**The Study of the Sediment and Developing the Process of Removing Inert Material from the Zhinvali Reservoir Aiming at Extending its Lifespan**

**General part**

According to the bathymetric studies conducted annually on the Zhinvali Reservoir, an average of 1.5 mln. cubic meter of inert material is accumulated, which reduces the volume of the reservoir every year.

Most of the inert material accumulates in the upper parts of the reservoir, near the mouths of the rivers, and a small fraction of the material moves to the dam towards the deeper part of the reservoir. Sand, gravel, sludge and waste mass can be distinguished as an inert material.

The research process should coincide with the lowest levels of reservoir filling, which in turn includes the period from the end of November to the beginning of March.

**Research aim**

The aim of the study is to assess the possibility of removing the of inert material from the aquaria in order to increase the of the operational period reservoir, as a result this process will enable:

* Maintenance of the existing volume of the reservoir;
* Gradual restoration of the design volume of the reservoir;

Based on research conducted the following information need to be obtained:

* Study of the existing situation;
* Sediments inflow forecasting based on available statistical data;
* Identification of sediment granulometry and its locations
* Development of sediment removal methodology, which will take into account existing environmental protection requirements;
* Study of the existing market of inert material;
* Determining the economic effect from the possibility of realizing the sediment and calculating the effect of improving the generation by increasing the volume of the reservoir;

One of the most important factor which need to be foreseen is uninterrupted, safe water supply to Tbilisi city with the highest quality.

**Work to be performed within the framework of the study**

The following works should be carried out in the scope of the study:

* Sediment fragmentation, volume and their geographical distribution;
* Determining the composition of the sediment - gravel, sand, silt, etc, based on samples and respective laboratory tests
* Determination of reference volumes corresponding to sediment composition;
* Determination of the amount and composition of pelitic sediment;
* Dynamics of the surface of the reservoir;
* Reservoir water quality control in the processes.
* River sediment dynamics and its areas;
* Economic assessment.

Based on the conducted research, it should be determined:

* Development of several variants of the inert material removal processes by determining the methods and modes of removal;
* How these material removal processes or methods and modes of removal would impact on the reservoir water quality. How we will control this impact after and during the extraction processes.
* Categorize the methodologies and the impacts, and determine the better methodology to utilize following different criterial.
* Ensuring the protection of water extraction modes and quality needed for Tbilisi water supply, during the removal of the inert materials;
* Further utilization of useful part of inert material;
* Further disposal of the wasted part of the inert material, including the possibility of placing it in the downstream of the Zhinvali dam;
* Determination of further utilization of pelitic sediment;
* Selection of several alternative places for storage of inert material;
* Comparing the total volumes of the useful part of inert material with the total annual volumes within the country and determining the percentage share;
* For the National Agency of Mineral Resources, preparation of the optimization plan for the extraction of inert materials throughout the country, taking into consideration the resources of the Zhinvali reservoir;

The study report should contain a plan with possible options for the volumes of inert material and pelitic sediment removal. The plan should include economic evaluations in case of withdrawal of different volumes and corresponding effects of extending the operation period of the reservoir in time. Besides above mentioned tasks and outcomes, it is requested to elaborate the respective BOQ for the methodologies proposed in study.

**Recommended list of specialists required in the research process**

It is necessary to conduct research with the involvement of the following specialists: hydrologist, geographer, chemist, biologist, economist; ecologist, sociologist, geomorphologist, climatologist, geologist, soil scientist and GIS specialist.