



# GEOTEAM

11.07.2016

## In Response to the Concerns Expressed by the Representative of Turkey and Azerbaijan to EBRD Board

| Questions from the Representative of Turkey and Azerbaijan to EBRD Board  | Geoteam Answers   |
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| <p>The planned mining operation areas of 152 ha, belonging to the Armenian Gndevaz residence, (close to the Jermuk and Saravan cities) cover border areas with Azerbaijan (according to the calculations of electronic map, the operation areas are about 12-17 km distance from the border).</p>   | <p>Actual distances to the Armenian border are:</p> <ul style="list-style-type: none"> <li>• Open pit: 15km</li> <li>• BRSF: 13km</li> <li>• HLF: 15km</li> </ul>   |
| <p>According to the ESIA, the Arpachay river will be used as the main source of industrial and drinking water utilization during project operation. This will increase water consumption volume of the river which in its turn will result direct and indirect effects on the ecosystem of the river, as well as the nearby farms which use the river as main irrigation and melioration source. The Arpachay river, one of the main drinking and economic water supplier of Nakhchivan Autonomous Republic, gets its origin from the ridge of Basarkechar which is situated 12 km north from the town of Jermuk, Armenia that is proposed to be mining area. The Arpacay Reservoir constructed on the Arpachay river in Nachivan side is used for the crop irrigation of 20 thousand hectares areas of Sharur, Kengerli and Sadarak.</p> | <p>The abstraction of river water has been considered in the ESIA – see Chapter 6.10 and Appendix 6.10.1 – The Site Wide Water Balance.</p> <p>The maximum abstraction rate from the Arpa River would be 12.3l/s, which is less than 1% of the flow in the Arpa River in low flow conditions (See Section 6.10.7 of the ESIA).</p> <p>The importance of the Arpa River is recognised in the ESIA and all known users of this reach of the Arpa River have been considered in order to determine the potential impacts associated with the abstraction from the Arpa River, for makeup during the construction and operational phase of the mine (see Section 6.10.7 of the ESIA).</p> |
| <p>The river water will be used for processing during the planned construction and manufacturing process. This factor can be considered as danger for drying of the river, as well as significant biological effects on the environment due to the lack of water in the period of drought.</p>  | <p>The Environmental Monitoring Plan (see Appendix 8.12) requires the continuous monitoring of flow in the Arpa River together with monitoring the effects on water flow from the operation of the Kechut Reservoir.</p>  |
| <p>During the construction and operation of the</p>   | <p>The operation of the heap leach facility and gold</p>  |



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| <p>mine, the Arpachay river, other surface as well as ground water are expected to be polluted by the <b>cyanide</b> and other toxic substances which are used in the processing of gold, as well as by domestic and economic wastewater.</p>   | <p>processing has been designed so that there is no discharge to surface or groundwater during the operational life of the site. The Cyanide Management Plan (Appendix 8.11) provides the details that will apply to all operations that involve the use of cyanide. In addition, Lydian will be a signatory of the International Cyanide Code, which is a benchmark of international best practice. The leach pad will have a composite double liner to prevent leaks to groundwater. The HLF and ponds will have zero discharge.</p> <p>The processing of gold is a fully contained process that takes place within the ADR buildings, there is zero discharge from this process.</p> <p>Domestic waste waters will be treated through septic tanks, with residual solid waste removed to landfill, septic tank system will drain to leach field and percolate to surface water.</p> |
| <p>According the proposed scheme of the project, the production lines, in particular, enrichment process of granular boulders with cyanide and erosion structures (pools) are designed very close to the river. The clean industrial water, as well as all removing drainage water (surface streams, rainwater) are designed to be floated to the Arpachay river. In this point of view, the Arpachay river fed by groundwater, snow and partly rain water flows, is in danger of contamination by cyanide leak to surface flows as a result of mining operations. The cyanide is characterized with high toxicity and can seriously affect the ecosystem of the river, quality of the drinking water, biological environment, agricultural land, fishing activity.</p> | <p>The HLF, ponds and processing plant will operate with zero discharge and will not affect flows to the Arpa River, therefore there will be no discharge of cyanide contaminated water to the environment. The Cyanide Management Plan and the requirements of the International Cyanide Code, specifically address the design and management requirements for the Project.</p> <p>The contribution of surface water to flow in the Arpa River has been considered in Chapter 6.10 (see Table 6.10.5), which calculates the predicted change in flows to main rivers, as a consequence of the construction of the mine. The reduction in flow to tributaries of the Arpa River, in the vicinity of the HLF, would be &lt;28%. The reduction in flow calculated to the Arpa River would be &lt;1%.</p>   |



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|   | <p>It should also be recognised that the flow in the Arpa River is controlled by the management of the Kechut Reservoir and the overflow to the river from the reservoir.</p>   |
| <p>The cyanide leak to the ground could also be a danger for the other rivers of Aras River Basin including Darb, Voroton rivers as all of them are fed by groundwater.</p>   | <p>There is no groundwater connection between the HLF and either the Darb or Voroton rivers (see Section 6.9.6 and Figure 6.9.2).</p> <p>In addition, the design of the heap leach pad incorporates a composite liner system that is tested for leaks once in place and prior to further construction. As a consequence the heap leach will be zero discharge.</p>  |
| <p>In addition, the explosion and excavation in mine will result in deterioration of the top layer of fertile land and lithological structure, as well as will increase the sensitivity of the underground water sources to toxic contamination due to the opening of the layers.</p> | <p>The potential impact on soil and geology and hydrogeology have been considered in detail Chapters 6.8 and 6.9. Chapter 6.10 also considers the impact on biodiversity as a consequence of removing the soil to construct the mine. Extensive mitigation measures have been recommended and designed, see in particular the management plans in Appendix 8.8 (Footprint Management Plan) and Appendix 8.20 (Biodiversity Management Plan). The management plans have been developed to ensure that critical habitat and the soil resources that support this habitat are conserved.</p> <p>The potential impact on groundwater, resulting from mining operations are detailed in Chapter 6.9. Section 6.9.5 considers the design of mine infrastructure, including the open pits, BRSF and HLF and the techniques that have been used to mitigate the effects on groundwater. Section 6.9.6 provides the detailed studies of the potential impacts of mining operations on groundwater – including the groundwater regime and recharge to springs and seepages. The impact on groundwater quality (including the Spandaryan to Kechut</p> |



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|   | <p>tunnel, Jermuk spring mineral waters and nitrate released from blasting leaching to groundwater). The potential impacts have been summarised in Table 6.9.13 and been shown to be not significant.</p>  |
| <p>Furthermore, during construction and operation of mining areas the explosion and destruction of the solid rock fragments, as well as grinding process will result in sharp reduction of biodiversity and changes in the landscape structure due to the inorganic dust, noise and vibration effects, the destruction of the productive layer of soil and natural pasture landscape. These factors could be observed to have an indirect impact in Azerbaijan territory.</p> | <p>The potential impacts of dust, reduction in air quality, noise, change to the landscape and biodiversity have been considered in Chapters 6.4, 6.5, 6.3 and 6.10 respectively.</p> <p>Dust and Air Quality:</p> <p>Figure 6.6.3 and Figure 6.6.4 clearly demonstrate that dust and air pollutants (particulates and combustion gases) decline within a range of 500m to 600m from the source of the emission. The assessment demonstrates that there would be no significant effect at receptors approximately 1km from the project. Therefore, no significant effect is predicted in the ESIA.</p> <p>Figures 6.7.10 to 6.7.16 show the output from the detailed noise modelling that has been used to calculate noise emissions from mining plant and vehicles. The figures also clearly demonstrate that the predicted noise levels from the project will be the same as currently experienced within a range of approximately 1km of the project footprint (this is based on the area of greatest activity near the haul roads and open pits). It can be confirmed the site operations will not have a significant effect at more than 1km.</p> <p>Figure 6.5.2a is the theoretical zone of visual influence that takes account of all project components at worst case, in terms of height of mounds and footprint of the open pits. The extend of visibility will depend on the topography and extends to a radius of 15km from the open pits. The analysis of the ZTV is explained in 6.5.15, which identifies that there are no areas designated for landscape qualities, such as State Reserves or National Parks located within the ZTV. No areas</p> |



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|  | <p>outside of the ZTV, which are designated for special landscape qualities, will be affected by the proposed Project, either directly or indirectly.</p> <p><b>Biodiversity</b></p> <p>Chapter 6.11 provides a detailed assessment of the potential impacts on biodiversity, see in particular Table 6.11.5 and Figure 6.11.1 that define area of habitat types that will be lost and disturbed, as a consequence of the development. Of these habitats the critical habitat for <i>Potentilla porphyrantha</i> is located within the footprint of the open pits. The potential impact on this critical habitat has been mitigated through a range of mitigations measures, designed to maintain or exceed the current population. This approach has been used for other species, which could be potentially effected by mine construction and operations. The mitigation measures are identified Section 6.11.6 of the ESIA. In addition, the Mine Reclamation and Rehabilitation Plan (Appendix 8.18), identifies the techniques that will be used to introduce habitat back to the mining area, once the operational phase has been completed.</p> |
| <p>Zangezur National Park, which is situated in Nakhchivan Autonomous Republic, the closest area to the project zone can be considered as a sensitive object. The above-mentioned effects will lead to the break of the natural metabolism in the park and the increase of the pressure of prey, reptiles and rodents in this area while leaving the mining area. Generally, this will result in the loss the nest and feed sources of protected valuable species, migration, and migration routes will be affected.</p> | <p>Zangezur National Park is located approximately 85km SE of the project. The extent of the study area, with respect to biodiversity and ecosystems services, included:</p> <ul style="list-style-type: none"> <li>• Caucasus Biodiversity Hotspot (Conservation International).</li> <li>• Caucasus Mixed Forest Ecoregion.</li> <li>• State Sanctuaries (Jermuk Forest, Herher Open Woodland and Jermuk Hydrological).</li> <li>• Sevan National Park.</li> <li>• Proposed Jermuk National Park.</li> <li>• Jermuk IBA: a Key Biodiversity Area, identified using recognised selection criteria.</li> <li>• Gorayk IBA: a Key Biodiversity Area, identified using recognized selection criteria.</li> </ul>   |



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|   | <p>Table 6.11.2 identifies the priority biodiversity aspects that were included within the project affected area. This was based on the detailed baseline data presented in Chapter 4.10, including migratory routes and species. The potential impacts on the carrying capacity of disturbed land within the project footprint has been assessed in Section 6.11.4 of the ESIA. It can be confirmed that the potential impact on migratory species was not significant and that the mitigation measures in Section 6.11.6 include the requirement to maintain the food sources for both mammals and bird species.</p>   |
| <p>The ESIA does not provide cost-effective proposals on the continuity and protection of environment, but merely assesses the important environmental factors and characteristic ecosystem at the local level.</p> | <p>Sections 4.1 to 4.3 define the Project Affected Area, together with an analysis of the project footprint and disturbed area. This analysis contributed to the detailed explanation and definition of the baseline for each of the environmental and social aspects studied. Therefore, the ESIA defines the methodology that has been used to establish the project affected area, based on the specifics of each environmental and social aspect. In turn, this analysis informs the methodology for the impact assessment (see Sections 6.1 to 6.2) of the ESIA. Within each section of the ESIA, mitigation measures have been defined and assessed to validate the effectiveness of the mitigation (considering both design and management requirements). These have been collated in to a commitments register, the public version of which is published in the ESIA (Appendix 8.5). The commitments are developed into Environmental Design Criteria (EDC) that inform the detailed design of project infrastructure. In addition, each of the management plans (see Appendices 8.6 to 6.24) have been prepared in accordance with the requirements of these commitments. The EDC and the management plans are costed to ensure that environmental and social commitments are</p> |



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|   | maintained throughout the life of the project.  |
| It must be noted that in accordance with international (EBRD, World Bank, Asian Development Bank) classification standards of projects this project is considered as "A" category of projects, requires the environmental and human health assessment not only at the local level but also beyond the project area. This requirement of the international standards was violated in this Project. | As identified in the answer to the previous question, the project affected area has been defined, by establishing the detailed analysis of the environmental and social baseline, based on recognised international best practice for each environmental and social aspect. The project affected areas defines the limits within which potential impacts are predicted and have, therefore been assessed in the ESIA. Outside of the project affected area, no significant effects are predicted and are therefore not considered specifically. This approach is consistent with international best practice. |
| Besides to the above mentioned, please be informed in order to analysis the stated affects more accurately comprehensive information is required.   | It is considered that the ESIA provides a comprehensive analysis of the baseline conditions within the project affected area. Potential impacts and mitigation measures have been defined in the context of the baseline studies and no further studies are required.   |

Managing Director

Hayk Aloyan

