



**KAZAKHSTAN PUBLIC REPORTING ASSOCIATION
ON THE RESULTS, MINERAL RESOURCES AND MINERAL RESERVES**

METHODOLOGICAL RECOMMENDATIONS

**preparation of Reports on the results of geological
exploration, Mineral Resources and Mineral
Reserves in accordance with the KAZRC Code as
amended in 2022**

November 2022

PREFACE

The Methodological Recommendations are published during the reform of control over geological exploration work in the conditions of market relations in the Republic of Kazakhstan. During this period, the state transfers the functions of quality control over geological exploration work, audit of Mineral Resources/Reserves* of deposits and reports on them to professional societies, in particular PONEN. The functions of PONEN include control over compliance with the KAZRC principles when auditing and writing reports by Competent Persons.

Over the past two years, PONEN experts have conducted about 50 control examinations of reports. They have established that more than half of the reports of Competent Persons were completed with violations of the KAZRC Code. The reasons for these violations are different, but they have one common reason - the lack of practical experience in conducting audits and writing reports in compliance with the KAZRC principles among Competent Persons.

These Guidelines have been prepared to fill this gap and are a list of generally accepted rules and recommendations for Competent Persons when preparing reports. Most of them are based on experience in preparing reports on JORC standards and, to a lesser extent, CIM GUIDELINES NI 43-101.

Authors:

I.I. Ussoltsev, MPONEN, MAIG, PhD

A.I.Daraev, FPONEN, MAIG

V.A. Borisenko

Reviewers:

G.G. Freiman, FPONEN, FAIG, PhD

P.A.Mukhin, FPONEN, FAIG, PhD

N.V.Enshin, FPONEN

A.A.Kuznetsov, MPONEN, MAIG

*- the term "Mineral Reserves" in the definition of the KAZRC Code, in order to avoid misunderstandings with the existing "reserves" according to the GKZ standard, also mentioned in this document. In such a case, the text always refers to the reserves according to the GKZ standard.

TABLE OF CONTENTS

PREFACE	2
METHODOLOGICAL RECOMMENDATIONS for the preparation of Reports on the results of geological exploration, Mineral Resources and Mineral Reserves according to KAZRC standards	7
PROJECT SUMMARY	8
1 INTRODUCTORY INFORMATION	8
2 DESCRIPTION OF THE SUBSOIL USE OBJECT AND LOCATION	8
3 STORY	8
4 GEOLOGY AND MINERALIZATION	8
5 STAGE OF STUDY	8
6 MINERAL RESOURCES ASSESSMENT	8
7 TECHNICALLYE RESEARCH WITH EVALUATION MODIFYING FACTORS	8
8 RESERVE ASSESSMENT	8
9 RECOMMENDATIONS	8
1 INTRODUCTION	10
1.1 Basic information on the project, data of the subsoil user	10
1.2 Technical assignment/Composition and scope of work.....	10
1.3 Sources of information.....	10
1.4 Site visit or participation in field work by a Competent Person	10
1.5 Relying on other experts	10
1.6 Limitations, Declaration, Permissions, Copyrights and Explanations	11
1.6.1 Declaration	11
1.6.2 Copyright	11
1.6.3 Legal support	11
1.7 Consultant qualifications	11
1.7.1 General information	11
1.7.2 Responsible for preparing the report.....	11
2 PROJECT STRUCTURE	11
2.1 Description of the subsoil use object.....	11
3 ACCESSIBILITY, GEOGRAPHY, CLIMATE, LOCAL RESOURCES AND INFRASTRUCTURE	12
3.1 Topography, relief	12
3.2 Climate.....	12
3.3 Hydrographic network	12
3.4 Fauna and flora	12
3.5 Access, proximity to populated areas	12
3.6 General infrastructure.....	12
3.7 Labor resources	13
4 HISTORY OF THE PROJECT DEVELOPMENT	13
4.1 Previous subsoil users.....	13
4.2 Previously completed geological exploration work	13
4.3 Previously completed Mineral Resource/Reserve estimates (or estimates reserves according to the State Reserves Committee standard) of minerals.....	13
4.4 History of development	13

5	 GEOLOGICAL STRUCTURE, MINERALIZATION AND TYPE OF DEPOSITS	13
5.1	Type of mineralization.....	13
5.2	The location of the deposit in the geological structures of the region.....	14
5.3	Geological structure of the deposit.....	14
5.4	Nature and control of mineralization.....	14
5.4.1	Characteristics of ore zones/bodies of the deposit	15
5.4.2	Tectonics, ore-controlling structures	15
6	 GEOLOGICAL EXPLORATION DATA.....	15
6.1	Introduction	15
6.2	Topographic and mine surveying principles.....	15
6.3	Search work	16
6.4	Geological exploration.....	16
6.4.1	Geophysical research	16
6.4.2	Drilling	16
6.4.3	GIS (Logging).....	16
6.4.4	Mining operations.....	18
6.4.5	Core Documentation Procedures	17
6.4.6	Testing.....	17
6.4.7	Sample preparation	17
6.4.8	Laboratory tests	18
6.5	Quality control(QAQC) geological exploration	18
6.6	Database.....	19
6.7	Hydrogeological works	19
6.8	Engineering and geological surveys.....	19
6.9	Study of bulk density and moisture content	19
6.10	Technological research.....	19
6.11	Environmental research.....	19
6.12	Exploration data assurance, audits and reviews	20
7	 ASSESSMENT AND MINERAL RESOURCES.....	20
7.1	Methods of assessment and modeling	20
7.2.	Intelligence Database	21
7.3	Geological model.....	21
7.4.	Modeling mineralization and surfaces	21
7.5	Creating Composite Intervals	22
7.6	Statistical analysis.....	22
7.6.1	Summary statistics	22
7.6.2	Definition (limitation) of outstanding contents	22
7.7	Variographic analysis	23
7.8	Determination of volumetric weight	23
7.9	Block modeling.....	23
7.9.1	Model building and parameters.....	23
7.10	Model verification	23
7.11	Classification Mineral resources and criteria	23
7.12	Quarry optimization.....	26
7.13	Report on Mineral resources.....	26
7.14	Tonnage-grade charts.....	26
7.15	Comparison of Mineral Resources presented in the Report with reserves listed on the State Balance Sheet of the Republic of Kazakhstan.....	26
8	 TECHNICAL RESEARCH	29
8.1	Introduction.....	29

8.2	Engineering and geological research	30
8.3	Hydrogeological research	31
8.4	Development design and production schedule	32
8.4.1	Dilution modeling	32
8.4.2	Geotechnical parameters of the quarry	32
8.4.3	Quarry optimization	32
8.4.4	Selecting a quarry shell.....	33
8.4.5	Development System	33
8.4.6	Quarry operating mode and productivity	33
8.4.7	Mine planning	34
8.4.8	Composition of technological equipment	35
8.4.9	Drilling and blasting operations.....	35
8.4.10	Water drainage	35
8.4.11	Dumping	36
8.4.12	Stability of rock dump slopes	36
8.4.13	Mine infrastructure	36
8.5	Metallurgical research (processing/beneficiation).....	36
8.5.1	Historical data	36
8.5.2	Processing technology	38
8.5.3	Metallurgical Extractions.....	38
8.5.4	Technological regulations.....	38
8.6	Environmental research.....	39
8.6.1	Flora and fauna	39
8.6.2	Environmental and Social Impact Assessment.....	39
8.7	Closure and reclamation	40
8.8	Legal and Permitting Issues.....	40
8.9	Economic criteria.....	40
8.9.1	Scope of application of EO.....	41
8.9.2	Initial data for economic assessment	42
8.9.3	Categories of mineral objects	42
8.9.4	EO Methods	42
8.9.5	Use of Mineral Resources and Mineral Reserves when evaluating	43
8.9.6	Evaluation of Prospective Mineral Resources, Exploration Targets and Ore Occurrences	43
8.9.7	Basic parameters of EO	44
8.9.8	Income approach.....	44
8.9.9	Discounted Cash Flow (DCF) Method	45
8.9.10	Final value of fixed assets.....	46
8.9.11	Discount rate	46
8.9.12	Depreciation.....	48
8.9.13	Approach to the formation of a deterministic model.....	48
8.9.14	Performance Definition	49
8.9.15	Commodity products. Market analysis	49
8.9.16	Capital expenditures	50
8.9.17	Assessment methods used.....	51
8.9.18	Operating costs	52
8.9.19	Project implementation.....	52
8.9.20	Economic model	53
9	ASSESSMENT OF MINERAL RESERVES	55
10	RISKS, OPPORTUNITIES AND FUTURE WORK	55

11 CONCLUSIONS AND RECOMMENDATIONS	56
12. References, reports of predecessors	57
APPLICATIONS	58
APPLICATIONA - Glossary	58
APPLICATIONB - List of abbreviations	58
APPLICATIONB - Units of measurement	58
APPENDIX G: Geostatistics: Semivariograms	58
APPENDIX D: Quality Assurance and Quality Control of Analytical Work (“QA/QC”)	58
Appendix 1-D: List of laboratory equipment.....	59
Appendix 2-D: Certificate of assessment of the state of measurements in the laboratory as of _____.....	59
Appendix 3-D List of used standard samples (co).....	59
APPENDIX E: Data from analytical studies (tabular appendices)	59
APPENDIX G: FINANCIAL AND ECONOMIC MODEL	59
TABLE #1	59
COMPETENT PERSON CERTIFICATE (Appendix 2 to the 2021 version of the KAZRC Code).	59
List of sources	61
APPENDIX 1 - NOTES TO THE TABLE OF CONTENTS OF THE MINERAL RESOURCES/RESERVES ESTIMATE REPORT	62
APPENDIX 2 - Minimum Contents of a Mineral Resource and Reserve Report in accordance with KAZRC	65
APPENDIX 3 - TABLE 1 VERSION 2016 for filling and Referrals in the Report	71
APPENDIX 4 - Table 1 is used as a checklist for preparing the Report	84
APPENDIX 5 – Terms of Reference for the Development of a Mineral Resource Assessment Report	98
APPENDIX 6 – Terms of Reference for the Development of a Mineral Resource and/or Mineral Reserve Assessment Report	101
APPENDIX 7 – Terms of Reference for the Development of a Report on the Results of Geological Exploration Work	107

METHODOLOGICAL RECOMMENDATIONS

for the preparation of Reports on the results of geological exploration, Mineral Resources and Mineral Reserves according to KAZRC standards.

According to the KAZRC Code, Article 4:

*4. **Public Reports**— are reports prepared for informing investors or potential investors and their advisers about Exploration Results, Mineral Resources and Mineral Reserves. They include, but are not limited to, annual and quarterly company reports, press releases, information memoranda, technical documents, website announcements and public speeches.*

The KAZRC also applies to any reports that have been prepared for the purposes described in section 4, such as environmental reports, information notes, expert reports, and technical papers relating to Exploration Results, Mineral Resources and Mineral Reserves. These reports may also be prepared for the purposes of complying with government regulations in Kazakhstan.

In accordance with the KAZRC code, Competent Persons (hereinafter referred to as CPs) who are members of PONEN or foreign professional organizations recognized by CRIRSCO must prepare reports.

The requirements for the content of the report are determined by the KAZRC Code. The Competent Person and the management of the customer company for which and based on whose materials the report was prepared are responsible for the content of the report.

If the Competent Person acts not individually, but on behalf of the company (in which the specialist works), the report is signed by the head of the developer company in addition to the Competent Person. In this case, responsibility for the content of the report also rests with the management of the company that prepared the report.

The developed report content contains the main types of data that should be presented in the reports on the Results of Geological Exploration Works, Mineral Resources and Mineral Reserves and is divided into the main blocks: 1) Brief summary of the project, 2) Information on the deposit (sections 1-5), 3) Results of the work performed (section 6), 4) Estimate of Mineral Resources (section 7), Modifying Factors (section 8), Estimate of Mineral Reserves with sufficiency of Modifying Factors (section 9), risk analysis, conclusions and recommendations (sections 10-11).

Title page: includes the title of the report; the general location of the mineral resource project; the name and professional affiliation of each Competent Person and the effective date of the report.

Page with date and signature: The report must contain a signature page at the beginning or end of the report. The signature page must indicate the actual date and the date the report was signed.

Content: Prepare a table of contents listing the contents of the report, including figures and tables.

Illustrations: The report shall contain illustrations in the form of legible maps, plans and sections; all of which shall be prepared to an adequate scale so that important features can be distinguished. Maps shall be dated, shall contain legends, an indication of the author and source of information, a scale in the form of a ruler or grid, and an arrow pointing north. All reports

shall be accompanied by a map of the work area or an overview map and a summary map showing the general geology of the property. In addition, all reports shall include more detailed maps showing all important relief features within the property boundaries described in the text, including but not limited to:

- (a) Previous and historical exploration sites, locations of known mineralization, geochemical or geophysical anomalies, drilling and mineral deposits for exploration stage projects;
- (b) The location and surface delineation of mineral resources, mineral reserves and, to the extent known, areas of potential exploitation and infrastructure for areas at a more advanced stage but not at the development or production stage; and
- (c) The location of the open pit or underground working boundaries, processing areas, tailings storage facilities, waste dumps and all significant infrastructure facilities for areas at the development and production stage.

Where information from other sources is used in preparing maps, figures and diagrams, the source of the information should be disclosed. Where adjacent or neighbouring subsurface properties have a significant influence on the potential of the subject property, the location of the properties and any relevant mineralised structures discussed in the report should be shown in relation to the subject property.

INSTRUCTIONS: Select and simplify illustrations so that they are legible and suitable for electronic presentation. For ease of use, consider inserting illustrations into the text of the report in relative proximity to the text they illustrate.

This Methodological Guide presents the main chapters that should be in any report regardless of the project stage. If these chapters do not correspond to the work performed, the corresponding sections briefly provide information about the absence of information on the section at this stage of research. If a section or subsection of the standard report composition does not correspond to the nature of the report (stage of work), it is sufficient to write "not applicable" after the section name.

BRIEF SUMMARY OF THE REPORT

It is compiled in brief form and contains the key points of the work performed and the main conclusions and recommendations of the Competent Person. It is recommended to limit it to two pages signed by the Responsible Executor and the CL. Contains the following subsections:

- 1 INTRODUCTORY INFORMATION**
- 2 DESCRIPTION OF THE SUBSOIL USE OBJECT AND LOCATION**
- 3 STORY**
- 4 GEOLOGY AND MINERALIZATION**
- 5 STAGE OF STUDY**
- 6 MINERAL RESOURCES ASSESSMENT**
- 7 RESULTS OF TECHNICAL STUDIES WITH ASSESSMENT OF MODIFYING FACTORS**
- 8 GRADEMINERAL RESERVES**
- 9 RECOMMENDATIONS**

The permanent requirements for the report are: a clear presentation of the results of the work, verifiability of measurements and calculations, validity of conclusions and recommendations, eliminating the possibility of ambiguous interpretation.

The report must demonstrate a complete study of all issues affecting the assessment of the property. At the same time, it is recommended to avoid lengthy descriptions,

unnecessary information, and inappropriate detail. Conciseness and clarity of presentation are welcome.

The Summary of the Report should briefly reflect the content of the report.

The text of the Abstract is presented in a coherent sequence and should at least reflect the following aspects:

- 1) research object, information on the current Contract/License, information on the contract holder/licensee, administrative and geographical location of the research object;
- 2) an explanation of the purpose of preparing the Report, whether it contains information about the entire object or part of it, indicating the current date of the Report and the remaining (further planned) work;
- 3) tasks solved during geological exploration work, assessment of the quality of initial geological data;
- 4) work methodology, information about the geological model of the research object;
- 5) results of work, reports on Mineral Resources and/or mineral reserves;
- 6) recommendations for using the conclusions.

Optimally, the Summary of Exploration Results, Mineral Resources or Reserves Report is structured into sections and chapters, based on the conclusions included at the end of each chapter in the main text.

The introductory information discloses the name of the research object, information on the current Contract/License, information on the contract holder/licensee, and other information on subsoil use.

The location of the research object is indicated in accordance with administrative and geographic affiliation (nomenclature of sheets of scale 1:200,000 and larger). It is necessary to indicate the name of the coordinate system used (it is recommended to use the international WGS 1984 system).

When describing the results of the work, it is necessary to provide an assessment of the quality of the initial geological data and their possibility of use for subsequent audit, describe the geological model of the research object and the methodology of the work, listing the types and volumes of work performed.

Provide the results of the calculation of Mineral Resources/Mineral Reserves in tabular form.

Provide recommendations for using the findings of the report's authors.

MAIN PART

1. INTRODUCTION

1.1 Basic information on the project, data of the subsoil user.

In brief form, the most important information on the project and the report. Legal and physical information on the subsoil user is provided.

1.2 Technical assignment/Composition and scope of work

The technical assignment for the performance of work contains a description of the composition and scope of research. The technical (geological) assignment must contain precise information about the approved deadlines for the implementation of the work, the stages of its implementation, the goals pursued and the tasks to be solved. It is necessary to indicate who issued the assignment for the research, and to characterize the materials on which the work is based.

1.3 Sources of information

A short list of information on which the report is based shows not only the degree of exploration of the deposit/site, but also provides information on the work carried out and the availability of official documents showing the exploration of the object. Here it is worth indicating all the documents provided by the subsoil user, including financial models, production plans, process diagrams, etc. Usually consists of sections: Stock reports and Published data.

1.4 Site visit or participation in field work by a Competent Person

A visit to a deposit or work site is conducted to verify the presence of this deposit in the coordinates of the issued license, geological and mining allotments. During the visit, the Competent Person checks the coordinates of quarries, mineralization, wells (selectively), the presence of infrastructure, mining equipment, production facilities and confirms their correctness.

The core storage facility is visited to check the storage conditions of the core/samples, to check the quality of sampling, to familiarize oneself with the type of ores and host rocks, and to check the availability of duplicates for control sampling.

A visit to the laboratory allows you to check the conditions of sample preparation, the equipment used, the analysis methods, the quality control of laboratory work and to identify weak points that could affect the accuracy and reliability of the sample analysis results.

Personal contact with geologists and mining foremen during the visit allows you to quickly get answers to any questions that arise and get a realistic picture of the quality of the work.

1.5 Relying on other experts

A competent person who prepares or directs the preparation of all or part of a report may include a limited disclaimer if:

- (a) The Competent Person relies on a report, opinion or report of another expert who is not a qualified person, or on information provided by the issuer on legal, political, environmental or tax matters relevant to the report, and the Competent Person indicates:
 - (i) the date, title and author of the report, examination or opinion;
 - (ii) the qualifications of the author of the other report and why it is appropriate for the Competent Person to rely on the results of that report;

- (iii) any material risks associated with valuation or pricing; and
 - (iv) all steps taken by the Competent Person to verify the information provided.
- (b) The Competent Person is not an expert on all the issues covered by the report. In this case, the Competent Person will establish a panel of one or more competent persons on the relevant issues. The Competent Person remains fully responsible for the entire report. The Competent Person shall disclose:
- (i) the qualifications of another expert and provide a copy of his certificate;
 - (ii) any significant risks associated with engaging an additional expert;

1.6 Limitations, Declaration, Permissions, Copyrights and Explanations

1.6.1 Declaration

This section discloses the presence or absence of a connection between the Mineral Resources assessment contractor and the subsoil user company, which must be clearly and unambiguously stated.

1.6.2 Copyright

The copyright to geological and other information and the results of the assessment usually belongs to the subsoil user company and is used by it or the contractor to assess the Mineral Resources/Reserves. If the rights to the information and results belong to someone other than the client of the report, this information should be reflected in this section.

1.6.3 Legal support

If the report performer has checked the rights of the company that ordered the report for a license/contract, existing production facilities, buildings, equipment, etc., this information should be reflected in this section. If the check was not carried out, this should also be indicated.

1.7 Qualifications of consultants

1.7.1 General information

The experience of the team (company) that prepared the Mineral Resources/Reserves estimate is described; experience in this type of mineral resource must be reflected.

1.7.2 Responsible for preparing the report

The list of performers must contain the names of all performers who took creative part in the work (responsible for preparing the report by chapters). The names in the list are arranged in the order determined by the Responsible Performer (Competent Person), whose name is written first.

It is important to remember that the Competent Person (Responsible Executive) is responsible for the accuracy of the data contained in the report.

The name of the organization and the names of the specialists who provided assistance or advice to the performers must be indicated.

2 STRUCTUREPROJECT

2.1 Description of the subsoil use object

General requirements for the structure of the report are defined in sections of Table No. 1 of the Kazakhstan Code of Public Reporting on the Results of Geological Exploration Work, Mineral Resources and Mineral Reserves (KAZRC Code).

The specific structure and content of the report are determined mainly by the level of study of the research object.

The description of a subsoil use object implies the content of such information as:

- 1) its name, type of mineral (minerals), industrial type of mineralization;
- 2) Description of the location of the license area: its administrative and geographical reference, including a list of nomenclature sheets for the location of license areas of various scales.
- 3) Details of the contract/license, addendums, and validity periods in chronological order, giving an idea of the current status and obligations of the subsoil user. The nature and extent of the issuer's right of ownership or share in the site, including rights to land, legal access, obligations that must be satisfied to maintain ownership, and the expiration date of allotments, licenses, or other rights of ownership of the site;
- 4) Terms of royalties (or other basic taxes of subsoil users), the right to restore the original share, payments or other agreements and encumbrances in relation to the subsoil plot;
- 5) Obligations for environmental protection activities in relation to the site;
- 6) The permits that must be obtained to carry out the work proposed on the site and whether the permits have been obtained; and
- 7) Any material factors and risks that may affect the availability, ownership or right, or ability to perform the works.

3 ACCESSIBILITY, GEOGRAPHY, CLIMATE, LOCAL RESOURCES AND INFRASTRUCTURE

3.1 Topography, relief

The characteristics of the terrain and relief that affect the accessibility of individual parts of the territory, suitability for the construction of temporary and permanent structures are given. The possibility of flooding, mudflows and landslides is indicated. The nature of the exposure is described, absolute marks and relative elevations are indicated.

3.2 Climate

The seasonal and climatic characteristics of the work area are described, maximum, minimum and average seasonal temperatures and precipitation are indicated. Possible stoppages of the mining process due to adverse weather conditions (storm winds, extreme heat or cold) are discussed.

3.3 Hydrographic network

The existing hydrographic network, the degree of its development and seasonal behavior (floods, inundations, ice drifts and drying out) are described. The available sources of domestic, drinking and technical water supply are characterized.

3.4 Fauna and flora

The animal and plant world is described, with special attention paid to species listed in the Red Book. The possibility of using individual plants in the production process by humans is indicated.

3.5 Access, proximity to populated areas.

Provides information on the nearest settlements and their accessibility depending on the state of the roads and the season. Briefly describes the administrative and economic importance of settlements, the availability of government services and services.

3.6 General infrastructure

The types of infrastructure in the work area are listed. Electrical networks, gas and oil pipelines, railways and highways, river and sea highways are described separately.

Information on communication lines, communication networks and the Internet is provided.

Other deposits in the area are briefly described. In case of special significance of the problem, the seismic and ecological situation in the area is described.

3.7. Labor resources.

The local population is characterized, the number and types of economic activity are given. The possibility of using local labor is indicated.

4 HISTORY OF THE PROJECT DEVELOPMENT

4.1 Previous subsoil users

The history of subsoil use is given, the periods and types of subsoil use, previous subsoil users, when and how the current subsoil user received rights to the site/deposit are indicated.

4.2 Previously completed geological exploration work

The history of the project development involves a review and analysis of previously conducted studies. Brief information is provided on the history of discovery, study, exploration and development of the deposit.

An analytical review of previously performed geological exploration work at the site reveals the degree of study of the site (geological, geochemical, geophysical, hydrogeological, engineering-geological, geological-ecological, etc.). The text is accompanied by maps of the study. At the end of the section, a conclusion is given on the suitability/unsuitability of previously obtained data for the purposes of this report.

4.3 Previously completed estimates of mineral resources/reserves or reserve estimates (according to the State Reserves Committee standard) of minerals

Information on previously made assessments of the object, approval of Mineral Resources/Reserves (dates) is disclosed, and the numbers of the protocols of previous examinations of reserves by state expert bodies, if any).

The recommendations given by the state expert bodies during the previous approval of reserves/conditions for the deposit under consideration, or the recommendations of previous researchers are provided, an assessment of their relevance and information on their implementation is given.

4.4 History of development

For the developed objects, the current state of Mineral Resources/Reserves is reflected on the date of the submitted Report and approved during the last review. In addition, data on the movement of Mineral Resources/Reserves at the developed object are provided: the amount mined, additionally explored, written off as unconfirmed, etc.

INSTRUCTIONS: If the report includes work that was performed outside the current site boundaries, clearly distinguish between that work and work performed on the site that is the subject of the report.

5 GEOLOGICAL STRUCTURE, MINERALIZATION AND TYPE OF DEPOSITS

5.1 Type of mineralization

The type of deposit is indicated and its geological and commercial features are briefly described.

5.2 The location of the deposit in the geological structures of the region

The description of the geological structure of the research object is given in accordance with a certain plan.

Information is provided on the geological structure of the region, the position of the explored deposit in the general geological structure of the region is reflected, including a description of the stratigraphy, characteristics of intrusive formations, tectonic features of the region, distribution of minerals, as well as prospects for identifying new deposits.

The subsection is illustrated by regional maps at a scale of 1:200000 – 1:50000 indicating the location of the deposit in the main regional structures.

5.3 Geological structure of the deposit

The characteristics of the deposit itself, its boundaries, structural, lithological and other factors determining the conditions of occurrence, morphology of mineralization and quality of the mineral are given; the geological and industrial type is characterized and ideas about the genesis of the deposit are discussed; the geometry of mineralized bodies, their distribution across the sections of the deposit.

The features of forms and structure are given – conditions of occurrence, nature of wedging, variability of parameters of mineralized bodies (thickness, length, width, angles of dip); validity of their coordination along the strike and dip by geological, geophysical and other data; patterns of distribution of main, associated components and harmful impurities; presence and features of placement of enriched areas (including "ore pillars") and empty layers in mineral bodies, possibility of their geometrization; determination of karstification of mineral.

For deposits, the assessment of which is carried out using the ore-bearing coefficient, an assessment is made of the spatial position, typical shapes and sizes of areas of commercial minerals and a justification for the possibility of their selective development.

For placer deposits, the characteristics of geomorphological (paleogeomorphological) features of the placer localization are given: its shape, size, structure, and bedding conditions are described; the composition and thickness of productive layers, peats, and the structure of the raft; the content of valuable components in sands, peats, and in the rocks of the raft; the size, shape, and degree of roundness of grains of useful minerals; the content of useful components in the mineral or the fineness of gold; grain composition, boulder content, clay content, and water content of sands and peats.

In the event that previous ideas about the geological structure of a deposit change in accordance with information obtained as a result of ongoing geological exploration work, the newly adopted concept must be sufficiently substantiated and clearly reflect the latest interpretation.

Information on the geological structure and mineralization of the deposit must be sufficiently illustrated by sections, maps, diagrams, and plans.

5.4 Nature and control of mineralization

A description of the ore-bearing complexes is given, zoning and associated types of mineralization are described - oxidized, mixed, sulphide ores, subzones are described if available, the main complexes are illustrated with photographs of outcrops or borehole cores, each type of ore and host rocks is described by mineral and chemical composition.

For each type of mineralization, if necessary, there may be separate sections of the report that are not reflected in this instruction for a more complete presentation of information and its better understanding.

5.4.1 Characteristic mineralized zones / deposit bodies

In the case of the presence of oxidized mineralized bodies at the deposit, they are characterized separately from the primary mineralized bodies. Their description is carried out according to the standard list of features (shape, volume, orientation, mineralogical composition, harmful impurities and physical properties). Here, bodies of mixed (semi-oxidized) composition can also be described in the case of their significant development in terms of volume.

The description of primary mineralized bodies is carried out according to generally accepted methods.

5.4.2 Tectonics, ore-controlling structures

If mineralization at a deposit is controlled by folded or faulted structures, or both, these can be included in a separate subsection of the text as important ore-controlling factors.

6 GEOLOGICAL EXPLORATION DATA**6.1 Introduction**

The methodological part of the Competent Person's Report contains a description of the conditions and methods of the types of work actually performed. Specific requirements for the performance of certain geological exploration works are in turn determined by the types of research used and the scale of the work.

The chapter includes, but is not limited to, the following information:

- 1) stages of exploration of the deposit, exploration depth, types and volumes of geological exploration work performed (in tabular form);
- 2) a method for studying the surface and, if available, deep horizons of a deposit, the purpose, system of arrangement and orientation of mining, if available underground, workings (horizontal, vertical, inclined), tracing and intersecting mineral bodies.

The paper provides a rationale for the adopted geometry and density of the workings network for various categories of Mineral Resources/Reserves. It shows how it depends on the geological features of the deposit: the conditions of occurrence, size and material composition of mineral bodies, and the nature of the distribution of useful components in them. Completeness of intersection of mineral bodies and their study along the strike and dip; applied exploration equipment; comparability of results based on data from various exploration equipment. The degree of exploration of the deposit sections and analysis of their readiness for priority development.

The introductory part must include a summary table of all types and volumes of geological exploration work by stages of work and in total. This table must be verified with the table of types and volumes of samples used in the assessment of Mineral Resources/Reserves, given in the relevant section below.

The section should provide the most complete information possible on the various types of work carried out, the results of which may affect the assessment of Mineral Resources/Reserves.

6.2 Topographic and mine surveying principles

Topographic and surveying bases, time of survey, coordinate system and methods of instrumental binding of exploration workings and boreholes to the reference network. The topographic network, its quality and reliability should be assessed by the Competent Person and a conclusion made on the suitability of the topographic base for the estimation of Mineral Resources/Reserves and how it may affect the category of Mineral

Resources/Reserves. Only international coordinate systems should be used for public reporting.

6.3 Search work

The requirements for grid density and reliability of geological data at the prospecting stage are usually lower than at the exploration and evaluation stage of Mineral Resources, which should be reflected in this subsection. The results achieved should be assessed by the Competent Person in terms of their possibility of further use in the evaluation of Mineral Resources/Reserves.

The types and volumes of work by type and the results achieved are described.

Quality Assurance Quality Control (QAQC) is provided in Section 6.5.

6.4 Geological exploration

6.4.1 Geophysical research

Description of the conducted geophysical surveys. A list of geological problems solved using geophysical survey methods is provided. Justification of the set of methods used. Summary data on the volumes of all types of surveys; the degree of study of the deposit area by geophysical methods; the number of boreholes and mine workings covered by geophysical surveys (total, including those involved in the assessment of Mineral Resources); verification of geophysical survey data by drilling or mine workings, volumes and results of verification; assessment of the reliability of interpretation methods and the authenticity of geophysical results; errors in determining contacts, thickness, depth of occurrence of mineral bodies, content of useful components and harmful impurities, as well as other parameters in comparison with geological data.

6.4.2 Drilling

Purpose, depth, diameter of boreholes, drilling methods; curvature of borehole shafts, measurement results and their assessment; condition of borehole core, its linear, weight, volumetric yield (cuttings yield) - average for the mineral resource and for the host rocks, limits of core yield variations (in tabular form). Monitoring of core (cuttings) yield, volume, assessment of representativeness by quantity and quality of material. Percentage of boreholes (intervals) with low core or cuttings yield, their impact on the reliability of the estimated Mineral Resources/Reserves; results of the study of selective abrasion and representativeness of the core, assessment of the reliability of the data obtained; number of intersections of mineral bodies at an acute angle (less than 30°), justification of the possibility of using the obtained data in assessing Mineral Resources/Reserves.

Methodologically, it is recommended to carry out the work in accordance with Recommendations R001-22 “Drilling”.

The types of drilling are described separately with the corresponding subsections (RC drilling, RAB, GGC, Diamond core drilling, etc.).

Each type of drilling must be accompanied by photographs from the drilling sites, indicating the dates, which show the conditions of the work.

This subsection also provides information on geological quality control of drilling by verification in a more representative way (another type of drilling, mine workings with comparison of sampling intervals and graphs of comparison of borehole logs or mine workings).

6.4.3 GIS (Logging)

Application of geophysical methods for determining the content of components in mine workings and boreholes; scope of work; results of control by geological methods; information on the approval of the methods used by competent organizations.

6.4.4 Mining operations

The excavation of trenches, shafts, furrows, and underground mine workings is described in stages of work, while the methodical execution of work is recommended to be carried out in accordance with Recommendation R001-22 “Mining Works”.

6.4.5 Core Documentation Procedures

A description of the core documentation methodology is provided, with the applied documentation forms, lists of lithological codes, coding of mineralization types, secondary changes, etc.

The photo documentation data of the core is provided with typical photographs attached. Usually the borehole core is photographed before and after sawing, which allows checking for errors if the core was mixed up and restoring its original location. Also, the core photographs are taken in dry and wet form for ease of documentation.

The data are presented for each period of geological exploration work separately.

Core documentation procedures are regulated in accordance with Recommendation P003-22 "Geological Documentation".

6.4.6 Testing

Justification of the adopted methodology for sampling minerals. Methods (geological, geophysical), techniques (core, slurry, channel and others) and sampling volumes, including the number of samples used in the assessment of Mineral Resources/Reserves. Location of samples in mine workings, section length and channel cross-section, distance between sampled faces. Sampling quality; completeness of sampling by thickness; sampling of host rocks; control over compliance with the sample cross-section and mass; ratio of theoretical and actual sample weights; volume and regularity of control sampling; assessment of random errors in determining grades and thicknesses for different methods and techniques of sampling (for a sample and an interval).

Group samples, methods of their compilation, their total number, including those participating in the assessment of Mineral Resources/Reserves; control over the correct compilation of group samples; the specific weight of mineral intervals characterized by group samples; uniformity of their coverage of mineral bodies by area and section.

Sampling procedures are governed by Recommendation P004-22 "Sampling".

The subsection is accompanied by photographs from the work site, reflecting the methodology of excavation, marking, geological documentation, testing with the date indicated.

6.4.7 Sample preparation

Justification of the sample processing scheme. Quality control of processing, its volume, regularity, results (including control of reduction products, duplicates). Random errors in sample processing, conclusions about the quality of processing.

The sampling procedure is regulated by Recommendations R005-22 “Sample Preparation”.

The subsection is accompanied by photographs of the sample preparation module, taken during a visit to the laboratory by a Competent Person, reflecting the equipment used, the sample preparation method, the documentation (regulations) existing in the laboratory, with the date indicated.

The dates of verification of measuring instruments (scales, etc.) are also given.

The subsection provides a sample preparation scheme for each type of sample; if different sample preparation schemes were used in different periods of the study of the object, it is necessary to provide them all by period.

6.4.8 Laboratory tests

Analytical works: volumes and methods of conducting the main, control and arbitration (if any) analyses, indicating the laboratories that performed them. Conformity of the methods of conducting analyses to current standards. Results of processing the control data of analyses. Periods within which the quality of analytical works was unsatisfactory. Analysis of the reasons for the unsatisfactory quality of analyses, the results of their elimination, and an assessment of their impact on the reliability of Mineral Resources/Reserves.

The laboratory work procedure is regulated by Recommendations R006-22 “Laboratory Work”.

The subsection is accompanied by photographs of laboratory equipment taken during a visit to the laboratory by a Competent Person, reflecting the analysis methodology, existing documentation (regulations) in the laboratory, with the date indicated.

Laboratory accreditation certificates and dates of verification of measuring instruments are also provided (they can be provided in Appendices to the Mineral Resources/Reserves Assessment Report).

6.5 Quality control QAQC of geological exploration works

Data verification: Describe the steps taken by the Competent Person to verify the data in the report, including:

- (a) the procedure for verification of data by the Competent Person;
- (b) any limitations or impossibility of carrying out such verification and the reasons for any such limitations or impossibility; and
- (c) the Competent Person's opinion on the sufficiency of the data for use in the report.

The analysis of quality control results is provided for periods of geological exploration work and laboratories in which analyses were carried out separately; each laboratory is monitored in each individual period of analytical work.

Validity assessment of core and trench sampling. Quality control (QA/QC) procedures for field sampling procedures: frequency of adding blanks, duplicates, reference samples (CRM), process of checking the results of analyses, etc.

In this case, if quality control was not carried out in accordance with international standards (according to the USSR methods such as NSAM) during historical periods, such results are also provided in this section, and the Competent Person must make an informed decision on which data from the historical ones can be used in the assessment of Mineral Resources/Reserves and under what conditions (re-analysis of part of the existing core or laboratory samples with a full set of quality control in accordance with KAZRC in an accredited laboratory, verification re-drilling/re-sampling of part of the data with analysis in an accredited laboratory in accordance with KAZRC or other options at the discretion of the Competent Person).

The quality control procedure is regulated by Recommendations P007-22 “Quality Control QAQC for Geological Exploration Works”.

6.6 Database

The creation of a database is an important stage of work for the preparation of the Mineral Resources assessment, the section covers the procedure for creating a database, provides forms in accordance with the generally accepted structure according to Recommendations R008-22 "Database".

Information on the database checks performed and the errors corrected is provided.

6.7 Hydrogeological works

The methodology and volumes of hydrogeological studies carried out, data on the contractor (if any) that carried out the work, the type of observations, drilling, pumping, etc. are provided.

The quality control procedure is regulated by Recommendations R011-22 "Hydrogeological Studies".

6.8 Engineering and geological surveys

The methodology and volumes of engineering and geological studies carried out both in the process of geological exploration (core documentation, sampling for tests, laboratory test results, etc.) and specialized geotechnical works (drilling geotechnical wells, wells with oriented core, etc.) are presented.

The procedure for geotechnical investigations is regulated by Recommendations R012-22 "Geotechnical investigations".

6.9 Study of bulk density and moisture content

The study of the bulk density of ores and host rocks directly affects the final figures of Mineral Resources/Metal Reserves and the mining parameters of the quarry/underground mine, so this parameter should be given special attention. During geological exploration, it is necessary to approach the determination of the bulk density of each rock and ore type in a differentiated manner, including oxidized, mixed and sulphide ore. This section describes the sampling and measurement methodology, the number of each type of sample and the conclusion of the Competent Person of sufficiency for confidently determining the bulk density and moisture content for subsequent assessment.

Methods for determining bulk density for different types of minerals (by samples, pillars or geophysical methods). Results of comparison, in case of obtaining data by different methods. Assessment of the influence of the chemical and mineralogical composition of the mineral, fracturing and karstification on the value of bulk density; its determination by the regression equation; substantiation of the values of bulk density adopted for the assessment of Mineral Resources/Reserves; number and results of determining the natural moisture content of the mineral, taking their results into account when calculating the bulk density.

6.10 Technological research

The methodology and volumes of technological testing are described separately for each technological type of ore; it is recommended to provide summary information in tabular form with the division of studies by exploration periods, analytical laboratories and ore types.

6.11 Environmental research

Environmental studies must be conducted in the amount required by the legislation of the Republic of Kazakhstan for the preparation of the Environmental Impact Report (EIA). The methodology for conducting environmental studies and the volumes by periods of study of the object (site or deposit) are described.

6.12 Exploration data assurance, audits and reviews

The verification of exploration results is important for assessing the reliability of the data accepted for the estimation of Mineral Resources/Reserves. It describes who and when carried out the verification of results, what Reports/Notes resulted from these verifications in historical order.

At the end of each section of the report, it is recommended to present the main conclusions of the work and research carried out, their positive aspects and shortcomings.

7 ASSESSMENT AND MINERAL RESOURCES DEPOSITS

A report disclosing mineral resources must:

- (a) provide a clear and concise statement of the key assumptions, parameters and methods used to estimate the Mineral Resources so that the user of the report can understand the reliability of the estimate and how it was derived;
- (b) comply with all Mineral Resource disclosure requirements set out in the KAZRC Code;
- (c) where Mineral Resources for multi-component complex minerals are reported on a metal or mineral equivalent basis, report the individual grades of each metal or mineral and the metal prices, recoveries and any other relevant conversion factors used to estimate the metal or mineral equivalent; and
- (d) include a description of the extent to which any known environmental, permitting, legal, ownership, tax, socio-economic, marketing, political or other relevant factors could materially affect the estimate of the Mineral Resource.

INSTRUCTIONS:

- (1) The numerical values of quantity and content presented in the Report must be rounded to reflect the fact that they have been measured to a certain level of accuracy.
- (2) Where multiple cut-off grade scenarios are presented, the Competent Person shall identify and indicate the base case, or preferred scenario. All estimates resulting from each cut-off grade scenario shall satisfy the assessment of a reasonable prospect for economic recovery.

7.1 Methods of assessment and modeling

There are different assessment methods used for different scenarios, depending on the deposit geometry, mineralisation morphology and compositional and concentration variability.

Traditional (Polygonal) methods of Mineral Resource estimation include geological and exploitation block, section (or cross-section) methods and statistical analysis.

Block modeling is based on dividing the deposit space into elementary blocks (cells), into which the values of the object's properties, in particular the content of the useful component, are interpolated from the initial sampling data, taking into account weighting factors.

Currently, the most commonly used estimation method is geostatistical interpolation methods, in particular the kriging method, with its variations such as Ordinary Kriging (OK), Simple Kriging (SK) and Indicator Kriging (IK). Kriging methods allow estimating the probability of estimating the grade in each block. Other methods (Nearest Neighbour NN, Inverse Distance W) are not geostatistical, but can also be used for

estimation in simple deposit structures. The choice of interpolation method for estimation is the responsibility of the Competent Person.

Several different mathematical methods can be used simultaneously for the assessment, depending on the desired degree of accuracy, the quality and quantity of data, and their nature.

The corresponding section is constructed based on the method of assessment and modeling chosen by the authors, and should contain comprehensive information regarding the methodology for assessing the mineral resources of the deposit.

7.2. Intelligence Database

The section should contain the initial sampling data for exploration intersections, and, if necessary, codes for rocks of different compositions and other necessary information. The initial data underlying the assessment of Mineral Resources should be reliable, complete and up-to-date.

It is recommended to provide data on the number of samples in the database, including those included in the assessment by type of workings and by exploration periods, so that readers of the Report have an understanding of what data by year and type were used in assessing Mineral Resources/Reserves.

A 3D drawing of the workings in space is also provided in graphic form, giving an understanding of the spatial arrangement of the data. If the scale does not allow displaying data on the ore field, it is recommended to provide the results in the form of separate sections of a larger scale. Workings of different years or types are recommended to be shown in different colors.

The development of the database is regulated by Recommendation R008-22 “Database”.

7.3 Geological model

The geological model is constructed based on lithological coding of rocks and analysis of geological sections. The methodology for constructing the geological model and analysis of factors that influence the localization of mineralization are provided. These factors should be identified and the geological model should be focused on their construction. Such factors may include contacts of suites/complexes, intrusion, fault, which are either mineralization-containing complexes or barriers to accumulation, or channels for supplying ore solutions, etc.

The results of the analysis are given in the text of the subsection, a conclusion is made whether there is geological control of mineralization. In the case of geological heterogeneity of different sections (parts), the deposit is divided into domains.

A domain is understood as a spatially isolated mineralized body or bodies characterized by common occurrence elements and the nature of the distribution of useful components.

7.4 Modeling mineralization and surfaces

The geological parameters used to delineate the mineralisation and the delineation methodology are described in accordance with generally accepted industry standards. The methodology is selected by the Competent Person and its application should ensure reliable and unambiguous linkage of deposits and mineralised bodies in accordance with the geological structure of the ore-bearing complexes and taking into account faults (proven and possible displacements of mineralisation along them).

The resulting frameworks are shown graphically, the 3D picture should be accompanied by a coordinate grid giving an understanding of the orientation in space and scale. The sections show mineralized intervals along the mine workings, the topographic surface

and significant boundaries (oxidation zones, boundaries of sulphide mineralization, etc.).

7.5 Creating Composite Intervals

The creation of composite sampling intervals is a standard procedure that is used to bring all sampling intervals to one common length (influence weight) so that all samples have the same influence on the result during grade interpolation and geostatistical analysis.

Typically, the composite sample interval length is chosen to be close to the standard or average sample length. The frequency of occurrence is also taken into account.

To do this, a histogram of the sampling intervals by length is constructed and an interval is selected which, in the opinion of the Competent Person, will provide an adequate representation of the distribution of grades.

7.6 Statistical analysis

Statistical analysis is performed for each domain separately.

7.6.1 Summary statistics

Statistical analysis includes: statistical analysis itself; declustering of initial data; correction of "hurricane" contents of useful components and gives an understanding of what kind of deposit we are dealing with, what is the level of contents in it, whether there are "rich" ores. All data are presented graphically in the form of histograms of the distribution of the useful component both for the entire ore and for individual types of ores. Each histogram should be accompanied by comments from the author.

7.6.2 Definition (limitation) of outstanding contents

Limiting the impact of "hurricane" grades is a safety procedure designed to compensate for the non-representativeness of sample sampling data used in the assessment of Mineral Resources in relation to the natural distribution of useful component grades within the deposit. The methodology for limiting "hurricane" samples should be described in detail, including the result.

To identify outstanding grades, lognormal probability distribution plots of grades are usually created to trim out the "hurricanes" graphically. A sharp change in the direction of the distribution curve indicates the possible presence of samples with "hurricane" grades in a given grade class.

To estimate hurricane values, calculation methods for identifying outstanding values are also used.

$$Cv.h = C_{av} + (1.96 * St. dv),$$

Cv.h - very high content samples

C_{av} - average sample

St. dv - standard deviation

Another evaluation method is quantile analysis.

It is advisable to provide a calculation of the "hurricane" contents using several methods and select the result that, in the opinion of the Competent Person, best suits the given deposit.

After applying a content limitation, it is desirable to provide statistics on the number of samples limited and the effect of the limitation on the average content for each domain.

7.7 Variographic analysis

Variographic analysis is based on the assessment method and is associated with the construction of semivariograms - "downhole" to detect the nugget effect at a distance of "0", omnidirectional to identify spatial distribution patterns and further semivariograms along three main axes. The results of variographic analysis are presented in the report in the form of semivariogram graphs and in tabular form summarizing all the variogram parameters, while modeling is performed separately for each ore type and for each domain.

7.8 Determination of volumetric weight

This section provides calculation of bulk density for all types of ores and host rocks, according to the methodology described in section 6.9 of these Methodological Recommendations.

7.9 Block modeling

7.9.1 Model building and parameters

Modeling of deposits can be performed using any mining and geological software products tested in world practice. Block modeling in the assessment of mineral resources of minerals is performed on the basis of the accepted indicators (parameters) for the deposit with a description of the modeling algorithms and assessment of Mineral Resources/Reserves.

The block model can encode parameters of the geological model, which allows differentiating blocks by rock types, age, secondary changes, belonging to fault zones, etc.

7.9.2 Methodology for interpolation of contents

The methodology used to interpolate contents into a block model is described.

7.10 Model verification

Model validation is performed in at least three ways. The purpose of validation is to identify global or local errors that have arisen during grade estimation and to determine the appropriateness of the smoothing level. When classifying Mineral Resources, the results of visual and, to an equal extent, statistical verification are taken into account. The following validation methods are used:

- visual inspection of blocks and sample contents;
- statistical testing of blocks and sample contents,
- construction of verification (SWATH) graphs.

Also, the results obtained using the kriging method are often compared with the inverse distance method or the nearest neighbor method.

7.11 Classification Mineral resources and criteria

7.11.1 Definitions

The definition of the classification of Mineral Resources is used in the Report in accordance with the KAZRC Code, Article 22.

22. Mineral Resources are defined as a concentration or occurrence of solid mineral matter of definite economic interest, located in the earth's crust or on its surface, in such form and at such contents, quality and quantity that there is a reasonable possibility of its economic extraction from the subsoil in the foreseeable future.

Location, quantity and the content or quality of the Mineral Resources, their degree of spatial continuity and other geological characteristics are reliably known, estimated or interpreted on the basis of geological data, including sampling.

Mineral Resources are divided into categories, in order of increasing geological reliability: Inferred, Indicated and Measured.

Any reporting on Mineral Resources should include prospects for their economically viable extraction.

Parts of a solid mineral deposit that have no reasonable prospects for possible economic extraction (not economic mineralization), cannot be classified as Mineral Resources.

Term "Mineral Resources" encompasses mineralization, including waste and tailings, that have been identified and estimated as a result of the

When classifying Mineral Resources, the Competent Person shall take into account the following aspects:

- volume of data, in particular the distance between sampling points;
- data quality in terms of methods, reproducibility and accuracy of analyses, quality control procedures;
- results of topographic survey;
- density measurements;
- core yield data;
- confidence in the geological interpretation and consistency of geological characteristics, as well as consistency of mineralization/grades;
- independent data verification;
- results of geostatistical analyses;
- quality of the obtained content assessment;
- for operating facilities - results of comparison of contents according to exploration data and according to processing data at the plant

It is necessary to assess the quality of the exploration data base obtained during different periods of exploration of the deposit from the standpoint of its sufficiency for reporting Mineral Resources in accordance with the requirements of the KAZRC code and classifying Mineral Resources as Measured, Indicated and/or Inferred.

The classification of Mineral Resources is generally subjective. According to global industry practice, the classification of Mineral Resources should take into account the confidence in the consistency of the geological characteristics of mineralized structures, the quality and extent of the exploration data on which the estimates are based, and the geostatistical reliability of the tonnage and grade estimates. The relevant classification criteria should, where possible, combine both concepts to identify relevant areas with the same Mineral Resource category.

7.11.2 The most important factors for dividing Mineral Resources into categories: 1) at the stage of Conceptual Technical and Economic Assessment (in international terminology - Scoping Study).

Mineral Resources of the categories Inferred and Indicated may be allocated:

- 1) The density of the exploration network and the number of samples do not allow for an assessment using the Cricking method; the IDW method is used more often, with the search ellipsoids oriented along the strike of mineralization and deposits; when interpolating the contents of useful components into the block model, the distribution is checked using various methods; the RANGE parameter should be greater than the distance between workings and demonstrate the extent of mineralization when checking the model. In this case, it is desirable to classify Mineral Resources as identified that are outlined by the interpolation method (the block is limited by ore-controlling workings on both sides), and extrapolations as Inferred (deposits intersected by one working, a working that outlines the flanks).
- 2) Engineering and geotechnical studies should be carried out to a minimum extent, ensuring preliminary design of the quarry with assessments of the main parameters by analogy.
- 3) Hydrogeological studies conducted on a regional scale allow us to make a reasonable assumption about possible complications of mining and possible water inflows into the quarry/underground mine; some parameters can be taken by analogy.
- 4) Environmental studies have been carried out in a preliminary version (EIA Section for the Exploration Plan).
- 5) Technological studies on small-volume samples, some parameters by analogy.
- 6) The design of the mining and processing complex is conceptual.

2) at the stage of Preliminary Feasibility Study (PFS).

Mineral Resources may be classified as Inferred and Indicated, and some of the Mineral Resources may be classified as Measured. Some of the Indicated and Measured Mineral Resources may be converted to Mineral Reserves based on the Competent Person's assessment of the adequacy of the Modifying Factors.

- 1) The exploration grid density should correspond to the search ellipsoids when interpolating the contents of useful components into the block model, the RANGE parameter should be greater than the distance between workings and demonstrate semivariograms showing the presence of a connection between samples at such a distance. In this case, it is desirable to include Mineral Resources outlined by the interpolation method among the identified ones (the block is limited by ore-controlling workings on both sides). The measured Mineral Resources by the exploration grid density parameter are allocated by the Kricking method with semivariograms confirming the continuity of mineralization (the continuity of mineralized bodies and contents should be confirmed by the results of geostatistical constructions).
- 2) Engineering and geotechnical investigations must be carried out with a level of detail that ensures a sufficiently reliable quarry design with estimates of key parameters.
- 3) Hydrogeological studies carried out at the deposit, including experimental filtration work (pumping, filling and injection) allow us to calculate water inflows into the workings and draw conclusions about the water supply to the quarry/mine.

3) at the Feasibility Study (FS) stage.

A portion of the Indicated and Measured Mineral Resources may be classified as Probable and Proved Reserves.

- 1) Engineering and geotechnical investigations must be carried out with a level of detail that ensures a sufficiently reliable quarry design with estimates of key parameters.

- 2) Hydrogeological studies carried out at the deposit, including experimental filtration work (pumping, filling and injection), allow us to calculate water inflows into the workings and draw conclusions about the water supply of the quarry/mine.
- 3) Based on a set of technical studies, a Production (Operation) Project must be prepared.
- 4) Technological research on large-scale samples with preparation of the Technological Regulations of the Factory with a given productivity.
- 5) Environmental studies must be carried out to a level that enables the preparation of an Environmental Impact Statement (EIA) that takes into account decisions on the quarry (mine) and the plant.
- 6) Economic costs (capital and operating) must be determined with an accuracy of +- 15%.
- 7) A risk and sustainability analysis of the project must be carried out.
- 8) A liquidation plan has been developed.

7.12 Quarry optimization or optimization of the extraction unit in underground mining

Compliance with the criterion of “...reasonable prospects for further economic recovery” when reporting Mineral Resources typically involves the estimated tonnage and grades meeting certain breakeven points and the presentation of the Mineral Resource at an adequate cut-off grade, taking into account possible scenarios for the recovery of the Mineral Resource and the technological recovery of the metal.

The main optimization parameters are presented in brief form, based on the Technical studies conducted up to the current stage of the Project development – the following are assessed:

- ore productivity,
- quarry slope angles,
- dilution,
- losses,
- extraction during processing at the factory,
- operating costs OPEX,
- capital expenditures CAPEX,
- selling price of the useful component.

The rationale for the main parameters for optimization is briefly described.

At the stage of allocation of Mineral Resources, economic modeling is applied in a limited volume in the form of optimization of mining using special software (optimizer) or manually with drawing of a quarry or mine and enlarged economic calculations.

7.13 Mineral Resources Report

The State Reserves Committee of the Republic of Kazakhstan takes into account the Mineral Resources/Reserves presented in the Report in the form of accounting of Mineral Resources/Reserves in the State Balance of the Republic of Kazakhstan (Table 7.1).

Table 1 – Form of the report on Mineral Resources submitted for inclusion in the State Balance of the Republic of Kazakhstan

Indicators	Unit of measurement	Mineral Resources		
		measured	identified	supposed
<u>field</u>				
ore type				
Ore resources	thousand tons			
metal	kg			
		average content		
metal	g/t			

The Geology Committee of the Republic of Kazakhstan sends a letter to the subsoil user company and the Competent Person who prepared the Report, notifying about the registration of Mineral Resources/Reserves on the State Balance of the Republic of Kazakhstan. Registration on the State Balance of the Republic of Kazakhstan is the legal basis for applying to the Competent Authority for the purpose of moving to the production stage.

7.14 Tonnage-grade charts

Tonnage-grade graphs are presented in a form generally accepted in exploration practice and allow one to estimate the Mineral Resources/Reserves of a deposit and grades at different cut-off grades of the useful component.

Typically, tonnage-grade charts are prepared for the sum of Measured and Indicated Mineral Resources and for all Mineral Resources (including Inferred).

7.15 Comparison of Mineral Resources presented in the Report with reserves listed on the State Balance of the Republic of Kazakhstan

For deposits for which Reserves are listed on the State Balance, the CL compares the Mineral Resources presented in the Report with the reserves listed on the State Balance of the Republic of Kazakhstan in the form approved by the Committee of Geology and Subsoil Use (Table 2).

Table 2 – Comparison form of reserves calculated according to the State Reserves Committee and listed on the state balance sheet according to Form 1TPI, with Mineral Resources estimated according to the KAZRC Code

Indicators	Unit of measurement	Status of reserves according to the State Reserves Committee, form 1TPI as of 01.01.2019				According to the KAZRC report (as of _____)								Absolute difference to industrial categories of reserves of the State Reserves Committee (sum of identified + measured to the sum of A + B + C ₁)	Relative difference, %%	
		Balance			Off-balance sheet	Mineral resources					Mineral reserves					
		A+B+C ₁ *	C ₂	A+B+C ₁ +C ₂		Measured	Identified	Sum of Measured and Detected	Assumed	TOTAL	Proven	Probable	TOTAL			
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	
ore	thousand tons															
gold	kg															
Aver. content:																
gold	g/t															

Note: * - industrial category reserves according to the GKZ

If, in accordance with subparagraph 4 of paragraph 10 of Article 278 of the Code "On Subsoil and Subsoil Use", "...in the report on the assessment of Mineral Resources of solid minerals, Mineral Resources have decreased by more than twenty-five percent of the reserves of industrial categories previously approved in accordance with Article 121 of the Law of the Republic of Kazakhstan "On Subsoil and Subsoil Use" ..." (column 15 of Appendix 1), the Committee, together with the EC PONEN, shall decide to conduct an examination of this report in order to confirm (or refute) the validity of such changes in Mineral Resources.

To resolve the issue set out in the previous paragraph, the EC PONEN, together with the Committee, shall determine an independent expert (or experts) from among the Competent Persons who will be entrusted with conducting an expert examination of the report. Payment for such an expert examination shall be provided by the subsoil user who submitted the report to the Committee. The term for conducting the expert examination shall be determined separately in each specific case.

Methodology for comparing Mineral Resources with Reserves listed on the State Balance according to the State Reserves Committee standard.

Direct comparison of historical categories of reserves of the State Reserves Committee of the Republic of Kazakhstan with categories of Mineral Resources in accordance with KAZRC is impossible due to the fact that fundamentally different approaches are used in delineation and assessment.

Comparison is recommended based on the sum of balance reserves of industrial categories (A+B+C1) with Mineral Resources based on the sum of the Measured and Indicated categories. Inferred Mineral Resources are not compared with balance reserves of industrial categories, although some of them can technically be classified as category C2 of GKZ Reserves.

8 TECHNICAL RESEARCH

8.1 Introduction

Technical studies are carried out with the aim of studying the modifying factors and converting part of the Mineral Resources into Mineral Reserves and preparing the deposit for industrial development.

In the Mineral Resources report this section is not completed, it is necessary to provide the title of the section and indicate that in this study a detailed assessment of Modifying Factors was not carried out and information on technical studies is not provided.

The definition of Modifying Factors is given in accordance with Article 16 of the KAZRC Code.

16. *Modifying Factors- These are the considerations used to convert Mineral Resources to Mineral Reserves. They include, but are not limited to, mining, technological, metallurgical, infrastructural, economic, marketing, legal, environmental, social and administrative aspects.*

Drawing 1 defines the basis for classifying estimates of the quantity and quality of mineral resources in order to reflect different levels of geological certainty and different degrees of technical and economic assessment of the object.

Mineral Resources are estimated primarily on the basis of geological information taking into account the parameters of a number of related disciplines.

Mineral Reserves, which represent a modified subgroup of the Identified and Measured Mineral Resources (shown within the dashed outline in Figure 1) require consideration of Modifying Factors that affect mineral recovery and should generally be assessed in conjunction with related disciplines.

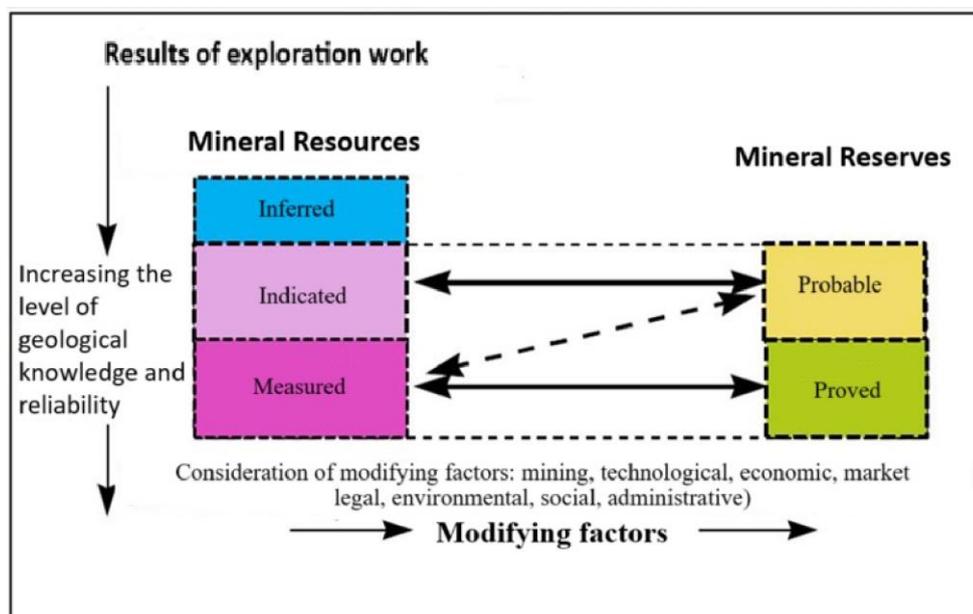


Figure 1. Relationships between Exploration Results, Mineral Resources and Mineral Reserves.

Modifying factors – engineering and geotechnical studies, hydrogeological, environmental studies, mining planning and economic assessment in a complex are intended to show the main technical solutions for the development project and demonstrate “reasonable prospects for the final profitable extraction” and the degree of readiness of the deposit for industrial development.

The detail of the development of the information complex is reflected in the stages of the study of the deposit and is directly related to the identified categories of Mineral Reserves:

1. Conceptual Technical and Economic Assessment (in international terminology - Scoping Study) - Conducting and describing technical studies is not mandatory,
2. Preliminary Feasibility Study (PFS) – Technical studies are required to a limited extent in the scope of Mineral Resources to justify “a reasonable prospect of their extraction”. In the case of allocation of Mineral Reserves, technical studies are mandatory,
3. Detailed Feasibility Study (FS) – Technical studies for Mineral Reserves are mandatory.

The degree of study of all aspects of the deposit is reflected in the table in Appendix 2, which is a more detailed version of Table No. 2 of the 2021 KAZRC Code.

8.2 Engineering and geological research

The chapter Engineering-geological and mining-geological studies (conditions) includes the following information:

- 1) methodology, volumes and types of studies performed; assessment of their completeness and quality;
- 2) characteristics of the mining and geological conditions of the deposit (site), the method of opening and developing the deposit (site);

- 3) geological and genetic complexes with the identification of classes of cohesive, loose and rocky rocks; types, kinds and varieties of soils;
- 4) physical and mechanical properties of soils;
- 5) engineering-geological zoning of geological section; engineering-geological conditions for surface construction;
- 6) assessment of the complexity of the mining-geological and engineering-geological conditions of the deposit (tectonic disturbances, fracturing, anisotropy of changes in the host rocks, karstification, gas content, the possibility of landslides and mudflows, seismicity);
- 7) in open-pit mining – average and maximum stripping ratios, quarry depths and slope angles of its sides;
- 8) in underground mining – characterization of the physical and mechanical properties of rocks located directly in the roof and soil of the mineral, as well as in weakened zones; assessment of the possibility of rock burst, the ability of minerals to spontaneous combustion;
- 9) radiation characteristics of minerals and host rocks; assessment of factors affecting human health;
- 10) general conditions of surface construction and justification for the selection of areas for the placement of industrial, housing and civil facilities and waste rock dumps; information on the methods and mining conditions for the development of other deposits explored in the area; complications that arose during their development (Assessment of proposed industrial sites for ore barrenness);
- 11) forecast of changes in mining and geological conditions as a result of deposit development.

8.3 Hydrogeological research

Hydrogeological studies contain the following information:

- 1) methodology, types and volumes of completed hydrogeological work and the completeness of the study of hydrogeological conditions of development;
- 2) surface watercourses and reservoirs;
- 3) hydrogeological characteristics of the deposit; main aquifers, complexes and fracture zones involved in the flooding of the deposit; chemical composition, bacteriological and radiological state of surface and ground waters, their saturation with gases, their aggressiveness to metals, wood and concrete; the amount of predicted water inflows to mine workings; assessment of the quality of drainage water, the possibility of using it for technical purposes and irrigation; calculation of the provision of water inflows of drainage water; assessment of the volumes of drainage water; assessment of the degree of complexity of the hydrogeological conditions of development;
- 4) analysis of drainage and dewatering measures applied at similar developed deposits in the region, recommendations for draining the explored deposit;
- 5) assessment of available water resources as a source of water supply for an enterprise engaged in the extraction and processing of minerals; data on explored groundwater deposits and on the approval of their reserves (in tabular form); the possibility of identifying new groundwater deposits;
- 6) assessment of the possibility of using waters involved in the flooding of a deposit for water supply, balneological purposes or the extraction of valuable components from them; assessment of their operational reserves;

- 7) the enterprise's need for water and its provision with sources of domestic, drinking and technical water supply;
- 8) for placer deposits intended for dredging - the possibility of constructing dams to raise water if its depth is insufficient for dredging.

The authors also present data on drainage and drying of workings: methods and systems for drying deposits, selection of types and kinds of drainage devices. The same concerns issues of organizing waste dumping and conducting drilling and blasting operations.

8.4 Development design and production schedule

The design of quarry or underground mining operations should be based on the company's experience in developing the deposit (for existing mining companies), available equipment taking into account the expansion of the scope of work and the best world practice of operating deposits of this type, or on estimated data (for subsoil user companies operating under an exploration contract/license).

8.4.1 Dilution modeling

Theoretical calculations of losses and dilution may be carried out using generally accepted formulas and instructions used in the industry. Given the available experience of field operation, it is necessary to confirm the calculated indicators with actual data on losses and dilution.

In the modelling it is permissible to use techniques for including part of the host rocks in the ore blocks. To estimate the dilution of the Mineral Resource models SR and YR were subjected to regularisation by transforming all blocks into larger blocks, which approximately corresponds to the block size delineated during the separation of ore and waste rock, and is called a selective extraction unit (SEU). Ore loss is defined as the sum of mineralised blocks above the cut-off grade in the original Mineral Resource model, but which after regularisation are classified as waste rock, since the grade thus recalculated is now below the cut-off grade. Dilution is defined as the sum of blocks in the original Mineral Resource model with grades below the cut-off grade, and which during the regularisation process were mixed with blocks with higher grades, as a result of which the resulting blocks of the ESU size turn out to have a grade above the cut-off grade.

8.4.2 Geotechnical parameters of the quarry

The design of quarry slopes for optimization is based on parameters developed for each quarry separately. It is recommended to conduct special geotechnical drilling with subsequent analysis of the calculation of the stability of the slope.

The geotechnical analysis consists of a kinematic analysis of the fractured and primary rock zones. Limit equilibrium analysis is performed to determine the slope angle of the bench and the general slope angle. For the purposes of this analysis, it is generally assumed that the rock will be dry, as recommended by Knight Piésold Pty Limited. Each quarry requires stress relief measures for the rock massif of the side massif, as well as active measures to limit water inflow into the quarry.

This section also defines the minimum permissible quarry parameters – berm width, bench height, geotechnical berm width, quarry slope angles. In complex geotechnical conditions, the quarry should be divided into geotechnical domains, each of which has its own parameters taken into account during optimization.

8.4.3 Quarry optimization

Pit optimization is usually performed using specialized software such as Micromine pit optimizer, Geovia Whittle with implementation of the Lerchs-Grossman (Whittle) algorithm, etc., which allow determining the optimal production boundaries.

The main optimization parameters are presented in brief form, based on the Technical studies conducted up to the current stage of the Project development – the following are assessed:

- ore productivity,
- quarry slope angles,
- dilution (%),
- losses (%),
- recovery during processing at the factory (%),
- operating costs OPEX,
- capital expenditures CAPEX,
- selling price of the useful component.

In general, the process of quarry optimization for the allocation of Reserves is carried out similarly to optimization for Mineral Resources, only the optimization parameters are not adopted by analogy or assumptions, but are substantiated by Technical Studies.

8.4.4 Selecting a quarry shell

Typically, programs can produce a series of optimal pit shells, in the form of concentric pits for a given set of economic parameters and slope values used to develop the optimized shell. The shells are built by changing the price of the metal (useful component) in question, but after the shells are built, they are all evaluated using the base case metal price.

8.4.5 Development System

The development system is determined by the mining and geological conditions of the mineralization occurrence. The selection of the mining method is given and the main decisions on mining, quarry organization (roads, sites), transportation of ore and overburden from the quarry, etc. are described. All decisions should be linked to the types of mining and transportation machinery and equipment. It is recommended that the subsection be accompanied by graphic illustrations showing the main parameters of the quarry, underground mine or underground leaching system without direct access to the mineral.

8.4.6 Quarry operating mode and productivity

When determining the optimal performance for constructing a deterministic case of a financial and economic model, it is necessary to be guided by:

- Mining and geological conditions of deposit development;
- Availability of infrastructure for extraction/processing;
- Restrictions on sales;
- Resource capabilities of the subsoil user company: financing, possession of certain means of production, etc.

Some companies assume that a mine should have a productive life of at least 10 years to offset any risk from cyclical price fluctuations. However, many mines, particularly gold mines, have recently been commissioned with much shorter lifespans. Low-grade but high-

reserve deposits, such as porphyry copper deposits, which often require significant investment in infrastructure, should have a mine life of at least 20–25 years.

There is no single approach to determining the optimal productivity of an enterprise, but it is useful to consider the statistical data that were analyzed by Taylor (1977):

Expected reserves, million tons.	Average period of operation, years	Range of working periods, years	Average daily productivity, t/day	Average daily productivity range, t/day
0.1	3.5	3 - 4.5	80	65 – 100
1.0	6.5	5.5 – 7.5	450	400 – 500
5	9.5	8 – 11.5	1500	1250 – 1800
10	11.5	9.5 – 14	2500	2100 – 3000
25	14	12 - 17	5000	4200 - 600
50	17	14 – 21	8400	7000 – 10000
100	21	17 – 25	14000	11500 – 17000
250	26	22 – 31	27500	23000 – 32500
350	28	24 – 33	35000	30000 – 42000
500	31	26 - 37	46000	39000 - 55000
700	33	28 – 40	60000	50000 – 72000
1000	36	30 - 44	80000	65000 - 95000

Based on the results of the analysis of statistical data, Taylor derived a formula for the correlation between the volume of ore reserves and the period of development:

$$\text{Working time (years)} \approx 0.2\sqrt[4]{\text{Ore reserves}(t)}$$

$$\text{Working time (years)} \approx 6.5\sqrt[4]{\text{Ore reserves}(mln. t)}$$

Despite its convenience and simplicity, the Taylor formula should not be the primary method for assessing optimal performance, but should only be used as an auxiliary tool in the early stages of mineral asset evaluation.

8.4.7 Mine planning

Diluted mining models used for open pit optimization are used for scheduling operations without adding loss factors and ore dilution. The mining, processing and administrative costs, as well as the revenue factor, are stored in the model, allowing the cost of the project to be calculated over a given period. This is not the final cost of production, which is determined later in a separate financial model.

When using a standard resource model, when moving to the mining planning stage, it is necessary to recalculate ore volumes taking into account losses and dilution, adjusting the volumes of overburden accordingly.

When there are several types of ore, it is often necessary to plan their extraction separately in accordance with the capacities of processing complexes and factories of each technological type.

The volume of mining operations is directly related to the capabilities of the mining equipment and the production capacity of the plant.

The subsection is accompanied by development schedules divided by types of ores and overburden rocks.

The calendar plan by years or quarters is given in tabular form.

8.4.8 Composition of technological equipment

Based on the previously adopted volume of production of ore and overburden, equipment is selected and, based on the equipment's productivity, the required amount of equipment is calculated.

The number of main equipment is calculated based on the volume of planned mining operations, while the number of dump trucks is determined taking into account the haulage parameters for each bench, and then adjusted manually depending on changes in the plan.

Mining equipment models are usually considered interchangeable. For example, BelAZ dump trucks can save on capital expenditures, but the suitability and reliability of this equipment should be further studied. The EX3600, EX2600 excavator models and the Caterpillar 785 and Caterpillar 777 dump trucks were compared in terms of practicality, capital and operating costs. After the analysis, the EX2600 excavator and Caterpillar 777E dump truck model was selected as the base option for a number of projects.

The need for key equipment is also reflected in the form of a graph by year, with the maximum amount of equipment in certain periods associated with large investments, which should be reflected in the financial and economic model.

8.4.9 Drilling and blasting operations

Drilling and blasting operations significantly increase the cost of the extraction process, therefore, special attention should be paid to planning this type of work, in particular, based on the strength and degree of disturbance (fracturing, karst) of the rocks, the quantity and type of drilling equipment, the density of the blast network, which directly affect the cost of the work, are selected.

The data on equipment, blast network parameters, type and specific consumption of explosives are provided. Cost indicators are accepted based on the Commercial Proposals of contractor companies offering such services.

8.4.10 Drainage

The section is based on the results of hydrogeological and hydrological studies provided in the relevant section and includes solutions for surface water drainage, pumping mine and quarry waters from mining workings. The type of drainage scheme used (pumping wells, trenches, mining ditches, sumps) and the parameters of the pumping equipment (platforms, pumps) depend on the amount of expected water inflow and the stability of the sides and benches of quarries and underground workings.

Open drainage schemes provide for intra-mine and intra-quarry drainage. In open-pit mining of ore deposits in simple hydrogeological conditions of the object, when stable rocks participate in the quarry structure, on the change of properties of which underground or surface waters have practically no significant effect and the rocks do not have a tendency to filtration deformation. The flow of underground waters entering the slopes of the quarry sides is received in drainage and collection ditches and then in an organized manner through pipelines is discharged into a receiving sump, arranged along the bottom of the active face. In underground mining of the deposit, a central pumping station with a water intake is arranged on the lower horizons of the mine field, the volume of which is sufficient

to receive the total water inflows of mine waters; At all overlying working horizons, mine water is received in drainage ditches and then transferred through pipes between horizons to a common water intake, from where a central pumping station pumps it to the surface.

Special-purpose drainage systems are used at ore deposits with complex natural conditions characterized by a water inflow of 150-500 m³/hour and instability of ore-bearing rocks in the sides and benches of the quarry and underground mine workings. Depending on the nature of the water intrusion, the systems may consist of a system of underground drainage mine workings, dewatering wells, diversion and/or isolation of surface water flows beyond the limits of possible drainage of mine workings.

The costs of dewatering pumps and labour are included in the Financial Model under the production cost section, assuming that these activities will be performed by the Mining Department.

8.4.11 *Dumping*

The solutions for the placement of rock mass mined simultaneously with ore extraction are described. The required volume of dumps, their parameters - height, area - are designed, the location, haulage arm (transportation distance) are determined.

Overburden dumps are reclaimed to a flat, stable structure and are landscaped throughout the life of the deposit. Bulldozer operations associated with the formation of dumps are included in the bulldozer work within the calculation of costs, and additional working time for dump trucks and a loader for the removal and storage of the overburden is also taken into account. The costs of landscaping and managing ongoing dump reclamation work are not included in the calculation of mining costs. The dump of mineralized overburden will remain until the completion of the ore processing schedule for the entire period of reserve development. These rocks can be processed, provided that they are economically feasible.

8.4.12 *Stability of rock dump slopes*

Waste disposal operations include waste unloading, waste dump grading and road grading. Waste dump slope decisions are usually part of the Mining Project and are taken from it with appropriate references to the source. If the Mining Project has not been developed at this stage, the Competent Person should provide reasonable preliminary waste dump decisions.

From an operational point of view, overburden dumps are in a process of constant formation. Slopes and heights are constantly changing. Therefore, when analyzing the slope stability of overburden dumps, a lower stability coefficient value is applied compared to quarries. The minimum permissible stability coefficient is 1.1. Resulting values above 1.5 are considered stable in the long term.

8.4.13 *Mine infrastructure*

Solutions for the mine infrastructure are presented with graphic diagrams. Technical solutions for the placement of all sections of the enterprise are important both for the available territories and for the distances between them, which affects the costs of transportation and construction of transport routes, conveyors, intermediate warehouses, etc.

8.5 Metallurgical research (processing/beneficiation)

Technological properties of ores are characterized by:

- 1) the methodology, volumes and types of technological research carried out, their completeness and quality;
- 2) the material composition of the host rocks and minerals, natural varieties of the mineral; their mineral and chemical composition, results of rational analysis, mineral forms, textural-structural and physical-mechanical properties. Patterns of distribution of natural types of minerals within a deposit (site); changes in the composition and physical-mechanical properties of the mineral in the oxidation (weathering) zone and the depth of its development, criteria for dividing the mineral by oxidation degree; physical properties and other characteristics of major, minor and rare minerals;
- 3) distribution of main and associated useful components, harmful and slag-forming impurities by mineral forms, individual deposits and by the deposit as a whole; presence or absence of correlation between the contents of main and associated components. Justification of the possibility of assessing the Mineral Resources of individual associated components by the correlation method if they gravitate predominantly towards the minerals-carriers of the main components; presence of zoning in the distribution of main and associated components by mineral bodies and the deposit as a whole; mineral bodies with an increased content of harmful and slag-forming impurities. Possibility of selective development of minerals of various technological types;
- 4) justification of the sufficiency of the studies performed on the material composition of the mineral to determine its quality and assess the Mineral Resources. Completeness of sampling of each of the associated components and justification of the conditions for assessing the Mineral Resources of associated components by content in routine or group samples, in minerals or concentrates, in individual bodies of the mineral and in the deposit as a whole;
- 5) criteria for identifying industrial (technological) types and grades of minerals; their location and variability of technological properties; shares in total reserves;
- 6) the methodology and volumes of selection of process samples (sampling locations, number and mass of samples); the methodology and volumes of geological and process mapping; the representativeness of process samples (by mass, sampling location, material composition, content of main and associated components and other indicators) for individual bodies, sections, horizons and for the deposit as a whole; justification for the completeness of process testing of individual sections of the deposit, as well as its natural and industrial (technological) types and grades, associated components; organizations that conducted process research and their programs;
- 7) results of mineralogical and technological mapping (determination of the contents of useful and associated components, forms of their occurrence and accompanying useful components, their volume);
- 8) results of technological research carried out at different stages, indicating the organizations that carried out the study; industrial (technological) types and grades of minerals; the nature of their location, the justification for their allocation; the share of identified technological types and grades in the total reserves of the deposit and the possibility of their geometrization;
- 9) recommended technological scheme for processing mineral raw materials, main processing indicators (yield of marketable products, their quality, extraction of main components into marketable products and production waste, distribution of harmful impurities among processed products); possibility of using methods of radiometric enrichment of mineral

- raw materials; physical properties that can be used for separation of mineral raw materials, contrast of minerals by these properties;
- 10) the behavior of associated components in the process of enrichment, metallurgical or chemical processing of mineral raw materials (separately by technological types and grades of minerals): the content of these components in the enrichment and processing products, the content of their carrier minerals in the enrichment products, the balance of the distribution of each associated component among minerals and products of enrichment and processing; the possibility of obtaining independent concentrates of associated components that form their own minerals;
 - 11) the composition and properties of mining waste from primary production, the results of their technological study; the possibility of industrial use of waste or components contained therein and the need for them; the advisability of taking into account the quantity of individual types of waste from primary production or the approval of their reserves, consisting primarily of natural formations (dump rocks, waste from the extraction of wall and facing stone, beneficiation tailings, etc.), or valuable components contained therein (if their use is advisable and there is a consumer);
 - 12) use of recycled water and its impact on technological processes; recommended methods for stabilizing the salt composition of recycled water before its use;
 - 13) justification of the sufficiency of the conducted study of the material composition and technological properties of the mineral for the design of a technological scheme for their processing; compliance of the obtained results with the data underlying the feasibility study; enrichment indicators and their comparison with the indicators of domestic and foreign enterprises of a similar profile.

8.5.1 Historical data

The types of technological research conducted and the results obtained are described in historical order.

8.5.2 Processing technology

The CL report concerning the current or proposed extraction and processing of mineral resources shall include:

- a. description of the methods of extraction or processing of raw materials (where applicable) with the corresponding forecast and the obtained statistics of extraction and processing;
- b. a description of the plant, technology and production processes, as well as the actual or projected recovery from raw materials into marketable products; and
- c. where applicable, justification in support of the recommendation to reopen temporarily suspended or abandoned production facilities.

Production targets are projections of the amount of minerals that will be extracted over a period extending beyond the current year.

Performance targets include forward-looking statements that must be considered reasonable.

8.5.3 Metallurgical Extractions

The extraction of useful component(s) during the processing of mineral raw materials must be justified by the technological tests carried out. It is also necessary to study the relationship between the extraction coefficient and the initial content in the ore and the level of residual contents in the processing "tailings".

Since laboratory tests are conducted under ideal conditions, the overall recovery forecast can typically include an allowance for recovery losses that will occur due to plant and operating inefficiencies.

Whether or not to apply a recovery reduction is a decision of the Competent Person, and any impact on recovery reduction (or increase) compared to the tests can be assessed in the project financial sensitivity modelling.

8.5.4. Technological regulations.

The technological regulations for processing, taking into account the planned productivity of the factory, are usually drawn up by a specialized organization and serve as the basis for the Factory Project, the presence of which means a sufficient degree of development of design issues and serves as one of the modifying factors for the transfer of Mineral Resources to Reserves. Information is provided on the available documents, their developers and the adopted technological solutions.

8.6 Environmental research

Environmental information and decisions taken on the project must be based on environmental studies conducted, in particular, as part of the preparation of the Environmental Impact Report (EIA). The obligation to undergo the EIA procedure when intending to carry out production activities is regulated by paragraph 1 of Article 36 of the Environmental Code of the Republic of Kazakhstan.

In the process of developing pre-planning, planning, pre-project and project documentation justifying economic and other activities in the Republic of Kazakhstan, the EIA procedure is carried out in the order of successive stages, in accordance with paragraph 2 of Article 37 of the Environmental Code of the Republic of Kazakhstan.

EIA includes:

- determination of the resource potential of territories and the background state of the environment;
- development of an EIA program;
- assessment of alternative construction or business options;
- assessment of the magnitude and duration of the project's potential impact on the environment;
- monitoring the impact of project implementation on the environment;
- development of measures and activities to reduce the level of impact on the environment;
- public hearings and environmental assessment;
- preparation of reports on the analysis of the project's impact on the environment.

The final version of the EIA materials must include minutes of public hearings.

Therefore, if an EIA report is available, the environmental survey data should be included in the Mineral Reserves assessment report in accordance with the EIA report. If an EIA report is not available, the Competent Person should make a reasonable assessment of the risks to the project from the state and local permitting system.

8.6.1 Flora and fauna

Information on flora and fauna is provided.

8.6.2 Environmental and Social Impact Assessment

Technical studies should include the following environmental information:

- 1) the methodology, volumes and types of geocological studies performed, their completeness and quality;
- 2) the current state of environmental components: air, surface and ground water, soil, vegetation, fauna; toxic components and heavy metals in mineral raw materials and overburden;
- 3) characteristics of objects with environmental impact: quarries, mines, waste rock dumps, mineral and topsoil storage facilities, industrial sites, tailings ponds, storage ponds, sludge ponds, pipelines;
- 4) features of production technology that negatively affect the environmental situation;
- 5) assessment of the predicted impact of a mining enterprise on surface and groundwater, vegetation, wildlife, the surface atmosphere and the population of nearby settlements;
- 6) radioactivity of soils, rocks and minerals;
- 7) characteristics and dimensions of sanitary protection zones;
- 8) measures to reduce the negative impact of field development on the environment and their economic assessment.

8.7 Closing ("liquidation" according to the "Code") and reclamation

The solutions for closing the enterprise and reclamation are provided, as well as an assessment of the cost of the work involved in the financial model.

8.8 Legal and Permitting Issues

Conclusions are provided on the current legal status of the Contract/License, the availability of all necessary permits in connection with the Project stage, the possibility of obtaining missing approvals, legal and actual obstacles (barriers) to obtaining all necessary approvals for the legal functioning of the enterprise.

8.9 Economic criteria

According to the KAZRC Code, Article 22:

Any reporting on Mineral Resources should include prospects for their economically viable extraction.

Parts of a solid mineral deposit that have no reasonable prospects for possible economic extraction (not economic mineralization), cannot be classified as Mineral Resources.

The expression "reasonable prospects of eventual economic recovery" implies a judgment by the Competent Person (albeit preliminary) as to the technical and economic factors that are likely to affect the prospects for economic recovery of the mineral resource, including the approximate recovery parameters. In other words, a Mineral Resource is not the sum total of all mineralisation drilled or sampled, irrespective of cut-off grades, likely size of development, location, continuity of mineralisation. It is a realistically estimated volume of mineralisation which, under reasonably accepted technical and economic conditions, could in whole or in part be subject to economic recovery.

Economic criteria as a modifying factor are used when converting Mineral Resources into Mineral Reserves. If at the stage of allocation of Mineral Resources economic modeling is used in a limited volume in the form of optimization of development using special software (optimizer) or manually with drawing of a quarry or mine and

consolidated economic calculations, then at the stage of assessment of Mineral Reserves it is necessary to develop a financial and economic model.

Objectives of Economic Evaluation (EE)

An EA is defined as an analytical study of the economic viability of extracting a Mineral Resource. An EA includes appropriate assessments of realistically anticipated modifying factors together with any other relevant operational factors that are necessary to demonstrate that continued development of the project through to the next stage of development can be reasonably justified.

The EA should not be used as a basis for a market valuation of Mineral Reserves for the purpose of determining the market value of a subsoil use right, a subsoil user company or a share in it. The objective of the EA is to assess the “realistic prospects for possible profitable extraction” of the Mineral Resources of the subject of the study.

Where a Mineral Resource/Reserve report is prepared in the presence of a previously developed PFS or FS, the results of the PFS and/or FS are used for the EA by reference to those sources, with reasonable adjustments and assumptions that may have arisen due to changes, for example in the market, during the time that has elapsed since the previous more detailed studies were conducted.

The economic assessment of the project includes:

- (a) a clear statement and justification of the key assumptions;
- (b) a forecast of cash flows by year using the mineral resource or mineral reserve and a production schedule by year for the life of the project;
- (c) a brief description of taxes, royalties and other governmental charges or interests applicable to the mineral project or production and to the revenues or income of the mineral project; and
- (d) consideration of net present value (NPV), internal rate of return (IRR) and payback period of capital at assumed or actual interest;
- (e) sensitivity or other analysis using alternatives for commodity prices, grades, capital and operating costs or other relevant parameters as appropriate and present the impact on the results.

8.9.1 Scope of application of EO

These guidelines apply to the preparation and reporting of Mineral Resources for all types of solid minerals. The valuation of oil and gas (petroleum) assets is not covered by these guidelines.

The primary reason for the need for EA guidelines for reporting Mineral Resources is to ensure consistency and minimum standards and to provide guidance to mineral asset valuers.

It is the responsibility of the CL to ensure that it has the necessary skills in accordance with the specific application area related to the type of mineral and the scope of work, or to use suitably qualified technical experts or other competent persons to provide technical input or assessment expertise that the CL may not have.

8.9.2 Initial data for economic assessment

The definition of Mineral Resources includes the requirement of "realistic prospects for eventual economic extraction". This definition requires the application of an appropriate level of consideration to the potential viability of a project, based on reasonable assumptions and forecasts, including those taken into account in estimating the cut-off grade. CLs should be aware of this requirement and should be prepared to quantify the figures applied.

To demonstrate that Mineral Resources can be converted into reserves, the economics must be demonstrated by means of a PFS or FS. Based on this type of study, Indicated Mineral Resources can be converted into Probable Reserves and Measured Mineral Resources can be converted into Proved Reserves. Inferred Mineral Resources cannot be converted into reserves in any way and their use in economic evaluation is limited and is discussed in more detail below.

It should be taken into account that in EA the accuracy of the initial assumptions is often at a low confidence level. In such cases, CLs should disclose the risks associated with the low level of accuracy and confidence that are associated with these initial data and should disclose the assumptions, all assumptions, limitations or any other relevant modifying factors and forecasts that were used in performing the EA.

The valuation of mineral assets inherently involves risk in terms of the reliability of input data and forecasts. The CL should highlight the uncertainties associated with the Mineral Resources and the modifying factors so that an informed layperson can have a clear understanding of the risks associated with the EA.

8.9.3 Categories of mineral objects

For mineral properties, the approach to economic valuation depends on the stage of exploration or development of the mineral resource. Mineral properties can be divided into four types for convenience, but it should be noted that there are no clear boundaries between these types, that the category of mineral properties may change over time, and that it may be difficult to classify some mineral properties so that they fit only into one specific of the following categories:

- Intelligence objects;
- Objects with Mineral resources;
- Objects under development;
- Objects in operation.

The mineralization object that is the subject of the EA should be described in sufficient detail to identify its key mining and geological, technological, economic, and operational characteristics. When the valuation object is economically interdependent with other objects, it is necessary to indicate the assumptions used in the EA. For example, in the case where the processing plant planned for the development of the Mineral Resources being estimated is located at another site and is not directly dependent on the EA object.

8.9.4 EO methods

Since the purpose of the EA is not to determine the market value of the valuation object, but to determine the "realistic prospects for possible profitable extraction", then of the three generally accepted methods of economic valuation (income, market and cost/cost), the most suitable is the income approach, which constructs a deterministic case (or several cases) with a certain set of modifying factors. Other valuation methods do not allow for the assessment

of the "realistic prospects for possible profitable extraction", since, for example, the valuation object may have a positive market value based on the results of the market or cost approach to valuation, but at the same time have a negative assessment using the income method due to the fact that the fundamental value of Mineral Resources is determined precisely by the possibility of their profitable extraction, and not by resale, when the market value does not always reflect the assessment of the "realistic prospects for possible profitable extraction".

8.9.5 Use of Mineral Resources and Mineral Reserves in Estimation

For income approach methods, it is generally acceptable to use all Proved Mineral Reserves and Probable Mineral Reserves, and to use Measured Mineral Resources and Indicated Mineral Resources in the circumstances described below. However, historical estimates, preliminary exploration results, author's estimates of exploration targets and mineralisation - anything that is not defined as a Mineral Resource or Mineral Reserve in accordance with the KAZRC Code - should not be included in the EA.

It is generally acceptable to use Mineral Resources in an income approach if Reserves are also present and if Reserves are typically mined before Mineral Resources in the same income approach model, provided that in the opinion of the CL the Mineral Resources reflected in the income approach model are likely to be economically viable.

Where Measured and Indicated Mineral Resources are used in an income approach, the technical and related parameters used must be assessed or confirmed by one or more CLs and/or technical experts and the Report must include a clarifying statement of the level of confidence in the technical and related parameters relative to the level of accuracy and confidence in the EA. The technical and related parameters must be consistent with and current as of the date of the EA.

Where Measured and Indicated Mineral Resources are used in the Income Approach and/or where technical, economic, financial and related parameters are at a lower level of confidence than the PFS level, the higher level of risk or uncertainty must be reflected in some manner, which may include a higher discount rate, a reduction in the quantity of Mineral Resources or a deferral of the production dates of Mineral Resources in the Income Approach model or some other suitable means of reflecting the higher risk of including the Mineral Resources.

8.9.6 Evaluation of Prospective Mineral Resources, Exploration Targets and Ore Occurrences

Although they are not typically included in an EA, Inferred Mineral Resources have value to investors. In practice, many operations produce (incidentally) Inferred Mineral Resources (which are, for example, overburden from a quarry, along with the Mineral Reserves that co-occur with them) and these requirements should be taken into account when conducting an EA. There are instances where it may be necessary to estimate Inferred Mineral Resources, Exploration Targets and/or Occurrences. This may be in circumstances such as (but is not limited to):

- Justification of future (guaranteed) costs for exploration objects;
- Justification of the costs required to increase the reliability categories of Mineral Resources, exploration targets or ore occurrences;
- Calculation of the project's prospective budget efficiency – taxes and other payments to the budget.

It is obvious that in such cases there are significant risks associated with the EA in terms of the level of accuracy and reliability of the estimates or approach/method. Therefore, when preparing a report, it is necessary to qualify any such estimate as follows:

- A clear statement of the level of confidence and risks associated with the assessment;
- Reason for using the approach and method;
- Modifying factors that were applied.

It is not acceptable for the income approach to use “potential Mineral Resources”, “hypothetical Mineral Resources” or any other similar categories that are not consistent with the KAZRC or CRIRSCO definitions of Mineral Resources and Mineral Reserves. If the EA is based on inferred Mineral Resources to which the CL believes the income approach can be applied, the CL must disclose all risks associated with the estimate.

However, the EA may be developed at an early stage, provided that the relevant assumptions regarding the risks/uncertainties underlying the assessment are fully disclosed.

8.9.7 Basic parameters of EO

Technical, economic and related parameters shall include, but not be limited to, Mineral Reserves, Mineral Resources, mining recoveries (losses), dilution, mine plan, tailings and waste disposal, production schedule, metallurgical testwork, mill/metallurgical recovery, process plant design, project management, construction schedule, environmental aspects, permits, socio-economic aspects, political and geopolitical risks, reclamation and abandonment, closure plan, capital expenditure, operating costs, plant conditions, MET (or royalty), product sales, sales contracts (if any), financing and price forecasts. The relevant technical, economic and related parameters and the level of uncertainty and limitations of all material assumptions made by the CL shall be disclosed in the Report or summarized from any Technical Report used as a source document for the estimate.

8.9.8 Income approach

The income approach determines the net present value by converting future cash flows to their present value. According to the income approach, the valuation of an asset is determined based on the amount of income, cash flow, or cost savings.

The fundamental basis of the income approach is that investors expect to receive a return on their investments, and that such a return should reflect the expected level of risk in the investment. Investors in riskier assets require a higher return to compensate for this risk.

Generally, investors can expect to be compensated only for systematic risk (also known as market risk or non-diversifiable risk). For example, although it is riskier to invest in only one asset (or asset class) than to invest in a diversified portfolio of assets, the rates of return on individual assets are not expected to exceed the rates of return on the portfolio, all other things being equal.

Although there are many ways to implement the income approach, all income approach methods are essentially based on discounting future cash flows to their present value. They are all variations of the discounted cash flow (DCF) method, and the concepts below are partially or fully applicable to all income approach methods. In general, the valuation of mineral properties using the income approach comes down to the following algorithm:

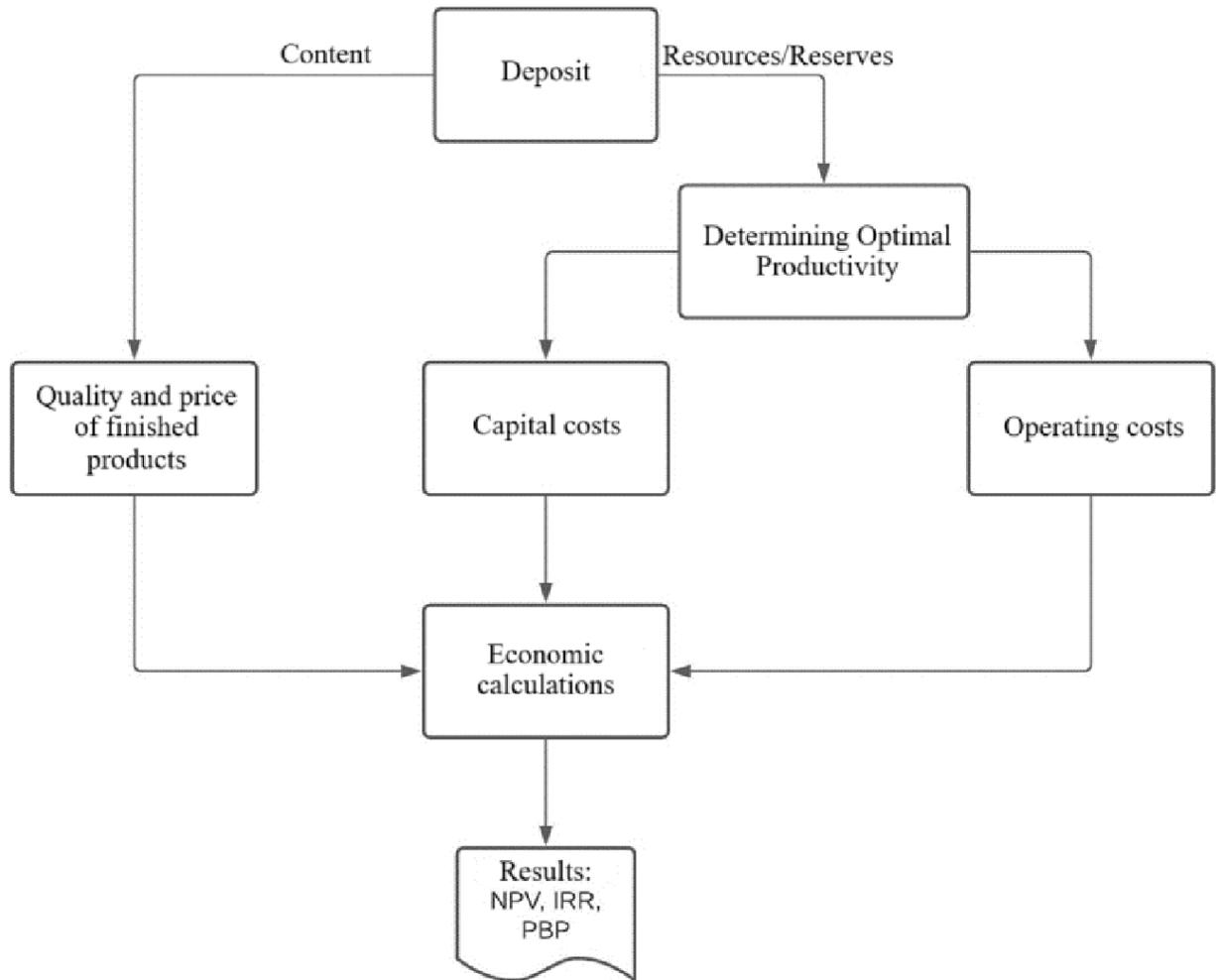


Figure 8.1 – Algorithm for evaluating mineral objects

8.9.9 Discounted Cash Flow (DCF) Method

Under the DCF method, the projected cash flow is discounted to the EO date, resulting in the present value of the asset.

Key steps of the DCF method:

- select the most appropriate type of cash flow for the nature of the asset under consideration and the purpose (i.e. gross or net, before tax or after tax, total cash flows or cash flows to equity, real or nominal, etc.),
- determine the most appropriate explicit period, if any, over which cash flow will be projected.

Given the finite nature of Mineral Resources extraction projects, it is necessary to determine the project implementation period, taking into account the terms of development of the deposit reserves. Production productivity should be determined by a set of factors, including, but not limited to: the tonnage of Mineral Resources and/or Mineral Reserves, mining and geological conditions of development, technological, infrastructural, economic, environmental and social conditions of development of the object. At the same time, the use of only special formulas - like the Taylor formula, is not sufficient for choosing the productivity of the enterprise.

- prepare cash flow forecasts for this period,
- determine the appropriate discount rate, and
- apply the discount rate to projected future cash flows.

Cash flow type

When selecting the appropriate type of cash flow for the nature of the asset, the factors listed below should be considered (however, it is important to note that the discount rate and other inputs should be consistent with the underlying assumptions):

- a. cash flow to the whole asset or to the participant's share: cash flow to the whole asset is usually used because a mining asset should theoretically have a single economic analysis value for the same set of modifying factors, regardless of how the project is financed, whether the income is paid out as dividends or reinvested. For mining projects, the most applicable is Free Cashflow to the Firm (FCFF), which allows us to assess the overall performance of the project for all investors.
- b. the cash flow must be after tax, the tax rates applied must correspond to the tax rates of the market participant, and not to the conditions of the specific owner (in the case where they differ from the market).
- c. nominal versus real: real cash flow does not take inflation into account, whereas nominal cash flow includes expectations of inflation. If the expected cash flow includes the expected rate of inflation, then the discount rate should be calculated taking into account the same rate of inflation, and
- d. currency: the choice of currency used can affect inflation and risks. This is especially true for emerging markets or currencies with high inflation rates. When exporting production, the income and expenditure parts of the financial and economic model are formed in different currencies. For correct forecasting, it is recommended to use inflation forecasting of the exchange rate based on the forecast inflation data for convertible currencies.

Cash flow forecasts

Cash flow for the forecast period is calculated using projected financial information (projected revenues/inflows and expenses/outflows).

Regardless of the source of the project financial information (e.g. management forecasts), the CL must analyze the assumptions underlying the EA and determine their adequacy.

The cash flow is divided into suitable periodic intervals (e.g. monthly, quarterly or annually) with the interval selected depending on the nature of the asset, the cash flow structure, the available data and the length of the forecast period.

The projected cash flow should reflect the amount and timing of all future cash inflows and outflows associated with the asset in question. Typically, the projected cash flow will reflect the most likely sequence of cash flows from a CL perspective.

8.9.10 Final value of fixed assets

If it is expected that some production assets will have a positive market value beyond the end of the forecast period of development of the deposit, it is not recommended to take into account their sale with the emergence of a corresponding cash flow at the end of development, since the purpose of the assessment is to determine the “realistic prospects for possible profitable production” at the site, and the residual/market value of the assets should not affect the development indicators.

8.9.11 Discount rate

The discount rate for the projected cash flow should reflect not only the time value of money but also the risks associated with the future operations of the asset or business.

While there are many methods for developing or determining the most appropriate discount rate, they typically consider the risk-free rate plus some form of risk premium.

A partial list of common methods includes:

- a. Capital Asset Pricing Model (CAPM),
- b. weighted average cost of capital (WACC),
- c. Internal Rate of Return (IRR),
- d. weighted average return on assets (WARA), and
- e. build-up method (usually used only in the absence of market factors).

When determining the discount rate for CL, the following should be taken into account:

- a. risk associated with forecasts regarding the cash flow used;
- b. rates applied in other similar projects in the industry,
- c. the geographic location of the asset and/or the location of the markets in which it will sell its products,
- d. the life of the asset and the reliability of the input data. For example, the risk-free rate under consideration will be different for an asset with a three-year life and a 30-year life,
- e. the type of cash flow used. For example, in business valuation, WACC is the discount rate that weights the rates of return across types of financing (debt and equity) and should be applied to the free cash flow to the firm, while CAPM results in the rate of return on equity that will be applied to the free cash flow to equity, and
- f. The discount rate should be developed from the perspective of the market participant, not from the perspective of a particular investor.

8.9.12 Depreciation

Depreciation deductions are generally recognized for the following types of asset obsolescence/wear and tear, which can be further divided into subcategories:

- a. physical obsolescence: any loss of usefulness due to physical wear and tear of an asset or its components as a result of its age and normal use,
- b. functional obsolescence: any loss of usefulness resulting from the ineffectiveness of the asset in question compared to its replacement, such as its design, specifications or technology becoming obsolete, and
- c. external, economic or extrinsic obsolescence: any loss of usefulness caused by economic or geographical factors external to the asset. This type of depreciation may be temporary or permanent.

Depreciation/obsolescence should take into account the physical and economic life of the asset:

- a. The physical life is the period during which an asset can be used before it becomes worn out or beyond economic repair, assuming routine maintenance but excluding any potential for refurbishment or reconstruction.
- b. Economic life is the expected length of time an asset can continue to provide financial or non-financial benefits from its current use. It will be affected by the degree of functional or economic obsolescence. The economic life cannot exceed the physical life.

When conducting an EA, the most important is tax depreciation, which is usually calculated at the maximum rates established by the Tax Code of the Republic of Kazakhstan for groups of fixed assets, or by the production method for the release of finished products. If necessary, the CL can separately calculate depreciation for accounting.

8.9.13 Approach to the formation of a deterministic model

To develop an EA, it is necessary to establish the technical, economic, environmental and social feasibility of subsoil use operations.

Matters to be considered in relation to mineral assets may include, but are not limited to:

- a. extraction and processing methods,
- b. content control, mining losses and dilution,
- c. engineering-geological, hydrological and climatic conditions,
- d. mineralogical and metallurgical factors that may affect the extraction process,
- e. processing flow chart,
- f. variability of the physical and chemical properties of a mineralized body,
- g. metal extraction and productivity,
- h. tailings and waste disposal,
- i. quantity and quality of final and intermediate products and waste,
- j. labor sources, needs and productivity,
- k. methods of work and technologies used or planned to be used;
- l. equipment utilization and productivity,
- m. sources of electricity and water,
- n. latest data from pilot production and processing (for the proposed production facilities),
- o. construction and commissioning schedules,
- p. product competitiveness, income factors, commodity prices and exchange rates,

- q. issues of transportation and sales of products,
- r. environmental, legal, statutory and social constraints and obligations, and
- s. measures to eliminate the consequences of mining.

8.9.14 Performance Definition

In determining proposed performance indicators, comparisons with previous indicators are required. Such comparisons should include, but are not limited to:

tonnage or volumes of minerals extracted and, where applicable, processed,
reconciliation of historical production volumes with ore reserve estimates,
quantity and quality of products, and
cost of extraction/processing.

8.9.15 Commodity products. Market analysis.

Market analysis includes the following components:

A) analysis of the market for the company's products, forecasts of supply and demand taking into account forecasts from leading analytical agencies.

B) a price forecast based on the average price over the last 5 years of the main exchange sources, taking into account the forecast price of the world's leading analytical agencies.

The forecast price is calculated based on the nature of the final product - metal or concentrate, taking into account the main useful components, for the content of which part of the cost of the concentrate is paid.

The methods for determining the cash value payable for concentrate are generally very similar for most non-ferrous metal smelters. The main points typically contained in a smelter contract include:

Basic processing fee or metallurgical fee (TC), usually expressed in dollars per dry metric ton (t) processed.

Analysis and price adjustment for each metal paid for.

Estimated fines for excess harmful component content. These assessments are usually included in the cost of processing (TC).

Refining costs to cover metal refining (RC) costs.

Price participation - increasing or decreasing tariffs depending on fluctuations in metal prices.

There are generally two types of contracts - long-term contracts, usually concluded on an annual basis, and spot contracts, which are short-term and usually apply to individual shipments.

Other clauses typically contained in a smelter contract include payment terms and currency; quotation period; weighing and sampling procedures; assay and arbitration procedures; insurance provisions for loss of cargo, title, and risk insurance; taxes and duties; force majeure; and arbitration.

Typically, for the main metal component, the amount paid is between 85 and 98 percent of the mass of metal in the concentrate. The percentage paid for by-products is usually lower.

The processing fee is also subject to agreement and adjustment. It is usually indexed to the main smelting parameters, i.e., labor, fuel, and electricity. It may also be increased by additional charges to cover items such as environmental costs.

Refining costs (RC) may be covered as a separate item, as an adjustment to the metal price paid, or as an invisible component of the recycling fee (TC).

Metal prices

There are many sources of metal price quotations. When determining income, it is advisable to use those that are most often referred to in concentrate processing contracts, because this is where the cost of the enterprise's products sold is determined. Among such sources of price information, we can note:

Copper - London Metal Exchange (LME) Grade A cash

Lead - LME Pure Lead cash

Zinc - LME SHG, cash (LME SHG cash)

Nickel - LME cash

Gold - Engelhard Industries (USA) and LME Cash.

Silver - LME Cash.

Palladium – LME PM cash

Platinum - London PM cash

8.9.16 Capital expenditures

The CL report should indicate the range or estimated order of accuracy of the capital and operating cost estimates adopted, as well as supporting data.

The CL shall analyze and describe the actual and projected capital and operating costs for the estimated period of the projected production of the mineral resource that is the subject of the report.

If the report includes information relating to projected costs, the CL must apply the reasonableness criterion to those costs and make any adjustments as necessary.

Adequacy

The CL must report on the adequacy of (and barriers to) access to the relevant Mineral Resources and the infrastructure necessary to undertake the extraction, and an estimate of the associated costs.

When estimating capital and operating costs, any likely changes over time in factors such as production methods and productivity should be taken into account to assess their realistic and achievable nature.

The capital cost estimate will typically include, but is not limited to:

- costs of feasibility study and related studies,
- the acquisition cost of the asset,

- costs of construction, implementation and commissioning,
- working capital,
- owner's costs,
- maintenance costs,
- costs of decommissioning, liquidation of consequences of subsoil use,
- unexpected costs, and
- the stated level of accuracy of cost estimates.

Capital Cost Estimates, are typically based on Mineral Resources/Reserves determined by exploration drilling and metallurgical analysis, and general experience with similar projects in accordance with the KAZRC disclosure standards. Such an estimate typically includes a geological model and an estimate of the grade of the mineralisation. A mine plan is then prepared, which covers the mining method (open pit, underground mine); production volume schedules; nominal production capacity; proposed process flow diagrams and balances; and a conceptual definition of infrastructure requirements. Only a minimal amount of metallurgical testing and geotechnical, hydrological or other additional studies may be carried out. No design drawings or equipment specifications are prepared, other than some rough sketches and diagrams by the project engineer.

8.9.17 Assessment methods used

Cost estimates are typically based on available internal and industry data for similar previous projects. Gross unit costs may be applied to mining and quarrying volumes. Equipment cost factoring methods may be used to calculate total capital costs to include all types of costs, and gross unit costs are applied to construction volumes, piping, and other components. Cost/performance ratio methods may be used for some cost items. Indirect costs are factored from direct costs based on internal and industry experience using typical cost factors and other parametric and modeling methods.

Existing sources of such models include, for example, consolidated estimate standards (SES), according to collections of which it is possible to make a consolidated assessment of capital costs for the creation of certain types of production. There are also similar international resources, such as InfoMine and others, which annually publish collections of prices for various equipment, materials, works, as well as ready-made economic models for mining production of different productivity. In addition, it is advisable to consider analogs if they are available.

If the available cost information is limited to one similar plant, or if the plants are comparable in all but capacity, the "0.6 rule" (or six-tenths rule) can be used to estimate capital costs. The 0.6 rule was first described by Mular (1978). The formula for the "0.6 rule" is:

$$\frac{\text{Investment costs } x}{\text{Investment costs } y} = \left[\frac{\text{Productivity } x}{\text{Productivity } y} \right]^{0.6}$$

According to Noakes (1993), the result of applying the 0.6 rule can be expected to have an error of about 30%.

Price indices are used to adjust capital expenditures for inflation when earlier sources are used. If expenditures are to be calculated for the current year, the following formula is used:

$$\text{Current costs} = \text{Annual costs } X \times \frac{\text{Price index (current)}}{\text{Price index (annual } X)}$$

8.9.18 Operating costs

Estimation of operating costs typically includes, but is not limited to:

- hiring of labor,
- consumables and spare parts,
- electricity, water supply and other resources,
- contract services,
- equipment rental and hire,
- administrative costs,
- environmental monitoring and protection, as well as non-capitalized reclamation/liquidation,
- transportation and accommodation of the workforce,
- social and public programs,
- product marketing, transportation and sales,
- taxes and other government fees,
- payments for the obligations of the subsoil user
- unexpected costs, and
- the stated level of accuracy of cost estimates.

Services and infrastructure that should be considered include electricity, water, transport links, communications, security, staff accommodation, medical services and waste and tailings treatment and/or disposal facilities. The CL report should also consider any access and terrain conditions that may impact exploration and development logistics.

Comparison

If the CL considers it appropriate, the capital and operating cost estimates should be compared with those of similar industries.

Both capital and operating costs should be presented by functional grouping and in suitable units of measurement such as "per ounce of gold produced" or "per ton of ore produced at annual plant throughput", in addition to the total capital and annual operating costs.

8.9.19 Project implementation

Income - Initial Assumptions

The CL report should estimate the potential income stream from the mineral asset for the relevant period.

If the CL report includes information relating to forecast revenue, it must establish reasonable criteria for price-related assumptions applicable to any product(s) derived from the mineral asset.

Assumptions related to pricing may include, but are not limited to:

- projected product prices, metal processing and refining costs, current and projected market conditions, and the likely quantity and quality of products,
- components of fines and surcharges of the product,
- variation in the price of the product and the source used to forecast product prices,
- the size, nature and location of product markets,
- imbalances in the commodity market and price discounts or markups,

- sales volumes,
- price increase,
- exchange rates,
- hedging or forward sales contracts.

It should be clearly stated whether the expected income is estimated in real or nominal terms.

If by-product credits make a material contribution to revenue, production costs should be reported with and without credits for by-products.

The auditor must apply reasonableness criteria to the income assumptions and make any adjustments as necessary.

Market assessment

A consideration of the proposed production volumes and product quality with likely market opportunities and available Mineral Resources and/or Ore Reserves should be included in the CL report.

Financing

The conclusions of the CL report may be affected by the terms of project financing. Therefore, the CL should analyze the likely financing terms when preparing the report in terms of the validity of the main assumptions.

Commitments, contractual obligations and financial risks

The CL must note in the report the financial obligations and risks of the project known to him.

Such financial risks may include, but are not limited to:

- creditors,
- expenses and obligations for conducting geological exploration work,
- costs of compliance with environmental regulations, reclamation and liquidation of production facilities,
- security deposits, and
- material agreements and contracts, including development plans, sales contracts, joint venture agreements, subsoil use contracts and licenses, royalty agreements, project permits, etc.

Forecasts

Current and projected future economic conditions may affect the economic viability of the project. The CL report should contain a discussion of these conditions together with supporting justification for the assumptions made.

Financial models use forward-looking assumptions. Such projections may be considered forward-looking statements, and therefore the CL should be familiar with the relevant requirements for such statements.

8.9.20 Economic model.

The results of the financial and economic model include the project's cash flows before and after taxes, as well as unit costs. Various project cost indicators are also calculated, including the net present value of cash flows (NPV) and the internal rate of return (IRR).

An example of calculations and preparation of a financial and economic model is given in Appendix G.

Taxation.

The report should include the assumptions used in the financial and economic model to calculate taxes, cost growth, inflation and exchange rates.

Cost-effectiveness analysis

An analysis of the Project's profitability is provided and compared with industry averages.

Project Sensitivity Analysis

A sensitivity analysis is performed to demonstrate the impact of changes in key parameters on the economic return of the project.

It is recommended that sensitivity data be presented in tabular form and in the form of graphs for the main indicators, usually these are:

- The price of the useful component,
- Capital expenditures,
- Operating expenses,
- Average grade in ore,
- Recovery coefficient during processing.
- The after-tax cash flow sensitivity analysis is conducted by varying the key variables (stated above) by +/- 15% to 20% of the base case cash flow, and each sensitivity is calculated independently.

9 ASSESSMENT OF MINERAL RESERVES

A report disclosing Mineral Reserves must:

- (a) provide a sufficient and detailed description of the key assumptions, parameters and methods used to enable a reasonably informed user of the report to understand how the Competent Person was able to convert Mineral Resources to Mineral Reserves;
- (b) comply with all Mineral Reserve disclosure requirements set out in the KAZRC Code;
- (c) where Mineral Reserves of multi-component complex minerals are reported on a metal or mineral equivalent basis, report the individual grades of each metal or mineral and the metal prices, recoveries and any other relevant conversion factors used to value the metal or mineral equivalent; and
- (d) describe the extent to which mining, metallurgical, infrastructure, permitting and other relevant factors could materially affect the Mineral Reserve estimate.

The source for the transfer to Mineral Reserves are the Mineral Resources previously explored and estimated at the deposit.

The criteria and methods used as a basis for classifying Mineral Reserves into different confidence categories shall be based on the relevant Mineral Resource category and include consideration of reasonable Modifying Factors.

The Mineral Reserve Report must specify in sufficient detail the mining method (open pit or underground), the source and type of mineralisation and information on ore bodies.

10 RISKS, OPPORTUNITIES AND FUTURE DIRECTIONS OF WORK

The CL report should include an assessment of the risks that may arise in relation to the mineral assets under consideration. The risk assessment includes an analysis of the uncertainties inherent in the assumptions made and their impact on the outcome.

Risks may arise regarding the availability, uncertainty and quality of data and other information, including, but not limited to:

- a. geological prospectivity and the possibility that further exploration may not demonstrate economic mineralization (in the case of projects without defined Ore Reserves),
- b. geology of mineral deposits,
- c. estimation of Mineral Resources or Ore Reserves,
- d. operational aspects including mining/extraction method, dilution and mining losses, equipment selection and efficiency, selective mining assumptions where possible, waste management, regulatory compliance and mine abandonment,
- e. mineral processing and the variability of metallurgical parameters such as: recovery rates, equipment utilization rates and the ability of new processes to operate as predicted,
- f. construction, including unexpected physical or weather conditions, as well as social conflicts, which may affect both capital costs and the completion date of construction,
- g. provision and adequacy of infrastructure,
- h. forecasts of product prices, inflation and exchange rates,
- i. manufactured products in terms of quality, price and cost price,

- j. sovereign risk, which is associated with social, political, environmental, cultural and security factors that cannot be controlled by the project owners, and
- k. project financing.

The CL should report on the likelihood of deviations from the underlying assumptions. These may include delays in completing or commissioning projects; major changes in operating practices; or potential difficulties with new technologies, particularly if such factors could have a significant impact on technical or financial feasibility.

The key risk associated with exploration activities is the risk that the results of Mineral Resource/Reserve estimates will not be confirmed.

In turn, geological risks of non-confirmation of the prospects of the assessed object are associated with non-confirmation of geological, geophysical and other characteristics of the assessed object. Geological risks may occur when using unreliable data or inaccurate measurements, as well as subjective assessments and high uncertainty of the forecast when determining the prospects of the assessed object. The implementation of geological risks directly affects the results of the work.

This section proposes to assess (analyze) the geological risks that occurred during geological exploration work at different stages of project implementation (exploration), indicating the decision points for continuing or completing the work.

Recommendations should contain solutions to avoid similar situations in the future. In the event of a cumulative effect of errors associated with geological risks, recommendations may contain solutions up to and including changing the methodology of geological exploration work.

11 CONCLUSIONS AND RECOMMENDATIONS

The main results of the work and conclusions are briefly presented: on the degree of exploration and study of the geological structure, material composition and technological properties of the mineral, the conditions of development of the deposit; assessment of its industrial significance.

The main unresolved issues and problems that require further study are highlighted, with corresponding recommendations.

For developed deposits, recommendations may be set out for improving the adopted development systems, ore preparation and enrichment schemes, technological schemes, rational and comprehensive use of minerals and the components contained in them.

The analysis of the general prospects of the deposit is covered, with an assessment of its possible potential and the expected economic efficiency of its development.

In some specific cases, the Competent Person may not be able to make meaningful recommendations for further work. Typically, such situations are limited to areas at the development or production stage where significant exploration and technological research activities have already been completed. In such cases, the Competent Person should explain why he or she is not making further recommendations.

12. References, reports of predecessors.

The list of references should contain a list of literary sources and previous reports referenced in the text of the report.

Based on established practice, it is recommended to first cite published works from open sources, and then stock reports.

Literary sources in the list are usually arranged in alphabetical order and numbered (continuous numbering).

If there are several works by one author, they are presented in chronological order, and if the years of publication coincide, they are presented in alphabetical order of titles.

Works written in collaboration are listed in alphabetical order of the authors' surnames, and in the case of a complete coincidence of the author's teams, in chronological order of publication.

The bibliographic description of literary sources/reports must include the last name and initials of the author or group of authors, the full title of the literary source/report, the name of the publisher or organization that issued the report, the city and year of publication/compilation.

APPLICATIONS

Appendices to the report can be textual and graphical.

Text appendices include various auxiliary materials: extracts from reports, descriptions of outcrop sections, mine workings, boreholes, list of observation points, additional illustrations, tables, paleontological definitions, etc., necessary for the completeness of the report and explanation of conclusions or serving as primary material for them (descriptions of sections and boreholes), tables of assessment of Mineral Resources/Reserves, results of laboratory determinations and their mathematical processing.

Graphic applications include various maps, geological sections, stratigraphic columns, various diagrams, graphs, etc.

Appendices are arranged in the order in which references to them appear in the text. Each appendix should begin on a new page and have a meaningful title.

Illustrations (maps, graphs, charts, diagrams, sketches, photographs, computer printouts, etc.) in the report are placed immediately after the text in which they are mentioned for the first time, or on the next page.

Tables must have a meaningful, precise and brief title. Tables are placed among the text or on separate sheets. They are placed after the first mention of them in such a way that the tables are read without turning the report or with a clockwise turn. All tables must be referenced in the report.

APPLICATION A - Glossary

The main terms used in the Report are summarized for clarification in this subsection and contain the name of the Customer, Contractor, explanations of Mineral Resources and Reserves, deciphering the main significant parameters of the Report.

APPLICATION B - List of abbreviations

All abbreviations used in the report are provided.

CL	Competent person
CIM	The Canadian Institute of Mining, Metallurgy and Petroleum
Feasibility study	Feasibility Study
PTEO	Preliminary feasibility study
PEA	Preliminary Economic Analysis (Scoping Study)
LME	London Metal Exchange, London Metal Exchange

APPLICATION B - Units of measurement

The units of measurement used for the main quantities are given.

APPENDIX G: Geostatistics: semivariograms

To reduce the burden of a report when there are numerous and complex geostatistical graphs, they can be moved to an Appendix.

APPENDIX D: Quality Assurance and Control of Analytical Works (“QA/QC”)

The main laboratory documents, standard samples, etc. are added as Appendices.

Appendix 1-D: List of laboratory equipment

Appendix 2-D: Certificate of assessment of the state of measurements in laboratories as of _____.

Appendix 3-D List of used standard samples (co)

APPENDIX E: Data of analytical studies (tabular appendices)

More detailed data on Quality Control for various periods, statements of calculations of internal and external control using various methods can be included in a separate Appendix.

APPENDIX G: FINANCIAL AND ECONOMIC MODEL

The financial and economic model is a visual illustration of the production plan and the economic part of the Project and is provided in the recommended form.

TABLE #1

Table No. 1 is filled in accordance with the KAZRC Code version 2016.

Table 1 in the 2021 Code is used as a checklist to assess the completeness of the report.

CERTIFICATE OF COMPETENT PERSON

Appendix 2 (page 49) of the 2021 KAZRC Code

This Competent Person Certificate is only provided as a guide for the Competent Person. It is designed to meet all the requirements of the KAZRC Code.

Competent Person Certificate

As the author of the report entitled [title], I hereby declare:

1. My name is [name of competent person] and [details - position in the company, company name, address].
2. [Profession and details of the registering authority].
3. [Qualification].
4. [Relevant experience].
5. I am a “Competent Person” as defined in the KAZRC Code.
6. [Work performed or services rendered].
7. [Details of the site visit].
8. [Details of aspects of this report for which the Competent Person is responsible].
9. I don't know about any material facts or material changes in relation to the subject of the Report that are not reflected in the Report and the omission of which may mislead the readers of the Report.

10. I declare that this Report fairly reflects the views of the Competent Person/author.

11. I am independent/not independent of [name of issuer].

12. I have read the KAZRC Code and the report has been prepared in accordance with the guidelines of the KAZRC Code.

13. I do not have, and do not expect to have, a direct or indirect interest in [project/mine details] or [name of issuer] OR I am an [employee/shareholder/director or other interested party] in relation to the issuer [name of issuer] or the project/mine. OR I have no conflict of interest in relation to the issuer [name of issuer] or the project/mine.

14. At the time of entry by virtue of the Report, to the best of my knowledge, the information and beliefs,

The Report contains all scientific and technical information that must be disclosed so that the Report does not introduce into confusion.

Date from [place] and [date].

[Signature]

[Name of Competent Person]

[Name of PO or RPO]

List of sources

1. NI 43-101 Standards of Disclosure for Mineral Projects, Form 43-101F1 Technical Report and Related Consequential Amendments, 2011.
2. AACE International Recommended Practice No. 47R-11: Cost Estimate Classification System – As Applied In The Mining And Mineral Processing Industries, 2012.
3. AACE International Recommended Practice No. 18R-97: Cost Estimate Classification System - As Applied In Engineering, Procurement, And Construction For The Process Industries, 2005.
4. ASIC REGULATORY GUIDE 170: Prospective financial information, 2011.
5. AUSIMM: Guidelines for Technical Economic Evaluation of Minerals Industry Projects, 2012.
6. Friedrich-Wilhelm Wellmer, Manfred Dalheimer, Markus Wagner: Economic Evaluations in Exploration, 2008.
7. CIM: The CIMVAL Code for the Valuation of Mineral Properties, 2019.
8. CIM: Standards And Guidelines For Valuation Of Mineral Properties Special Committee Of The Canadian Institute Of Mining, Metallurgy And Petroleum On Valuation Of Mineral Properties (CIMVAL), 2003.
9. AUSIMM: Code for the Technical Assessment and Valuation of Mineral and Petroleum Assets and Securities for Independent Expert Reports, 2005.
10. SME: SME Standards And Guidelines For Valuation Of Mineral Properties, 2017.
11. The South African Code For The Reporting Of Mineral Asset Valuation (The SAMVAL Code), 2016.
12. The VALMIN Committee: Australasian Code For Public Reporting Of Technical Assessments And Valuations Of Mineral Assets, 2015.
13. IVSC: IVS 105: Valuation Approaches And Methods, 2016.

Appendix 1 – Explanatory Notes TO THE TABLE OF CONTENTS OF THE MINERAL RESOURCES/RESERVES ESTIMATE REPORT

Content	Explanations
<p>1 INTRODUCTORY INFORMATION 2 DESCRIPTION OF THE SUBSOIL USE OBJECT AND LOCATION 3 STORY 4 GEOLOGY AND MINERALIZATION 5 STAGE OF STUDY 6 MINERAL RESOURCES ASSESSMENT 7 RESULTS OF TECHNICAL STUDIES WITH ASSESSMENT OF MODIFYING FACTORS 8 GRADEMINERAL RESERVES 9 RECOMMENDATIONS</p>	<p>Items 1 to 9 – a brief summary of the entire report with key tables (Mineral Resources, Reserves, Key Economic Indicators)</p>
<p>1 INTRODUCTION 1.1 Basic information on the project, data of the subsoil user 1.2 Technical assignment/Composition and scope of work 1.3 Sources of information 1.4 Site visit or participation in field work by a Competent Person 1.5 Relying on other experts 1.6 Limitations, Declaration, Permissions, Copyrights and Explanations 1.6.1 Declaration 1.6.2 Copyright 1.6.3 Legal support 1.7 Consultant qualifications 1.7.1 General information 1.7.2 Responsible for preparing the report</p>	<p>Technical specifications from a subsoil user company in the generally accepted form, stages of work and goals in more detail List of information on which the report is based Brief description of the visit with overview photos, information and photos by sections - in the relevant sections (core warehouse, laboratory) Which sections are completed by other experts? Free form copyright and disclaimer Description of the current situation/stage, tasks Location with map of Kazakhstan / region</p>
<p>2 PROJECT STRUCTURE 2.1 Description of the subsoil use object</p>	
<p>3 ACCESSIBILITY, PHYSIOGRAPHY, CLIMATE, LOCAL RESOURCES AND INFRASTRUCTURE 3.1 Topography, relief 3.2 Climate 3.3 Hydrographic network 3.4 Fauna and flora 3.5 Access, proximity to populated areas. General infrastructure</p>	<p>Brief description of exploration stages, drilling programs, ideas about the type and structure of the deposit</p>
<p>4 HISTORY OF THE PROJECT DEVELOPMENT 4.1 Previous subsoil users 4.2 Previously completed geological exploration work 4.3 Previously completed Mineral Resource/Mineral Reserve Estimates 4.4 History of development</p>	<p>Stock Tables</p>

<p>5 GEOLOGICAL STRUCTURE, MINERALIZATION AND TYPE OF DEPOSITS</p> <ul style="list-style-type: none"> 5.1 Type of mineralization 5.2 The location of the deposit in the geological structures of the region 5.3 Geological structure 5.4 Nature and control of mineralization <ul style="list-style-type: none"> 5.4.1 Characteristics of ore zones/bodies of the deposit 5.4.2 Tectonics, ore-controlling structures 	<p>Geological and industrial type Geological models with analysis of ore confinement to certain rock complexes, statistics. Wireframe models, drawing of boundaries (oxidation zones, mixed ores), justification, ore domains by lithology and statistics, illustrations by sections by models</p>
<p>6 GEOLOGICAL EXPLORATION DATA</p> <ul style="list-style-type: none"> 6.1 Introduction 6.2 Topographic and mine surveying principles 6.3 Search work 6.4 Geological exploration <ul style="list-style-type: none"> 6.4.1 Geophysical research 6.4.2 Drilling 6.4.3 Logging 6.4.4 Mining operations 6.4.5 Core Documentation Procedures 6.4.6 Testing 6.4.7 Sample preparation 6.4.8 Laboratory tests 6.5 Quality control QAQC of geological exploration works <ul style="list-style-type: none"> 6.5.1 Definitions 6.5.2 Test control 6.5.3 Sample Processing Control 6.5.4 Analytical quality control procedures and data 6.6 Database 6.7 Hydrogeological works 6.8 Engineering and geological surveys 6.9 Study of bulk density and moisture content 6.10 Technological research 6.11 Environmental research 6.12 Exploration data assurance, audits and reviews 	<p>Traditional description of exploration programs and results</p> <p>Description and photographs of sample preparation and laboratory equipment from a visit to the KL facility</p> <p>In detail by stages of study, quality control according to standards, forms, certifications</p> <p>Description of the methodology for creating a database</p> <p>Control of geological work</p>
<p>7 MINERAL RESOURCE ESTIMATES</p> <ul style="list-style-type: none"> 7.1 - Methods of evaluation and modeling 7.2 Intelligence Database 7.3 Geological model 7.4. Modeling mineralization and surfaces 7.5 Creating Composite Intervals 7.6 Statistical analysis <ul style="list-style-type: none"> 7.6.1 Summary statistics 7.6.2 Definition (limitation) of outstanding contents 7.7 Variographic analysis 7.8 Determination of volumetric weight 7.9 Block modeling 7.10 Model verification 7.11 Classification Mineral resources and criteria 	<p>Database description, statistics, error checking</p>

<p>7.12 Quarry optimization 7.13 - Mineral Resources Report 7.14 Tonnage-grade charts 7.15 Comparison of Mineral Resources presented in the Report with reserves listed on the State Balance of the Republic of Kazakhstan</p> <p>8 TECHNICAL RESEARCH</p> <p>8.1 Introduction 8.2 Engineering and geological research 8.3 Hydrogeological research 8.4 Development design and production schedule 8.5 Metallurgical research (processing/beneficiation) 8.6 Environmental research 8.7 Closure and reclamation 8.8 Legal and Permitting Issues 8.9 Economic criteria</p> <p>9 ASSESSMENT OF MINERAL RESERVES 10 RISKS, OPPORTUNITIES AND FUTURE DIRECTIONS OF WORK 11 CONCLUSIONS AND RECOMMENDATIONS</p> <p>APPLICATIONS APPENDIX A - GLOSSARY APPENDIX B - LIST OF ABBREVIATIONS APPENDIX B - UNITS OF MEASUREMENT APPENDIX G - GEOSTATISTICS: SEMIVARIOGRAMS APPENDIX D: QUALITY ASSURANCE AND CONTROL OF ANALYTICAL WORKS 2011 (“QA/QC”) Appendix 1-B: List of laboratory equipment Appendix 2-B: Certificate of assessment of the state of measurements in laboratories as of _____ Appendix 3-B List of used standard samples (s) for ____year APPENDIX E: ANALYTICAL RESEARCH DATA APPENDIX G: FINANCIAL AND ECONOMIC MODEL</p> <p>TABLE #1</p> <p>COMPETENT PERSON CONSENT FORM</p>	<p>Technical studies are described in detail in the case of a feasibility study stage as modifying factors influencing the RESERVES categories and briefly if this is a report with only an assessment of MINERAL RESOURCES The level of detail of the data is provided in Appendix 3.</p> <p>Recommendations of the CL for continuation of exploration work at the field, problematic issues</p> <p>Any detailed illustrative information necessary to understand the aspects of the assessment</p> <p>Table No. 1 in accordance with the KAZRC Code form</p>
---	---

APPENDIX 2 - Minimum Contents of a Mineral Resource and Mineral Reserve Report in accordance with KAZRC

Description	Scoping Study	Preference Study	Feasibility Study
INTRODUCTION, PROJECT STRUCTURE, ACCESSIBILITY, PHYSIOGRAPHY, CLIMATE, LOCAL RESOURCES AND INFRASTRUCTURE, HISTORY OF PROJECT DEVELOPMENT			
Location, Topography and Climate			
Situational plan	Base map	Detailed map showing mining allotments and boundaries	Detailed map showing all mining allotments and boundaries
Topographic map	Base map showing the relief of the area, with contour intervals of 20-100m	Preliminary map showing topographic and geographic features of the site, with contour intervals of 1 - 10 m	Detailed topographic map; aerial survey data verified with ground observations and surveys, with contour intervals of 1 m
Ownership	Analysis of the boundaries of the license area and subsoil use rights	Analysis of the boundaries of the license area and subsoil use rights	Access roads and subsoil use rights are protected and controlled
Current situation and background			
Historical chronology	Basic presentation of previous owners and work history	Full presentation of previous owners and work history	Detailed presentation of previous owners and work history
Historical production data (if available)	Basic presentation	Full presentation	Detailed presentation
GEOLOGICAL STRUCTURE, MINERALIZATION AND TYPE OF DEPOSITS			
Description of geological conditions			
Review	General overview of regional geology	Preliminary analysis of the geology of the site	Detailed analysis of the geology of the site taking into account local geology and the geology of the deposit
Data registration	Overview of existing available maps	Detailed analysis of geological maps, including cross-sections	Well-studied deposit with 3D model, geological maps, longitudinal sections and horizon plans
Geological assessment	Preliminary	Basic assessment and review of mineralogy and controls	Detailed assessment of structures/rock contacts, alteration, mineralization, deposit characteristics
Mineralogical testing and analysis	Limited testing; preliminary assessment	Preliminary mineralogical sampling and analysis; preliminary assessment of enrichment possibilities	Detailed mineralogical study taking into account the different forms of mineralization from the point of view of enrichment/impact on ecology; corresponding maps and 3D models
Drilling, Geotechnical Investigations, Sampling, Analysis			
Parameters of drilling wells	Wide grid mapping/channel sampling/corresponding drilling	Initial network thickening; preliminary well layout	Dense grid drilling with detailed well layout to confirm estimated Reserves categories; assessment of narrow interval grade variability using twin wells and geostatic cross-checks
Samples	Preliminary samples; individual assays, historical results/production/reserves report	Regular sampling of wells and analysis with quality assurance/quality control program in accordance with international reporting systems	Completion of all sampling programs
Geotechnical investigations	Preliminary research, analysis based on comparison with similar industries	Preliminary assessment of rock mass properties, including geotechnical logging and borehole sampling with multiple test pits for plant site selection and infrastructure facilities.	Detailed assessment of rock mass properties and ore body characteristics during mining operations. This assessment includes geotechnical mapping, rock stress modeling, rock support system design, slope angles, bench sizes, etc.
Analysis data	Report on existing drilling data	Checking of all wells (coordinates, elevations, inclinations, etc.), verification analyses, sample	Well data verification (coordinates, elevations, inclinations, etc.), verification analyses, comparison of inclined and vertical well data, etc.), verification analyses, twin well

Description	Scoping Study	Preference Study	Feasibility Study
		preparation and analysis flow chart, documented quality assurance/quality control program	drilling; flow chart of analysis; validated database, full quality assurance/quality control program (implemented and documented)
Drilling to confirm the absence of ore	not executed	not executed	Test drilling of areas under all major infrastructure facilities, including waste dumps, tailings storage facilities and processing plants
MINERAL RESOURCES AND RESERVES			
Resources	Typically implied (based on historical data) but may be Indicated or Inferred Resources	Indicated Mineral Resources (sometimes some Mineral Resources in the Inferred category are considered as an optimistic option, however the Life of Mine Plan should only be based on Indicated Mineral Resources or higher)	Measured and Indicated Mineral Resources (sometimes some Mineral Resources in the Inferred category are considered as an optimistic option, however the Life of Mine Plan should only be based on Indicated Mineral Resources or higher)
Geological control means	It is assumed	They are established based on geological data and mineralogical structural studies.	Well defined by high density geological data
Density	Preliminary assessment based on information materials	Preliminary analysis and definitions	Detailed analysis and definitions for each type of material
Statistical analysis	Not implemented	Preliminary analysis and definitions	Detailed analysis and definitions for each assessment area
Geostatistical analysis	not executed	Preliminary analysis and definitions	Detailed analysis and definitions
Evaluation of the useful component content	Supposed	3D block model, preliminary tonnage-grade curve	Three-dimensional block model of all significant quality parameters, high-confidence quality-volume curve
Stocks	Mineral Resource/Reserve Estimate or Low Confidence Estimate	Probable	Proven or probable
Evaluation parameters	Typically, reserves are not estimated.	Known or appreciated	Detailed analysis and definitions
On-board content (OC)	Calculated based on operating costs at similar enterprises	Calculated based on operating costs	Calculated and then optimized based on mining/processing parameters
TECHNICAL RESEARCH			
General part			
Method of extraction	Estimated; open or underground mining based on information about similar operations	A specific method determined on the basis of a preliminary assessment	The method of extraction and the mining plan finally determined after detailed assessment and analysis
Production schedule	Baseline schedule based on estimated life of mine	Preliminary or life-of-mine based production volumes and ore and rock quality indicators	Detailed annual/quarterly graphs showing ore/product grade and waste volume and quality
Capital Cost Estimation	Order of magnitude, calculated or based on indicators of similar industries	Preliminary equipment list; price indicators based on budget or historical data; use of certain coefficients	Detailed list of equipment; final prices for major equipment and infrastructure facilities; all capital equipment units identified and preferably put out to tender
Estimation of operating costs	Order of magnitude, calculated or based on indicators of similar industries	Quantitative estimates of labor, energy, and materials costs; unit price estimates based on budget or historical data; use of specific ratios	Detailed engineering assessment of project areas based on price proposals and detailed cost analysis
Quarry development plan			
Quarry sides	Presumable	Preliminary slope angles of quarry sides and waste heaps, determined based on the results of	Slope angles of quarry sides and waste heaps determined with a high degree of accuracy based on the results of

Description	Scoping Study	Preference Study	Feasibility Study
		the stability analysis of the sides based on geotechnical studies	geotechnical works; structural mapping based on borehole data with the selection of oriented cores
Quarry project	Simplified final pit contours, in some cases optimised using Whittle software using assumed input parameters	Optimisation of quarry outlines in Whittle using preliminary input parameters; preliminary analysis of haulage routes.	Detailed pit design in stages, including access for equipment operation. Final optimisation of pit outlines in Whittle using accurate input parameters
Dumps	Simplified final contours of dumps	Preliminary design for total waste rock volume; intermediate and final contours of waste dumps	Waste dump areas defined by geotechnical data; final waste rock volume defined taking into account intermediate stages, annual and final dump contours
Mine development plan			
Mining plan	Proposed mining system; general description of the mining and development plan, proposed dimensions of the working chambers	A preliminary mining system defined on the basis of geological and geotechnical data; a preliminary description of mining and development operations, including a stripping plan	A specific mining system defined on the basis of geological and geotechnical data; a detailed description of mining and development operations, including a stripping plan
Rock fastening	Proposed support option based on comparison with other mines	Preliminary assessment based on geotechnical investigations	Detailed assessment based on in-depth geotechnical investigations and analysis
ENRICHMENT			
Ore sampling and testing work	Minimum testing; laboratory testing to determine process characteristics on selected samples (if available)	Core sampling; preliminary laboratory testing to determine recovery rates, ore characteristics and beneficiation parameters for process flowsheet development	Collection of core samples from various areas of the ore body; validation of the process flowsheet; comprehensive beneficiation test programme to determine recovery rates and waste and useful component contents, testing and analysis of variability; determination of ore/product characteristics and final selection of beneficiation parameters. Pilot plant.
Design of technological process			
Performance	Approximate performance assessment based on information about similar objects	Conducting a performance optimization study	Performance should be determined at the Pre-Project Study stage, but may be adjusted based on new information.
Design concept	General description of design criteria and parameters, including local/regional climatic conditions	Design criteria for a construction site taking into account known climatic conditions at the site	Determination of design parameters taking into account known climatic conditions on the site
Initial data for design	Preliminary, using estimates, industry standards or information about other companies	General design basis; preliminary engineering drawings; conducting some comparative studies	Detailed design basis; basic engineering drawings generally complete; additional comparative studies completed
Technological Semes	Proposed circuit based on known technologies; simplified block diagram	Determination of a possible process flow diagram based on preliminary test data; flow diagrams of the main process flows; preliminary determination of material and heat balances	Detailed process flow diagram based on a comprehensive enrichment test program. detailed equipment list; diagrams for all process flow diagrams; final determination of material and heat balances
Description of the technological process	General	Comments: working design is 1-2% complete	Detailed description; working design is 5-15% complete
Layout	Approximate geographic location and site map; no layout drawings	Optimization of the object location on the site map with relief image; simplified layout drawings for large pieces of equipment	Precise geographic location on a site map with relief images; detailed layout drawings; detailed layout diagram of objects
Construction works	Approximate topographic maps; no soil analysis or quantitative estimates	Updated topographic maps; soil condition report to determine foundation type; preliminary quantitative estimates	Detailed topographic maps with established soil characteristics for foundation design, loads and quantitative assessments

Description	Scoping Study	Preference Study	Feasibility Study
Equipment specifications	List of main equipment	Preliminary list of main equipment with initial dimensions and specifications	Complete list of main equipment with detailed dimensions and specifications
Structural part	No	Schematic drawings	External elevation marks only
Pipelines/HVAC Systems	No	Preliminary piping and instrumentation diagram	Basic piping and instrumentation diagram
Electrical distribution network	No	Basic single-line diagram of an electrical network	All design schemes of single-line electrical networks
Engines	No	General description	Detailed list of main units of equipment with indication of power (hp)
Control and measuring instruments	General description	General description	Detailed list of devices
PLACEMENT OF TAILS			
Tailings storage facility	Project with costing based on similar objects	Conducting a detailed analysis for site selection, preliminary assessment of tailings placement method, cost calculation with an accuracy of +/- 30%	Testing of representative samples of tailings to determine their physical properties, basic design of tailings storage facility and tailings disposal method to calculate costs with an accuracy of +/- 15%
INFRASTRUCTURE			
Buildings	General overview with description of types of service facilities	Definition of all types of service structures, dimensions and quantitative assessments	Determination of all necessary service structures, calculation of dimensions and costs
Engineering communications	Determination of necessary communications	Communications Research	Obtaining information on licensing and utility standards
Electricity supply	Overview of available power supply sources and the cost per unit of electricity in the region	Identify power supply sources and needs; obtain cost information from the power supplier	Power requirements and unit costs are determined based on detailed engineering studies.
HYDROGEOLOGY			
Water supply sources	Estimation using regional data	Preliminary hydrogeological study	Identifying a specific water supply source
Water consumption	Estimated volume required for the factory and unit costs	Estimation of the volume of water required for the plant and estimation of specific costs	Determination of required water volume for the plant and unit costs based on detailed engineering/geotechnical studies
Dehumidification	Determination of drying parameters	Evaluation of dehumidification parameters and preliminary cost assessment	Confirmation of dehumidification parameters, determination of water treatment plan and cost calculation
ECOLOGY			
Environment	A preliminary environmental assessment of a property to identify potentially significant environmental or permitting restrictions based on the location of the property	Preliminary assessment of the impact of the facility on the environment; Characterization of all possible impacts of the facility on the schedule for obtaining the necessary environmental and/or other permits; assessment of the environment of the facility to determine potentially significant environmental or permitting restrictions based on data on the location of the facility.	Characterization of all possible environmental impacts of the facility; final determination of the schedule for the release of environmental and/or other necessary permits; assessment of the facility's environment to determine potentially significant environmental or permitting restrictions.
Data	Collection and analysis of all existing data on environmental studies, assessments or audits; inspections conducted by regulatory authorities, waste management practices, management plans and all applicable environmental regulations; social, training and safety programs are not specified	Collection and analysis of all existing data on environmental studies, assessments or audits; inspections carried out by regulatory authorities, waste management practices, management plans and all applicable environmental regulations; preliminary collection of environmental baseline	Identification of all necessary environmental data for the project; completion of site sampling and analysis; detailed review of the types, scope and schedule of environmental and/or government reports; comprehensive collection and assessment of baseline environmental data; confirmation of social, training and health and safety programs.

Description	Scoping Study	Preference Study	Feasibility Study
		data, definition of social, training, health and safety programs	
Environmental Impact Statement/Environmental Assessment	No	Preparation of a preliminary Environmental Impact Statement/Environmental Assessment	Submission of Environmental Impact Report/Environmental Assessment to Regulatory Authorities
Reporting and plans	Conceptual plans for managing any environmental issues identified	Preparation of an environmental action plan and monitoring programs; preliminary sediment and erosion control plan; preliminary land remediation plan; assessment of acid water drainage needs; analysis of the geotechnical stability of waste dumps and tailings dam; preliminary plan for mitigation of adverse environmental impacts; preliminary plan for spill and accident response	Incorporate environmental design considerations; finalize environmental plans and monitoring programs; sediment and erosion control plan; finalize solid and hazardous waste management plan; finalize environmental impact mitigation plan; geotechnical stability analysis of all major structures; finalize land remediation plan; finalize acid water management scheme analysis; finalize spill and accident response plan.
Monitoring	Not considered	General description of the environmental monitoring plan	Development of an environmental monitoring plan with identification of activities and cost calculation
Necessary permissions	General overview	Comprehensive overview and list of required permits	Detailed assessment of all relevant environmental and permitting requirements and timetable for obtaining an operating licence
PROJECT IMPLEMENTATION SCHEDULE			
Project implementation plan	Estimation of project implementation timeframes and mine lifespan	Estimation of implementation dates and overall calendar schedule; determination of the mine life and project implementation schedule	Detailed project implementation schedule; determination of the exact lifespan of the mine; final development of the project implementation schedule
Main project schedule	Estimated schedule with start and completion dates of construction; Gantt chart showing the main areas of work	Gantt chart with general time periods; approximate schedule for detailed design; approximate quality assurance/quality control program; preliminary construction schedule; preliminary project execution plan	Gantt chart with overall time periods and planning of the project execution process; detailed project schedule showing project deliverables and detailed design; CP schedule ; definition of the main stages of the project; description of the project implementation control system; final formation of the quality assurance/control and safety program; preliminary guidance on project management procedures; final development of design solutions
CAPITAL COST ESTIMATION			
Base, Construction of structures, Structural part, Piping/HVAC, Electrical part, Instrumentation, Construction personnel, Productivity of construction personnel, Volume/quantity of materials, Prices for materials/equipment, infrastructure	Order of magnitude based on historical data, or estimated indicators	Estimates based on historical factors, percentages and supplier prices based on material volumes	Detailed assessment based on calculations; completion of engineering calculations with an error of 15-25%; price offers from various suppliers
Contractors	Included in costs or % of total costs	Percentage of direct costs for contractor, historical indicators for subcontractors	Written price proposals from contractors are the best practice; another acceptable option is a detailed cost estimate from the owner, with a 15-20% contractor fee added.
Design, procurement, construction, management (DPC)	Percentage of estimated construction cost	Percentage of detailed construction cost	Price offer from the contractor for the ESPU
Pricing	FOB mine price including all fees and taxes	FOB mine price including all fees and taxes	FOB mine price including all fees and taxes

Description	Scoping Study	Preference Study	Feasibility Study
Owner's expenses	Retrospective assessment	Determined based on comparison with a similar project	Detailed breakdown provided by the owner
Cost increase	Not considered	Based on percentage values of the current budget	Based on risk-adjusted costs
Working capital	Calculated based on previous experience	Estimate obtained on the basis of a similar project	Conducting a detailed cash flow analysis
Error	+/- 50%	+/- 30%	+/- 15%
Unforeseen expenses	+/- 35%	+/- 30%	+/- 10%
ASSESSMENT OF OPERATING COSTS			
Base	Order of magnitude estimation	Estimates of specific rates and quantitative estimates using specific calculations	Detailed database, receiving price offers; minimum calculation indicators
Operational quantitative indicators	General meanings	Quantitative determination by estimates using specific calculations	Detailed assessments
Costs by expense items	Historical unit costs and estimated indicators	Estimates of labor, energy and consumable costs using specific calculations	Price offers from suppliers; minimum estimated indicators
Error	+/- 50%	+/-30%	+/- 15%
ECONOMIC ASSESSMENT			
Financial analysis	Preliminary assessment of the main economic parameters	Assessment of the main economic parameters	Detailed assessment of all key economic parameters
Product price(s)	Assessment based on the average minimum value over three years	Assessment based on the average minimum value over three years	Valuation based on three-year average minimum or detailed market research
License fees and taxes	Preliminary assessment	Preliminary analysis	Detailed analysis with the conclusion of the tax authority
Metallurgical production, Processing and freight	Retrospective data	Budget price indicators	Final price indicators
Cash flow analysis	Simplified Cash Flow Analysis	Preliminary cash flow analysis	Final detailed cash flow analysis
Economic criteria	Simplified Calculation of IRR (Internal Rate of Return) and NPV (Net Present Value) (Before Taxes)	Preliminary calculation of IRR and NPV (after taxes)	Final determination of IRR, NPV, ROI (return on investment) and payback period (after taxes)
Sensitivity analysis	Basic analysis with a minimum set of project variables	Preliminary analysis with selected key project variables	Comprehensive analysis using all key project variables
RISK ASSESSMENT			
Risk assessment	General overview	A spreadsheet risk analysis covering all areas	A spreadsheet risk analysis covering all areas
Project	Preliminary review of geological, engineering and environmental risks	Preliminary analysis of environmental, country, licensing, technological and business risks; detailed analysis of geological and engineering risks	Detailed analysis of geological, engineering, environmental, legal, country, licensing, technological, business and financial risks

APPENDIX 3 - TABLE1 VERSION 2016 for filling and inclusion in the Report

CHECKLIST OF QUESTIONS ON ASSESSMENT CRITERIA AND REPORTING

Preface.

According to KAZRC Table1 is a checklist of questions and guidelines for preparing ReportsKAZRC on the Results of Geological Exploration Works, Mineral Resources and Mineral Reserves.

Because Table 1 contains both questions and instructions, the most efficient way to complete it is at the same time you are writing your report. This will ensure that you do not miss any questions or instructions that you will have to return to after you have written your report.

Table No. 1 of the 2016 version for filling in and citing in the Report

Criterion (object of verification)	Explanation
Testing methods and data (criteria in this group apply to all subsequent groups)	
<i>Testing methods</i>	<i>The type and quality of sampling (e.g. furrow, chunk, etc.) and the steps taken to ensure representativeness of samples.</i>
<i>Drilling techniques</i>	<i>Exploration drilling methods (core, percussion, auger, reverse circulation (RC), rotary auger (RAB), Bank drill, etc.) and details (core diameter, triple or standard pipe, depth of diamond tails, face or other type of bit, whether oriented core was taken and if so, by what method, etc.).</i>
<i>Documentation</i>	<ul style="list-style-type: none"> - <i>Have core and lump samples been documented to a level of detail sufficient for use in appropriate Mineral Resource estimates, mining and processing studies.</i> - <i>Was the documentation qualitative or quantitative. Photographs of cores, ditches, furrows, etc.</i>
<i>Methods of sample processing and preparation</i>	<ul style="list-style-type: none"> - <i>For core: split or sawn, quartered, half or all of the core taken for sampling.</i> - <i>If non-core sample: a flute splitter, or a tubular sampler, or a rotary splitter was used; and in dry or wet condition.</i> - <i>For all types of samples: the nature, quality and adequacy of the sample preparation method.</i> - <i>Quality control procedures for all stages of sample processing/preparation (division) in order to increase the representativeness of samples.</i> - <i>Measures to ensure that samples are representative of the material collected at the site.</i> - <i>Do the sample sizes correspond to the grain sizes of the sampled material?</i> - <i>It is recommended that the sample security measures used to ensure the integrity of the samples be outlined.</i>
<i>Quality of analytical and laboratory test data</i>	<ul style="list-style-type: none"> - <i>The nature, quality and adequacy of the methods of analysis and laboratory procedures, and whether these methods are partial or complete.</i> - <i>Essencequality control procedures (standards, blanks, duplicates, external laboratory testing, etc.) and whether an acceptable level of reliability (absence of systematic errors) and accuracy has been achieved.</i>
<i>Testing and analysis check</i>	<ul style="list-style-type: none"> - <i>Checking of important intersections by employees of independent or alternative companies.</i> - <i>Use of dual well deviations or control samples.</i>
<i>Location of data acquisition points</i>	<i>The reliability and accuracy of geodetic referencing of wellheads and inclinometry, trenches, mine workings and other points used to estimate Mineral Resources.</i>

	- <i>Quality and adequacy of topographic control. Map of the area.</i>
<i>Spatial distribution and intervals of data</i>	- <i>Data density for reporting on exploration results.</i> - <i>Are the data density and distribution sufficient to establish a degree of continuity of geological structure and grades suitable for the Mineral Resource and Mineral Reserve estimation and classification procedures being applied?</i> - <i>Were sample composites used?</i>
<i>Reporting archives</i>	- <i>Primary data documentation, data entry procedures, data verification, data storage (physical and electronic) for Report preparation.</i>
<i>Orientation of data with respect to geological structure</i>	- <i>Was it possible to characterize possible structures using oriented samples, and to what degree of reliability, given the type of deposit?</i> - <i>If the relationship between drillhole orientation and the orientation of key mineralised structures indicates assay bias, this should be assessed and reported (if significant).</i>
<i>Audits or examinations</i>	<i>Results of any audits and examinations of testing methods and data.</i>
<i>Reporting on the results of geological exploration work.</i> <i>(the criteria specified in the previous group also apply to this group)</i>	
<i>Mineral rights and land ownership</i>	- <i>Type, reference name/number, location and form of ownership, including agreements or matters affecting relationships with third parties (such as joint ventures, partnerships, sublease royalties, landowner interests, protection of historic sites, nature reserves, national parks, natural landscapes, environmental conditions, etc.).</i> - <i>Guarantees of subsoil use rights at the time of submission of the Public Report, together with any known obstacles to obtaining a license for work in this area.</i> - <i>Plans for the location of the subsoil use site. The technical report does not require a legal opinion - certification of the legality of ownership of the subsoil use site when describing it, a brief and clear description of these rights in the author's understanding is sufficient</i>
<i>Geological exploration work carried out by other researchers</i>	- <i>Study and evaluation of the results of geological exploration work.</i> <i>other researchers.</i>
<i>Geological structure</i>	- <i>Geological and industrial type, geological structure of the deposit and type of mineralization</i> - <i>Reliable geological maps and geological sections should be provided to support interpretations</i>
<i>Data structuring methods</i>	- <i>When reporting on the results of geological exploration work, it is necessary to indicate essential information - methods for calculating weighted average values, cutting off maximum and/or minimum grades (for example, high ones) and cut-off grades.</i> - <i>If the aggregated intersections include a short interval of high grades and longer intervals of low grades, the procedure for such aggregation should be specified and a detailed description of several examples of such aggregation should be given.</i>

	- Assumptions when presenting values for conventional metals must be clearly stated.
<i>The relationship between the width of mineralization and the length of intersections</i>	- The relationship between mineralization width and intersection length is particularly important in reporting exploration results. If the geometry (outlines) of mineralization is established from drilling data (from known well inclination angles), its nature should be described in the report. If the geometry (outline) of the mineralization is not established from drilling data (only well intervals are given, but not well angles), this should be clearly stated in the report (e.g. well intervals are known, but the true thickness is unknown).
<i>Graphic materials</i>	- Available maps, cross-sections and tables of data on important intersections should be included in the report, as far as possible, to clarify and substantiate the provisions of the report and to facilitate its understanding.
<i>Final reporting</i>	- Where a full and comprehensive presentation of exploration results is not possible, representative reporting of low and high grades and/or thicknesses should be provided (instead of presenting exploration results, which in this situation may only be misleading).
<i>Other essential data of GEOLOGICAL EXPLORATION WORKS</i>	- The following exploration data should also be provided (if relevant and material), including but not limited to: geological observations, geophysical survey results, geochemical survey results, bulk samples - size and processing methods, process test results, bulk density, groundwater, geotechnical/geomechanical properties, potentially harmful or contaminant substances.
<i>Further work</i>	- The nature and scale of any further work planned (e.g. testing to determine lateral or depth extent, or a large-scale drilling programme beyond the mineralisation boundary).
Mineral Resource Assessment and Reporting (the criteria specified in the first group and those relevant from the second group are also applicable to this group)	
<i>Database integrity</i>	- Measures to prevent data from being tampered with (for example by transcription, copying or keying) between the time it is initially collected and its use for Mineral Resource estimation purposes. - Data verification and/or validation procedures.
<i>Geological interpretation</i>	- Confidence in the geological interpretation of the deposit (or, conversely, uncertainty in the interpretation). - The nature of the data used and any assumptions made. - The impact of alternative interpretations, if any, on the Mineral Resource estimate. - Use of geological data to control the Mineral Resource estimation process. - Factors influencing the consistency of both the contents and the geological structure.
<i>Geometrical parameters</i>	- The extent and variability of the Mineral Resource, expressed as the length (along strike or otherwise), width in plan, and depth (from the earth's surface) of the upper and lower boundaries of the Mineral Resource.

<i>Methods of assessment and modeling</i>	<ul style="list-style-type: none"> - <i>The nature and appropriateness of the estimation methods and key assumptions applied, including the methods used to limit the impact of “hurricane” grade values in resource estimation, domain allocation, interpolation parameters, and maximum extrapolation distance from data points.</i> - <i>Availability of control estimates of the quantity and quality of resources, estimates made previously, and/or data comparing the results of exploration and exploitation of developed areas of the deposit, and whether these data were used in the estimation of Mineral Resources.</i> - <i>Assumptions regarding by-product recovery.</i> - <i>Evaluation of harmful impurities or other variables (with undetectable content), such as sulfur for the characterization of acid mine drainage.</i> - <i>In the case of interpolation in a block model – the block size in relation to the average distance between samples and the search radius used.</i> - <i>Any assumptions regarding cell modeling (e.g. nonlinear kriging).</i> - <i>Any assumptions regarding the correlation between variables.</i> - <i>The methods of confirmation and verification used, the comparison of model data with drilling data and the use of the results of such verification (if any).</i> - <i>A detailed description of the methods for estimating tonnages and grades and the assumptions made (section, polygon, inverse distance, geostatistical, or other methods).</i> - <i>Description of the application of geological interpretation data to control the Mineral Resource estimation process.</i> - <i>Discussion of the reasons for applying or not applying the truncation of extreme (outlier) content values. If a computer method is chosen, provide a description of the programs and parameters used.</i> - <i>Geostatistical methods are extremely diverse, and they (the ones used) should be described in detail, with a justification for the choice of a specific method. Should be discussed geostatistical parameters including variograms, and their compatibility with geological interpretation. Experience in the application should be taken into account. geostatistical methods on similar fields.</i>
<i>Humidity</i>	<ul style="list-style-type: none"> - <i>How was the tonnage estimated - for a substance in a dry state or at natural humidity, and the method for determining humidity.</i>
<i>On-board parameters</i>	<p><i>The validity of cut-off grades (including for the conventional component at deposits with a multi-component composition of the mineral) or qualitative boundary parameters and their compliance with the structural features of the deposit and technical, technological and economic conditions.</i></p>
<i>Mining factors and assumptions</i>	<ul style="list-style-type: none"> - <i>Assumptions regarding possible mining methods, minimum mining units (e.g. blocks) and internal (or, where applicable, external) dilution. When estimating Mineral Resources, it is not always possible to make assumptions regarding mining methods and parameters. If no assumptions are made, this should be stated in the report.</i>

	<p><i>-To demonstrate “reasonable prospects for economic extraction from the subsurface” in the foreseeable future, basic assumptions are required and should be clearly stated in the Public Report. Examples include access issues (shafts, slopes), geomechanical parameters (pit slopes, stope sizes, etc.), infrastructure requirements and estimated operating costs (for extraction from the subsurface).</i></p>
<p><i>Technological factors and assumptions</i></p>	<p><i>- The proposed processing technology and the compliance of the recommended process flow diagram with the type of mineralization. When assessing Mineral Resources, it is not always possible to make assumptions (guesstimates) regarding the technologies and parameters of raw material processing. If no assumptions are made, this should be indicated in the report.</i></p> <p><i>-To demonstrate “reasonable prospects for economic recovery from the subsurface” in the foreseeable future, underlying assumptions are required and should be clearly stated in the Public Report. Examples include the extent of process testing required, recovery factors, allowances for cost savings from integrated use of feedstock or for hazardous components, infrastructure requirements, and estimated processing costs.</i></p>
<p><i>Bulk density</i></p>	<p><i>- Presumed or directly determined. If presumed, indicate the grounds for the assumption. If determined, indicate the method of determination, in dry or wet condition, the frequency of measurements, the nature, size and representativeness of the samples used.</i></p>
<p><i>Classification</i></p>	<p><i>Criteria for dividing resources into classification categories of varying reliability.</i></p> <p><i>Were all relevant factors taken into account sufficiently, i.e. the relative reliability of tonnage/grade calculations, confidence in the consistency of geological structure and metal grades, the quality, quantity and distribution of data?</i></p> <p><i>Does the classification result adequately reflect the Competent Person's opinion of the deposit?</i></p>
<p><i>Audits or examinations</i></p>	<p><i>- Results of any audits and assessments of Mineral Resources</i></p>
<p><i>Discussion of relative accuracy/reliability</i></p>	<p><i>- Where appropriate, a statement of the relative accuracy and/or confidence in the resource estimate should be provided, using an approach or procedure determined by the Competent Person. For example, the use of statistical or geostatistical procedures to quantify the relative accuracy/confidence of the resource within specified confidence limits, or, if such an approach is not considered appropriate, a qualitative analysis of the factors that may affect the relative accuracy and confidence in the estimate should be provided.</i></p> <p><i>- The statement of the relative accuracy and/or reliability of resource estimates must clearly indicate whether it refers to integrated estimates (relating to the total volume of the resource) or local estimates (relating to a limited volume - in which case the relevant tonnages and volumes should be stated, which should be relevant to the technical and economic assessment). The</i></p>

	<p>documentation should indicate the assumptions made and the procedures used.</p> <ul style="list-style-type: none"> - Such a statement of the relative accuracy and reliability of the estimate should be compared with production data (if available).
<p>Mineral Reserve Estimation and Reporting (the criteria specified in the first group and those relevant from other preceding groups also apply to this group)</p>	
<p><i>Estimate of Mineral Resources for conversion to Mineral Reserves</i></p>	<ul style="list-style-type: none"> - A description of the resource estimate used as the basis for converting Mineral Resources to Mineral Reserves. - A clear statement as to whether the stated "reserve" figures are included within the stated "resource" quantities, or whether the stated resource and reserve figures are complementary.
<p><i>Research level</i></p>	<ul style="list-style-type: none"> - The type and level of research to establish criteria for converting Mineral Resources into Reserves. - The KAZRC Code does not require conversion of Mineral Resources to Mineral Reserves is possible if a Feasibility Study has been developed (a detailed feasibility study), but requires at least a Pre-Feasibility study to be completed to determine a technically feasible and economically viable mine plan, taking into account all modifying factors.
<p><i>On-board content parameters</i></p>	<ul style="list-style-type: none"> - The basis for the cut-off grades or quality parameters applied, including, where appropriate, the equivalent metal formula. This cut-off parameter may have greater economic significance (per block) than the grade.
<p><i>Mining factors and assumptions</i></p>	<ul style="list-style-type: none"> - The method and assumptions adopted to convert Mineral Resources to Reserves (e.g. by applying appropriate factors and optimisation or using a preliminary or detailed design). - The selection, nature and applicability of selected mining methods, mining cell size (length, width, height) and other mining parameters, including associated development issues such as pre-stripping, access, etc. - Assumptions regarding geomechanical parameters (pit slope angles, cleaning chamber sizes, etc.), grade control and drilling prior to the start of solid mineral extraction. - Key assumptions and Mineral Resource model for quarry optimisation (if relevant). - Accepted dilution factors during mining, solid mineral recovery factors during mining and minimum mining capacities. - Infrastructure requirements of the selected mining methods. If available, reliability of operational characteristics of work in previous years.
<p><i>Technological factors and assumptions</i></p>	<ul style="list-style-type: none"> - The proposed processing technology and compliance of the recommended process flow diagram with the type of mineralization. - Is the proposed processing technology well-established or new? - The nature, scope and representativeness of the technological tests performed and the extraction factors used during enrichment. - Any allowances or adjustments for harmful components.

	<ul style="list-style-type: none"> - <i>The existence of any bulk samples or test samples and the degree to which these samples are representative of the ore body as a whole.</i> - <i>When presenting tonnages and grades used to estimate reserves, it should be clearly stated whether they relate to material entering the concentrator or as recovered. Comments on the existing concentrator and equipment, including details of equipment replacement and residual values.</i>
<i>Cost and Revenue Factors</i>	<ul style="list-style-type: none"> - <i>The conclusion or assumptions made regarding the projected capital and operating costs.</i> - <i>Assumptions made regarding revenue, including source grade, price of metal or commodity(ies), exchange rates, transportation and processing costs, penalties, etc.</i> - <i>Amendments made to the payable tax on the extraction of solid minerals (royalty), public and private.</i> - <i>The main sources of cash flow for the specified period.</i>
<i>Market valuations</i>	<ul style="list-style-type: none"> - <i>Demand, supply and inventory levels of a particular commodity, consumption trends and factors that may affect future demand and supply.</i> - <i>Analysis of consumers and competitors along with identification of potential market niches for the product.</i> - <i>Price and volume forecasts and the basis for these forecasts.</i> - <i>For non-metallic solid minerals, a customer specification, testing and acceptance requirements are required before entering into a supply contract.</i>
<i>Other</i>	<ul style="list-style-type: none"> - <i>The impact, if any, of natural risks, infrastructural, environmental, legal, market, social or governmental factors on the likely viability of the project and/or on the estimation and classification of mineral reserves.</i> - <i>The status of rights (land and subsurface use) and approvals critical to the viability of the project, such as mining allotments, waste discharge permits, government and regulatory approvals.</i> - <i>Description of expected environmental obligations. Layout of sites for the development of solid minerals.</i>
<i>Classification</i>	<ul style="list-style-type: none"> - <i>The basis for classifying mineral reserves into categories of varying reliability.</i> - <i>Does the classification result adequately reflect the Competent Person's opinion of the deposit?</i> - <i>The proportion of Probable Mineral Reserves converted from Measured Resources (if any).</i>
<i>Audits or examinations</i>	<ul style="list-style-type: none"> - <i>Results of any audits and examinations of mineral reserve estimates</i>
<i>Discussion of relative accuracy/reliability</i>	<ul style="list-style-type: none"> - <i>Where appropriate, a statement of the relative accuracy and/or confidence in the reserve estimate should be provided, using an approach or procedure determined by the Competent Person. For example, the use of statistical or geostatistical procedures to quantify the relative accuracy/confidence of the reserve within stated confidence limits, or, if such an approach is not considered appropriate, a qualitative analysis of the factors that may affect</i>

	<p><i>the relative accuracy and confidence in the estimate should be provided.</i></p> <ul style="list-style-type: none"> - <i>The statement of the relative accuracy and/or reliability of the reserve estimates must clearly indicate whether it refers to integral estimates or local (relating to a limited volume - in which case the relevant tonnages and volumes should be indicated, which should be relevant to the technical and economic assessment). The assumptions made and the procedures used should be stated in the documentation.</i> - <i>Such statements about the relative accuracy and reliability of the estimate should be compared with production data (if available).</i>
<p>Valuation and reporting of diamonds and other gemstones</p> <p><i>The criteria listed in other relevant groups are also applicable to this group; further guidance is provided in the Guidelines for Reporting Exploration Results for Diamonds issued by the Committee on best practices in diamond exploration established by the Canadian Institute of Mining, Metallurgy and Petroleum (the 'Guidelines for the Reporting of Diamond Exploration Results' issued by the Diamond Exploration Best Practices Committee established by the Canadian Institute of Mining, Metallurgy and Petroleum)</i></p>	
<i>Associated minerals</i>	<i>Sampling and analysis reports for indicator minerals such as chemically/physically defined garnet, ilmenite, chrome spinel and chrome diopside should be prepared by competent accredited laboratories.</i>
<i>Source of diamonds</i>	<i>- Details of the type, shape, size and colour of the diamonds and the nature of the diamond source (primary or secondary), including rock type and geological setting.</i>
<i>Testing</i>	<p><i>Sample type (outcrop, pebbles/boulders, drill core, reverse circulation drilling cuttings, gravel, river sediments, soils) and purpose, e.g. coring to test for microdiamonds and study geological conditions, drilling large diameter holes to establish the number of "rocks" per unit volume and their quality, bulk sampling to establish the average value of the diamonds being studied.</i></p> <p><i>Sample size, distribution and representativeness.</i></p>
<i>Sample processing</i>	<p><i>Type of installation, processing rates of diamond-bearing raw materials and accreditation issues.</i></p> <p><i>Sample reduction. Bottom and top sieve parameters and re-crushing.</i></p> <p><i>Technological processes (separation in heavy media, using fat, X-rays, manual ore sorting, etc.).</i></p> <p><i>Efficiency of applied technologies, tailings audit and granulometric analysis. Granulometry of particles in the "head" of the process during loading and in tailings.</i></p> <p><i>Details of the laboratory involved, the type of process used to separate the microdiamonds, and accreditation</i></p>
<i>Carat</i>	<i>- 0.2 grams (often defined as metric carat (MC)).</i>
<i>Diamond content in samples</i>	<p><i>The diamond content of the samples in this section of Table 1 is measured in carats per unit mass, area or volume.</i></p> <p><i>Diamond grades in samples exceeding the established bottom sieve aperture size limits shall be reported in carats per dry metric</i></p>

	<p><i>ton and/or carats per 100 metric tons (also on a dry weight basis). For alluvial diamonds, grades in samples may be reported in carats per square (or cubic) meter if a volume/weight basis for calculation is specified.</i></p> <p><i>In addition to the general requirements for volume and density assessment, it is necessary to determine the relationship between diamond frequency (crystals per cubic metre or tonne) and crystal size (carats per crystal) to determine the sample grade (carats per tonne).</i></p>
<p><i>Reporting on resultsgeological exploration work.</i></p>	<ul style="list-style-type: none"> - <i>Complete set of sieve analysis data using standard facies grading. Bulk assay results, sample grades by facies. Use of spatial structural analysis in estimating grade distribution. Diamond size and frequency distribution. Granulometric composition of samples and tailings.</i> - <i>Determination of sample density.</i> - <i>Percentage shares of concentrate and under-lattice product for each sample.</i> - <i>The influence of changes in the condition of the hole size in the lower "side" sieve on the diamond content in samples.</i> - <i>Diamond size separation technologies to support local sample processing and commercial scale operations (Reserve modifying factors).</i> - <i>Diamond size separation technologies to support local sample processing operations and commercial scale operations (Reserve Modifying Factors).</i> - <i>If geostatistical methods were used to model crystal sizes,distribution of diamonds by size and frequency of occurrencefor exploratory samples.</i> - <i>The weight of diamonds may be omitted from the Report only if the diamonds are considered too small to be of commercial value. This lower "cut-off" limit for crystal size must be stated.</i>
<p><i>Estimating grades for resource and reserve reporting</i></p>	<ul style="list-style-type: none"> - <i>Description of the sample type and spatial configuration of drilling or sampling designed to estimate grades.</i> - <i>The particle size of crushed samples in relation to that achievable during industrial processing (enrichment) of raw materials.</i> - <i>The total number of diamonds is larger than the specified lower edge size of the sieves.</i> - <i>The total weight of diamonds is larger than the specified lower edge size of the sieves.</i> - <i>The content of diamonds in the samples is larger than the specified lower cut-off size of the sieves.</i>
<p><i>Cost assessment</i></p>	<ul style="list-style-type: none"> - <i>Valuations should not be included in the reporting of diamond samples processed using total liberation methods that are commonly used to process exploration samples.</i> - <i>The public report must include the following information (to the extent that it is not commercially sensitive, i.e. will not worsen the market situation for the Company):</i> <ul style="list-style-type: none"> • <i>The number of "stones", their distribution by weight (in carats) and size based on a standard set of sieves for each distinguished facies or depth.</i>

	<ul style="list-style-type: none"> • Detailed description of the lot of diamonds being evaluated. • Number of "stones", carats, lower side size (sieves) by facies and depths • Average cost per carat and per metric ton (\$/carat and \$/ton) when changing the lower level of conditions by sieve size (in US dollars). The \$/carat price is critical to demonstrating the value of the project. • Price basis (e.g. actual selling price, dealer selling price, etc.). • Diamond integrity assessment. • Minimum lot size to ensure representative valuation.
<p><i>Preservation and integrity of samples</i></p>	<p>Accredited process audit. Sealing samples after their extraction. Location of appraiser, security, delivery, losses during cleaning, comparison with existing registration records of diamond content in samples and quantities of "stones". Washing of core samples before sending them for processing to obtain microdiamonds. Samples accepted for audit are tested at other facilities. Verification of tailings test results. Removal of tracking sensors used in sampling and processing. Geophysical (logging) measurements of the density of materials and particles. Cross-checking of sample weights, in a state of natural moisture and dry, at established volumes and density of drilling operations, taking into account the moisture factor.</p>
<p><i>Classification</i></p>	<p>In addition to the general requirements for volume and density estimates, it is necessary to determine the relationship between diamond frequency (crystals per cubic meter or ton) and crystal size (carats per crystal) to determine grade (carats per ton). The uncertainty elements in these estimates should be analyzed and a classification developed accordingly.</p>
<p style="text-align: center;">Estimating and reporting uranium for in-situ leach (ISL) mining <i>The criteria listed in other relevant groups also apply to this group.</i></p>	
<p><i>The main ore-forming feature</i></p>	<p>The main ore-forming feature that must be covered in the Public Report is the boundary of the wedging out of the zone of formation oxidation or ground oxidation.</p>
<p><i>Characteristics of counting blocks</i></p>	<p>The sections of ore bodies allocated into calculation blocks must be characterized by:</p> <ul style="list-style-type: none"> - the same degree of exploration and study of the parameters that determine the amount of uranium reserves and productivity; - homogeneity of the geological structure and approximately the same or similar degree of variability in the thickness, internal structure of ore bodies, material composition, main quality indicators and technological properties of the ore; - consistency of the conditions of occurrence of ore bodies, determined by the confinement of the block to a single

	<p><i>structural element (wing, locking part of a fold, tectonic block limited by faults, proximity of filtration coefficients along ore intersections, the presence or absence of local aquicludes of the roof and/or base of blocks, etc.);</i></p> <ul style="list-style-type: none"> - <i>common mining and technical conditions of development.</i>
<p><i>Geophysical research</i></p>	<p><i>Geophysical methods of well exploration accompany all stages of the study of most uranium deposits, from forecasting and exploration work to detailed and operational exploration and industrial development, the rational complex of which is determined based on the specific geological conditions of the deposits and the modern capabilities of geophysical methods. Gamma logging (GL) is mandatory in all boreholes. The feasibility and conditions for using other types of logging are determined by the tasks that arise when studying various deposits and are established in each specific case.</i></p> <p><i>At deposits in permeable rocks, electrical logging using the KS (Apparent Resistivity Logging) and PS (Spontaneous Polarization Logging) methods should be used to map permeable and impermeable horizons to identify clay interlayers in permeable ore intervals.</i></p> <p><i>When studying process, observation, control and other wells in experimental areas of underground leaching (ISL), in addition to gamma logging, methods of direct determination of uranium content can be used, in particular, fission neutron logging (FNL), thermometry and induction logging.</i></p> <p><i>Special requirements apply to the study of the radiology of the deposit (radiological zones, morphological elements of the ore deposit, ore block, technological and lithological type of ore, etc.)</i></p> <p><i>Based on the results of special core testing, with analysis of samples for uranium and radium content, it is necessary to study the types (residual, diffusion, migration) of radium halos and the features of their spatial distribution in the volume of ore deposits. Based on the results of these studies, zoning of deposits is also performed by the value of the Radioactive Equilibrium Coefficient (Krr) in areas within which its average values can be accepted for interpreting gamma logging.</i></p>
<p><i>Geotechnological factors and assumptions</i></p>	<p><i>The main factors determining the fundamental possibility of developing deposits using the PV method are:</i></p> <ul style="list-style-type: none"> - <i>permeability and water content of the ore-bearing environment, filtration coefficient,</i> - <i>the mineral composition of the ores, ensuring their recovery by the solutions used,</i> - <i>mineral composition of the host rocks,</i> - <i>productivity of the horizon, deposit,</i> - <i>the relationship between differential permeability of the</i>

	<p><i>formation and the distribution of uranium mineralization,</i></p> <ul style="list-style-type: none">– <i>mineralization power,</i>– <i>depth of mineralization,</i>– <i>uranium recovery factor,</i>– <i>groundwater temperature</i>– <i>carbonation of ore and host rocks no more than 2% by CO₂,</i>– <i>clay content of ore and host rocks no more than 30%,</i>– <i>the presence of organic matter in the ore and surrounding rocks is no more than 3%</i>– <i>the presence or absence of harmful impurities, such as chlorine, SO₄, Mo, V.</i>
--	--

APPENDIX 4 - Table 1 is used as a checklist for preparing the Report

*Positions for which it is sufficient to provide a link to the relevant section of the report are marked with an asterisk. Additionally, such items are highlighted in italics.

Table No. 1 – used as a checklist for preparing the Report

Criteria		Results of geological exploration work	Mineral Resources	Mineral Reserves
GENERAL INFORMATION				
Introduction	General part	(i)	Scope of work	
		(ii)	The Role of the Competent Person in the Preparation of the Report	
		(iii)	Statement for whom the Report is prepared; whether a full or partial assessment was made, scope of work, effective date of the Report, remaining work.	
		(iv)	Sources of information and data contained in the Report or used in its preparation, with references if applicable, list of sources used.	
		(v)	Title page and Table of contents with a list of figures and tables	
		(vi)	An executive summary that briefly summarises important information in a public report, including a description of the property and its ownership, geology and mineralisation, the status of exploration, development and exploitation, estimates of Mineral Resources and Mineral Reserves, and the Competent Person's conclusions and recommendations. If Inferred Mineral Resources are used, provide a financial estimate using them and, if possible, without including such Inferred Mineral Resources. The summary should be in sufficient detail to enable the reader to understand the nature of the project.	
		(vii)	A statement by the Competent Person stating whether “the statement has been made in accordance with the guidelines of the KAZRC Code”. If a Reporting Code other than the KAZRC was used, provide an explanation of the differences.	
		(viii)	Diagrams, maps, plans, sections, and illustrations that are dated, legible, and prepared to an appropriate scale, with important features highlighted. Maps that include a legend, author or source of information, coordinate system and datum, ruler or grid scale, and north arrow. A reference to a location or index map and more detailed maps showing all important features described in the text, including all relevant cadastral and other infrastructure features.	
		(ix)	Units of measurement, currencies and exchange rates	
	Important data	(x)	Details of the site visit by each Competent Person, if applicable, reasons why a personal visit was not carried out.	
		(xi)	If the Competent Person relies on a report, opinion or statement of another expert who is not the Competent Person, then disclosure of the date, title and author of the report, opinion or statement, the qualifications of the other expert, the reason why the Competent Person relies on the other expert, any significant risks involved and any steps taken by the Competent Person to verify the information provided.	

Criteria		Results of geological exploration work	Mineral Resources	Mineral Reserves
SECTION 1: PROJECT INFORMATION				
1.1	Location	(i)	Description of location and map (country, region, nearest settlements, coordinate system, etc.).	
		(ii)	Country profile describing information related to the country where the Project is located that is relevant to the project, including relevant applicable legislation, environmental and social context, etc. Preliminary assessment of relevant technical, environmental, social, economic, political and other key risks.	
		(iii)	Topographic map of the region	A detailed topographic map that allows the assessment of existing economic parameters and shows existing climate risks.
1.2	Property Description	(i)	Brief description of the scope of work performed on the project (i.e. preliminary sampling, advanced exploration, SS, PFS, FS mine plan for ongoing production or closure).	
		(ii)	A description of the topography, elevations, hydrographic network and vegetation, means and convenience of access to the property, proximity of the property to a populated area, nature of transport, climate, known associated climatic and seismic risks and length of the operating season and, to the extent relevant to the mining project, the adequacy of land rights for mining operations, including availability and sources of energy, water, personnel for mining operations, potential locations of tailings storage facilities, potential waste disposal sites, heap leach pads and potential sites of processing plants (taking into account any conditions that may affect potential exploration/mining operations).	
1.3	Neighboring objects	(i)	Information on nearby objects. Inclusion in maps of general mineralized structures on which adjacent or nearby objects of significance to the Report are located. References to information used from other sources.	
1.4	Story	(i)	Historical background of the project and surrounding areas, including known results of previous exploration and production activities (type, volume, quantity and development), previous owners and changes.	
		(ii)		Previous successes or failures revealing the reasons why the project should now be considered potentially economically viable.
		(iii)		Known or existing historical estimates of Mineral Resources and historical and current production statistics.
		(iv)		Known or existing historical estimates of Mineral Reserves and historical and current production statistics.
1.5	Legal aspects and permissions	Statement from a Competent Person confirming ownership rights, including a description of:		
		(i)	The nature of the Issuer's rights (e.g. exploration and/or mining rights) and the right to use the surface for the location of the properties to which those rights relate. The expiry date and other important details.	

Criteria		Results of geological exploration work	Mineral Resources	Mineral Reserves
		(ii)	The main terms and conditions of all existing agreements and details of those yet to be obtained (e.g. but not limited to concessions, partnerships, joint ventures, access rights, leases, historical and cultural sites, conditions of operation in the national park), environmental consents, royalties, agreements, permits, authorisations or powers of attorney).	
		(iii)	Security of title, licence issued at the time of reporting or expected in the future, should be provided together with any known information on barriers to obtaining rights to operate in the area. Details of applications that have been submitted. See section 31 for the Mineral Reserve declaration.	
		(iv)	Information on any litigation: land claims that may affect exploration or mining rights, or the existence of relevant adverse facts.	
		(v)	A statement regarding government/legislative requirements and approvals that may be required, have been submitted, approved or can reasonably be expected to be obtained. A review of the risks that approvals will not be obtained as expected and the impact on delays to the Project.	
1.6	Royalty	(i)	Royalties or other payments that are payable in respect of each property.	
1.7	Obligations	(i)	Any obligations, including rehabilitation guarantees, that relate to the project. Description of responsibilities for rehabilitation, including, but not limited to, legal requirements, assumptions and limitations.	
SECTION 2: GEOLOGICAL CONDITIONS, DEPOSIT DESCRIPTION, MINERALIZATION				
2.1	Geological position in regional structures, description of the deposit, mineralization	(i)	Regional Geology	
		(ii)	Project geology, including deposit type, geological characteristics and mineralization style	
		(iii)	The geological model or concepts used in an investigation and on the basis of which an exploration programme is planned, and a description of the conclusions and assumptions made from that model.	
		(iv)	The density, distribution and reliability of data and the sufficiency of the quality and quantity of information to support the claims made or implied about a deposit.	
		(v)	The significant minerals present in the deposit, their occurrence, size and other characteristics, including a discussion of minor and host rock minerals where they will influence processing steps and the variability of distribution of each significant mineral in the deposit.	
		(vi)	Significant mineralised zones occurring on the property, including a description of the host rocks, relevant geological factors controlling the mineralisation, and the length, width, depth and continuity of the mineralisation, and a description of the type, character and distribution of the mineralisation.	
		(vii)	Availability of reliable geological models and/or maps and sections to support the interpretation.	
SECTION 3: GEOLOGICAL EXPLORATION, DRILLING, SAMPLING METHODOLOGY AND DATABASE CREATION				
3.1	Geological exploration work	(i)	Sources of data or description of exploration methods and types, level of detail and reliability of geological data used (e.g. geological mapping, remote sensing results, stratigraphy, lithology, structural geology, secondary alteration, mineralization, hydrogeology, geophysics, geochemistry, petrography, mineralogy, geochronology (age dating of rocks), determination of bulk density, potentially harmful or contaminating components, geotechnical and engineering-geological characterization of rock properties, moisture, bulk sampling, etc.). Datasets with all relevant metadata such as unique sample numbers, sample mass, sampling date, spatial location (sampling coordinates), etc.	

Criteria		Results of geological exploration work	Mineral Resources	Mineral Reserves
		(ii)	The main data elements (observations and measurements) used in the Project and a description of the management and verification of the data in the database. Description of the following processes: data acquisition (collection or receipt from someone), verification, integration, control, error correction, storage and backup of data. If the data is not stored electronically, present handwritten tables with well-organized data and information.	
		(iii)	Confirmation and evaluation of data obtained from other parties and reference to all data and information obtained from other sources.	
		(iv)	The difference between data/information from the object under consideration and data from neighboring objects.	
		(v)	Methodology for surveying wellhead coordinates and inclinometry, technique and expected accuracy of data, projection used and density of the exploration network.	
		(vi)	Discussion of the adequacy of the exploration grid density (geological data) and spatial distribution of the data to establish the degree of geological extent and grade continuity (assay) consistent with the Mineral Resource/Mineral Reserve estimation and categorization methodologies used.	
		(vii)	Display of representative models and/or maps and sections or other two- or three-dimensional illustrations of the results of the work, showing the location of samples, the exact position of boreholes, results of inclinometry, exploration pits, underground mine workings, relevant geological data, etc.	
3.2	Drilling	(viii)	Spatial distribution (geometry) of mineralization depending on the angle of encounter with exploration wells due to the importance of the relationship between the thickness of mineralization and the length of its intersection (visible thickness). Justification if only visible capacities are used in reporting.	
		(i)	Drilling type (e.g. core, reverse circulation, auger, etc.) and detailed description (core diameter, standard or triple core barrel, oriented drilling, if so, by what method, etc.	
		(ii)	Geological and geotechnical description of core and cuttings to the level of detail required for Mineral Resource estimation, mine design and metallurgical testing.	
		(iii)	Description of core documentation (degree of detail), photographing the core (or furrow, etc.).	
		(iv)	Total length and documented mineralization intervals (undercuts).	
3.3	Methods sampling, selection and storage of samples	(v)	Inclinometry.	
		(i)	Description of the sampling technique (channel, chip or specific instrument measurements according to industry standards appropriate to the minerals being studied, such as gamma ray or various models of hand-held or stationary pXRF, etc.).	
		(ii)	Description of the sampling process, including measures to improve the representativeness of samples if the sample size does not correspond to the grain size of the material being sampled and a description of the sample composition method used (group samples).	
		(iii)	Description of each data set (geology, useful component content, quality, technological characteristics, etc.), sample type, methodology for selecting a representative sample size and sampling method.	
		(iv)	The shape and size of the mineralized zone in relation to the angle of the wellbore (if known). Orientation of sampling to achieve representative, unbiased sampling of potential structures given the expected deposit type. Intercept angle. Visible power along the well if the intercept angle is unknown.	
		(v)	Description of the basic principles for selecting samples for storage (core, sample residues, etc.).	

Criteria		Results of geological exploration work	Mineral Resources	Mineral Reserves
		(vi)	Description of the method for determining and monitoring core or cuttings recovery with evaluation results, measures taken to increase core recovery and ensure representativeness of samples, whether core recovery affects the grade of the useful component and whether systematic sampling error may occur due to loss of fine-grained material.	
		(vii)	Core cutting, whether the core was split or sawn, and what part of the core was taken for analysis (half, quarter or whole). Coreless sampling as slurry or with a sampler, whether a splitter was used on the machine, etc. Whether the sampled material was dry or wet. Effect of groundwater level and water inflow on the yield of material, quality of sampling or contamination. Evaluation of the effect of different core diameters.	
3.4	Sample preparation and analysis	(i)	Name of the laboratory(ies), its accreditation status and registration number. Steps taken by a Competent Person to ensure that the laboratory's results are of acceptable quality if it is not accredited.	
		(ii)	The analytical method, its nature, the quality and applicability of the method, laboratory techniques and procedures used and whether the analytical procedure has been assessed in whole or in part by a Competent Person.	
		(iii)	Description of the processes and methods used in sample preparation, sample splitting and reduction, the possibility of inadequate or unrepresentative samples (e.g. inadequate reduction, contamination, sieve sizes, granulometry (measuring grain sizes, etc.).	
3.5	Test Management	(i)	Management of the sampling process and processes to ensure the quality and representativeness of samples and data such as sample yield, selective material losses or contamination, borehole/core diameter, external and internal quality control and any other factors that may affect the quality of the analysis.	
		(ii)	Measurements taken to check the quality and consistency of sample movement.	
		(iii)	Procedures used to check the integrity of data, such as transformation, data entry or other errors that occur during the process from initial collection to future use in modeling (e.g. geology, grades, bulk densities, etc.).	
		(iv)	Audit and its frequency (including dates of audits) and disclosure of any risks identified.	
3.6	Quality control	(i)	Quality control (QA/QC) procedures for field sampling procedures, such as frequency of addition of blanks, duplicates, reference samples (CRM), process for checking analytical results, etc. Indirect measurement methods (e.g. geophysical methods) with particular attention to the reliability of the interpretation. Measures taken to ensure that samples are representative and that measuring instruments and systems are properly calibrated. Quality control procedures used to check the integrity of the database, in terms of checking how well the "new" data agrees with the database containing the "old" data.	
3.7	Volumetric weight	(i)	Methods for estimating bulk density, indicating the frequency of measurements, size, composition and representativeness of samples taken for measurement.	
		(ii)	Preliminary measurement results or justification for assumptions made for bulk density.	
		(iii)	Representativeness of bulk samples for measuring bulk density.	
		(iv)	Measurement of bulk density in bulk samples using methods that adequately take into account voids (leaching, etc.), moisture with separation of host rocks and zones of secondary alteration.	
3.8	Geophysical research in wells	(i)	Methodology for conducting GIS	
		(ii)	detection of geophysical anomalies in wells	
		(iii)	lithological dissection of well sections	

Criteria		Results of geological exploration work	Mineral Resources	Mineral Reserves
		(iv)	determination of the depths, boundaries, thickness of ore intervals and the content of minerals in them for calculating reserves (where possible)	
		V	determination of hydrogeological parameters of layers and horizons.	
		Vi	other types of control and research.	
3.9	Gross testing or pilot operation	(i)	Location of collected samples (including map).	
		(ii)	Sample size, sampling network distances/density and assessment of whether sample size and sample distribution are consistent with the grain size of the minerals in the sample.	
		(iii)	Extraction and processing method.	
		(iv)	Representativeness of samples for different types and kinds of mineralization and for the deposit as a whole.	
SECTION 4: EVALUATION AND REPORTING OF EXPLORATION RESULTS AND MINERAL RESOURCES.				
4.1	Geological model and its interpretation	(i)	The source, detail and reliability of the geological information with which the lithological, structural, mineralogical or other geological, geotechnical and technological characteristics were studied.	
		(ii)	The geological model, principles of its construction and assumptions underlying the Exploration Results or Mineral Resource estimate. Sufficient data to confidently conclude on the extent of mineralisation and geology and to provide an adequate basis for estimating and classifying the Mineral Resource.	
		(iii)	Any geological, mining, metallurgical, environmental, social, infrastructural, legal and economic factors that may have a material impact on the prospects of an Exploration Target or deposit.	
		(iv)		Geological data that may influence the quantitative or qualitative estimates of Mineral Resources.
		(v)		Considerations regarding the possibility of alternative interpretations or models and their possible impact (or potential risk) on the Mineral Resource estimate.
		(vi)		Geologically justified reductions (coefficient, per domain, etc.) applied in the model to mineralization or to host rocks and caused by faults, dikes, etc.
4.2	Modeling and evaluation techniques	(i)	A detailed description of the estimation techniques and assumptions used to determine the grade and tonnage range for the Exploration Targets.	

Criteria		Results of geological exploration work	Mineral Resources	Mineral Reserves
		(ii)		The nature and applicability of the assessment techniques, key assumptions applied, including limitation of 'hurricane' samples, compositing (taking into account interval lengths and/or bulk densities), domain identification, sampling grid density, block size estimation, single production unit, interpolation parameters and maximum extrapolation distance beyond the exploration grid.
		(iii)		Assumptions and justifications about the correlation between different variables.
		(iv)		The software used, including the version number and the settings that were used.
		(v)		Verification and validation procedures, comparison of model data with assay data, use of exploration, mining and processing comparison data and whether this information has been taken into account in estimating the Mineral Resource.
4.3	Reasonable prospects for economic extraction	(i)		Geological parameters including but not limited to volume/tonnage, grade and estimated recoverable value and quality, cut-off grades, stripping ratios, etc.
		(ii)		Engineering parameters including mining method, processing, geotechnical, hydrogeological and metallurgical parameters, allowances for mitigation of harmful impurities. Dilution and losses that apply when converting geological Mineral Resources into Mineral Reserves.
		(iii)		Infrastructure including but not limited to electricity, water supply, access to the site.
		(iv)		Legal, government, permitting parameters.
		(v)		Environmental parameters and social factors (local community).
		(vi)		Market conditions.
		(vii)		Economic assumptions and parameters, including, but not limited to, product prices, sales volumes, and potential capital and operating costs.
		(viii)		Material risks.
		(ix)		Parameters used to support the concept of 'possible economic recovery' in the case of Mineral Resource estimates.
4.4	Classification criteria	(i)		Criteria and methods used as a basis for classifying Mineral Resources into different confidence categories.
4.5	Reporting	(i)	Specific contents, quality and capacity	

Criteria		Results of geological exploration work	Mineral Resources	Mineral Reserves
		(ii)	Reporting of low and high grades and intercepts (thicknesses) and their spatial location to avoid misleading exploration results reporting.	
		(iii)	A statement as to whether the contents are averages for the area under consideration or selected individual samples.	
		(iv)		Information on open pit, underground mine, waste heaps, tailings dams and existing ore stockpiles, pillars or other sources in the Mineral Resource Report
		(v)		Comparison with previous Mineral Resource estimates with explanation of reasons for significant changes. Comment on any historical trends (e.g. global systematic errors).
		(vi)		The basis for the assessment and, if not 100%, the relative percentage of ownership by the entity issuing the report.
		(vi)	Calculation of the formula for conversion to conventional metal.	
SECTION 5: TECHNICAL RESEARCH.				
5.1	Introduction	(i)	Not applicable for Reporting of Exploration Results or Exploration Objective.	Research level – SS, PFS, FF or mine plan for current mining.
		(ii)		Summary table of Modifying Factors used to convert Mineral Resources to Mineral Reserves.
5.2	Extraction project (plan)	(i)	Not applicable for Reporting of Exploration Results or Exploration Objective.	Assumptions regarding mining systems and production parameters in estimating Mineral Resources.

Criteria		Results of geological exploration work	Mineral Resources	Mineral Reserves
		(ii)		All modifying factors and assumptions made in relation to mining systems, minimum dimensions (or pit shell dimensions), and internal and, where applicable, external planned and unplanned dilution and mining losses used for the feasibility studies developed documents, including mining method, mine design criteria, infrastructure, throughput, production schedule, mining efficiency, quality control, geotechnical and hydrological considerations, closure plans and personnel requirements.
		(iii)	Mineral Resource Models Used in Estimation.	Mineral Resource Models Used in Estimation.
		(iv)	Justification for Onboard Content(s)	Basis (adopted) cut-off grade(s) or quality parameters applied, including conversion to equivalent metal, if applicable.
		(v)		Extraction method(s) used
		(vi)		For open pits, the slope angle sides, their stability, overburden coefficient.
		(vii)		For underground mines, discussion of mining/development systems, geotechnical parameters, mine design parameters,
				ventilation/air heating/cooling system requirements.
		(viii)		Performance Discussion mine, selected equipment, grade control method, geotechnical and hydrogeological considerations, occupational health and safety of personnel, personnel requirements, losses and dilution
		(ix)		Quarry optimization methods and software used in planning, including discussion of limitations.
5.3	Technological research	(i)	Not applicable for Reporting of Exploration Results or Exploration Objective.	Source of samples, representativeness of potential raw materials and methods used to obtain samples, laboratory and process testing methods.

Criteria		Results of geological exploration work	Mineral Resources	Mineral Reserves
		(ii)		The basis for assumptions or predictions regarding the applicability of processing methods and any preliminary mineralogical testing performed.
		(iii)	Potential processing methods and any production factors that may have a significant impact on the likelihood of eventual economic recovery. Correspondence of processing methods to the type of mineralization.	Processing method(s), equipment, plant production capacity, efficiency and staffing requirements.
		(iv)		The nature, extent and representativeness of the metallurgical tests carried out and the factors influencing recovery. A detailed process flow diagram/flow chart and metal balance, especially for a multi-product plant from which the marketable products (concentrates) are assessed for various chemical and physical characteristics.
		(v)		Assumptions or assumptions made for hazardous components and the existence of any bulk or pilot scale testing and the extent to which they are representative of the deposit as a whole or ore body.
		(vi)		Disclosure of whether the metallurgical process is a well-established technology or a new method and, if new, the rationale for its use in estimating the Mineral Reserve.
5.4	Infrastructure	(i)	Not applicable for Reporting of Exploration Results or Exploration Objective.	Commentary on the current state of infrastructure or the ease with which infrastructure may be provided or accessed and its impact on the reasonable prospects for eventual economic extraction.

Criteria		Results of geological exploration work	Mineral Resources	Mineral Reserves
		(ii)		Evidence that necessary production facilities have been taken into account (which may include, but are not limited to: processing plant, tailings storage facility, leach facilities, waste dumps, roads, pipelines, rail or port facilities, water and electricity supplies, offices, housing, security, wastewater treatment facilities, etc.). Provision of detailed maps showing the location of facilities.
		(iii)		A statement that all necessary logistics have been taken into account.
5.5	Environmental and social factors	(i)	Not applicable for Reporting of Exploration Results or Exploration Objective.	Confirmation that the company holding the license has complied with the environmental compliance requirements of the country where the facility is located and any mandatory and/or voluntary standards or guidelines to which the company subscribes
		(ii)		Identifying the necessary permits that will be required and their status, including where they have not yet been obtained, and confirming that there are reasonable grounds to believe that all permits required for the project will be obtained in a timely manner.
		(iii)		Any sensitive factors that may affect the project, as well as any other environmental factors, including all Interested Parties (I&AP) and/or studies that may have a material impact on the likelihood of eventual economic recovery. Possible solutions to existing problems.
		(iv)		Legislative programs of social management that may be required, their content and status.
		(v)		Significant socio-economic and cultural factors that need to be managed and, where appropriate, the associated costs.
5.6	Market research (marketing) and economic factors.	(i)	Not applicable for Reporting of Exploration Results or Exploration Objective.	Technical and economic factors that may influence the prospects for economically viable production. Link to paragraphs 23-30.
		(ii)		Valuable and potentially valuable product(s), including suitability of the major useful component, minor components and by-products for sale in the marketplace. The product to be sold, customer requirements, testing and acceptance requirements. The presence of a ready market for the product and the presence or absence of ready sales contracts

Criteria		Results of geological exploration work	Mineral Resources	Mineral Reserves
		(iii)		Economic criteria used for the study such as capital and operating costs, exchange rates, revenue/price curves, royalties and streaming agreements, thresholds, reserve payment limits.
		(iv)		Brief description, source and validity of the method used to value the product, price/cost of the product used to calculate the cut-off grade, economic analysis and evaluation of the project including applicable taxes, inflation indices, discount rate and
		(v)		Assumptions made about production costs (cost price), including transportation, processing, fines, exchange rates, marketing and other costs. Allowances must be made for hazardous element content.
		(vi)		Royalty surcharges and rights transfer agreements payable to both government and private individuals.
		(vii)		The ownership, type, extent and condition of equipment and facilities that are significant to the existing operation.
		(viii)		Social costs, environmental costs and staffing costs.
5.7	Risk analysis	(i)	Not applicable for Reporting of Exploration Results or Exploration Objective.	An assessment of the technical, environmental, social, economic, political and other key risks to the project. Actions that will be taken to mitigate and/or manage the identified risks.
5.8	Economic analysis	(i)	Not applicable for Reporting of Exploration Results or Exploration Objective.	Mandatory notification if in PFS and FS including Inferred Resources. Sensitivity to the inclusion of any Intended Resources.
		(ii)		An economic analysis of the project that includes a post-tax forecast on an annual basis using Mineral Reserves or Mineral Resources OR an annual production schedule over the life of the project that has been used at the appropriate PFS or FS level Accounting for royalties and streaming agreements.

Criteria		Results of geological exploration work	Mineral Resources	Mineral Reserves
		(iii)		Discussion of net present value (NPV), internal rate of return (IRR), and payback period.
		(iv)		Sensitivity or other analysis using variations in product price, quality, capital and operating costs, or other relevant parameters, as appropriate, and a discussion of the impact of the results.
SECTION 6: ESTIMATION AND REPORTING OF MINERAL RESERVES.				
6.1	Mineral Reserves Assessment	(i)		Description of the Mineral Resource estimate used as the basis for conversion to Mineral Reserve.
		(ii)		A comparison between two possibilities, one with the inclusion of Inferred Mineral Resources and one without, in a manner that does not mislead investors. Quantity of Inferred Mineral Resources and sensitivity of inclusion in the study.
		(iii)		The Mineral Reserve Report shall indicate in sufficient detail the method of extraction (open pit or underground) and the source and type of mineralisation, the domain or ore body, surface waste heaps, stockpiles and all other sources.
		(iv)		Reconciliation of historical accuracy and performance parameters, assumptions and modifying factors. Comparison with previous estimates of mineral quantity and quality, if such information is available. Where appropriate, any historical trends (e.g. global patterns or errors).
6.2	Classification criteria	(i)		The criteria and methods used as a basis for classifying Mineral Reserves into different confidence categories shall be based on the relevant Mineral Resource category and shall include consideration of the confidence in all Modifying Factors.

Criteria		Results of geological exploration work	Mineral Resources	Mineral Reserves
6.3	Reporting	(i)		The proportion of Probable Mineral Reserves that have been derived from Measured Mineral Resources (if any), including the reason(s) for inclusion.
		(ii)		Include in the Mineral Reserve Report details of open pit, underground mining, ore stockpile residues, waste heaps, tailings dams, pillars or other sources.
		(iii)		Comparison with previous Mineral Reserve estimates. Any historical trends (eg global patterns).
		(iv)	Inclusion or exclusion of Mineral Resources from Mineral Reserves.	
SECTION 7: AUDITS AND REVIEWS				
7.1	Audits and reviews	(i)	Type of review/audit (e.g. independent, external), scope (e.g. laboratory, drilling, data, environmental compliance, etc.), date and name of reviewer(s) along with their recognised professional qualifications. Level of review/audit (desk, comparison with site visit and standard procedures, or approval where the auditor/reviewer has reviewed the work to the extent that they support it as if it were their own work).	
		(ii)	The level and findings of relevant audits or reviews. Whether significant deficiencies are identified and whether corrective actions are required.	
SECTION 8: OTHER RELATED INFORMATION				
8.1		(i)	Other important and relevant information not discussed in other sections.	
SECTION 9: QUALIFICATION OF THE COMPETENT PERSON AND OTHER KEY TECHNICAL PERSONNEL. DATE AND SIGNATURE				
9.1		(i)	Full name, registration number and name of the professional organisation (PO or RPO) of which he/she/they are a member. Relevant experience of the Competent Person(s) and other key technical personnel who prepared and are responsible for the Public Report.	
		(ii)	The Competent Person's relationship with the issuer of the report, if any.	
		(iii)	Inclusion of a Competent Person certificate (see Appendix 2). Such certificate must include the date of signing and the effective date of the Report.	

APPENDIX 5 – Terms of Reference for the Development of a Mineral Resource Assessment Report

I affirm:

Head of the Customer's company

_____ Signature, date

Agreed:

Head of the Contractor's company
(or Competent Person)

_____ Signature, date

TECHNICAL SPECIFICATIONS

*for the development of the Mineral Resource Assessment Report for the
_____ deposit in accordance with the requirements of the KAZRC Code
2021 as of “___” _____ 20___.*

Customer	
Executor	
Technical contacts Customer: Performer:	
Chapter	Description
1. Name of works (services)	Development of the Mineral Resource Assessment Report for the _____ deposit in accordance with the requirements of the KAZRC 2021 Code as of “___” _____ 20___.
2. Place of execution of works	1. Office of the Contractor (office work) 2. The mine site, laboratory and other areas required for visiting.
3. Location of the object, Subsoil Use Contract or License	
4. Basic requirements	
4.1 Objectives of the work, solution methods, types and volumes of work	Objectives of the work: The main objective is to carry out an assessment of the Mineral Resources of the _____ deposit in accordance

	<p>with the requirements of the KAZRC Code 2021. as of “ _____ ” _____ 20____.</p> <p>The Customer intends to use the results of the work for the purposes of _____ (registration of mineral resources in the state balance, or obtaining financing, or _____)</p> <p>Main methods of solution:</p> <ol style="list-style-type: none"> 1. Initial visit to _____ site, laboratory and other areas required for visit, study of available materials. Assessment of quality control procedures (QA/QC). Gap analysis report (on sufficiency of information for report preparation) 2. Creation of a model of mineral resources and a lithological-structural model 3. Mineral Resources Assessment, Categorization 4. Preparation of Mineral Assessment Report resources and related public reporting documentation <p>Types and volumes of work:</p> <p>To estimate the Mineral Resources of a _____ deposit, the following key work stages (1-12, including but not limited to) must be completed and described:</p> <ol style="list-style-type: none"> 1. Obtaining all available data required to develop the report. Initial assessment of their completeness, quality and suitability for the purposes of Mineral Resource assessment. 2. Visiting the field, laboratory and other facilities in order to collect all data and become familiar with the conditions of the work. 3. A detailed review of the exploration work carried out and an analysis of its quality and the data (by exploration periods) used in the estimation of the Mineral Resources, including the results of the technical studies carried out. 4. Development of a Mineral Resources model including: <ul style="list-style-type: none"> • Analysis of geological aspects influencing the Mineral Resources model: <ul style="list-style-type: none"> • Geological setting (from regional to deposit). • Mineralization and changes in ores and rocks. • Weathering and oxidation • Control, Geological interpretation of mineralization, morphology. • Statistical analysis of data testing and distribution, including: <ul style="list-style-type: none"> • Composite composition
--	---

	<ul style="list-style-type: none"> • Hurricane Content Limits • Variography, continuity assessment • other • Mineral Resources Estimate including: <ul style="list-style-type: none"> • Mineralization domains, weathering and mineralogy • Assessment methodology • Evaluation parameters • The presence of associated useful and “harmful” elements (if there is sufficient initial data) • Estimation of bulk density of ores and rocks • Checking the calculated parameters • Creating a block model, interpreting the contents • Classification of Mineral Resources <ol style="list-style-type: none"> 5. Assessment of quality/verification of Mineral Resource estimates, including comparison with mining results (if any). 6. Identification of any missing data required to estimate the Mineral Resource 7. Limiting the boundaries of the Mineral Resource estimate by selecting the optimal open pit shell for the adopted metal(s) price(s)_____ and/or optimal underground mining 8. Optimization parameters are determined based on available research data (or reliable substantiation of analogs is performed). For underground mining conditions – appropriate parameters. 9. Classify Mineral Resources and prepare a Report in accordance with the requirements of the KAZR Code 10. Identify factors and risks that may adversely affect the estimate of Mineral Resources and, possibly, adjust the classification taking into account such factors 11. To compile a list of recommendations for improving the assessment of Mineral Resources and increasing their categorization. 12. Preparation of the Mineral Resource Assessment Report for the _____deposit. 	
4.2. Deadlines for completion of works	Start date:	Completion date:
4.3 Safety requirements when performing work	The calendar schedule for the execution of works is approved by the Customer and agreed upon by the Contractor. When at the work sites, the Contractor is obliged to comply with all requirements of the Customer’s safety rules and ensure:	

	<i>(depending on the situation at the facility – from completing the Briefing to the Contractor having an occupational health and safety control system and full-time employees of the occupational safety department).</i>
4.4 Requirements for the quality of work performed	<p>Mandatory fulfillment by the Contractor of the work schedule approved by the Customer, timely submission of materials and reports.</p> <p>The Contractor shall engage a team of qualified specialists to perform the work. The Competent Person shall be responsible for the results of the work on the assessment of Mineral Resources.</p> <p>The Mineral Resource Assessment Report for the _____ deposit in accordance with the requirements of the KAZRC 2021 code must strictly comply with:</p> <ul style="list-style-type: none"> • Requirements of the Kazakhstan Code of Public Reporting of Exploration Results, Mineral Resources and Mineral Reserves, 2021 edition. • Requirements of the PONEN Ethical Code. • <i>Disclosure rules established by KASE and other exchanges (if the report is intended to raise money)</i>
4.5 Requirements for standardization and unification	The file formats of the three-dimensional geological model (including lithological, geological-structural models and geostatistical block model) of the deposit and databases developed based on the results of the work are agreed upon between the Contractor and the Customer.
4.6 Requirements for the approval of the Report	The quality of the work performed on the assessment of Mineral Resources and the preparation of the Report is reviewed jointly by the Customer and the Contractor and is agreed upon by a signed acceptance certificate for the work performed.
5. Additional requirements	
5.1 Requirements for accompanying documentation	All formats and content of the documentation that the Contractor submits for reports on stages of work (electronic templates; reports; electronic appendices to reports (files, tables, databases, etc.) must be agreed upon between the Contractor and the Customer.

APPENDIX 6 – Terms of Reference for the Development of a Mineral Resource and/or Mineral Reserve Assessment Report

I affirm:

Head of the Customer's company

_____ Signature, date

Agreed:

Head of the Contractor's company

(or Competent Person)

_____ Signature, date

TECHNICAL SPECIFICATIONS

for the development of the Mineral Resource and/or Mineral Reserve Assessment Report for the _____ deposit in accordance with the requirements of the KAZRC Code 2021 as of “ ___ ” _____ 20____.

Customer	
Executor	
Technical contacts Customer Performer	
Chapter	Description
1. Name of works (services)	Development of an Assessment Report (Mineral Resources) and Mineral Reserves _____ deposits in accordance with the requirements of the KAZRC 2021 code as of " ___ " _____ 20____. <i>(Note: The report may be prepared either jointly with a parallel assessment of both Mineral Resources and Mineral Reserves, or with only an assessment of Mineral Reserves)</i>
2. *Place of work performance	1. Office of the Contractor (office work) 2. The mine site, laboratory and other areas required for visiting.
3. Location of the object, Subsoil Use Contract or License	
4. Basic requirements	
4.1 Objectives of the work, solution methods, types and volumes of work	Objectives of the work: The main objective is to estimate the (Mineral Resources) and/or Mineral Reserves of the _____ deposit in accordance with the requirements of the KAZRC 2021 code as at “ ___ ” _____ 20____. The Customer intends to use the results of the work for the purposes of _____ (registration of mineral resources in the state balance, or obtaining financing, or _____)

	<p>Main methods of solution:</p> <ol style="list-style-type: none"> 5. When assessing Mineral Reserves, Mineral Resources, block models of Mineral Resources of the _____ deposit will be used. <i>(Note: If Mineral Resources and Mineral Reserves are to be estimated within the same Report, the template of the Mineral Resource Estimate Report Specification should be used in addition.</i> Initial visit _____ to the field, laboratory and other areas that need to be visited. 6. Creating an Ore Reserves Model Taking into Account Losses and Dilution (Diluted Model) 7. Optimization of quarry and/or underground mining operations 8. Development of a mine development plan (LOM). 9. Estimation of Ore Reserves taking into account all modifying factors, with the definition of a technically feasible and economically viable mine plan. 10. The minimum level of technical and economic calculations is Preliminary Feasibility Study (PFS). 11. Preparation of a summary report on the estimate (Mineral Resources, if required) and Mineral Ore Reserves and related public reporting documentation. <p>Types and volumes of work:</p> <p>To estimate the Ore Reserves for open pit/underground mining of the _____ deposit, perform and describe the following work stages (1-12, including but not limited to):</p> <ol style="list-style-type: none"> 13. Obtaining all available data and reports on Technical Studies required for the development of the report. Initial assessment of their completeness, quality and suitability for the purposes of Mineral Reserves estimation. 14. Visiting the field, infrastructure and other facilities in order to collect all data and become familiar with the conditions of the work. 15. A detailed review and analysis of the results of technological, geotechnical, hydrogeological and other studies to ensure their suitability for estimating Ore Reserves. Determination of modifying factors. The work is carried out with the involvement of specialized specialists. 16. Development of a methodology for determining ore dilution and losses. 17. Calculation of the Mineral Reserves model. 18. Analysis of operating, capital and administrative costs associated with ore mining and processing, if provided by the Customer, for their applicability in calculations. In the case
--	--

	<p>of an operating facility, use of average actual indicators (preferably for the last three years)</p> <ol style="list-style-type: none"> 19. If necessary, the Contractor's specialists must independently estimate the costs of ore extraction and processing, capital and administrative costs. For deposits where there is no operating mining enterprise, the Contractor's specialists must also independently calculate/justify the costs. 20. Determination of cut-off contents. 21. Analysis of the environmental status of the deposit, social aspects and labor safety, and the availability of necessary documentation (EIA, etc.). 22. Research and confirmation that the deposit has valid environmental, licensing and other permits in place. 23. Assessing the adequacy of the infrastructure for the estimation of Ore Reserves. Identifying possible necessary measures. 24. Upon completion of the checks, perform quarry optimization using the adopted modifying factors and/or the optimal underground mining option. 25. Create a quarry design. 26. Determine the transition point to underground mining (if necessary). 27. Development of a financial and economic model for ore mining and processing, taking into account all capital, operating, administrative and other costs. 28. Assess the risks based on factors that may have a negative impact on the estimate of Ore Reserves and adjust their classification taking into account these factors. 29. Prepare a summary report of the (Mineral Resource) and/or Mineral Reserve estimate and related public reporting documentation. <p>The Contractor shall agree with the Client its calculations of capital expenditures, mining, processing and general and administrative expenses, which will be used for the optimization of quarries (underground mining operations) and the assessment of Ore Reserves.</p> <p>Mineral Reserve Estimation for Underground Mining. In order to assess the Ore Reserves for underground mining, the Contractor's specialists must develop a plan for the construction of an underground mine. All initial parameters will be the same as for a quarry, except those that relate specifically to the design of an underground mine.</p> <p>Stages of work:</p> <ol style="list-style-type: none"> 1. Analysis for the purpose of selecting the transition point from open to underground mining of a deposit. 2. Consideration of possible development systems based on available data on geology, geotechnical investigations, losses, dilution and other modifying factors. 3. Prepare a preliminary capital cost estimate for each potential development system to support strategic analysis.
--	---

	<ol style="list-style-type: none"> 4. Analysis of operating and administrative costs associated with underground mining and ore processing, if provided by the Customer, for their applicability in calculations. 5. If necessary, the Contractor's specialists must independently estimate the costs of ore extraction and processing, capital and administrative costs. For deposits where there is no operating mining enterprise, the Contractor's specialists must also independently calculate the costs. 6. Determination of cut-off contents. 7. Selection of preferred mine development systems, development of open pit and underground mine design. 8. Calculation of the Reserves model taking into account possible losses and dilution 9. Development of a production schedule (Life of mine) for an underground mine. 10. Study and analysis of requirements for the project infrastructure. 11. Development of a preliminary financial and economic model to test the economic viability of the project. 12. Classify and report Ore Reserves in accordance with the requirements of the Code KAZRC2021. 13. Assess the risks based on factors that may have a negative impact on the estimate of Ore Reserves for underground mining and adjust their classification taking into account these factors. 14. Develop recommendations for possible improvement of the project economics. 15. Develop a preliminary combined mining plan for open pit and underground mining and calculate a combined preliminary technical and economic model. 16. Preparation of a consolidated report on the assessment of (Mineral Resources) and Mineral Reserves (open) and underground mining and related public reporting documentation. 	
4.2. Deadlines for completion of works	Start date:	Completion date:
4.3 Safety requirements when performing work	<p>The calendar schedule for the execution of works is approved by the Customer and agreed upon by the Contractor.</p> <p>When at the work sites, the Contractor is obliged to comply with all requirements of the Customer's safety rules and ensure: <i>(depending on the situation at the facility – from completing the Briefing to the Contractor having an occupational health and safety control system and full-time employees of the occupational safety department).</i></p>	
4.4 Requirements for the quality of work performed	<p>Mandatory fulfillment by the Contractor of the work schedule approved by the Customer, timely submission of materials and reports.</p> <p>The Contractor shall engage a team of qualified specialists to perform the work. The Competent Person shall be responsible for the results of the work on the assessment of Mineral Reserves.</p>	

	<p>The report on the assessment of (Mineral Resources) and/or Mineral Reserves of the _____ deposit in accordance with the requirements of the KazRC 2021 code must strictly comply with:</p> <ul style="list-style-type: none"> • Requirements of the Kazakhstan Code of Public Reporting of Exploration Results, Mineral Resources and Mineral Reserves, 2021 edition. • Requirements of the PONEN Ethical Code. • <i>Disclosure rules established by KASE and other exchanges (if the report is intended to raise money)</i>
4.5 Requirements for standardization and unification	The file formats of the three-dimensional geological model (including lithological, geological-structural models and geostatistical block model) of the deposit and databases developed based on the results of the work are approved by the Customers
4.6 Requirements for coordinating the results of work	The quality of the work performed on the assessment (of Mineral Resources) and/or Mineral Reserves and the preparation of the Report is jointly reviewed by the Customer and the Contractor and agreed upon by a signed acceptance certificate for the work performed.
5. Additional requirements	
5.1 Requirements for accompanying documentation	All formats and contents of accompanying documentation submitted by the Contractor to reports on stages of work (electronic templates; reports; electronic appendices to reports (files, tables, databases, etc.) must be agreed upon by the Customer and the Contractor.

APPENDIX 7 – Terms of Reference for the Development of a Report on the Results of Geological Exploration Work

I affirm:

Head of the Customer's company

_____ Signature, date

Agreed:

Head of the Contractor's company

(or Competent Person)

_____ Signature, date

TECHNICAL SPECIFICATIONS

to develop a report on the Results of geological exploration work on the site _____ in accordance with the requirements of the KazRC 2021 code.

Customer	
Executor	
Technical contacts From the Customer: From the Contractor:	
Chapter	Description
1. Name of works (services)	Development of a report on the Results of Geological Exploration Works at the site _____ in accordance with the requirements of the KazRC 2021 code.
2. Place of execution of works	1. Office of the Contractor (office work) 2. The work site, laboratory and other objects required for visiting.
3. Location of the object, Subsoil Use Contract/License	
4. Basic requirements	
4.1 Objectives of the work, solution methods, types and volumes of work	Objectives of the work: The main objective is to assess the Mineralization Potential of the _____ site in accordance with the requirements of the KazRC 2021 code. The customer intends to use the results of the work for the purposes of _____ (obtaining funding for further geological exploration work, registering the report with the Geology Committee, or...)

	<p>The report is prepared on the basis of:</p> <ul style="list-style-type: none"> • Results of historical works • Results of current work • Results of historical and current work. <p>Main methods of solution:</p> <ol style="list-style-type: none"> 12. Initial visit to the work site, the Customer's office, the laboratory and other facilities that need to be visited. 13. Geological structure, model and control of mineralization, analogues. 14. Description of the work performed, volume and methodology. 15. Evaluation of the adequacy and quality of the work performed and the possibility of using it for further assessment of resources/reserves. 16. Description of the results of geological exploration work. 17. Assessment of the site potential (mineralization parameters (thickness, content of useful components) are usually shown in the range “from – to” without giving their average values) 18. Recommendations on the direction and volume of further geological exploration work. <p>Types and volumes of work:</p> <p>To prepare a report on the Results of geological exploration work, the following main stages of work (1-12, including but not limited to) must be completed and described:</p> <ol style="list-style-type: none"> 30. Obtaining all available data for developing the report and systematizing it. 31. Visiting the site, laboratory and other facilities in order to collect all data and become familiar with the conditions of the work. 32. Brief overview of the subsoil user's permitting documentation (if any). 33. Study of geological, geochemical, geophysical data. Analysis, generalization. 34. Description of probable analogues with indication of mineralization parameters. 35. Develop a Mineralization Model (note: model refers to a concept, not a 3D model) that would describe: <ul style="list-style-type: none"> • Geological situation, from regional to detailed. • Mineralization and changes in ores and rocks. • Weathering and oxidation • Inferred or established: mineralization control, geological interpretation, morphology. • Other factors...
--	--

	<p>36. The description of the Model must contain the necessary maps, sections, geophysical, geochemical data that would confirm the plausibility of the Model.</p> <p>37. A detailed review of the methodology, volumes of all geological exploration work carried out, technical studies (if any), divided by periods.</p> <p>38. Analysis of their quality, volume and conclusion on the possibility of their use in the report with a sufficient degree of reliability.</p> <p>39. Description of the results of geological exploration work with the attachment of maps, sections, mineralization parameters, etc.</p> <p>40. Evaluation of the possible potential of the site.</p> <p>41. Developing Recommendations for further actions. If continuation of the work is recommended, determine its direction, methodology and approximate volumes.</p>				
4.2. Deadlines for completion of works	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; padding: 2px;">Start date:</td> <td style="width: 50%; padding: 2px;">Completion date:</td> </tr> <tr> <td colspan="2" style="padding: 2px;">The calendar schedule for the execution of works is agreed upon by the Contractor and approved by the Customer.</td> </tr> </table>	Start date:	Completion date:	The calendar schedule for the execution of works is agreed upon by the Contractor and approved by the Customer.	
Start date:	Completion date:				
The calendar schedule for the execution of works is agreed upon by the Contractor and approved by the Customer.					
4.3 Safety requirements when performing work	<p>When at the work sites, the Contractor is obliged to comply with all requirements of the Customer's safety rules and ensure: <i>(depending on the situation at the facility – from completing the Briefing to the Contractor having an occupational health and safety control system and full-time employees of the occupational safety department).</i></p>				
4.4 Requirements for the quality of work performed	<p>Mandatory fulfillment by the Contractor of the work schedule approved by the Customer, timely submission of materials and reports.</p> <p>The Contractor shall engage a team of qualified specialists to perform the work. The Competent Person shall be responsible for the development of the report on the Results of geological exploration work.</p> <p>Report on Results of geological exploration work on the site _____ must match:</p> <ul style="list-style-type: none"> • Requirements of the Kazakhstan Code for Public Reporting of Exploration Results, Mineral Resources and Mineral Reserves, 2021 edition. • Requirements of the PONEN Ethical Code. • <i>Disclosure rules established by KASE and other exchanges (if the report is intended to raise money)</i> 				
4.5 Requirements for standardization and unification	<p>Report file formats for work results agreed upon by the Contractor and the Customers</p>				
4.6 Requirements for the approval of the Report	<p>The quality of the work performed to prepare a report on the Results of geological exploration work is jointly reviewed by the Customer and the Contractor and agreed upon by a signed acceptance certificate for the work performed.</p>				
5. Additional requirements					
5.1 Requirements for accompanying documentation	<p>All formats and contents of accompanying documentation submitted by the Contractor to reports on stages of work</p>				

	(electronic templates; reports; electronic appendices to reports (files, tables, databases, etc.) must be agreed upon by the Customer and the Contractor.
--	---