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# ENVIRONMENTAL IMPACT ASSESSMENT
# FOR

# ENERGY COMMUNITY OF SOUTH EAST EUROPE APL 5- DAM SAFETY PROJECT IN ALBANIA

# REHABILITATION OF
# KOMAN HYDRO POWER PLANT

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# 1 INTRODUCTION

Albania's hydropower plants (HPP) in the Drin and Mat River Cascades are a precious asset for the country. They account for over 90% of domestic electricity production and supply normally more than 65% of the country's total electricity demand. On an average year, Albania generates about 4.2 GWh of hydroelectricity.

These major infrastructure facilities have been inadequately monitored and maintained for more than 15 years and may present significant risks to the country. Following the World Bank's warning on this issue, a Dam Safety Survey for Hydropower Plants Located on the Drin and Mat River Cascades was funded by the Swiss Secretariat of Economic Affairs (SECO) and completed in 2006. The survey identified a number of serious deficiencies and concluded that "*the present state of the dam safety is uncertain, and a disaster … could be considered as possible … if matters are left to deteriorate further*". Both the institutional set-up and the monitoring and physical infrastructure facilities were found in need of significant improvements.

Support for Albania's hydropower dams is needed not only because of the significant safety risks involved, but also to improve their overall operation and to facilitate further integration of the country with the regional electricity system. Because of the valuable storage capacity of the dams, the country can use its hydro resources to optimize its electricity supply as it integrates in the regional market. Albania is a member of the Energy Community of South East Europe (ECSEE), and a series of planned investments will assist it to better participate in the electricity market of the region. Furthermore, addressing safety risks of the existing dams could create valuable options regarding the future operation and ownership of the hydroelectric facilities.

Majority of the conclusions on the state of the equipment/dams and proposed works together with the photographs and drawings are taken, with the approval of KESH, from the Dam Safety Survey for Hydropower Plants Located on the Drin and Mat River Cascades.

## 1.1 PURPOSE OF THE STUDY

The purpose of this study is to carry out an environmental assessment (EA) of the proposed ESCEE APL 5 Albania Project – Dam Safety to be implemented on the hydropower Drin and Mat Rivers Cascade Dams in Albania. The assessment is to be done through five individual environmental impact assessments (EIA) for each of the five dams. The purpose of the EA is to ensure that the proposed investments implemented through the Project comply with the existing environmental protection laws, regulations and standards in Albania as well as with the World Bank's Operation Policies and Practices; and will not have a lasting adverse impact on the country's population, the natural environment or assets of particular cultural heritage value. The EIA needs to be done for the measures to be implemented as defined chapter 2.3 of this report, and this portends that the

existing power plants have to be taken into consideration as part of the present situation, and the EIA has to focus in environmental effects (positive and negative ones) of the measures to be implemented under this project.

Since feasibility study and accompanying technical documentation for the project is still not finalized, revision of this EA will be required if the study suggest approaches which are not in line with the current EA. The new document would have to be disclosed one more time.

This report presents EIA for the works envisaged for Koman HPP.

# 2 DESCRIPTION OF THE PROJECT

Maintenance and repairs in the country's dams need to be carried out urgently. There is considerable uncertainty about whether the current condition and operation practices of the dams will withstand an extreme weather event that might occur as is possible that climate change will increase such risks. The Government of Albania (GoA) has recognized the need to address safety issues of its hydroelectric facilities and requested the Bank's assistance to improve the sector.

The 2006 Dam Safety Survey recommended a series of investments to improve dam safety and operation and categorized them into: (i) very high priority, high priority and medium priority (Euro 28m); and (ii) conditional high priority (Euro 153m) measures. The project would finance the very high priority, high priority and medium priority investments, which are the most precisely defined and need relatively little further study.

These investments include works to rehabilitate and ensure the proper functioning of spillways, installation of safety alarm systems for flood warning and geodetic monitoring, rehabilitation of electromechanical equipment, instrumentation and monitoring equipment. Additional civil works and investments for some medium and high priority measures may be needed to complete the dam safety measures and will be studied further during project implementation. EBRD has agreed to provide financing for any additional safety investments as they are being precisely defined with a project of up to Euro 30m. The need and alternative approaches for the higher cost category (ii) conditional high priority measures, will be assessed during project implementation.

## 2.1 OBJECTIVES OF THE PROJECT

The development objectives of the project are to: (i) safeguard the hydroelectric plants of Albania and (ii) improve their operational efficiency and integration within the regional electricity market. The proposed project supports the development of the Energy Community in accordance with the objectives of the Energy Community APL.

The project's main impact would be to prevent a possible catastrophe resulting from a dam failure. Such a catastrophe could result in significant loss of life and

damage to property of persons living in downstream areas. It would also cause a major and prolonged fall in hydropower production that would severely affect the entire population of Albania and would likely significantly increase electricity prices in the whole SEE region. Poor and vulnerable people in the region would likely suffer disproportionately from any such electricity price increases.

In addition, the project would assist Albania to maximize its benefits from existing hydropower by improving operational practices of existing facilities and enabling more effective participation in the regional electricity market. The project will also promote private sector investment in hydropower by collecting, organizing, and making available, better data and studies on the country's hydropower potential.

## 2.2 LOCATION OF THE PROJECT

The project will implement the remedial measures on the HPP on the Drin and Mat river Cascades. The Drin River is the largest river of Albania, with an overall watershed of 14 173 km2, while the Mat River, with a total length of about 115 km, has a watershed of 2 441 km2. The Drin River Cascade consists of three hydropower plants, namely Fierze, Koman and Vau I Dejes. These dams have been constructed in the period of 1967 to 1985. Fierze dam, highest in the river cascade is a 177 m rockfill dam with clay core, with total active storage of 2700 mil m3. The reservoir created by the Fierze dam serves as a head pond for the Drin river cascade. Koman dam, second in the cascade is a 115 m high concrete facing rockfill dam with 430 mil m3 of impounded volume located 2 km from Koman village. Vau I Dejes is located in the lower part of the Drin river valley at the distance of about 18 km upstream from the city of Skhodra. The HPP comprises three separate dams. The Mat river cascade consists of two hydro power plants; Ulza and Shkopeti build between 1952 and 1963. The Ulza HPP is located near the villages of Ulza and Burrel. It is a 64 m high concrete gravity dam with straight axis with impounded volume of 240 mil m3. The reservoir created serves as a head pond for the Mat river cascade. The Skhopeti dam is a 50 m high concrete gravity dam with impounded volume of 40 mil m3.

The location of the dam is showed in the Figure 1.

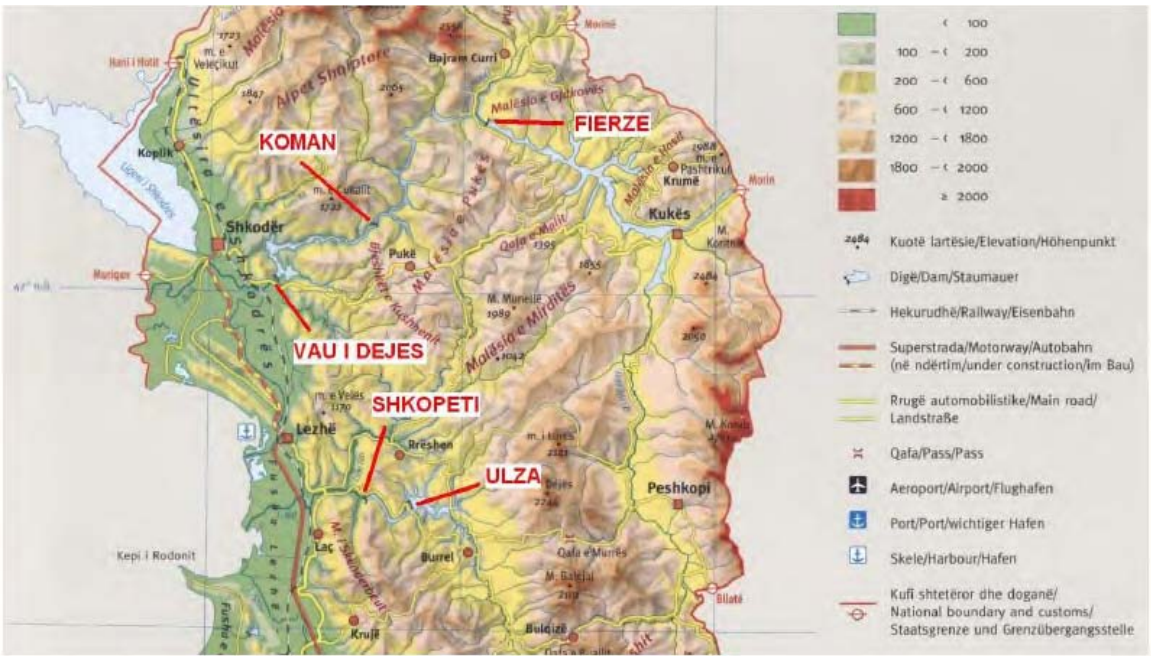



**Figure 1 Location of the HPP on Drin and Mat river cascades**

## 2.3 PROJECT COMPONENTS

The project would consist of two main components: (1) physical infrastructure investments; and (2) technical assistance.

**Component 1**: Physical Infrastructure Investments

Remedial Measures of Very High Priority (Euro 3 million): (i) Dam Safety Alarm Systems for Drin and Mat River Basins include the specification and implementation of water alarm systems in the Drin and Mat River basins, and specification of an Emergency Action Plan (Euro 2 million); (ii) Dam Monitoring Systems for Drin and Mat River Basins include the specification and implementation of dam monitoring equipment including GPS, and implementation of a data acquisition system (Euro 1 million).

Remedial Measures of High Priority (Euro 4.8 million): (i) Fierze Dam - Rehabilitation of spillway no. 3 (Euro 2.8 million); (ii) Fierze and Koman Geological Monitoring System- included the specification and implementation of movement/landslide alarm systems linked to GPS for identified potential geological slip zones (Euro 1.6 million); (iii) Vau I Dejes - Spillway rehabilitations and maintenance.(Euro 0.3 million); (iv) Albanian Power Utility (KESH) Dam Safety Department- equipment for data archives, monitoring and documentation. (Euro 0.1 million).

Remedial Measures of Medium Priority and Operational Improvements (Euro 7 million): (i) Koman Dam - General rehabilitation of spillway gate seals, as well as frames, cylinders and hydraulic power units. (Euro 0.5 million); (ii) Koman Dam - rehabilitation of electromechanical equipment. (Euro 5 million); (iii) Vau i Dejes

Dam - Implementation of Load Frequency Control system to allow for the integration of Albania's electricity system with UCTE (Euro 1.5 million).

**Component 2**: Technical Assistance and Training

Hydrology Analysis and Water Management (Euro1.5 million). Focusing on KESH and the Drin and Mat river basins the project will provide technical assistance to develop and train KESH on an integrated water resources management approach for the management of the Matt and Drin river basins and the optimization of power dispatching and water resource management. Dam safety, water infrastructure, and hydropower are essentially about water management. However, because of the lack of maintenance and institutional weakening in Albania, after the country's transition, the knowledge and practices on water management have been neglected and significant gaps were created. The project therefore to achieve its objectives will also provide technical assistance to: (i) improve the quality and availability of hydrological data, analysis and modeling; (ii) study the possibility of changes to operating rules to provide increased economic, environmental and social benefits, and (iii) incorporate implications of climate change in terms of hydrological profiles. Some of this analytical work has started during project preparation and will continue during project implementation.

The project team has been coordinating with bilateral aid agencies (SECO and SIDA) on projects aiming to enhance the country's ability on water management. The World Bank's Disaster Management and Risk Mitigation project for the South East Europe is also providing assistance for better weather and hydrological monitoring at the country level.

Project Implementation Consultants (Euro 2.5 million). The project will require specialized consultants during its implementation to assist KESH with to assist with procurement, design, and supervision of various contracts.

Institutional Strengthening (Euro 0.4 million). The development of a Safety of Dams culture within KESH and the institutional strengthening of the Albanian Commission of Large Dams (AlbCOLD) is a requirement for the sustainability and long-term implementation of safety measures. Technical assistance will be provided to strengthen the capacities of KESH's dam safety department and AlbCOLD.

Studies for new hydropower development (Euro 2 million). Albania has considerable undeveloped hydropower potential that when developed would provide additional capacity to the country and the regional electricity system. Around the Drin river area there seems to be potential for further development, or pumped-storage options. To address the initial upstream costs of feasibility studies this technical assistance component will finance detailed feasibility studies for new hydropower development in Albania.

Financial Management capacity building for KESH (Euro 0.5 million). KESH, in compliance with the Energy Community Treaty is undergoing further unbundling. The Transmission System Operator (TSO) became a separate entity in 2006,

while a Distribution System Operator (DSO) company was instituted legally in 2007. The TSO is currently fully owned by KESH, while the DSO is in the process of privatization. These changes have created a need for better financial reporting under International Financial Reporting Standards (IFRS) to improve sector monitoring and regulation. However, there is limited capacity in KESH to monitor its financial transactions and prepare adequate financial statements. This component will address these shortcomings.

Safety of Dams experts panel (Euro 0.2 million). An independent panel of experts is required to oversee the design and implementation of various interventions in the project dams as per Safety of Dams safeguards policy. This component will finance the work of the independent experts.

# 3 DESCRIPTION OF THE KOMAN HYDRO POWER PLANT

Koman dam located at a distance of 2 km from Koman village, and is the middle dam of the Drin Cascade comprising of Fierze, Koman and Vau I Dejes dams. Koman dam has been constructed in the period of year 1980 to 1988.

It is a concrete face rockfill dam with a watertight upstream concrete face slab. Water tightness of the dam foundation is achieved by a grout curtain. The maximum height of the dam is 100 m and the crest length is 250 m. The crest elevation is at 185 m asl and the maximum water level in the reservoir is at 175.5 m asl (full supply level). Minimum foundation level is 70 m asl and maximum dam height above foundation is 115 m. The dam volume is 5 million $m^3$.

The average annual inflow into the reservoir is 9.114 million m3. The reservoir total storage is 430 million $m^3$ and the active storage volume is 200 million $m^3$. Maximum water level is 175.5 m asl, while maximum operation water level is little bit less, i.e. 172 m asl. Minimum operation water level is 169 m asl.

The spillway is used to pass flood flows and consists of 2 intakes with roller/radial gates and adjacent outlet tunnel. Additional releases can be made through the power plant and two diversion tunnels. Crest level of spillway number 3 is at 115 m asl while of spillway tunnel number 4 is at 135 m asl. At maximum level spillway number 3 has total discharge capacity of 1925 $m^3/s$ and spillway number 4 1575 $m^3/s$.

The powerhouse (dimension 120m x 24m x 52m) is located at a downstream toe of the dam and has 4 units with a total generation capacity of 600 MW. The plant outflow is 4x180 $m^3/s$. Nominal net head is 96 m. Annual mean energy output is 1500 GWh and plant factor is 29%.

Figure 2 presents layout of the Koman dam (1 – Concrete faced rockfill dam; 2 – power house; 3 – Power water intake; 4 – surge chambers; 5 – tailwater channel; 6 – Drin River; 7 – tunnel spillway No 4; 8 – tunnel spillway No. 3; 9 – diversion tunnel No 2; diversion tunnel No 1.) Annex 1 presents additional schematic drawings of the Koman dam prepared by Electrowatt Econo Ltd and which are parts of the Dam Safety Study.

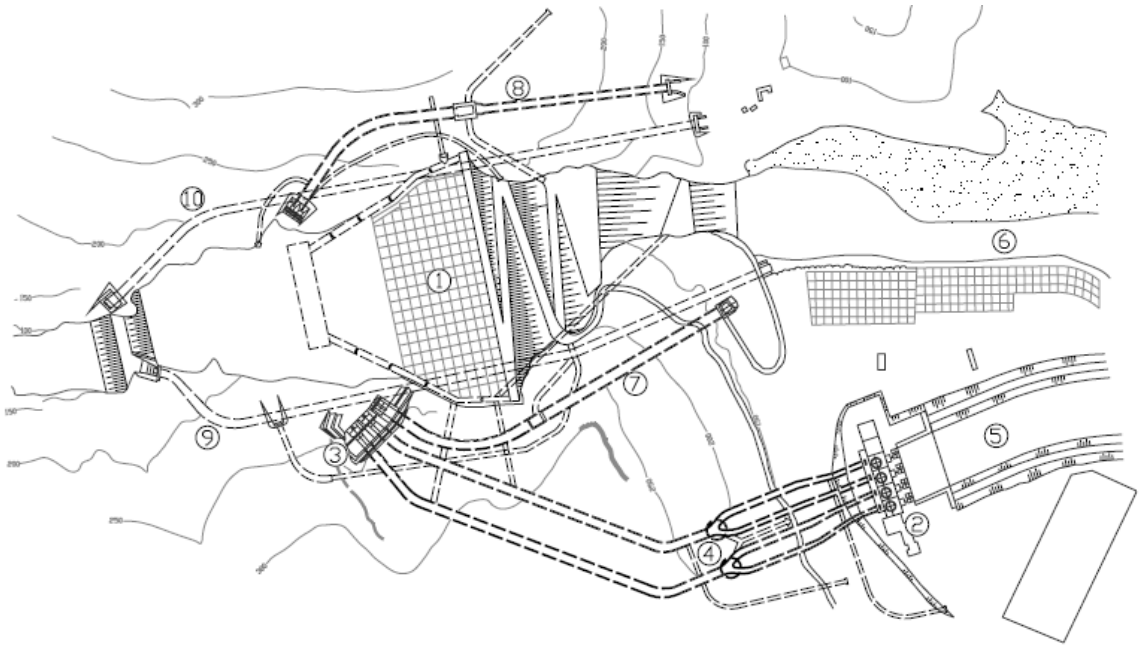


**Figure 2** Layout of Koman HPP (Source: Dam Safety Survey Study)

## 3.1 INVESTMENTS UNDER THE PROJECT AND CURRENT STATE

The project will finance on Koman HPP a) installation of Dam Monitoring System; b) installation of Geological Monitoring System; c) installation of Dam Alarm System with the preparation of Emergency Action Plan; d) General rehabilitation of spillway gate seals, as well as frames, cylinders and hydraulic power units; and e) Rehabilitation of electromechanical equipment.

### 3.1.1 Dam Monitoring System

The safety control of a large dam lies on the analysis of its structural behavior, based on monitoring of a large set of variables which describe the relations between the actions (gravity, temperature, hydrostatic pressure, etc.) and the corresponding structural responses (stresses, displacements, etc.), taking into account the properties of the materials used in the construction (concrete, embankment, masonry, etc.).

The dam monitoring system is currently in an unsatisfactory condition. Most of the existing instruments are no longer working due to the poor maintenance. Moreover the recorded data, where existing, were not evaluated regularly.

Koman dam has 31 pore water pressure cells (originally proposed 38), one stand pipe piezometer (out of 24 originally installed), five plate displacement gauges (originally 7), and all six steel or concrete strain gages considering still functional. Unfortunately, no measurements were available for review or a rough assessment of their correctness. It is doubtful that these devices are still working. KESH and the consultants for dam safety recommended the dam to be

re instrumented, although the existing instruments can also be utilized if it can be shown that the measurements obtained with them are plausible.

Although deformation as such are not expected to be critical for the dam safety, at least 30 geodetic targets are needed to establish a sufficiently comprehensive grid for observation of surface displacement on the crest, dam slopes, galleries and abutments.

All discharges of water downstream of the grout curtain, i.e. mainly at the toe of the dam must be collected and measured. The leakage, primarily the watertightness of the face slab joints has to be monitored as well. At least 4 seepage/ leakage monitoring devices should be installed.

The efficiency of the grout curtain (pore water pressure monitoring) should be checked by installing four additional standpipe piezometers downstream of the grout curtain and piezometers cells. This will be accomplished by drilling holes from the toe gallery.

In addition to mentioned, acellerographs will be installed for seismic loading.

The monitoring records will be systematically kept in a new automatic data acquisition system, making also use of a Geographic Information System (GIS). The recorded data will be reviewed periodically by dam engineers and geologists.

### 3.1.2 Dam Geological Monitoring System

The biggest landslide potentially affecting Komani Lake reservoir is Dushman Landslide more than 5 km north of the dam, which seems to be in the position to bring millions of m3 of rocks into the lake, endangering the dam and possibly causing a flood wave. Movement of the landslide can be caused by a very strong earthquake, heavy rainfall and/or rapid snow melt, or high residual pore water conditions following rapid draw down of the reservoir. This is the reason why extended geodetic grid is necessary to monitor the potential landslide. The system would consist of a geodetic and hydro-meteorological monitoring of the landslide and of movements along the slip planes. Modern approaches using satellite geodesy and the GPS (global positioning system) would be used. GPS in dam surveying is a complementary method providing additional redundancies and it is not a substitute for traditional terrestrial surveying methods as such. Its use facilitates and speeds up the overall surveying work. The GPS based monitoring will provide data on the long term movements within the area. The equipment to be installed on the potential landslides may be survey pillars and benchmarks; tiltmeters (for shallow surface observation), inclinometers (for detecting the onset of movement, revealing the precise depth of the slip plane and detection of multiple slip planes), extensometers (for monitoring large movements), etc. The analysis of both dam safety monitoring and geological monitoring data has to be complemented with the hydro meteorological data. For that reason meteorological stations will be installed. The station will be

equipped with thermometer, barometer, hygrometer, anemometer, wind vane and rain gauge.

Automated instrumentation systems will be installed to collect and transmit data (telemetry) from the piezometers, seepage measurement devices, meteorological stations and strong motion instruments to the dam monitoring team and central safety organization.

The installation of monitoring equipment would require shallow drilling (bore holes), and cementing.

### 3.1.3 Dam Alarm System

The Dam Water Alarm system currently is inefficient and there is no organization to make rapid response. The Alarm system should be connected with the monitoring equipment and GIS.

The alarm systems have to be designed to warn as quickly as possible operation and maintenance staff working in the HPP and as well all endangered downstream inhabitants in the event of a serious problem with one or more of the existing dams. Alarms have to in the worst case scenario alarm on the failure of a dam but also, for example, on the sudden release of large floods or damage to dam structures caused by earthquakes. The main challenge for an alarm system is getting a timely warning to the people at risk as soon as an alert is indicated. The reliability of the alarm system and the prevention of false alarms are essential for a credible dam alarm system.

The Emergency Action Plan will be defined for the Koman dam. The plan will provide KESH and the government with a guide for identifying, monitoring, responding to and mitigating emergency situations. It will have to define “who does what, where, when, and how” in an emergency situation or any other unusual occurrence affecting the dams.

The full plan will have two parts, internal and external. The internal plan will cover the activities and responsibilities of KESH, as owner of the dams, whilst the external plan has to set out the duties of the GoA and regional civil defense authorities.

### 3.1.4 Spillway gate seals

The dam has two spillway systems, one on each dam abutment. They can be closed by radial gates and as well as maintenance roller gates which serve as stop logs. The left spillway (no 3) is in a concrete tower, where the maintenance roller gates with their motor hoists are installed at the top. The radial gates are installed in a chamber on downstream side and are operated by hydraulic cylinders and power units. A similar arrangement is also used for the right spillway (no 4), which is combined with the power intake. The following figures present longitudinal profile of tunnel spillways ( 1 – spillway intake with maintenance roller gates; 2- pressure tunnel, 3 – spillway gate; 4 – free flow

tunnel; 5 - flip bucket; 6 – access gallery; 7 – grout curtain) and the photographs of the intake towers.

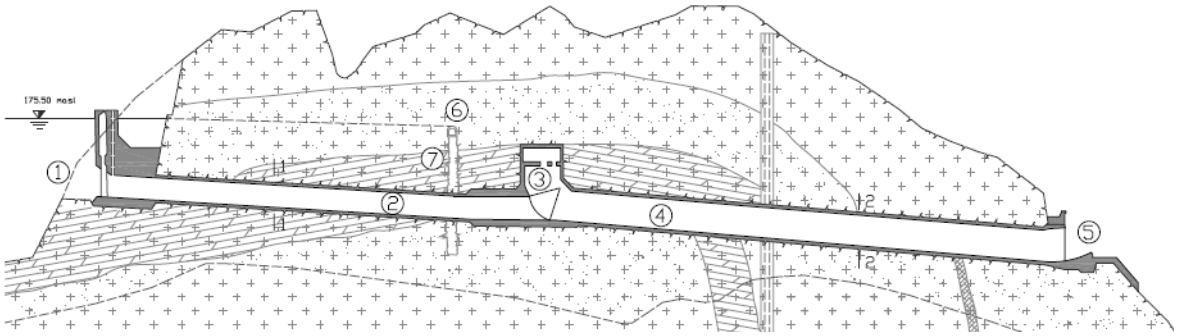



**Figure 3** Longitudinal profile of the tunnel spillway No 4


**Figure 4** Gate tower of the spillway No 4 (1) and power intakes (2)

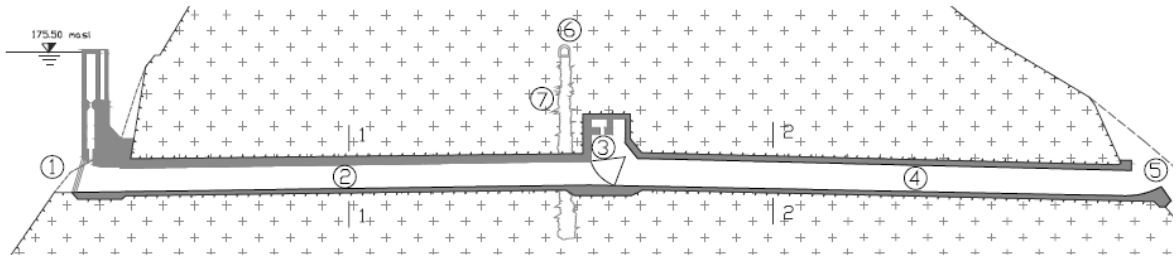



**Figure 5** Longitudinal profile of the tunnel spillway No 3

**Figure 6** Intake tower of the spillway No 3

The radial gates are leaking through the whole sealing system, i.e. top, bottom and sides. The seals are very old and have not been replaced since commissioning of the power plant. As the seals are no longer elastic, they may get damaged in the emergency operation. As the result the gate could jam, and it may no longer be possible to fully open or close the gate as desired. The hydraulic cylinders and the power units are in relatively good operation conditions, but still need some repairs. The motor hoists are quite old and they must be either completely repaired or replaced with modern equipment.

Refurbishing of the spillway gates presents technically most challenging task. In order inspect the gates and seals properly and to change the seals, first roller maintenance gates have to be repaired or complemented by stop logs. The hydro dam experts together with KESH concluded that in order to install stop logs the Koman lake level (upstream lake) has to be lowered by 10m. The lowering of Koman gate and the work on the installation will last about 10 days. The lowering of the lake will interrupt the electricity production in the Fierze HPP (upstream dam) as the power intake will be stopped during that period. Fierze Lake has the larges storage and therefore can withhold water for much more than 10 days, as such is normal during the maintenance of the plant. Total active storage of Fierze reservoir is 2700 million $m^3$, while active storage of Koman Lake is 200 million $m^3$ and Vau I Dejes Lake 250 million $m^3$. Difference between maximum and minimum operation level on Fierze dam is 58 meters. The level of the water for the Koman HPP might be too low for the electricity generation when the water level is lowered, as the difference between minimum and maximum operation of the lake is 6.5 m. The Vau I Dejes reservoir will have to take the additional water, and release it during these 10 days as a part of normal generation activities. The difference between maximum and minimum operation level for Vau I Dejes Dam is 14.5 m. The amount of water released

from Koman Lake, with normal operation of Vau I dejes HPP according to KESH who base the conclusion on the hydro dam experts report Dam Break and Flood Wave Analysis for the Drin River Cascade, will not endanger either operation or the safety of the Vau I Dejes HPP and either downstream settlement. The rough numbers, which need to be confirmed through feasibility study, indicate that to lower Koman lake by using solely power plant outflow (600 m3/s) after closure of Fierze dam would require only 4.5 days. In these conditions, Vau I Dejes HPP could as well operate normally, without necessity to overuse spillway discharges and endanger downstream settlements. Never the less the analysis of hydrometeorological cycle is done in order to recommend the best time of the year for the work, to minimize load of HPP Vau I Dejes.

The work on the spillway gates seals and supporting mechanism will entail dismantling, transportation of the parts, grinding, postheating, welding, sandblasting, cementing, reinforcing, painting, reassembling, etc.

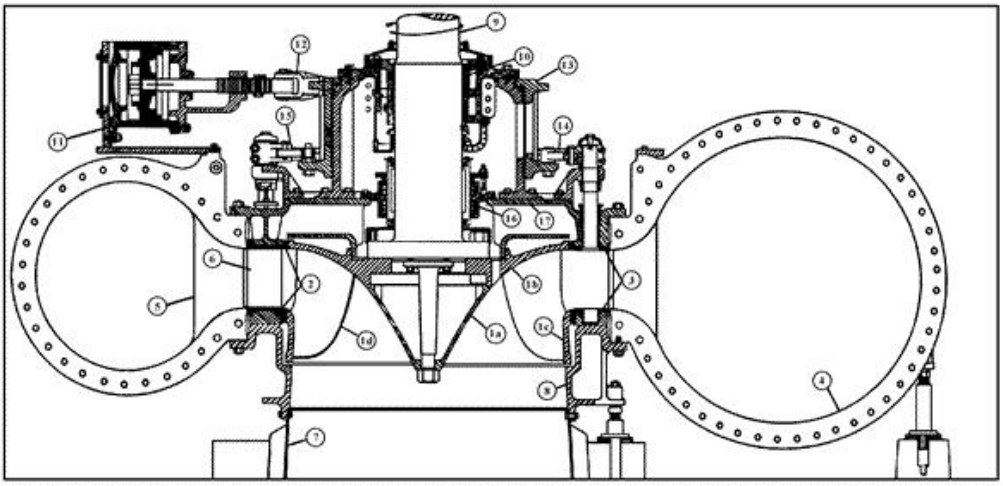
### 3.1.5 Electromechanical equipment

Works on the electromechanical equipment primarily relate to refurbishment of turbines, generator and auxiliary systems. The Koman dam uses Francis turbine. The works on the turbine will include rehabilitation of turbine intake and water accelerant system. Turbine runner receives water from intake swirl and as the swirl accelerates water transfers energy to the runner that is connected to the generator. The runner rehabilitation includes rehabilitation of runner cone, crown, band, bucket hub and blades. Other parts of the turbine that will require rehabilitation are: wearing rings, facing plates, stay vane, wicket gate and gate operating ring, wicket gate link and arm, draft tube, turbine shaft and guide bearing, and head cover. Runner blade servomotor and wicket gate servomotors will be replaced. Figure 7 shows schematics of Francis turbine with the identified parts.

On the generators, rehabilitation work includes change of generator breaking system, mainly breaking and jacking cylinders, refurbishing of both rotor and stator, upgrading cooling system, turbine generator shaft and re-wiring.

The works will entail dismantling, transportation of the parts, grinding, welding, sandblasting, coating, testing, reassembling, lubricating, etc.

Not to disrupt the operation of the plant which might have economical consequences for the whole country, works will not be preformed in parallel on turbines and generator, but one by one.



PARTS LIST FOR FRANCIS AND KAPLAN TURBINE DRAWINGS

| | | | |
|---|---|---|---|
| 1 | Turbine Runner | 7 | Draft Tube |
| 1a | Runner Cone | 8 | Discharge Ring |
| 1b | Runner Crown (Francis) | 9 | Turbine Shaft |
| 1c | Runner Band (Francis) | 10 | Turbine Guide Bearing |
| 1d | Runner Bucket (Francis) | 11 | Wicket Gate Servomotors |
| 1e | Runner Hub (Kaplan) | 12 | Servomotor Connecting Rod |
| 1f | Runner Blade (Kaplan) | 13 | Wicket Gate Operating Ring or Shift Ring |
| 2 | Wearing Rings or Seal Rings (Francis) | 14 | Wicket Gate Link |
| 3 | Facing Plates or Curb Plates | 15 | Wicket Gate Arm |
| 4 | Spiral Case or Scroll Case | 16 | Packing Box or Stuffing Box (Mechanical Seals) |
| 5 | Stay Vane | 17 | Head Cover |
| 6 | Wicket Gate | 18 | Runner Blade Servomotor (Kaplan) |

**Figure 7 Schematic and parts of Francis turbine**

# 4 ENVIRONMENTAL BASELINE CONDITIONS

## 4.1 PHYSICAL ENVIRONMENT

The area of Koman Dam, as well as this of the Koman Lake is a mountainous area deeply cut by the Drin River. In the area Koman Dam, Drin River flows at elevation about 80-90 m asl, but both banks abruptly rise to more than 600 m asl, and at some distance from the river the surface elevation raises up to more than 1000 m asl.

### 4.1.1 Geology

In geological terms the Drin River cascade dams are situated in so called Mirdita Geological Zone, which is known also as the Zone of Magmatic Rocks or the Ophiolitic Zone. This zone is developed south to the Shkodra-Pec traversal fault. Towards the north, it over-thrusts the Cukali Zone, and partially also the

Albanian Alps Zone. The locations and orientations of such faults should be determined.

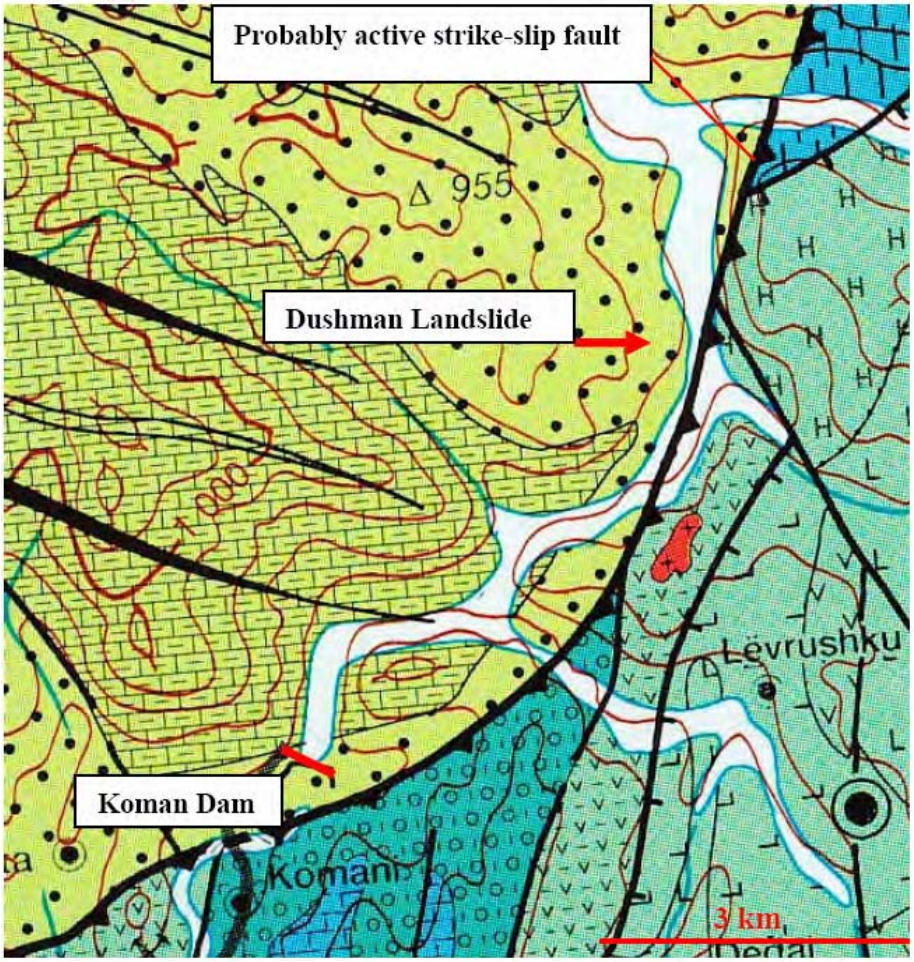



**Figure 8 Geological-tectonic map of Koman Dam site**

The magmatic rocks massifs form two belts, one eastern and one western belt, and are mainly of Jurassic age. However, within the zone are the Triassic-Jurassic volcano-sedimentary and the sedimentary formations with a rather wide distribution. In Mirdita zone are developed also some Miocene molasses basins like that of Mati. According to the Geology of Albania (2000) in this zone are identified two seismogenic zone: Shkodr-Pec transverse fault and Shkodra-Mati longitudinal zone.

The Koman Dam is founded on a complicated anticline structure of limestone, marly limestone, radiolarites and flisch (Fig. 8). The rocks are strongly folded and intensively fractured. The Scutary-Pec strike-slip fault (orientation NE-SW), less than 1 km from the dam site, is probably neotectonically active, and is accompanied by NW-SE trending presumably active faults. Hence, earthquakes may activate movements on major or minor faults interesting the Koman Dam the appurtenant structures.

### 4.1.2 Surface waters

The watershed of the Drin River has a total area of 19,582 km2, of which 14,173 $km^2$ belong to Drin itself and 5,183 $km^2$ to the Buna. The Drin River is formed by two main tributaries: Drin I Zi, with a catchmant area of 5,885 $km^2$, flowing from FYR of Macecedonia, and the Drin I Bardhe, flowing from Kosovo.

The Buna River drains Lake Shkodra, which is fed by rivers originating from Montenegro and Albania; its larger tributary is the Moraça which forms the border.

The Drin River had a mean annual discharge of 680 $m^3/s$ during the period 1951-1985, of which 360 $m^3/s$ came from the Drin River itself and 320 m3/s from the Buna River. The resulting specific discharge is about 35 l/s/km² and the runoff coefficient 0.74. But these high values are mainly due to the very high yield of the Buna River, which cannot be much exploited – except for navigation.

The most important river in the watershed is the Drin River, with the following characteristics

- Annual discharge volume: 11,100 m³
- Specific discharge; 24.8 l/s/km²
- Ratio wettest month (December0 to driest month (August): 5.7
- On in 10 years high flow: about 13 times the river module
- The storage capacity of Fierze reservoir : 2,700 million m³ (about 25% of annual flow)

### 4.1.3 Ground water

Drin River basin is characterized by the presence of hydrogeologicaly very different rocks (Hydrogeological Map of Albania, 1985). Most important aquifer of the Drin River basin is related to the carbonate limestone rocks which form some big karst massifs. They contain big and good quality groundwater resources, mostly discharged by big karst springs. Wide areas are covered by intrusive rocks, which are characterized as locally productive aquifers. Their water-bearing capacity depends on the quantity and character of the fissure. Most important are the deeply incised tectonic faults zone, which often contain important groundwater resources. The effusive, effusive-sedimentary and metamorphic rocks usually have low permeability and their groundwater resources are very limited.

Koman Dam area consist mostly of two hydrogeological types of rocks; mainly macro-fissured limestone and marly limestone with relatively important springs with the biggest discharge up to about 10 l/s, and the flish rocks with very low permeability and practically without groundwater.

### 4.1.4 Receiving water quality

The surface water quality was studied for some sections of the Drin River before construction of Drin HP cascade. The analyses were performed by the Institute of Hydrometereology of Tirana and the generalized results for the period 1965-1980 are described in the "Hydrology of Albania" published in 1984. The Drin River water, as measured in Kukes, Dushaj and Koman, is low mineralized and low hard and regarding the prevailing ions is of Bicarbonate-Calcium type. The water total mineralization varies about 250 to 300 mg/l and the total hardness varies about 9-10° German. There are no measurements of the microcomponents like heavy metals or others. As in the study area have been developed some copper and chrome mines, nevertheless that the last 15 yeas are note operating, it should be of a particular interest to measure the concentration of cupper and chrome in rivers and in Koman lake.

The groundwater chemistry is studied by the former Hydrogeological Enterprise of the Albanian Geological Service. The groundwater of the Koman Dam area is low mineralized and of low hardness; their hydro-chemical type is Bicarbonate-Calcium or Bicarbonate-Magnesium.

### 4.1.5 Land pollution

The soils in the region of Koman Dam are gray forest soils. The gray forest soils are typical for middle-mountain belt and they have developed on diverse soil-forming rocks due to which their mechanical composition varies from clayey-sandy to sandy-clayey, often rocky. Only the soils below the dam have affected by the construction of the dam before 1985 and by the construction of a service road.

The soils in the area are not polluted by toxic substances or waste.

### 4.1.6 Air Quality and Sources of Air Emission

Since the construction of Koman Dam the air quality corresponds to the natural conditions of the environment. There is no pollutant transport from other territories. The traffic of motor vehicles is limited and there is not any impact on air purity. The air purity is favored also by the lack of industrial activities beside this of the electricity generation.

### 4.1.7 Noise Emission

The investigated site is located far from the urban and industrial activities in basically rural area. The background noise is the natural background of the environment and stays surely below 40 dBA. The baseline sound emissions are abruptly increased only during the short spilling periods, which are associates with particularly high noise level.

### 4.1.8 Landscape

The changes in landscape environment in the considered region have already occurred to a large extend by the construction of the Koman Dam and formation of Koman lake. The oak forest cut during and after the construction faze of the dam is partially restored. This was favored by the massive demographic movement of the local population from the villages to the big towns and cities of the western Adriatic lowland of Albania. Lakes are not a foreign element to the mountain, and the artificial lake fits friendly into natural landscape.

## 4.2 METEOROLOGY

Koman Dam is situated in the North Mediterranean Fore-Mountain Climate Sub-Zone (Climate Division of Albania, in "Climate of Albania, published by Institute of Hydrometeorology of Tirana, 1984). It encompasses the North Albanian low mountain areas which elevation varies mostly from 600 to 1200 m above sea level. This sub-zone is characterized by relatively uniform thermal regime and of big aerial distribution of precipitation. The following description of the climate elements is based on the data of the nearest to Koman Dam climate station of Tropoja, Kukes and Puka.

### 4.2.1 Temperature

Winter in the region is relatively cold and the mean temperatures in January are about -0.3°C – 0.2°C. The mean daily minimum temperature for January is about -3°C to -4°C, and the absolute daily minimum temperature may fall below -10°C. The mean daily maximal January temperature is about 2°C to 4°C.

During the summer the mean daily monthly temperatures vary over the range 20-22°C at low elevation parts of the area. The mean daily maximum temperature for June and August is about -25°C to -30°C, and the absolute daily maximum temperature may reach up more than 35°C. The mean daily minimal temperature is about 14°C to 16°C.

Spring is cool, with mean monthly temperature in the central spring months about 9-11°C. During the autumn the mean monthly temperature falls from about 17-18°C during September to about 7-8°C during November.

### 4.2.2 Precipitation

The annual amount of the precipitation in the region varies within big limits; for the period 1931-1965 (Climate of Albania) it is 850 mm in Kukes, 1846 mm in Tropoja, 2104 mm in Iballa (near Puka) and 1797 mm in Shkoder. Very characteristic for the climate of Albania is the non-uniform distribution of the precipitation; most of them (about of 70 % of yearly precipitations) fall during the period October – March, while during the summer months (June – August) fall usually less than 10 % of the annual precipitations. The quantity of snow varies on big limits according to the elevation of the measuring are; along the valleys only about 5 to 10 % of the winter precipitation are of snow, while in the areas

higher than 1000 m the snow consist about 30 % of the winter precipitations. The maximum daily precipitations in the region according to the location vary from about 100 mm (Kukes) to more than 200 mm (Puke).

Storm events are a characteristic of the climate of Albania, but there are not records for all the territory of the country. According to some data of Shkoder Meteorological Station the 15 minutes rainfall is about 30 to 40 mm, the 30 minutes rainfall may reach up to 80 mm, while the rainfall for 1, 2 and 3 hours are registered to be respectively 120 mm, 152 mm and 161 mm.

**Table 1 Mean monthly temperature in °C and mean monthly precipitation in mm for the Climate Station of Tropoja and Puka**

| Station | Element | I | II | III | IV | V | VI | VII | VIII | IX | X | XI | XII | Average |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Tropoja | Temp. | 0.2 | 2.4 | 6.4 | 11.6 | 15.7 | 19.4 | 21.6 | 21.4 | 18.4 | 12.6 | 8.2 | 3.0 | 11.7 |
| | Precip. | 252 | 180 | 120 | 116 | 114 | 78 | 72 | 51 | 93 | 206 | 352 | 212 | 1846 |
| Puka | Temp. | -0.3 | 1.0 | 3.8 | 9.0 | 13.6 | 17.4 | 20.0 | 20.4 | 17.0 | 11.4 | 6.6 | 2.0 | 10.2 |
| | Precip. | 261 | 216 | 158 | 144 | 142 | 70 | 50 | 42 | 148 | 296 | 304 | 272 | 2104 |

(Observation period 1931-1985)

### 4.2.3 Wind patterns

The region is characterized of by good aeration conditions. According to the observations made by the Institute of Hydrometeorology of Tirana, the prevailing winds in Shkoder are east and south-east winds over all round the year, while in Kukes the prevailing winds are north and south winds. The mean monthly wind speeds are about 2.0 m/s in Shkoder and 2.8 m/s in Kukes. The biggest wind speeds registered in Shkoder are about 35 to 40 m/s, while those registered in Kukes are about 30-35 m/s.

## 4.3 BIOLOGICAL ENVIRONMENT

In the area of Koman Dam are present different ecosystems including mountains, rivers, freshwater lake and to a smaller extend also the agricultural ecosystem.

### 4.3.1 Flora

The terrestrial vegetation of the area corresponds mainly to the Continental-Central European character with strong participation of some Mediterranean elements. The plant formations of the land area exhibit a variety of forms, as they develop in the low high and high hilly area around the Koman Lake which elevation increases to the alpine zone.

According to M. Demiri (Gjeografia e Bimeve, Botim i UT, 1985) in Albania, with about 1/15 of the surface of Balkan Peninsula is identified about 50 % of the flora of the Balkan. The flora of Albania numbers 3250 species, from which 489

are characteristic for Balkan Peninsula. About 1% of the flora species of Albania are endemic.

**Figure 9 Oak tree forest above the tunnel spillway No. 3 in Koman Dam**

Flora and vegetation of this part of Drini watershed is dominated by woodlands of *Quercus pubescens* and *Q.petraea* in the upper part (area around Koman lake), dominated by the following associations: *Arbutus unedo-Erica arborea, Arbutus unedo+Phillyrea latifolia, Quercus ilex-Myrtus communis, Pistacia lentiscus+Juniperus oxycedrus, Carpinus orientalis+Fraxinus ornus and Carpinus orientalis+Crataegus sp.div.*.

## 4.3.2 Fauna

**Fauna** of this study area is that typical of the Mediterranean shrubs and forests. From mammals there are distinguished carnivores such as: *Canis aureus, Vulpes vulpes, Meles meles, Martes foina, Mustela putorius, M. nivalis.* A good number of bat species do occur in this study area, using it as hunting ground and source of water (eg. *Rhinolophus rhinolophus, Rh. blasii, Rh. euryale, Myotis myotis, M. blythi, Miniopterus schreibersi, Nyctalus sp, Pipistrellus sp.div*. etc). Water reservoirs created by hydropower dams are important feeding sites for the otter (*Lutra lutra*).

A relatively rich bird community occurs inside of the Mediterranean shrubs and forests, among which there are distinguished woodpeckers (*Dendrocopos sp.,*

*Jynx torquilla, Picus canus, P. viridis*), galliforms (*Perdix perdix, Coturnix coturnix*) and passerines (*Parus sp, Fringila sp, Carduelis sp., Emberiza sp., Sylvia sp., Sitta sp., Lanius sp., Turdus sp,* etc). Some aquatic birds do visit these waters reservoirs, such as *Podiceps nigricollis, P. cristatus, Tachybaptus ruficollis, Egretta alba, E.garzetta, Ardea cinerea, Larus ridibundus*, *Alcedo atthis* etc.

From reptiles and amphibians occurring inside the study area, particularly linked with aquatic habitats there are distinguished *Emys orbicularis, Natrix natrix, N. tessellata, Triturus vulgaris, T.cristatus, Salamandra salamandra, Hyla arborea, Bufo viridis, B. bufo,* and various species of frogs (*Rana sp.div.*)

In the fresh waters of Drin river there are found various species of fish, such as *Salmo trutta macrostigma, Salmo marmoratus, Gobio gobio lepidolemus, Barbus meridionalis petenyi, Cyprinus carpio, Alburnus alburnus alborella, Chondrostoma nasus nasus, Anguilla anguilla, Perca fluviatilis, Stizostedion lucioperca,* etc, of which some are of economic interest for local community living around the lakes.

### 4.3.3 Protected Natural Territories

Near the Koman Dam area there are not situated special protected areas. As could be seen in the "Map of the Protected Areas of Albania" (Fig. 10), the Koman Dam is situated far from the protected areas. Although some of them like the "Strictly Natural Resource of Gashi River" and "National park of Valbona River" are situated within the Drin River watershed area. These protected areas are situated upstream to the Koman Dam and could not have any impact by the activity developed on the dam and lake area.

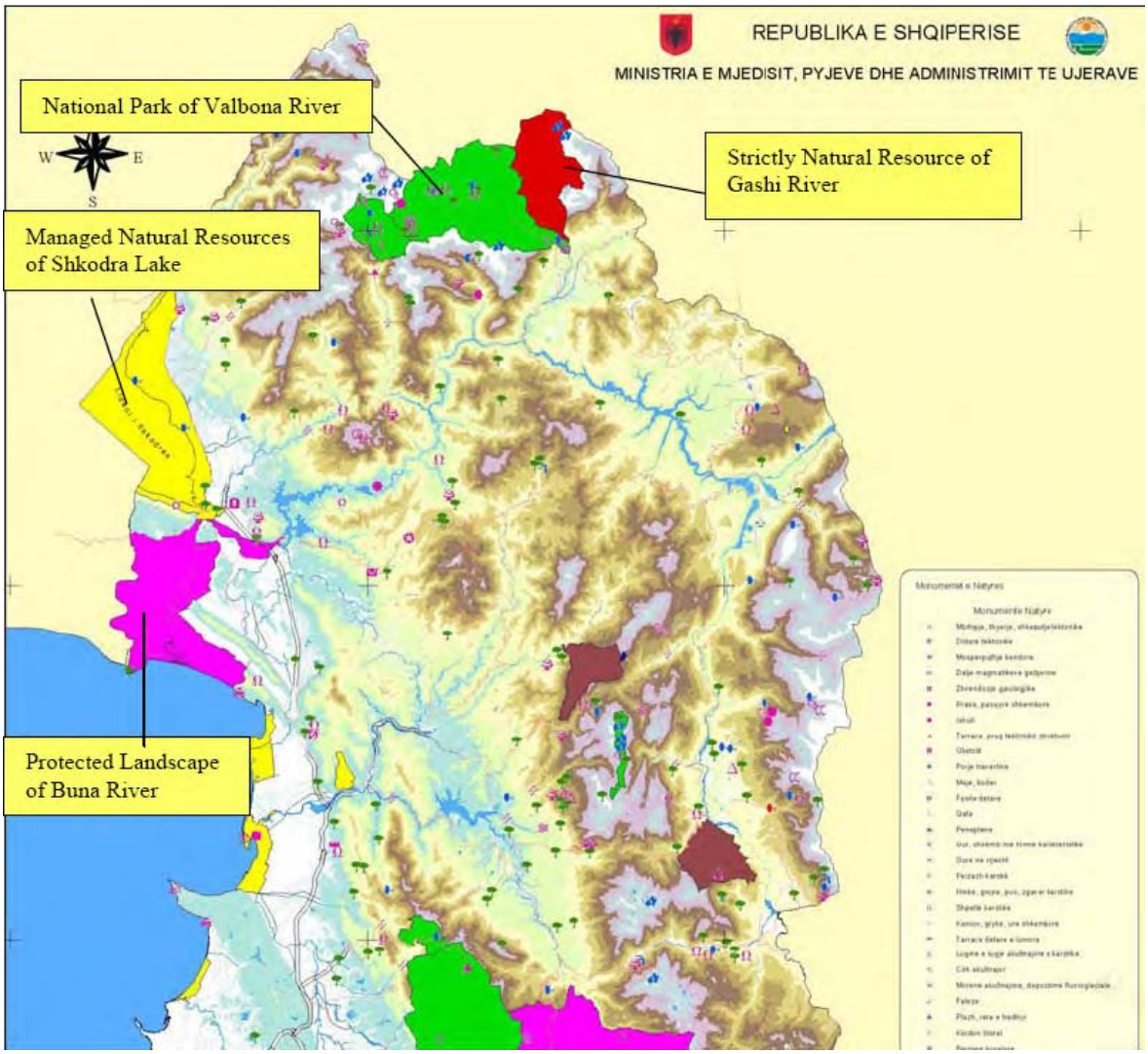



**Figure 10 Map of the protected areas of (North) Albania**

## 4.4 SOCIO – CULTURAL ENVIRONMENT

### 4.4.1 Agriculture and Livestock Activity

The population around Koman Dam is rare; there are some small villages scattered on the small valleys of the area. The population of Koman villages is less than 500 inhabitants. The population of the area is decreasing compared to the period prior to transition.

The main economic activity for the local population is agriculture and animal farming. The land has been distributed pursuant to the law No 7501, with each farmer receiving about 1 hectare of arable land, which is sufficient to meet the demands for a family, but quite insufficient with regard to intensive agriculture. The lack of the machinery has contributed to the general decay of agriculture. As a result, arable land is frequently used mainly for animal farming.

### 4.4.2 Income, Living Standard

The main income for the rural population of the Koman Dam area is by employment in the agriculture sector and remittances from immigrants. Often cutting the trees and selling them for construction purposes is used as by the local people as a way of surviving. The rural population in the region faces a number of problems, such as lack of water supply and sewerage systems and lack of proper road infrastructure. The standard of living of the rural population of this particular mountainous area is becoming even more critical during the transition period in terms of aggravating poverty in a broader sense. Younger people especially are seeking a better future in the town and in the non-agriculture sectors.

### 4.4.3 Other Sources of Income

Remittances from agricultural activity are insufficient for the majority of households in order to meet daily living needs. That is why households look for other sources of income. The most significant alternative source for households of the area is the income from long-term and short-term migration abroad, mainly in Greece and less in Italy. These remittances represent about 30 to 50 % of average household monthly income. The migration is so intensive that some the mountainous area like that of Koman is going to a fully abandoned by households.

During the past the forest areas have been intensively used to provide fire wood and as construction material. The forests comprise primary oak and beech. Other serious threat to the forests is tree lopping for the collection of winter fodder, mostly for goats. Another threat to the forest integrity is the overgrazing of sub-alpine and alpine meadows, which detrimentally affects the fragile alpine ecosystems. As a result of this over-utilization, most local forests have gradually deteriorated during the last 30 years into unproductive shrub communities of low commercial and biodiversity value.

# 5 ENVIRONMENTAL LEGISLATION AND SAFEGUARDS PROCEDURES

Activities carried out under the Albanian Dam Safety Project will comply with both the current Albanian Environmental Regulations and World Bank's Safeguards Policies. For this reason, this Environmental Impact Assessment is prepared and is based on the World Bank outline of the Environmental Assessment including Environmental Management Plan. The scope of this EIA entails as well all information required by Albanian Law on EIA, more specifically information required for Report on Summary Environmental Assessment.

## 5.1 WORD BANK SAFEGUARDS PROCEDURE

The Bank assesses every project against its safeguard policies. Albanian Dam Safety project in that way triggered the Bank's safeguard policy on environmental assessment and safety of the dams. The Bank's environmental screening could classify projects as category A (significant adverse environmental impacts), Category B (potential adverse environmental impacts less adverse than the one of category A) and category C (likely to have minimal or no adverse environmental impacts). The environmental screening of the project components determined that the project could be classified as category B. The Environmental Assessment done confirmed it as the project will not have significant, irreversible, cumulative or long-term adverse impacts. In fact, the EA identified a number of positive impacts of the proposed project and only minor negative impacts that could be effectively prevented or reduced through application of appropriate preventive actions or mitigation measures.

Environmental Assessment (OP 4.01, BP 4.01, GP 4.01) The anticipated environmental and social impacts of Physical Infrastructure Investments in the proposed project trigger this safeguard policy. Because the anticipated adverse impacts will not be significant or irreversible, however, and because they can be prevented or reduced through appropriate preventive actions or mitigation measures, the project is classified a Category "B" project, which requires only partial environmental assessment under this policy. To ensure that these issues are duly recognized, described and addressed, EAs are prepared for individual sub-projects (dams). This EA, with its EMP ensuring that recommended preventive actions and mitigation measures will be taken, satisfies this Bank safeguard policy.

Safety of Dams (OP 4.37, BP 4.37) The project component involving improvement measures for the safety and regulation of the Dams in Drin and Mat river cascades triggers this safeguard policy. The EIA, however, does not address this policy issue as the Bank's dam safety specialist performed a separate dam safety assessment in order to ensure project compliance with this safeguard policy.

## 5.2 ALBANIAN ENVIRONMENTAL LEGISLATION

Environmental legislation is governed by the Law on Environmental Protection No. 8934, dated September 5, 2002. This Law establishes national and local policies on environmental protection, requirements for the preparation of environmental impact assessments and strategic environmental assessments, requirements for permitting activities that affect the environment, prevention and reduction of environmental pollution, environmental norms and standards, environmental monitoring and control, duties of the state bodies in relation to environmental issues, role of the public and sanctions imposed for violation of the Law.

The Law on EIA, No.8990, was approved on January 23, 2003. It defines the rules, procedures and deadlines for identifying and assessing the direct or

indirect impacts of projects or activities on the environment. The Law establishes the steps necessary to implement EIA procedures: presentation of the application, preliminary review, selection and classification criteria, public hearing and consultation, access to information, duties and rights of other bodies. The Law also provides the list of activities that should be subject to the Profound and Summary EIA process.

A Profound (advanced) EIA is done for projects with significant potential impacts, as listed in Appendix 1 of the Law, those projects listed in Appendix 2 which the Ministry of Environment, Forestry and Water Administration (MOEFWA) considers will have a significant impact on the environment (based on information provided by the proposer at the time of application, in the manner detailed in Appendix 3 of the Law), and activities that are to be implemented in a protected area of the Republic of Albania.

A Summary (outlined) EIA is done for projects that may have less significant potential impacts which still require an expert assessment of their impacts. They include projects listed in Appendix 2 of the Law on EIA, and any changes or rehabilitations of projects listed in Appendix 1.

It is supported by several Decisions of the Council of Ministers and Guidance issued by the MOEFWA. The MOEFWA is the legal competent authority for requesting, reviewing and approving EIA documentation.

**Assessment of the project according to Albanian regulation**

According to Appendix 1 of the Law on EIA which identifies Activities that undergo Profound/advanced Process of Impact Assessment on Environment, the investments described under the Albanian Dam Safety Project, do not require to undergo Profound EIA process. Related to the project, the Appendix 1 defines that the Profound EIA is needed only for the construction of new hydro power plants.

According to Appendix 2 of the Law on EIA which identifies ctivities that undergo Summary Process of Impact Assessment on Environment, the investments described under the Albanian Dam Safety Project, do not require to undergo Summary EIA process, however according to article 4 of the Law on EIA, which states that changes or rehabilitations of projects listed in appendix 1 shall undergo summary process of impact assessment on environment. As the Appendix 1 is asking for EIA for the construction of hydro plants, the summary EIA is required for any changes or rehabilitation of existing hydro power plants.

**Summary Environmental Impact Assessment**

Report on Summary Environmental Assessment has to be compiled by licensed natural and juridical persons, selected, contracted and paid by proposer, in this case KESH. The brief information that needs to be provided in the Summary report of impact assessment on environment is given in Annex 2.

The request for approval of the project with prepared Report on Summary Environmental Assessment, the proposer (KESH) should submit to the Regional

Environmental Agency (REA) of the region where the project will be implemented. Within the five (5) days, the REA should either accept or reject the project classification. REA after inspection in the field of data presented in the report shall consult with local government units, with those of urban and tourism development and prepare in written its own justified opinion in favor of approval or refusal of the project as well as propose conditions to be placed in the approval documentation and forward these conditions to MoEFWA within twenty (20) calendar days from the day of request acceptance for review. The Minister of Environment shall establish the review commission which proposes the decisions.

Environmental declaration/ decision contains: (a) Norms of discharges of expected pollutes in air, water and land; (b) Compulsory measures based on best available techniques of construction put into use of the project; (c) Compulsory measures for protection of air, water land, biodiversity and to prevent the pollution transferal from one component of the environment to another; (d) Requirements for monitoring of discharges determining measurements methodology, their frequency, assessment procedure and publication of results; (e) Conditions on limiting the trans-border pollution above the permitted levels; (f) Additional measures to prevent surpassing of the quality norms of environment; (g) The requirement of reporting and comparing determined impacts during preparation of the report with real effects of project implementation.

In addition to Law on EIA, Republic of Albania has a special Regulation on the Participation of the Public in the Process of EIA from 2004. Public consultation procedure for Report on Summary Environmental Assessment is in detail described in chapter 10.

# 6 POTENTIAL ENVIRONMENTAL IMPACTS

As the objective of the project is to safeguard the hydroelectric plants of Albania and improve their operational efficiency, it is important to emphasize that the project would have overall long-term very positive impact on the environment. The installed monitoring equipment will contribute to the strengthening of the meteorological monitoring network and its remote system data collection will provide real-time data for safe dam and reservoir operation reduce emergency response time and provide a precise and consistent data collection system. The monitoring system together with the rehabilitation of the spillway gates will significantly minimize risk of flooding and endangering downstream inhabitants and habitats.

However, as with any construction works or operation of the large energy units, some negative impacts on the environment are expected. Impacts related to the project activities as defined in the chapter 3 are considered to be direct, short-term, immediate impacts which will affect solely the construction site.

## 6.1 ENVIRONMENTAL IMPACTS DURING CONSTRUCTION PHASE

The environmental impacts during construction phase are related to the installation of monitoring equipment, rehabilitation of the spillway gates seals and rehabilitation of the electromechanical equipment. Many of these are typical impacts associated with the construction activities.

A special attention will be given to the management of the reservoirs of the three lakes in the Drin cascade as it is necessary to lower the water level in Koman Lake for the installation of stop logs which will enable access and rehabilitation of spillway gates.

The other impacts are related to air pollution, waste generation, noise, soil and water pollution and potential health hazards.

### 6.1.1 Management of reservoirs

Issue with the management of the reservoirs during preparation for the rehabilitation of the spillway gates is already presented in 3.1.4.

As shown in figure 3 and 5 spillway gates are located with in the two tunnel spillways (no 3 and 4). To reach the gates it is necessary to close the spillway intake. On the entrance of the spillway intake tunnel, roller maintenance gates with stop logs were installed when dam was build for the purpose of closing the spillway tunnel for the maintenance of spillway gates. Since both spillway gates and roller maintenance gates were not maintained for more than 10 years, the mechanism of the roller maintenance gates on the entrance to spillway tunnel 3 first needs to be repaired, i.e. safely closed to have access to spillway gates. This as previously mentioned can be done by lowering the water just to the spillway intake level, i.e. 10 meters. This action will be necessary only for spillway tunnel No 3 as for the tunnel No 4 the stop log mechanisms for the power intake can be used.

The lowering of the Koman Lake has to be planed in cooperation with other dams on the Drin river cascade. Fierze Lake has the larges storage (2700 million $m^3$) and can withhold about 25% of annual flow of Drin River. Fierze dam only during the operation (maximum and minimum operation level) can vary 58 meters in height. As such, Fierze dam can withhold the water for Koman Lake, whose active capacity is 200 million $m^3$. During that period Fierze dam would stop functioning and would not generate electricity, which would require GoA to import electricity for that period of time.

Lowering of the water level and installation of stop logs on spillway No 3 would require 10 days. The rough numbers, which need to be confirmed through feasibility study, indicate that to lower Koman lake by using solely power plant outflow (600 $m^3/s$) after closure of Fierze dam would require only 4.5 days. These numbers are based on active capacity of the Koman Lake (200 mil $m^3$), average annual inflow to Koman Lake (9114 mil $m^3$), and maximum power plant operation (600 $m^3/s$). In these conditions, Vau I Dejes HPP could as well operate normally, without necessity to overuse spillway discharges and endanger

downstream settlements. After these 10 days, Fierze HPP could start operating as well as Koman HPP in few days when the Koman reservoir is brought to operation level.

During the period of the lowering of the water level in Koman Lake both Koman and Vau I Dejes dam should operate. After level in Koman dam reaches lower operating level, the Koman dam will stop operating and install stop logs on the intake tunnel. Vau I Dejes, should continue to operate normally. Active storage of Vau I Dejes is 250 million $m^3$. The difference between maximum and minimum operation level for Vau I Dejes Dam is 14.5 m.

Hydrometeorological data suggest that the best time to proceed with works would be in the period during the summer months (June – August) as the precipitation is usually less than 10 % of the annual precipitations. Since the works will require only 10 days, the scheduling of works should be done according to the weather forecast in these two months to avoid impacts of summer showers, which can according to some data of Shkoder Meteorological Station in the 15 minutes rainfall contribute to 30 to 40 mm, the 30 minutes rainfall may reach up to 80 mm, while the rainfall for 1, 2 and 3 hours are registered to be respectively 120 mm, 152 mm and 161 mm.

The lowering of the water level in Koman lake and stopping of intake of fresh water from Fierze dam in the summer month might have temporary influence on the temperature and dissolved oxygen level in the lake and therefore on aquatic life. Since lowering of the lake will not last for more than 10 day, these impacts are considered not to have significant impact on local economy or aquatic life.

### 6.1.2 Air pollution

Air pollution can be a consequence of several construction / rehabilitation activities, and following are envisaged: sandblasting, grinding, welding and transportation and stockpiling of construction material.

**Sandblasting**

Sandblasting is an abrasive blasting that involves forcefully projecting a stream of abrasive particles onto a surface, usually with compressed air or steam. It is used for the process of smoothing, shaping and cleaning a hard surface by forcing solid particles across that surface at high speeds. It will be used for cleaning (removing paint, rust, grease) both metal and concrete/stone surfaces. A sandblasting setup usually consists of three different parts: the abrasive itself, an air compressor, and a blaster gun

Silica sand is most commonly used as abrasive and the process produces large amounts of silica dust, causing air pollution, which is also high health hazard risk. However other materials can be used which present lesser health hazard. These might be steel grit, steel shots, copper slag, glass beads (bead blasting), metal pellets, dry ice, and garnet, powdered abrasives of various grades, powdered slag, and even ground coconut shells or corncobs, walnut shells, and Baking Soda.

Sandblasting will be preformed in both open (frames of the spillway gates, concrete surfaces of the spillway gates) and closed spaces (turbine rollers, stator and other electromechanical parts).

Prevention measures for sandblasting

Air monitoring should be performed to measure worker exposure to airborne crystalline silica, or other abrasive material. Air monitoring should be performed as needed to measure the effectiveness of controls. Respiratory protection should be used as defined bellow. Recommendations for the respiratory protection are according to NIOSH (US National Institute of Occupational Safety & Health) standards.

**Table 2** NIOSH-recommended respiratory protection for workers exposed to respirable crystalline silica

| **Condition** | **Minimum respiratory protection required to meet the Condition NIOSH REL for crystalline silica (50 µg/m$^3$)*** |
|---|---|
| Less than or equal to 500 $\mu$g/m$^3$ (10 x REL)** | Any air-purifying respirator with a high-efficiency particulate filter |
| Less than or equal to 1,250 $\mu$g/m$^3$ (25 x REL) | Any powered, air-purifying respirator with a high-efficiency particulate filter, or<br>Any supplied-air respirator equipped with a hood or helmet and operated in a continuous-flow mode (for example, type CE abrasive blasting respirators operated in the continuous-flow mode) |
| Less than or equal to 2,500 $\mu$g/m$^3$ (50 x REL) | Any air-purifying, full-facepiece respirator with a high-efficiency particulate filter, or<br>Any powered, air-purifying respirator with a tight-fitting facepiece and a high-efficiency particulate filter |
| Less than or equal to 50,000 $\mu$g/m$^3$ (1,000 x REL) | Any supplied-air respirator equipped with a half-mask and operated in a pressure-demand or other positive-pressure mode |
| Less than or equal to 100,000 $\mu$g/m$^3$ (2,000 x REL) | Any supplied-air respirator equipped with a full facepiece and operated in a pressure-demand or other positive-pressure mode (for example, a type CE abrasive blasting respirator operated in a positive-pressure mode) |
| Planned or emergency entry into environments containing unknown concentrations or concentrations less than or equal to 500,000 $\mu$g/m$^3$ (10,000 x REL) | Any self-contained breathing apparatus equipped with a full facepiece and operated in a pressure-demand or other positive-pressure mode, or<br>Any supplied-air respirator equipped with a full facepiece and operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained breathing apparatus operated in a pressure-demand or other positive-pressure mode |
| *These recommendations are intended to protect workers from silicosis; only the most protective respirators are recommended for used with carcinogens.<br>**Assigned protection factor (APF) times the NIOSH REL. The APF is the minimum anticipate | |

level of protection provided by each type of respirator.

Where possible, use containment methods such as blast-cleaning machines and cabinets to control the hazard and protect adjacent workers from exposure.

Wear washable or disposable protective clothes at the worksite; shower and change into clean clothes before leaving the worksite to prevent contamination of cars, homes, and other work areas.

Post signs to warn workers about the hazard and to inform them about required protective equipment. Posting should clearly indicate time and length of the activities and clearly define restrictive areas.

KESH should provide workers with training that includes information about health effects, work practices, and protective equipment for crystalline silica and other abrasives.

## Welding

Welding is a fabrication process that joins materials, usually metals or thermoplastics, by causing coalescence. This is often done by melting the work pieces and adding a filler material to form a pool of molten material (the weld puddle) that cools to become a strong joint, with pressure sometimes used in conjunction with heat, or by itself, to produce the weld. Regardless of location, welding remains dangerous, and precautions must be taken to avoid burns, electric shock, poisonous fumes, and overexposure to ultraviolet light.

Welding process produces dangerous gases and particulate matter. Processes like flux-cored arc welding and shielded metal arc welding produce smoke containing particles of various types of oxides, which in some cases can lead to medical conditions like metal fume fever. The size of the particles in question tends to influence the toxicity of the fumes, with smaller particles presenting a greater danger. Additionally, many processes produce fumes and various gases, most commonly carbon dioxide, ozone and heavy metals that can prove dangerous without proper ventilation and training.

Gasses and particulate matter are usually produced in small amounts and do not pose long-term or wide range air pollution. The process presents usually direct health hazard to the workers.

Air pollution cannot be easily prevented and since it is usually of a very short duration, usually only health measures for the workers are prescribed. Welding fume extractors are often used to remove the fume from the source and filter the fumes through a HEPA filter. Protective equipment is described under health hazard. Furthermore, because the use of compressed gases and flames in many welding processes poses an explosion and fire risk, some common precautions include limiting the amount of oxygen in the air and keeping combustible materials away from the workplace.

## Grinding

Grinding is a finishing process used to improve surface finish, abrade hard materials, and tighten the tolerance on flat and cylindrical surfaces by removing a small amount of material. In grinding, an abrasive material rubs against the metal part and removes tiny pieces of material. The abrasive material is typically on the surface of a wheel or belt and abrades material in a way similar to sanding. On a microscopic scale, the chip formation in grinding is the same as that found in other machining processes. The abrasive action of grinding generates excessive heat so that flooding of the cutting area with fluid is necessary. Grinding produces dust which causes short-term air pollution, which usually only presents potential health hazard for the workers. Mitigation measure should comprise use of protective respiratory equipment and informing the workers about the hazard and about required protective equipment. Posting signs should clearly indicate time and length of the activities and clearly define restrictive areas.

**Transportation and stockpiling of the construction material**

Dust is a typical occurrence in transportation and stockpiling of the construction material. To minimize dust following measures should be adopted: reduction of stockpiling period to a minimum, to minimize exposure to wind erosions, use of covered trucks for off site transport, reduction of speed of vehicles on the construction site.

### 6.1.3 Waste generation

Waste generation is expected to have the most important environmental impact. The envisaged works under the project will produce several types of waste. These are classified according to the European waste catalogue and hazardous waste list as the Republic Albania harmonized the waste legislation with the EU legislation. The identify waste marked with asterisk (*) represents hazardous waste.

Types of waste expected may be as follows but others are not excluded:

**08 Wastes from the manufacture, formulation, supply and use (MFSU) of coatings (paints, varnishes and vitreous enamels), sealants and printing inks**

08 01 wastes from MFSU and removal of paint and varnish

08 01 11* waste paint and varnish containing organic solvents or other dangerous substances

08 01 12 waste paint and varnish other than those mentioned in 08 01 11

08 01 17* wastes from paint or varnish removal containing organic solvents or other dangerous substances

08 01 18 wastes from paint or varnish removal other than those mentioned in 08 01 17

**12 Wastes from shaping and physical and mechanical surface treatment of metals and plastics**

12 01 wastes from shaping and physical and mechanical surface treatment of metals and plastics

12 01 13 welding wastes

12 01 16* waste blasting material containing dangerous substances (e.g. sandblasting)

12 01 17 waste blasting material other than those mentioned in 12 01 16 (e.g. sandblasting)

12 01 20* spent grinding bodies and grinding materials containing dangerous substances

12 01 21 spent grinding bodies and grinding materials other than those mentioned in 12 01 20

**13 Oil wastes and wastes of liquid fuels**

13 01 waste hydraulic oils (e.g. machinery and gate cylinders)

13 01 09* mineral-based chlorinated hydraulic oils

13 01 10* mineral-based non-chlorinated hydraulic oils

13 01 11* synthetic hydraulic oils

13 02 waste engine, gear and lubricating oils (e.g. servomotors, machiery)

13 02 04* mineral-based chlorinated engine, gear and lubricating oils

13 02 05* mineral-based non-chlorinated engine, gear and lubricating oils

13 02 06* synthetic engine, gear and lubricating oils

**15 Waste packaging; absorbents, wiping cloths, filter materials and protective clothing not otherwise specified**

15 01 packaging (including separately collected municipal packaging waste)

15 01 01 paper and cardboard packaging

15 01 02 plastic packaging

15 01 03 wooden packaging

15 01 10* packaging containing residues of or contaminated by dangerous substances

15 02 absorbents, filter materials, wiping cloths and protective clothing (e.g. oiled rugs)

15 02 02* absorbents, filter materials (including oil filters not otherwise specified), wiping cloths, protective clothing contaminated by dangerous substances

**16 Wastes not otherwise specified in the list**

16 01 end-of-life vehicles from different means of transport and wastes from dismantling of end-of-life vehicles and vehicle maintenance

16 01 07* oil filters

16 01 13* brake fluids

16 01 14* antifreeze fluids containing dangerous substances

16 01 15 antifreeze fluids other than those mentioned in 16 01 14

16 02 wastes from electrical and electronic equipment

16 02 13* discarded equipment containing hazardous components (16)

16 02 14 discarded equipment other than those mentioned in 16 02 09 to 16 02 13

16 03 off-specification batches and unused products

16 03 03* inorganic wastes containing dangerous substances

16 03 04 inorganic wastes other than those mentioned in 16 03 03

16 05 gases in pressure containers and discarded chemicals

16 05 04* gases in pressure containers (including halons) containing dangerous substances

16 05 05 gases in pressure containers other than those mentioned in 16 05 04

16 06 batteries and accumulators

6 06 01* lead batteries

16 06 05 other batteries and accumulators

**17 Construction and demolition wastes (including excavated soil from contaminated sites)**

17 01 concrete, bricks, tiles and ceramics

17 01 01 concrete

17 04 metals (including their alloys)

17 04 05 iron and steel

17 04 07 mixed metals

17 04 10* cables containing oil, coal tar and other dangerous substances

17 04 11 cables other than those mentioned in 17 04 10

17 09 other construction and demolition waste

17 09 03* other construction and demolition wastes (including mixed wastes) containing dangerous substances

17 09 04 mixed construction and demolition wastes other than those mentioned in 17 09 01, 17 09 02 and 17 09 03

**20 Municipal wastes (household waste and similar commercial, industrial and institutional wastes) including separately collected fractions**

20 01 separately collected fractions (except 15 01)

20 01 01 paper and cardboard

20 01 02 glass

20 01 35* discarded electrical and electronic equipment other than those mentioned in 20 01 21 and

20 01 23 containing hazardous components (21)

20 01 36 discarded electrical and electronic equipment other than those mentioned in 20 01 21, 20 01 23 and 20 01 35

20 03 other municipal wastes

20 03 01 mixed municipal waste

Waste management prevention measures

KESH has prepared a general hazardous waste contingency action plan for the all KESH facilities, which identifies rules for hazardous waste storages, protection equipment and training of the workers. Operation staff in cooperation with KESH should prepare site specific waste management plan for hazardous and non hazardous waste before commencing the rehabilitation activities suggested by the project in accordance with the national waste legislation. Types of waste and the expected quantities should be specified and separation measures of the same, their temporary storage and treatment/ disposal as well.

Some of the key provisions to be included in the plan are as follows.

Hazardous waste is expected in small quantities and it has to be separated from solid waste.

For hazardous waste contractor has to follow procedure for hazardous waste management, this implies collection, handing over the waste to authorized company for hazardous waste management and fulfilling accompanying documentation

Different waste types (plastic and glass packaging) for which separate collection/ recycling system exist in the country have to be separated from non recyclable waste and taken to appropriate collection points with accompanying documentation.

Non recyclable waste has to be taken to an approved landfill.

The building site will be cleaned and all debris and waste materials will be disposed of in accordance with clauses specified in the bills of quantities

Burning or illegal duping of waste is strictly forbidden.

Municipal waste and other waste have to be collected in containers specially designed for that purpose and regularly conveyed away.

According to the Law on environmental treatment of solid waste physical and legal entities are under the obligation to organize their own monitoring of waste quantities and disposal at their own expense and to submit the monitoring data every three months to Regional Environmental Agency.

### 6.1.4 Noise

The noise is an inevitable environmental impact during construction. Luckily, settlements are distant from Koman dam. The noise could be limited by following good management practices (calibrated equipment) and limiting works during regular daily shifts.

Construction equipment shall meet the applicable standard in EU Directive 2000/14/EC of May 2000. This Directive applies to the manufacturer of the noise emitting equipment. All equipment should be maintained in good working order.

### 6.1.5 Soil and water pollution

Soil and water pollution is not expected as it can be prevented. However, some increased pollution loads into water and soil may be caused by direct or indirect contamination due to accidental spills or mishandling of hazardous materials. This can also happen during installation of monitoring equipment due to the drilling activities (e.g. piezometers). KESH has prepared Action Plan for Spill Prevention, Control and Countermeasure for KESH's Facilities (annex 3). All workers are familiarized with the plan. The plan calls for continuous revisions. Upgrading of the Action plan to become site specific is advisable, since only possibilities of the accidents during normal operation are envisaged. The plan should as well reflect construction phase. According to the plan the operation staff is conducting regular inspection of pipes and equipment that store, transport or use oils, as a measure to prevent oil spills. Recommended frequency of inspection is to be done on a monthly basis. The records of inspections are maintained in the Environmental Information Register. The register includes records of environmental trainings and instructions, employee occupational health issues and monthly environmental information. The register is send to Environmental Management Unit in KESH on a monthly basis. The same practice should be continued during construction phase as well.

Some of the additional suggestions are outlined bellow. Stockpiling of construction material should be avoided by following proper storage conditions at the construction site while using covers for protection where possible against weathering. Hazardous materials (lubricants, oils, etc.) should be kept on impermeable surface, and adsorbents like sand or sawdust should be available for quick handling of small accidental spillages. All materials should be handled in line with instructions included in the Material Safety Data Sheets present at the construction site. Training of the operation staff as well as construction staff should be continued.

If there will be need for installing fuel storage tanks they will have secondary containment with sufficient volume contain a spill from the largest tank in the containment structure. The containment area will have a means (pumps)of removing accumulated water.

### 6.1.6 Health hazards and work safety

Some of the metal physical and mechanical treatment of metals can present health hazards. These hazards are related to exposure to UV, heat flames (welding), exposure to dust (sandblasting, grinding), and exposure to explosive substances.

Sandblasting is one of the high-risk operations for silicosis. Any abrasive blasting, even if the abrasive does not contain silica, may pose a silicosis hazard when it is used to remove materials that contain silica, such as remains of sand moulds from metal castings. For that reason respiratory protective equipment is advised as described in table 2. The respiratory protective equipment is suggested as well in grinding processes.

Welding, without the proper precautions, can be a dangerous and unhealthy practice. Because many common welding procedures involve an open electric arc or flame, the risk of burns is significant. To prevent them, welders wear personal protective equipment in the form of heavy leather gloves and protective long sleeve jackets to avoid exposure to extreme heat and flames. Additionally, the brightness of the weld area leads to a condition called arc eye in which ultraviolet light causes inflammation of the cornea and can burn the retinas of the eyes. Goggles and welding helmets with dark face plates are worn to prevent this exposure, and in recent years, new helmet models have been produced that feature a face plate that self-darkens upon exposure to high amounts of UV light. To protect bystanders, translucent welding curtains often surround the welding area. These curtains, made of a polyvinyl chloride plastic film, shield nearby workers from exposure to the UV light from the electric arc, but should not be used to replace the filter glass used in helmets. Welders are also often exposed to dangerous gases and particulate matter. Processes like flux-cored arc welding and shielded metal arc welding produce smoke containing particles of various types of oxides, which in some cases can lead to medical conditions like metal fume fever. The size of the particles in question tends to influence the toxicity of the fumes, with smaller particles presenting a greater danger. Additionally, many processes produce fumes and various gases, most commonly carbon dioxide, ozone and heavy metals that can prove dangerous without proper ventilation and training.

KESH should in cooperation with HPP Koman prepare the workers safety plan, identifying good practices and rules of conducting activities on the dam site.

## 6.2 ENVIRONMENTAL IMPACTS DURING OPERATION PHASE

Environmental impacts during operation phase which are related to the project investments primarily relate to waste generation and potential water and soil

contamination due to the accidents, for which measures should be the same as during construction phase.

### 6.2.1 Waste generation

Waste generated during operation is related to maintenance activities and regular operation activities and these are usually created in small quantities. As already mentioned, KESH has prepared a general hazardous waste contingency action plan for the all KESH facilities, which identifies rules for hazardous waste storages, protection equipment and training of the workers. The other waste streams are not handled in organized manner. Operation staff in cooperation with KESH should prepare site specific waste management plan for hazardous and non hazardous waste before commencing the rehabilitation activities suggested by the project in accordance with the national waste legislation. Types of waste and the expected quantities should be specified and separation measures of the same, their temporary storage and treatment/ disposal as well. A special attention should be put to selection of the waste disposal method. If proper facilities for waste disposal/treatment do not exist in Albania, waste should be exported. The chosen landfills have to comply with the minimum international standards for waste disposal. The waste management practice in Albania could be considered so far somehow inadequate; the cities and the villages have not adequate disposal facilities. Mostly the wastes are thrown at the nearest river, and in some towns there are traditionally collected "somewhere" outside the town. Sometimes the occasionally selected landfills are in good geological conditions but at all the "landfills" is not practiced any technology beside the fact that in some of them is practiced the covering of wastes with soil.

With the funds of "Cooperazione Italiana" the "Sharra" landfill of Tirana is under reconstruction and should be the first landfill of Albania which will fulfill the minimum requirements under international good practice. Beside this two other modern landfills are designed and which is believed o be constructed at near future; one, is that of Bushat (about 10 km south-west to Vau Dejes HHP) which should serve to the population of Shkodra and Lezha areas, and the other one is that of Maliqi which should serve to south-east Albania (Korca and Pogradec area).

If the waste is stored on site, a special designated place has to be found and waste should be stored according to the EU standards. The HESH hazardous waste management plan identifies how (annex 5).

HPP Koman should quarterly report to Regional Environmental Agency on the waste management issues and monthly to KESH Environmental Management Unit. This procedure is not followed always.

Potential types of waste are classified according to the European waste catalogue and hazardous waste list as the Republic Albania harmonized the waste legislation with the EU legislation. The identify waste marked with asterisk (*) represents hazardous waste.

Types of waste expected may be as follows but others are not excluded:

**13 Oil wastes and wastes of liquid fuels**

13 01 waste hydraulic oils (e.g. machinery and gate cylinders)

13 01 09* mineral-based chlorinated hydraulic oils

13 01 10* mineral-based non-chlorinated hydraulic oils

13 01 11* synthetic hydraulic oils

13 02 waste engine, gear and lubricating oils (e.g. servomotors, machinery)

13 02 04* mineral-based chlorinated engine, gear and lubricating oils

13 02 05* mineral-based non-chlorinated engine, gear and lubricating oils

13 02 06* synthetic engine, gear and lubricating oils

**16 Wastes not otherwise specified in the list**

16 01 end-of-life vehicles from different means of transport and wastes from dismantling of end-of-life vehicles and vehicle maintenance

16 01 07* oil filters

16 01 13* brake fluids

16 01 14* antifreeze fluids containing dangerous substances

16 01 15 antifreeze fluids other than those mentioned in 16 01 14

16 05 gases in pressure containers and discarded chemicals

16 05 04* gases in pressure containers (including halons) containing dangerous substances

16 05 05 gases in pressure containers other than those mentioned in 16 05 04

16 06 batteries and accumulators

6 06 01* lead batteries

16 06 05 other batteries and accumulators

**20 Municipal wastes (household waste and similar commercial, industrial and institutional wastes) including separately collected fractions**

20 01 separately collected fractions (except 15 01)

20 01 01 paper and cardboard

20 01 02 glass

20 01 35* discarded electrical and electronic equipment other than those mentioned in 20 01 21 and

20 01 23 containing hazardous components (21)

20 01 36 discarded electrical and electronic equipment other than those mentioned in 20 01 21, 20 01 23 and 20 01 35

20 03 other municipal wastes

20 03 01 mixed municipal waste

# 7 ENVIRONMENTAL MANAGEMENT PLAN

The present Environmental Management Plan (EMP) includes measures to address the potential impacts during the rehabilitation activities and operation of HPP Koman. The Mitigation Plan with identified impacts, measures and responsible parties is presented in table 3 and 4 while the Monitoring Plan for these mitigation measures is included in table 5.

The KESH, HPP Koman and the Supervisor Engineer will monitor the implementation of the EMP. Overall potential environmental and safety impacts are readily avoidable and can be easily mitigated by adopting good engineering practices. KESH will ensure that the contract documents include the relevant environmental protection clauses. The Contractor that will perform the civil works will also follow the requirements of the current Albanian construction and environmental regulations. The Supervisor Engineer will supervise the construction works. Compliance with the Albanian regulations and the terms of the present EMP will be monitored and verified during regular site visits. The findings of these visits will be reported quarterly in supervision reports submitted to the KESH by the Supervision Engineer, based on consultations with the Contractor. The Supervision Engineer will pay attention to any new critical issues that may come up during the civil works and will inform KESH and suggest actions for various agencies.

The KESH environmental management unit together with HPP Koman should implement the EMP mitigation measures during operation. The unit has experience with the implementation of the EMP measures since it is monitoring already two other projects that KESH has with the World Bank. KESH should report twice per year the status of the EMP implementation to the Bank.

The contractor will monitor and enforce all environmental mitigation measures, including the health and safety measures (accident prevention, etc.) and the control of pollution and wastes at the work sites and construction camps. The monitoring during operation phase will be conducted by KESH Environmental Management Unit and HPP Koman operation staff, i.e. by licensed contracted companies if necessary. There will be day-to-day supervision of all activities to ensure that sound environmental practices are employed during the construction period. The Supervisor Engineer will conduct quarterly project audits of the EMP to: a) ensure it is up to date and relevant to the situation on the ground; b) ensure that non-compliance and corrective actions are appropriately documented; c) review implementation status; and, d) evaluate corrective responses of the contractor. KESH will report regularly on the progress of implementation.

Monitoring data will be send once a month to KESH Environmental Management Unit , and quarterly to Regional Environmental Agency.

Environmental monitoring and supervision will be integrated into the project management and reporting system. Relevant Government authorities will be involved in auditing project performance and will receive copies of monitoring

reports. Tables 3, 4 and 5 summarize the proposed monitoring activities under the project and specify the location of the monitoring sites, frequency and duration of monitoring.

**Table 3 Environmental Mitigation Measures for the Construction Phase**

| Impact due to: | Impact Mitigation Measure | Place and time of performance | Implementation Funds | Person in Charge | Control functions performed by: |
|---|---|---|---|---|---|
| Lowering of the Koman lake (aqualife disturbance) | Special attention should be given to planning of the works for installing the stop logs. The works should be done in the shortest possible period to avoid lowering of DO and increase of temperature in Koman lake. However, safety of the dams during these works should be on the first place. | Koman lake during lowering period and during installation of stop logs on Spillway intake No 3 | Part of the technical documents for the project preparation | Contractor, Site supervising engineer | KESH PIU, REA Inspection, EMU of KESH |
| Air pollution by process of sandblasting, welding, grinding, etc. | Dust from demolition and transportation of construction material and waste will be minimized by use of water, by minimizing speed of vehicles and enclosement of cargo.<br>Dust from the object can be prevented by enclosing of construction site if necessary.<br>Where possible object that will undergo sand blasting will use containment methods such as blast-cleaning machines and cabinets to control the hazard and protect adjacent workers from exposure | During sandblasting in open and closed spaces where sand blasting is preformed | Could be significant<br>Contractor obligation transferred to the contractor by the agreement with HPP Koman/KESH | Contractor, | Site supervising engineer, KESH PIU, REA Inspection, EMU of KESH |
| Waste generation | HPP Koman together with KESH should prepare site specific Waste Management Plan before commencing the rehabilitation activities suggested by the project in accordance with the national waste legislation. Types of waste and the expected quantities should be specified and separation measures of the same, their temporary storage and treatment/ disposal as well.<br>Hazardous waste is expected in small quantities and it has to be separated from | During whole time of construction | Could be significant<br>Contractor obligation transferred to the contractor by the agreement with HPP Koman/KESH | Preparation of the plan should be lead by HPP Koman in cooperation with the Contractor<br>Contractor | Site supervising engineer, KESH PIU, REA Inspection, EMU of KESH |

| | | | | | |
|---|---|---|---|---|---|
| | solid waste<br>For hazardous waste contractor has to follow procedure for hazardous waste management, this implies collection, handing over the waste to authorized company for hazardous waste management and fulfilling accompanying documentation<br>All recyclable fractions have to be separated from non recyclable waste and taken to appropriate collection points with accompanying documentation<br>Non recyclable waste has to be take to approved landfill in agreement with local authorities<br>The building site will be cleaned and all debris and waste materials will be disposed of in accordance with clauses specified in the bills of quantities<br>Burning or illegal duping of waste is strictly forbidden<br>Municipal waste and other waste have to be collected in containers specially designed for that purpose and regularly conveyed away. | | | | |
| Noise | Limit the work from 7.00 a.m. to 7.00 pm<br>Meet general precautionary measures for noise mitigation on construction site (equipment attest). Construction equipment shall meet the applicable standard in EU Directive 2000/14/EC of May 2000. | During all time of construction | Part of the contractor regular practice | Contractor obligation transferred to the contractor by the agreement with HPP Koman/KESH | Site supervising engineer, KESH PIU, REA Inspection EMU of KESH, |
| Accidental spills to water and soil | Upgrade the existing Action Plan for Spill Prevention, Control and Countermeasure prepared for KESH facilities in order to become site specific and to encompass both construction and operation phase. (before | All the time during construction period | Contractor obligation transferred to the contractor by the agreement with | Preparation of the plan should be lead by HPP Koman in cooperation with | Site supervising engineer, KESH PIU, REA Inspection, EMU |

| | | | | | |
|---|---|---|---|---|---|
| | commencing construction)<br>If there will be need for installing fuel storage tanks they will have secondary containment with sufficient volume contain a spill, or 110% of the largest tank.<br>Implement the Plan | | HPP Koman/KESH | the Contractor<br>Contractor | of KESH |
| Health Hazard and Work Safety | Prepare site specific Work Safety Plan according to the suggested measures in EA (before commencing construction)<br>Implement the Plan<br>All construction workers and HPP employees should undergo health and safety training. Those dealing with the hazardous materials should receive special training in handling the materials | During construction period | Could be significant<br>Contractor obligation transferred to the contractor by the agreement with HPP Koman/KESH | Preparation of the plan should be lead by HPP Koman in cooperation with the Contractor<br>Contractor | Site supervising engineer, KESH PIU, EMU of KESH |
| Traffic disturbances | Although this is low populated area and the re will be not much traffic disturbance it is important that traffic management is prescribed and performed in accordance with the local laws with appropriate measures and signaling systems (e.g., appropriate lighting, traffic safety signs, barriers and flag persons) that are easily seen or easy to follow<br>Road speed should be clearly posted | During construction period on access roads | Part of the contractor regular practice | Contractor | Site supervising engineer, KESH PIU, EMU of KESH |

**Table 4 Environmental Mitigation Measures for the Operation Phase**

| Impact due to: | Impact Mitigation Measure | Place and time of performance | Implementation Funds | Person in Charge | Control functions performed by: |
|---|---|---|---|---|---|

| | | | | | |
|---|---|---|---|---|---|
| Waste generation | Implement the prepared site specific Waste Management Plan<br>Revise the plan if necessary | During operation period | Funds for regular maintenance, should be borne by HPP Koman | Environmental person at Koman HPP | EMU of KESH, REA Inspection |
| Accidental spills to water and soil | Implement site specific Action Plan for Spill Prevention, Control and Countermeasure<br>Revise the plan if necessary<br>If there will be need for installing fuel storage tanks they will have secondary containment with sufficient volume contain a spill, or 110% of the largest tank. | During operation | Funds for regular maintenance, should be borne by HPP Koman | Environmental person at Koman HPP | EMU of KESH, REA Inspection |
| Health Hazard and Work Safety | Implement site Specific Work Safety Plan and handle materials according to ISDS | During operation | Funds for regular maintenance, should be borne by HPP Koman | Environmental person at Koman HPP | EMU of KESH, REA Inspection |

**Table 5 Environmental Monitoring Plan**

| Phase | What *parameter shall be monitored ?* | Where *shall the parameter be monitored?* | How *shall the parameter be monitored?/ type of monitoring equipment* | When *shall the parameter be monitored? (at what intervals or continuously)* | Required Funds /Cost/ | Organization in charge of Monitoring |
|---|---|---|---|---|---|---|
| *Construction and Operation* | **Noise** will be monitored once, at both day and night, for an eight-hour period at the perimeter of the site during the peak of construction activity. | Noise will be monitored on construction site | Specialized and licensed monitoring company will be requested for the monitoring of the noise | At least once during the peak construction (day and night) | Coast should be beard by the contractor, cca 500 – 1000 euros | Monitoring should be organized by the contractor and data send to the PIU, EMU and HPP Koman environmental Person |
| | In addition, during operation noise will be monitored to determine noise level of the spillway operation. | Noise will be monitored at spillway and 1 meter outside of the HPP site border | | Once during the spillway operation | Cost should be beard by HPP Koman and KESH, up to 500 euros | Data Should be send to EMU |
| *Construction* | During Sandblasting activities **dust** will be monitored in order to check wheatear the safety equipment is appropriate | The dust will be monitored on all open and closed places where sandblasting will be preformed | Dust settling pots will be used | Continuous monitoring of the dust settling (monthly records) | Cost should be beard by the contractor | Monitoring should be organized by the contractor and data send to the PIU, EMU and HPP Koman environmental Person |

| | | | | | | |
|---|---|---|---|---|---|---|
| *Construction* | **Traffic disturbance** | On access roads | Visual observation | Continuously | Part of the supervising engineer contract | KESH PIU, EMU, HPP KOman |
| *Construction and Operation* | **Water and soil pollution due to spills** improper storage, management and use of materials | On the construction site and operation site | Visual observation<br>Records on training | Continuously (monthly records) | Part of the supervising engineer contract during construction and operation staff during operation | KESH PIU, EMU, HPP KOman |
| *Construction and operation* | **Waste generation** | On construction site and on HPP during operation | By waste manifests and data records kept on waste generation, collection and disposal<br>Visual observance<br>Records on training | Continuously during construction and operation (monthly records) | Part of the supervising engineer contract during construction and operation staff during operation | KESH PIU, EMU, HPP Koman |
| *Construction and Operation* | **Work safety** and hazard management | On construction site and on HPP during operation | Through monthly records of site inspection<br>Visual observance<br>Records on training | Continuously during construction and operation (monthly records) | Part of the supervising engineer contract during construction and operation staff during operation | KESH PIU, EMU, HPP Koman |

| | | | | | | |
|---|---|---|---|---|---|---|
| *Operation* | **Installed monitoring equipment** | Where new monitoring equipment is installed and should also | Piezometers, drainage / seepage equipment, pore pressure cells, etc. | Continuously, this would for example be, amount of seepage from the walls of galleries and abutment slopes, chemical quality of collected water, results from piezometers, etc. | Significant cost, part of the regular operation of the dam and part of the regular safety measures | HPP Koman, KESH EMU |
| *Operation* | **Alarm system** | On the whole dam system | Regular tests of the operation of the warning system are essential, subject to the inhabitants having been notified beforehand, and can be combined with evacuation exercises. | Will depends on the suggestions in the developed emergency action plan | Could be significant cost | HPP Koman, KESH EMU |

# 8 INSTITUTIONAL CAPACITY

Since year 2003, an Environmental Management Unit is operating in KESH. The unit is developing internal capacities for handling environmental health and safety program across all its facilities. The implementation of projects is done according to environmental standards of the European Union, World Bank safeguards procedures and ISO 14001 guidelines.

KESH is already implementing two project financed by the World Bank: Vlora Thermal Power Plant Project jointly financed by IBRD and EBRD and Project for Rehabilitation, Upgrading and Development of Bulk Power Transmission System financed solely by IBRD.

Environmental Management Unit has developed an environmental policy which provides guidance on environmental performance across KESH units. The environmental policies assure the implementation of preliminary measures to prevent and mitigate pollution, continuous improvements by effective training and awareness raising and discharge within the defined limits/thresholds.

The implementation of environmental policy is assured through environmental management programs and action plans. KESH has developed a) Action Plan for Spill Prevention, Control and Countermeasure for KESH's Facilities (annex 3), b) Emergency Action Plan (annex 4), and c) Hazardous Waste Contingency Action Plan (annex 5).

According to these plans the HPP should maintain the Environmental Information Register. The register includes records of environmental trainings and instructions, employee occupational health issues and monthly environmental information. The register is send to Environmental Management Unit in KESH on a monthly basis.

According to the Law on Environment KESH has following obligation:

- The implementation of all possible measures that prevent pollution discharges and environmental pollution.
- The prevention and reduction of waste and wherever their use is not technically or economically possible, their neutralization, by avoiding and reducing their impact on the environment.
- Prevention of industrial accidents and limitation of their consequences.
- Restoration of the site in satisfactory environmental conditions, after the conclusion of the activity.
- Information provision about every planed change of the technological line.
- Informing of the Regional Environmental Agency, not less than once in three months about the results of self-monitoring and at any time, about all accidents or emergency situations, having an adverse effect on the environment.

- Meeting of the requirements of the Environmental Inspectorate when controlling their activities.
- Informing of the public on the state of the environment and environmental profile of their activity.
- Keeping of registers on environmental discharges, water use and energy and applied techniques.

The control of the state of the environment is the duty of the Environmental Inspectorate, assigned by the Minister of Environment, and Regional Environmental Agencies.

Regional Environmental Agency has a role in monitoring of the implementation of the project after the EIA study process has concluded. According to the Law on Environmental Protection, KESH should inform Regional Environmental Agency, not less than once in three months about the results of self-monitoring and at any time, about all accidents or emergency situations, having an adverse effect on the environment.

Environmental Inspectorate as well from time to time visit the project site and check are the activities conducted in accordance to the environmental legislation and decision on EIA. The inspection has the power to close down, to suspend, to partially or totally stop the activity of the physical and legal persons, who have caused environmental pollution or damage and defines the relevant tasks for the improvement of the situation. Description of duties of state bodies related to environmental control is described in annex 6.

## 8.1 STRENGTHENING THE INSTITUTIONAL CAPACITY FOR THE PROJECT

KESH as investor is responsible for the implementation of the stipulated measures and monitoring plan. The mitigation measures defined in the Ministerial decision will be incorporated into the location and construction permit.

In order to ensure proper implementation of the various environmental activities (preventive actions/ mitigation measures and monitoring) recommended in this EIA, KESH will support the strengthening of the PIU as well as the contractor and operator.

KESH will designate one person from the Environmental Management Unit to the Project Implementation Unit. This person will conduct quarterly visits to the site during the construction phase in order to gather information on monitoring for the Regional Environmental Agency as well as the project progress reports. When suitable the person will join the Bank's missions.

KESH will through contractual agreement transfer the responsibility of implementation of mitigation measures and monitoring during the construction onto the contractor. KESH will define in the constructor's contract the obligation for reporting. The legal responsibility toward the implementation will remain

with the investor (KESH). To facilitate the process, KESH should organize one day training course for the construction company, identifying clearly the responsibilities and reporting obligation. The construction company will report to the PIU quarterly on environmental issues. The Contractors' teams will nominate a person to be in charge for environmental aspects during the construction phase.

The site/supervising engineer selected as independent party will also report to the KESH for any non compliance with the EA and EMP. The Supervisor Engineer on the site will assist HPP Koman/KESH in monitoring the environmental aspects of the project during construction works. The Supervisor Engineer will explain to the contractors their responsibilities in meeting the mitigation plans included in the contract. Furthermore, the Supervisor Engineer will be responsible for: (i) providing to the monitoring reports of the implementation of the EMP during the completion of the works; and (ii) taking timely measures in case of non-compliance of suggested EMP measures including indication of any variances from the EMP and specific mitigation actions that have been taken or need to be taken.

KESH will as well organize continuous annual trainings of the operation staff on environmental legislation, including familiarizing them with the EIA. KESH will nominate one person in HPP Koman to be in charge for the environmental issues during operation.

KESH will report to the Bank progress on implementation of environmental measures and monitoring through regular progress reports. The semiannual report submitted to the Bank will include the following aspects and supervision activities as stipulated in the EMP and according to the Albanian national laws: (i) Supervision on the potential environmental impacts during works including construction noise, air quality, etc.; (ii) Verification of the contractor responsibility on monitoring data collection as well as overall maintenance of the construction site related to environmental protection measures; (iii) Existence of work safety plan, waste management plan and emergency action plan on the site (during work performance), spill action plan and valid environmental permits and related documents for proper implementation of works; (iv) Supervision of proper disposal of generated waste according to national regulations; (v) Monitoring of mitigation measures of environmental pollution impacts at the construction site (e.g., construction noise; brief assessment of short-term impacts during constructions on surface waters/sea); (vi) Inspection visits and conclusions.

Control of realization of obligation from EIA will be as well implemented by Inspectors of the Regional Environmental Agency through unannounced visits.

**Table 6 Responsibilities for environment during construction and operation**

| *Responsibilities for mitigation and monitoring* | *Environmental information flow (reporting)* | *Decision making chain of command for environmental management (to take action, to authorize expenditures, to shut down, etc.)* | |
|---|---|---|---|
| | | *Activities* | *Responsibility Institution or person* |
| ***During Construction:*** | | | |
| KESH<br>HPP Koman<br>Contractor | Supervisory Engineer to PIU / KESH Environmental Management Unit to Regional Environment Agency | Monitoring of the Implementation of the EMP and provisions of the EIA | Supervisory Engineer, appointed person (liaison officer) from KESH<br>Environmental Inspectorate of the Regional Environment Agency |
| ***During Operation:*** | | | |
| KESH<br>HPP Koman | HPP Koman to KESH Environmental Management Unit Port Authority Environmental Unit to Regional Environment Agency | Monitoring of the Implementation of the EMP and provisions of the EIA | Appointed person from HPP Koman and environmental team of Environmental Management Unit<br>Environmental Inspectorate of the Regional Environment Agency |

# 9 PUBLIC PARTICIPATION

Public participation for the Albanian Dam Safety Project will follow both Albanian and World Bank procedures.

According to the World Bank policy on Environmental Assessment, for all Category B projects proposed for IDA financing, during the EA process, the borrower consults project-affected groups and local nongovernmental organizations (NGOs) about the project's environmental aspects and takes their views into account at least once. The borrower initiates such consultations as early as possible. In addition, the borrower consults with such groups throughout project implementation as necessary to address EA-related issues that affect them.

Public consultations on EIA in the Republic of Albania are defined by the Law on EIA and a special Regulation on the Participation of the Public in the Process of EIA.

The project and the report of impact assessment on environment have to undergo a public consultation. The consultation should be organized by the local government where the project will be implemented in collaboration with the Ministry of Environment/ Regional Environmental Agency and the proposer. The local government will invite stakeholders, make available the EIA report, in cooperation of the MoEFWA/REA decide on the date for the debate and notify the participants for the day, time and location of the meeting. The summary EIA should be available to the stakeholders 4 weeks before the presentation.

Based on the regulation the project should not be submitted for Environmental Impact Assessment procedures if the proposer has not consulted the public. The proposer should in cooperation with the Regional Environmental Agency develop a public consultation plan with concrete requests and operational deadlines.

The plan should include: a) Identification of stakeholders, b) Methods that will be used for public participation described and arguments provided on why exactly these methods have been selected, and c) the graph for public consultations.

The proposer informs the public on the following: a) Project implementation site/location; b) Type of activity; c) Technology capacity; d) if possible raw material, energy, water to be used; e) Project duration; f) Waste to be generated, type and if possible quantity; g) Negative impact on health and environment (water, air and soil/land discharges) f) Measures that will be taken for reducing them.

The proposed time line for the consultation which complies with both Albanian and World Bank procedure is as follows:

| | |
|---|---|
| April 24, 2008 | KESH publishes the draft EIA report on the website, calling or the comments of interested parties |
| | KESH provides municipalities where the HPP are located with the hard and electronic copies reports, which local governments publish on their website and post copies available on the billboard asking for the comments of the stakeholders. |
| April 24, 2008 – | KESH works with REA and local government on the |
| May 10, 2008 | confirmation of the category of the document and on preparation of the public presentation/consultation plan |
| May 10, 2008 | Local government representative 10 days in advance notifies the participants for the day, time and location of the consultation meeting |

| | |
|---|---|
| May 19-21, 2008 | KESH together with local governments and MOFWA/REA organizes a public presentation and consultation of the project in the municipality in question. |
| May 26, 2008 | KESH submits to the Ministry documentation as follows: (a) Conclusions of organized meetings (minutes), (b) Summary of opinion and comments of the public during the presentation, (c) Reactions from the written and electronic media. |
| June 1, 2008 | Final report which reflects the comments form the public is submitted to the Bank and the MOFWA for approval |

# 10 ANNEXES

## 10.1 ANNEX 1 SCHEMATIC DRAWINGS OF THE KOMAN HPP

## 2.3 Koman HPP

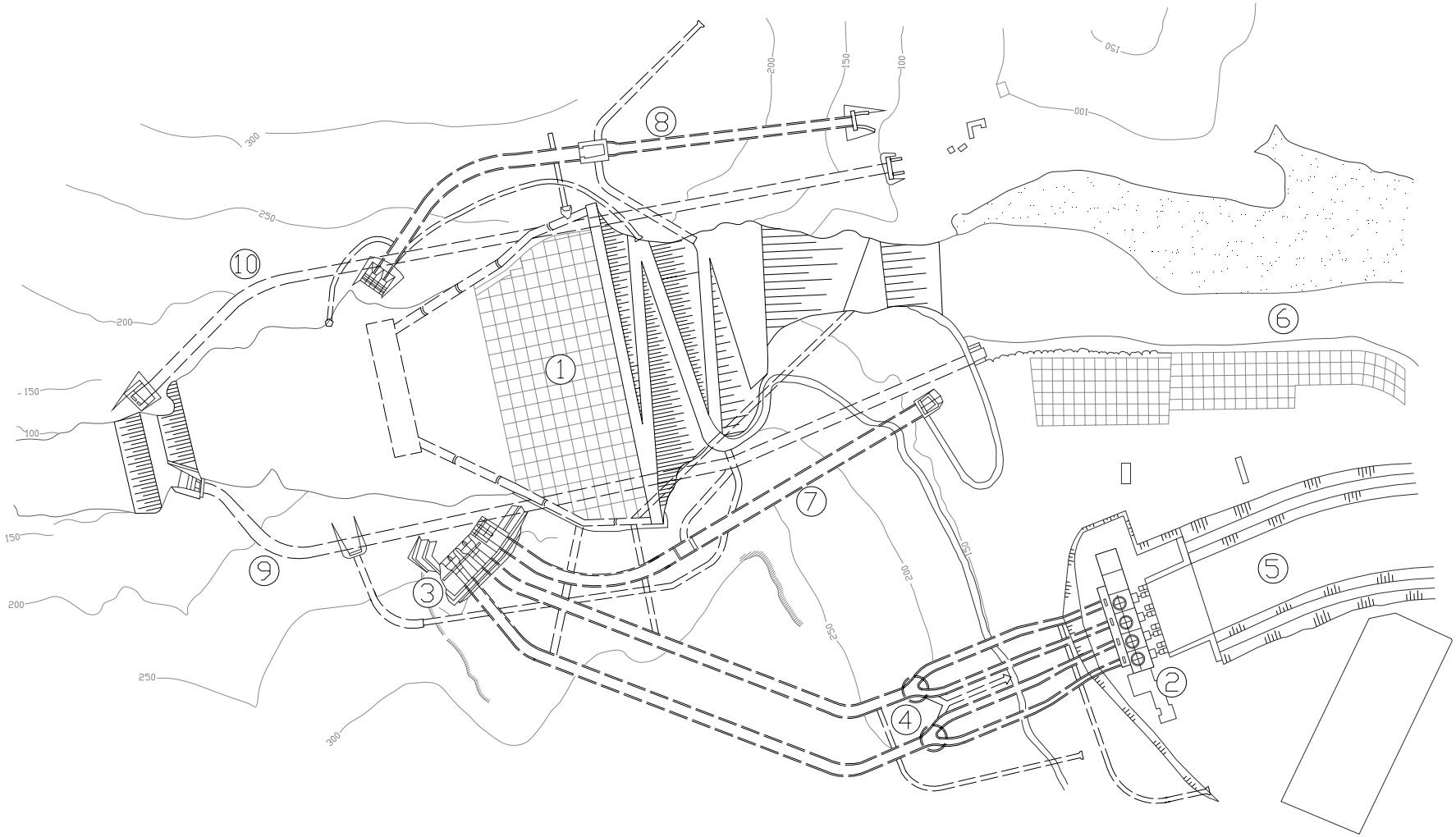



Fig. 10: Layout of Koman HPP. ①: Concrete faced rockfill dam, ②: power house, ③: power waterway intake, ④: surge chambers, ⑤: tailwater channel, ⑥: Drin River, ⑦: tunnel spillway No. 4, ⑧: tunnel spillway No. 3, ⑨: diversion tunnel No. 2, ⑩: diversion tunnel No. 1.

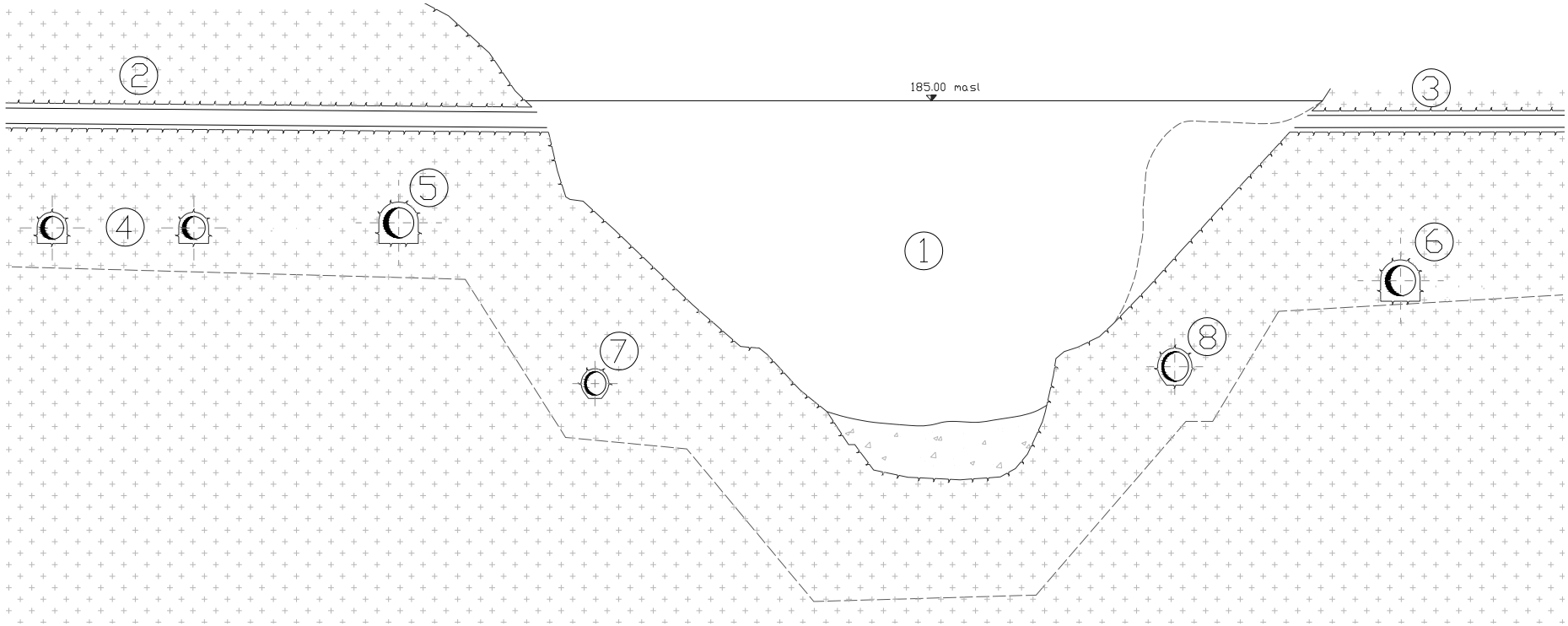



Fig. 11: Longitudinal section of Koman Dam. ①: dam, ②: gallery, ③: gallery, ④: power waterway, ⑤: tunnel spillway No. 4, ⑥: tunnel spillway No. 3, ⑦: diversion tunnel No. 2, ⑧: diversion tunnel No. 1.

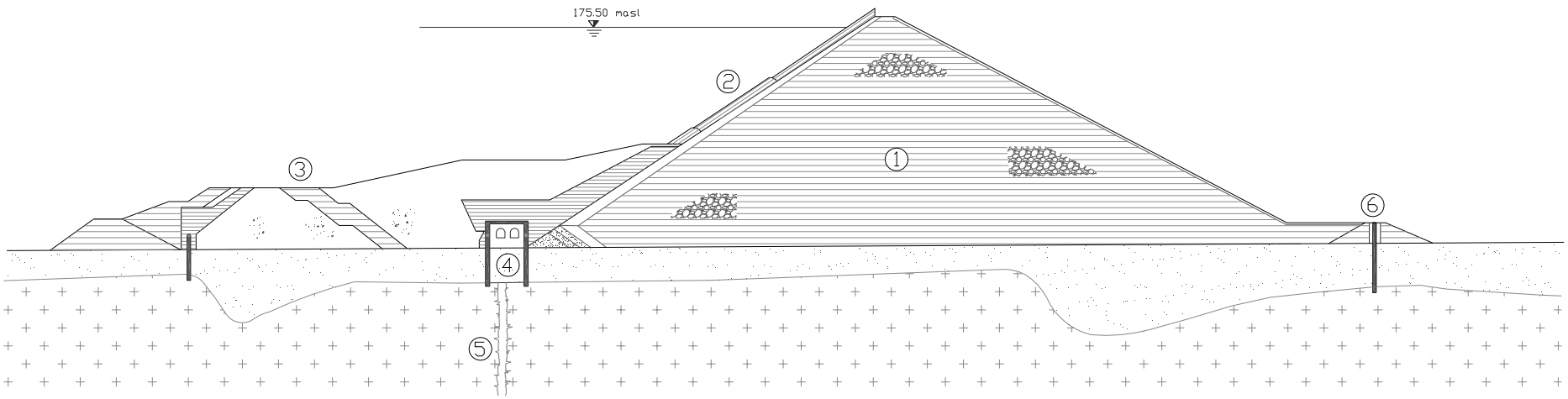



Fig. 12: Cross section of Koman Dam. ①: rockfill dam, ②: concrete slabs, ③: previous upstream coffer dam, ④: control galleries, ⑤: grout curtain,⑥: previous downstream coffer dam.

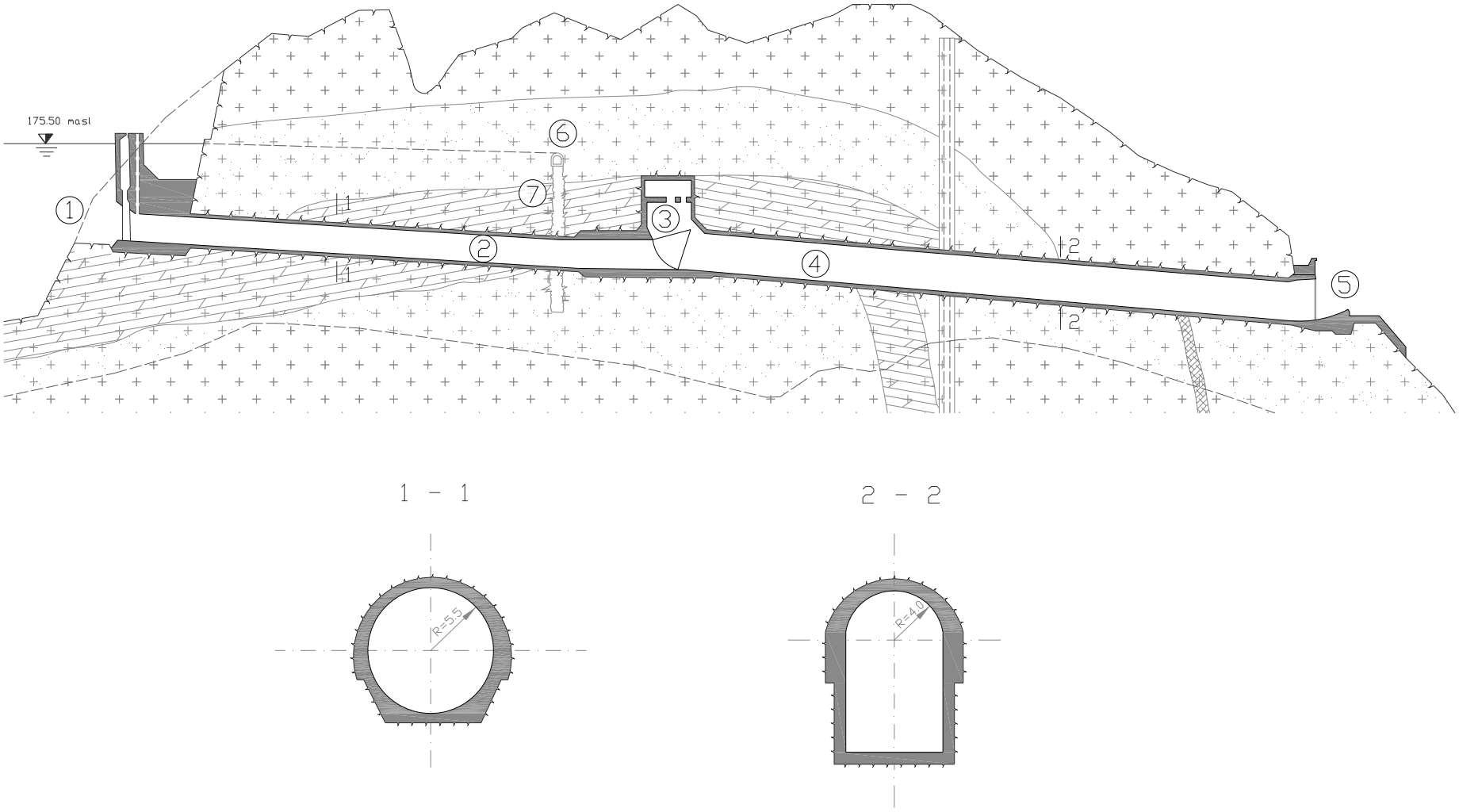



Fig. 13: Longitudinal profile of tunnel spillway No. 4. ①: spillway intake, ②: pressure tunnel, ③: spillway gate, ④: free flow tunnel, ⑤: flip bucket, ⑥: access gallery, ⑦: grout curtain.

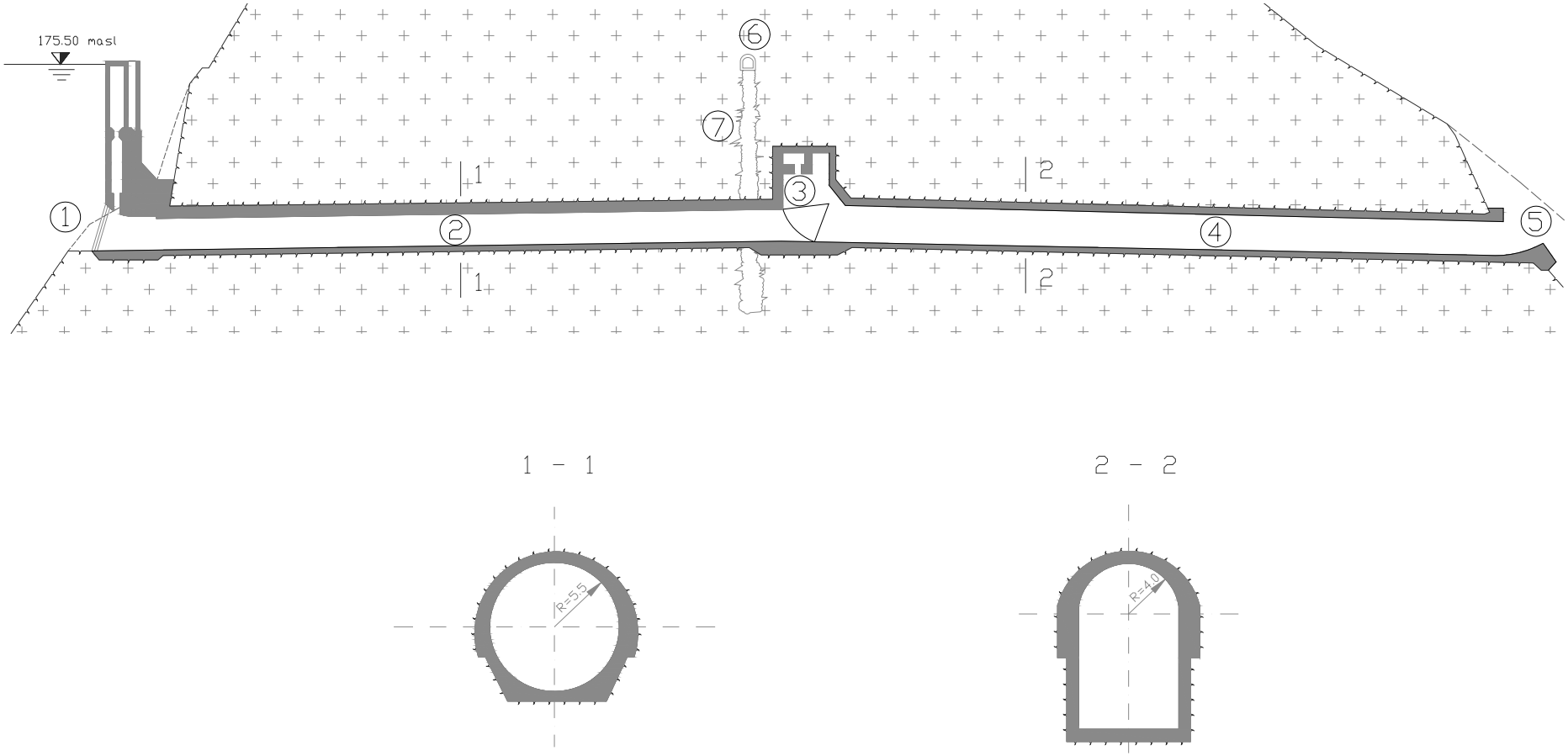



Fig. 14: Longitudinal profile of spillway tunnel No. 3. ①: spillway intake, ②: pressure tunnel, ③: spillway gate, ④: free flow tunnel, ⑤: flip bucket, ⑥: access gallery, ⑦: grout curtain.

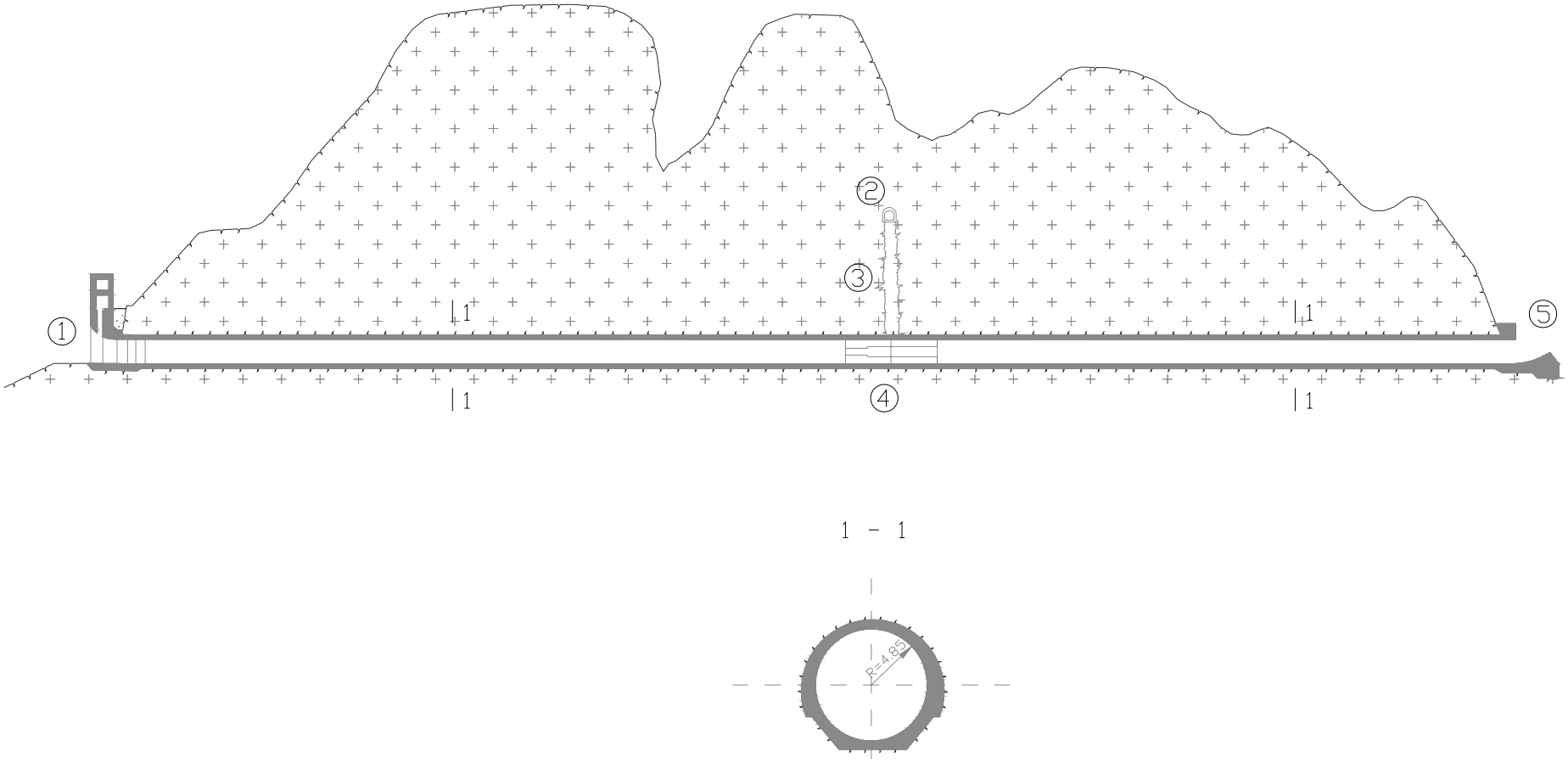



Fig. 15: Longitudinal profile of diversion tunnel No. 1. ①: intake, ②: access gallery, ③: grout curtain, ④: concrete plug, ⑤: flip bucket.

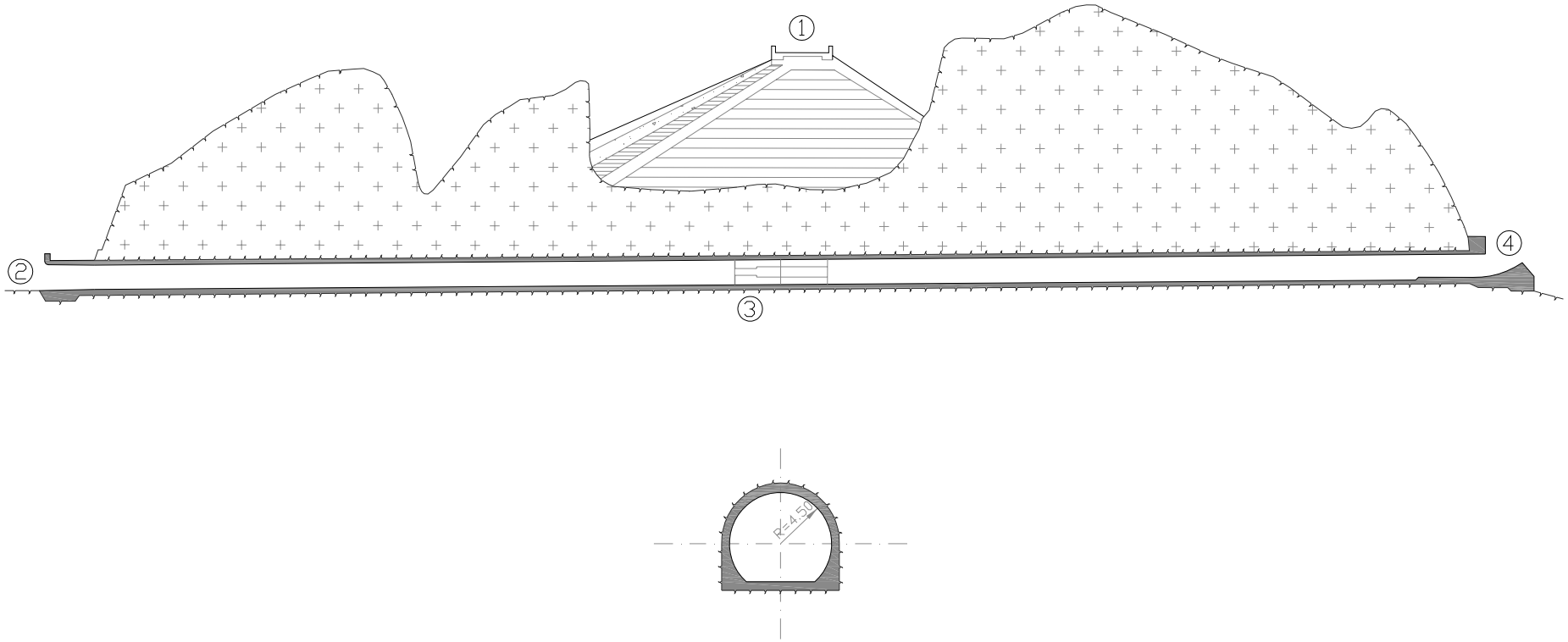



Fig. 16: Longitudinal profile of diversion tunnel No. 2. ①: dam, ②: intake, ③: concrete plug, ④: flip bucket.

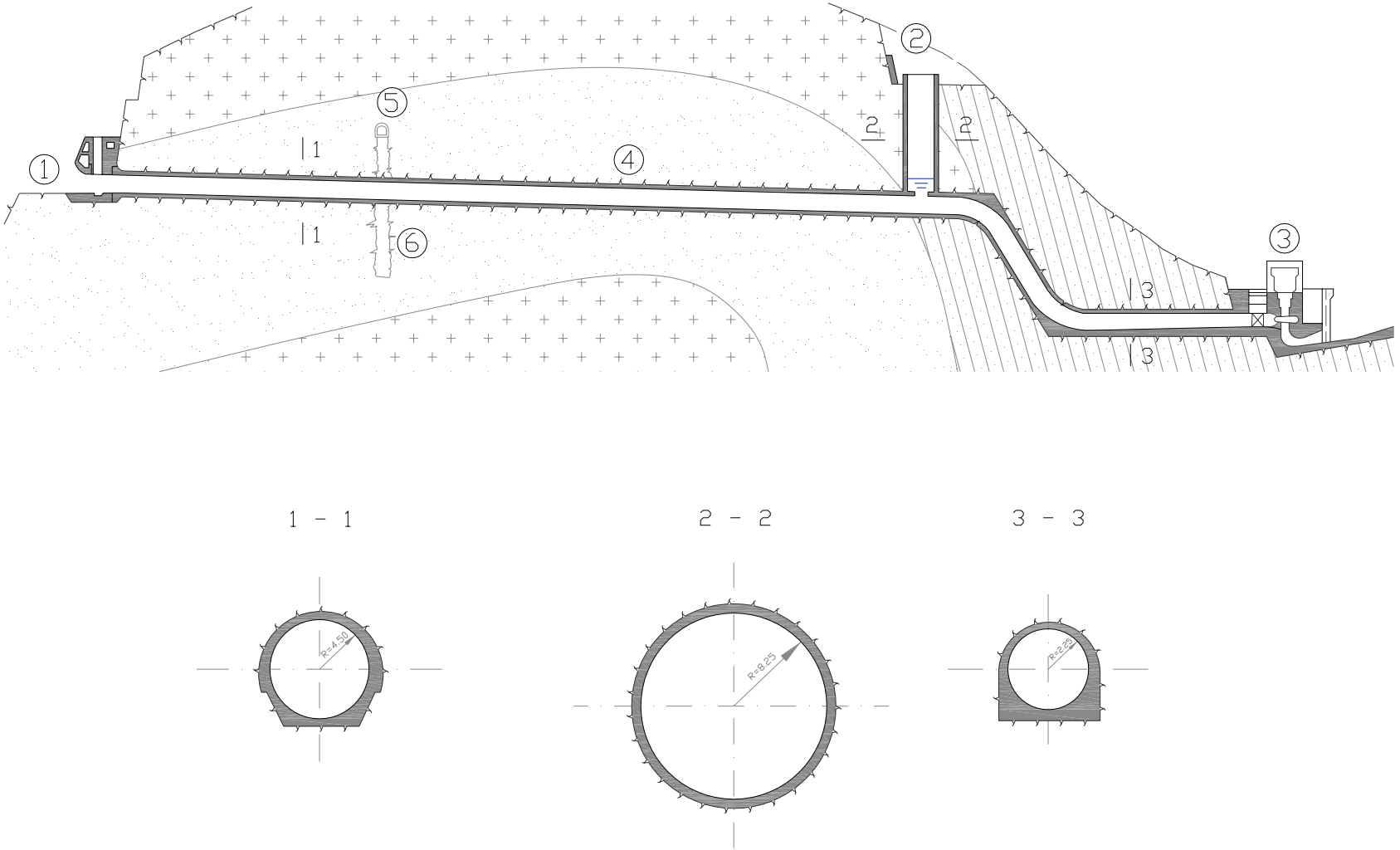



Fig. 17: Longitudinal profile of power waterway. ①: power waterway intake, ②: surge chamber, ③: power house, ④: pressure tunnel, ⑤: access gallery, ⑥: grout curtain.

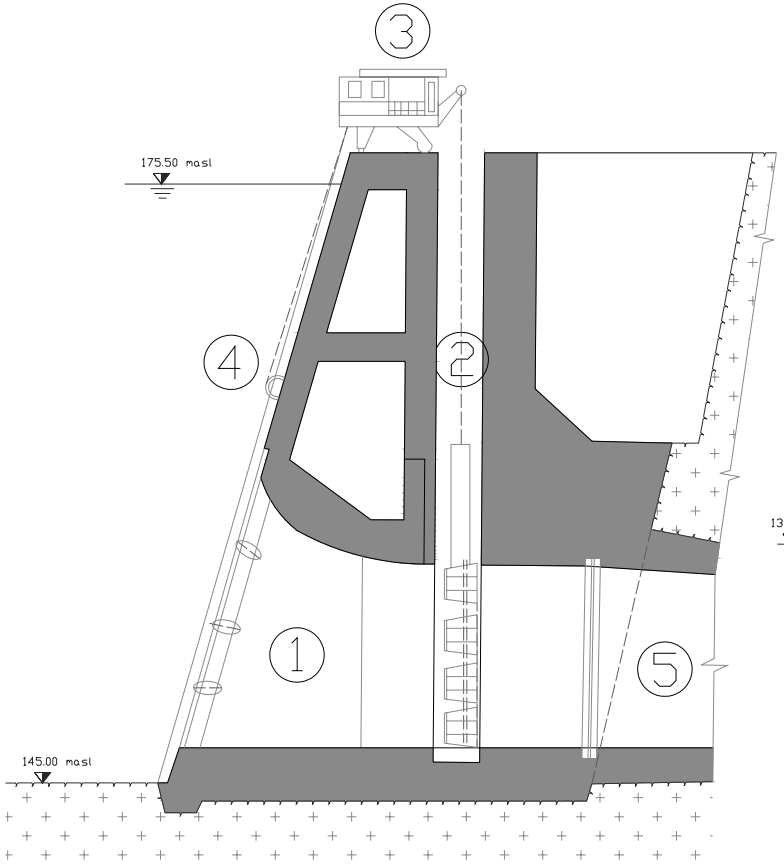



Fig. 18: ①: power waterway intake, ②: stop log shaft, ③: gantry crane, ④: trash rack cleaning equipment, ⑤: power waterway.

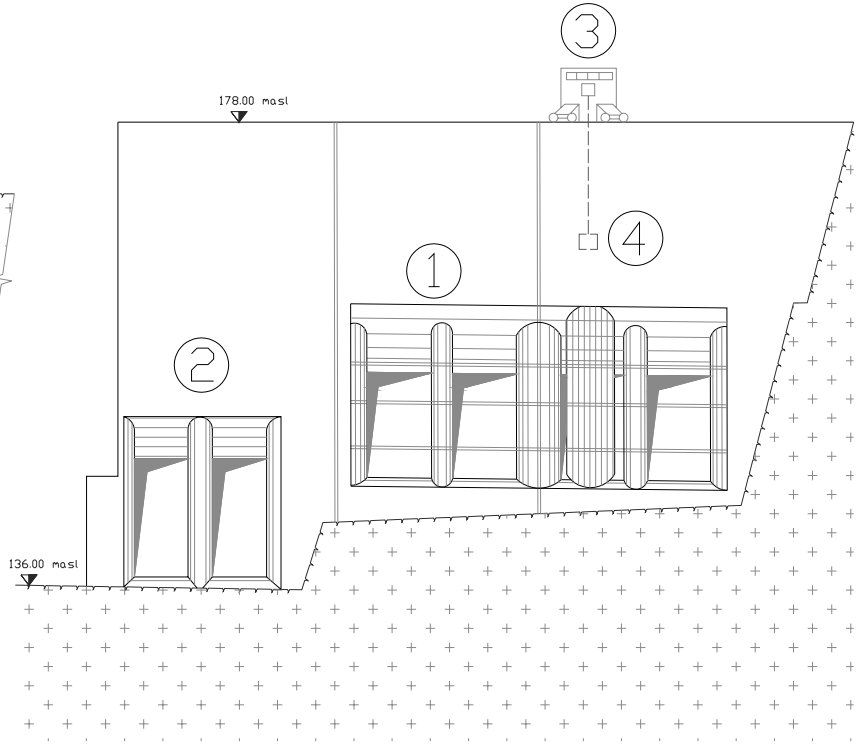



Fig. 19: ①: power waterway intake, ②: spillway intake, ③: gantry crane, ④: trash rack cleaning equipment.

## 10.2 ANNEX 2 SUMMARY REPORT ON EIA

Summary report of impact assessment on environment contains brief information on the following:

a) Objective of the project;

b) Detailed objective description;

c) Data on present environment of the area and in its vicinity where the project is implemented;

d) Detailed description of all installations that are part of the project or will be used during its implementation;

e) Construction plan and the deadlines of its implementation;

f) Description of engineered values that are constructed or enlarged and of necessary works for project implementation;

g) Potential impacts on environment and proposed measures to prevent or bumper these impacts;

h) Monitoring program of project impact on environment;

i) Conformity of the project with territory adjustment plan and with economic development plan of area where project will be implemented;

j) Summary of consultations with local government organs, the public and environmental non-for profit organizations and of their opinions;

k) Rehabilitative measures in case of pollution and damage of environment as well as their cost;

l) A copy of the license of natural or juridical person which has prepared the report of impact assessment on environment.

## 10.3 ANNEX 3 ACTION PLAN FOR SPILL PREVENTION, CONTROL AND COUNTERMEASURE FOR KESH'S FACILITIES

# "ACTION PLAN FOR SPILL PREVENTION, CONTROL AND COUNTERMEASURES FOR KESH's FACILITIES"

## INTRODUCTION

The Environmental Policy of KESH directs all facilities to develop best management practices for all process operations in order to improve the environmental performance at all KESH's Facilities. The Environmental Policy also requires implementing reasonable actions to prevent pollution through environmental management initiatives.

KESH owns and operates numerous Substations, some HPP and Fieri TPP. Mainly the HPPs are located in the northern part of Albania.

Oil spills can occur during supply and change of oil, under the pipe joints and discharge valves of oil tanks, during the filling with oil of keys.

Oil spills have been observed at Fier TPP, notably at the oil pumping station, under the discharge valves and the pipe joints, near the oil tanks and transformers.

The electric substations and cabins are located in both rural and urban areas. The substations range in size between 400 kV to 35 kV and electric cabins range in size from 6 kV to 10 kV and 20 kV. Usually these sites have 2 to 4 personnel on shift at site.

Over the years, during the utilization of some oil equipment (such as transformers, oil pumps, bearings etc) spills have occurred from temporary use and during continual operation oil spills because of equipment amortization (it has become old), manual oil fillings without filling lines from oil tanks and sometimes from bad repair quality. Electric cabinet oil spills have occurred because of a lack of controls and the absence of spill prevention measures.

The EMU in KESH is developing action plans for better management of oil in these locations for complying with the Environmental Policy.

This action plan is a compilation of best practices to control and/or mitigate environmental impacts due to oil spills.

The EMU with facilities' personnel will in an efficient and environmentally safe manner, take reasonable measures to prevent oil spills from occurring. If an oil spill should occur, KESH will take reasonable actions to contain the spill and prevent the oil from reaching and discharging to the surface and groundwater. The EMU will train the facility personnel on best management practices to prevent, control and mitigate oil spills.

The information on the facilities across the country is not well known due to lack of formal reporting and recordkeeping practices in the past. To ensure development of a relevant spill prevention and control plan, the EMU will gather preliminary data for the KESH facilities and will develop a database.

The EMU will gather the data by site visits and inspections at the Facilities, from Monthly Reports on Environmental Issues, telephone interviews with facility personnel, or by sending a questionnaire. The EMU will generate a unique

identification number (IDN) for each facility and for each oil containing tank and piece of equipment. This IDN will be used in all database, plans reporting and recordkeeping etc.
The action plan for spill prevention, control and countermeasures is simple to carry out. A copy of the plan will be maintained at the site and another copy will be maintained by EMU. The key elements of the Plan are:

- General facility information
- Facility layout drawing
- Procedures for spill prevention and control
- Procedures for response to oil spills
- Procedures for detection and notification for oil spills
- Procedures for inspection and recordkeeping
- Training of facility personnel

## GENERAL FACILITY INFORMACION

The facility information will help in quickly identifying the location of the spill and help in developing a site-specific response plan. The EMU will continually collect all facility information in a database developed in Microsoft Excel or Microsoft Access which will allow the EMU to quickly access the data when required and track the overall success of the program.
The facility information will be reviewed at least once every year to make sure all information is correct and up to date.

## FACILITY LAYOUT DRAWING

All facilities will maintain an updated layout drawing at the site. One copy of the layout drawing will be located in the EMU office. The layout drawing will include the following information:

- Location of the transformers
- Identification of fences, secondary containments, offices in the facility
- Contour of the land
- Direction of flow of rainwater and oil in case of a spill
- Route for vehicle entry and exit from the facility
- Nearest source of water for fire fighting
- Distance and location of nearby water bodies

The drawing should also include the electrical capacity, physical dimensions and the maximum oil holding capacity of the transformers. Each tank and transformer should be identified with an identification number. If a facility layout

drawing changes a copy of the revised drawing needs to be sent to the EMU office.

## GENERAL PROCEDURES FOR SPILL PREVENTION AND CONTROL

General procedures for spill prevention are as follows:

- Facilities personnel shall maintain electrical equipment in good working order, including periodic painting, thus providing corrosion control. It's required to mow down the grass and the bush all around and within the Facility to 7 m away from facility's fence line. ( This 7 m of clean zone is for service of free moving vehichles in emergency situations.) The facility fence line needs to be maintained and its height should not to be less than 1.7 m (according to "Safety and technical utilization of electrical equipment and installation Regulation"). Facility personnel must control and eliminate oil spills and leaks during repair and maintenance processes.
- If no concrete containment exists under transformer, we recommend that no less than 25 cm of gravel be placed under the transformer and this gravel surface must be 1 m outside of the transformer's perimeter. The Facility will have to continually remove the contaminated soil under transformers and replace the contaminated materials with clean gravel. Waste oil sludge, gravel and soil have to be placed in closed metal containers and be stored for further treatment in a waste treatment facility. These containers have to be marked with a label that says "Hazardous Waste" and the weight of the containers and the date it was filled should be written on the label. Facility personnel are responsible for implementation and ongoing implementation of the SPCC plan.
- Each employee has to be familiar with:
    - transformer instructions (capacity, manufactured date, oil type),
    - procedures for responding to oil spills,
    - oil flow,
    - prevention measures for oil spills.
- The fueling operations should be regularly inspected by facility personnel and should be operated in a manner consistent with good management practices, which requires a provision for containing spilled oil. The small volume keys oil should be changed without oil analysis. Oil cleaning or oil analysis work must be completed according to the "Safety and technical utilization of electrical equipment and installation Regulation", published in year 1977.
- If it's difficult to avoid oil spills caused from older equipment pails can to be used to catch drippage during oil transformers change. Also, it's recommended that you use sand, rags, wood sawdust, etc. to avoid soil contamination from oil spills. The facility personnel should wear Personal

Protective Equipment (PPE) for health and safety protection in some work process. Every facility must have a First Aid Kit available to use.

Spill control can also be achieved by the use of secondary containment such as dikes and berms.

## SPILL DETECTION AND NOTIFICATION

### Detection:

Large leaks are rare, but they can be occur. It should be noted, however, that substantial leakage would cause significant ecological damage to the environment, and consequently human health, flora and fauna damage through contamination of surface water and groundwater, and soil and air. It's easier to prevent spills and eliminate spills. Spill detection and notification is very important because small spills could be followed by major spills, which could be avoided. The facility personnel could discover seepage or a spill during filling operations and supplying and changing oil process. These spills should be stopped and contained in the manner described in this spill control plan.

### Notification:

Minor spills are to be recorded regularly on the "Register of Identifying Pollution and Emergency Situations", including:

- Occurrence description, location and cause of occurrence,
- Time of discovery,
- Recording when the spill started and when the spill had been cleaned up and how long the spill lasted,
- Operations undertaken to mitigate / eliminate pollution or emergency situation,
- Responsible persons participating in the process,
- Date and time of informing Facility's Director and the EMU,

All KESH facilities must report the monthly environmental information requested to the EMU in KESH. In case of major spills they should be immediately reported the Facility Director, the EMU in KESH and if it's necessary notify the local fire authority, local government authority and the community. This notification should be made by telephone immediately if a significant spill occurs, followed by a report on the spill and the response actions taken.

## PROCEDURE FOR RESPONSE TO OIL SPILLS

Procedures addressing small spills

- Spills are likely to occur around insulators or fittings in the transformers cases, under the pipe joints and discharge valves, in oil tanks, etc.

Facility personnel shall carefully and continually observe and contain the oil spills.

- Facility personnel shall wipe up small leaks from tanks, transformers or oil pipes at the time of discovery. These actions shall be according to "Safety and technical utilization of electrical equipments and installations Regulation".

Facilities personnel should record the spillage immediately on discovery.

Procedures addressing major spills

- Facility personnel should immediately evacuate the facility and assemble in a designated shelter area as necessary.
- The community near the station where the oil is expected to flow should be immediately informed and evacuated if necessary.
- The spill should be immediately reported to Police Fire Station, and local authority.
- The EMU and Facility Director should be informed immediately.
- Necessary actions should be taken for avoiding contact with the oil spill, the oil flow and transformers burnout, etc. PPE such as head protection, safety shoes, gloves, work clothes, goggles and face shields should to be used during the process.

## PROCEDURE FOR INSPECTION AND RECORDKEEPING

Regular inspection of equipment, pipes and equipment that store, transport or use oil, is necessary to prevent and control oil spills. The following inspection frequency is recommended:

- Monthly inspection by the responsible person of the facility for environmental problems related with environment pollution. The records of inspection should be maintained on the "Environmental Information Register", including the details of the inspection and dates. The Monthly Inspection Report must sent to the EMU in KESH every month. The EMU reports to Director for environmental performance of KESH facilities every three months.

- Annual inspection by EMU: This inspection will be made to control the environmental conditions at KESH facilities, to determine the actions needed for improving the environmental performance, and to review the SPCC plan with respect to actual facility operation including monthly facility inspection forms. The inspection may be coincidental with annual refresh training of the facility personnel on SPCC plan.

## TRAINING OF FACILITY PERSONNEL

Training of facility personnel in utilizing the SPCC plan is essential for proper implementation of the Plan. It is recommended that all facility personnel undergo an initial training during initial implementation of the Plan and thereafter refresh training on an annual basis. The EMU specialists in collaboration with the Director familiar with facility environmental problems will develop the training materials. The Facility Director can also provide this training with guidance from the EMU.

The maintenance and repair group who work on electrical equipment that contains oil should be trained specifically on how to prevent spills and how to respond to spills when they occur.

"The Environmental Information Register" should include:

- Environmental training and instructions, (the training date, name of instructor who prepared training and the signature of the trained employee).
- Employees occupational health issues,
- Environmental monthly information.

## UPDATING OF SPCC PLAN

This plan must be reviewed annually and updated if necessary. In addition, the plan must be updated whenever a material change occurs at the facility. Such changes include but are not limited to: Removal or addition of transformers, installation or removal of fence lines, changes in facility contact personnel, changes in first responder contact information and changes in gradients in the land of the facility that may affect the direction of flow of an oil spill. All the revisions in the plan should be identified with the revision number, date and name and signature of the person making the change.

## 10.4 ANNEX 4 EMERGENCY ACTION PLAN

# ACTION PLAN FOR PREPARATION AND WITHSTANDING EMERGENCY SITUATIONS ON KESH'S FACILITIES

## INTRODUCTION

As earlier emphasized Environmental Policies is directing KESH to develop best management practices for all work processes as part of environmental well-management. Our Environmental Policy requires the implementation of proper actions to respond to emergency situations such as fires, floods, earthquake etc through environmental management initiatives too. The procedures for preparation and withstanding emergencies need to define these emergency situations, there consequences, and how to prevent or mitigate environmental impacts that accompany them. The procedures must be reviewed as necessary and tested periodically. This will result in a successful Emergency Action Plan.

Emergency situations that required implementation of EAP are:

- Fire
- Natural disasters (floods, high winds)
- Earthquake

According to European Norm EN 50110-1 everyone must remember that the best rules and procedures haven't any value if all employees working in, with or near electrical equipments don't completely know and don't rigorously follow up them.

The causes of fires may be:

- Natural
- Technical
- Carelessness
- Criminal intention

The major causes of fires include disposal of smoking materials, overloaded electrical outlets, misuse of space heaters, short connections, mishandling flammables, improper storage of combustibles, and atmospheric discharges( thunder-bolt) etc.
Combustible materials should be present in work areas only in quantities required for the days job, and must be placed in an approved storage area at the end of each work day.
Materials must not obstruct sprinkler heads or be piled around fire extinguishers, or around fire alarm pull station locations.
Dispose of all trash as son as possible in trash cans or dumpsters. Waste materials must never be piled in corridors or stairwells while waiting removal.
All electrical equipment and electrical cords should be inspected periodically by

supervisors to ensure proper use and safe conditions. Be sure that all electrical equipment is properly grounded. If any evidence is found of frayed, cracked or otherwise damaged wiring or electrical outlets, the equipment affected should be immediately taken out of service until repairs can be made.
Electrical extension cords are to be used only by authorized persons under proper and approved conditions. They should never be passed wire through doorways, never hidden under rugs or other places that can move or crush.
Space heaters, coffee makers, and all other appliances with exposed heating elements should never be left unattended while in operation, shall not be placed under desks or in other enclosed areas. They should be unplugged after each use and stored only after they are cool enough to touch.
Ensure that such appliances are operated away from combustible materials such as files, curtains, trash containers, etc.
With proper care and use, emergency situations will not occur.

Natural causes of emergencies include rainfalls that may bring floods, and may cause erosion. Erosion can also occur from poor maintenance, damage and incorrect actions in handling dams, discharging doors, draining ditches, embankments along rivers etc. Everyone should take necessary precautions, in case flood situations develop everybody must be prepared.
We can avoid ditches becoming blocked by continually cleaning and allowing water to flow freely into the ditch.
If the reservoir's drainage doesn't function, it needs to be pumped, unblocked or excavated to allow free water flow.

Attention is required for the maintenance of embankments along the rivers. This is a very important element to stop floods.

Some additional problems that can cause erosion include trees planted on or near drainage areas or dams, mountainous debris building up, etc. These situations also need attention. A temporary solution to erosion or landslides include the use of more soil, stones, gravel or sand bags to stabilize the sliding or erosion.

Earthquakes may damage people, buildings, electro energetic and telephone systems, and may bring fires, explosions and surface separation. To minimize an earthquake's consequences it's required for all employees to know and to implement the proper procedures that are outlined below:

## EMERGENCY PREPERNES AND WITHSTANDING PROCEDURES BASED ON ENVIRONMENTAL MANAGEMENT SYSTEM (EMS)

### PURPOSE:

KESH is dedicated to the protection of its employees from emergency situations such as fires, earthquakes and floods. When emergencies do occur, our Emergency Action Plan (EAP) is initiated. This EAP is in place to Project employees from emergencies during regular hours and after hours. It provides a written document detailing and organizing the actions and procedures to be followed by employees in case of a workplace emergency.
Best Management Practices require a written and approved Emergency Action Plan (EAP). This EAP addresses emergencies that KESH facilities expect may reasonably occur at any of our facility locations.
The EAP communicates to employees, the policies and procedures to follow in emergencies. This written Plan is available, upon request, to employees, and government officials who ask to see it.

## ADMINISTRATIVE DUTIES

The KESH Environmental Management Unit (EMU) has the overall responsibility for this Emergency Action Plan and this includes the following:

- Developing and maintaining a written Emergency Action Plan for regular and after hours work conditions;
- Notifying law enforcement authorities, and the Director of KESH in the event of an emergency affecting one of our facilities;
- Taking security measures to protect employees;
- Integrating the Emergency Action Plan with any existing general emergency plan covering the building or work area occupied;
- Distributing procedures for reporting emergencies, describing initial actions for employees to take to protect themselves and others, the location of safe exits, and evacuation routes for each employee;
- Conducting drills to acquaint employees with emergency procedures and to judge the effectiveness of the plan;
- Training designated employees in emergency response such as the use of fire extinguishers, the application of first aid and evacuation of employees to the proper place, etc ;
- Ensuring that equipment is placed and in storage rooms or desks for protection and security;
- Maintaining records and property as necessary;
- Ensuring that our facilities meet all regulations and legal requirements.

The EMU is responsible for reviewing and updating the plan as necessary. Copies of this plan may be obtained from KESH Environmental Management Unit (EMU) in Tirana and from each facility's Director.
The facility's Director has full authority to decide to implement the EAP if he/she believes an emergency might threaten human health. The following

potential emergencies might reasonably be expected at this facility and must call for the implementation of this EAP:

- Facility fire
- Earthquake
- Weather emergency – flooding, high winds

The following personnel can be contacted regarding further information about the written Emergency Action Plan or an explanation of duties under this plan:

- EMU specialists and/or
- The Facility's Director

The EMU must inform its employees of their duties and responsibilities under the plan. If, after reading this plan, the employees find that improvements can be made, please contact the specialists of the EMU or your Facility Director. We encourage all suggestions for successful implementation of this Plan and strive for clear understanding and involvement in the Program from every level of the Company.

## Identifications/Notifications

In the event that anyone smells smoke or sees fire or smoke and there is a building fire alarm system, they should immediately activate the alarm to evacuate the occupants from the building. Even if the fire is known to be small, the alarm should be activated immediately. The fire could grow quickly, endangering building occupants. All buildings are required to install alarm system in the event of emergency situation.
After activating the fire alarm, the person discovering the fire should turn off electricity if electrical use will make the situation worse and immediately call Police Fire Station from a safe location, and provide the emergency dispatcher with the name and location of the building and information about the fire. At the same time he/she shall notify the facility's Director (if he is not available call his authorized person).
After the alarm has been sounded and the fire has been reported, an attempt should be made to extinguish the fire if it is small and if it can be extinguished without exposing oneself to injury. Portable fire extinguishers are available for use.

Follow these same procedures in the event of an earthquake or bad weather like flooding or high winds emergencies. The consequences of this situation might be catastrophically for occupants and the facility so these situations need to be taken seriously. Evaluation from the beginning following relevant procedures and in collaboration with local authorities will prevent personal harm and damage to property.

All name lists of that include the facility's Director, Police Fire Station, local person's of authority and all employees telephone numbers are required to be posted in a safe place near the phone. These telephone numbers need to be distributed to every employee for use in the event of an emergency during regular and after hours work conditions.
The facility's Director shall organize, collect and preserve any material that helps to determine the cause of a fire, make an official documented response to the attorney's office and follow each emergency incident to conclusion.

## Alarms

Different emergencies call for different alarms to indicate what actions employees should take. KESH has to establish an employee alarm system for its facilities. Employees can use their direct voice for alerting others of an emergency when the distance permits.
It's necessary to post the emergency telephone numbers of emergency responders near telephones where they serve as a means of reporting emergencies.

*In the event of an emergency requiring evacuation*

When employees detect an emergency that requires an evacuation, such as an earthquake, fire, etc. they should notify the Facility Director. He will notify the legal authorities and implement specialized procedures for this event.

## Evacuation Procedures

The primary concern in the event of a fire is to evacuate everyone from the building as quickly as possible. In order to accomplish this, employees must be prepared in advance for quick and orderly evacuation. Periodic meetings should be held with all personnel to explain in detail evacuation procedures. When the fire alarm sounds, immediate evacuation is required.
Some emergencies require evacuation procedures, while some require employees to stay indoors or in a safe area.
The evacuation procedures are designed to respond to many potential emergencies, depending on the degree of seriousness.
At KESH facilities, the following types of emergency evacuations exist:

- Fire
- Weather emergency – flooding, high winds
- Earthquake

Employees need to know what to do if they are alerted to a specific emergency. After an alarm is sounded to evacuate if a fire happened, employees should take the following steps:

- Exit the Facility immediately and assemble at locations outside of the facility as identified on the evacuation map.
- See the layout drawing of the building with exit route assignments for each group evacuating an area or building and the assembly points outside of the Facility.

Before leaving, employees should check rooms and other enclosed space as they use to exit routes from the workplace looking for other employees who may be trapped and are unable to evacuate the area. Also, make sure that you turn off any electric equipment that may cause a risk later.

In the event of an earthquake, employees must stay inside until the shaking stops and it is safe to go outside, they should minimize their movements during an earthquake to a few steps to a nearby safe place, they should take cover under doors, tables, etc., and stay away from windows. If there is no nearby protected structure, they should cover their face and head with their arms and crouch in an inside corner of the building. If they are outside, they should stay there, away from buildings and equipment.

In the event of bad weather such as flooding and high winds, employees have to be assembling in protected areas away from metallic structures, buildings, stairs, etc.

All the employees have to be trained to:

- Emergencies procedures:
    - Check and observe the facility and the workplace continually, determine the exact location of the emergency and activate the alarm immediately if required.
    - Be alert for any situation that could cause electrical shock and go to the sturdy structure if a fire or earthquake or flooding occures.
- Provide guidance and instruction for all types of emergency situations,
- Direct and assist in safe and orderly emergency evacuation,
- Be aware of employees with special needs who require extra assistance,
- Avoid hazardous areas during an emergency evacuation,
- Keep the facility clean,
- Clean and maintain drains, build dams as needed by placing riprap (rocks, soil) and sandbags to minimize the flooding aftermath.

## Tracking Method

- Count employees at assembly points inside or outside of the Facility

Once employees have reached their evacuation locations, the Facility Director should:

- Take roll call of his or her group,
- Make sure all persons are accounted for.

No employees are to return to the Facility or to the building until advised by the Facility Director. If anyone is injured or contaminated, the Facility Director will activate rescue and first aid actions.

### Non-Evacuation Emergency Procedures

Once employees are made aware of a severe weather situation such as flooding or high wind they are to follow these procedures:

- Follow the direction of the Facility Director,
- Employees should stay away from windows, but stay inside the building unless told otherwise. The attached facility map shows the location of the shelter assignments,
- Employees are not to leave the shelter or return to their regular duties until told to do so by the Facility Director,
- If anyone is injured or contaminated the Facility Director will activate rescue and first aid actions.

## Critical Operations

KESH has critical operations that **cannot** be shut down for emergencies.

These operations include the following:

- Power generating operations
- Power distribution operations

The employees who are designated to remain behind during the evacuation to care for critical plant operations include the following:

1) _____
2) _____
3) _____
4) _____

## Training

The Facility Director or a member of the EMU reviews the Emergency Action Plan with each of employee at the following times:

- Initially when the plan is developed,
- Whenever a new employee is hired,
- Whenever the employee is assigned initially to a new job,
- Whenever new equipment is introduced into the workplace,
- Whenever the layout or design of the facility changes and
- Whenever the plan is changed.

The facility should perform drills for the following emergencies:

- Facility evacuation

They hold these drills at least:

- Once per calendar year

After a drill, the Facility Director and the EMU judge the effectiveness of the plan and review any employee comments concerning the drill. Employees performing the drill may identify something that did not follow the procedures, or that procedures were ineffective. For example, they may discover doors that would not open; they may enter storage closets instead of exiting; they may get lost and confused. These are the types of things the Facility Director and EMU need to hear about after a drill. That way, they can be addressed before a real emergency.

## Emergency Equipment and Support

KESH provides the following equipment and support for use by our trained personnel during emergencies:

- Fire Extinguishers
- Water and sand tank, paddle, bucket, pickax, stair, etc.

All employees have to be delivered with Personal Protective Equipment (PPE) in work areas that require PPE, including gloves, hats, footgear, work clothes, goggles/face shields. Also they must be trained how to use and maintain their personal equipment.

## 10.5 ANNEX 5 HAZARDOUS WASTE CONTINGENCY ACTION PLAN

# Hazardous Waste Contingency Action Plan

## Introduction

The purpose of this plan is to inform KESH of the requirements for maintaining and implementing a Hazardous Waste Contingency Plan. This plan describes the administrative duties, emergency equipment, hazardous waste maintenance, employees training, etc.
The Environmental Management Unit (EMU) in KESH developed this program to handle hazardous wastes at operating facilities and at construction sites, because hazardous waste can pose significant safety and health risks to workers, when not handle properly.

This program applies to all work operations in KESH facilities where employees may be exposed to potential discharge or spill situations involving hazardous waste under normal working conditions or during an emergency situation.

The plan is designed to minimize the hazards to human health or the environment from fires, explosions or any unplanned sudden or non-sudden release of hazardous waste to air, soil, or surface water. The hazardous waste contingency plan, and the associated procedures of emergency action plan, have to be carried out immediately whenever there is a fire, explosion or release of hazardous waste that could threaten human health or the environment.
Hazardous waste includes cancerous, toxic, irritant, corrosive, poison, explosive, chemicals, etc. which affect the hematite system and could hurt lungs, liver, neural system, eyes, skin, mucus, etc.
PCBs could be a hazardous waste at KESH facilities, such as the cooling liquid oil of transformers manufactured before year 1980, discharges of battery acid, etc. PCBs (Polychlorinated biphenyls) are synthetic organic chemicals and they are very persistent in the environment. PCB risks are not from its acute toxicity but from its chronic toxicity, thus it's long-term exposure to PCBs that we are concerned about. The chronic effects of exposures to PCBs include affects on the liver, reproductive and development system, that can lead to cancer.
PCBs manufacture and utilization is minimized now, but many years have to pass before PCBs will not be an environmental problem. The EMU will inform KESH employees continually at all operating facilities about new environmental legislation in Albania, this will help in procedure development and implementation for hazardous waste training.
The EMU encourage any suggestions that employees have for improving the hazardous waste plan as the EMU is committed to developing an effective plan, striving for clear understanding, collaboration, and involvement in the plan from every level of KESH.

## Administrative Duties

The EMU is responsible for the Hazardous Waste Contingency Plan. Copies of this plan may be obtained from EMU office in KESH and from the Facility Director. The EMU specialists and Facility Director have to be familiar with:

- ❖ All aspects of the facility contingency plan
- ❖ All operations and activities at the facility
- ❖ The location and characteristics of waste handled
- ❖ The location of all records within the facility, and
- ❖ The facility layout.

The Facility Director is responsible for the operation of his facility. Working with the EMU, he is responsible for ensuring that Plan is complete, kept up to date and made available to any legal authority as required.

The following are the responsibilities of the Facility Director or his designate in the event of an emergency caused by a hazardous waste spill or discharge:

- Determine the extent of the emergency
- Respond with appropriate equipment to contain the release
- Ensure no employees are in danger
- Use Emergency Action Plan as necessary

In addition, the Facility Director or his designate has the following responsibilities after determining that the facility has had a release, fire or explosion that threatens human health or the environment outside the facility:

- Implement the Hazardous Waste Contingency Plan as necessary
- Implement the Emergency Action Plan as necessary

The following are the responsibilities of the Facility Director or his designate immediately after an emergency:

- Determine if the Hazardous Waste Contingency Plan was effective
- Determine if the Emergency Action Plan was effective (if utilized)
- Determine what improvements to the plans need to be made (if any)

## Location of Plan

A copy of the Plan may be obtained from the Facility Director and from the EMU specialists.

## Emergency Equipment and Procedures

It's KESH's policy to operate its facilities in a safe and responsible manner. The EMU in KESH continually reviews its operations to minimize the possibility of fire, explosion or an accidental release of hazardous waste.
Because of the nature of the hazardous waste KESH generate, the facility is equipped with an alarm system which is capable of providing immediate emergency instruction to facility personnel.
Each KESH facility must regularly check and maintain as required the water pressure and water volume to make sure that they are sufficiently adequate to supply water hose streams.

## Preliminary measures to reduce employees exposure from hazardous materials

The safe handling of hazardous waste may be executed using controled measures. These measures include, engineering controls, personal protective equipment, and the storage and treatment of hazardous wastes to reduce employee exposures to hazardous materials. These measures limit an employee's exposure to hazardous materials.

The correct method of hazardous waste storage is very important to prevent actions that cause fires, explosive or other risks to employee's health.

## Rules for hazardous waste storage

It's required that hazardous waste be handled as following:

- Be stored in a designated Hazardous Waste Storage area that is labeled with at sign that says "Hazardous Waste Storage".
- This Hazardous Waste Storage area should be locked to prevent accidents. (Away from other chemicals, locked with controlled access and separate from other flammable materials).
- The Hazardous Waste Storage are must be organized an ordely manner to prevent accidents (do not store directly on soil or on a floor that will not contain a spill or on the top of shelves).
- The Hazardous Waste Storage area should be well ventilated to avoid flammable vapors building up.
- The Hazardous Waste Storage area should not be located near any residences, surface water, etc. It should be an area that is easy to get access to but separate from daily work activities.
- Any container (drum, tank, pail, bag) in the Hazardous Waste Storage area should be marked clearly with labels in the Albanian

language, with specific signs of wastes according to the Government Decree No. 824, date 11/12/2003.

- The Hazardous Waste Storage area should be surveyed continually by responsible persons and a record of this survey needs to be kept. These surveys should happen at least once per week. This survey checklist should note the conditions of the Hazardous Waste Storage area and any changes during storage.
- To complete this survey you must prepare a register to record this information.
- Make an effort to get out the old wastes that have accumulated in The Hazardous Waste Storage area and to comply with all Albanian laws.

Anyone handling hazardous waste and working in the Hazardous Waste Storage area must use personal protective equipment.

The alarm system, fire control equipment, spills control equipment and decontamination equipments should be tested and maintained regularly to ensure that it will function properly in an emergency. Some of the equipment should be part of this effort include:

- Fire extinguishers
- Water tanks
- Rags/Absorbents
- First Aid Kit
- Telephone with emergency numbers posted.

At facility, we need to ensure that the emergency equipments needed is readily accessible to employees during any operation that would involve hazardous waste.

It's required that employees use personal protective equipment during the handling of hazardous waste (or hazardous materials) such as gloves, goggles, safety shoes, work clothes, etc. to avoid direct or indirect contact with body.

Every facility must have adequate aisle space to allow for unobstructed movement of personnel and the transporting of equipment during emergencies.

*First Aid Procedures for Hazardous Materials*

*Eye Contact*: If a chemical has been splashed into the eyes, immediately wash the eye and inner surface of the eyelid with copious amounts of water for 15 minutes. Check for and remove any contact lenses at once. Seek medical attention immediately.

*Minor Skin Contact*: Promptly flush the affected area with water and remove any contaminated clothing. If symptoms persist after washing, seek medical attention.

*Major Skin Contact*: If chemicals have been spilled over a large area of the body, quickly remove all contaminated clothing while using the shower. Repeat if pain returns. Wash off chemicals by using a mild detergent or soap and water, do not neutralize chemicals or apply salves. Seek medical attention immediately.

Fire blankets are primarily used as a first aid measure for prevention of shock.

*Medical Consultation / Examinations*

Whenever an employee develops signs or symptoms associated with exposure to a hazardous chemical they shall receive an appropriate medical examination. Whenever an event takes place in the work area such as a spill, leak, explosion or any other occurrence related to hazardous waste or materials, the affected employees shall be provided a medical consultation.

## Training

Each employee who works with or may be potentially exposed to hazardous chemicals shall receive initial training on the safe use of those chemicals within 30 days of employment. Additional training should be provided for employees whenever a new hazard is introduced into their work area.

The training should emphasize the following elements:

- a summary of this written program;
- discussion of general chemical properties including visual appearance, odor and methods that can be used to detect the presence or release of hazardous chemicals;
- General procedures to protect against hazards, e.g., personnel protective equipment, work practices, and emergency procedures;
- Hazardous chemical spill and leak procedures; and
- The location of hazardous waste and how employees may obtain and use the appropriate hazard information.

Periodic training shall be scheduled at least annually.

## 10.6 ANNEX 6 ROLES AND RESPONSIBILITIES OF THE STATE BODIES RELATED TO ENVIRONMENT

Environmental institutional network

All the specialized bodies, entitled by law with the environmental protection in the Republic of Albania, represent the environmental institutional framework of the country.

The environmental institutional framework comprises of the Ministry of Environment, REA-s, Environmental Inspectorate, environmental bodies under the main central and local authorities, as well as inter-ministerial organisms, approved by the Council of Ministers to follow on important environmental issues.

The governmental central and local bodies, as legitimate administrators of various environmental elements, realize the protection of the environment through the implementation of this function.

The Ministry of the Environment

As a central institution specialized in environmental protection and as a technical supporting body to the Minister of the Environment, the Ministry of Environment performs these main duties:

- Cooperates and coordinates with central and local government institutions, with the public and none—profit organizations, to increase the level of enforcement of the environmental legislation.
- Prepares the bilateral or multilateral draft agreements, protocols, projects and programs of cooperation with governments, with international bodies and organizations for the environmental protection and follows their implementation.
- Studies the country needs for specialists and coordinates the qualification and specialization activities of the personnel dealing with environmental protection, in cooperation with the Ministry of Education and Science.
- Supports projects about the scientific research, the improvement of the state of the environment, the introduction of ecologically clean technologies and the promotion of non-profit organizations activities.
- Assists the local government bodies on environmental protection and on the preparation of the local environmental action plans.

Regional Environmental Agencies

The Regional Environmental Agencies (REA-s) are specialized bodies in environmental protection, depending on the Ministry of Environment and which operate on prefecture level. While implementing the objectives and priorities of the Ministry of Environment, the REA-s:

- Realize the enforcement of legislation for the protection of the environment on local level;
- Assist the local government bodies in the field of environmental protection and management within their jurisdiction; cooperate with the local government for the development of local environmental actions plans, programs and projects;
- Promote the use of clean technologies and introduction of environmental management systems;
- Are involved in the process of the approval of the environmental permit and declaration, by performing the duties defined by the Minister of Environment in a special regulation. They provide the environmental consent and authorization for local activities
- Undertake awareness activities for the protection of the environment and cooperate with the community, the public and environmental NGO-s and professional business organizations.

Environmental Inspectorate

The Environmental Inspectorate functions within the Ministry of Environment, as a specialized body on environmental control. The Environmental Inspectorate is composed by: the Chief Inspectorate, inspectors of the Ministry of Environment and inspectors of the REA-s. The inspectors of the Ministry of Environment exercise their control activity in all the territory of the Republic of Albania, while the inspectors of the REA-s operate within the prefecture's territory.

The Environmental Inspectorate:

- Exerts continuous control on the environment and the polluting activities in order to guarantee the protection of the environment through the enforcement of the environmental legislation and the conditions of the environmental permit and declaration.
- Requests the participation of the local government authorities, of the representatives of the municipalities, of the non-profit environmental organizations and of the media during the controls on the environment.
- Creates the environmental file for every activity dotted with an environmental permit. The Minister of Environment defines the detailed rules on the format, content and the administration of the environmental file.
- Assists the physical and legal persons to realize the self-monitoring, the verification and the implementation of the integrated management systems and controls their implementation.
- Orders for the implementation of obligatory measures to be taken for the improvement of the state of environment, for the mitigation of the pollution and the damage of the environment.

- Informs regularly the local authorities on the state of environment, on the approved activities, projects and installations, according to the dispositions of this law.
- Controls the pollutant's register, the inner, technical and technological regulations and other documents related to the activity and the risks of pollution.
- Imposes sanctions, according to this law and other legal acts that protect special constituents of the environment.
- Publishes the results of every exerted control.

Public media

The public media assist in:

- the protection of national interests in the field of environmental protection;
- the rising of the contemporaneous knowledge and culture on the environment;
- the realization of the public's right to be informed on the state of the environment;
- the diffusion of the technical and scientific achievements in the field of environment and of the national activities in this field.

The local government authorities

The local government authorities represent the most important governmental structure for the administration and the protection of the environment that they have under jurisdiction, by implementing the responsibilities, rights and duties given to them by the law No.8652, of 31.07.2000 "For the organization and the functioning of the local government". In the field of environmental protection, they have the following duties:

- realize the implementation of the environmental legislation;
- draft local plans for the environmental protection and plans for the territory adjustment;
- publish the programs and measures for the protection of the environment;
- inform the public on the state of environment and local activities that are subject to the environmental impact assessment;
- promote and support the activities of the non-profit organizations for the environment, by drawing their opinion in the environmental decision-making process;
- define the sites for the collection and elaboration of the production and human life wastes, in accordance with the environmental criteria and development plans;

- organize the deposit of the wastes and hazardous substances as well as the protection of green areas in urban centers and around them;
- administer the urban wastes, the waste water treatment and solid wastes plants; and
- discipline the transport and the constructions in the urban environment.

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