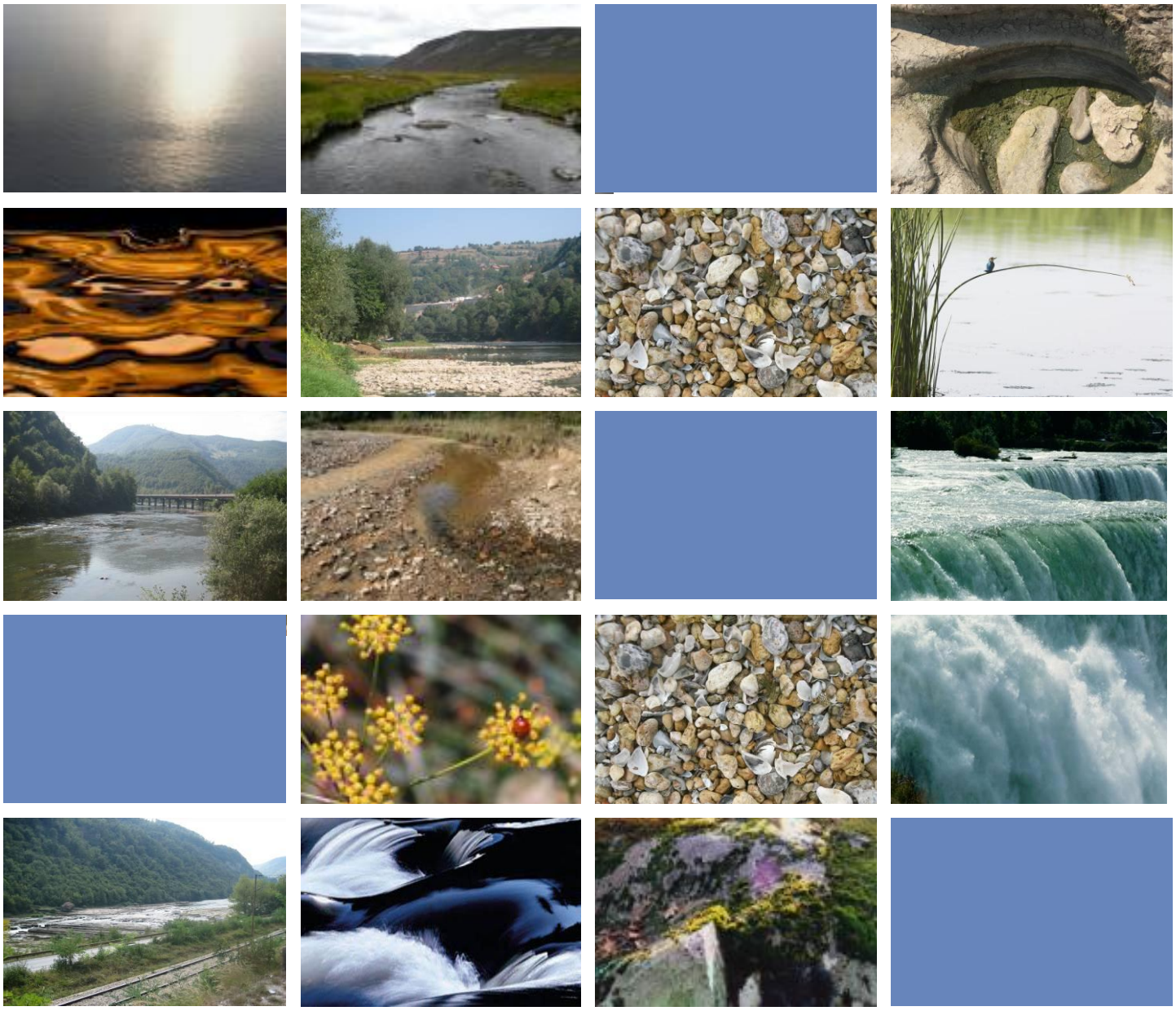

Environmental and Social Action and Monitoring, Lengarica Small Hydro Power Plant, Albania

Environmental and Social Action and Monitoring Plan

Version 11th Mai, 2012
1st update – 5th June, 2012
2nd update – 30th January, 2013

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Finance in Motion
Green for Growth Fund,
Southeast Europe

Delivering sustainable solutions in a more competitive world

ERM

ESAM

ERM GmbH
Environmental
Resources
Management

Environmental and Social Action and Monitoring, Lengarica Small Hydro Power Plant, Albania

ESAM

Version 11th Mai, 2012
1st update – 5th June, 2012
2nd update – 30th January, 2013

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Mitglied der
Environmental Resources
Management Group

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ERM GmbH

Neu-Isenburg, 30th January, 2013

p.p.a.

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Project Manager

CONTENTS

Abbreviations

ESAM	Environmental and Social Action and Monitoring
GGF TAF	Green for Growth Fund Southeast Europe Technical Assistance Facility
EHSS	Environment, Health and Safety and Social Aspects
EIA	Environmental Impact Assessment
ESIA	Environmental and Social Impact Assessment
LaE	Lengarica and Energy sh.p.k.
ERM	ERM GmbH (Environmental Resources Management)
REA	Regional Environmental Agency
HPP	Hydropower Plant
ISO	International Organisation of Standardisation
H&S	Health and Safety
IMS	Integrated Management System
IFC	International Finance Cooperation
PS	Performance Standard
ENSO	EnsoHydro GmbH
CLO	Community Liaison Officer
OHSA	Occupational Health and Safety
SPV	Special Purpose Vehicle

1 *INTRODUCTION*

The Green for Growth Fund Technical Assistance Facility GGF TAF (Lender) seeks to invest into Lengarica and Energy sh.p.k., Albania (Sponsor) for the construction of a Small Hydro Power Plant (HPP) at Lengarica River. Lengraica & Energy sh.p.k (LaE) is a Special Purpose Vehicle (SPV) company registered in Albania. Shareholders are EnsoHydro GmbH, Austria (80%) and HASI Energy sh.p.k, Albania (20%). ERM GmbH was commissioned by *GGF TAF (Lender)* and by Lengarica and Energy sh.p.k.(Sponsor) to undertake an Environmental and Social Action and Monitoring Project.

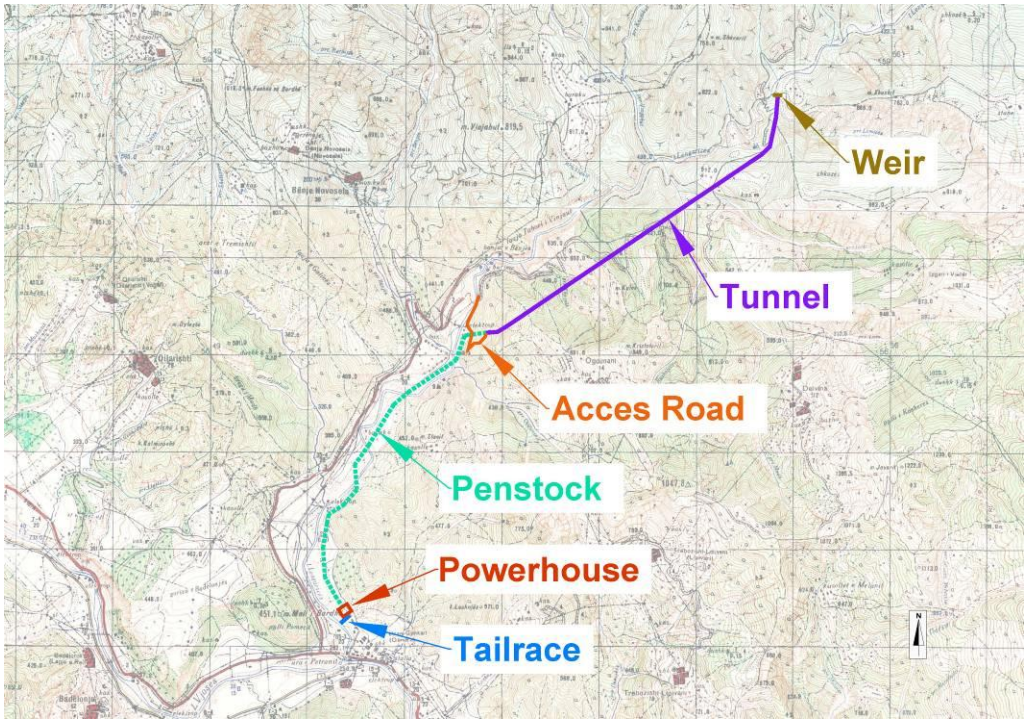
Lengarica hydropower project is a Run-Of-River type Hydropower Plant, which will be built at the lower part of the Lengarica River basin in Permet district, Gjirokaster prefecture. It will be situated in a hilly and mountainous terrain, in Banja's Canyon zone at the elevation of 410m above sea level, about 7 km from Vjosa river. The project will consist of a regulator ("side intake" type, opening for ecological flow, about 13m height and 60m length), about 4 km tunnel (concrete lining, 2.4m width, 4m height), a forebay (concrete basin to collect the water coming from the tunnel), about 3.7 km penstock (6 river crossings), a powerhouse (8.9MW), and about 6.5 km 35kV transmission line to Permet substation. The powerhouse will be located in the north of the village of Petran about 2 km from river Vjoses.

According to the existing Lengarica HPP ESIA the foreseen installed capacity for Lengarica HPP is 8,600 kW and expected annual production amounts to 28,4 GWh. The catchment area of the SHPP is 270.6 km^2. The projected water flow to be exploited is calculated at 7.15 m^3/sec. Annual operation time is calculated at 3,307 hours (or 137 days).

The Project was classified by International Finance Corporation IFC into Category B[1] as stated on the IFC website:
(http://www.ifc.org/ifcext/spiwebsite1.nsf/f451ebbe34a9a8ca85256a550073ff10/799a140eed7a6bcb852578fb005299a5?opendocument).

[1] A project is classified as Category "B" if its potential environmental impacts are less adverse than those of Category "A" projects (highest impact category). These impacts are site-specific, few if any of them are irreversible, and in most cases mitigatory measures can be designed more readily than for Category A projects.

Figure 1-1 Lengarica HPP Project



2 ENVIRONMENTAL AND SOCIAL ACTION PLAN ESAM

General Environmental and Social Management Framework

This Environmental and Social Action and Monitoring Plan (ESAM) compiles the organizational requirements and mitigation measures to avoid or minimise potentially adverse effects on environment, health and safety and on social aspects (EHSS) by the proposed Project. The EIA Permit Decision[2] received by LaE contains a number of mitigation measures and specific instructions and action items (see attached in Annex A). The main purpose of this ESAM is to present additional action items required to make the Project compliant with international requirements and/or international best practice, - see text box below.

Lender Environmental and Social Requirements:

- The Project will need to meet Albanian environmental, health and safety and social laws and regulations;
- The Project will be carried out in compliance with the European Union environmental and social standards, in particular EIA, Birds and Habitat Directives.
- Compliance with the IFC Performance Standards available at http://www.ifc.org/enviro
- Public consultation and stakeholder engagement will be meaningful and allow for public participation in decision making (in accordance with UN ECE Aarhus convention)
- The project includes all necessary measures to avoid, minimize or mitigate any adverse change in environmental conditions and impacts on public health and safety.

This ESAM will be also made available to Contractors who will be expected to comply with relevant requirements and implement the ESAM during construction. During construction and operation, LaE will monitor implementation of the ESAM and report to ERM. The ESAM must also be made publicly available.

Overall responsibility for the ESAM lies with LaE for all project phases, i.e. project design, construction, operation, and decommissioning. In this regard LaE are responsible for agreeing the ESAM, communicating requirements of the ESAM with any contractors working on the project and monitoring contractor performance in terms of ESAM compliance. This monitoring of compliance must include an auditing/verification element, a reporting element (to inform the responsible contractor of the non-compliance) and a

[2]Decision on Environmental Permit, Ministry of Environment , Forests and Water Administration, No.318 Ref. Identification NO.473, Tirana, dated 17.01.2012

tracking mechanism to ensure that all identified non compliances are remedied.

Since an ESAM continues to evolve in scope and depth with subsequent stages of the Project preparation and implementation (e.g. construction, operation, tendering), the ESAM itself provides a framework. Detailed plans, such as e.g. EHSS plans, will need to be setup by the Construction Contractor. It is the responsibility of LaE to ensure that such plans are consistent with requirements of the Environmental Permit, Lender Requirements and the overall ESAM. The compliance with the ESAM will be monitored by ERM and reported to GGF TAF.

Monthly reports during construction and then quarterly monitoring reports during operation will be compiled by LaE. The reports shall cover the status of EHSS related aspects and summarize the activities and results of monitoring contractor compliance with this ESAM.

The EIA Permit Decision stipulates environmental assessments and reporting to the national authority no less than once every 3 years and short periodic reporting to the Albanian Regional Environmental Agency (REA) on a quarterly basis during construction and every 6 months during operation.

LaE shall nominate a Community Liaison Officer (CLO) to handle communication with the community, answer questions, and make sure people are aware of LaE's commitments. A grievance mechanism shall be established.

Construction

LaE will mandate a Construction Supervisor who is responsible for supervision of the environmental and social as well as health and safety relevant activities.

The Supervisor will be responsible for carrying out inspections during all phases of construction and to supervise the works contractor's activities to ensure that the EHSS requirements are met during construction.

The Construction Contractor will be obliged to provide all necessary skilled and competent EHSS staff to ensure that all activities are carried out in accordance with the EHSS regulations, and guidelines of Albania and the Lenders requirements and comply with the ESAM. Potential risks at work places have to be assessed, including chemicals, mechanical and electrical risks, confined space, hot work. Further aspects which have to be addressed are safety issues, incidents/accidents, near misses, inspections by regulators, need for corrective measures, conflicts amongst construction workforce or with local residents, grievances of workforce or stakeholders.

Construction workforce and sub-contractors shall receive comprehensive EHSS training at the beginning of the work, thereafter on a regular basis. Special EHSS instructions will be provided for temporary workforce and subcontractors.

Operation

LaE is responsible for the operation and maintenance of its installations. Operation will be in an environmentally sound manner, in particular to ensure compliance with any environmental provisions set out by the competent licensing authority.

The EHSS responsible person from LaE will handle EHSS issues during operation of the plant. An Integrated Management System (IMS) will be implemented.

The EHSS responsible person will ensure that the operation of the plant complies with environmental standards and the requirements of the Albanian environmental legislation as well as with Lenders Environmental and Social Requirements and this ESAM.

Action Item Tables

The action item table of this ESAM presents specific mitigation measures as per each of the relevant IFC Performance Standards in construction and operation stages and provides for compliance of the overall project with international best practice.

In general, any plan or procedure/work instruction listed in the following shall be reflected in the contractual environmental, health & safety and social responsibility provisions of the contracts between LaE and the contractor. Implementation Supervision will be provided by LaE and monitoring by LaE and ERM. According to the ESAM, Plans and measures are subject to revision for performance improvement, if monitoring reveals weaknesses in implementation. Action item implementation will also be benchmarked against key performance indicators. All activities related to construction and operation will be subject to official Albanian environmental and social inspection within the mandate of the relevant authorities as specified in the EIA Permit Decision.

Table 1 Action Item Table

Item No Lender Standard	Potential Impact / Issue	Mitigation / Management	Responsibility / Implementation	Monitoring / Key Performance indicators	Cost / Budget for Activity	Timeline / Milestones
1 PS1	Compliance with the conditions of the permit decision	Implementation of all mitigation measures stipulated in: • Environmental Permit – On the activities that have an impact on the environment (January 17, 2011, no. 318 Ref. Identification No. 473) Pursuant to Act No. 8934, dated 05.09.2002 " On Protection of Environment" and its amendments • Water Permit – Decision, Nr. 4, Date 25.09.2008, National Basin Council, Vjosa Catchment Basin Council Vlore	For Construction: LaE and contractor to implement, ERM to monitor implementation; For Operation: LaE to implement; ERM to monitor implementation during first year	Monitoring and audit reports	Auditing time Management time	During all project stages as appropriate
2 PS1	Social and Environmental Management System	LaE will implement an Integrated Management System (IMS), based on ISO 14001 (Environment), OHSA 18001 (Occupational Health and Safety) and ISO 9001 (Quality). In addition ENSO will present an environmental process manual including environmental standards and principles and environmental health and safety requirements for contractors. The Environmental Process Manual should clarify organisational arrangements of ENSO and LaE regarding roles, duties, responsibilities for EHSS and community liaison, their responsibilities and reporting line during construction and operation and should incorporate IFC PS (as stated in the ESAP prepared by ENSO, August 25, 2011). The people in charge shall be competent and trained. The requirements for implementation shall be stipulated in the contracts. Construction: The construction contractor will have to prepare and implement a Construction Site Management Plan and a Quality Assurance Plan in compliance with Lender requirements	LaE for implementation of a general Management System; Contractor for preparation of site specific EHSS Plan and Construction Site Management Plan; implementation during construction	Implementation of Management systems LaE's documentation of Management Systems based on international standards (ISO) Environmental process manual prepared by ENSO. EHSS Plans Construction Site Management Plan incl. Waste Management Plan, a Pollution Prevention Plan, Chance Find Procedure.	Management time	Management System and Environmental Process Manual prior to IFC´s disbursement latest one month after construction start EHSS Plans by the Contractor before start of construction

Item No Lender Standard	Potential Impact / Issue	Mitigation / Management	Responsibility / Implementation	Monitoring / Key Performance indicators	Cost / Budget for Activity	Timeline / Milestones
		and ENSO's EHSS and Management Plans. The Construction Site Management Plan shall include at a minimum the following sub-plans: a Waste Management Plan, a Traffic Management Plan a Pollution Prevention Plan and a Chance Find Procedure. The contractor shall provide the required plans, processes and measures to LaE for approval prior to start of construction works. The measures to be implemented in each plan shall be specified in detail by including priority, timeline, performance indicator, acceptance criteria that can be tracked over defined time periods, and should also indicate the resources, including budget, and responsibilities required for implementation. The Contractor for construction works will provide project specific EHSS training to ensure that all staff working on site are aware of their duties and responsibilities relating to EHSS and to maintain documents for all training provided. EHSS critical posts should have training and competence requirements defined.		Training Matrix Training records		works.
3 PS1	Construction	The contractor will be required to adhere to the Construction Site Management Plan. Measures to be incorporated into this plan are inter alia: • Minimize the number of trees to be cut; as mitigation measure - plants shall be replanted where cutting of trees is not avoidable. • Minimize the areas to be cleaned from bushes and other plantations; as mitigation measure plants shall be replanted. • Apply measures to minimize the time required for the restoration of natural plant cover at the construction areas (e.g. seedling, fertilizing); • Inform local communities of major activities in advance; • Implement a Grievance Mechanism (see Community Engagement No.17)	Contractor	Construction Site Management Plan Visual inspection and photographs of affected sites Monthly reports on implementation. Invoice from tree provider and photos of affected areas. Visual inspection of dust sources weekly in the evenings		Monthly Reporting Replanting within one month after finishing works at the respective HPP-component Slope stability to be monitored

Item No Lender Standard	Potential Impact / Issue	Mitigation / Management	Responsibility / Implementation	Monitoring / Key Performance indicators	Cost / Budget for Activity	Timeline / Milestones
		• Ensure all dangerous construction sites are fenced off and appropriate Security arrangements, if security personnel is needed, they should be trained; • Safe storage of hazardous substances and materials (e.g. oil, fuel). Spray Stockpiles and aggregates with water to suppress dust emissions and excavated material should be wetted during loading and unloading during dry weather conditions; • Visible inspection of dust emissions in settlements adjacent to construction activities; • Improve quality of roads being used by the project; • Strictly enforce and monitor road safety standards (see Traffic Management Plan below); • Soil will be stored carefully to one side of the construction working area, in such a way that it is not mixed with sub soil or trafficked on by vehicles; • Topsoil stripping will be limited to the footprint of the intake area, the Pipeline locations, the Powerhouse, the transmission line and the access roads according to the project design; • Stockpiles of topsoil will be a maximum of 2 m high to avoid compaction from the weight; • Retaining walls shall be constructed in areas prone to landslides and at stream crossing of the pipeline if needed; • For Pipeline construction in agricultural used areas earth and river gravel should be re-used separately. Special conditions for Penstock erection are inter alia: • During penstock erection slope damage shall be minimized and if applicable protection measures (e.g. berms, protection walls) installed. This includes a construction technique which		Reporting on security arrangements Fencing of powerhouse and tunnel entrance/exit and others if needed Regular auditing during construction regarding Topsoil stripping, soil storage, soil use, stockpiles and soil compaction.		weekly during construction, monthly during operation

Item No Lender Standard	Potential Impact / Issue	Mitigation / Management	Responsibility / Implementation	Monitoring / Key Performance indicators	Cost / Budget for Activity	Timeline / Milestones
		minimizes the footprint of excavation works (e.g. sky crane); • Vegetation clearing shall be minimized as far as possible in order to avoid erosion and keep slope stability; • Replanting of trees within one month after finishing works (leveling surface and filling holes). Special requirements for road construction are inter alia: • During road construction it must be considered that slope stability is critical in some sections, thus slope damage must be avoided in order to cope with security requirements and to avoid soil erosion. Slope damage during construction shall be avoided. Slope stability to be inspected and approved by an experienced Engineer. In case of slope damage the slope must be stabilized (see Traffic Management Plan below); • Replanting of trees within one month after finishing works at the respective HPP component (leveling surface and filling holes) Special requirements for tunnel construction are inter alia: • Special Health and Safety Plan (guideline of International Tunneling and Underground Space Association, 2008) • Tunnel construction work should be monitored by a geologist. • Firefighting requirements shall be set out; • Illumination plan, considering emergency cases; • Ventilation plan; • Method of atmospheric monitoring and limits for illumination and ventilation shall be stipulated; Personal Protection Equipment (PPE) shall be provided for construction personnel (Hard hats, high visibility overalls,				

Item No Lender Standard	Potential Impact / Issue	Mitigation / Management	Responsibility / Implementation	Monitoring / Key Performance indicators	Cost / Budget for Activity	Timeline / Milestones
		adequate foot protection, hearing protection, respiratory protection); • Explosives and auxiliary equipment must be stored in a safe place possibly close to work place; • Blasting works to be undertaken by competent person; • Dust control measures; • Monitoring of thermal springs (see Hydrogeology Monitoring Program, Annex B).				
4 PS1	Renaturation	Reinstatement of the areas after construction shall also be part of the Construction site Management Plan. The construction working area will be reinstated as far as practicable to the same condition as before, in order to avoid soil erosion on bare soils. This includes planting of autochthonous/native trees and filling holes and levelling surface.	LaE	After construction regular auditing on soil erosion and measures against erosion e.g. vegetation rehabilitation Invoices from tree providers Filling holes and levelling surface Photos of affected areas		Replanting of trees within one month after finishing works at the respective HPP component (levelling surface and filling holes).
5 PS1	Waste Management	A Waste Management Plan shall be implemented as part of the Construction Site Management Plan in order to minimise risks of materials such as oil, wastes and sewage and shall provide for the storage and handling of hazardous fuels, construction materials and wastes. This includes: • Site infrastructure must provide for proper removal of sewage and wastes; • Waste and wastewaters from workers must be disposed with other municipal waste and if applicable hazardous wastes; • The proper disposal of wastes and management of oil shall be specified in construction contracts;	Contractor	Construction Site Management Plan/Waste Management Plan Respective specifications in contract Regular auditing during construction and operation by visual inspection	Management time	Regular auditing during operation

Item No Lender Standard	Potential Impact / Issue	Mitigation / Management	Responsibility / Implementation	Monitoring / Key Performance indicators	Cost / Budget for Activity	Timeline / Milestones
6 PS1	Excavated Materials	The Waste Management Plan shall also stipulate the management of excavated materials. Measures to be incorporated into this plan are inter alia: • Following reinstatement, any surplus (uncontaminated) soil will be used within the project area as far as possible; • All construction residues at every HPP compound shall be stockpiled and removed from the assigned place for terrain flattening or disposal; • A proper assessment of storage of excavated materials must be carried out; Environmental Permit for disposal of tunnel excavation material in accordance with Albanian legislation is required from the Permit Decision; • For the dumping sites a habitat mapping (field spot check) is needed to assess whether a proposed site is suited or not. This spot check should also consider soil aspects. As a result also an adaption of a site and technical details of site rehabilitation could be proposed; • The selected disposal site shall secure that no material will be discharged to the river; • A recultivation plan has to be developed; • Slope stability has to be ensured and monitored by an experienced engineer; • Ensure appropriate excess for heavy transport to the disposal site; • It has to be secured, that only inert material will be disposed; • Arrangements for appropriate drainage of surface water have to be made (drainage layer on basis and top of disposed material); • Unhindered access to the disposal site has to be avoided (fencing).	Contractor	Construction Site Management Plan/Waste Management Plan Assessment for disposal sites for excavated materials Environmental Permit for disposal sites of tunnel muck. Visual inspection		Removal of stockpiles latest 2 weeks after termination of works at respective HPP compound (if material is not used for surface levelling)

Item No Lender Standard	Potential Impact / Issue	Mitigation / Management	Responsibility / Implementation	Monitoring / Key Performance indicators	Cost / Budget for Activity	Timeline / Milestones
7 PS1	Traffic	As part of the Construction Site Management Plan a Traffic Management Plan shall be elaborated. A road to the intake did exist, but was improved by the project developer recently (enlarged width, stone pavement, drainage pipes). In addition, a bridge over Lengarica River in vicinity of the Thermal Springs is under construction (at time of site visit end of February 2012). The road is only accessible with 4WD and is narrow in parts, steep and windy. A Construction Traffic Management Plan is needed to cope with this situation and must address inter alia the following points: • Safety aspects have to be considered • Traffic organisation (cut-outs are needed) – drivers to be equipped with walkie-talkies or similar devices • Max. truck capacity has to be defined • Train drivers in sensitivity to critical safety conditions • No night time heavy transport • Slope stability in some sections may be critical (e.g. in case that loaded trucks with heavy weight will use these sections) and it is suggested that the road is inspected and approved by an experienced Engineer. • Trucks coming from the tunnel exit need to cross the river. In case the newly constructed bridge cannot be used, a dry river crossing is needed (e.g. pontoon bridge) in order to avoid increased turbidity downstream • Along the transportation route, speed limits shall be implemented at village roads. Peak traffic hours should be avoided as far as possible.	Contractor	Construction Site Management Plan/ Traffic Management Plan Statement of experienced Engineer Regular auditing during construction		Regular auditing during construction
8	Pollution	A Pollution Prevention Plan shall be included in the Construction Site Management Plan. In order to minimise potential impacts	Contractor	Pollution Prevention Plan		Before start of

Item No Lender Standard	Potential Impact / Issue	Mitigation / Management	Responsibility / Implementation	Monitoring / Key Performance indicators	Cost / Budget for Activity	Timeline / Milestones
PS1	Prevention	(such as: contamination of soil during construction through direct spillage of materials) • Refuelling of mobile vehicles or equipment will be restricted to the workshop; • Refuelling of machinery on site will need special precautionary measures (e.g. secondary containment); • Secondary containment measures at storage areas shall be installed; • Used oil and spare parts shall be managed separately and oil must be stored properly to be recycled. As part of the Pollution Prevention Plan the contractor will also develop and define emergency/ spill response procedures. Measures and preparedness for the following events will have to be determined: • Fire • Pollution of soil and/or water due to oil spill • Stormwater/floods/ weir failure/ earthquake • Increased turbidity or change of chemical parameters is encountered in the thermal springs During works the contractor will have the responsibility to train employees on emergency preparedness and response. LaE is responsible for monitoring during operation. Materials and equipment for clean-up of spills should be available onsite.	LaE	Regular auditing during construction If necessary soil and water samples to be analysed. Contractor shall report on restrictions and events.		construction works.
9 PS1	Monitoring	For the construction phase, monitoring and reporting procedures shall be established by the contractor (to be consistent with the ESAM) and	Contractor	See IMS above Monitoring Reports	Management time	Monthly reporting

Item No Lender Standard	Potential Impact / Issue	Mitigation / Management	Responsibility / Implementation	Monitoring / Key Performance indicators	Cost / Budget for Activity	Timeline / Milestones
		approved by LaE prior to start of construction. Monthly monitoring reports provided by the contractor shall be agreed with LaE include information on safety issues, incidents/accidents, inspections by regulators, need for corrective measures, conflicts amongst construction workforce or with local residents, grievances of workforce or stakeholders. Sub-contractor related issues shall be included, implementation of measures from the Environmental Permit and ESAM.				during construction
10 PS1	Operation	For the Operation Phase LaE shall prepare an Operation Management Plan as Part of its EHSS Plans in conformance with the IMS and similar to the Construction Site Management Plan. This includes inter alia: • Monitoring of slope stability at road; • Monitoring of erosion on slopes; • Monitoring of minimum ecological flow; • Monitoring of water quality (conductivity) used for downstream irrigation activities (depending on outcomes of study on irrigation activities); • Grievance mechanism for downstream river users (see Community Engagement No.17); • Monitoring of thermal springs, if this is decided necessary as outcome of the Hydrogeology Monitoring Programme (see Annex B); • Monitoring of Biodiversity (Fish monitoring to confirm suitability of fish passage and estimated ecological flow) ; • Monitoring of security arrangements; • Proper disposal of wastes; • Monitoring of status of replanting; • Pollution Prevention/spill prevention; • Monitoring of health and safety issues.	LaE	Operation Management Plan including waste management and pollution prevention Quarterly reports on EHSS Regular flow monitoring Periodic visual inspection of aquatic habitats and thermal springs. Visual inspection of slopes, erosion, vegetation status. Photos of affected areas. Periodic inspection of functionality of security arrangements Grievance mechanism and request from stakeholders/community.		Before start of operation Monitoring during operation

Item No Lender Standard	Potential Impact / Issue	Mitigation / Management	Responsibility / Implementation	Monitoring / Key Performance indicators	Cost / Budget for Activity	Timeline / Milestones
11 PS1	Audits / Internal Reporting	LaE must report on the implementation of the ESAM to ERM and the Lenders. Reports must be submitted to the Regional Environmental Agency (REA) on a quarterly basis during construction and semi annually during operation. Implemented mitigation measures shall be documented and a list shall be added to the monthly reports. LaE must provide monitoring and documentation of project progress. This should be part of the regular monitoring and Key Performance Indicators have to be developed linked to a time schedule.	LaE	Monthly reports during construction, Quarterly reports during operation Time schedule including Key Performance Indicators for project stages. Matrix, documenting implemented mitigation measures including timelines	Management time	Monthly reporting during construction, quarterly reporting during operation
12 PS1	Social and Environmental Assessment	In addition to the maps provided in the Updated ESIA, a topographic map presenting the project in its spatial context at a reasonable scale should be prepared by LaE. The map shall include the transmission line to the powerhouse.	LaE	Topographic map with project layout	Document Preparation time	As soon as possible
PS1	Socio-economic impact	Refer to PS5				
13 PS1	Soils	The Updated ESIA did not address soils in the project area, which might be affected by construction works. Soil type and erosion should be addressed together with vegetation loss and regarding impacts related to compaction and relocation. The risk for landslides shall be described more in detail indicating areas of risks where protection walls will be constructed. This Action Item can be addressed within the Construction Site Management Plan, where management of construction material and protection measures against erosion must be stipulated. Best practice soil handling techniques will be implemented: see	LaE & Contractor	Short report on soils in the project area and possible impacts to be included in the Construction Site Management Plan. Plans for landslide/ erosion protection measures.	Document Preparation Time	Before start of construction works

Item No Lender Standard	Potential Impact / Issue	Mitigation / Management	Responsibility / Implementation	Monitoring / Key Performance indicators	Cost / Budget for Activity	Timeline / Milestones
		Construction Site Management Plan				
14 PS1	Hydrogeology	As recommended in the Updated ESIA an additional report on hydrogeology has been compiled by ERM. The entire tunnel will be water tight sealed, where natural conditions are not sufficient. In case karst openings will be encountered during construction, they will be filled and sealed before support installation. Until the sealing is completed, temporary drainage of potential groundwater (thermal or non thermal) from the limestones between tunnel km 0+110 to 2+100 cannot be excluded. In order to limit such potential drainage, tunnel walls will be sealed progressively as drilling proceeds. However, there may be potential temporary impacts on turbidity or water chemistry by the filling and sealing material. Therefore a monitoring program is proposed (See Hydrogeology Monitoring Programme, Annex B). In addition an emergency plan should be established in case an increased turbidity or change of chemical parameters is encountered in the thermal springs.	ERM for preparation and LaE for implementation	The monitoring program can be found in Annex B.	Monitoring Time Laboratory costs	
PS1	Biodiversity	See PS6 below				
PS1	Cultural Heritage	See PS8 below				
15 PS1	Landscape and visual impacts	The project Site lies within the area of a designated National Park and the canyon comprises some areas designated as Natural Monuments. The project design including tunnel and buried	LaE		Document preparation	Before start of construction

Item No Lender Standard	Potential Impact / Issue	Mitigation / Management	Responsibility / Implementation	Monitoring / Key Performance indicators	Cost / Budget for Activity	Timeline / Milestones
		pipes addresses visibility of the project, thus the visual impact of the project has not to be addressed necessarily more in detail. Nevertheless, it is recommended to perform a short assessment and present it in a report. A number of measures minimising visual impacts are part of the Construction Site Management Plan as described above in item No.3.			Time	works
16 PS1	Area of influence	The area of influence must be described more in detail. There is no impact assessment for the transmission line connecting the power house to Permet substation. If the transmission line is located within the National Park in accordance with Albanian legislation and good international practice LaE will conduct a separate Environmental and Social Impact Assessment Study for the construction of the power transmission line, once the power-line route has been defined including land acquisition, impact on forestland, etc.	LaE	Environmental and Social Impact Assessment Report for transmission line if needed.	Document preparation time Time for additional surveys	Once power-line route has been defined
PS1	Organisational Capacity	Refer to IMS Item no. 2				
17 PS1	Community Engagement	LaE shall designate a Community Liaison Officer (CLO) to follow up on complaints and grievances from local communities. Further, the CLO must ensure that people in the communities are aware of the project and know how to communicate concerns or complaints to the company. A grievance mechanism must be provided. The public shall be informed about this and the map indicating the project scheme should be publicly available. The public shall be informed about the project schedule and the size and origin of workforce. In order to document an appropriate community engagement and	LaE CLO	Grievance mechanism Records of consultations, Minutes of Meetings, schedule and list of attendees of public meetings during ESIA process Publication of the ESAM on ENSO webpage, IFC webpage, if possible at the community website or to be made available at the	Management time	Before start of construction works

Item No Lender Standard	Potential Impact / Issue	Mitigation / Management	Responsibility / Implementation	Monitoring / Key Performance indicators	Cost / Budget for Activity	Timeline / Milestones
		to know if all Stakeholders have been considered, information on previous consultation and disclosure shall be presented, i.e. a schedule of community engagement like public meetings, disclosure of information and minutes of meetings. The ESAM must be made available to the affected communities by the CLO.		municipality.		
PS1	Monitoring, Internal Reporting	Refer to IMS item No.9 and 11				
18 PS2	Worker Grievance Mechanism	A worker grievance mechanism shall be established for employees and contractor workers and reporting shall be made to the CLO.	Contractor	Grievance mechanism, Workers are aware of grievance mechanism Spot checks by CLO	Management Time	Before start of construction works
19 PS2	Workforce Protection	Occupational Health and Safety shall be reflected in the contracts specifications for contractor. An Integrated Management System (IMS) should be implemented according to OHS 18001 safety standards (See item no. 2). Health and Safety and social clauses shall be included in the contracts for non employee workers. Worker accommodation has to consider IFC/EBRD's worker accommodation guidelines (http://www1.ifc.org/wps/wcm/connect/9839db00488557d1bdfcff6a6515bb18/workers_accomodation.pdf?MOD=AJPERES).	Contractor	See IMS above Detailed Construction Site Management Plan	Management Time	Construction Site Management Plan before of constructions.
20	Supply Chain	Materials for the project shall be procured from reputable firms and prohibition of low-cost labour, child labour, forced labour	Contractor	Respective specifications in contracts for works and		Contracting

Item No Lender Standard	Potential Impact / Issue	Mitigation / Management	Responsibility / Implementation	Monitoring / Key Performance indicators	Cost / Budget for Activity	Timeline / Milestones
PS2		shall be addressed in the contracts.		materials		
PS3	Pollution Prevention	Refer to Construction Site Management Plan/ Pollution Prevention Plan (PS1)				
PS4	Exposure to natural hazards	Refer to Emergency Response Plan /Pollution Prevention Plan Technical Specifications of Contracts for material and works (PS1)				
21 PS4	Work Force	LaE must provide appropriate information / training to own employees as well as to the contractor and must ensure that the contractor implement the required training to their workers including training.	LaE	Training protocol		During construction
22 PS5	Physical and Economic displacement	Contracts with land owners have to specify conditions of use of private land during construction.	LaE	Contracts with landowners	Document preparation time	Before start of construction works
23 PS5	Physical and Economic displacement	The Thermal springs are a source of income as they attract tourism, as well as the gorge for kayaking. Evaluation of impacts on tourism has to be assessed with regard to economic displacement.	LaE	Short report on assessment of impact on tourism	Document preparation time Time for additional surveys	As soon as possible
24 PS5	Physical and Economic displacement	The ESIA defines the restriction that no water shall be used for power production during irrigation period (July – September), which is not compliant with the Permit on Water Use (minimum river flow: 200l/s) and the EIA Permit Descision. In order to clarify this issue, the function of irrigation for the local community shall be explained more in detail and impacts on irrigation activities, especially during construction, should be assessed. This includes listing of water amounts as well as possible limitations for irrigation activities. A map indicating current	LaE	Short report on irrigation including average used water amount and locations for water extraction from the river.	Document preparation time Time for additional surveys	As soon as possible

Item No Lender Standard	Potential Impact / Issue	Mitigation / Management	Responsibility / Implementation	Monitoring / Key Performance indicators	Cost / Budget for Activity	Timeline / Milestones
		locations for water extraction from the river and irrigated areas shall be added. In consideration of the aquatic ecosystem an irrigation concept during construction and operation of the HPP Lengarica shall be elaborated. The irrigation plan shall also consider inter alia: • Commitments with the Water Basin Committee and Water Association • Provision of sufficient water required for downstream irrigation activities • Water quality for the downstream section after inflow from thermal springs also considering quality needed for irrigation				
25 PS5	Physical and Economic displacement	A shepherd with goats has his night shelter close to the intake and in the area which will be flooded in the future. Appropriate alternative facilities (same size and quality) should be offered to the shepherd for use.	LaE will lobby with local authorities for an appropriate solution	Process documentation with Shepherd/local authorities	Management time	Before start of construction works or latest after first three months of construction
26 PS5	Physical and Economic displacement	As far as possible construction workers for the project will be employed locally. Recruitment of supporting staff and workers should be supported by the CLO who will contribute information about job profiles in the communities.	Contractor CLO	Name of workers and residential place to be provided by LaE	Management time	Before start of construction works
27 PS6	Biodiversity	A Biodiversity Report has been compiled by ERM in order to close gaps regarding impact assessment on Flora and Fauna. As outlined in the Biodiversity Report additional studies on Fauna were conducted in order to identify possible impacts and respective mitigation measures. The "Report on Large Carnivores, Bats and Birds of Prey in	LaE Contractor	Construction work plans avoiding night time traffic and construction works at night. Visual inspection of situation	Management time Tbd	During construction and operation Fish way system to be

Item No Lender Standard	Potential Impact / Issue	Mitigation / Management	Responsibility / Implementation	Monitoring / Key Performance indicators	Cost / Budget for Activity	Timeline / Milestones
		Lengarica HPP area"(Prof. Ass. Dr. Ferdinand Bego, June 2011) defines mitigation measures to protect the wildlife in the Lengarica HPP project area • Large Carnivores LC (especially the bear) that cross Lengarica river and other large mammals may be impacted during the construction phase of tunnel and intake. No heavy traffic and construction work outside the tunnel that may generate disturbance (noise, light) shall be conducted during night. • Breeding birds may be impacted due to construction phase traffic (the gorge and its slopes is an attractive area for raptors as breeding site). In order to protect breeding birds of prey and bats along the canyon no construction work shall be performed outside the tunnel during dusk and night. • During the construction phase disturbance and temporary loss of biotopes along the river bed, downstream from the tunnel exit that are used by fish and frogs during the breeding season (February-June) are expected. After finalisation of construction works the riverbed should be restored. • Otter (*Lutra lutra*): An otter survey was conducted as part of the field survey at Lengarica HPP project area. The otter was not found present along the Lengarica River, except for the confluence point of Lengarica River with Vjosa River. At the confluence point a high marking territory activity of otter was observed. Measures should be taken during the construction phase of the HPP to not disturb this site, situated some 50 m downstream of Petran Bridge over Lengarica River, and some 250 m downstream of projected location of Lengarica HPP power house. No access road from the confluence point and no material deposit or excavation should take place at the confluence point of the Lengarica with Vjosa River.		at confluence point with River Vjoses and vegetation clearing. Visual inspection of restoration of riverbed after finalisation of construction works by experienced biologist. Reporting on trainings for drivers. Short description of selected design for fish way system and explanation of selection Visual inspection during monitoring Fish monitoring Exceptional permission for Vegetation clearing or documentation of process		designed before start of construction works at the weir Monitoring of acceptance of fish way system during construction and operation

Item No Lender Standard	Potential Impact / Issue	Mitigation / Management	Responsibility / Implementation	Monitoring / Key Performance indicators	Cost / Budget for Activity	Timeline / Milestones
		• Increased incidents of animal collision/killing due to increased traffic were already observed. Animals like tortoise, snakes and lizards are most exposed to such treat and are active during daytime. Engaged drivers should receive training on how to avoid, minimize animal killing on the road. • Any vegetation clearing shall only be done before or after breeding season (meaning not in the period from March to June). If it is not possible to obtain the official construction permit or the ownership transfer is delayed, vegetation clearing shall be done before March, trees and shrubs shall be cut back (latest end of February) in order to prevent birds from nesting in the area. For this activity LaE shall try to obtain a permit from the municipality to cut vegetation in advance (e.g. during meeting with the municipalities in the first week of February 2013). If there is no possibility at all to obtain a permit, birds have to be scared away to prevent them from nesting. This measure should be performed during all daytime e.g. by a person accompanied by a dog and making noise if needed to scare away birds (clapping hands, whistle, warning shots). This person should be instructed by an ornithologist and effectiveness should be monitored during a site visit after two weeks. • The recommended minimum flow (see Item No. 28) shall be provided in order to keep the habitat for bat population and nesting birds whose life and survival is linked with Lengarica river and canyon (micro-climatic conditions, feeding, etc.). A fish assessment was performed (Spase Shumka and Pellumb Aleksi, August 2012) in order to investigate fish communities and				

Item No Lender Standard	Potential Impact / Issue	Mitigation / Management	Responsibility / Implementation	Monitoring / Key Performance indicators	Cost / Budget for Activity	Timeline / Milestones
		migration within Lengarica River. • The construction of a fish way (fishladder) is foreseen. The fish way design shall consider migration behaviour and physiological capabilities of small and medium-sized, potamodromous (migratory in fresh water) non- salmonid fish according to appropriate technical guidelines[3].. • The suitability of the fish passage system and the appropriateness of the determined minimum flow for preservation of the aquatic ecosystem should be proofed by a repeated fish monitoring during the first low flow period (dry period July-September). If an impact on fish fauna is observed additional measurements and estimations of ecological flow should be performed (e.g. GIPPEL & STEWARDSON, 1998)[4]. In addition, measures which may be identified in the Appropriate Assessment for the Emerald Site will have to be considered.				
28 PS6	Water flow management	The temporal pattern of resulting flow pulses in the downstream section is similar to a fast flow peak caused to stormwater flow. The increasing phase of peaking mode up to 0,5 m^3/s is within the natural amplitude, whereas stopping down the operational peak should be smoothed.	LaE	Flow measurements Calculations for determination of ecological flow	Management time	Determination of required flow preferred prior to

[3] ATV-DVWK (2004): ATV-DVWK-Themen: Fischschutz- und Fischabstiegsanlagen -Bemessung, Gestaltung, Funktionskontrolle. - Hennef (ATV-DVWK – Deutsche Vereinigung für Wasserwirtschaft, Abwasser und Abfall e.V.), 256 p.

FAO/DVWK [ed,.(2002): Fish passes – Design, dimensions and monitoring. Rome, FAO. 2002. 119 p.

GLUCH, A. (2007): Kombinierter Fisch- und Treibgutableiter für Wasserkraftanlagen. Wasser & Abfall 9: 38-43.

PAVLOV, D.S. (1989): Structures assisting the migration of non-salmonid fish: USSR. FAO Technical Paper 308, Rome. 97 S.

[4] GIPPEL, C.J. & M.J. STEWARDSON (1998): Use of wetted perimeter in defining minimum environmental flows. Regulated Rivers: Research & Management 14: 53–67

Item No Lender Standard	Potential Impact / Issue	Mitigation / Management	Responsibility / Implementation	Monitoring / Key Performance indicators	Cost / Budget for Activity	Timeline / Milestones
		The proposed minimum ecological flow of 0.200 m³/s seems to be within a plausible range, but the suitability for temporary fish passage and sufficient dilution of the thermal waters at the same time is not proven yet. . During low flow season the river channel has to be checked for critical riffles and rapids, representing the shallowest points of the thalweg. At these points, water depths shall be measured and related to the gauged flow. Repeated records under different hydrological conditions make it possible to interpolate the necessary flow for a certain minimum thalweg depth. A low flow event below or close to the proposed 200 l/s should be included.		Monitoring of ecological flow		construction, also possible during construction or operation Monitoring of flow during Operation
29 PS8	Cultural Heritage	A chance find procedure shall be implemented to protect cultural heritage that might be uncovered during construction works. Training of construction workers has to be performed in this regard. Any archaeological chance finds during excavation works will be reported to the competent authority immediately after discovery and fenced off to allow further investigation by the Competent Authority.	Contractor	Document describing chance find procedure. Protocol of received trainings.	Management time Training time	Prior to start of works.
30 PS8	Cultural Heritage	Natural Monuments in the area as thermal springs, Lengarica Canyon shall be protected during construction and operation. Changes in quality or quantity of thermal waters have to be reported directly to the REA.	Contractor for Construction LaE for Operation	Regular auditing on the status of natural monuments during construction and operation. Photos of affected areas.	Management time	During Construction and Operation

CONTENTS

ANNEXES

ANNEX A

EIA Permit Decision

REPUBLIC OF ALBANIA
MINISTRY OF ENVIRONMENT, FORESTS AND WATER ADMINISTRATION
General Directorate of Environment Policies
Environment Protection Department
Environment Assessment and Impact Sector

Rruga "Durresit" Nr. 27 Tirana, Tel. 04 2256 113; Fax. 04 2270 627 www.moe.gov.al

No. 318 Ref. **Tirana, 17.01.2012**

Identification No. 473 **Decision No 1 of KSHK**

Approval Act

ENVIRONMENTAL PERMIT

On the activities that have an impact on the environment

Pursuant to Act No. 8934, dated 05. 09.2002 "On Protection of Environment" and its amendments, the company **"LENGARICA & ENERGY" Sh.p.k.** is granted the Environmental Permit for the activity:

1. Description of the allowed activity

1.1 Activity: Construction and operation of the Hydroelectric Power Station
1.2. Site: On the course of river Lengarica, Commune of Petran, District of Permet, County of Gjirokastra
1.3 Technical Specifications of the HEPS: *Find attached the Annex*

2. Details of the permit holder

2.1 Responsible person: Wolfgang Kröpfl
2.2 Address: Rruga "Eqerem cabej", Nd. 6, H. 2, Municipal Unit No. 5, Tirana
2.3 Telephone: +355 42322337 / 686061925

3. Permit conditions:

3.1 During the construction of the works [the Company] must:

- Strictly respect the geographic coordination given in the Annex attached to the Environmental Permit;
- Categorically avoid opening new roads and to use the exiting network, by maintaining it continuously;
- The earth masses generated from the construction work must be controlled and must not be allowed to slide and seep into the water ways in the construction zone, including the bed of the water reservoir (they increase cloudiness, damage the natural state of the river, etc.)

- Soil and rocks generated by digging the tunnel, the canal or other objects will be deposited in researched places and before they are disposed an application should be submitted for a Environmental Permit for their site of disposals, pursuant to the current legislation.
- The construction work must avoid to the maximum damaging the land and prohibit the development of environment degrading processes, such as erosion, etc.
- The transport of removed material must by carried out by clean vehicles in particular free of mud (they must clean the tyres before using asphalted roads), during transport, vehicles must be covered with covers which prevent leakages of the material on the road and dust emissions.
- The technical conditions of the working vehicles must be inspected periodically to avoid and prevent leakages of lubricants and hydrocarbons in the environment, emission of gases and excessive noises caused by technical defects of equipment (exhaust pipe).
- The Company must manage the urban waste created from the activity and workers, in particular packaging, by transporting them in order in the defined dumping areas;
- Measures should be taken to prevent fires during the works on the site (drillings, cigarettes, etc.) and ensure the necessary equipment of intervention in the event of fire (fire extinguishers, etc.)

3.2 During the operation of the object:

- During operation, an amount of water no smaller then 0.2 m^3/S, should be allowed to flow for the functioning of the ecosystem. During periods of low flow, water must not be used, or an amount of water should be allowed to flow in the River Lengarica for the normal ecologic functioning of the ecosystem. Therefore in this river section and in dried periods it is necessary to allow an amount of water of 20% of the multiyear average.
- This amount of water must be allowed into the existing flow of the river during all the time of the functioning/running of HEPS;

3.3 During the rehabilitation phase

- The Company, upon placing the pipes in the riverbed, must cover them, rehabilitate the area and the riverbed must be retuned to its initial state.
- At the end of the construction activity of HEPS the surface impacted by construction must be rehabilitated (road, site for material storing, derivation canal). At the end of the rehabilitation operation the Company must report to the Regional Environmental Agency.
- Prior to the start of construction work, a full and detailed environment rehabilitation plan must be drafted with regards to the flora and the territory where the works will be carried out for the realisation of the project. The Environmental Rehabilitation Plan includes the areas where the rehabilitations work will be carried out, the volume and type of works - including the time limits for the completion of the rehabilitation works. Drafting of the rehabilitation plan must be based on the National Park status and its phytoclimatic and pedologic features of the area.

4. Discharges into the environment and the limit values allowed for discharges into the environment

4.1. – Discharged in the air

- Norm not applicable

4.2 Liquid discharges

- Norm not applicable

4.3 Discharges into the ground

- Norm not applicable

5. Obligations on environment monitoring and reporting:

Monitoring is the process of surveillance and periodic or continuous data collection on the natural phenomenon developing on the object, as a result of the above mentioned activity.

The physical or the natural persons must train their employees or contract specialised institutes for the monitoring. The self-monitoring of the activity must be carried out based on the individual monitoring program and pursuant to the stipulations of the National Monitoring Program. The self-monitoring program of the Company must cover the following issues:

- Monitoring of the impacts from the activity in the surrounding environment and its elements.
- Monitoring of the way of implementation of the environmental permit conditions.
- Monitoring of the progress of the rehabilitation measures and their effectiveness.
- Monitoring of the status of the natural flow of the water source used by the plant (including the development and status of biodiversity).

* Monitoring must be carried out by specialised and accredited laboratories as per the current legislation for the protection of environment.

6. Reporting the environmental data

- Pursuant to the legal requirements, the Company must carry out periodic environment assessment of its activity no less then once every 3 years.
- In order to maintain the information on the monitoring and the implementation of the Environmental Permit conditions, the Company must organise a special log.
- The self-monitoring and implementation of the Environmental Permit conditions data must be submitted to the state institutions and other interested parties.
- The Regional Environmental Agency (REA) must be informed immediatly on any planned changes in technology, and foreseen or stated changes in the VNM Report.
- REA must be informed all the time, on the accidents or emergencies with negative impact on the environment.
- Before the activity begins all the employees must be trained, introduced to the terms of the Environment Permit as well as the consequences of not implementing them in the environment and the relationship of the Company with the body that has issued the Environmental Permit.
- For all the above mentioned terms of the Environmental Permit, during the implantation the Company shall submit to REA a short periodic written report (every 3 months), from the start of construction until the conclusion; and during operation a report must be submitted on the way of the implementation of the permit conditions (every 6 months).

7. Validity of the environmental permit:

- This permit is valid upon the activity is licensed by the respected institutions.
- Not starting the activity within a two year period makes the permit invalid for the purpose of exercising this activity.
- If new unknown ecologic elements come to light when the permit is granted, the permit will be reassessed or be removed.

8. The below stated legislation must be implemented:

- Act No. 8934, dated 05.09.2002, "On Protection of the Environment", and its amendments.
- Act No. 8990, dated 23.01.2003, "On the evaluation and impact on the environment" and its amendments.
- Act No. 8906, dated 06.06.2002 "On Protected Areas" and its amendments.
- Act No. 8093, dated 21.03.1996 "On Water Reserves" and its addendums
- Act No. 10463, dated 22.09.2011 "On the integrated management of waste"
- Act No. 8897, dated 16.05.2002 "On the Protection of Air from Pollution"

- Act No. 9385, dated 04.05.2005 "On Forests and Forestry Service" and its amendments.
- CMD No. 1189, dated 18.11.2009 "On rules and procedures of drafting and implementation of the National Environment Monitoring Program"
- CMD No. 587, dated 07.07.2010 "On the monitoring and controlling the level of noise in urban and tourist centers"
- Direction No. 8, dated 27.11.2007 "On the limit levels of noises in particular environments"

9. Possible sanctions

For not implementing the condition of the Environmental Permit and the environmental legislations legal sanctions apply:

a) Administrative and penal punishment of the Company that does not implement the conditions of the permit;

b) Suspension of the environmental permit for a determined time or permanently;

10. The value of tariff of the environmental permit service

Based on the Direction No. 5, dated 28. 12. 2007, "On determining the tariffs of Environmental Permits". The above mentioned permit is classified in point 12.
The value of tariff of the environmental permit service is 50 000 ALL.

Arben Demeti
Deputy Minister

[Signature, seal]

ANNEX

1. Main coordinates of the activity:

Points	Coordinates X	Coordinates Y	Quotes H
Object	44 58 792.55	44 54 843.58	410
The Basin of pressure	44 56 222.03	44 51 803.65	403
The Building of HEPS	44 53 357.98	44 50 349.78	256

2. Main coordinates of the axis of the tunnel:

No. Pickets	X	Y
0 (Entry port)	44 58 615.3853	44 54 819.2932
1 (Entry of the tunnel)	44 58 612.4432	44 54 819.9150
2	44 58584.3725	44 54825.8476
3	44 58 554.6941	44 54 833.3047
9	44 58 201.7385	44 54 756.7805
10	44 58 118.7034	44 54 712.5930
68	44 56 244.6347	44 51 951.5375
73/1 (End of the tunnel)	44 56 226.0591	44 51 830.5051

3. Technical data on the HEPS:

Characteristics	Data
Forseen capacity	8960 kW
The yearly production is expected to be	28.4 GWh
Water basin	270.6 km2
Flow calculated for use	8 m^3/sek
Annual working time	3196 hrs/year or 137 day/year
The quota of the works	410 m
The quota of the plant	256 m
Length of the tunnel	4000 m
Length of the canal to the derivation with plastic piping under the surface	3750 m
The transition line is designed to be	35 kV

ANNEX B

Hydrogeology Monitoring Programme

Monitoring HPP Lengarica: Index of Effort

Hydrogeological Monitoring During the Construction Period – HPP Lengarica

Pos. 1. Daily visual inspections of the turbidity with photo documentation at the following measuring points

- one thermal spring at the right riverbank (spring nr.1)
- one thermal spring at the left riverbank (spring nr.6)

- if the tunnel heading will be carried out at dry conditions, these daily visual inspections of the turbidity must be executed only if natural water inrush occurs during the tunnel heading in the limestones
- if the tunnel heading will be carried out at wet conditions, these daily visual inspections of the turbidity must be executed during the tunnel heading in the limestones

- Performance of the daily inspections
- Transfer of data to AQUATERRA ZT GmbH in an appropriate file format

Pos. 2. Weekly measurements of field parameters (electric conductivity, water temperature, ph-value, discharge and visual inspection of the turbidity) at the following measuring points:

- tunnel water (two positions, if the tunnel construction will be conducted from two sides)
- Performance of the weekly measurements
- Transfer of data to AQUATERRA ZT GmbH in an appropriate file format

Pos. 3. Weekly measurements of field parameters (electric conductivity, water temperature, ph-value, and visual inspection of the turbidity) at the following measuring points:

- Lengarica river at the water intake
- Lengarica river downstream at Kadiu Bridge
- one thermal spring at the right riverbank (spring nr.1)
- one thermal spring at the left riverbank (spring nr.6)

- Performance of the weekly measurements
- Transfer of data to AQUATERRA ZT GmbH in an appropriate file format

Pos. 4. Monthly water sampling for chemical and isotopic analysis, including measurements of the field parameters electric conductivity, water temperature, ph-value and visual inspection of the turbidity at the following measuring points:

- Lengarica river at the water intake
- Lengarica river downstream at Kadiu Bridge
- tunnel water (just one position)
- one thermal spring at the right riverbank(spring nr.1)

- one thermal spring at the left riverbank(spring nr.6)
- Performance of the monthly water sampling and measurements of the field parameters
- Obtaining the instruments for sampling such as sampling bottle, acid and filtering tool
- Delivering the water samples to the office in Tirana and thereafter delivering the samples to the office of AQUATERRA ZT GmbH in Graz
- Transfer data to AQUATERRA ZT GmbH in an appropriate file format

Pos. 5. Monthly chemical and isotopic analysis of the 5 water samples carried out by laboratories in Graz

Pos. 6. Measurements of the discharge once per three months at the following measuring points:

- Lengarica river at the water intake (for calibration of the data loggers)
- Lengarica river downstream at Kadiu Bridge (for calibration of the data loggers))
- one thermal spring at the right riverbank (spring nr.1)
- one thermal spring at the left riverbank (spring nr.6)
- Performance of the discharge measurements
- Supervision of the measurements carried out by a local engineer of Lengarica & Energy sh.p.k. and inspection of the hydrological measurement points
- Preparation and organization of the two days field trip for monitoring (the payment for a second engineer from Tirana are included in the all-in costs)
- Serve as an Albanian contact person for upcoming hydrogeological questions for the local engineer of Lengarica & Energy sh.p.k.
- Transfer of data to AQUATERRA ZT GmbH in an appropriate file format after uploading

Pos. 7. Documentation and reporting

- Implementation of a data base for all the measurement results (continuous, daily, weekly and monthly measurements)
- Preparation of a data sheet for the filed measurements
- Control and supervision of the delivered data
- Interpretation and graphical presentation of the hydrogeological data (field and laboratory parameters)
- Calculation of the rating curve for the continuous determination of discharge from water level measurements of data loggers
- Monthly documentation and reporting to Lengarica & Energy sh.p.k.

- Providing a quarterly intermediate report concerning the evaluation and possible aberrances of the hydrogeological conditions
- Organization of the correct execution of the monitoring program
- Submission of a final report

Pos. 8. Performance of two field trips from Austria to Albania each lasting three days; the organization and cost for the transport and accommodation will be taken by Lengarica & Energy sh.p.k.

Pos. 9 Participation on meetings in Austria or Albania; cost for the transport and accommodation are not included; charging after time and effort

Note:

The monitoring program can be reduced after 1 year, if the results of the measured parameters are constant and no negative influence is taking place at the thermal springs in Lengarica valley originating from the construction of the HPP Lengarica. This reduction is not applicable for Position 1.