

DRAFT TRANSLATION FROM ARMENIAN

ORDER  
RA MINISTER OF NATURE PROTECTION

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30.06.2014

# EXPERTISE CONCLUSION ON ENVIRONMENTAL IMPACT

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Issued to: Mego Gold LLC  
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Activity: Concerning the amended environmental part of  
tailing dam of Toukhmanuk processing plant  
Meliqgyugh community, Aragatsotn region, RA

"Nature protection expertise" state non-commercial company  
Temporary acting director /signature/seal/ V. Sahakyan

Expertise inset: 4 pages.

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Concerning the amended environmental part of the tailings dam of  
Toukhmanuk processing plant presented by Mego Gold, LLC

Applicant:	Mego Gold, LLC
Designer:	Akunq-Firma, LLC
Authorized person:	A. Tarverdyan, V. Hambardzumyan
Presented material:	Environmental part
Location:	Meliqgyugh community, Aragatsotn province, RA

The new tailings dam is expected to be built on the Eastern part of Meliqgyough village, on the distance of 800 meters, and 1,600 meters from the plant, on a relatively flat area, with an incline of 7%. The total surface area provided under the tailings dam is 6-7 hectares. The relief of the terrain allows building semi-flat type of tailing dam, which shall be surrounded by earthy barricade.

The tailings dam is of a filling type, the volume is 370,000 cubic meters. The barricade and the ground of the tailings dam shall entirely be covered with a clay layer, which shall prevent production waters of the tailings dam to soak into subterranean waters.

The thickness of the clay layer of the barricade is expected to be 3.0 meters, and on the floor – 1.0 meters. As an alternative option, the clay layer is expected to be replaced by geo-membrane.

Geo-membranes are multifunctional cylinder-package polymeric papers with thickness of 1.0-2.5 millimeters. Geo-membranes are easy implementable: standard membranes have width of 2 meters and 6 meters with high bonding property. Convenient for transportation and warehousing.

Pursuant to the project, the surface area of the tailings dam is 1.53 hectares or 170x90 meters. Tailings establishment includes the following structures:

- Earthy barricade: maximum height – 24.3 meters, width of the tip – 7 meters, upper slope inclination –  $m=3$ , inner slope inclination –  $m=2.5$ , 3m width berm is expected on the 2052 digit of the inner slope. The body of the barricade is expected to be built by garble –breakstone – gravel-sand natural soil,
- Thickness of the clay layer of the ground of the tailing dam is 1.0 meter, geomembrane – 2.5 millimeters.
- Tailings pipe – total length – 1607m; it is a closed steel pipeline with 150mm diameter installed in concrete chamfer. In case of tailings emergency, the pulp will be directed to tailing dam through the chamfer, which, at the same time bears a role of emergency pool.
- To divide the pulp in the tailings dam, 24 units of distributing asbo-cement semi-pipes are expected on tailings dam upper slope with width of 300mm.
- Circulation system: narrow-gauge with 47.4m length and 0.9m width is expected to be built from upper slope of the barricade to tailing dam stretching, on which shall be installed portable pumping station for riposte the stretching of the tailings dam to enrichment plant.

Tailings germinate during the ore enrichment, which form the 88.6% of the productivity. The tailings, in the form of pulp, transport and storage in the tailings dam. The content of the solid part of the pulp directed to the tailings dam is 25-26%. The ratio of liquid to solid part is 3:1, fraction largeness: 0,2mm-15-18%, 0,2-0,08mm-25-27%, 0,08-60-55%.

Compound of solid part of the tailings are the following:  $\text{SiO}_2$  – 46,23%,  $\text{AL}_2\text{O}_3$  – 10,81%,  $\text{MgO}$  – 5,17%,  $\text{TiO}_2$  – 0,82%,  $\text{CaO}$  – 6,41%,  $\text{MnO}$  – 0,15%,  $\text{Fe}_2\text{O}_3$  – 6,4%,  $\text{FeO}$  – 3,62%,  $\text{C}\text{U}$  – 12.71%. The tailings are not hazardous or explosive and are not soluble.

During the construction, the main sources of impact on atmospheric air are dust emissions during land works, smoky gas emissions from construction equipment, vehicle work (dust, sulfuric anhydride, carbon oxide, azote oxide and etc.)

Levels of upper-terranean pollution of emission of hazardous substances to the atmosphere are provided in the project, both during construction and exploitation stages. In

the result of calculations it was confirmed, that concentrations of hazardous substances are within in the accepted norms (0,00002-0.33U<sup>10</sup> unit).

The following environmental activities are stated by the project during the construction:

- Area watering is implemented to decrease the dust emission.
- Construction area is fenced off with impermeable membrane.
- Regulation of engines of construction equipment.

Total amount of earth extracted during the construction works is 3,342,235 tons, which will be transported in the distance of 20 meters and will be used for construction of tailing dam barricade.

The fertile layer of the soil in the amount of 46,200 tons will be transported to a specially provided area and will be warehoused in the form of 3m high dams. That soil will later be used as re-cultivator for the tailings dam.

During the construction, the water is used:

- For communal household necessity for workers in the construction,
- For construction of pillar body from useful extraction of natural soil macadam lid,
- For layer construction from soil-clay natural soil,
- For construction of slopes
- During the construction of macadam roof with 15sm width,
- During the watering of the construction area for decreasing the dust emission.

The water for drinking and for equipment is delivered.

Pursuant to the project, the volume of the technical water during the construction works is 35,627 cubic meters.

Pursuant to the project, total economic damage inflicted to the environment is 4,426,620 AMD.

During the exploitation the following activities are stated by the project:

- For supervision of the quality and level of ground waters it is expected to install piezometer in bunches in different levels of depth (3 in each bunch) in distance

of 20-25 meters away from the tailing dam barricade, in the direction of drainage of ground waters.

- Background piezometer shall also be installed away from the possible impact of the tailings dam, in the opposite direction of drainage of ground waters.
- Re-cultivation of barricade.
- Watering the tip of the barricade in dry and hot weather.

After the construction works, it is foreseen to implement re-cultivation of tailings dam barricade. The surface area of barricade of tailings dam is 22,953 square meters, the expenses are 4,472.000 AMD on 1 hectare.

Waste will come out during the construction work (extracted earth) in the volume of 10 tons, which will be gathered in a special area and will be used during the construction of the barricade.

Anti-emergency and monitoring program is provided in the project.

#### EXPERTISE REQUIREMENTS

1. It is required to present to RA Ministry of Nature Protection the Toukhmanuk gold mine extraction and processing plant reconstruction projects for environmental impact expertise.
2. After the completion of exploitation, it is required to present to RA Ministry of Nature Protection the project of tailings dam re-cultivation for environment expertise.
3. During the activity, it is required to periodically implement monitoring of separate components of environment (air, water, soil) and form a report, which must be available to interested stated bodies and the community.
4. Pursuant to the note N 01/13.2/890-14 of governor of Aragatsotn region, RA dated 24.03.2014, it is required to solve the issues of welfare of population of the affective community stated by RA Law on Expertise of Environmental Impact article 5 point 1 sub-point "a", paragraph 2.

#### CONCLUSION

A positive conclusion is hereby granted for the environmental amended part of the project of the new tailings dam of the processing plant of Toukhmanuk, presented by "Mego

Gold" LLC, with the above mentioned conditions of implementation of mandatory expertise requirements.

Deputy Director

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Expert

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