aspects of environmental management related to Flood Emergency Recovery Project - The Project of Pumping out Water and Sediment at the Open Pit Mine Tamnava – West Field, MB Kolubara are dealt with several other institutions, among which the most prominent are the Institute for Nature Protection of Serbia (INP), Serbian Environmental Protection Agency (SEPA), and PE EPS.

In the juridical system of the Republic of Serbia, the Environmental Impact Assessment procedure is regulated by the Law on Environmental Impact Assessment, which is fully in line with the European EIA Directive-85/337/EEC. The Law stipulates that preparation of EIA is not required for the Open Pit Mine Tamnava – West Field rehabilitation projects, unless their alignments are placed within or in the vicinity of the nature or culture protected areas. In case of existence of protected areas, the investor is obliged to request from MoAEP the opinion of the need and, if necessary, the conditions for undertaking EIA. Depending upon the assessment of potential significance of environmental impacts, MoAEP can decide if there is a need to apply partial or full EIA procedure for the relevant Project.

Environmental Safeguard Policies of the World Bank relevant for FERP are: OP/BP 4.01 Environmental Assessment; OP/BP 4.04 Natural Habitats; OP/BP 4.11 Physical Cultural Resources; OP/BP 4.12 Involuntary Resettlement.

**Environmental and Social Baseline**

The environment of Serbia is highly diverse compared to some other countries in Europe. The reasons for this comparative richness include: the variety of climate, topography, and geology and the long- term ecological and evolutionary history of the region at a biological crossroads. The varied ecosystems of Serbia give rise to a diversity of valuable ecological processes.

Serbia is species-rich. It has a number of different types of ecosystems of particular environmental importance, including: forest ecosystems representing different types of forests; high mountain regions with characteristic mountain ecosystems well-represented or preserved, some of which are found along the borders and would require trans-boundary management efforts; mountain regions in which the traditional human activities have maintained and even increased biodiversity through centuries of maintaining the open pastures on mountain meadows; gorges and canyons that have been identified as important centers for relict and endemic species; steppes and sands of Vojvodina, as well as lakes, wetlands, swamps, marshes and ponds which provide key-habitat for the migratory birds from elsewhere in Europe that have been protected under the Ramsar Convention; karst regions in parts of Serbia, with their numerous caves and pits, supporting a rich fauna; and mountain bogs around mountain and glacial lakes.

Water quality in Serbia differs significantly from one region to the next. According to the findings of the Republic Hydro-meteorological Service of Serbia in 2005 and keeping in mind that the best river quality is Class I and the most polluted is Class IV, the water parameters for 23% of 65 monitored river profiles fell into Classes I and II, 70% into Class III and 6% into Class IV.

The relatively poor quality of ambient air in a number of towns in Serbia results from the emissions of sulfur dioxide, nitrous oxides, carbon monoxide, soot and particulate. Thermal Power Production (TPP) and road vehicles in transport sector are considered as major contributors to air pollution in Serbia. The main reasons for the air pollution from the transport sector are poor quality of the engine fuel; old and inadequately maintained vehicle fleet.

The general state of waste management in Serbia is still inadequate. Over 50% of waste disposal sites do not meet the technical requirements of sanitary landfills, and are actually just fenced and mapped dump areas. There are also hundreds of illegal dump sites of various sizes in rural areas. Leakages from these dump sites pose additional threat to groundwater, surface water and soil. However, the country has adopted the new Law on Waste Management, which is fully harmonized with the EU acquis communautaire, and its implementation is steadily progressing.

**Principles of FERP Environmental Management**

Environmental assessment procedure for the FERP contain: environmental screening; preparation for Rehabilitation Process; preparation of the site-specific EMP based on screening criterion; obtaining all the necessary preconditions, conditions and opinions from the relevant institutions; preparing the EIA Studies (if required); and obtaining the Final Environmental Approval.

Regarding the EMP implementation, a rehabilitation contractor will be responsible for undertaking all activities related to environmental protection during Pumping out of Waters at Open pit mine Tamnava West and rehabilitation works in open pit mine; while PE EPS will be responsible for the supervision of EMP implementation and for the compliance enforcement measures.

**Implementation arrangements**

PE EPS, as the Project's implementing agency, will be responsible for the implementation and compliance with the EMFD, site-specific EMP and monitoring plans. PE EPS will also be responsible for the supervision of the overall project implementation and supervision of environmental monitoring (through the consulting services and preparation of the periodic environmental reports).

The Project Implementation Unit (PIU) within PE EPS will be responsible for the day-to-day project implementation, using its own staff from the Investments Department. The Director for Investments heads the PIU and reports to PE EPS General Director. The PIU's Environmental Specialist and the Assistant Engineer for Environment will be engaged during the whole project implementation period and will be responsible for monitoring and evaluation of environmentally-related indicators, to be measured against the agreed targets and compared to defined baselines. Project progress reports, including monitoring indicators and reporting on the implementation of the requirements set in the site-specific EMPs, will be prepared on a quarterly basis and submitted to WB for review. Monthly progress reports prepared by the supervision consultants will be submitted by PIT to WB for review upon request.

**Public Consultations and Disclosure Process**

As required by the WB Safeguards Policies, public consultations were undertaken on draft version of EMP documents that were produced for KOLUBARA sub-projects. Public consultations and information disclosure will be obligatory for EMP documents for other component which will be prepared under FERP.

Beneficiary consultations will be conducted during the design and later during the Open pit mine rehabilitation phase, and issues related to environmental and social issues raised and complaints received during consultations, field visits, informal discussions, written communications etc. will be followed up. The relevant records will be kept in the project offices of PE EPS.

Information Disclosure Framework in case of any specific EIA preparation (according to national legislation) is presented in EMFD document. Basic stages for public consultations in this case are: Initial Consultation, Decision about scope and Content of EIA Study, Draft EIA Study and Final Environmental Approval. Each of these stages is followed with adequate process of public consultations, in line with the national legal requirements.

A project-specific Grievance Mechanism will be implemented to ensure that all complaints from the local communities are dealt with appropriately, with corrective actions being implemented, and the complainants being informed of the outcome. PE EPS will maintain a Complaints Database, which will contain all the information on complaints or grievances received from the communities or other stakeholders. Details of this procedure are presented in section 7.1. of EMFD.

Public discussion and disclosure of this Environmental Management Framework document was completed in April 2015, and details of the process can be found in the Annex 6 of this document.

**Monitoring and Reporting Arrangements**

A specific monitoring plan for the proposed Project has been developed and is presented in Annex 4 of EMFD. The main components of the monitoring plan include: Environmental issue to be monitored and the means of verification; Specific areas and locations; Parameters to be monitored; Frequency; and Institutional responsibilities for monitoring and supervision.

The contractors will prepare their compliance reports in respect to EMP, which document the implementation of environmental mitigation and protection measures (together with prescribed monitoring activities carried out during the reporting period) on monthly basis and submit them to PE EPS. However, in case of any kind of accident or endangerment of protected environments, reporting to PE EPS will be immediate.

Monitoring and compliance in accordance with EMFD and site specific EMPs, including monitoring of implementation of site-specific measures on project/section during project implementation will be undertaken by PE EPS and its implementation unit, and reported in writing to the Bank on Reports on monthly basis.

Monthly Environmental Health and Safety (EHS) reports, including monitoring indicators and reporting on the implementation of the requirements set forth in the EMPs will be prepared by PE EPS and submitted for WB

review. In case of fatalities or major incidents on sites, PE EPS will immediately report to WB.

Upon Project completion, PE EPS will be in charge of future operation and maintenance of rehabilitated open pit mine Tamnava West. Routine and random monitoring will be undertaken as scheduled in the monitoring plan.

# 1. DESCRIPTION OF PROJECT COMPONENTS INCLUDING DESCRIPTION OF TYPE OF ACTIVITIES ELIGIBLE FOR FINANCING

## 1.1 Background

Ministry of Mining and Energy (MoER) and is initiating trough Flood Emergency Recovery Project - The Project of Pumping out Water and Sediment at the Open pit mine Tamnava – West field, MB Kolubara (FERP/ PWSOTWF) to improving rehabilitation of open pit mine after the floods and safety coal supplying of EPS TPPs.

Public Enterprise "Elektroprivreda Srbije" (PE EPS) will be the implementing agency for the rehabilitation program including the proposed Bank-supported project. PE EPS, including its Project Implementation Unit (PIU), has gained previous experience while implementing the World Bank (WB)-supported Flood Emergency Recovery Project.

This Environmental Management Framework Document (EMFD) is required for the FERP to identify the required environmental management measures that need to be taken during implementation the Flood Emergency Recovery Project - The Project of Pumping out Water and Sediment at the Open pit mine Tamnava – West field, MB Kolubara (FERP/PWSOTW) rehabilitation and operations phase, in order to ensure compliance with the GoS own requirements and those of the WB. All the major environmental impacts along with mitigation and management measures have been compiled in the form of EMFD.

## 1.2 Project Description

The project includes pumping out the water that rushed into and flooded the Open Pit Mine Tamnava West Field, its complete recovery and rehabilitation and bringing to original purpose.

Four main activities can be identified:

1. Pumping out the water out of the Open Pit Mine Tamnava West field and bringing the water back to the riverbed of the Kolubara river (estimated at 230 * $10^6$ $m^3$ of water)
2. Storing the settled silt (estimated at 3 - $610^6$ $m^3$ of sediment – characterization and classification will be made subsequently, as well as the treatment plan)
3. Rehabilitation of the existing equipment flooded by Kolubara river
4. Re-establishment of the complete coal production

The water management "Jaroslav Černi" Institute has also been engaged in the activities of monitoring the pumping out, concerning the preparation of the project documents for the recovery of the facilities destroyed or damaged by the floods.

Within the Project of pumping the water out the Open Pit Mine Tamnava West field, 24 pumps will be engaged of the capacity Q ≈ 8 $m^3$/s by MB Kolubara (local source), and 20 pumps from the company Južna Bačka of the capacity, Q ≈ 20 $m^3$/s. Maximum allowed quantity of water to be pumped out prescribed by the competent authority is 50 $m^3$/s.

## 1.3 Objectives of the Environmental Management Framework Document

This Environmental Management Framework Document (EMFD) provides general policies, guidelines, codes of practice and procedures to be integrated into the implementation of the WB-supported FERP. It defines the steps, processes, and procedures for screening, alternative analysis, assessment, monitoring and management of the environmentally-related issues. In addition, the EMFD analyzes environmental policies and legal regime of Serbia and safeguard policies of the WB; presents the institutional and capacity assessment related to the environmental management; and describes the principles, objectives and approach to be followed while designing site-specific environmental mitigation measures. The EMFD is intended to be used as a practical tool during program formulation, design, implementation, and monitoring in FERP.

## 1.4 Approach and Methodology

The operations under FERP are classified as belonging to environmental Category B according to WB procedures, since they will involve only rehabilitation of the open pit mine Tamnava West Field in RB Kolubara, with the possibility of minor alignment changes for safety purposes.

The EMFD outlines the environmental policy, legal, and administrative framework for undertaking the project, presents the environmental baseline information and potential environmental impacts and includes the range of available mitigation measures that may be adopted, based on each particular situation. The EMFD also contains the description of the environmental management systems and institutional arrangements to be applied as well as recommendations for the capacity building measures to be implemented in PE EPS during project implementation in order to ensure environmental sustainability.

The EMFD describes how the potential environmental impacts will be managed during preparation, implementation (rehabilitation works) and, in the post implementation periods (post-rehabilitation phase). The EMFD incorporates a framework for implementation, monitoring, supervision, auditing and reporting of the EMFD requirements.

With respect to health and safety, a number of the recommendations build on the work currently being undertaken to develop capacity for occupational health and safety management in PE EPS, and are specifically included here for reference to this project.

The EMFD includes a generic sample environmental and social mitigation (see Annex 3) and environmental monitoring plans (see Annex 2)

# 2 OPERATING REQUIREMENTS - DIAGNOSIS OF LEGAL AND INSTITUTIONAL FRAMEWORK AND APPLICABLE SAFEGUARDS

## 2.1. Foreword

The legal, legislative and institutional framework for health and environment in Serbia is founded on the Constitution of Serbia, which stipulates the right to a healthy environment and the duty of all, in line with the law, to protect and enhance the environment. Health and environment is also supported by many governmental strategies, international agreements and the Millennium Development Goals.

Environmental legislation in Serbia has over 100 laws and regulations. Currently, the majority of these are harmonized with EU legislation. The list of currently valid environmentally-related legislation is presented in Annex 5 of EMFD.

## 2.2. Relevant Institutions

The Ministry of Agriculture and Environmental Protection (MoAEP), Ministry of Energy and Mining (MoEM), Republican Hydrometeorological Institute and Serbian Environmental Protection Agency (SEPA) are the key institution in Republic of Serbia responsible for formulation and implementation of the project of Pumping out Water and Sediment at the Open Pit Mine Tamnava – West Field, MB Kolubara and environmental policy matters.

The other aspects of environmental management related to project of Pumping out Water and Sediment at the Open Pit Mine Tamnava – West Field, MB Kolubara are dealt with several other institutions, among which are Nature Protection Institute of Serbia (INP), and the Public Enterprise Electric Power Industry of Serbia (PE EPS).

## 2.3. EIA procedure in the Republic of Serbia

In the juridical system of the Republic of Serbia, the Environmental Impact Assessment procedure is regulated by the Law on Environmental Impact Assessment, which is completely in line with European EIA Directive - 85/337/EEC. According to that Law, preparation of the Environmental Impact Assessment is not required for the Flood Emergency Recovery projects unless their alignments are placed within or in the vicinity of the nature or culture protected areas. In such cases the Project Proponent is obliged to submit so-called "Request for Decision about Need for Environmental Impact Assessment" (RDNEIA) to the MoAEP. Depending on the Ministry's assessment of significance of potential environmental impacts of the project, it is decided if there is a need (or not) to apply partial or full EIA procedure for the Project of Pumping out Water and Sediment at the Open pit mine Tamnava – West field in MB Kolubara

If any project is found to be adjacent or within the nature/cultural protected area the EIA could be required for this project in accordance with the Serbian legislation, depending strictly on the opinions obtained from the relevant institutions (Institute for Protection of Cultural Monuments (IPCM), Department of EIA (DoEIA)) within the MoAEP. In such case a PE EPS Consultant (C)[1] should submit request to the IPCM in order to obtain preconditions under which proposed project should be implemented.

Request for opinion regarding necessity of EIA procedure for each sub-project which is found to be adjacent or within the nature/cultural protected area will be submitted to DoEIA together with other relevant project documentation, which mandatory include preconditions of relevant institutions in charge of the environmental protection.

After receiving the request from PE EPIS, MoAEP define a Terms of Reference (TOR) for EIA for such project. This will ensure proper implementation of all project related environmental requirements and will offset or minimize any negative impact on local human and biotic environment.

[1] PE EPS will authorize a C in order to obtain all preconditions from relevant institutions.

For project which are found neither nor within the nature /cultural protected areas there no need for obtaining preconditions from INP or opinions from MoAEP.

As the FERP will be funded by WB the following Lender requirements will need to be applied to any works:

- WB: Operational Policy OP 4.01 Environmental Assessment, which require partial EIA and development of site specific EMPs for projects belonging to Category B;

WB requires compliance with the national laws and WB safeguards procedures.

## 2.4 Relevant Government Policies, Acts, Rules, Strategies and Guidelines

Environmental protection in Republic of Serbia is regulated by several national and municipal laws and by-laws. The environmental legislation in force in Serbia is summarized in Annex 5. The main legal documents are:

- The Constitution of Serbia ("Official Gazette of RS" No. 98/06).
- The National Strategy for Sustainable Development ("Official Gazette of RS" No. 72/09, 81/09)
- The Law on Environmental Protection ("Official Gazette of RS" No. 135/04, 36/09)
- The Law on Environmental Impact Assessment ("Official Gazette of RS" No. 135/04)
- The Law on Waste Management ("Official Gazette of RS" No. 36/09)
- The Law on Protection against Environmental Noise ("Official Gazette of RS" No. 36/09, 88/10)
- The Law on Water ("Official Gazette of RS" No. 30/10, 93/12)
- The Law on Occupational Safety and Health ("Official Gazette of RS" No. 101/05)
- The Law on Planning and Construction ("Official Gazette of RS" No. 72/09, 81/09)
- The Law on Nature Protection, ("Official Gazette of RS" No. 36/09)
- The Law on Strategic EIA ("Official Gazette of RS" No. 135/2004Law on Forest ("Official Gazette of RS", 46/91, 83/92, 54/93, 60/93, 53/93, 67/93, 48/94, 54/96, 101/05),
- The Law on Air Protection ("Official Gazette of RS", 36/09
- The The Law on SIA ("Official Gazette of RS" No. 135/04)
- The Energy Law („Official Gazette of the Republic of Serbia" No. 57/11, 80/11-amendment, 93/12 and 124/12)
- Agricultural Land Law , ("Official Gazette of RS" No. 62/06)

**Regulations established on the basis of the Law on EIA include the following:**

- Decree on establishing the List of Projects for which the Impact Assessment is mandatory and the List of projects for which the EIA can be requested ("Official Gazette of RS" No. 114/08)
- Rulebook on the contents of requests for the necessity of Impact Assessment and on the contents of requests for specification of scope and contents of the EIA Study ("Official Gazette of RS" No. 69/05)
- Rulebook on the contents of the EIA Study ("Official Gazette of RS" No. 69/05)
- Rulebook on the procedure of public inspection, presentation and public consultation about the EIA Study ("Official Gazette of RS" No. 69/05)
- Rulebook on the work of the Technical Committee for the EIA Study ("Official Gazette of RS" No. 69/05)
- Regulations on permitted noise level in the environment ("Official Gazette of RS" No. 72/10)
- Decree on establishing class of water bodies ("Official Gazette of SRS" No. 5/68)
- Regulations on dangers pollutants in waters ("Official Gazette of SRS" No. 31/82)
- Law on confirmation of convention on information disclosure, public involvement in process of decision making and legal protection in the environmental area ("Official Gazette of RS", 38/09)

### 2.4.1. The Constitution of Serbia

Serbia's Constitution, adopted in September 2006, states that "Everyone shall have the right to a healthy environment and the right to timely and full information about the state of the environment. Everyone, especially the Republic of Serbia and autonomous provinces, shall be accountable for the protection of the environment.

Everyone shall be obliged to preserve and improve the environment."

### 2.4.2. The National Strategy for Sustainable Development

The National Strategy for Sustainable Development contains chapters that cover public health and environmental risk factors, including climate change, waste, chemicals, accidents, radiation, noise and natural disasters, such as floods, landslides, fires and earthquakes.

### 2.4.3. Law on Environmental Protection

Law on Environmental Protection (LEP) is adopted in 2004. The LEP is currently the main legislation relating to environment protection in Serbia. The Law on Environmental Protection is fully harmonized with Council Directive 2003/105/EC, which amends Council Directive 96/82/EC on the control of major-accident hazards involving dangerous substances (Seveso II Directive).

The main objectives of LEP are:

- Conservation and improvement of the environment; and
- Control and mitigation of pollution of the environment.

The main focuses of LEP are:

- Declaration of ecologically critical areas and restriction on the operations and processes, which can or cannot be carried out/ initiated in the ecologically critical areas;
- Regulations in respect of vehicles emitting smoke harmful for the environment;
- Environmental Approval;
- Regulation of industries and other development activities' discharge permits;
- Promulgation of standards for quality of air, water, noise and soil for different areas for different purposes;
- Promulgation of a standard limit for discharging and emitting waste; and
- Formulation and declaration of environmental guidelines.

To implement the Law on Environmental Impact Assessment, a government decree determines the list of projects for which an impact assessment is mandatory or may be required in accordance with the relevant EU directives 97/11/EC and 337/85/EEC. Public participation is also envisaged in all environmental impact assessment stages. All subsidiary regulations were adopted in 2005.

Public information and public participation in decision-making have been introduced in line with EU Directive 2003/35/EC on public participation.

### 2.4.4. Law on Environmental Impact Assessment

The Law on EIA (LOEIA) provides categorization of industries and projects and identifies types of environmental assessment required against respective categories of industries or projects.
The Law covers, among others:

- Declaration of ecologically critical areas;
- Classification of industries and projects into 2 categories;
- Procedures for issuing the Final Environmental Approval (FEA); and
- Determination of environmental standards.

LOEIA also contains the procedures for obtaining FEA from the Department of EIA for different types of proposed industries or projects.

### 2.4.5. The Law on Waste Management

The Law on Waste Management, which is harmonized with all relevant EU directives, has been adopted in 2009 and contains provisions that relate to PE EPS is tent organic pollutant waste and polychlorinated biphenyl and/or polychlorinated terphenyl waste.

### 2.4.6. The Law on Protection against Environmental Noise

The Law on Protection against Environmental Noise, adopted in May 2009, transposed EU Directive 2002/49/EC. The Law has the following main goals: establishment, maintenance and improvement of the system of noise protection on Serbian territory; and determination and realization of measures in the field of noise protection that avoid, prevent or decrease the harmful effects of noise on human health and the environment. Other goals are: determination of the limit values of noise levels in the environment in view of area, facilities and/or public (population) sensitivity, as well as in view of noise source; determination of the level of noise exposure in the environment; and public access to the information about noise and its effects. The levels of noise are covered by the Regulation on permitted level of noise in the environment.

### 2.4.7. The Law on Water

The Law on Water ("Official Gazette of RS" No. 30/10, 93/12), which incorporates the EU Water Framework Directive, covers water regimes, water management areas, responsibilities for water management (including sub-law water management legislation), water management activities, limitation of owners' and beneficiaries' rights, water cooperatives, financing of water management activities, and administrative inspection to enforce the Law. The legislation provides for various water management sub-laws on water resource conditions, water resource compliance and water resource permits.

### 2.4.8. The Law on Occupational Safety and Health

The Law on Occupational Safety and Health regulates the occupational safety and health system in Serbia. By harmonizing this law with the ratified International Labor Organization conventions and EU Framework Directive 89/391/EEC, as well as special directives derived from the Framework Directive, all guidelines originating from them have been acted in a form adjusted to national conditions. Apart from this Law, the regulatory framework of the occupational safety and health system is integrated by several sub-acts.

### 2.4.9. Energy Law

The present Law regulate the following: energy policy objectives and the method of its implementation, conditions for reliable, secure and quality energy and energy-generating products supply, conditions for safe supply to the customers, conditions for constructing new energy facilities, conditions and manner of performing energy related activities, manner of organizing and functioning of the electricity and natural gas market, rights and obligations of market participants, energy customers' protection, manner, conditions and incentives for energy production from renewable energy sources and combined generation of electricity and heat, rights and duties of governmental bodies and Energy Agency of the Republic of Serbia (hereafter: Agency) in enforcing this law and monitoring the implementation hereof.

## 2.5 World Bank's Environmental Safeguard Policy

Following is the short summary of several relevant Banks' Safeguards Policies. The full texts could be found at the WB web site.

### 2.5.1 OP/BP 4.01 Environmental Assessment

The Bank requires Environmental Assessment (EA) of projects proposed for Bank support to ensure that they

do not have, or mitigate potential negative environmental impacts. The EA is a process whose breadth, depth, and type of analysis depend on the nature, scale, and potential environmental impact of the proposed project. The EA evaluates a project's potential environmental risks and impacts in its area of influence; examines project alternatives; identifies ways of improving project selection, siting, planning, design, and implementation by preventing, minimizing, mitigating, or compensating for adverse environmental impacts and enhancing positive impacts; and includes the process of mitigating and managing adverse environmental impacts throughout project implementation. The EA takes into account the natural environment (air, water and land); human health and safety; social aspects; and transboundary and global environmental aspects. The Borrower is responsible for carrying out the EA and the Bank advises the Borrower on the Bank‘s EA requirements.

The Bank classifies the proposed projects into three major categories, depending on the type, location, sensitivity, scale of the project and the nature and magnitude of its potential environmental impacts.

- Category A: The proposed project is likely to have significant adverse environmental impacts that are sensitive, diverse, or unprecedented. These impacts may affect an area broader than the sites or facilities subject to physical works.
- Category B: The proposed project‘s potential adverse environmental impacts on human population or environmentally important areas-including wetlands, forests, grasslands, or other natural habitats- are less adverse than those of Category A projects. These impacts are site specific; few if any of them are irreversible; and in most cases migratory measures can be designed more readily than Category A projects.
- Category C: The proposed project is likely to have minimal or no adverse environmental impacts.

### 2.5.2 OP/BP 4.04 Natural Habitats

The conservation of natural habitats, like other measures that protect and enhance the environment, is essential for long-term sustainable development. The Bank therefore supports the protection, maintenance, and rehabilitation of natural habitats and their functions in its economic and sector work, project financing, and policy dialogue. The Bank supports, and expects borrowers to apply, a precautionary approach to natural resource management to ensure opportunities for environmentally sustainable development. The Bank proMoEMes and supports natural habitat conservation and improved land use by financing projects designed to integrate into national and regional development the conservation of natural habitats and the maintenance of ecological functions. Furthermore, the Bank proMoEMes the rehabilitation of degraded natural habitats. The Bank does not support projects that involve the significant conversion or degradation of critical natural habitats.

### 2.5.3 OP/BP 4.11 Physical Cultural Resources

Physical cultural resources are defined as movable or immovable objects, sites, structures, groups of structures, and natural features and landscapes that have archaeological, paleontological, historical, architectural, religious, aesthetic, or other cultural significance. Their cultural interest may be at the local, provincial or national level, or within the international community. Physical cultural resources are important as sources of valuable scientific and historical information, as assets for economic and social development, and as integral parts of a people's cultural identity and practices. The Bank assists countries to avoid or mitigate adverse impacts on physical cultural resources from development projects that it finances. The borrower addresses impacts on physical cultural resources in projects proposed for Bank financing, as an integral part of the environmental assessment (EA) process. When the project is likely to have adverse impacts on physical cultural resources, the borrower identifies appropriate measures for avoiding or mitigating these impacts as part of the EA process. These measures may range from full site protection to selective mitigation, including salvage and documentation, in cases where a portion or all of the physical cultural resources may be lost.

### 2.5.4 WB Environmental, Health and Safety Guidelines

The Environmental, Health and Safety (EHS) Guidelines of the WB Finance Corporation, 2008 are the safeguard guidelines for environment, health and safety for the development of the industrial and other projects. They

contain performance levels and measures that are considered to be achievable in new facilities at reasonable costs using existing technologies.

### 2.5.5 Safeguard Policies Triggered by the Project of pumping out water and sediment at the Open pit mine Tamnava – West Field, MB Kolubara

| | |
|---|---|
| Environmental Assessment OP/BP 4.01 | ■ |
| Natural Habitats OP/BP 4.04 | ■ |
| Physical Cultural Resources OP/BP 4.11 | ■ |
| Indigenous Peoples OP/BP 4.10 | ■ |

### 2.5.6. Environmental Approval Procedure

Projects for which the Impact Assessment is mandatory and the List of projects for which the EIA can be requested ("Official Gazette of RS" No. 114/08) ) includes submission of:

- Request for Decision about Need for EIA (RDNEIA)
- Environmental Impact Assessment (EIA)
- Environmental Management Plan (EMP)

Structure of the whole process is presented in Figure 2.2 - Environmental Approval Procedure.

Most of the FERP project of Pumping out Water and Sediment at the Open pit mine Tamnava – West field, MB Kolubara rehabilitation will be implemented within the non-sensitive areas in environmental point of view, so they could be categorized as a "Low B" Environmental

Category. Such projects require only EMP, Checklist EMP or application of regulations/standards. Environmental management process, including obtaining of FEA includes:

- Screening/Scoping in order to determine what are the likely potential issues;
- Request for the Opinion about Need for EIA, submitted to MoAEP;
- Full Environmental Impact Assessment Procedure, only in case where MoAEP issue an Opinion that EIA is needed for these projects;
- In case where MoAEP issue an Opinion that EIA is not needed for the project, Environmental Approval is obtained by collecting subject Opinion.
- EMP

The environmental impact assessment, based on LOEIA, has been the most efficient regulatory instrument since it was implemented in Serbia over 15 years ago. With this instrument, impacts of any pollution originating from the future facilities and/or related activities can be foreseen and prevented or mitigated.

## 2.6 Implication of GoS Policies in FERP - instruction how to integrate national laws and their requirements with the Project/Bank Requirements

Except LEP and LOEIA, all other policies, strategies and legal instruments do not explicitly require any environmental assessment of the Project-related activities. Most of the policies, strategies and legal instruments emphasized the need for environmental consideration along with the project planning and implementation. There is no straight forward environmental categorization for the proposed FERP as per LEP and LOEIA. PE EPS will ensure, on a case- by-case basis that the environmental management will be an integral part of the subproject planning, design, implementation, and operation and maintenance (O&M). PE EPS will screen and monitor the environmental issues in both rehabilitation and in subsequent operation & maintenance phases and ensure efficient application of environmentally-related measures, as defined in site-specific EMPs.

# 3. ENVIRONMENTAL AND SOCIAL BASELINE ON NATIONAL/STATE LEVEL AND SAMPLE SUBPROJECT LEVEL

## 3.1 Environmental and Social baseline at national/state level

Republic of Serbia is taking a huge effort to reach good environmental standards. A set of environmental laws adopted during the last decade contributed to Serbia coming closer to desired environmental standards. The standards of good environmental practice are applied throughout the country, and progress is particularly visible within the energy and transport sector, also due to the fact that several large projects were financed by WB, which implemented a strict environmental systems.

However, there is still a lot of work to be done regarding environmental protection in Serbia and this chapter is focused on issues most commonly present in these fields, which lead to environmental degradation.

### 3.1.1 Baseline country and environmental information

Serbia has a land area of 77,474 square kilometers, constituting only 0.05% of the world's land area, or about 1.5 % of Europe. Despite its small size, however, the environment of Serbia is highly diverse compared to other countries in Europe. The reasons for this comparative richness include: the variety of climate, topography, and geology and the long-term ecological and evolutionary history of the region as a biological crossroads.

The varied ecosystems of Serbia in turn give rise to a diversity of valuable ecological processes. The following ecosystems are represented: deciduous forests of several types in lowland, foothills, and mountain areas; mountain forests of pine, spruce, and fir; steppe (grasslands that develop in regions of wind-deposited soil) and forest-steppe; and alpine grasslands above "tree line" in the high mountains.

Serbia is species-rich. The Balkan Peninsula is the most species-rich part of Europe for flowering plants and Serbia is among the most diverse parts of the Balkan Peninsula - only Greece and Bulgaria being comparable.

In general, Serbia has a number of different types of ecosystems of particular environmental importance, including: forest ecosystems representing different types of forests ; high mountain regions with characteristic mountain ecosystems well-represented or preserved, some of which are found on borders and would require trans-boundary management efforts; mountain regions in which traditional human activities have maintained and even increased biodiversity through centuries of maintaining the open pastures of mountain meadows; gorges and canyons that have been identified as important centers for relict and endemic species; steppe and sands of Vojvodina, as well as lakes, wetlands swamps, marshes, ponds which provide key habitat for migratory birds from elsewhere in Europe and have been identified as wetlands of the Ramsar Convention; karst regions in parts of Serbia, with their numerous caves and pits, supporting a rich fauna; and mountain bogs around mountain and glacial lakes.

### 3.1.2 Water quality

Water quality in Serbia differs significantly from one region to next. Monitoring has shown the presence of: ammonia, nitrates, sulfides, iron and mineral oils in the Tisa River Basin; evaporable phenols and manganese in wells in the area of Backa; and, in some cases, suspended solids - for example, in the South Morava Basin. Throughout Serbia, the most problematic physicochemical water quality parameters are turbidity, iron, manganese, nitrates and, in the Autonomous Province of Vojvodina, arsenic. In Central Serbia the main problem is bacteriological contamination, with more than 40% of samples not meeting required standards for unlimited use. Moreover, the reserves of underground water in the Autonomous Province of Vojvodina are polluted with heavy metal contamination, particularly arsenic.

According to the findings of the Republic Hydrometeorological Service of Serbia in 2005 and keeping in mind that the best quality is Class I and the most polluted is Class IV, the water parameters for 23% of 65 monitored river profiles fell into Class II, 70% into Class III and 6% into Class IV. During last decade the Danube and Tisa rivers fell from Class II/III to Class III/IV, along with the trans-boundary rivers that come from Romania.

### 3.1.3 Air Quality

The poor quality of ambient air in a number of areas and towns in Serbia results from emissions of sulfur dioxide, nitrous oxides, carbon monoxide, soot and particulate. In particular, the air quality deteriorates during calm weather and during the heating season.

Among other sources, the main sources of air pollution are: the energy sector (coal-fired thermal power plants); district heating plants; oil refineries; the chemical industry; fuel combustion in households, industry, individual heating boiler plants; traffic; the construction industry; inadequate storage of raw materials; and waste dump sites.

Thermo Power Plants and road vehicles are considered as one of the major contributors to air pollution in Serbia. Emissions from Thermo Power Plants and vehicle exhausts contribute sulfur dioxide, carbon monoxide, nitrogen oxides, ozone and particulate matter pollution to the air.

### 3.1.4 Noise

Serbia has problems that originate from: inadequate legislation and limit values for noise; inadequate monitoring of noise in urban areas; lack of enforcement of spatial planning, including noise zoning and improper location of industrial areas; insufficient control of noise emitted by MoEM or vehicles; and improper traffic management. Also, the noise that arises from various infrastructure development activities is not always considered during planning. Significant progress in this field was made by the adoption of the Law on Protection Against Environmental Noise in May 2009. Work on the related by-laws will is finished during 2010.

### 3.1.5 Waste

The general state of waste management in Serbia is still inadequate, posing public health and environmental hazards. The most acute problem is hazardous waste, which is not separately collected and disposed of - currently it is processed in regular waste disposal sites. In general, over 50% of disposal sites do not meet the technical requirements of sanitary landfills, and are actually just fenced and mapped dump areas. There are also hundreds of illegal dump sites of various sizes in rural areas. Moreover, leakage from these dump sites poses a threat to groundwater, surface water and soil, due to the high content of organic matter and heavy metals. It is, however, important to mention adoption of the new Law on Waste Management, which is fully harmonized with the EU acquis communautaire, and the numerous sub-laws that are currently being developed.

### 3.1.6 Occupational Health

On average, Serbia has 60 fatal cases of industrial accidents each year, mostly associated to lack of enforcement of relevant laws.

### 3.1.7 Climate Change

According to the World Meteorological Organization, the estimated effects of climate change on Serbia will be the medium range. Serbia, as well as south-east Europe, is likely to have hotter summers, decreased precipitation and, therefore, an increased risk of summer drought.

# 4. THE PROJECT OF PUMPING OUT WATER AND SEDIMENT AT THE OPEN PIT MINE TAMNAVA – WEST FIELD FEATURES

Due to the great floods that struck almost the entire Serbia, at 11 o'clock on 15th May 2014, the emergency session of the Republic Emergency Management Headquarter was held, on which the conclusion was adopted that the Government should be suggested to declare an emergency situation within the entire territory of the Republic of Serbia. At the Government session held at 13 o'clock on the same day, the Decision on Declaring Emergency Situation within the entire territory of the Republic of Serbia was made.

## 4.1 Natural causes of occurrences

**Meteorological Conditions in May 2014**

Due to the intrusion of the cold Atlantic air through the Alps into the Mediterranean area, a wide cyclone was formed, developed at all altitudes, which had a dominant impact on the weather above the majority of the Balkan Peninsula within the period from 14th to 18th of May 2014 and, on this occasion, within the area of the Western and Central Serbia, there was a record amount of rainfall, in most places over 200 l/m², and even over 300 l/m² locally. This event was preceded by an abundant rainfall within the period from 14th April to 5th May, during which there were between 120 and 170 l/m² of rain in the majority of the Republic of Serbia, and even over 250 l/m² in the south-western parts, due to which the soil had already been significantly saturated with water. All this caused catastrophic floods, the occurrence of torrents, erosion and the activation of a large number of landslides.

### 4.1.1 Analysis of the amount of Rainfall and its deviation with respect to the multi-year mean values, as well as the estimate of the normality of the amount of Rainfall, within the territory of Serbia in May 2014

In Serbia, within the period from 1st to 31st May 2014, the registered amount of rainfall was within the interval from 92.8 mm in Kuršumlija to 317.6 mm in Valjevo (Enclosure 1, Table 4.1). In Belgrade, 278.5 mm were recorded, which is almost four times more than the mean May amount of rainfall.

The majority of rainfall was registered within the period from 14th to 16th May 2014, when 213.2 mm were measured in Loznica. The highest three-day amount of rainfall was recorded in the western and a part of the central Serbia (over 100 mm) which is more than the mean values for the month of May (Enclosure 1, Table 4.2). The total amount of rainfall was from 134% in Kuršumlija to 394% in Belgrade with respect to the normal state within the reference period 1961-1990.

The highest daily amount of rainfall was recorded on 15th May 2014 when, at the three main weather stations, the maximum daily amounts of rainfall at these stations since the beginning of their operation (since 1888 for Belgrade, and since 1925 for other stations) were exceeded (Table 4.1)

The highest recorded total historical monthly amount of rainfall during May since the beginning of measuring at the main weather stations was exceeded already within the period from 1st to 31st May 2014 at nine stations (Enclosure 1,Table 4.3).

The May amounts of rainfall at three stations (Loznica, Valjevo and Belgrade) are from three to almost four times higher than the mean values for May. The snow cover was observed and measured on Kopaonik during the second decade on 16th May and it amounted to 61 cm.

**May 2014 is ranked first for the highest amount of rainfall for this month within the period from 1951 to 2014 in Serbia (Enclosure 1) and in Belgrade from 1888 to 2014 (Enclosure 1)**

The Enclosure 1 presents the daily and the cumulative amounts of rainfall for the month of May 2014 in Loznica, when both daily and monthly absolute maximum amounts of rainfall were measured.

*Table 4.1 Maximum daily amounts of rainfall. Source RHSS*

| Meteorological station | Daily max RR May 2014 | Date of daily max RR May 2014 | Annual daily abs. RR max | Date of annual daily abs. RR max |
|---|---|---|---|---|
| LOZNICA | 110.0 | 15. 05.2014 | 100.7 | 20.06.1956 |
| VALJEVO | 108.2 | 15. 05.2014 | 94.7 | 23.10.2003 |
| BELGRADE | 107.9 | 15. 05.2014 | 94.0 | 14.06.1994 |

*Table 4.2 Daily maximum rainfall during May and historical maximum daily rainfall. Source RHSS*

| Meteorological station | Daily max RR May 2014 | Date of daily max RR May 2014 | May daily RR max | Date of daily May RR max |
|---|---|---|---|---|
| LOZNICA | 110.0 | 15.05.2014 | 82.0 | 24.05.1937 |
| VALJEVO | 108.2 | 15. 05.2014 | 77.5 | 25.05.1926 |
| BELGRADE | 107.9 | 15. 05.2014 | 68.7 | 21.05.1927 |
| S.PALANKA | 95.3 | 15. 05.2014 | 59.1 | 22.05.1967 |
| S.MITROVICA | 69.1 | 15. 05.2014 | 53.5 | 26.05.1934 |

*Table 4.3 Highest total historical monthly amount of rainfall during May was exceeded at nine stations. Source RHSS*

| Meteorological station | Sum amount of rainfall from 1st to 31st May 2014 | May average | Highest May amount | Year of the highest May amount |
|---|---|---|---|---|
| NOVI SAD | 201.9 | 57.0 | 175.7 | 1987 |
| LOZNICA | 314.6 | 82.7 | 218.6 | 1938 |
| S.MITROVICA | 189.0 | 58.2 | 184.9 | 1939 |
| VALJEVO | 317.6 | 88.1 | 213.2 | 1957 |
| BEOGRAD | 278.5 | 70.7 | 191.7 | 1900 |
| KRAGUJEVAC | 227.0 | 73.8 | 169.7 | 1970 |
| S.PALANKA | 238.2 | 69.9 | 164.7 | 1929 |
| ZLATIBOR | 195.6 | 100.0 | 172.5 | 1956 |
| POŽEGA | 199.4 | 86.0 | 177.9 | 1980 |

So as to have an idea about the amount of water that fell in this weather situation, the rainfalls for 14th, 15th and 16th May 2014, the 3 days with the highest amount of rainfall, were added up and compared with the calculated 200-year, 500-year and 1000-year three-day rains. The calculation was made using the Gumbel Model of Extreme Value Theory on the basis of the measured amount of rainfall at 59 weather stations within the period 1961-2011. On the basis of these data, maps have been made for the entire territory of the Republic of Serbia. The Enclosure 1 shows the difference between the amount of rain for the 3-day period 14th-16th May and the **calculated 1000-year three-day rain**. It is visible from the figure that the rainfall within the area of the Drina catchment area and Kolubara Region, Mačva and Tamnava exceeded the 1000-year three-day rains.

### 4.1.2 Hydrological Conditions in May 2014

Due to the extreme rainfall from 13th to 16th May on the small and medium-sized watersheds in the western, south-western, central and eastern Serbia, there were sudden and severe water stage rises. The absolute maximum water stage were recorded on the **Sava, Kolubara, Tamnava** rivers**,** on the **Jadar** river and other tributaries of the Drina river, the upper course of the Western Morava river with tributaries, on the Great Morava river with tributaries, on the Mlava and the Pek river. On these rivers, the water stage exceeds the limits for emergency flood defense, new historic water stage maximums were recorded and there was an outflow and the

flooding of large areas. The overview of the maximum water stages during May 2014 and the so-far recorded historical maximums are shown in the Table 4.4.

The characteristic of the flood waves on minor and medium-sized watersheds is that intensive increases and rapid decreases were recorded, so that the waves were of torrential character. In addition, the cause of such sudden increase is the high previous soil saturation which is the consequence of the intensive rainfall during April 2014.

As the consequence of the intensive rainfall on the watershed of the Sava river, a was formed complex flood wave which within the territory of the western, central and eastern Bosnia and the Croatian part of Sava river catchment area, during April and May 2014, and which led to a sudden increase in the right tributaries of the Sava such us Una, Sana, Vrbas, Bosnia and Drina river.

The precipitation above Austria, Slovakia and Hungary caused a significant increase in the water stage on the Serbian part of the Danube river and on its tributaries.

***The timely and proper management of the Djerdap reservoir improved the flowing conditions and mitigated the combined flood wave from the Sava and the Danube.*** Consequently, downstream from the confluence of Sava and the Danube river, the water stage did not reach the emergency defense stage and, simultaneously, the "backwater" effect was significantly mitigated on the Sava and Kolubara rivers.

On the rivers in the western, south-western, central and eastern Serbia on which flood waves were recorded, after the 17th May, the water stages went into, at first minor and then major, decline except for the lower course of the Kolubara near Obrenovac, on the lower course of the Mlava river near Bratinac and in the vicinity of Kostolac, where the water stages had a tendency of a very slow decline.

## 4.2 HYDROLOGICAL CONDITIONS WITHIN THE WATERSHED OF THE RIVER KOLUBARA

At the end of the second and in the middle of the third decade of April 2014, due to two episodes of rain, two flood waves with moderate and major water stage increases were recorded. The first flood wave lasted from 17th to 20th April, the increase amplitudes ranged from ΔH= 105 cm at the gauging station Valjevo on the Kolubara river to ΔH= 378 cm at the gauging station Bogovađa on the Ljig, the wave peaks were recorded on 19th/20th April and, at all gauging stations, the water stages were above the reporting limits (nominal water stage).

The second flood wave lasted from 23th to 26th April, the increase amplitudes ranged from ΔH= 72 cm at the gauging station Draževac to ΔH= 393 cm at the gauging station Beli Brod on the Kolubara river, the flood wave peaks were recorded on 25th/26th April and at the gauging station Valjevo and at the gauging station Slovac on the Kolubara river, the water stage were above the flood defense limits and at other stations, above the reporting limits (nominal water stage).

Within the period from 27th April to 2nd May, the water stages were in the decline, and then, the third flood wave was registered from 3rd to 7th May. The increase amplitudes ranged from ΔH= 55 cm at the gauging station Draževac on the Kolubara river to, the wave peaks were recorded on 05th/06th May and, at the gauging station Valjevo on the Kolubara river and the gauging station Ćemanov Most on the Tamnava river, the water stages were above the flood defense limits, and at other stations, above the reporting limits (nominal water stages).

After the passage of the previous wave in the middle of the first decade of May, within the period from 10$^{th}$ to 13$^{th}$ May, the water stages stagnated within the entire watershed of the Kolubara river. As from the evening hours on 13th May, at first moderate and then also major, water stage increases were recorded on the upper course of the Kolubara river. At the gauging station Valjevo, the maximum water stage was recorded on 15th May at the value of H= 340 cm (the new historical maximum), and the increase amplitude was ΔH= 248 cm.

*Table 4.4. Historical maximum stages on the Serbian rivers*

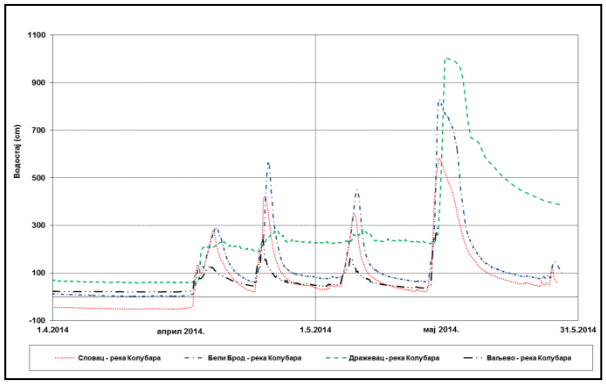
| N⁰ | Gauging station code | Gauging station | River | May 2014 | | Existing maximum Water stage | |
|---|---|---|---|---|---|---|---|
| | | | | $H_{max}$ (cm) | Date | $H_{max}$ (cm) | Date |
| 1 | 45084 | Jamena | Sava | 1268 | 17.05.2014 | 1104 | 12.01.2010 |
| 2 | 45090 | Sremska Mitrovica | Sava | 866 | 17.05.2014 | 800 | 26.10.1974 |
| 3 | 45094 | Šabac | Sava | 664 | 17.05.2014 | 590 | 25.03.1981 |
| 4 | 45096 | Beljin | Sava | 755 | 18.05.2014 | 764 | 25.03.1981 |
| 5 | 45099 | Belgrade | Sava | 586 | 23.05.2014 | 738 | 16.04.2006 |
| 6 | 45098 | Rakovica | Topčiderska reka | 355 | 15.05.2014 | 294 | 10.07.1999 |
| 7 | 45905 | Valjevo | Kolubara | 340 | 15.05.2014 | 230 | 21.06.2001 |
| 8 | 45908 | Slovac | Kolubara | 583 | 15.05.2014 | 500 | 13.05.1965 |
| 9 | 45910 | Beli Brod | Kolubara | 827 | 15.05.2014 | 718 | 23.06.2010 |
| 10 | 45920 | Draževac | Kolubara | 1005 | 15.05.2014 | 917 | 24.06.2010 |
| 11 | 45922 | Obrenovac | Kolubara | 694 | 16.05.2014 | 652 | 26.03.1981 |
| 12 | 45902 | Degurić | Gradac | 348 | 15.05.2014 | 223 | 21.06.2001 |
| 13 | 45903 | Sedlari | Jablanica | 385 | 15.05.2014 | 384 | 05.07.1987 |
| 14 | 45904 | Bjelo Polje | Obnica | 450 | 15.05.2014 | 380 | 21.06.2001 |
| 15 | 45906 | Mionica | Ribnica | 360 | 14.05.2014 | 110 | 17.05.2012 |
| 16 | 45909 | Bogovadja | Ljig | 637 | 15.05.2014 | 586 | 27.09.2001 |
| 17 | 45912 | Zeoke | Peštan | 480 | 15.05.2014 | - | - |
| 18 | 45914 | Koceljeva | Tamnava | 560 | 14.05.2014 | 464 | 21.06.2001 |
| 19 | 45916 | Ub | Ub | 540 | 15.05.2014 | 456 | 23.06.2010 |
| 20 | 45917 | Ćemanov Most | Tamnava | 507 | 15.05.2014 | 444 | 20.03.1981 |
| 21 | 47010 | Varvarin | Velika Morava | 507 | 17.05.2014 | 560 | 14.05.1965 |
| 22 | 47030 | Ćuprija | Velika Morava | 619 | 18.05.2014 | 700 | 21.02.1963 |
| 23 | 47040 | Bagrdan | Velika Morava | 692 | 18.05.2014 | 607 | 26.03.2006 |
| 24 | 47090 | Ljubičevski Most | Velika Morava | 448 | 20.05.2014 | 706 | 04.05.1958 |
| 25 | 47015 | Ćićevac | Jovanovačka reka | 305 | 16.05.2014 | 260 | 18.02.2002 |
| 26 | 47025 | Paraćin | Crnica | 408 | 16.05.2014 | 313 | 16.05.1996 |
| 27 | 47029 | Ćuprija | Ravanica | 498 | 15.05.2014 | 468 | 12.06.2002 |
| 28 | 47038 | Jagodina | Belica | 330 | 15.05.2014 | 260 | 11.06.2002 |
| 29 | 47057 | Batočina | Lepenica | 552 | 16.05.2014 | 545 | 10.07.1999 |
| 30 | 47063 | Manastir Manasija | Resava | 424 | 16.05.2014 | 420 | 11.06.2002 |
| 31 | 47067 | Svilajnac | Resava | 439 | 16.05.2014 | 480 | 09.06.1969 |
| 32 | 47072 | Donja Šatornja | Jasenica | 250 | 15.05.2014 | 409 | 09.07.1999 |
| 33 | 47075 | Smederevska Palanka | Jasenica | 450 | 15.05.2014 | 385 | 10.07.1999 |
| 34 | 47076 | Smederevska Palanka | Kubršnica | 518 | 16.05.2014 | 361 | 20.02.2010 |
| 35 | 47101 | Kratovska Stena | Zapadna Morava | 880 | 15.05.2014 | 773 | 19.02.1986 |
| 36 | 47115 | Čačak | Zapadna Morava | 460 | 15.05.2014 | 460 | 13.05.1965 |
| 37 | 47120 | Miločaj | Zapadna Morava | 716 | 15.05.2014 | 496 | 19.06.1989 |
| 38 | 47150 | Trstenik | Zapadna Morava | 520 | 16.05.2014 | 490 | 14.05.1965 |
| 39 | 47195 | Jasika | Zapadna Morava | 498 | 17.05.2014 | 339 | 21.11.1979 |
| 40 | 47140 | Guberevac | Gruža | 325 | 17.05.2014 | 312 | 22.02.1969 |
| 41 | 47460 | Kosjerić | Skrapež | 346 | 15.05.2014 | 250 | 13.06.1986 |
| 42 | 47495 | Požega | Skrapež | 510 | 15.05.2014 | 377 | 07.07.1991 |
| 43 | 99007 | Bedina Varoš | Lučka | 180 | 15.05.2014 | 180 | 07.05.2005 |
| 44 | 47112 | Prijevor | Kamenica | 349 | 15.05.2014 | 345 | 13.05.1965 |
| 45 | 99073 | Gornja Gorevnica | Čemernica | 360 | 15.05.2014 | 303 | 28.05.2011 |
| 46 | 47123 | Preljina | Čemernica | 606 | 15.05.2014 | 650 | 10.07.1999 |
| 47 | 47121 | Brdjani | Dičina | 417 | 15.05.2014 | 399 | 13.08.1991 |
| 48 | 42520 | Gornjak | Mlava | 536 | 15.05.2014 | 494 | 12.06.2002 |
| 49 | 42527 | Veliko Selo | Mlava | 630 | 16.05.2014 | 628 | 12.06.2002 |
| 50 | 42535 | Bratinački Most | Mlava | 567 | 17.05.2014 | 564 | 09.03.2009 |
| 51 | 42540 | Kula | Vitovnica | 500’ | 15.05.2014 | 473 | 12.06.2002 |
| 52 | 42730 | Kusiće | Pek | 373 | 17.05.2014 | 350 | 08.03.2009 |
| 53 | 42720 | Kučevo | Pek | 425 | 16.05.2014 | 391 | 06.03.2009 |
| 54 | 45890 | Zavlaka | Jadar | 467 | 14.05.2014 | 406 | 05.07.1987 |
| 55 | 45892 | Lešnica | Jadar | 447 | 16.05.2014 | 436 | 23.06.2010 |

At the gauging station Slovac, the maximum water stage was recorded on 15th May at the value of H= 583 cm (the new historical maximum), and the increase amplitude was ΔH= 583 cm. At the gauging station Beli Brod, the maximum water stage was recorded on 15th May at the value of H= 827 cm (the new historical maximum), and the increase amplitude was ΔH= 763 cm. At the gauging station Draževac, which is in the lowest part of the river

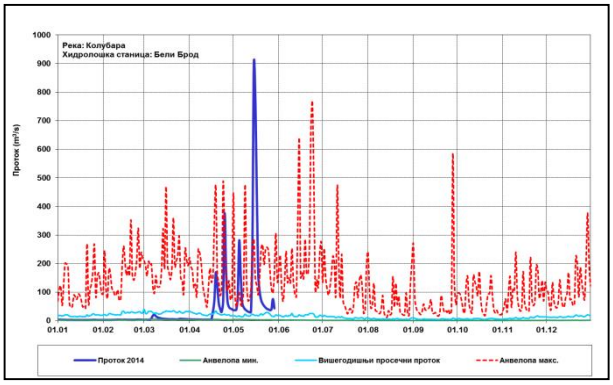
course, a sudden increase was registered on 14th/15th May, when the water stage increased from H= 219 cm to H= 1005 cm in 24 hours, which is the last registered value, because after this, the device stopped working due to submersion, and after this moment, we dispose only of the water stages observed on the water stage measuring stick.

On the river Tamnava at the gauging station Ćemanov Most, a major water stage increase was registered on 14th/15th May, and the maximum value was reached on 15th May at the value of H= 507 cm (the new historical maximum), and the increase amplitude was ΔH= 439 cm.

The Picture **Error! Reference source not found.** give a graphic presentation of the recorded stage graphs for the period April – May 2014 for the gauging stations on the watershed of the Kolubara for the gauging station Beli Brod for the year 2014 parallel with the corresponding minimum and maximum envelopes and the multi-year mean flow.




Picture 4.1 Comparative stage graph – the river Kolubara




Picture 4.2 Hydrograph with minimum, maximum envelopes and multi-year mean flow for the gauging station Beli Brod on the river Kolubara

## 4.3 ANALYSIS OF MAXIMUM FLOWS REGISTERED DURING MAY 2014

The enclosure shows a table overview of the maximum flows registered in May 2014, the maximum historical flows, the calculated values of characteristic flows for the corresponding occurrence probabilities, the return period to which the flows from May 2014 correspond for the selected gauging stations.

On the basis of the carried out statistical analyses, it can be determined that, on the Kolubara river, at the **gauging stations Slovac** and **Beli Brod,** the flows were of the **return period with the order of magnitude higher than 1000 years**, on the Sava river, at the **gauging station Sremska Mitrovica,** and on the Western Morava river, at the **gauging station Jasika,** the flows were of the **100-year return period**, on the Drina river, at the **gauging station Radalj, between 10 and 20 years**, and on the Great Morava river, at the **gauging stations Bagrdan and Ljubičevski Most between 10 and 20 years**. (Table 4.5).

*Table 4.5 Maximum flows during May 2014, historical maximums, characteristic values ($m^3/s$) with exceedance probability (%) and return periods (years)*

| Gauging Station | River | Discharge May 2014 | | Historical max. Discharge | | Calculated values of characteristic flows (m3/s) | | | | | Return period (for Qmax in May 2014) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Qmax | Date | Qmax | Date | 0.10% | 1% | 2% | 5% | 10% | (%) | (god) |
| **Beli Brod** | **Kolubara** | **954** | **15.05.2014** | 767 | 23.06.2010 | 768 | 621 | 568 | 490 | 424 | <0.1 | >1000 |
| Slovac | Kolubara | **721** | **15.05.2014** | 322 | 23.06.2010 | 481 | 399 | 369 | 325 | 286 | <0.1 | >1000 |
| Jamena | Sava | 4610 | 17.05.2014 | * | | | | | | | | |
| **Jasika** | **Western Morava** | **1960** | **17.05.2014** | 1870 | 14.05.1965 | 2940 | 1840 | 1580 | 1270 | 1060 | 1% | 100 |
| **Sremska Mitrovica** | **Sava** | **6600** | **17.05.2014** | 6280 | 26.10.1974 | 8460 | 6710 | 6270 | 5680 | 5220 | 1% | 100 |
| Radalj | Drina | 3940 | 15.05.2014 | 4450 | 02.12.2010 | | 5830 | 5040 | 3710 | 3130 | 5% | 20 |
| Lešnica | Jadar | **207** | **16.05.2014** | 195 | 23.06.2010 | | | | | | | |
| Bagrdan | Great Morava | 2110 | 18.05.2014 | 2930 | 16.05.1965 | 4100 | 3080 | 2770 | 2360 | 2040 | 10% | 10 |
| Ljubičevski Most | Great Morava | 2150 | 20.05.2014 | 2350 | 23.02.1963 | 3590 | 2740 | 2480 | 2130 | 1870 | 5% | 20 |
| **Veliko Selo** | **Mlava** | **158** | **16.05.2014** | **151** | **12.06.2002** | | | | | | | |

*Legend: (**Bold**) Qmax exceeded the historical maximum in May 2014*

*(*) Data on the flow available since 2006*

## 4.4 The Company MB Kolubara in flood period

The production of coal and overburden has not been working since 14.05.2014 as the consequence of the flood caused by excessive rainfall and the discharges of river watercourses.

At the Open Pit Mine Field ”B“, the interburden spreader O3 and a part of the conveyors have been flooded, and the remaining excavators and spreaders have been stopped for the safety of people and equipment. The operation of the First, the Second and the Fourth Excavator-Conveyor-Spreader overburden producing systems has been started. The water which has penetrated into the mine is being pumped out intensively.

At the Open Pit Mine Field ”D“, the coal production is not working because a part of connecting conveyors at the Excavator-Conveyor-Loading and the Excavator-Conveyor-Separation system has been flooded. Overburden systems have been stopped for the safety of people and equipment. The operation of the Second and the Fifth Excavator-Conveyor-Spreader overburden excavating systems has been started. Water is being pumped out from the flooded zones at the Excavator-Conveyor-Loading and the Excavator-Conveyor-Separation system.

At the Open Pit Mine”Tamnava West Field“, the coal production is not working and the majority of the equipment for producing coal and overburden has been flooded except for the First Excavator-Conveyor-Spreader system.

On 18.05.2014, the dikes of the course of the Kolubara river which had been flowing into the Open Pit Mine”Tamnava West Field” were destroyed.

At the Open Pit Mine”Veliki Crljeni“, the pumping out of water has been finished and a complete rehabilitation of the mine is being worked upon in the sense of coal production and the rehabilitation of excavators and the transfer conveyor.

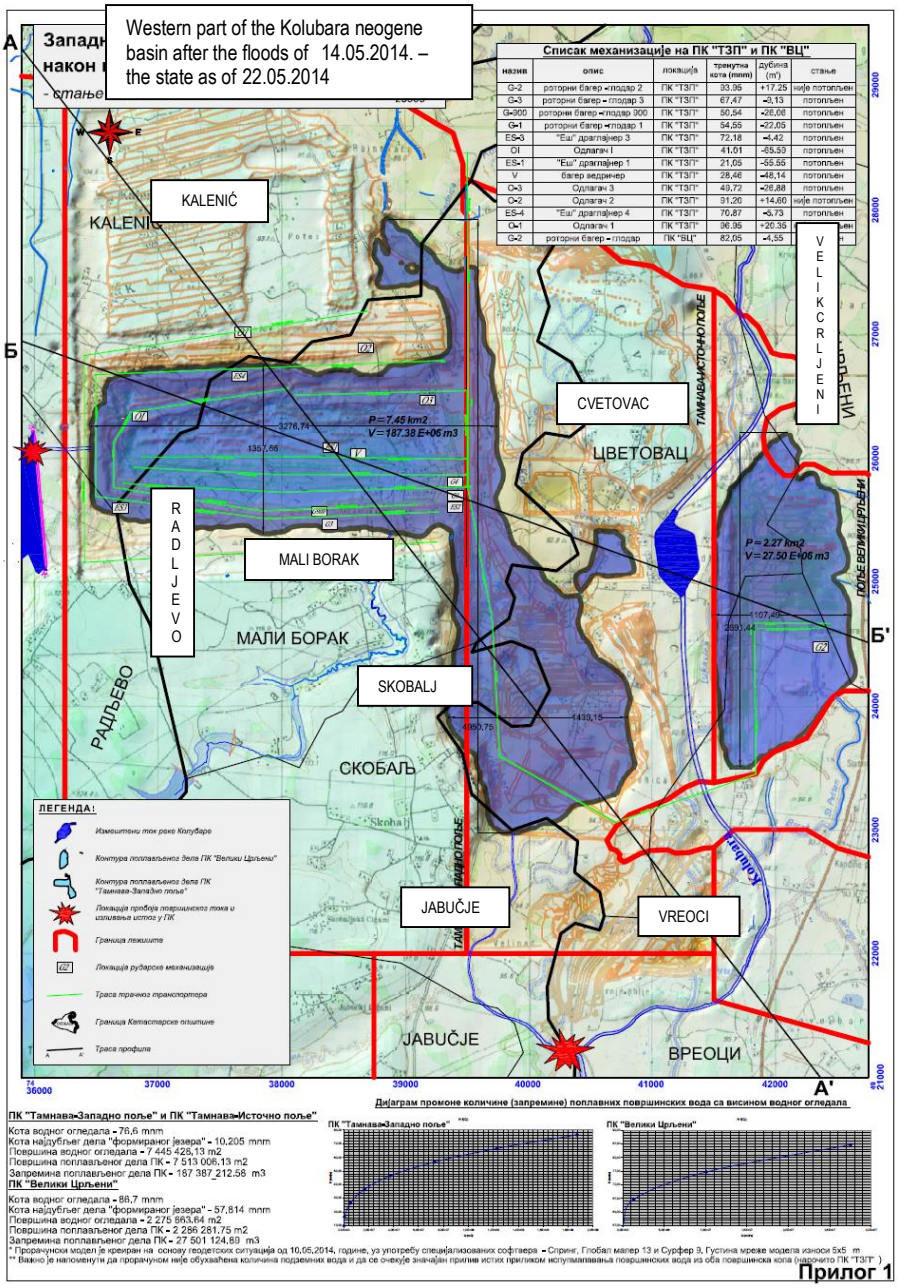
## 4.5 Description of Occurrences and Activities during the Flood Period

***In the night between 14.05.2014, there was a large inflow of water from the rivers Kolubara, Peštan and Kladnica within the zone of the western part of the Kolubara basin in the early morning hours on 15.05.2014, there was an overflow of the embankments on the river Kolubara in the part where the river Vranišina flows into the river Kolubara and water penetrated into the Mine Tamnava East Field, and then into the Mine Tamnava West Field. All this time, efforts were made to save – pull out the movable property: bulldozers, pipe-lying machines, trenchers etc. to higher finished grades. By overflowing the embankments, the Kolubara eroded the material and practically formed a new bed towards the Open Pit Mine Tamnava West Field.***

***At the confluence of the Peštan River into the Kolubara River, there has been water overflowing the defense embankment that is again eroded, and water rushed from the Kolubara and Peštan River into the Open Pit Mine Veliki Crljeni. The Paljuvi Viš dam and the Kladnica river retention is situated at the defence system downstream the Kladnica River.***

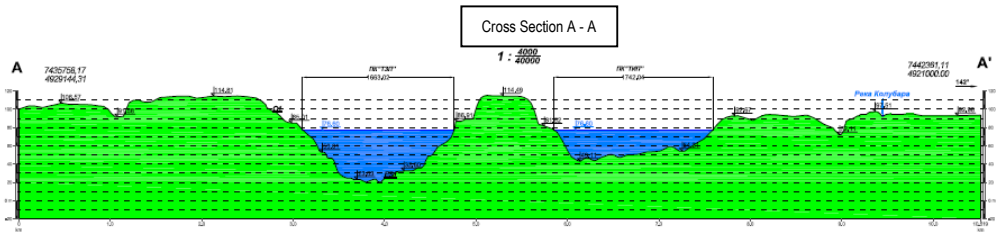
The retention of the Kladnica River was operational until May 15$^{th}$ 2014, in the morning hours, when the water gushed into the facility from which the water is being pumped out the retention system. The water stage was 2m below the dam top on the 15th. The whole time, the works were performed in order to put the pumping station back to operation, but everything was already wet and there was no possibility to start the facility. In the afternoon, on May 15ht, 2014, at 18h the accumulation water started to overflow.

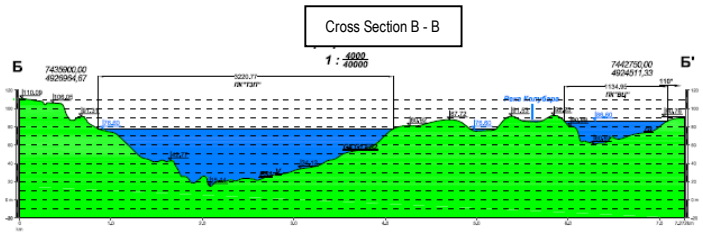
In the Open Pit Mine Tamnava West field, around 210.000 000 m$^3$ of water was accumulated (estimated value of the water volume), and in Veliki Crljeni 26.000.000 m$^3$. In the Mines Field D and C, a high quantity of water started to build up in the depression through the route of the coal bearing conveyors. At the ECS system of the Field D it is necessary to pump out around 400.000 m$^3$ of water in order to get the system working, excavating and conveying coal to the operational unit in the processing plant.




Picture 4.3 Open Pit Mine Tamnava West field

At the ECL system, around 800.000 m$^3$ of water was accumulated. Six pumps work on pumping the water out. There are no big excavators in these two mines. All employees, not affected by the floods personally, were engaged to fight the floods consequences. Those who were working at the time when the facilities of the Catering service were not working, foods and drinking water were provided and they also had personal protective equipment at their disposal.




**Прилог 2**

Enclosure

***Tamnava West Field then and now***

*Water intrusion into the facility from which water is pumped out from the retention Kladnica*

*Cutting through the dam Paljuvi Viš 1*


*Cutting through the Paljuvi Viš 2 dam*

## 4.6 DESCRIPTION OF THE PROJECT OF PUMPING OUT THE WATER AND SEDOMENT OUT OF THE OPEN PIT MINE TAMNAVA WEST FIELD

The project includes pumping out the water that rushed into and flooded the Open Pit Mine Tamnava West Field, its complete recovery and rehabilitation and bringing to original purpose.

Four main activities can be identified:

1. Pumping out the water out of the Open Pit Mine Tamnava West field and bringing the water back to the riverbed of the Kolubara river (estimated at 230 * $10^6$ $m^3$ of water)
2. Storing the settled silt (estimated at 3 - $610^6$ $m^3$ of sediment – characterization and classification will be made subsequently, as well as the treatment plan)
3. Rehabilitation of the existing equipment flooded by Kolubara river
4. Re-establishment of the complete coal production

Within the Project of pumping the water out the Open Pit Mine Tamnava West field, 24 pumps will be engaged of the capacity Q ≈ 8 $m^3$/s by MB Kolubara (local source), and 20 pumps from the company Južna Bačka of the capacity, Q ≈ 20 $m^3$/s. Maximum allowed quantity of water to be pumped out prescribed by the competent authority is 50 $m^3$/s.

### 4.6.1 Possible cumulating with the effects of other impacts

The project of dewatering the Open Pit Mine Tamnava West Field does not have any cumulative negative effects or other negative impacts on the environment in open pit mine Tamnava West field and river Kolubara. The anticipation of any possible negative events has been secured by the Monitoring Program.

Continuous monitoring has been envisaged during the entire process of pumping out, in terms of both quality and quantity of the water pumped out. As far as the water quality is concerned, the Monitoring Program is made by Serbian Environmental Protection Agency (SEPA) and approved by the Ministry of Agriculture and environmental protection of the Republic of Serbia, sampling and laboratory tests in the National water quality laboratory will be conducted by SEPA, while the hydrological elements, such as water stages, flows, ice occurrences and water temperatures will be taken care by Republic Hydrometeorological Institute (RHMI). As for the continuous measuring, sampling and observation (elements that could be monitored this by, such as water temperature,

electrical conductivity etc.) will be performed by use of multiparameter probes to be installed at the hydrological profile downstream and upstream of the water inflow point.

No short-term, nor long-term impact is expected on the eco systems in the Kolubara river, its tributaries nor downstream on the Sava river if EMP measures are fully implemented.

No thermal pollution is expected in the Kolubara River, its tributaries nor downstream on the Sava River, nor is the water pumping out of such a type to be able to anticipate such occurrence. Yet if there appears such pollution, the difference between the temperature of water that is being pumped out and the temperature in the recipient is higher or lower than $3^0$C, the pumping out should be stopped while the temperature differences is again lower than $3^0$C.

Expected changes in water chemistry of the Kolubara River during the performance of this project are negligible.

Morphological surveying of the riverbed of the Kolubara River has already been made by the Institute Jaroslav Černi, and the monitoring of possible morphological changes in the riverbed will be in the competency of the Institute Jaroslav Černi during the implementation of the Project of pumping the water out the Tamnava West Field.

We would like to point out that the complete Project of pumping the water out the Tamnava West Field will be implemented in accordance with the Water Quality Monitoring Program prepared in accordance with the valid legal regulation of the Republic of Serbia as well as the EU General Directive on Waters (**Directive 2000/60/EC**).

Also, the continuous monitoring of the slopes stability has been established aiming at monitoring the possibility of land-sliding during the pumping out of the newly formed lake and possible catastrophic consequences that such event would possibly produce.

#### 4.6.1.1 Waste

The sampling of the quality analysis of the sediments-zero state were done on 24-25$^{th}$ of August, 2014 by the Serbian Environmental Protection Agency (SEPA). Sampling program and sediments analysis will proceed in accordance at the prescribed rate and in compliance with the law. The characterization of sediments will be done and in accordance with the law on waste management of the Republic of Serbia and Plan of Open Pit Mine Tamnava West field recovery.

**Other types of waste** - In the pumps operation process for pumping out the water from the Tamnava West Field, there will emerge some other additional quantities of other types of waste materials (package waste, oiled cloth and other oiled fine waste, waste oil, municipal waste and etc.). This type of waste will occur in usual smaller quantities and the procedure of its collection and disposal should be included in the existing practice of waste management in the MB Kolubara.

#### 4.6.1.2 Risk of accident, especially in terms of substances used or the technology used, in accordance with the regulations:

During the implementation of the Project of pumping the water and sediments out the Open Pit Mine Tamnava West, the environmental risk may appear in case of fuel spilling or in the event of fire.

Quantities of hazardous matters to be used in the facility for pumping out will be significantly lower than the quantities of hazardous matters already used in MB Kolubara.

Having all this in mind, the reaction procedures in case of accident at the facility for pumping or supply of fuel should be integrated into the existing reaction procedures for earlier identified accident situations.

The very technology process of pumping out does not hold a high stage of fire risk or explosion risk. Regular

risks of fire occurrence are a subject of a special plan documentation of fire protection.

### 4.6.2 LOCATION

The vulnerability of the environment in the given geographical areas that are possibly exposed to harmful influence of the project, specifically with regards to:

a. existing land utilization: the area where the pumping the water out the Open Pit Mine Tamnava West Field is within the compound of MB Kolubara, operating for more than 50 years, so it is completely anthropogenically changed and degraded, as the immediate surrounding within the compound.

b. Relative scope, quality and regeneration capacity of natural resources in the given area: No impact.

c. absorption capacity of the natural environment, with taking special care to swamps, coastal area, mountain and forest areas, specially protected areas (natural and cultural resources) and densely populated areas: Pumping the water out the Open Pit Mine Tamnava West Field will with no doubt have a positive influence on the ecosystem of the Kolubara river in terms of recovery of the state in the Kolubara river and the Open Pit Mine Tamnava West field after the May floods in 2014.

## 4.7 Characteristics of the possible impact

Possible significant projects impacts, specifically:

a. Impact scope (geographical area and population exposed to the risk):

The implementation of the Project of pumping the water and sediments out the Open Pit Mine Tamnava West field does not have some significant adverse impact to the area and the population. The entire project is being implemented within the zone of MB Kolubara, including 400-500m protective zone away from the residential area. The measuring of noise is envisaged in accordance with the valid legal regulation in the Republic of Serbia. It should be noted that the works (water pumping out) are not being performed in the populated area (there is a protective zone 400-500m wide).

The area, where the Project of pumping the water and sediments out the Open Pit Mine Tamnava West field will be carried out, is situated within the compound of MB Kolubara, operating for more than 50 years, so it is completely anthropogenically changed and degraded, as the immediate surrounding area within the compound. It is clear that in this area, the vegetation consists of only the most resisting ruderal species, and fauna of only synanthropic species. In the mines area, there are no protected flora and fauna species nor especially valuable dendro flora and herbaceous communities.

The present vegetation is a result of the action of geological, orographical, climate, hydrological, edaphic and extremely dominant anthropogenic impacts. The observed wider area is filled with the most diverse flora and fauna.

b. Nature of trans-boundary impact: - There is no trans-boundary impact
c. The size and complexity of the impact: - No impact on air, water or soil.

### 4.7.1 IMPACT ON WATER QUALITY

The impacts on the surface water quality of the Kolubara River, during implementation of Project of pumping out the water and sediments from the Open Pit Mine Tamnava West field into the recipient the Kolubara River will be negligible. Given the envisaged monitoring measures during pumping out and a relatively low sensitivity of the recipient, as well as envisaged protective measures and effluent characteristics – the impact on the surface water can be assessed as a minor impact.

### 4.7.2 IMPACT ON THE QUALITY OF SOIL AND GROUND WATER

The implementation of the Project of pumping the water and sediments out the Open Pit Mine Tamnava West field will not represent a significant risk of soil contamination nor ground water pollution.

A part of the technology procedure that could, to a great extent, impact the change in the soil and ground water quality is **the procedure of disposal of sediments to the area envisaged therefor**, **only in the case if the content of sediments are characterized as a hazardous waste.**

The regime of ground water in the zone of the mine Tamnava West field is strictly controlled and directly conditioned by the work at numerous wells aiming at regional lowering the stage of ground water. The protection of the Open Pit Mine Tamnava West field against water is being implemented through two independent drainage systems: surface water drainage and ground water drainage.

Surface water represents precipitation water not infiltrated in the ground but coming to the mine zone by surface, or the water appearing in the bench slopes as a result of ground water pouring out. This water is collected in the channels and water collectors, from where it is taken by means of pump stations and discharge pipelines outside the area of the Open Pit Mine to the Kolubara River.

Having in mind the Project envisaged measures of protection of ground water in the gypsum storage, and also the fact that the potential receptor (ground environment in the zone of Tamnava West field in the regime of strict drainage (pumping), with the mixing of a large quantities of ground waters and their transport to the Kolubara river, it can be concluded that the potential impact on the quality and regime of ground water can be classified as an impact of a minor importance upon completing the implementation of the Project of pumping the water and sediments out the Open Pit Mine Tamnava West field.

### 4.7.3 IMPACT ON THE ECOSYSTEM

There is no adverse impact on the existing ecosystems.

### 4.7.4 IMPACT ON IMMOVEABLE CULTURAL RESOURCES

There is no impact of the immoveable cultural resources on the implementation of the Project of pumping the water and sediments out the Open Pit Mine Tamnava West field.

### 4.7.5 IMPACT ON THE NOISE STAGE, VIBRATION, HEAT AND RADIATION

Noise measuring has been planned in accordance with the valid legal regulation of the Republic of Serbia. It should be noted that the works (water pumping out) are not being performed in the populated area (there is a protective zone 400-500m wide).

The receptor nearest to the location of the future project represents a twenty some structures (huts) at the distance of about 500m.

Taking into account that the intensity of the sound gets lower with the expansion of the wave front (increasing the distance between the source and the receptor) and the passage of the sound wave through the medium (air), the sound stage can be estimated that will appear at the receptors nearest to the water pumping facilities. The calculated values of the sound stages imply that the work of the new facility will not have any impact on the changes of the noise stage.

Additional source of noise will be the fuel supply vehicles (trucks) traveling down the access roads.

The noise emitted by one freight vehicle is 88 dB(A) driving at the speed lower than 56 km/h i.e. up to 96 dB(A)

at higher speed. It is estimated that at the distance of 25 m away from the road, the total stage of noise will not exceed the legal maximum values (65 dB (A) daytime and 55 dB(A) at night).

### 4.7.6 IMPACT ON THE LANDSCAPE APPEARANCE

The impact of the Project of pumping the water and sediments out the Open Pit Mine Tamnava West field. On the existing quality of the landscape will be of little or negligible importance.

### 4.7.7 IMPACT ON CLIMATE

The impact of the Project of pumping the water and sediments out the Open Pit Mine Tamnava West field on the climate is not assessed as relevant.

### 4.7.8 IMPACT ON SOCIAL AND ECONOMIC FACTORS

The implementation of the Project of pumping the water and sediments out the Open Pit Mine Tamnava West field will have a positive impact on the social and economic factors, primarily on the increase of employment and local community income. Namely, the comeback of 2000 workers will be realized directly, while reopening the mine will facilitate complete supply of TPP Nikola Tesla A and B, and therefore the 1500 MW contribution to the power system of the Republic of Serbia.

### 4.7.9 IMPACT ON THE POPULATION HEALTH

The adverse impact of the Project of pumping the water and sediments out the Open Pit Mine Tamnava West field on the population health is negligible. In general measures taken in to the water quality monitoring during the performance the Project have positively effects to the quality of drinking water, the possible emergence of infectious diseases transmitted by water for all the inhabitants in to the settlements downstream of water pumped outlet flows of from the Open Pit Mine Tamnave West field in the Kolubara river.

### 4.7.10 DURATION, FREQUENCY AND PROBABILITY OF IMPACT REPEATING

The duration of the Project of pumping the water and sediments out the Open Pit Mine Tamnava West field is estimated at 6-9 months, excluding the possibility of recurrence of the impact.

# 5 ENVIRONMENTAL MANAGEMENT FRAMEWORK DOCUMENT (EMFD) - SCREENING PROCEDURES

**Introduction**

This Annex 4 is amendment to Environmental Management Emergency Plan entitled "Emergency Plan for Environmental Monitoring during Pumping out of Waters at Open Pit Mine Tamnava West, MB Kolubara D.O.O." during implementation of the project of pumping out water and sedimented overburden at mine Tamnava west field, MB Kolubara, Lazarevac, which was hit by the large flood wave in May 2014 whereby the mine was filled with water and technical systems which were located and operating at surface exploitation of overburden and coal was flooded with all their accompanying infrastructure logistics. The attachment describes the conditions for implementation of subject project according to the contractual obligations in connection with and in the context of mitigating negative impact to the environment. This attachment binds the Responsible Party to fully apply and implement it during the execution of the activities for pumping out of water and sediment at open pit mine. MB Kolubara is responsible for its own pumping operations and the Contractor will be responsible for its activities, which will be performed under the oversight of MB Kolubara. Costs of implementation of the stated environmental mitigation measures the contractor is obliged to fully implement are included in the estimation of total costs for the implementation of the subject contract.

## 5.1. Monitoring

The MB Kolubara will be responsible for collecting the data required for monitoring and evaluation which will in turn be reviewed by PE EPS. Indicators will be measured against the agreed targets and compared to the defined baselines. Project progress reports, including monitoring indicators and reporting on the implementation of the requirements set in the EMPs will be prepared on a quarterly basis and submitted for WB review. Monthly progress reports prepared by the supervision consultants will be submitted by PIT to WB for review upon a request.

The Construction contractor is obliged to perform all monitoring activities (sampling, measurement, etc.) prescribed within the Monitoring Plan of EMP document produced for subproject on which the Contractor is engaged.

In the implementation of The Project of Pumping out Water and Sediment at the Open Pit Mine Tamnava – West Field, MB Kolubara main activities and responsibilities are (Table 5.1):

Table 5.1 The Project of Pumping out Water and Sediment at the Open Pit Mine Tamnava – West Field, MB Kolubara main activities

| Subject | Mitigation Action | Rensponsibility for Action Inplementation |
|---|---|---|
| **Hazardous materials and spills** | | |
| Soils and water contamination Protection | Storage of fuel and oil/lubricants will be at the maximum distance from water as is feasible, and there will be an embankment or other barrier between any tank or storage container and the water so that any leaks cannot reach water | Contractor |
| Cleanup of contaminated soil | In case of spills or other releases, all contaminated soil and other materials must be excavated as soon as possible. Contaminated material will be removed | MB Kolubara/Contractor |
| Spill prevention and reaction | Locations where fuel and oil products are stored or used will be equipped with absorbents and other materials and equipment suitable for absorption and cleanup of spilled materials | Contractor |

| Subject | Mitigation Action | Rensponsibility for Action Inplementation |
|---|---|---|
| **Water** | | |
| Water quality protection | Compare effluent standards under Serbian law, European Union Directives, and World Bank Group EHS Guidelines for Mining and use the most stringent concentration as the applicable discharge standard. The actions will be undertake as part of Emergency Monitoring of Water Quality from Tamnava pit, which is constituent part of this EMP. | MB Kolubara |
| | On daily basis, water quality will be analyzed on tree main elements: undissolved oxygen, total suspended solids, and water temperature<br><br>Based on the results, take action as follows:<br><br>› **total suspended solids**: If concentrations are higher then 50mg/l or above stop pumping until turbidity in pit lake decreases to a concentration below the level in the receiving water.<br>› **Water temperature:** stop pumping until temperature differential is less than 3$^{o}$C.<br>› **Dissolved oxygen**: If concentrations are less than the applicable standard, stop pumping until concentrations are equal or undertake measures (spraying or aeration) | MB Kolubara/Contractor |
| | During and after precipitation that increases turbidity in the pit, as determined by visual observation, measure **total suspended solids** in water in the pit and in receiving water. If **total suspended solids** is higher in pit water than in the receiving water, stop pumping until **total suspended solids** in the river is equal to or higher than TSS in the pit. Calibrate instrument according to manufacturer's instruction. | MB Kolubara/SEPA |
| | Sampling and analyzed water quality parameters according Emergency Monitoring Program on seven-day-level. In the event of exceeding MAQ, act in accordance with definitions from emergency Monitoring Plan. | MB Kolubara/SEPA |
| Prevent ion of river contamination | Maintain dispersants, booms, and other containment and cleanup materials designed for controlling spills in water. Train pump-station workers and equipment operators in their use.<br><br>If oil or fuel is spilled into water, stop all pumps that are taking water from within about 50 meters of the spill. Do not start pumping again until the oil has been removed.. | MB Kolubara/Contractor |
| River banks and river bed protection | Design the points where water pumped out to the river so the discharge will not erode or otherwise damage or erode the riverbanks or riverbeds. | MB Kolubara/Contractor (selection of pumping place, technical solution) |
| Protection of land and water quality | Use good international practices (straw bales, settling basins flow retarding devices, etc.) to reduce sediment load in run-off that flows from disturbed areas to undisturbed areas or to the river areas. | MB Kolubara |
| Protection of flora and fauna | Workers and equipment must stay within disturbed areas and not move into and disturb any areas with trees or other vegetation. | MB Kolubara/Contractor (control) |
| Topsoil and subsoil salvage and storage | If any new ground is to be disturbed, including the pipeline route from the second pumping station, topsoil (humus) and subsoil must be salvaged and stored separately. | Contractor |
| Restore land and protect water quality | During pumping operations, use good international practice to control run-off to the rivers. Upon completion of pumping, remove pipeline and other infrastructure and continue to control run-off to the rivers until self-sustaining vegetative cover of native grass and plant species is established and effectively prevents sediment-laden run-off from flowing into the river(s). | Contractor |
| | Upon completion of pumping, remove pipelines, transmission lines, pump stations, and other temporary infrastructure. For areas where vegetation is disturbed, establish self-sustaining vegetative cover of native grass and other plant species. | MB Kolubara/Contractor |

| Subject | Mitigation Action | Rensponsibility for Action Inplementation |
|---|---|---|
| **Noise and vibration** | | |
| **Noise and vibration** | Noise at work camp/accommodations must not exceed levels for residential areas under Serbian law, or 45dB during nighttime hours and 55dB during the day. | MB Kolubara/Contractor |
| **Air** | | |
| Equipment emissions | Maintain generators so there are no visible emissions at any time except during cold startup, and if such emissions are observed, shut down generators and adjust the engines until there are no visible emissions. | MB Kolubara/Contractor |
| Dust control | Minimize dust generation during dry periods when dust can be generated due to usage of roads. Undertake measures by limiting the speed of vehicles and equipment and by spraying the roads with water. | MB Kolubara/Contractor |
| **Riverbanks and riverbeds** | | |
| Dust control | Minimize dust generation during dry periods when dust can be generated due to usage of roads. Undertake measures by limiting the speed of vehicles and equipment and by spraying the roads with water. | MB Kolubara/Contractor |
| Protection of Kladnica River channel and embankments | Limit pumping to the Kladnica River so that total flow in the river, including both discharge ad natural river flow, does not exceed the maximum amount of $3m^3/s$, (Jaroslav Černi Institute, recommendation). MB Kolubara will monitor upstream flow in the Kladnica River on at least a daily basis and will take weather conditions (upstream and at the site) into account to ensure flow rates are maintained below the maximum rate at all times. | MB Kolubara |
| **Waste** | | |
| Waste management | All wastes will be collected, separated by type (sanitary, household and kitchen, hazardous, paper, scrap metal, reusable/recyclable, etc.) and removed from the site by licensed or authorized haulers. EPS/MB Kolubara will control implementation of these activities as well as providing documents for them. | MB Kolubara/Contractor |
| Sediment management | Sediment material pumped from the Tamnava West pit will be placed in a location of depleted mine Tamnava East and managed in accordance with Law on Waste Management. Detailed instructions shall be given by the MoAEP. Program of sampling and sediment analysis is continued in accordance with defined dynamics according the law | SEPA/MBKolubara (implementation) |

# 6 SOCIAL PLAN FOR PROJECT OF PUMPING OUT WATER AND SEDIMENT AT THE OPEN PIT MINE TAMNAVA – WEST FIELD, MB KOLUBARA- SCREENING PROCEDURES

## Introduction

The World Bank (WB) is considering financing an Environmental Improvement Project at Kolubara Mining Basin - Project of Pumping out Water and Sediment at the Open Pit Mine Tamnava – West Field .

This proposed investment of WB funds is for the improvement of Pumping out Water and Sediment at the Open Pit Mine Tamnava – West Field after Big flood in May 2014 and introduction of the coal management system providing an energy resource for power plant Nikola Tesla operation.

PE EPS has been appointed by WB to review the existing documentation and the existing project activities, to compare their scope and content with the environmental and social requirements of WB Environmental and Social Policy. As necessary, measures are to be identified for achieving compliance with the WB Environmental and Social Policy, through an Environment and Social Action Plan (ESAP) to be implemented as part of the loan agreement.

The following environmental and social actions are required to fulfil the requirements of the WB Environment and Social safeguards policies, within the timescale indicated. An estimate of the resources in terms of personnel time has been provided where relevant, and external costs have been estimated where possible; this is provided for information purposes only. Responsibility for discharging the actions will lie with PE EPS, although it is recognised that PE EPS' subsidiary companies, including MB Kolubara will be instrumental in delivering the actions. The project is categorised as a Category B project according to WB categorisation.

In the implementation of Social plan of The Project of Pumping out Water and Sediment at the Open Pit Mine Tamnava – West Field, MB Kolubara main activities and responsibilities are:

The Bank Operational Policy on Involuntary Resettlement (OP 4.12) has been triggered for this project in view of the fact that the infrastructure rehabilitation and reconstruction works under Component 3A (Investments in Flood Protection) in some cases may lead to temporary acquisition of private land for securing the right-of-way. Since the size, scale and location of activities could not be determined during project preparation, the Resettlement Policy Framework (RPF) and Environment and Social Management Framework (ESMF) have been prepared to mitigate potential environmental and resettlement impacts.

Mine dewatering activities financed under this project do not require land acquisition or involuntary resettlement. The ongoing resettlement activities related to the expansion of the Tamnava West Field mine are not considered to be an associated to the WB-financed project activity as defined in WB's OP 4.12.

**Resettlement Screening**

Resettlement screening refers to the process of identification whether or not the a project-financed activity (i.e. sub-project) involving land acquisition requires application of social safeguards measures in line with the requirements of the World Bank Operating Policy 4.12 on "Involuntary resettlement".

Screening seeks to provide answers to the following questions:

1) Does the project activity requires land acquisition?
2) Is this land owned and/or used by a third party?
3) Is there necessity for potential physical or economic displacement (e.g. taking agricultural lands) of people?
4) Does this impacts require the preparation of a Resettlement Action Plan and who will be responsible for its preparation and implementation?

If a sub-project is identified through the screening process above to require the preparation of a RAP or Abbreviated RAP, the process described in the project's Resettlement Policy Framework (RPF) for the preparation of such instruments should be followed and should comply with local regulations and the WB's OP

4.12.

Table 6.1 Implementation of Social plan of The Project of Pumping out Water and Sediment at the Open Pit Mine Tamnava – West Field

| Subject | Mitigation Action | Responsibility for Action Implementation |
|---|---|---|
| **Stakeholder engagement** | | |
| Open communications In downstream villages | A fact sheet will be prepared, advertised, and placed in the town halls of all villages along the Kladnica River between the discharge point and the Kolubara River, and along the Kolubara River between the mine and the Sava River. The fact sheet will describe the pumping program, including the length of time it will take, the impacts (if any) on the river(s), and risks (if any) to downstream villages and people. These are to be available from the time the Contractor first arrives on the site until all pumping is complete and all workers are gone from the site. | MB Kolubara |
| Grievance mechanism in downstream villages | A telephone line will be maintained to receive comments and complaints from stakeholders, including potentially affected people. All complaints will be registered and dealt with in accordance with a defined procedure that requires quick resolution and communication back to the person as to how the complaint has been resolved. The telephone number is to be placed on the fact sheet of local communities. | MB Kolubara |
| Drinking water quality in downstream villages and local residences | MB Kolubara will consult with the Ministry of Health to develop and implement a system to monitor water taken from the Kolubara River. The system must provide for sampling of water as soon as practicable (wherever possible within 24 hours, with laboratory analysis performed on an emergency basis if the problem cannot be resolved by sight, smell, or taste). If the monitoring identifies contamination due to water from the pit, pumping will be stopped until the problem can be overcome. | MB Kolubara |
| **Site workers** | | |
| Worker health and safety at all work locations | MB Kolubara must ensure that an occupational health and safety plan is in place from the time Contractor workers come on the site until the pumping project is complete and all workers are gone. The plan and operational practices must ensure:<br><br>A trained and qualified safety professional („responsible person“) is on site at all times, with authority to monitor and enforce safety rules.<br>A responsible person from MB Kolubara communicates with the Contractor's safety professional on a daily basis.<br>All workers are trained on the hazards of their jobs, including measures to avoid or reduce risks.<br>Personal protective equipment is provided by workers' employer or MB Kolubara, and use of PPE is monitored and enforced by the responsible person(s).<br>Flotation devices and lifesaving equipment is available and accessible at all work locations near the pit lake and the riverbanks.<br>Equipment operators working near the pit lake have special training to respond to emergencies.<br>Equipment operation near the pit lake is under constant observation by a trained responsible person<br><br>Responsible person visits every work location at least daily.<br>Proper records are kept (person-days, lost time incidents, lost time, serious injuries/fatalities, etc.).<br>Serious injuries or fatalities are reported to World Bank immediately.<br>Requirements of the Ministry of Health and Ministry of Labor are met (helicopter or other evacuation available, rescue /transport vehicle | MB Kolubara, Contractor, Ministry of Interior of the Republic of Serbia, Army of the Republic of Serbia, Mining Inspection |

| | |
|---|---|
| | available, etc.) |

| Subject | Mitigation Action | Rensponsibility for Action Inplementation |
|---|---|---|
| **Site Workers** | | |
| Worker health and safety at Site Workers' camp | Operate worker accommodations so they meet the requirements of Serbian law and international good practice. | Contractor<br>MB Kolubara for its workers |
| The Inception Report including Environmental Protection Plan, an Environmental Action Plan for the operational phases of Tamnava West Field | Prepare an Inception Report for Tamnava Wes Fieldt. The report should include the proposed mitigation measures, procedures for environmental monitoring, connected with RB Kolubara's Environmental Management System.<br><br>Risk: Organization Capacity and Commitment/Managing Contractors/Nonemployee workers. Risk of damage to environmental (including to habitat and unanticipated cultural heritage finds) features of non-implementation of appropriate measures at the correct time. The approach will be applied for Tamnava West Field, reducing the risk of confusion during implementation | MB Kolubara |
| In MB Kolubara the programme including the mitigation actions set out in the Inception Report and EIA and detailing when each action will commence and conclude. The monthly reports are to indicate that all planned actions have been started and completed. | Develop a programme for implementing the mitigation measures described in text and monitoring requirement described in Section 5 for Tamnava West, and the any other mitigation measures specified in the Inception Reports during the operational phases of Tamnava West Lignite Mine. In particular the programme should recognise the need for the collection of data in advance of works and for the restoration of the site upon phased completion of mining activities | MB Kolubara |
| In MB Kolubara the Monthly report the actions implemented in the last month and the actions to be implemented in the next month. The report are to indicate the mitigation | Implement the programmed mitigation measures (described in Section 8 and monitoring requirement described in Section 9 of the EIAs and in the Inception Report) at the appropriate times in the project lifecycle. This includes the advanced surveys required and the phased restoration of the mine upon completion of activities in a particular area. | MB Kolubara |
| The SEP will be implemented and evaluated by:<br><br>1. A completed Register of Stakeholders;<br>2. Records of stakeholder engagement activities, including minutes of meetings held being uploaded onto EPS and RB Kolubara websites;<br>3. Copy of SEP on the EPS and RB Kolubara websites;<br>4. New SEPs being prepared for other projects developed by EPS during the lifetime of the loan;<br>5. An established and readily accessible grievance management system;<br>6. Records of training provided to staff in managing grievances;<br>7. Record of all grievances and related follow-up (number of resolved grievances compared to number of unresolved grievances).<br>8. Register of compensation agreements; | Implement the Stakeholder Engagement Plan, to ensure all consultation / complaints are documented, monitored and dealt with promptly and transparently. The SEP will include an improved grievance procedure that is simple and easily available (including forms), and contain clauses on confidentiality, non-retribution, time-scale, right of appeal, right to be accompanied and record keeping and will be in accordance with the provisions of Serbian Law.<br><br>Provide training as necessary for staff involved in the management of the grievance mechanism Legal compliance.<br><br>Risk: Best Practice. Reduced risk of stakeholder grievances being overlooked and resulting in project delay or reputational protest. | MB Kolubara |

| Subject | Mitigation Action | Rensponsibility for Action Inplementation |
|---|---|---|
| **Site Workers** | | |
| Industrial Waste Management Plan for Tamnava West. The Contaminated Soil Action Plan will also be developed in the case of hazards. Records of compliant waste management should be maintained, with no non-compliances. | Prepare an Industrial Waste Management Plan (WMP) for Field C to satisfy the requirements of EU Waste Framework Directive and Serbian waste legislation. The plan should describe industrial waste management procedures with an action plan, as well as remediation activities for contaminated soil in the case of hazards. | MB Kolubara |
| Clear procedures within the EMS requiring risk assessments to be undertaken. Records of assessments and evidence of compliance to be maintained. | Risk assessments are to be prepared regarding the use and management of hazardous materials. | MB Kolubara |
| Documented emergency procedures that fully meet the requirements of the OHSAS clause 4.4.7. | Develop suitable emergency preparedness and response procedures in accordance with OHSAS 18001 clause 4.4.7. | MB Kolubara |
| Revised Risk Assessment which puts priority on the elimination of risks. Implementation to be monitored annually through management system audits. | dopt a hierarchy of controls (as per OHSAS 18001 clause 4.3.1) | MB Kolubara |
| A set of H&S objectives/goals with a clear management program for implementation, including timescales and resources to be formulated and recorded. | Bureau Veritas Certification Auditor's Report found no reference to H&S objecti-ves. A management program should be developed to include objectives, timescales for achieving them, allocate responsibilities and the necessary financial funds. | MB Kolubara |

## 7. PUBLIC CONSULTATION AND DISCLOSURE PROCESS/PROCEDURES

### Introduction

Participatory consultation is both an essential criteria and important strategy for an integrated environmental and social analysis process, the project design and its implementation. Views of the project affected persons and NGOs have been fully taken into account during the project preparation and continue to form a basis for further design and implementation of the subprojects throughout the FERP implementation period. The purpose of the stakeholder consultation is to identify the views of local communities, major institutional and other stakeholders, and to assess any mitigation measures which may be undertaken to minimize any adverse impacts of the proposals under consideration.

### Consultation and Information Disclosure

I Public Consultation

As required by the WB Safeguards Policies, public consultations were undertaken for draft version of EMP document. Public consultation and information disclosure will be obligatory for EMP document which will be prepared under FERP.

For EMP document, following procedure was take place:

1. PE EPS was announce invitation for public consultations for the public, institutions and organizations interested in EMP for rehabilitation works on particular FERP subprojects.
2. The in-country disclosure of EMP document was start when invitation to the interested parties were published in the daily newspaper "Danas", inviting the public, authorities and relevant institutions to have an insight into the proposed rehabilitation works and environmental impact of the project with mitigation and monitoring measures.
3. Public and other interested parties and organizations were invited to participate in process of public consultation on draft EMP document.
4. Prior to announcement in the newspapers, the EMP will be delivered to the local municipality.
5. Representatives of the local municipality were informing the public through their local media of the time and place of public consultations. Invitation will also be placed on PE EPS web site. Insight into the EMP document will be ensured on following addresses:

   - the premises of the MB Kolubara investment sector, Svetog Save St. 1, Lazarevac, on working days from 11:00 AM to 01:00 PM
   - the premises of the relevant local municipality, during normal working days.
   - on PE RB Kolubara web site: www.eps.rs and www.rbkolubara.rs

1. Public Consultation and presentation of EMP document was held in the premises of the local municipality.
2. Questions raised and clarification provided was presented within the EMP's Report on Public Consultations.
3. Detailed Report on Public Consultation process was presented within the final version of EMPs documents.

Beneficiary consultations was conducted during the rehabilitation phase, and records of environmental and social issues raised and complaints received during consultations, field visits, informal discussions, formal letters, etc., will be followed up. The records were kept in the project office in PE EPS/MB Kolubara.

In advance of the work commencing PE EPS was provide information in:

1. Newspaper articles in minimum one national and also in one local media.
2. Posters on main notice board at all community centers
3. Radio announcements of road diversions
4. PE EPS and relevant contractors will also provide contact details of community liaison officers who are appointed to work with local communities.

l Information Disclosure and Dissemination of EIA Studies

For all the sub-projects for which the EIA Study will be requested by MoEDEP, the documents including the mitigation measures and consultation process will be made available for public review in both English and Serbian. The summary EA will be published on PE EPS and WB websites.

Table 7.1: Information Disclosure Framework in case of EIA preparation

| Stage of Consultation | Information dissemination tools |
|---|---|
| Initial Consultation, Decision about scope and Content of EIA Study | Documentation of a summary of the project description and objectives, and potential adverse effects of the proposed project will be delivered to the MoAEP. Interested public will be invited to participate during process of decision making regarding Scope and Content of EIA Study<br><br>This round of consultation will be announced in daily newspaper and on the PE EPS web site |
| Draft EIA Study | PE EPS will deliver a Draft EIA Study for approval to the MoAEP. Second round of public consultation will be organized and Draft EIA Study will be disclosed on PE EPS web site and delivered to the municipalities which are potentially affected with the project.<br><br>MoAEP will announce invitation to interested parties in order to participate this round of consultations. A public presentation of Draft EIA Study will be organized on a local level, in one of municipalities which is by MoAEP recognized as a most relevant local community. |
| Final Environmental Approval | MoAEP will inform, through local daily newspaper, interested parties about Decision made regarding Final Environmental Approval for EIA Study.<br><br>Interested parties will be invited to protest in case they find EIA procedure was irregular and/or their complaints are not properly integrated within the Final EIA Study. |

The relevant information prior to public consultations in a timely manner and in a form that is meaningful for, and accessible to, the groups being consulted, will be disseminated as outlined above. The framework for the information disclosure is shown in Table 7.1.

### 7.1 Grievances Redress Mechanism

A Grievance Mechanism will be implemented to ensure that all complaints from local communities are dealt with appropriately, with corrective actions being implemented, and the complainant being informed of the outcome. It will be applied to all complaints from affected parties.

PE EPS/MB Kolubara will maintain a Complaints Database, which will contain all the information on complaints or grievances received from the communities or other stakeholders. This would include: the type of complaint, location, time, actions to address these complaints, and final outcome.

The contractor, in coordination with PE EPS/MB Kolubara, shall set-up a grievance redress committee that will address any complaints during project implementation. Grievances should be resolved within 15 working days.

## 8. MONITORING AND REPORTING ARRANGEMENTS

### Monitoring

A specific c monitoring plan for the proposed Project (Annex 4) has been prepared. The main components of the monitoring plans include:

1. Environmental issue to be monitored and the means of verification,
2. Specific areas, locations and parameters to be monitored;
3. Applicable standards and criteria;
4. Monitoring of noise levels near residential areas
5. Duration and frequency; and
6. Institutional responsibilities for monitoring.

Within the defining of activities related to the pumping out of water from the mines, it is particularly important that proper attention be paid to the manners and dynamics of transfering water from the flooded mines into the river Kolubara which will affect the regime of water and sediment (i.e. the quantity and quality of water and sediment) in the recipients and within acceptable limits.

Using the “INSTITUTE OPINION" as monitoring guidelines, the Environmental Protection Agency in cooperation with the expert service of the company MB “Kolubara" Lazarevac has selected the locations for measuring profiles and prepared the Planfor Monitoring the Water Quality from Tamnava Mines the results of which should be the elements for monitoring the impact of the pumping out of water from the mines on the quality of water of the river Kolubara.

Potential water contamination

- inspection of drainage works to ensure implementation of environmental best management practices (periodical inspection, should be done by the road inspection organization)
- test roadside soils for elevated levels of heavy metals, particularly lead and cadmium (long-term investigation, can be done as a contract work by a research institute)
- test aggregates to ensure they are contaminant free (periodical test, can be done by the road inspection organization)

Noise Quality

Contractor is obliged to perform noise level measurement according to the monitoring plan of EMP document. Within the zone with sensitive recipients Contractor will monitor the noise levels once at the beginning of the project and later on quarterly basis, and on complaint. If the results of monitoring are not satisfactory, monitoring should be conducted on monthly basis.

Waste Disposal

Periodic inspection of road rehabilitation works helps to ensure proper handling of waste materials.

Noise Quality

Contractor is obliged to perform noise level measurement according to the monitoring plan of EMP document. Within the zone with sensitive recipients Contractor will monitor the noise levels once at the beginning of the project and later on quarterly basis, and on complaint. If the results of monitoring are not satisfactory, monitoring should be conducted on monthly basis.

Bridge widening and culvert lengthening:

Monitoring of the influence of mitigation measures used in the bridge widening and culvert lengthening has following aspects:

- determination of optimal in-stream construction time window (should be known before starting of the operation but it is important information for other analogous cases)
- monitoring work to ensure in-stream work avoids or minimizes damage to fish habitat (foresees periodical

inspection trips)
- periodic inspection of works to ensure aquatic habitat protection measures are being implemented
- inspection during concrete pours to ensure proper handling of concrete and proper cleanup and disposal of waste concrete
- inspection of foundation rehabilitation works to ensure application of environmental best management practice.

Equipment Maintenance and Fuelling

To avoid possible leakage of lubricants and fuel and following pollution, periodic inspection of equipment maintenance, fuelling and materials storage areas is needed to ensure the best management practices being implemented.

Occupational Health and Safety

Worker Safety can be increased by periodic monitoring of on-the-job safety.

### 8.1 Reporting Arrangements

Public enterprise PE EPS / MB Kolubara to WB

MB Kolubara with PE EPS / MB Kolubara will prepare a site specific EMP monthly report during Project implementation to WB.

MB Kolubara was prepare EMP presentation and was organize and perform EMP presentation and consultation to the interested parties and stakeholders.

MB Kolubara was prepare and submit to PE EPS a Detailed Report on Public Consultation. Comments, remarks and suggestions collected during public consultation process are integrated within the final EMP document.

MB Kolubara/ PE EPS will be prepare finale project implementation report on the end of the process and submit to WB

If any kind of accident or endangerment of environment happens, reporting will be immediate. PE EPS and the Contractor have joint responsibility for reporting and investigating incidents. The Contractor is obliged to inform the project manager and local authorities about accident immediately after it happened. In case that project manager is not responding on a call, the Contractor is obliged to inform PE EPS about accident (phone number +38111 2024 600 or via Email on following address: milos.stojanovic@eps.rs).

Environmental & Social Report

Contractor is obliged to produce and deliver to PE EPS an Environmental and Social Report (ESR) covering all project activities during an implementation phase.

ESR document should be produced respecting the proposed template - a sample screening checklist for ESR presented within the Annex 1 of this EMFD document.

Each contractor should deliver an ESR to the PE EPS latest one month after finishing implementation of the Project.

I Project Supervision Consultant to PE EPS

The findings of the regular monitoring activities, including activities specified in the Generic Monitoring Plan (Annex 4) carried by the Contractor will be included in the quarterly PSC progress reports.

II PE EPS to MoEM, WB

In case of fatalities or major incidents on site the PE EPS will immediately report to WB and EIB.

Monitoring and compliance in accordance with EMFD and EMP, including monitoring of implementation of specific measures on each sub-project/section during project implementation will be undertaken by PE EPS and its implementation unit, and reported in writing to the Bank.. An environmental specialist will be appointed to the Project by PE EPS to ensure quality in the implementation of EMPs.

**ANNEXES:**

**Annex 1**: Sample Screening Checklist for the Annual Environmental & Social Report
**Annex 2**: Generic Mitigation Plan for Project of Pumping out Water and Sediment at the Open Pit mine Tamnava – West field, MB Kolubara
**Annex 3**: Generic Social Mitigation Plan for Project of Pumping out Water and Sediment at the Open Pit mine Tamnava – West field, MB Kolubara
**Annex 4**: Generic Monitoring Plan for Project of Pumping out Water and Sediment at the Open Pit mine Tamnava – West field, MB Kolubara
**Annex 5:** Relevant National legislation as of December 2014
**Annex 6:** Report on Public Disclosure and Public Consultation

## ANNEX 1: SAMPLE SCREENING CHECKLIST FOR THE ENVIRONMENTAL & SOCIAL REPORT

| 1. General | | |
|---|---|---|
| Is the project materially compliant with all relevant Performance Requirements (taking account of agreed action plans, exemptions or derogations)? | Yes □ No □ | If No, please provide details of any material non-compliances: |
| Is the project materially compliant with all applicable environmental and social laws and regulations? | Yes □ No □ | If No, please provide details of any material non-compliances: |
| Have there been any accidents or incidents that have caused damage to the environment, brought about injuries or fatalities, affected project labor or local communities, affected cultural property, or created liabilities for the company? | Yes □ No □ | If yes, please describe, including details of actions to repair and prevent reoccurrence: |
| Have there been any changes to environment, social, labor or health and safety laws or regulations that have materially affected the company? | Yes □ No □ | If yes, please describe: |
| How many inspections did you receive from the environmental authorities during the reporting period? | Number: | Please provide details of these visits, including number and nature of any violations found |
| How many inspections did you receive from the health and safety authorities during the reporting period? | Number: | Please provide details of these visits, including number and nature of any violations found |
| How many inspections did you receive from the labor authorities during the reporting period? | Number: | Please provide details of these visits, including number and nature of any violations found: |
| Have these visits resulted in any penalties, fines and/or corrective action plans? | Yes □ No □ | If yes, please describe, including status of implementing corrective actions to address any violations found: |
| Has the Company engaged any contractors for project-related work in the reporting period? | Yes □ No □ | If yes, please state for which types of work, and how the company has monitored the compliance of contractors with Performance Requirements and the Environmental and Social Action Plan: |
| Were any of the violations stated above the responsibility of contractors? | Yes □ No □ | If yes, please provide details, including how the Company is ensuring that corrective actions are implemented by the Contractor? |
| Have any operations been reduced, temporarily suspended or closed down due to environmental, health, safety or labor reasons? | Yes □ No □ | If yes, please describe: |
| Please describe any environment or social programs, initiatives or sub-projects undertaking during the reporting period to improve the company's environmental or social performance and/or management systems:<br><br>Please indicate the level of associated expenditure (capital expenditure and operating expenditure), and whether this relates to the requirements of the Environmental and Social Action Plan, or to any other initiative: | | |
| **2. Status of the Environmental and Social Action Plan** | | |
| Please provide information on the status of each item in the Environmental and Social Action Plan (ESAP). If the ESAP has been updated during the reporting period, please attach a copy of the new plan. | | |
| **3. Environmental Monitoring Data[2]** | | |
| **Please provide the name and contact details for your environmental manager:** | | |

[2] Please provide the results of any environmental monitoring carried out by the Company or its consultants. If you already have all the data requested available in another format, then this can used instead.

| Parameter[3] Water Quality | Value[4] | Unit | Compliance Status[5] | Comments[6] |
|---|---|---|---|---|
| Water temperature | | °C | | |
| pH value | | | | |
| Conductivity | | µS/cm | | |
| Water look- description | | | | |
| Water color - description | | | | |
| Suspended solid (SS) | | mg/l | | |
| $KMnO_4$ Consumption | | mg/l | | |
| Dissolved oxygen $O_2$ | | mg/l | | |
| Five days biochemical oxygen $O_2$ demand, *(BOD)* $O_2$ | | mg/l | | |
| oxygen $O_2$ water saturation | | % | | |
| Biological oxygen demand $BPK_5$ | | mg/l | | |
| Chemical oxygen demand from $KMnO_4$ HPK | | rng/l | | |
| Chlorides | | rng/l | | |
| Sulfates | | mg/l | | |
| Alkalinity | | ml 0.1 MHCl/l | | |
| Phenolic index | | mg/l | | |
| Orthophosphates | | mg/l | | |
| Total phosphorous | | mg/l | | |
| Total organic carbon (TOC) , $O_2$ mg/l, (in PPU) | | rng/l | | |
| TN | | rng/l | | |
| Amonium ion , ($NH_4$ as N), mg/l $^+$, ( in PPU) | | mg/l | | |
| Total hardness as $CaCO_3$ | | mg/l | | |
| **Specific pollution substances in water and sediment** | | | | |
| Zinc ($Zn_{tot}$) | | µg/l | | |
| Copper ($Cu_{tot}$) | | µg/l | | |
| Aluminum ($Al_{tot}$) | | µg/l | | |
| Iron ($Fe_{tot}$) | | µg/l | | |
| Manganese ($Mn_{tot}$) | | µg/l | | |
| Total chrome ($Cr_{tot}$) | | µg/l | | |
| Arsenic ($As_{tot}$) | | µg/l | | |
| Boron ($B_{tot}$) | | µg/l | | |
| Cobalt ($Co_{tot}$) | | µg/l | | |
| Anion-active surface substances | | mg/l | | |
| Oil hydrocarbons | | mg/l | | |
| **Priority hazardous substances in water and sediment** | | | | |
| Alachlor | | | | |
| Anthracene | | | | |
| Atrazine | | | | |
| Cadmium (Cd) and its compounds | | | | |
| Chlorfenvinphos | | | | |
| Chlorpyrifos | | | | |
| cyclodiene pesticides | | | | |
| Aldrin | | | | |
| Dieldrin | | | | |
| Endrin | | | | |
| Izodrin | | | | |

[3] Not all parameters will necessarily apply. Please complete those rows that are most relevant to the industry sector. Additional parameters can be added as necessary.

[4] Please ensure that the units of measurement are clearly stated

[5] Please report on compliance against the standards for this project (typically local, EU and/or World Bank Group)

[6] In addition to any other comments, please indicate whether the measurements reported apply to all or only some process operations at the facility

| Priority and priority hazardous substances in the sediment |
|---|
| Total dichlorodiphenyltrichloroethane DTD |
| Para - para - dichlorodiphenyltrichloroethane DDT |
| Diuron |
| Endosulfan |
| Fluoranthene |
| Hexachlorobenzene |
| Hexachlorobutadiene |
| Hexachlorocyclohexane and<br>α- HCH<br>β- HCH<br>γ- HCH( lindane)<br>δ- HCH |
| Isoproturon |
| Oktifenoli 4 - ( 1,1,3,3 -tetrametilbutil) phenol |
| Lead (Pb) and its compounds |
| Naphthalene |
| Nickel (Ni) and its compounds |
| 4-(para)nonylphenol |
| Pentachlorobenzene |
| Pentachlorophenol |
| polyaromatic hydrocarbons (PAH)<br>Benzo(a)pyrene<br>Benzo(b)fluoranthene<br>Benzo(g,h,i)perylene<br>Benzo(k)fluoranthene |
| Polychlorinated biphenyls (PCB):28,52,101,138,153,180 and 194 |
| Simazine |
| Trifluralin |
| Terbutrin |
| Mercury (Hg) and its compounds |
| Heptahlor |
| Heptahlor-epoksid |
| Terbutilazin |
| Propazin |
| Linuron |
| **The biological quality element** |
| Aquatic macroinvertebrates<br>phytobenthos |
| **Air Emissions** |
| $SO_2$ |
| $NO_X$ |
| Particular metters |
| $CO_2$ |
| $CH_4$ |
| $N_2O$ |
| $HFC_S$ |
| $PFC_S$ |
| $SF_6$ |
| [Other] |
| **Other Parameters** |
| Noise |
| [Other] |
| **Solid Waste** |

| |
|---|
| Please provide details of the types and amounts of solid wastes generated by the project. Indicate where wastes are classified as hazardous. Indicate the final re-use, recycle or disposal method for each waste type |

| 4. Resource Usage and Product Output | | | |
|---|---|---|---|
| **Parameter [11]** | **Value[12]** | **Measurement Unit** | **Comments[15]** |
| **Fuels used** | | | |
| Oil | | | |
| Gas | | | |
| Grid Electricity | | | |

| 5. Human Resources Management | | | |
|---|---|---|---|
| **Please provide the name and contact details for your Human Resources manager:** | | | |
| | **Total** | **Recruited in this reporting period** | **Dismissed in this reporting period** |
| **Number of direct employees:** | | | |
| **Number of direct workers:** | | | |
| Were there any collective redundancies during the reporting period? | Yes □ No □ | If yes, please describe the redundancy plan, including reasons for redundancies, number of workers involved, how they were selected, consultation undertaken, and measures to mitigate the effects of redundancy: | |
| Are there any planned redundancies to the workforce in the next year? | Yes □ No □ | If yes, please describe the redundancy plan, including reasons for redundancies, number of workers involved, and selection and consultation process: | |
| Were there any changes in trade union representation at Company facilities during the reporting period? | Yes □ No □ | If yes, please provide details, and summaries engagement with trade unions during reporting period: | |
| Were there any other worker representatives (e.g. in the absence of a trade union)? | Yes □ No □ | If yes, please provide details and summaries engagement with them during reporting period: | |
| Were there any changes in the status of Collective Agreements? | Yes □ No □ | If yes, please provide details: | |
| Have employees raised any grievances with the project during the reporting period? | Yes □ No □ | If yes, please state how many, split by gender, summaries the issues raised in grievances by male and female staff and explain how the Company has addressed them: | |
| Have employees raised any complaints about harassment or bullying during the reporting period? | Yes □ No □ | If yes, please state how many, split by gender, summaries the issues raised by male and female staff and explain how the Company has addressed them: | |
| Have there been any strikes or other collective disputes related to labor and working conditions at the Company in the reporting period? | Yes □ No □ | If yes, please summaries nature of, and reasons for, disputes and explain how they were resolved | |
| Have there been any court cases related to labor issues during the reporting period? | Yes □ No □ | If yes, please summaries the issues contested and outcome: | |
| Have there been any changes to the following policies or terms and conditions during the reporting period in any of the following areas:<br>■ Union recognition<br>■ Collective Agreement<br>■ Non-discrimination and equal opportunity<br>■ Equal pay for equal work<br>■ Gender Equality<br>■ Bullying and harassment, including sexual harassment<br>■ Employment of young PE EPS under age 18<br>■ Wages (wage level, normal and overtime)<br>■ Overtime<br>■ Working hours<br>■ Flexible working / work-life balance<br>■ Grievance mechanism for workers<br>■ Health & safety | Yes □ No □ | | |

## 6. Human Resources Management

**Please provide the name and contact details for your Health and Safety manager:**

| | Contracted workers | Direct employees | | Direct employees | Contracted workers |
|---|---|---|---|---|---|
| Number of man-hours worked this reporting period: | | | Number of Fatalities[16]: | | |
| Budget spent on OHS in this period (total amount and currency): | | | Number of disabling injuries: | | |
| OHS training provided in this period in PE EPS on-days: | | | Number of Lost Time Incidents (including vehicular)[17]: | | |
| Number of lost workdays[18] resulting from incidents: | | | Number of cases of occupational disease: | | |
| Number of sick days: | | | | | |
| Accident causes (falling, heavy loads, struck by object, contact with energy source etc.): | | | | | |
| Please provide details of any fatalities or major accidents that have not previously been reported to Banks, including total compensation paid due to occupational injury or illness (amount and currency): | | | | | |
| Please summaries any emergency prevention and response training that has been provided for company PE EPSonnel during the report period: | | | | | |
| Please summaries any emergency response exercises or drills that have been carried out during the report period | | | | | |

## 7. Stakeholder Engagement

**Please provide the name and contact details for your external relations or community engagement manager:**

Please provide information on the implementation of the stakeholder engagement plan and summaries interaction with stakeholders during the reporting period, including:

1. Meeting or other initiatives to engage with members of the public or public organizations during the report period,
2. information provided to members of the public and other stakeholders during the report period relating to environmental, social or safety issues
3. coverage in media,
4. and interaction with any environmental or other community groups.

Please describe any changes to the Stakeholder Engagement Plan:

How many complaints or grievances did the project receive from members of the public or civil society organizations during the reporting period? Please split by stakeholder group. Summaries any issues raised in the complaints or grievances and explain how they were resolved:

[16] If you have not already done so, please provide a separate report detailing the circumstances of each fatality.
[17] Incapacity to work for at least one full workday beyond the day on which the accident or illness occurred.
[18] Lost workdays are the number of workdays (consecutive or not) beyond the date of injury or onset of illness that the employee was away from work or limited to restricted work activity because of an occupational injury or illness.

## 8. Status and Reporting on Resettlement Action Plan

**Existing Land Acquisitions**

**Please report any further progress made during this reporting period in the implementation of the Resettlement Action Plan (RAP) or using the monitoring indicators as detailed in the RAP , and complete the table below. Please provide the results of any other related monitoring carried out by the Company or its consultants and attach any additional information you think would be useful.**

| | | |
|---|---|---|
| the affected persons been fully compensated for their physical displacement and, if applicable, any economic losses resulting from the project? | Yes □ No □ | If no, specify how many compensation payments are still outstanding (in terms of number and percentage of recipients and payment amounts) and state when these payment will be made: |
| Has the land acquisition had any additional, unforeseen impacts on affected percons standard of living or access to livelihoods that were not previously covered in the **FERP**? | Yes □ No □ | If yes, quantify these impacts and specify what measures have been undertaken to minimize and mitigate these impacts. If no, specify how potential impacts on livelihoods have been monitored. |
| Have any vulnerable groups been identified? | Yes □ No □ | If yes, list the groups that were identified and describe any additional measures undertaken in order to mitigate impacts specific to these groups. |
| If applicable, have all transit allowances been paid? | Yes □ No □ | If no, specify how many payments are still outstanding (in terms of number and percentage of recipients and payment amounts) and state when these payments will be made. |
| Has legal support been provided to all the affected persons? | Yes □ No □ | If yes, specify how many PE EPS effectively made use of the legal support. |
| Have all outstanding land and/or resource claims been settled? | Yes □ No □ Not applicable □ | If no, specify how many claims are still outstanding and state what the expected timing is for settling them. |
| Have there been any new land acquisition- related complaints or grievances? | Yes □ No □ | If yes, please state how many and summarize their content. |
| Has the company regularly reported to the affected communities on progress made in implementing the RAP? | Yes □ No □ | If yes, please state how many meetings were held and how many participants attended. |

**New Land Acquisitions**

**If the company acquired any new land for the project during the reporting year, please provide documents to show closure of land acquisition transactions. Please attach new/revised RAP covering the new land acquisition and describe mitigation measures, compensation, agreements reached, etc., and provide in tabular form a list of affected people and status of compensation.**

| | | |
|---|---|---|
| Have any persons been physically displaced? | Yes □ No □ | If yes, how many? |
| Have any persons been economically displaced? | Yes □ No □ | If yes, how many? |
| Was it a government assisted resettlement? | Yes □ No □ | |

## 9. Community Interaction and Development

Please summarize any social or community development initiatives undertaken by the company during the reporting period, and any associated expenditure:

**ANNEX 2: SITE SPECIFIC ENVIRONMENTAL MITIGATION PLAN FOR PROJECT OF PUMPING OUT WATER AND SEDIMENT AT THE OPEN PIT MINE TAMNAVA – WEST FIELD, MB KOLUBARA as approved on 16, September 2014**

The following environmental and social actions are required to fulfill the requirements of the World Bank Environment, within the timescale indicated. An estimate of the resources in terms of personnel time has been provided where relevant, and external costs have been estimated where possible; this is provided for information purposes only. Responsibility for discharging the actions will lie with EPS, although it is recognized that EPS' subsidiary companies, including RB Kolubara will be instrumental in delivering the actions.

| N⁰ | Location where applied | Subject | Mitigation Action | Responsible Person |
|---|---|---|---|---|
| **Hazardous materials and spills** | | | | |
| **1** | At the pumping stations and wherever diesel and other oil products are used | Protection of soils and water against contamination | Storage of fuel and oil/lubricants will be at the maximum distance from water as is feasible, and there will be an embankment or other barrier between any tank or storage container and the water so that any leaks cannot reach water. The Contractor must remove any tanks or other storage vessels as soon as they are no longer needed. Contractor's obligation is to replace all fuel generators with electrical generators within 3 weeks. | Contractor |
| **2** | At the pumping stations and wherever diesel and oil products are used, including storage areas and places where vehicles and equipment are operated, maintained, or stored | Cleanup of contaminated soil | In case of spills or other releases, all contaminated soil and other materials must be excavated as soon as possible. Contaminated material will be removed from the site by a qualified operator and disposed according to the Law on Waste Management of the Republic of Serbia. | MB Kolubara and Contractor |
| **3** | At the pumping stations and wherever diesel and oil products are used, including storage areas and places where vehicles and equipment are operated, maintained, or stored. | Spill prevention and reaction | Drivers of fuel trucks and other workers who handle fuel or other oil products will be trained to prevent and clean up spills. Locations where fuel and oil products are stored or used will be equipped with absorbents and other materials and equipment suitable for absorption and cleanup of spilled materials. | Contractor (vehicles/equipment and fuel storage) |
| **Water** | | | | |
| **4** | At point of discharge into Kolubara River and Kladnica River | Protection of water quality | Compare effluent standards under Serbian law, European Union law and Directives, and World Bank Group EHS Guidelines for Mining and use the most stringent concentration as the applicable discharge standard. Collect and analyze samples of water at locations, at frequencies, and for parameters as required by the Program- Emergency Monitoring of Water Quality from Tamnava pit (Environmental Protection Agency, July, 2014), which is constituent part of this EMP. Undertake actions as required by the Ministry in case | MB Kolubara |

| N⁰ | Location where applied | Subject | Mitigation Action | Responsible Person |
|---|---|---|---|---|
| **Water** | | | | |
| | | | concentrations of any contaminant exceeds the applicable standard, as required by the Emergency Monitoring Program. | |
| **5** | In pit and at point of discharge into Kolubara River and Kladnica River | Protection of water quality | On at least daily basis, analyze discharges into receiving waters for undissolved oxygen, total suspended solids, and temperature using instrument(s) calibrated according to manufacturer's instructions. (Emergency Monitoring of Water Quality from Tamnava pit Program, July 2014). (If possible, install instruments for continuous monitoring.)<br><br>Based on the results, take action as follows:<br><br>› TSS: If concentrations are higher then 50mg/L or above the applicable standard as prescribed for water quality in recipient water body, in line with the national water quality classification (2nd or 3rd class respectively), whichever is more stringent stop discharging until turbidity in pit lake decreases to a concentration below the level in the receiving water.<br>› Temperature: If the temperature of water being discharged is more than 3°C higher or lower than the receiving water, stop discharge until temperature differential is less than 3°C.<br>› Dissolved oxygen: If concentrations are less than the applicable standard, stop discharge until concentrations are equal or undertake measures (spraying or aeration) to increase the concentration of oxygen in the water up to the limit when the discharge into recepient is allowed. | MB Kolubara and Contractor (monitoring),<br><br>MB Kolubara and Contractor (pumping) |
| **6** | In pit and at point of discharge into Kolubara River and Kladnica River | Protection of water quality | During and after precipitation that increases turbidity in the pit, as determined by visual observation, measure TSS in water in the pit and in receiving water. If TSS is higher in pit water than in the receiving water, stop pumping until TSS in the river is equal to or higher than TSS in the pit. Calibrate instrument according to manufacturer's instruction. | MB Kolubara (monitoring)<br><br>Environmental Protection Agency |
| **7** | 12 measuring points from the mine to Sava River, defined by the Emergency Monitoring Program | Protection of water quality | Sampling and measuring quality according to parameters defined by Emergency Monitoring Program. Measurement should be done on seven-day-level. In the event of exceeding MAQ, act in accordance with definitions from emergency Monitoring Plan. | Environmental Protection Agency (monitoring),<br><br>MB Kolubara (implementation) |

| N⁰ | Location where applied | Subject | Mitigation Action | Responsible Person |
|---|---|---|---|---|
| **Water** | | | | |
| **8** | All pumping stations | Prevent contamination of river | Maintain dispersants, booms, and other containment and cleanup materials designed for controlling spills in water. Train pump-station workers and equipment operators in their use.<br><br>If oil or fuel is spilled into water, stop all pumps that are taking water from within about 50 meters of the spill. Do not start pumping again until the oil has been removed.. | MB Kolubara and/or Contractor |
| **9** | All locations where water is discharged into the Kolubara and Kladnica rivers | Protection of river banks and bed | Design the points where pumped water will be discharged to the rivers so the discharge will not erode or otherwise damage or erode the riverbanks or riverbeds. If modifications are needed to aerate water before or during discharge, these modifications must be designed so discharges do not cause damage or erosion to banks or riverbeds. | Contractor (selection of place and technical solution, and MB approval. |
| **10** | All disturbed areas where run-off flows away from the pit | Protection of water quality and land | Use good international practices (straw bales, settling basins flow retarding devices, etc.) to reduce sediment load in run-off that flows from disturbed areas to undisturbed areas or to the river areas. | MB Kolubara |
| **11** | Any location where there are trees or other vegetation | Protection of flora and fauna | Workers and equipment must stay within disturbed areas and not move into and disturb any areas with trees or other vegetation. Workers must not cut trees or other vegetation except as authorized by MBKolubara, may not build fires at any time, and may not hunt wild animals. | Contractor<br>MB Kolubara (control) |
| **12** | At any location where new ground is to be disturbed, for the needs of excavation | Topsoil and subsoil salvage and storage | If any new ground is to be disturbed, including the pipeline route from the second pumping station, topsoil (humus) and subsoil must be salvaged and stored separately. Storage piles should be protected against erosion until they are used for land rehabilitation. | Contractor |

| Nº | Location where applied | Subject | Mitigation Action | Responsible Person |
|---|---|---|---|---|
| **Water** | | | | |
| **13** | Pipeline corridors between the service road and the Kolubara River, and within 15 meters of the Kladnica River. | Restore land and protect water quality | During pumping operations, use good international practice (straw bales, settling basins flow retarding devices, etc.) to control run-off to the rivers from the cleared pipeline corridor and other project-disturbed areas.<br><br>Upon completion of pumping, remove pipeline and other infrastructure and continue to control run-off to the rivers until self-sustaining vegetative cover of native grass and plant species is established and effectively prevents sediment-laden run-off from flowing into the river(s). | Contractor |
| **14** | All disturbed areas except as otherwise addressed | Restore land and protect water quality | Upon completion of pumping, remove pipelines, transmission lines, pump stations, and other temporary infrastructure. For areas where vegetation is disturbed, establish self-sustaining vegetative cover of native grass and other plant species. | Contractor<br>MB Kolubara |
| **Noise and vibration** | | | | |
| **15** | At the workers' camp/accommodation | Noise protection | Noise at work camp/accommodations must not exceed levels for residential areas under Serbian law, or 45dB during nighttime hours (2200-0700) and 55dB during the day. This can be accomplished by locating accommodations away from pumps and generators, or by insulating accommodations against noise. | Contractor (for its service providers)<br>MB Kolubara (for its service providers) |
| **Air** | | | | |
| **16** | At location of generators | Equipment emissions | Maintain generators so there are no visible emissions at any time except during cold startup, and if such emissions are observed, shut down generators and adjust the engines until there are no visible emissions. Take vehicles and equipment out of service for maintenance if they generate visible emissions at any time other than initial cold startup. | Contractor (generators and vehicles/ equipment);<br>MB Kolubara (vehicles/ equipment) |
| **17** | Unpaved roads and other work locations | Dust control | Minimize dust generation during dry periods when dust can be generated due to usage of roads. Undertake measures by limiting the speed of vehicles and equipment and by spraying the roads with water. | Contractor<br>MB Kolubara |

| Nº | Location where applied | Subject | Mitigation Action | Responsible Person |
|---|---|---|---|---|
| **Riverbanks and riverbeds** | | | | |
| **18** | Kolubara River at discharge locations | Protection of Kolubara river channel and embankments | Limit pumping to the Kolubara River so that total flow in the river, including both discharge and natural river flow, does not exceed the maximum amount recommended by „Beograd vode" (50 $m^3$/sec), as defined in accordance with letter number 3676 dated 23.07.2014, which is constituent part of this EMP. MB Kolubara will monitor upstream flow in the Kolubara River on at least daily basis and will take weather conditions (upstream and at the site) into account to ensure flow rates are maintained below the maximum rate at all times. This applies at the farthest downstream discharge location. | Contractor MB Kolubara |
| **19** | Kladnica River at discharge location | Protection of Kladnica River channel and embankments | Limit pumping to the Kladnica River so that total flow in the river, including both discharge ad natural river flow, does not exceed the maximum amount of 3m3/s, as recommended by the Jaroslav Černi Institute, Belgrade (Letter No. 2496 dated 29.08.2014, which is constituent part of this EMP). MB Kolubara will monitor upstream flow in the Kladnica River on at least a daily basis and will take weather conditions (upstream and at the site) into account to ensure flow rates are maintained below the maximum rate at all times. | MB Kolubara |
| **Waste** | | | | |
| **20** | All work areas and worker accommodations | Waste management | All wastes will be collected, separated by type (sanitary, household and kitchen, hazardous, paper, scrap metal, reusable/recyclable, etc.) and removed from the site by licensed or authorized haulers. EPS/MB Kolubara will control implementation of these activities as well as providing documents for them. | Contractor and MB Kolubara (control) |
| **21** | In the pit and at possible future disposal locations | Silt management | Silt material (as defined by the national Law on Water and related by-laws), pumped from the Tamnava West pit will be placed in a location of depleted mine Tamnava East and managed in accordance with Law on Waste Management of the Republic of Serbia. Detailed instructions shall be given by the Ministry of Agriculture and Environment and Environmental Protection Agency of the Republic of Serbia.<br><br>First results of silt quality analysis – zero state were finalized on 24 – 25 August, 2014 by Environmental Protection Agency. Program of sampling and silt analysis is continued in accordance with defined dynamics and the law | Environmental Protection Agency (sampling and analysis) and MB Kolubara (implementation) |

## ANNEX 3: GENERIC SOCIAL MITIGATION PLAN FOR PROJECT OF PUMPING OUT WATER AND SEDIMENT AT THE OPEN PIT MINE TAMNAVA – WEST FIELD, MB KOLUBARA

| N⁰ | Location where applied | Subject | Mitigation Action | Responsible Person |
|---|---|---|---|---|
| **Stakeholder engagement** | | | | |
| **1** | In downstream villages | Open communications | A fact sheet will be prepared, advertised, and placed in the town halls of all villages along the Kladnica River between the discharge point and the Kolubara River, and along the Kolubara River between the mine and the Sava River. The fact sheet will describe the pumping program, including the length of time it will take, the impacts (if any) on the river(s), and risks (if any) to downstream villages and people. These are to be available from the time the Contractor first arrives on the site until all pumping is complete and all workers are gone from the site. | MB Kolubara |
| **2** | In downstream villages | Grievance mechanism | A telephone line will be maintained to receive comments and complaints from stakeholders, including potentially affected people. All complaints will be registered and dealt with in accordance with a defined procedure that requires quick resolution and communication back to the person as to how the complaint has been resolved. The telephone number is to be placed on the fact sheet of local communities. | MB Kolubara |
| **3** | In downstream villages and local residences | Drinking water quality | MB Kolubara will consult with the Ministry of Health to develop and implement a system to monitor water taken from the Kolubara River. The system must provide for sampling of water as soon as practicable (wherever possible within 24 hours, with laboratory analysis performed on an emergency basis if the problem cannot be resolved by sight, smell, or taste). If the monitoring identifies contamination due to water from the pit, pumping will be stopped until the problem can be overcome. | MB Kolubara |
| **4** | At all work locations | Worker health and safety | MB Kolubara must ensure that an occupational health and safety plan is in place from the time Contractor workers come on the site until the pumping project is complete and all workers are gone. The plan and operational practices must ensure:<br>› A trained and qualified safety professional („responsible person“) is on site at all times, with authority to monitor and enforce safety rules.<br>› A responsible person from MB Kolubara communicates with the Contractor's safety professional on a daily basis.<br>› All workers are trained on the hazards of their jobs, including measures to avoid or reduce risks.<br>› Personal protective equipment is provided by workers' employer or MB Kolubara, and use of PPE is monitored and enforced by the responsible person(s). | MB Kolubara, Contractor, Ministry of Interior of the Republic of Serbia, Army of the Republic of Serbia, Mining Inspection |

| N⁰ | Location where applied | Subject | Mitigation Action | Responsible Person |
|---|---|---|---|---|
| **Workers** | | | | |
| **4** | At all work locations | Worker health and safety | › Flotation devices and lifesaving equipment is available and accessible at all work locations near the pit lake and the riverbanks.<br>› Equipment operators working near the pit lake have special training to respond to emergencies.<br>› Equipment operation near the pit lake is under constant observation by a trained responsible person<br>› Responsible person visits every work location at least daily.<br>› Proper records are kept (person-days, lost time incidents, lost time, serious injuries/fatalities, etc.).<br>› Serious injuries or fatalities are reported to World Bank immediately.<br>› Requirements of the Ministry of Health and Ministry of Labor are met (helicopter or other evacuation available, rescue/transport vehicle available, etc.) | MB Kolubara, Contractor, Ministry of Interior of the Republic of Serbia, Army of the Republic of Serbia, Mining Inspection |
| **5** | Workers' camp | Worker health and safety | Design, construction, and operate worker accommodations so they meet the requirements of Serbian law and international good practice (such as the IFC/EBRD guidance note on worker accommodation). | Contractor<br>For its workers MB Kolubara |
| 6 | In MB Kolubara the Inception Report including Environmental Protection Plan, an Environmental Action Plan and a budget realization of detailed Environmental Action Plan for the construction and operational phases of Field Tamnava West Field. | The report will ensure that the best environ-mental practice | Prepare an Inception Report for Tamnava West. This will include an Environmental Protection Plan, Environmental Action Plan and a budget. The report should include the proposed mitigation measures (including those set out in the EIA), procedures for environmental monitoring and restoration strategy, connected with RB Kolubara's Environmental Management System.<br><br>Risk: Organization Capacity and Commitment / Managing Contractors/ unemployed workers. Risk of damage to environmental (including to habitat and unanticipated cultural heritage finds) features of no implementation of appropriate measures at the correct time. Field, reducing the risk of confusion during implementation | MB Kolubara |
| 7 | In MB Kolubara the program including the mitigation actions set out in the Inception Report and EIA and detailing when each action will commence and conclude. The monthly reports are to indicate that all planned actions have been started and completed. | The report will ensure that the best environ-mental practice | Develop a program for implementing the mitigation measures described in Section 8 and monitoring requirement described in Section 9 of the EIAs for Tamnava West, and the any other mitigation measures specified in the Inception Reports (including Environ-mental Protection Plan and Environ-mental Action Plan) during the operational phases of Tamnava West Lignite Mine. In particular the program should recognize the need for the collection of data in advance of works (such as the registers of all fauna and flora species) and for the restoration and reclamation of the site upon phased completion of mining activities. The program should assign roles and responsibilities to EPS/RB Kolubara staff, consultants as appropriate, and indicate how the program will be managed and delivered. | MB Kolubara |

| Nº | Location where applied | Subject | Mitigation Action | Responsible Person |
|---|---|---|---|---|
| **Workers** | | | | |
| 8 | In MB Kolubara the Monthly report the actions implemented in the last month and the actions to be implemented in the next month. The report are to indicate the mitigation | Mitigation measures and monitoring to be implemented in accordance with program. After defining the activities set out in paragraph 2, their implementation will begin, lasting until the end of the project | ▸ Implement the programmed mitigation measures (described in Section 8 and monitoring requirement described in Section 9 of the EIAs and in the Inception Report) at the appropriate times in the project lifecycle. This includes the advanced surveys required and the phased restoration of the mine upon completion of activities in a particular area. | MB Kolubara |
| 9 | The SEP will be implemented and evaluated by:<br>▸ A completed Register of Stakeholders;<br>▸ Records of stakeholder engagement activities, including minutes of meetings held being uploaded onto EPS and RB Kolubara websites;<br>▸ Copy of SEP on the EPS and RB Kolubara websites;<br>▸ New SEPs being prepared for other projects developed by EPS during the lifetime of the loan;<br>▸ An established and readily accessible grievance management system;<br>▸ Records of training provided to staff in managing grievances;<br>▸ Record of all grievances and related follow-up (number of resolved grievances compared to number of unresolved grievances).<br>▸ Register of compensation agreements; | To be implemented within 1 month of signing of Loan Agreement | Implement the Stakeholder Engagement Plan, to ensure all consultation / complaints are documented, monitored and dealt with promptly and transparently. The SEP will include an improved grievance procedure that is simple and easily available (including forms), and contain clauses on confidentiality, non-retribution, time-scale, right of appeal, right to be accompanied and record keeping and will be in accordance with the provisions of Serbian Law.<br><br>Provide training as necessary for staff involved in the management of the grievance mechanism Legal compliance.<br><br>Risk: Best Practice. Reduced risk of stakeholder grievances being overlooked and resulting in project delay or reputational protest. | MB Kolubara |

| N⁰ | Location where applied | Subject | Mitigation Action | Responsibility |
|---|---|---|---|---|
| **Workers** | | | | |
| 10 | Updated organization charts to indicate these positions in MB Kolubara. Copies of job descriptions. Provision of measures, feedback and actions to be monitored through SEP as updated on the websites. | Best Practice reduce risk of stakeholders feeling ignored and ensure company/project is proactive in informing public rather than being reactive and exposed to | Appoint community-liaison officers to liaise with local communities and assist stakeholders in raising verbal or written grievance. Provide other means of feedback to stakeholders, including bulletin boards and boxes for suggestions. | MB Kolubara |
| 11 | Records of an annual company newsletter, a 6-monthly staff meeting and 3-monthly email updates. An employee grievance mechanism.<br><br>All employees to have up to date knowledge of the project and grievance mechanism. | Best Practice /Compliance with WB requirement/ | Make information about the project, its operation and programme available to staff via a company newsletter, e-mail updates, regular meetings, and via notice boards.<br><br>Establish a formal mechanism for employees to raise grievances with management and ensure that issues raised by employees are addressed within a specified time period. Ensure feedback provided is treated confidentially where confidentiality is requested/necessary. | MB Kolubara |
| 12 | Provide a copy of the HR policy and of the 'signposting' document.<br><br>Provision of supply chain procedures defining required standards for the supply chain, and how this will be implemented within management systems i.e. what criteria and how will suppliers be checked. | Own resources. Human Resources Manager and Legal department. | Develop and implement a Human Resources Policy that is in compliance with EBRD policy (and PR2) and produce a 'signposting' HR document summarizing key points and directing staff to where they can get more detailed information. The policy should include:<br><br>› Principles of non-discrimination and equal opportunities<br>› Prohibition of forced labour<br>› Prohibition of child labour<br>› Rights of non-employee Workers<br>› Principles for Contractor management | MB Kolubara |
| 13 | Details of the information requested from contractors and sub-contractors, together of records of the information gathered in response. | Own resources. Human Resources Manager and Legal department. | Ensure that contractor implement environmental, health, safety and social requirement in line with Serbian legislation and relevant WB Performance Requirements. This will require contractor to:<br><br>› have or be working towards developing an EMS or, for smaller companies, that they have a procedure for identifying and managing environmental risk;<br>› implement health and safety and fire protection measures;<br>› disclose any environmental and H&S incidents they have had in the last three years;<br>› implement policies that eliminate risk of child labour, forced labour and general labour violations. | MB Kolubara |

| N⁰ | Location where applied | Subject | Mitigation Action | Responsibility |
|---|---|---|---|---|
| **Workers** | | | | |
| 14 | Industrial Waste Management Plan for Tamnava West. The Contaminated Soil Action Plan will also be developed in the case of hazards. Records of compliant waste management should be maintained, with no non-compliances. | Own resources. RB Kolubara Environment Manager supported by the Environment Department. | Prepare an Industrial Waste Management Plan (WMP) for Field C to satisfy the requirements of EU Waste Framework Directive and Serbian waste legislation. The plan should describe industrial waste management procedures with an action plan, as well as remediation activities for contaminated soil in the case of hazards. | MB Kolubara |
| 15 | Clear procedures within the EMS requiring risk assessments to be undertaken.<br><br>Records of assessments and evidence of compliance to be maintained. | Potential impact to employees and environmental receptors. | Risk assessments are to be prepared regarding the use and management of hazardous materials. | MB Kolubara |
| 16 | Documented Risk Assessment (along lines of international best practice) of possible hazards and risks to the community from this project and this equipment. | Reduced risk of injuries to those in the community. | Prepare a Health and Safety (H&S) Risk Assessment for possible hazards and risks to the community from this project. | MB Kolubara<br>H&S Department |
| 17 | Documented emergency procedures that fully meet the requirements of the OHSAS clause 4.4.7. | Improved safety performance and improvements in the Safety Management System. | Develop suitable emergency preparedness and response procedures in accordance with OHSAS 18001 clause 4.4.7. | MB Kolubara<br>H&S Department |
| 18 | % of staff involved in safe behavior programs, as per training. Implementation to be monitored annually through management system audits. | Improved safe behaviors to reduce risk of injuries to employees. | Kolubara to organise employees re-training to improve safe behaviour and prevent fatalities due to non-observance of the existing H&S rules and measures. | MB Kolubara<br>H&S Department |
| 19 | Identify specific actions to improve safety and develop a plan to implement them. Implementation to be monitored annually through management system audits. | Understanding root causes highlights specific hazards and risks to be avoided. | Kolubara to further review the recent reports from the Mining Inspectors to identify root causes of the immediate cause of death. | MB Kolubara<br>H&S Department |

| N⁰ | Location where applied | Subject | Mitigation Action | Responsibility |
|---|---|---|---|---|
| **Workers** | | | | |
| 20 | Lessons learned procedure. A documented list of actions to be implemented and evidence of actions taken, as a result of incidents. Evidence of safety inspections being carried out to monitor those actions. Mandatory amendments of the Risk Assessment Act related to fatalities based on legal regulations. Implementation to be monitored annually through management system audits. | Ensuring regular review and update creates safer workplace and reduces risk of injuries to employees. | Develop a lesson learned procedure for fatalities, accidents and near-misses. Following any such incidents, increase monitoring to assess the effectiveness of corrective actions. | MB Kolubara H&S Department |
| 21 | Revised Risk Assessment which puts priority on the elimination of risks. Implementation to be monitored annually through management system audits. | Control measures that avoid or eliminate risk as a priority over those that reduce risk are more effective. | Adopt a hierarchy of controls (as per OHSAS 18001 clause 4.3.1) | RB Kolubara IMS Department H&S Department |
| 22 | A program of safety inspections (ad hoc and random) to be developed and evidence of it being implemented to be recorded through management system procedures. | Safer work practices for contractors conforming to and working within Kolubara's H&S processes. | Continue to implement the H&S processes for managing contractors. Ensure that the Kolubara H&S Division carry out ad hoc and random safety inspections that include contractors and that these are recorded. All recommendations to be communicated to the contractors. | MB Kolubara H&S Department |
| 23 | Updated H&S Policy and all old H&S Policies removed from display. | Compliance with OHSAS requirements. | Update the H&S policy to include a commitment to prevention of injury and ill health, and to be signed by the current Company Director. | RB Kolubara IMS Department H&S Department |
| 24 | A set of H&S objectives/goals with a clear management program for implementation, including timescales and resources to be formulated and recorded. | Clear H&S objectives/ goals lead to good focus on improving H&S with resources targeted appropriately | Bureau Veritas Certification Auditor's Report found no reference to H&S objectives. A management program should be developed to include objectives, timescales for achieving them, allocate responsibilities and the necessary financial funds. | RB Kolubara H&S Department |

| N⁰ | Location where applied | Subject | Mitigation Action | Responsibility |
|---|---|---|---|---|
| **Workers** | | | | |
| 25 | A Management Review report that fully meets requirements of OHSAS clause 4.6, to be prepared and recorded. | Improved safety performance and improvements in the Safety Management System. | Management Review which fully meets the requirements of OHSAS 18001 clause 4.6 to be undertaken as a priority within 3 months. | RB Kolubara<br>IMS Department<br>H&S Department |
| 26 | Evidence of all 18 non-conformities being closed out.<br><br>Review safety lists implement accordingly. All actions in the Bureau Veritas Auditor's Report to be closed and evidence of the actions taken to be recorded and reviewed through management system procedures. | Improved safety performance and improvements in the Safety Management System | First internal audit based on OHSAS 18001:2007 identified 18 non-conformities. Management to ensure that all findings are actioned and that the close out is recorded.<br>Lack of safety lists, should be reviewed, clarified, actioned and recorded.<br><br>Improvements are identified in findings of Bureau Veritas Auditor's Report | RB Kolubara<br>IMS Department<br>H&S Department |
| 27 | If applicable, a RAP detailing how the requirements of WB OP 4.12 and the guidelines set forth in the project's Resettlement Policy Framework, will be met, including an Entitlements Matrix that sets out the types of compensation that people can expect. A 6-monthly report of the actions completed, including details of the compensation measures offered in addition to the legal requirements by EPS. | Reduced risk of objections through proactive management. | If land acquisition that generated economic and/or economic displacements if required for the purposes of the project, develop and implement a Resettlement Action to mitigate any corresponding risks and impacts. This is not related to any land acquisition and economic displacement associated to the ongoing development of Tamnava West mine. The RAP will detail as a minimum the entitlements of all relevant categories of affected persons, and document all transactions to acquire land rights, the compensation measures (as necessary to restore the livelihoods and standards of affected people or to provide fair compensation) and the relocation assistance to be provided. It will detail the programme and budget for implementing the resettlement, a grievance mechanism and the arrangements for monitoring, evaluation and reporting of the RAP . | RB Kolubara |

## ANNEX 4: GENERIC MONITORING PLAN FOR PROJECT OF PUMPING OUT WATER AND SEDIMENT AT THE OPEN PIT MINE TAMNAVA – WEST FIELD, MB KOLUBARA

**Table 1. General physical and chemical elements of surface water quality**

| Parameter<br>Sampling date and time | Method | Measuring Unit<br>xx.xx.xxxx/xx:xx |
|---|---|---|
| Water temperature | SRPS H.Z1.106/70 | °C |
| pH value | SRPSH.Z1.111/87 | |
| Electrical conductivity | UP 1.95/PC 12 or equivalent accredited | µS/cm |
| Turbidity (turbo) FTU | HM 1 | |
| Water colour | HM2 | |
| Suspended solid (SS) | SRPS .Z1.160/87 | mg/l |
| Chemical oxigen demand (COD) from $KMnO_4$ (HPK/Mn) (in PPU and sediment), $O_2$ mg/l | HM3 | mg/l |
| Dissolved oxygen $O_2$ | SRPSISO 5813/94 | mg/l |
| Five days biochemical oxygen demand *(BOD)* $O_2$ | SRPSISO 5813/94 | mg/l |
| Percentage of oxigen saturation, $\%O_2$ | UP 1.90/PC 12 or equivalent accredited | % |
| biochemical oxygen demand $BPK_5$ | DIN EN 1899-2 | mg/l |
| Chemical oxigen demand (COD) from $KMnO_4$ ( HPK/Mn) (in PPU and sediment), $O_2$ mg/l | SRPS ISO 6060/94 | rng/l |
| Total Chlorides | SRPS ISO 9297/97 | rng/l |
| Total phosphorus | HM4 | mg/l |
| Total alkality $CaCO_3$ | SRPSENISO.9963-1/2007 | ml 0.1 MHCl/l |
| Phenolic index | SRPS ISO 6439/97 | mg/l |
| Ortophosphates ($PO_4$ as P) | UP 1.102/PC 12 or equivalent accredited | mg/l |
| Total phosphorus (as P) | APHA AWWA WEF 4500 (A,B,E) or equivalent accredited | mg/l |
| Total organic carbon (TOC), $O_2$ | SRPS ISO 8245/94 | rng/l |
| Total nitrogen (N) | *NSM-O.VV3 | rng/l |
| Amonium ion ($NH_4^+$) | SRPSH.Z1. 184/74 | mg/l |
| Total alkality $CaCO_3$ | ISO 6059:1984 | mg/l |

**Table 2. Specific pollutants**

| | Parameter | Measuring Unit | Test method (or accredited equivalent method) |
|---|---|---|---|
| 1 | Zinc ($Zn_{tot}$) | µg/l | EPA 6020 A/ ICP-MS -AWWA APHA WEF 3111B -ISO 17294-2: 2003/ICP-MS |
| 2 | Copper (Cu tot) | µg/l | EPA 6020 A / EPA 220.2 -ISO 17294-2: 2003/ICP-MS |
| 3 | Aluminum (Al tot) | µg/l | EPA 6020 A /ICP-MS -ISO 17294-2: 2003/ICP-MS |
| 4 | Iron (Fe tot) | µg/l | EPA 6020 A / ICP-MS -AWWA APHA WEF 3111B -ISO 17294-2: 2003/ICP-MS |
| 5 | Manganese (Mn tot) | µg/l | EPA 6020 A / ICP-MS -AWWA APHA WEF 3111B -ISO 17294-2: 2003/ICP-MS |
| 6 | Total chrome (Crtot) | µg/l | EPA 6020 A / EPA 218.2 |
| 7 | Arsenic ($As_{tot}$) | µg/l | EPA 6020 A / EPA 206.2 |
| 8 | Boron ($B_{tot}$) | µg/l | EPA 6020 A / ICP-MS |
| 9 | Cobalt ($Co_{tot}$) | µg/l | EPA 6020 A ICP-MS; EPA 213.2 AAS |
| 10 | Anion-active surface substances | mg/l | EPA 425.1; ISO 7875/Methylene blue index |
| 11 | Oil hydrocarbons | mg/l | EPA 425.1; ISO 7875/Methylene blue index |

**Table 3. Priority and priority hazardous substances**

| № | priority substances | № | priority substances |
|---|---|---|---|
| 1 | Alachlor | 19 | Isoproturone |
| 2 | (Anthracene | 20 | Octylphenol 4 - ( 1,1,3,3 - tetramethylbutyl) phenole |
| 3 | Atrazine | 21 | Lead (Pb) and its compounds |
| 4 | Cadmium (Cd) and its compounds | 22 | Naphthalene |
| 5 | Chlorfenvinphos | 23 | Nickel (Ni) and its compounds |
| 6 | Chlorpyrifos | 24 | 4-(para) nonylphenoel |
| | Cyclodiene pesticides | 25 | Pentachlorobenzene |
| | Aldrin | 26 | Pentachlorophenole |
| 7-10 | Dieldrin | | Polyaromatic hydrocarbons (PAH) |
| | Endrin | | Benzo(a) pyrene |
| | Izodrin | 27-31 | Benzo(b)fluoranthene |
| 11 | Total dichlorodiphenyltrichloroethane (DDT) | | Benzo(g,h,i) perylene |
| 12 | Para-para dichlorodiphenyltrichloroethane (DDT) | | Benzo(k) fluoranthene |
| 13 | Diuron | 32 | Polychlorinated biphenyls (PCB):28,52,101,138,153,180 и 194 |
| 14 | endosulfan | 33 | Simazine |
| 15 | Fluoranthene | 34 | Trifluralin |
| 16 | Hexachlorobenzene | 35 | Terbutrin |
| 17 | Hexachlorobutadiene | 36 | Merchury (Hg) and its compounds |
| | Hexachlorocyclohexane and | 37 | Heptachlor |
| | α- HCH | 38 | Heptachlor-epoxide |
| 18 | β- HCH | 39 | Terbuthylazine |
| | γ- HCH(Lindane) | 40 | Propazine |
| | δ- HCH | 41 | Linuron |

**Table 4. The biological quality elements**

| The biological quality element | Parameter | The biological quality element | Parameter |
|---|---|---|---|
| **Aquatic macro invertebrates** | Saprobic index (Zelinka & Marvan)<br>BMWP score<br>ASPT score<br>Diversity index (Shannon - Weaver's method)<br>Participation of Oligochaeta- Tubificidae (%) | **Aquatic macro invertebrates** | EPT index<br>Number of sensitive taxa<br>Taxa Total number<br>Shell species number<br>Gastropod species number |
| **Phytobentos** | IPS index<br>CEE index | **Phytobentos** | EPI-D index |

Test method in Table 10: Analytic methods applied in the process of monitoring the status of surface waters must be in accordance with the standard SRPS ISO/ IEC 17025:2006.

Test method in Table 11: Analytic methods applied in the process of monitoring the status of surface water must be in accordance with the standard SRPS ISO/ IEC 17025:2006.

**Table 5. Priority and priority hazardous substances in the sediment**

| № | priority substances | № | priority substances |
|---|---|---|---|
| 1 | Alachlor | 20 | Octylphenol 4 - ( 1,1,3,3 - tetramethylbutyl) phenole |
| 2 | Anthracene | 21 | Lead (Pb) and its compounds |
| 3 | Атразин (Atrazine) | 22 | Naphthalene |
| 4 | **Cadmium (Cd) and its compounds** | 23 | Nickel (Ni) and its compounds |
| 5 | Chlorfenvinphos | 24 | 4-(para) nonylphenoel |
| 6 | Chlorpyrifos | 25 | Pentachlorobenzene |
| | **Cyclodiene pesticides** | 26 | Pentachlorophenole |
| | Aldrin | | Polyaromatic hydrocarbons (PAH) |
| 7-10 | Dieldrin | | Benzo(a) pyrene |
| | Endrin | | Benzo(b)fluoranthene |
| | Izodrin | | Benzo(g,h,i) perylene |
| 11 | Total dichlorodiphenyltrichloroethane (DDT) | 27-31 | Benzo(k) fluoranthene |
| 12 | Para-para dichlorodiphenyltrichloroethane (DDT) | | Indeno(1,2,3-cd) pyrene |
| 13 | Diuron | 32 | Polychlorinated biphenyls (PCB):28,52,101,138,153,180 и 194 |
| 14 | endosulfan | 33 | Simazine |
| 15 | Fluoranthene | 34 | Trifluralin |
| 16 | Hexachlorobenzene | 35 | Terbutrin |
| 17 | Hexachlorobutadiene | 36 | Merchury (Hg) and its compounds |
| | Hexachlorocyclohexane and | 37 | Heptachlor |
| | α- HCH | 38 | Heptachlor-epoxide |
| 18 | β- HCH | 39 | Terbuthylazine |
| | γ- HCH (Lindane) | 40 | Propazine |
| | δ- HCH | 41 | Linuron |
| 19 | Isoproturone | | |

**Sediment**

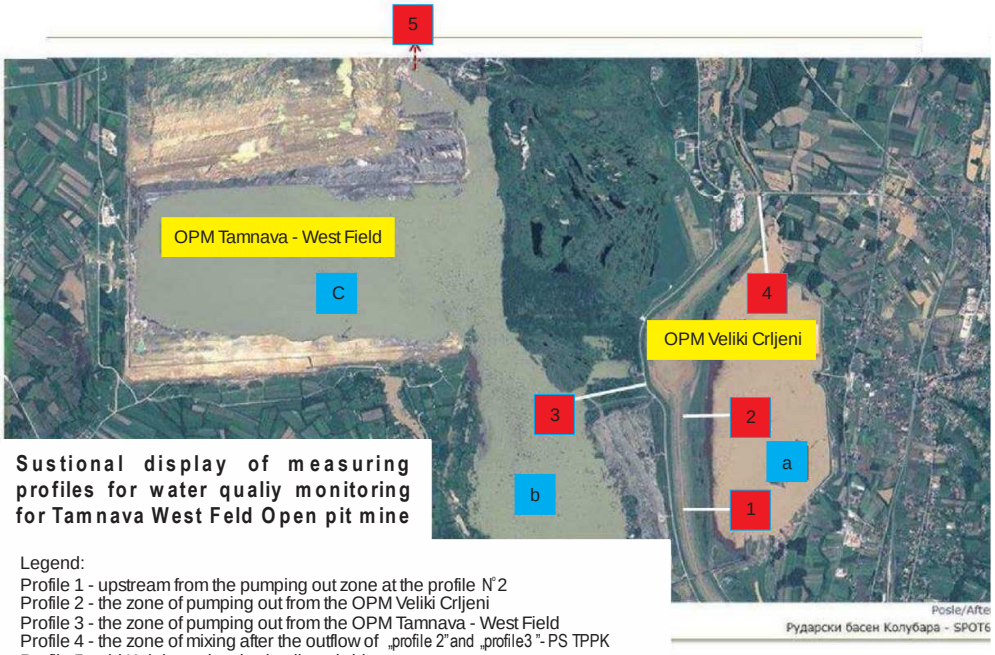
Sediment analysis includes the testing of samples for general parameters (nutrients etc.), the priority and priority hazardous substances and specific pollutants – other pollutants.

Test method in Table 12: Analytic methods applied in the procedure of monitoring the status of surface and ground waters and sediments must be in accordance with the standard SRPS ISO/ IEC 17025 : 2006.

**Table 6. Specific pollutants – Other pollutants**

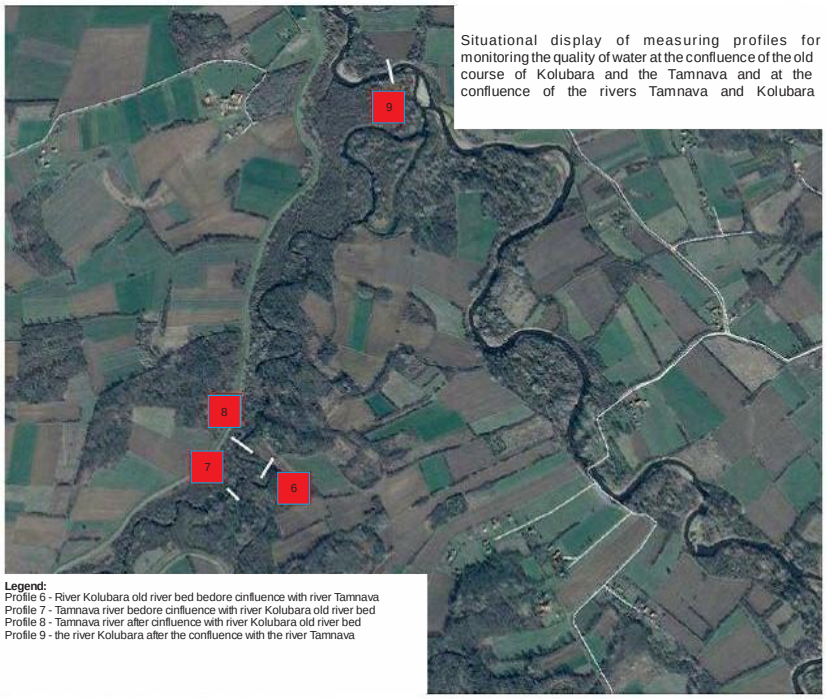
| | Parameter | | Parameter |
|---|---|---|---|
| 1 | Zinc (Zn) | 6 | Cobalt (Co) |
| 2 | Copper (Cu) | 7 | Total Chromium (Cr) |
| 3 | Aluminium(Al) | 8 | Arsenic (As) |
| 4 | Iron (Fe) | 9 | Boron(B) |
| 5 | Manganese (Mn) | 10 | Petroleum Hydrocarbons |

Test method in Table 13: The analytical methods which are applied in the procedure of monitoring the status of surface and ground waters and sediments must comply with the standard SRPS ISO/ IEC 17025: 2006.




**Sustional display of measuring profiles for water qualiy monitoring for Tamnava West Feld Open pit mine**

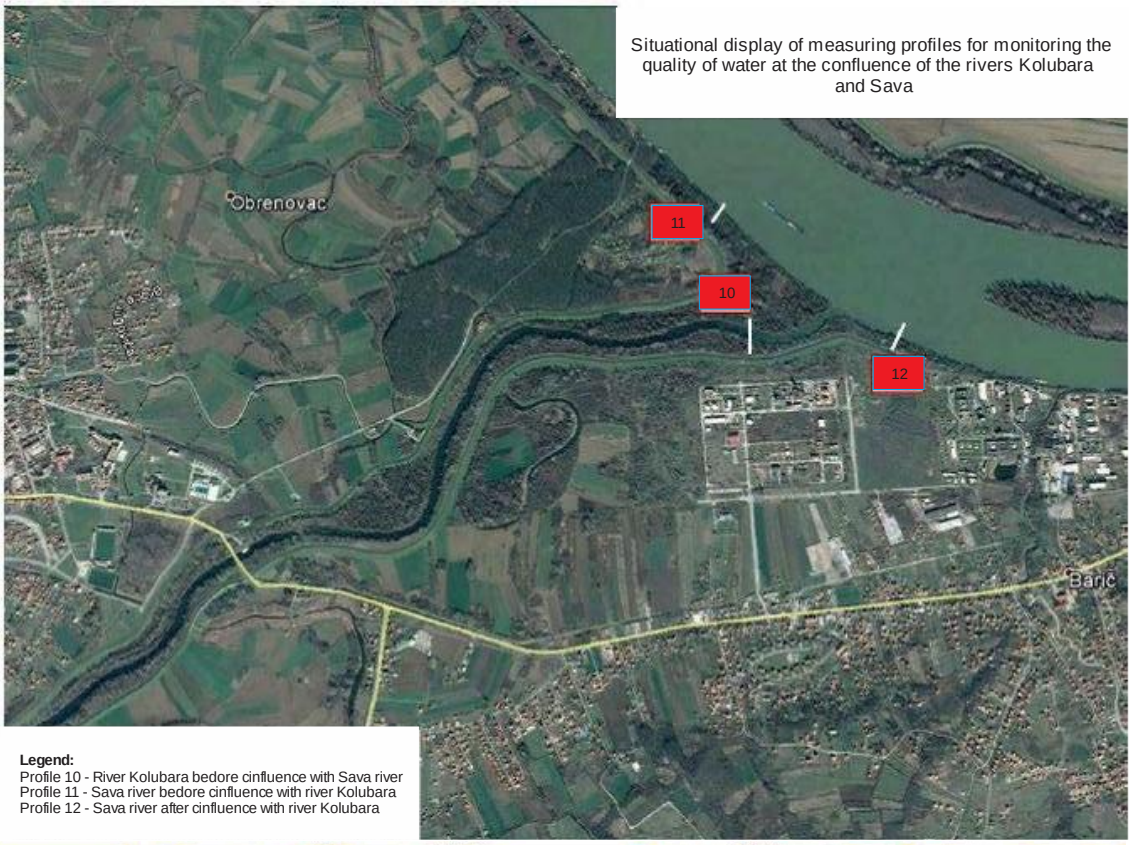
Legend:
Profile 1 - upstream from the pumping out zone at the profile N°2
Profile 2 - the zone of pumping out from the OPM Veliki Crljeni
Profile 3 - the zone of pumping out from the OPM Tamnava - West Field
Profile 4 - the zone of mixing after the outflow of „profile 2" and „profile3 "- PS TPPK
Profile 5 - old Kolubara river bad, railway bridge
Profile a - sediment and water semple from the OPM Veliki Crljeni
Profile b and c - sediment and water semple from the OPM Tamnava - West Field



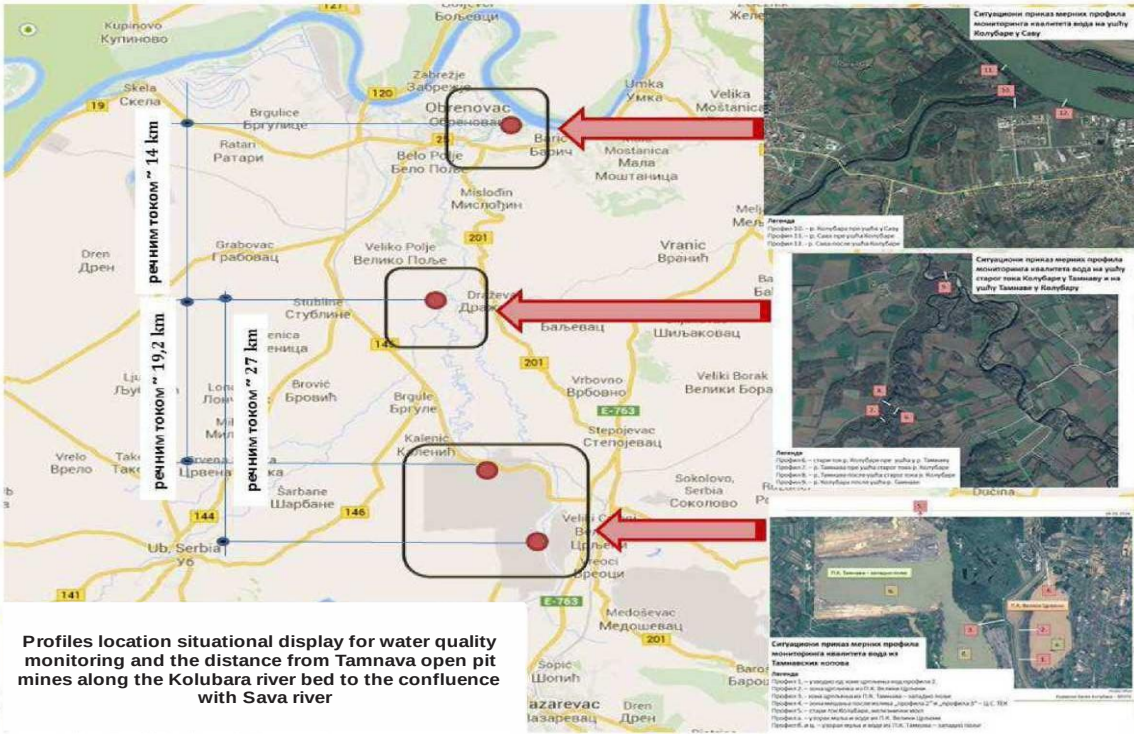

Situational display of measuring profiles for monitoring the quality of water at the confluence of the old course of Kolubara and the Tamnava and at the confluence of the rivers Tamnava and Kolubara

**Legend:**
Profile 6 - River Kolubara old river bed bedore cinfluence with river Tamnava
Profile 7 - Tamnava river bedore cinfluence with river Kolubara old river bed
Profile 8 - Tamnava river after cinfluence with river Kolubara old river bed
Profile 9 - the river Kolubara after the confluence with the river Tamnava

Situational display of measuring profiles for monitoring the quality of water at the confluence of the rivers Kolubara and Sava




**Legend:**
Profile 10 - River Kolubara bedore cinfluence with Sava river
Profile 11 - Sava river bedore cinfluence with river Kolubara
Profile 12 - Sava river after cinfluence with river Kolubara




**Profiles location situational display for water quality monitoring and the distance from Tamnava open pit mines along the Kolubara river bed to the confluence with Sava river**

Operational monitoring program can be implemented in cooperation with the National Laboratory of the Environmental Protection Agency and the laboratory of the MB “Kolubara”d.o.o. Lazarevac - Branch Processing Plant, Vreoci - Center for Coal and Waste Water Testing. General physical and chemical elements of surface water quality (Table 8) from the profiles 1-5 will be handled by the laboratory of the MB “Kolubara”d.o.o., Lazarevac - Branch Processing Plant, Vreoci- Center for Coal and Waste Water Testing, and the specific water pollutants (Table 9), the priority and priority hazardous substances (Table 10), the biological elements of water quality at the profiles 10, 11 and 12 (Table 11) by the National Laboratory of the Environmental Protection Agency. The monitoring from the profiles a, b and c, where the sampling of water and silt (Tables 12 and 13) is envisaged within the open pit mines themselves, and which will be carried out before the emergency monitoring, will be performed one time. The National Laboratory of the Environmental Protection Agency will perform the analysis of water and silt for the specific pollutants and the priority and priority hazardous substances, and the Laboratory Vreoci - Center for Coal and Waste Water Testing will perform the analysis for general physical and chemical elements of quality. The emergency monitoring program at the profiles 6-12 will be implemented in the National Laboratory of the Environmental Protection Agency. The flows at the measuring profiles will be determined by the Republic Hydrometeorological Service of Serbia.

## ANNEX 5: RELEVANT NATIONAL LEGISLATION AS OF DECEMBER 2014

The main laws and regulations currently in force in Republic of Serbia which are relevant to the environmental protection during planning, design, construction and operating of this Project are listed below:

1. Law on planning and construction ("Official Gazette of RS" No. 72/2009, 81/2009)
2. Law on nature protection ("Official Gazette of RS", 36/09)
3. Law on Environmental protection ("Official Gazette of RS" No. 135/04, 36/09, 72/09)
4. Law on EIA ("Official Gazette of RS" No. 135/2004, 36/2009)
5. Law on SIA ("Official Gazette of RS" No. 135/2004)
6. Law on waste management ("Official Gazette of RS", 36/09)
7. Law on noise protection ("Official Gazette of RS", 36/09, 88/10)
8. Law on water ("Official Gazette of RS", 30/10, 93/12)
9. Law on forest ("Official Gazette of RS", 46/91, 83/92, 54/93, 60/93, 53/93, 67/93, 48/94, 54/96, 101/05)
10. Law on Air Protection ("Official Gazette of RS", 36/09
11. Law on Safety and Health at Work ("Official Gazette of RS", 101/05)
12. The Law on Occupational Safety and Health ("Official Gazette of RS" No. 101/05)
13. Law on Planning and Construction ("Official Gazette of RS" No. 72/09, 81/09)
14. Energy Law („Official Gazette of the Republic of Serbia" No. 57/11, 80/11-amendment, 93/12 and 124/12)
15. Agricultural Land Law , ("Official Gazette of RS" No. 62/06)

**Regulations established on the basis of the Law on EIA include the following:**

1. Decree on establishing the List of Projects for which the Impact Assessment is mandatory and the List of projects for which the EIA can be requested ("Official Gazette of RS" No. 114/08)
2. Rulebook on the contents of requests for the necessity of Impact Assessment and on the contents of requests for specification of scope and contents of the EIA Study ("Official Gazette of RS" No. 69/05)
3. Rulebook on the contents of the EIA Study ("Official Gazette of RS" No. 69/05)
4. Rulebook on the procedure of public inspection, presentation and public consultation about the EIA Study ("Official Gazette of RS" No. 69/05)
5. Rulebook on the work of the Technical Committee for the EIA Study ("Official Gazette of RS" No. 69/05)
6. Regulations on permitted noise level in the environment ("Official Gazette of RS" No. 72/10)
7. Decree on establishing class of water bodies ("Official Gazette of SRS" No. 5/68)
8. Regulations on dangers pollutants in waters ("Official Gazette of SRS" No. 31/82)

**Other relevant Serbian legislation**

1. Law on confirmation of convention on information disclosure, public involvementin process of decision making and legal protection in the environmental area ("Official Gazette of RS", 38/09)
2. European Environment and Health Committee. Serbia. Copenhagen, WHO Regional Office for Europe, 2006 (http://www.euro.who.int/eehc/implementation/20061010_9 accessed 29 December 2009).
3. Constitution of the Republic of Serbia. Official Gazette of of the Republic of Serbia, 2006, No. 98/06.
4. Law on Management of Chemicals. Official Gazette of the Republic of Serbia, 2009, No. 36/09.
5. Law on Biocidal Products. Official Gazette of the Republic of Serbia, 2009, No. 36/09.
6. The Law on Environmental Protection. Official Gazette of the Republic of Serbia, 2009, No. 36/09.
7. Regulation (EC) No 1907/2006 of the European Parliament and of the Council of 18 December 2006 concerning the Registration, Evaluation, Authorization and Restriction of Chemicals (REACH), establishing a European Chemicals Agency, amending Directive 1999/45/EC and repealing Council Regulation (EEC)

No 793/93 and Commission Regulation (EC) No 1488/94 as well as Council Directive 76/769/EEC and Commission Directives 91/155/EEC, 93/67/EEC, 93/105/EC and 2000/21/EC. Official Journal of the European Union, 2006, L396:1-849.

8. Directive 2003/35/EC of the European Parliament and of the Council of 26 May 2003 providing for public participation in respect of the drawing up of certain plans and programmes relating to the environment and amending with regard to public participation and access to justice Council Directives 85/337/EEC and 96/61/EC. Official Journal of the European Union, 2003, L156:17-24.
9. Council Directive 91/271/EEC of 21 May 1991 concerning urban waste water treatment. Official Journal of the European Communities, 1991, L135:40-52 (http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:31991L0271:EN:HTML, accessed 25 January 2010).
10. Council Directive 98/83/EC of 3 November 1998 on the quality of water intended for human consumption. Official Journal of the European Communities, 1998, L330:32-33 (http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:1998:330:0032::EN:PDF, accessed 25 January 2010).
11. Directive 2002/49/EC of the European Parliament and of the Council of 25 June 2002 relating to the assessment and management of environmental noise - Declaration by the Commission in the Conciliation Committee on the Directive relating to the assessment and management of environmental noise. Official Journal of the European Communities, 2002, L189:12-25 (http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=QJ:L:2002:189:0012:: EN:PDF , accessed 25 January 2010).
12. Federal Assembly. Regulation on permitted level of noise in the environment. Official Gazette of the Republic of Serbia, 2010, No. 72/10.
13. Law on Integrated Pollution Prevention and Control. Official Gazette of the Republic of Serbia, No. 135/04 (http://www.basel.int/legalmatters/natleg/serbia-04e.pdf, accessed 11 January 2010).
14. Council Directive 1999/30/EC of 22 April 1999 relating to limit values for sulphur dioxide, nitrogen dioxide and oxides of nitrogen, particulate matter and lead in ambient air. Official Journal of the European Communities, L163:41-60.

## ANNEX 6: REPORT ON PUBLIC DISCLOSURE AND PUBLIC CONSULTATION

### 1. BACKGROUND

In mid-May 2014 most of central and western Serbia has been affected by devastating floods. These floods particularly affected the western part of the Kolubara River Basin where surface coal mines are located: Tamnava - West Field and Veliki Crljeni. Both surface mines are completely submerged along with much of continuous manufacturing systems and they do not run production activities.

The sinking of surface mines occurred due to flooding of water from the existing bed of the rivers Kolubara, Pestan and Vranicina. With water in the pits along with the floodwater entered and a large amount of sediment and sludge, which are result of the erosion of the river bed and the flood wave.

In respect to environmental safeguard issues, and according to environmental legislative of Republic Serbia and official letter from Ministry of Agriculture and Environment, EPS had no obligation to prepare specific EIA Study. Nevertheless, Electric Power Industry of Serbia (EPS) prepared following documents:

| N⁰ | Name of document | Prepared by |
|---|---|---|
| 1. | Additional mining project of the study estimates the environmental impact of the Project "Expansion of the open pit Tamnava West field"[7] | "Kolubara project Lazarevac", November, 2009 |
| 2. | Study of defining priorities for addressing environmental issues in the period 2011-2021 with an action plan in "PD RB Kolubara"[8] | Faculty of Mining And Geology Belgrade, 2011 |
| 3. | Project is the rehabilitation of pumping water from mines in RB "Kolubara" after the great flood of May 2014 | Professional team for drafting a plan of rehabilitation of the open pit in "PD RB Kolubara" |
| 4. | Study on water pumped from the pit "Tamnava west field" in the river Kolubara River | Professional team for drafting a plan of rehabilitation of the open pit in "PD RB Kolubara" |
| 5. | Interim plan environmental monitoring in water pumped from the open pit mine "Tamnava west field" | Professional team for drafting a plan of rehabilitation of the open pit in "PD RB Kolubara" |
| 6. | Hydro meteorological newsletter River basin Kolubara | Republički Hydro meteorological Service of Serbia, Belgrade; |
| 7. | Program Associate water quality monitoring of Tamnavskih pits (Monitoring the impact of pumping water from the mines to the water quality of the Kolubara River after a flood of May 2014) | Ministry of Agriculture and the Environmental Protection, Serbian Environmental Protection Agency; |

All mentioned documents were the basis for the development of EMP prepared by EPS.

### 1.1 Public Consultations on section specific EMP

The in-country disclosure of draft EMP started on September 06, 2014, when public consultations were announced on "EPS" web-site (pictures 01 and 02), and on "RB Kolubara" web-site (pictures 03 and 04). At the same date the draft EMP document was placed on web-sites. .

On September 06, 2014, public consultations were announced in daily newspaper "Danas" (picture 05).

[7] Document already existed and remain valid for EPS activities.

[8] Document already existed and remain valid for EPS activities.

A public announcement invited the public, authorities and relevant institutions to have an insight into the EMP for the Project. (Official letters to Ministry of Mines and Energy, Ministry of Agriculture and Environment, Republic Hydro Meteorological Service of Serbia, Agency for Environmental Protection, Center for Development of Non-Profit Sector and to local villages in surrounding of pit mine and river Kolubra).

Information about public consultation was available in period from September 06, 2014 to September 12, 2014 (which included 5 working days). Disclosure of draft EMP finished on September 13, 2014, when the public meeting was held in the city of Lazarevac.

There were 28 attendees (23 from public, 4 people from EPS and an independent moderator) on public consultation meeting in Lazarevac (pictures 06 to 10). Thirteen attendees were local citizens and municipality officers. Among the others, there were, local environmental and NGO`s officers (6 attendees), Ministries representatives (3 attendees), local media representatives, colleague engineers etc.

Meeting was attended by Miss. Olivera Jordanovic, (WB Land Administration Specialist) as a citizen.

The meeting started according to schedule at 08,30 AM. The meeting was recorded by local TV station and journalists. EMP was presented in detail to the interested attendees by the EPS representatives via two presentations.

During the public consultations, there were no significant remarks in regards to environmental protection issues. (List of questions and answers is attached).

EPS representatives explained all mitigation measures, including procedures and actions related to Hazardous materials and spills; Water, Noise and vibration; Air quality;, Riverbanks and riverbeds; Waste management; and Stakeholder engagement which will be implemented during project implementation.

Consultation ended at 11,30 AM, local time.

Comments were received by NGO CEKOR (Center for Ecology and Sustainable Development) after completion of public consultation process, and the responses were provided in writing to the authors.

## 2. LIST OF PARTICIPANTS

| Редни број No. | Име и презиме Name | Бр. лк. ID/Passport | Организација/приватно Organization/personally |
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| 3. | Марина Андрејашевић | 003238031 | Министарство рударства и енергетике |
| 4. | Бранислав Пауић | | РБК |
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| | | | |
|---|---|---|---|
| 7. | Катарина Јанимовић | 003377017 | Зелени Србије |
| 8. | Слободан Јовановић | 002752700 | Јунковац приватно |
| 9. | Мајан Живановић | 0050573O4 | Еколошки покрет Обршина |
| 10. | Предраг Ивановић | 1904973710117 матични | МЗ Петка |
| 11. | Горан Камчев | 0047689G2 | Министарство пољопривреде |
| 12. | Светомир Максимовић | 001901959 | ЕПС |

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| | | | |
|---|---|---|---|
| 13. | Небојша Вељковић | 0017730l0 | Агенција за заштиту ж. средине |
| 14. | Сања Спасић | 0020ll802 | Општина Уб |
| 15. | Горан Митић | 0037914б0 | Центар за развој друштва |
| 16. | Живомир Филиповић | 063/1025610 | Одборник Општине Уб |
| 17. | Снежана Зордановић | 0ll/3023725 | Сбетска банка |
| 18. | Слободан Тадић | 3004974771612 | Одборник Уб |

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| | | | |
|---|---|---|---|
| 19. | Зоран Живановић | 0049379502 | Одборник Уб |
| 20. | Драган Јелић | 0350967771622 | Председник Скупштине Уба |
| 21. | Иван Бабић | 064/8333188 | ЕПС |
| 22. | Владислав Васиљевић | 060/1717100 | Зелени Србије |
| 23. | Стевановић Петровић Надежда | 0047601906 | РБ Колубара |
| 24. | | | |

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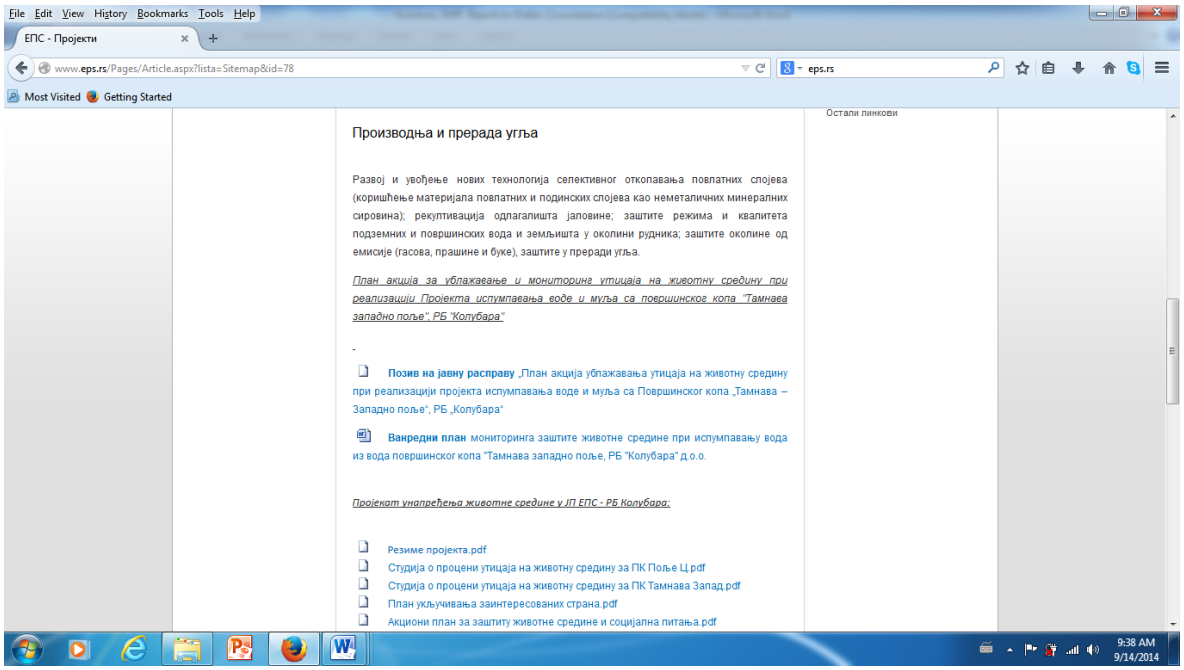
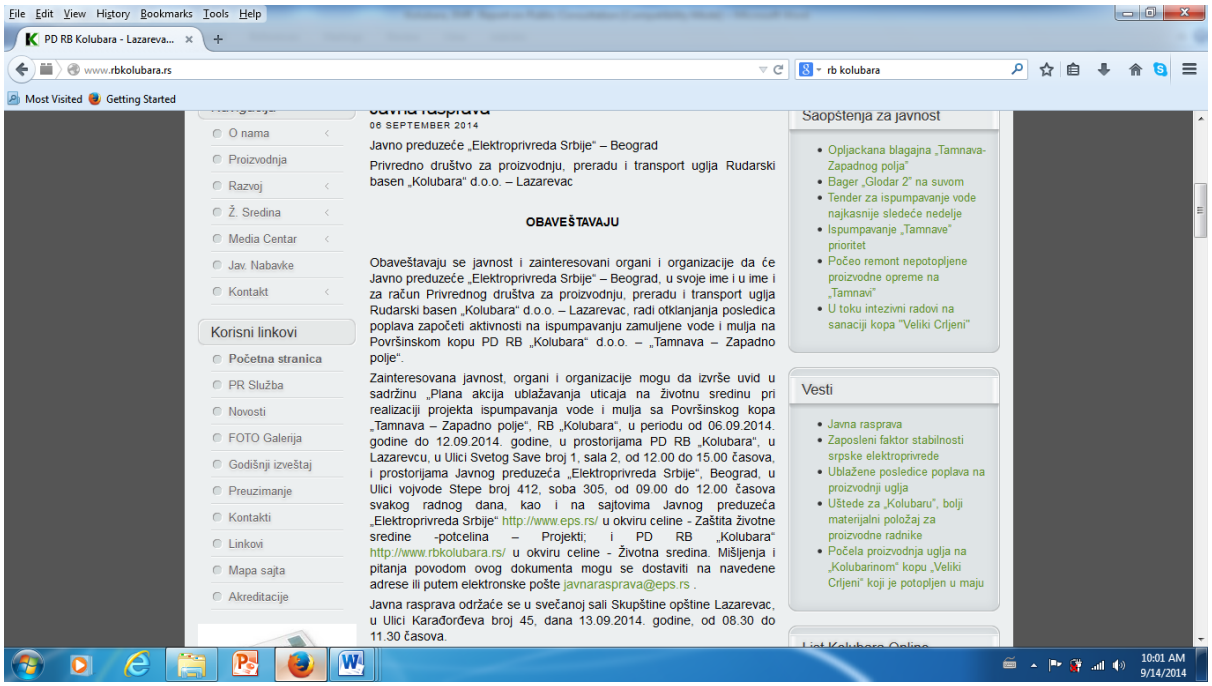
## 2. DOCUMENTATION

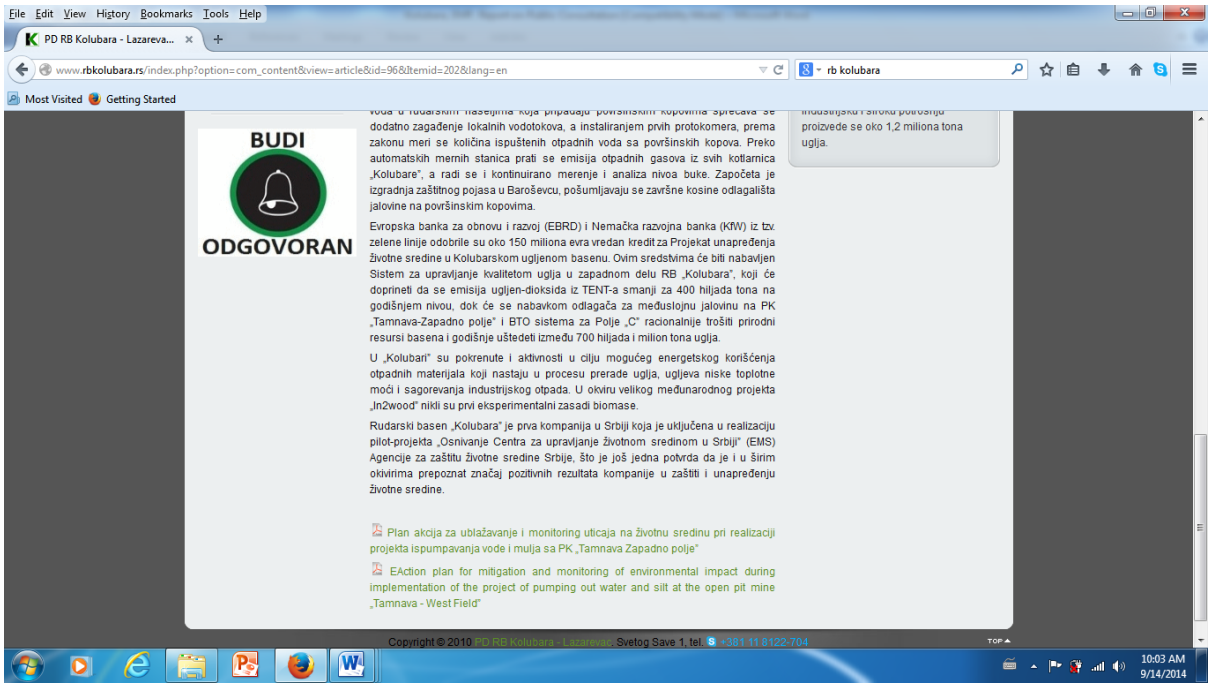



Picture 01 – Public Announcement and EMP on "EPS" web-site, September 06st 2014


Picture 02 – EMP on "EPS" web-site, September 06st 2014 - english version




Picture 03 – Public Announcement on "RB Kolubara" web-site, September 06st 2014




Picture 04 – EMP on "RB Kolubara" web-site, September 06st 2014 - english version

Medij - Rubrika: DANAS - Market
Datum: Sub, 06/09/2014 Zemlja: Srbija
Površina članka: 165cm²
Autor:
Strana: 15
Deo: 1/1

Јавно предузеће „Електропривреда Србије“ – Београд

Привредно друштво за производњу, прераду и транспорт угља
Рударски басен „Колубара“ д.о.о. – Лазаревац

**ОБАВЕШТАВАЈУ**

Обавештавају се јавност и заинтересовани органи и организације да ће Јавно предузеће „Електропривреда Србије“ – Београд, у своје име и у име и за рачун Привредног друштва за производњу, прераду и транспорт угља Рударски басен „Колубара“ д.о.о. – Лазаревац, ради отклањања последица поплава започети активности на испумпавању замуљене воде и муља на Површинском копу ПД РБ „Колубара“ д.о.о. – „Тамнава – Западно поље“. Заинтересована јавност, органи и организације могу да изврше увид у садржину „Плана акција ублажавања утицаја на животну средину при реализацији пројекта испумпавања воде и муља са Површинског копа „Тамнава – Западно поље“, РБ „Колубара“, у периоду од 06.09.2014. године до 12.09.2014. године, у просторијама ПД РБ „Колубара“, у Лазаревцу, у Улици Светог Саве број 1, сала 2, од 12.00 до 15.00 часова, и просторијама Јавног предузећа „Електропривреда Србије“, Београд, у Улици војводе Степе број 412, соба 305, од 09.00 до 12.00 часова сваког радног дана, као и на сајтовима Јавног предузећа „Електропривреда Србије“ http://www.eps.rs/ у оквиру целине - Заштита животне средине -потцелина – Пројекти; и ПД РБ „Колубара“ http://www.rbkolubara.rs/ у оквиру целине - Животна средина. Мишљења и питања поводом овог документа могу се доставити на наведене адресе.
Јавна расправа одржаће се у свечаној сали Скупштине општине Лазаревац, у Улици Карађорђева број 45, дана 13.09.2014. године, од 08.30 до 11.30 часова.

Picture 05 – Public Announcement in daily newsparer “Danas”, September 06, 2014