

Analysis and assessment of the results of complex expert assessment commissioned under criminal case No.69104218 in charge of the RA Investigative Committee General Department of Major Cases Investigation (initiated pursuant to Article 282.1 of the RA Criminal Code over possible withholding of environmental pollution data by officials of the RA Ministry of Nature Protection (currently Ministry of Environment)) obtained on August 7, 2019, with a focus on deficiencies identified

ACRONYMS

UV – Upper Volcanic

LV – Lower Volcanic

ARD – Acid Rock Drainage

PTG - Potentially Acid Generating

BRSF – Barren Rock Storage Facility

HLF – Heap Leach Facility

PTS – Passive Treatment System

ADR – Adsorption-Desorption-Recovery plant

ABA - Acid-Base Accounting

On July 20, 2018, the RA Investigative Committee General Department for Investigation of Particularly Important Cases initiated a criminal case on possible withholding of information by Ministry of Nature Protection officials (currently Ministry of Environment) related to alleged environment pollution associated with operations at the Amulsar Project.

On November 8, 2018, the RA Investigative Committee announced a two-phase prequalification to select internationally certified organizations to examine the risks of harmful impact of operations at Amulsar Project on environment (soil, air water, flora, fauna) and the reliability of preventive measures, as well as to conduct independent expert assessment of the Environmental Impact Assessment (EIA) and Environmental and Social Impact Assessment (ESIA) reports presented, and on the same day, a relevant announcement was published on the official website of the RA Investigative Committee. The announcement was published on www.devex.com as well.

Requests for proposals were sent to international organizations engaged in the given sector.

On January 19, 2019, the tender commission summed up the tender results and selected Earth Link & Advanced Resources Development (ELARD).

On February 21, 2019, under Government Resolution No.148, an amount equivalent to 396,900 USD was allocated from the Government Reserve Fund to the RA Investigative Committee for the purpose of contracting Earth Link & Advanced Resources Development (ELARD) and organizing further processes.

On March 15, 2019, a relevant contract was signed between Earth Link & Advanced Resources Development (ELARD) and RA Investigative Committee.

On March 18, 2019, environmental, geological, hydrological, geophysical, chemical, construction and technical complex expert assessment was commissioned under the criminal case and ELARD expert group was assigned with the implementation thereof. The expert group undertook the implementation of the independent third-party expert assessment.

Within the framework of the expert assessment, the international expert group conducted following:

1. Water resources impact assessment (Lake Sevan, Spandaryan-Kechut Tunnel and Reservoir, Arpa, Darb, and Vorotan rivers, Jermuk springs, groundwater basins),
2. Geology impact assessment,
3. Biodiversity impact assessment,
4. Air quality impact assessment,
5. Unprejudiced clarification of the 15 issues raised by the decision to commission a complex expert examination.

The final report of the complex expert assessment was provided to the Investigative Committee on August 7, 2019.

According to the complex expert assessment report,

Assessment of impact on water resources

1. Groundwater flow and contaminant transport pathways between the Project Area and the Jermuk thermal springs do not exist. Under conditions resulting from earthquake impairment of the BRSF, ARD-impacted groundwater will not reach Jermuk.
2. Assuming the liner beneath the BRSF and the Toe Pond are effective in containing ARD seepage, impacted groundwater from the Project may not discharge to the Spandaryan-Kechut tunnel. Isotopic data do not support discharge of Amulsar Mountain ridge groundwater to the tunnel. Under the same assumption, the Kechut Reservoir and Lake Sevan would not be impacted.
Under conditions resulting from earthquake, potential mixing of impacted waters, first with the Kechut Reservoir water and then Kechut Reservoir water with Lake Sevan water, would probably not generate significant or even measurable changes in concentrations of Lake Sevan water due to the sequential dilutions in both reservoirs and the size of Lake Sevan.
3. Significance of impacts on Kechut Reservoir, Arpa, Vorotan and Darb rivers is uncertain, as ESIA models neither assess nor measure those impacts. It is impossible to determine the significance of impacts on groundwaters, based on the information available. Releases

of untreated Mine contact water can contaminate groundwater and can reach and impact surface waters.

According to the report and the Annex (Memorandum) to it:

Generally, the design concepts used in the Amulsar ESIA/EIA for development of mitigation measures are reasonable and appropriate. However, a number of the measures and plans, are partial.

To ensure the efficiency of Project impact mitigation measures, the expert groups recommends about 16 mitigation measures for unforeseen circumstances and states that ***the environmental risks to nearby water resources (groundwater, and major rivers and springs) should be manageable if the Lydian planned mitigation and closure measures and the above supplemental and contingent mitigation measures are adequately and verifiably planned, modeled, designed, implemented, operated, monitored, and maintained during the operation and post closure phases.***

Biodiversity impact assessment

1. No breach to any national or international regulations or recommendations are to be noted.
2. Observations highlighted throughout the assessment and in this conclusion are mainly intended for use in the event of an update or improvement of the ESIA especially that, given the amount of efforts invested to develop this ESIA, the methodology could have been improved to cover ecological functionalities and a more exhaustive assessment.
3. No violation is to be reported.

Air quality impact assessment

In general, no major issues were identified in a way that cannot be mitigated. Taking into account the additional mitigation measures and monitoring actions, the impact of the project related to air quality is likely to be manageable.

The expert group has outlined a number of deficiencies and the essential ones were analyzed and evaluated by the agency in charge of the case and are present below:

Summary, Conclusions and Data Gaps (Section 3.0)

Geology (paragraph 3.1.1.)

The baseline characterization of the geology of the Project study area is data deficient, and the interpretation and conceptualization of the geology across the area is too simplistic. Detailed surface geologic mapping was focused on the Amulsar Mountain ridge. Fault and fracture mapping throughout the rest of the study area was not conducted. Faults may be barriers and/or conduits of groundwater flow throughout the area.

Lydian Armenia CJSC provided the following response: The conceptual hydrogeological model used as the basis for the development of the groundwater model, sub-models and risk assessments in the ESIA was based on all the available data including both geological mapping and the logs of boreholes drilled for exploration, geotechnical and hydrogeological purposes. The amount of data is considered appropriate for an ESIA.

The expert group highlighted that the available data is not sufficient and stated that the conceptual hydro-geologic model is inadequate, as it presents local mountainous area with complex structure, surrounded “multi-layer” nature of volcanogenic layers with homogenous hydraulic properties. They disagree that the amount of data is appropriate for ESIA, at the same time saying that conservative properties were used in groundwater modelling.

Analysis by Investigating body: According to the experts, faults and fractures represent an obstacle or transit path for groundwater hydraulic conductivity, which is a basis for an adequate conclusion that these faults may represent both an obstacle and a transit path. However, neither this nor the other assumption was disclaimed or confirmed to arrive at a final conclusion. Nevertheless, if, according to assumptions of the expert group, the non-studied fractures and faults represent a transit path and there is potential seepage risk, the same experts stated that Lydian’s mitigation measures and design concepts are reasonable and adequate. At the same time, the expert state that if Lydian planned mitigation and closure measures and the above supplemental and contingent mitigation measures are adequately and verifiably planned, modeled, designed, implemented, operated, monitored, and maintained during the operation and post closure phases, the environmental risks to nearby water resources (groundwater, and major rivers and springs) should be manageable.

The Amulsar Mine facilities are not entirely within the Amulsar Tectonic Block (ATB). These faults also represent potential seismic hazards. The ATB does not isolate potential Project impacts from the environment. Potential seepage to groundwater from the part of the BRSF north of the Zirak Fault could result in contaminated groundwater potentially reaching the Madikenc springs. Contaminated groundwater beneath the mine pits could potentially flow to and reach the Darb and Vorotan Rivers. The extent of the impacts to groundwater cannot be determined based on available information.

Lydian Armenia CJSC provided the following response: The hydrogeological assessment is based on the current understanding of the geology and hydrogeology of the area, consistent with international practice. The study has included 57 tests, including packer tests and pumping tests, to determine hydraulic conductivity in 40 boreholes across the project area. It is considered that the hydrogeology of the project area is sufficiently understood to undertake an assessment of the impact of the development in the context of an ESIA.

The expert group disagreed that the examination is sufficient and that the Project area hydrogeology was sufficiently studied to carry out the mine impact assessment. There are likely

fault and fracture zones outside the assessment area, which have serious control over groundwater flow and contaminant transport pathway. These properties were neither mapped nor tested.

Analysis by the Investigating body: The experts again indicate that faults and fractures were not studied sufficiently and assume that there may be transit paths in the non-studied zones and the contaminated waters may be mixed with groundwaters. However, this assumption is neither confirmed nor disclaimed by the experts. Nevertheless, if, according to assumptions of the expert group, the non-studied fractures and faults represent a transit path and there is potential seepage risk, the same experts stated that Lydian's mitigation measures and design concepts are reasonable and adequate. At the same time, the expert state that if Lydian planned mitigation and closure measures and the above supplemental and contingent mitigation measures are adequately and verifiably planned, modeled, designed, implemented, operated, monitored, and maintained during the operation and post closure phases, the environmental risks to nearby water resources (groundwater, and major rivers and springs) should be manageable.

The seismic hazard risk is high for the Project Area. The seismic hazards assessment is generally thorough and conservative. However, the bounding faults of the ATB block were not considered in the assessment. If displacement occurs along major active faults in the vicinity of the Project Area, including the PSSF5a that potentially underlies the Vorotan River valley, movement could potentially occur along other faults in the Project area, including the Zirak Fault under the BRSF and the Agarakadzor Fault passing through the pit areas.

Lydian Armenia CJSC provided the following response: Seismic hazard at the site is moderate, not high, when compared with other locations in the region (i.e., parts of northeast Turkey and Iran). The seismic potential of faults considered in the seismic hazard assessment were based on:

1. Geologic and seismotectonic maps and other published studies that identified faults with proven or potential activity on the Quaternary Period (i.e., last 2.6 million years)
2. Information on the location of seismically active faults in Armenia and surrounding region, their activity rate, and likely maximum earthquake magnitude provided by Dr. Sos Marqaryan - a Seismic Hazard Specialist based in Armenia
3. Golder's own field investigations at the Amulsar site.

The expert group stated it disagrees that the seismic hazard is moderate and not high, stemming from Golder's surveys and studies.

The analysis by the Investigating body: Although the expert group disagreed with Lydian's assessment of not high seismic hazard, it stated that Golder's assessment of seismic hazards is generally thorough and conservative.

Geochemistry (paragraph 3.1.2.)

The broad categories of Upper Volcanics (VC) and Lower Volcanics (LV) are inadequate for acid rock drainage (ARD) characterization. These categories encompass a range of rock sub-types that are not defined as geochemical test units for specific characterization, resulting in insufficient characterization of each rock sub-type and the ARD potential of the rocks as a whole.

Lydian Armenia CJSC provided the following response: Lydian has divided the LV into three groups based on ARD behavior. This has been presented in the ARD block model. The reviewers do not have the ARD block model in the reference list; even though it has been provided.

The expert group stated it studied the Technical Memorandum (GRE, 2018), which was unintentionally omitted from the Preliminary Report, but was included in the Final Report. LV classification is an improved approach to the management of strongly acid-generating rocks. At the same time, the expert group stressed the importance of sub-classification of UV rocks, since some sub-types of UV rocks may be acid-generating and mistrusts Lydian's characterization of UV rocks as non-acid generating.

Analysis by the Investigating body: The expert group stated that Lydian's ARD block model is generally based on the conservative assumption that total sulfur is a proxy for sulfide sulfur and that total sulfur greater than 2 percent is strongly acid generating. Although this approach does not rectify the deficiencies in characterization, it improves ARD management of LV rock. At the same time, the expert group mentioned that VC samples generally show pH ranges from 4.5 to 6.0, which neutralizes acid generation and one of the VC samples attained a pH as low as 4. This indicates at lower pyritic sulfur percentages. The expert group believes such low pH of UV reinforce the need for sub-types of rocks. Stemming from the general analysis and the expert group's statement that VC has certain, though low potential for acid generation, irrespective of its scale, according to the same expert group's statement, if Lydian planned mitigation and closure measures and the above supplemental and contingent mitigation measures are adequately and verifiably planned, modeled, designed, implemented, operated, monitored, and maintained during the operation and post closure phases, the environmental risks to nearby water resources (groundwater, and major rivers and springs) should be manageable.

Acid-base accounting (ABA) and classification of the tested samples are incomplete, and maximum potential acidity (AP) is incorrectly calculated. The LV and at least part of the VC are potentially acid generating (PAG). The results of the characterization should be viewed with caution.

Lydian Armenia CJSC provided the following response. In the mining industry the Modified Sobek is, in fact, the industry-standard:

- **The testing of Non-Acid Generating pH is not a required test.**

- Alunite and Jarosite are minerals that are not significant acid generators.
- The ARD block model defines PAG material that produces mild ARD (above 4.5).

The expert group highlighted that Modified Sobek method should have been applied irrespective of whether ARD was moderate or high.

Analysis by the Investigating body: The Investigating body deemed it acceptable that Lydian Armenia CJSC was guided not only by Modified Sobek method, but also referred to GARD Guide – section 5.4.10, according to which, alunite and jarosite are not acid generating. Stemming from the general analysis and the expert group’s statement that moderate ARD is also acid generating, irrespective of its scale, according to the same expert group’s statement if Lydian planned mitigation and closure measures and the above supplemental and contingent mitigation measures are adequately and verifiably planned, modeled, designed, implemented, operated, monitored, and maintained during the operation and post closure phases, the environmental risks to nearby water resources (groundwater, and major rivers and springs) should be manageable.

The ESIA discussion of ARD geochemistry is misleading because the ARD Management Plan:

- Lydian ignores the importance of ferrous iron (Fe+2 [translator’s note]) oxidation in generating acid and solids (metals).
- Lydian postulates that the reaction of pyrite by ferric iron (Fe+3 [translator’s note]) dominates the oxidation of pyrite, when in fact the ferric iron oxidation is just one of the two pathways for pyrite to be oxidized, and the two pathways cannot be distinguished based on the products generated.
- Postulates that there is some “natural suppression agent” inhibiting the oxidation of pyrite in the LV ores, when in fact there is no evidence for some suppression agent other than the slow reaction of pyrite. There is no evidence the Amulsar rocks have natural resistance to ferric iron oxidation of pyrite and ARD generation.
- Underestimates ARD generation, and corresponding water quality and environmental impacts and water treatment requirements.

Lydian Armenia CJSC provided the following response: Lydian was guided with the acknowledged method in mining industry, the Sobek method, GARD Guide. As baseline, Lydian took as standard the barren rock present at Site 27 since 1950-1960s and the ferric iron contents in it and that Site 27 barren rock are characterized as identical Amulsar barren rock. Lydian took as baseline the behavior of Site 27 barren rock in natural conditions.

The expert group stated that Lydian's barren rock leachate concentration is acceptable, at the same time noting that leachate from Site 27 may not represent the composition of Amulsar barren rock leachate with the same behavior.

Analysis by the investigative body: Considering the expert group's approach, the investigative body believes that it is reasonable determining the concentrations based on Site 27, as barren rock exposed to natural conditions for 60 years would have been oxidized.

At the same time Lydian's assumptions that Site 27 there is a factor suppressing acid generation in Site 27 rocks, which may be a circumstance.

Stemming from the general analysis and the expert group's statement that ARD potential and water quality should not be ignored, according to the same expert group's statement, if Lydian planned mitigation and closure measures and the above supplemental and contingent mitigation measures are adequately and verifiably planned, modeled, designed, implemented, operated, monitored, and maintained during the operation and post closure phases, the environmental risks to nearby water resources (groundwater, and major rivers and springs) should be manageable.

Water resources (paragraph 3.1.3.)

Five hydrogeologic units were delineated in the groundwater study area (GSA), which is appropriately defined. The structural control of the boundary rivers ensures that flow and transport from the GSA do not traverse these hydraulic boundaries.

The continuous flow monitoring stations established by the Project on the Arpa, Darb, and Vorotan Rivers are generally adequate.

However, the hydraulic properties of the units are inadequately characterized by a limited distribution of hydraulic tests across the GSA and a complete lack of pumping tests.

Lydian Armenia CJSC has provided the following response: The geological units are clearly defined in Chapters 4.8.2 and Appendix 6.91. The units are defined based on the mapped geology and the results of the hydrogeological investigations. ESIA considers impact to groundwater and surface water around all the surrounding Arpa, Darb and Vorotan catchments. Three well yield tests were undertaken in boreholes RCAW286, 287 and 289, along with many falling head or packer tests. Lydian followed the guides and standards acknowledged in the mining industry, and the reviewers detected no violation or improper implementation thereof.

The expert group did not argue.

Analysis by the investigating body: Considering the above-mentioned, the investigating body deemed Lydian Armenia CJSC's above response satisfactory.

Baseline data are lacking for many springs in the GSA. The flow rate at a number of springs in the vicinity of Kechut were not measured. In the south of the GSA, flow was not measured at the Pluskandyal springs or other community springs southeast of Ughedzor. The ESIA states that several potentially significant springs were not visited.

The ESIA does not provide an explanation for the hiatus in continuous flow monitoring between May and December 2013. Termination of the continuous discharge monitoring after May 2014 is questionable.

Baseline groundwater quality data for springs and wells are deficient. Likewise, baseline surface water quality data are far from sufficient. For comparison of future concentrations, meaningful statistics are necessary, requiring 30 to 50 data points for each analyte at each monitoring station.

Lydian Armenia CJSC provided the following response: Springs near the critical site facilities were evaluated. It is not considered necessary to visit every ephemeral spring in order to develop a robust project baseline. The break in monitoring in Q3 2013 was the mainly the result of logistical issues. As can be seen from the data monitoring continued in Q4 2013. The termination of monitoring related to issues maintaining the gauging stations.

The expert group stated that without proper characterization of baseline data of springs, the parties may face potential risks and complaints. At the same time, the expert group noted that flow monitoring duration and consistency are not sufficient for proper characterization of major flow conditions.

Analysis by the investigating body: The investigating body believes that Lydian's explanations connected with the reason of monitoring termination due to logistic issues and acquisition of gauging stations are logical.

Groundwater flow and solute transport modeling (paragraph 3.2)

The water fluxes from the pit seepage sub-model are incorrect. The major issue is too much evaporation from exposed rock and loose rock backfill (with no soil cover). Use of these fluxes in the regional groundwater flow model results in incorrect assessments of impacts to groundwater levels and springs. Furthermore, solute transport simulations would severely underestimate potential impacts to groundwater and springs from ARD.

The calculated volumetric fluxes that report to the base of the BRSF are greatly underestimated. Underestimated water fluxes translate to underestimated ARD mass fluxes, overestimated makeup water volume, and underestimated PTS influent volume, potentially delaying the timing when the PTS is required (i.e., water treatment will be required prior to year 5 estimated in the ESIA).

The source term for transport is poorly constrained. Simulated transport species omit chloride, the most mobile solute in groundwater. Furthermore, selenium should be included in transport simulations due to the detrimental impacts of this element to fish.

A three-dimensional groundwater flow model was constructed for the GSA. The model is inadequate due to incorrect specification of boundary conditions, insufficient and uniform recharge, oversimplification of geologic structure, homogeneous, too low, and poorly-constrained hydraulic conductivities, and a poor calibration for the intended predictive usage. The simplistic numerical representation of the subsurface in the model is inadequate for making the quantitative predictions that were performed, including estimates of pit inflow.

The model does not correctly represent the water balance of the GSA. Less water is moving through the simulated rocks than the actual quantity, and the simulated rates of advective flow and transport (in the particle tracking simulations) are too low. A significant omission of the modeling is the performance of solute transport simulations for predicting chemical impacts to groundwater and surface water quality.

Lydian Armenia CJSC provided the following response: Lydian disagreed with ELARD expert group's statement and insisted that the reviewers detected no substantiating data. According to Lydian, the project compliant with IFC Performance Standard 1 and EBRD Performance Requirement 1.

Lydian disagreed with ELARD's criticism about modeling, noting that FEFLOW model water balance margin error is less than 0.001%.

The expert group in its response stated the same, with no additional grounds provided.

Analysis of the investigating body: The abovementioned is, in fact, a discourse between two expert groups. According to the investigating body, contact water control and management is of prior importance. According to the expert group statement, if Lydian planned mitigation and closure measures and the above supplemental and contingent mitigation measures are adequately and verifiably planned, modeled, designed, implemented, operated, monitored, and maintained during the operation and post closure phases, the environmental risks to nearby water resources (groundwater, and major rivers and springs) should be manageable.

Water quality and water resources impact assessment (paragraph 3.2.)

The post-closure impacts analysis for the BRSF is flawed due to underestimated potential mass loading to groundwater. Specification of iron phases in the equilibrium modeling is inappropriate. An assessment of impacts to groundwater was not performed, and transport was not simulated because the ESIA/EIA incorrectly concludes that no contaminated water will reach the groundwater.

Lydian Armenia CJSC provided the following response: The improved BRSF plan is more protective of water resources because leachate (contact) and spring (none-contact) water is not

mixed. It is separated by a low permeability clay liner and seeps/spring water is captured by a network of engineered underdrains. Therefore, the iron phase discussion is no longer relevant. Groundwater impact calculations from the BRSF were carried out.

The expert group stated that the statement in the Preliminary Report did not apply to change in iron concentrations. The mentioned iron concentrations are the results of geo-chemical modeling of water penetrated beneath BRSF. Mix waters at BRSF are generated from UV and LV rocks without mixing with seepage and springs. At the same time, the experts mentioned about clay liner and sub-grade drains to be applied by Lydian.

The expert group stated that in the referred GRE report (GRE, 2014g), no geochemical modeling of BRSF leachate and groundwater mixing was presented. Geochemical modeling just predicts leachate water quality. In the part referring to the flow, the report presents the model of infiltration rates to groundwater, based on which, they insisted that there were no groundwater impact assessment and modeling of transport pathway from BRSF in any document.

Analysis by the investigating body. In its additional mitigation measures, the expert group mentioned the efficiency of clay liner. The investigating body believes that for the given particular case, Lydian's BRSF model substantiation with clay liner is sufficient, as the expert group recommended the given measure as one of the effective measures to make environmental risks manageable.

BRSF post-closure impact assessment presents incorrect baseline concentrations of solute transport pathway modeling. Furthermore, the transport path does not include potential impact on groundwaters from BRSF and open pits.

Lydian Armenia CJSC provided the following response: The relatively small amount of leachate from the BRSF is not considered to be significant enough to result in a change the leachate quality from millions of tons of ore leached at rates of ~5L/m² per hour.

The expert group admitted that the design concept of using non-PAG drainage layer at the base of the waste rock pile and an underlying low permeability clay liner to deflect seepage through the BRSF to the subgrade drains and mitigate infiltration to groundwater is adequate.

Analysis of the investigating body: Installation of clay liner and soil cover compaction using relevant equipment is discussed in detail in the additional measures, which was assessed by the expert group as a measure to make the risk manageable. Noteworthy that Lydian envisaged the above measures in its documents and committed to implement them, which was highlighted by the experts.

The simulated pit runoff water quality is questionable due to the reliance in a non-conservative assumption of 40% of precipitation on the pit walls reporting to the sumps, and simulated solid phase precipitation of copper oxides and iron-bearing phases with slow growth kinetics at surface temperatures. The runoff water quality has extremely low iron concentrations that are inconsistent with leachate from existing waste rock piles.

According to Lydian Armenia, CJSC's response, The runoff quality model has considered the fast mining rates, which means that the newly-opened and fresh surfaces do not have enough time for oxidization. Hence, the earliest humidity cell tests results were used to represent the active pit situation at best. Moreover, the iron concentrations are not an important factor in these calculations, as 3.2 mg/L is still a very low level, which may be easily processed by PTS. The copper concentration in Amulsar rocks is very low, which fact was clearly stated in the studies.

Expert group does not accept Lydian's explanations and continues to state that wrong value was selected for iron concentration level irrespective of the low copper concentrations in the rocks: in the geochemical modeling unbiased specification of precipitation phases is unacceptable.

The Investigating body determines: Based on the complex expertise and Lydian's studies and research, the investigating body has concluded that the ferric iron concentration of 3.2 mg/L was taken based on the Site 27's iron filtrate concentration level, which was deemed as reasonable by the expert team. According to the research findings, the average site-wide concentration of ferric iron makes 2,8 mg/L, meanwhile the highest 3,2 mg/L concentration was taken based on the Site 27 iron concentration level.

The post-closure solute transport simulations underestimate potential impacts to groundwater and surface water. The solute transport scenario and the local impacts scenario, based on mixing, are not conservative, with source concentrations determined by geochemical modeling that are too low. Loading rates to groundwater are also underestimated due to seepage rates from the pits that are too low, and the predicted concentrations do not include potential effects on the BRSF and HLF. The screening level spreadsheet (analytical) model approach used for solute transport is in appropriate for a project of this scope, extent, and complexity in such an environmentally-sensitive area. The analytical model may not accurately represent the Amulsar's complex and extensive physical system.

According to Lydian Armenia, CJSC's response, The simulations/modelling/calculations are based on the Site 27's leachate quality agreed as a site's ARD representative sample. Besides, the comments on geochemical modeling and spring control are given above. Lydian stands for the data presented in the report and relating to the pit seepage rates. The auditors have failed to present any counterarguments to prove the probability of increased number of seepages on the bottom with unbroken argillic rocks.

Expert group has referred to its audit report, to answer the question.

The Investigating body determines: The calculations selected based on Site 27 are acceptable considering the parties' positions on the above- mentioned issue.

Even if we accept the fact that the concentration rates were taken incorrectly and the modeling was deficient, it will not be that important provided that proper mitigation and supplementary measures are implemented.

Baseline studies and evaluations for the ESIA are poorly planned and poorly integrated, rushed and incomplete. For example, impacts assessment modeling was performed before studies were

complete or other modeling was performed on which inputs for a model are dependent (e.g., unsaturated flow modeling of infiltration through the post-closure cover was not complete at the time of the HLF assessment). The mine closure plan was not complete at the time of the HLF assessment. Studies and planning were still being performed at the writing of the current version of the ESIA. Although the Site-Wide Water Balance was updated, the models for fate and transport simulations and impact assessments were not revised or updated.

According to Lydian Armenia, CJSC's response, ESIA studies and evaluations were designed and implemented according to the best industry practice. ARD-related continuous studies are performed during the Project development as required by GARD guide and the best international industry practice. This comes from the ARD management plan's monitoring commitment, adopted by the Company. The studies were suspended because of the road blockage and will be resumed once the roads are deblocked.

Expert group has not responded to this by supporting its previous comment.

The Investigating body determines: The investigative body has reviewed the positions and comments of the parties and found that the Lydian Armenia, CJSC's commitment to continue the ARD studies in compliance with CARD guides and the best international industry practice, are acceptable.

Post-Closure Expenses

The post-closure monitoring period and costs are underestimated. In the US, post closure costs should be calculated for a 30-year period (as minimum). Contingency costs should be specified and increased.

According to Lydian Armenia, CJSC's response, The closure costs and payment period thereof meet the requirements of the Armenian legislation. It should be mentioned that the costs include the 5 years' monitoring and maintenance as prescribed by the Armenian laws and according to common practice. Besides, the water treatment system monitoring and maintenance costs will be continued for 34 years. The 6% contingency costs are based on the cost-calculating SRCE recommendations.

Environmental Monitoring Plan

The surface water quality monitoring locations, specified in the quarterly monitoring reports, are not enough. The sites on Darb river and to the north of Kechut reservoir (Jermuk included) were not involved into the sampling. Most locations north of the Barren Rock Storage Facility, including the streams in the vicinity of Madikenc springs, the Spandaryan Reservoir, two locations around Gorayk, as well as all locations east and west of the Amulsar mountain were omitted.

The springs and underground waters' quality monitoring locations are too deficient. This sampling program is unacceptable with respect to the number of locations and the deficiency in baseline data.

The monitoring reports do not include potentiometric surface contour maps or contour maps of key constituents in groundwater. There are no time-concentration graphs. There is no discussion of results with respect to previous results and no discussion of analytical methods.

According to Lydian Armenia, CJSC's response, Lydian has committed to regularly review its monitoring plan and to supplement the program with new monitoring works.

Expert group states that there are no monitoring plans envisaged for the mine operation and post-closure phases. Monitoring plan should be included because of limited data for statistical and design purposes.

The Investigating body determines: Lydian Armenia, CJSC has admitted the expert group's recommendations and has committed to regularly review the monitoring plan and to include new monitoring points.

Mitigation Measures

In the estimation of the expert group, basically, the concepts used in Amulsar ESIA/EIA to develop mitigation measures are reasonable and adequate (for instance, low permeability membrane liner, encapsulation, cover, drainage and leachate treatment).

Pits

As part of post-closure mitigation measures Tigranes-Artavazdes and Erato pits will be backfilled partially and the backfill will be capped with an evapotranspiration soil cover. Backfill mitigates adverse impacts of infiltration into groundwaters from the pit. The ET soil cover on the Tigranes-Artavazdes backfill will mitigate ARD formation from the backfill and ARD-impacted water infiltration into groundwaters (by limiting water and oxygen intrusion).

BRSF

To mitigate seepage into groundwaters, the design concept of using a non-acid generating upper volcanic drainage liner on the bottom of Barren Rock Storage Facility, and an underlying low permeability liner will suffice.

Other mitigation measures include subsurface drainage on the perennial pathways beneath BRSF and the toe pond for collecting contact waters, as well as derivation channels. Additional post-closure mitigation measures include ET-cover with NAG barren rocks (UV), and routing contact waters to Passive Treatment System (PTS).

ET soil cover will mitigate ARD formation from potential acid generating barren rocks, and potential seepage of ARD-impacted waters into groundwaters (by limiting water and oxygen intrusion). There will be pores (holes) between PAG rock particles which can allow infiltration.

HLF leachate

Mitigation measures provided by heap leach facility design are appropriate in general. The design includes in-built geomembrane and soil lining system, drainage collection system in the liner, which will route the pregnant leach solution to process pond.

The process pond will have a double composite geomembrane-soil lining system, discharge collection, remediation system. Stormwater events ponds will have a composite geomembrane-soil liner. Closure measures for the HLF include an ET soil cover.

Contact Waters Treatment System

ESIA focuses on and for the mine contact waters recommends only a Passive treatment System (PTS). Two PTSs are proposed: one for the leachate post closure, and the second for BRSF leachate during the operation of the mine and post-closure.

According to ESIA and ARD Management Plan (Geoteam, 2016), in the event if the treatment trials demonstrate that there is a risk the PTS may not meet the required MAC II standards a conventional packaged active water treatment plant will be used.

To make reliable the water resources impacts mitigation measures, in the annex to the Audit Report the expert group suggests 16 mitigation and additional mitigation measures for contingencies, which are presented below:

- To use active treatment system in addition to and/or instead of the passive treatment system proposed for the mine. Treatment processes, techniques and the design must be based on the properly designed and used, tested laboratory and field surveys, indicating completeness of operation and closure conditions, chemicals of concern and pollution sources. Reliable laboratory and field pilot plans and projects must be designed and presented.
- To improve natural soil clay liner design standards, as follows:
 - To increase the liner thickness from 30cm to at least 60-90cm.
 - Define the maximum hydraulic conductivity at $10^{-6} - 10^{-7}$ cm/sec.
 - Use an appropriate compressing equipment using relevant compacting method and power.

- Implement a reliable and comprehensive hydraulic testing plan for construction quality assurance/quality control
- During the operation waters should be permanently pumped off from the pits directing them to contact water ponds thus preventing ARD generation and groundwater seepage
- Add appropriate pH neutralization level and buffering-capable soil/rock in the BRSF and pits backfill
- Envisage appropriate measures for contingencies of pits upon closure
- The following measure(s) for contingencies can be used to control and mitigate ARD seepage and penetration into groundwaters.
 - For the contingencies in the pits place sumps with pumping system and direct the leachate to ARD treatment system to control ARD seepage and penetration into groundwaters.
 - Place emergency wells to remove waters along the perimeter and in the area downstream the pit, and direct the removed groundwaters to ARD treatment system to control potential ARD seepage to groundwaters.
 - Reassess the capacity of ARD treatment system and ponds to accommodate pit contingency pumped waters.

Contingency mitigation measures for contact water ponds and diversion systems

- The current design of the contact water ponds includes freeboard to withstand the 100-year, 24-hour storm in accordance with the requirements of International Finance Corporation. However, considering climate change effects and the high degree of uncertainty in the Project data and models, as well as the seismic risks it is recommended to enlarge the contact water ponds and diversion systems against the 500-year, 24-hour storm event as a contingency mitigation measure (as recommended by Nevada Division of Environmental Protection) (<https://ndep.nv.gov/land/mining/closure/guidance-policies-and-applications>).
- Place a special evapotranspiration closure cover on Erato pit
- Backfill and cover the Arshak pit to mitigate seasonal pond waters formation and seepage
- Design and use a pit and BRSF lining inspection and maintenance plan.
- Use a reliable groundwaters monitoring plan for implementing immediate appropriate response actions and groundwater remediation measures in the Project infrastructure areas.

During the preliminary investigation, the investigating body acting within the scope of his liabilities prescribed by the Criminal Procedure Code of the Republic of Armenia, has collected, checked and evaluated the obtained evidence to reveal all the related circumstances significant for the lawful, substantiated and equitable resolution of the case. All evidences are subject to

scrutiny concerning its relevance, admissibility, and the totality of the evidence obtained is a subject to scrutiny concerning its sufficiency for the determination of the case. Under Article 25 of the Criminal Procedure Code of RA the prosecutor shall assess the evidence independently, relying on their own belief. The Cassation Court of the Republic of Armenia has stated the following legal definition in the non-precedential decision adopted December 2011: "Inner conviction, resulting from the assessment of the obtained evidence, is characterized by an inextricable link between objective and subjective factors, it must, on the one hand, derive from and rely on a sufficient combination of the evidence to be investigated, and on the other hand, must give the impartial observer the confidence that the evidence has been examined in accordance with all requirements of justice. Though the assessment of evidence is based on inner conviction, it cannot be arbitrary. It shall be grounded by a comprehensive, complete, objective examination of the circumstances". The Expert examination/ Due diligence report of this criminal case serves as evidence that has been assessed by the investigating body together with other factual evidence obtained in the process of the preliminary investigation. During the investigation, the complex audit report has not been refuted by any evidence obtained for the criminal case, therefore the conclusions/ considerations of the body conducting the proceeding derive from the above mentioned investigation and other factual data assessed.

Therefore, analyzing and evaluating the evidence collected for the investigation of the criminal case, the investigating body considers that there are no grounds for initiating a criminal prosecution for deliberately concealing by RA MNP officials the information concerning the environment pollution arising from "Lydian Armenia" CJSC's mining operation at the gold bearing quartzite deposit.

Major Cases Investigation Department,
Investigative Committee of the Republic of Armenia