POLYMETAL

wardell armstrong

Kyzyl ESIA Report
Non-Technical Summary

October 2016

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INTRODUCTION

Polymetal International (Polymetal) acquired a gold deposit adjacent to the village of Auezov in East Kazakhstan Oblast, Republic of Kazakhstan (RoK) in 2014. Polymetal have completed a Feasibility Study and an Environmental and Social Impact Assessment (ESIA) for mining and processing the gold. This document is the Non-Technical Summary (NTS) of the ESIA. The proposed development has been named the Kyzyl Gold Deposit (Bakyrchik), but is also referred to as 'the Project' within this document.

OVERVIEW OF THE KYZYL GOLD DEPOSIT

Project Location

District

Zharminsky District,

East Kazakhstan

Borders | Distance

Kazakhstan-Russia | 120km

Kazakhstan-China | 330 km

Nearest cities | Distance

Astana | 750km west

Ust-Kamenogorsk | 75km east

Semey | 160km northwest

Nearest Settlements

Auezov

Shalabay

Mining began at Kyzyl (Bakyrchik) in 1956 and continued until the accessible and less complex to process gold-bearing ore was exhausted, leaving only the ore types requiring more process to extract the gold. Mining has continued intermittently to the present day, with different mining and processing technologies used to extract gold from the remaining complex ore. The mine and processing facilities are currently under Care and Maintenance, meaning that a limited number of staff maintain the site, and no full-scale mining activities are currently undertaken.

Once operational, the Project will be developed in two stages, and mining will last for about 23 years.

Stage 1 (2016-2026) is extending the mining stage that comprises open pit development, waste dump stacking, minerals processing, and tailings storage.

Stage 2 (2026-2039) is an underground mining stage, extracting ore from below the base of the open pit, where existing mining infrastructure will be upgraded, and the deeper underground ore resources will be extracted.

See Chapter 2 for drawings of the planned Project layout.

Once mining is completed the site will be closed and the affected land reclaimed and rehabilitated. After a period of post-closure monitoring, most of the restored land will be returned to local communities or the government. Areas of land that cannot be returned to their previous use (such as pit areas with steep slopes) will be made safe or be assigned other land uses. The plans for mine closure will be updated as the Project develops, with a final closure plan made available at least two years before mining ends.

Approximately 608 and 1,084 people will be employed during Stages 1 and 2 of the Project, respectively. Most workers will be accommodated locally in Auezov or Shalabay settlements.

THE ESIA

The ESIA was prepared by Wardell Armstrong in September 2015 and contains the following:

- A review of the policies, laws and regulations that the Project must comply with as it is developed and operated. These include both Kazakh legal requirements and international standards which Polymetal has committed to apply, in particular the International Finance Corporation Performance Standards (IFC PS);
- A detailed description of the mining and industrial processes that will be employed;
- An assessment of alternative mining and processing methods that were considered, and an account of how the proposed locations of major items of Project infrastructure were selected, including illustrations of how environmental sensitivities and stakeholder considerations informed these choices;
- A description of the environmental and social 'baseline' conditions in the Project area, including physical, biological, social and cultural elements;
- The impact assessment, which predicts potential impacts of the Project on baseline conditions, taking account of feedback from stakeholders including those residing in affected communities, local government, businesses, and other interested organisations;
- Identification of mitigation measures required to avoid, minimise and manage negative impacts (or enhance positive impacts), and which may apply to the engineering design, construction, operation or closure phases of the Project;
- A series of management plans outlining mitigation measures for various infrastructural, environmental, and social elements of the Project; and
- The Environmental and Social Management Plan (ESMP) for the Project, which outlines how to implement mitigation measures and monitor their effectiveness throughout the life of the Project.

LOCAL KAZAKH OVOS PROCESS COMPARED TO INTERNATIONAL ESIA

In conjunction with the international ESIA, the Project has obtained mining permits that require Kazakh Environmental Impact Assessment (EIA) process, nationally referred to as the OVOS. In the RoK, the mining sector is governed by the Ministry of Investments and Development, chiefly under the auspices of the 'Law of Subsoil and Subsoil Use' (2010, #291-IV), as amended on 29.12.2014 by endorsement of the law "On introduction of amendments and additions to certain legislative acts on subsoil use matters" (#271-V). There are also a number of Decrees issued by the RoK Government, which regulate specific issues in subsoil use.

The RoK Environmental Code requires that pre-project and project development works that may have an impact on the environment are subject to an EIA (OVOS). In particular, an EIA is required for the construction of new, or reconstruction of existing, facilities and for mineral exploration and production. To that end, a separate OVOS is required for each element of the Kyzyl Project. For example, a separate OVOS is required for the tailing storage facility and for the processing plant. Each OVOS considers impacts from each element separately. Approval of

the OVOS is an integral part of acquiring permissions and licenses relevant to exploration and ore extraction in Kazakhstan.

OVOS regulations contain general requirements as to how developers must conduct the assessment of environmental impacts and approval of an OVOS submission, which requires a public hearing for stakeholders and approval by the state authorities, before mining operations can commence. Discussions at public hearings are recorded.

The purpose of each OVOS is to fulfil the requirements of State (RoK) permitting, and so to get permission from the authorities to undertake activities needed for the Project. The OVOS procedure is a legal requirement for Kazakhstan. In contrast, an international ESIA is developed to support applications to International Financial Institutions or Equator Principles Financial Institutions for project funding. The international ESIA is not a legal requirement for Kazakhstan. Instead it provides detailed information to lenders about the environmental and social effects of the project so that they are able to make informed decisions on whether or not to make an investment. The ESIA expands on the requirements of the OVOS to meet specific criteria as set out by these international banks.

A standard adopted by many international banks, and the one to which the ESIA was carried out, is the International Finance Corporation's Performance Standards. The Performance Standards require that impacts from all project activities and infrastructure be considered in an integrated way. This includes carrying out a more extensive consideration of the socio-economic impacts a project has. Much of the same environmental baseline data collected for compiling the OVOS can be used for the ESIA, but the Performance Standards often require a higher level of detail and a more comprehensive data than demanded by the OVOS regulations.

SUPPLEMENTARY ENVIRONMENTAL & SOCIAL REPORT

In order to further develop mining activities at Kyzyl, Polymetal seeks funding from the European Bank for Reconstruction and Development ("EBRD"). An additional report, written to complement the ESIA with supplementary information to consider certain environmental and social aspects of the project, prior to disclosure and consideration by EBRD for project funding, has been prepared following discussions between Polymetal and EBRD representatives. This report is called the Supplementary Environmental & Social Report ("SESR") and aligns all aspects of the Kyzyl project to the EBRD's environmental and social standards, known as the EBRD Performance Requirements ("PRs").

EBRD PERFORMANCE REQUIREMENTS AND DISCLOSURE

The ten EBRD PRs aim to help companies achieve good international practices relating to sustainable development. They provide a solid base from which companies, such as Polymetal at Kyzyl, can improve the sustainability of their business operations. Broadly, they stipulate that, where possible, projects should avoid adverse impacts on workers, communities and the environment. If avoidance is not possible, negative impacts should be reduced, mitigated or compensated for, as appropriate. The EBRD PRs are:

- PR 1: Assessment and Management of Environmental and Social Impacts and Issues
- PR 2: Labour and Working Conditions
- PR 3: Resource Efficiency and Pollution Prevention and Control
- PR 4: Health and Safety
- PR 5: Land Acquisition, Involuntary Resettlement and Economic Displacement
- PR 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources

- PR 7: Indigenous Peoples
- PR 8: Cultural Heritage
- PR 9: Financial Intermediaries
- PR 10: Information Disclosure and Stakeholder Engagement

The EBRD Performance Requirements are well aligned with the IFC Performance Standards.

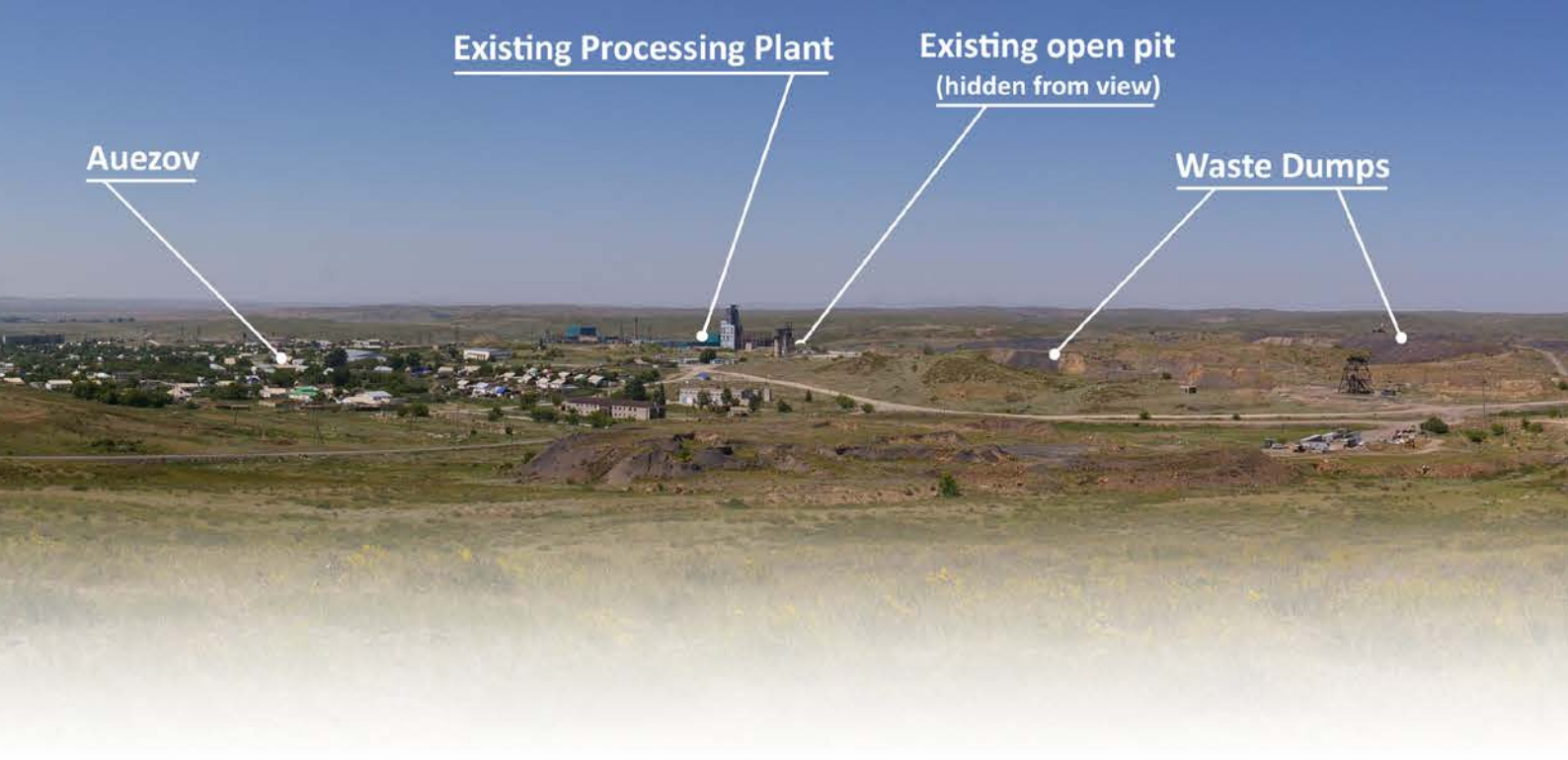
The EBRD also has a specific protocol for how the project's elements should be disclosed to the public. Disclosure will be carried out through a series of public hearings ("Information Sessions") held at Auezov, Shalabay and Ust-Kamenogorsk, which will enable the public to become familiar with methods of assessment, mitigation measures and the ESMS considered. Apart from a public presentation, the sessions offer members of the public the opportunity to ask Polymetal questions about the project. The sessions and accompanying materials will be made available in Russian and Kazakh. The EBRD also requires that the full suite of ESIA and SESR documents is made available on the websites of Polymetal, the EBRD and local Akimats, as well as in various locations in the Project area, for a period of 60 days before the Project is approved for further funding.

HOW THE ESIA AND ADDITIONAL SESR REPORT HAVE BEEN SUMMARISED IN THIS NTS

The focus of this document is to communicate the planned Project activities, and how potential environmental and social risks and impacts will be managed, to all stakeholders.
Chapter 2 provides a brief Project description. Chapter 3 summarises the results of the baseline studies and impact assessment process by answering the following questions:

- What is the present state of the environment or social situation?
- What are the potential impacts from the Project activities on the environment or communities?
- What will be done to manage or control the potential impacts?
- What risks and impacts will remain after taking action to control the impacts?

Chapter 4 summarises the cumulative impacts of the Project, taking account of other potential local developments or background trends. Potential alternatives to the Project that were considered during the Project design process are summarised in Chapter 5. The approach to implementing the ESMP is described in Chapter 6. Chapters 7 and 8 address, respectively, the stakeholder engagement and public participation that have informed the ESIA and will be a continuing aspect of Polymetal's management of the Kyzyl Gold Project.



PROJECT DESCRIPTON

BACKGROUND

Historic mining on the Bakyrchik Deposit led to the creation of several open pits, processing plant facilities, various waste rock and discard material dumps, and a tailings storage facility. The Bakyrchik Deposit has also been previously mined underground, and so shaft and underground tunnel infrastructure is already in place.

Mining that took place in the past extracted the ore that could be processed using conventional minerals processing techniques. The ore now present in the remaining deposit is more complex from a minerals processing perspective, with high concentrations of carbon and sulphides that interfere with conventional gold extraction methods. Until recently attempts to extract gold from these more complex ores have not yielded high enough gold recoveries for mining to be profitable.

Polymetal have developed a new open pit and underground mining design, and will use an improved minerals processing design to economically extract gold from the ore.

PROJECT SCHEDULE

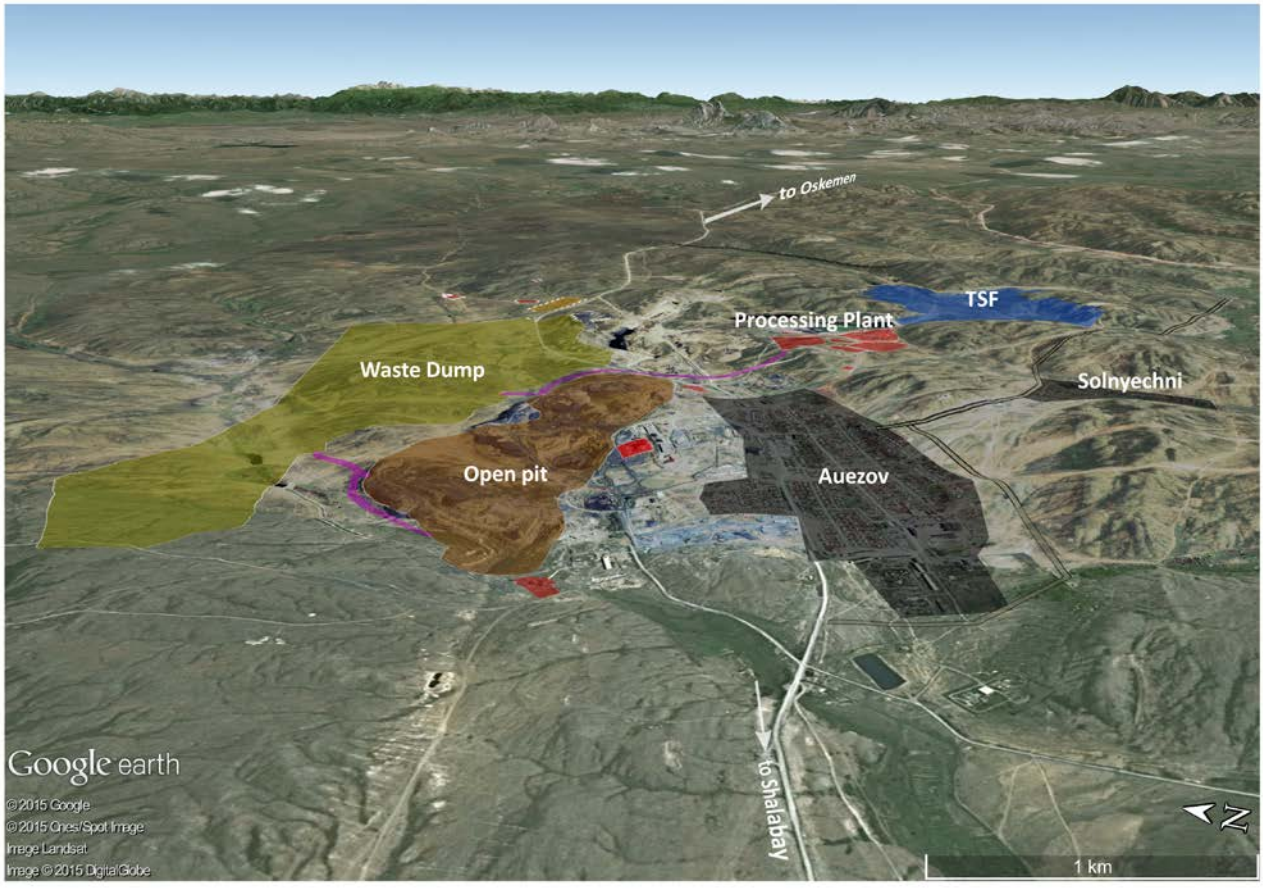
The Kyzyl Gold Project will take place in two stages – open pit mining and underground mining. Each of these stages require site preparation and infrastructure construction prior to mining.

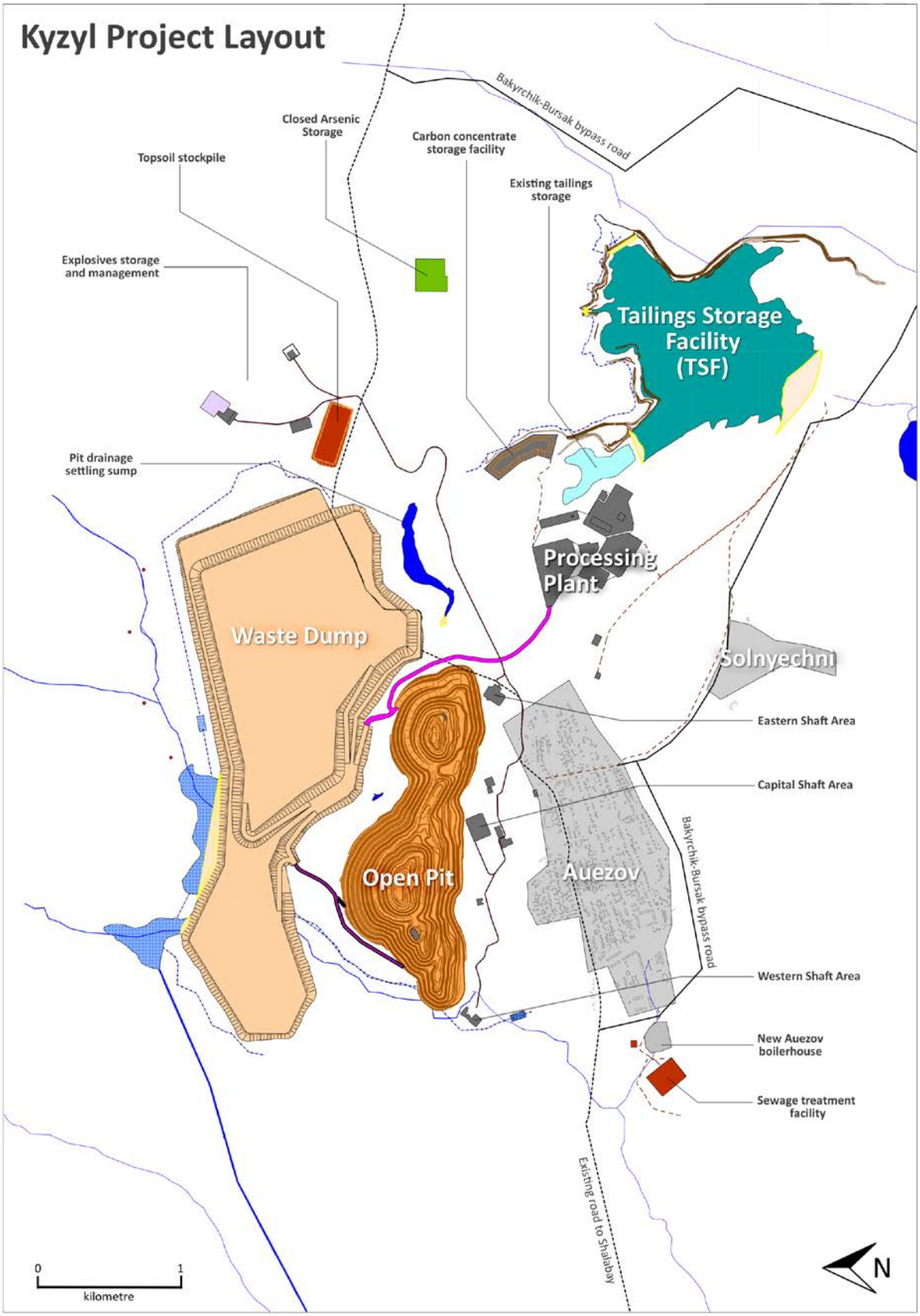
Finally, after all economically extractable ore is recovered, the mine will be closed and rehabilitated.

LAYOUT OF THE MINE

The drawings on these pages show the proposed mine layout compared to the existing settlements of Auezov and Solneychni. The proposed infrastructure is shown superimposed on 3D satellite imagery, looking from the western side of the Project area to the east. A simplified "Kyzyl Project Layout" map shows the locations of the main items of infrastructure that will be described in this section.

Project Schedule Summary		
Project Stage	**Year and Time Period**	**Key Project Activities**
Stage 1 Construction	Years 0-4 (4 years)	Removal of old buildings and infrastructure and construction of new Project infrastructure and processing plant
Stage 1 Operations	Years 1-10 (10 years)	Open pit mining
Stage 2 Construction	Years 10-13 (3 years)	Activities necessary to support underground mining: repair and refurbishing of ventilation shafts, construction of backfill plant, refurbishing of mine water treatment station
Stage 2 Operations	Years 11-23 (13 years)	Underground mining
Decommissioning, reclamation, and closure	Years 24-25 (2 years)	Dismantling of infrastructure, reclamation and revegetation of land
Post-closure monitoring	Years 26-30 (5 years)	Monitoring after rehabilitation




Kyzyl Project Layout
Bakyrchik-Bursak bypass road
Closed Arsenic Storage
Carbon concentrate storage facility
Topsoil stockpile
Existing tailings storage
Explosives storage and management
Tailings Storage Facility (TSF)
Pit drainage settling sump
Processing Plant
Waste Dump
Solnyechni
Eastern Shaft Area
Capital Shaft Area
Open Pit
Auezov
Bakyrchik-Bursak bypass road
Western Shaft Area
New Auezov boilerhouse
Sewage treatment facility
Existing road to Shalabay
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SITE PREPARATION AND CONSTRUCTION

Many of the existing mine and processing plant buildings will be dismantled before open pit mining begins, because the extent of the open pit will affect the stability and safety of those structures. Polymetal will construct a new boiler, to supply heating to Auezov, and a new water tower away from the mining activities. These new items will be commissioned and operational before the existing boiler and water tower, positioned too close to the pit edge, are dismantled.

Some of the activities during Stage 1 construction include:

- Build new processing plant buildings
- Remove waste rock (material that does not contain gold) from pit areas and place in the waste dump
- Prepare and line the base of the tailings storage facility and carbon concentrate storage facilities
- Build road around Auezov (the Bakyrchik-Bursak bypass road) for mine access

During Stage 2 construction, in preparation for underground mining, the existing underground shafts will be refurbished to be suitable as ventilation shafts. Other construction preparation will also be needed and this will include constructing some of the following items:

- Ventilation shafts (ventilation provided at each of the western, central, and eastern shaft areas)
- Coal-fired heating units for each shaft area
- Backfill plant

MINING OPERATIONS

OPEN PIT MINING

Open pit mining will include the following operations: conventional drill, blast, load, and haul methods. Open pits are used when ore bodies are located close to, and can be mined from, the ground surface. Mining operations at the Project will excavate rock from the pit, separating:

- Ore, which is rock that contains concentrations of gold that can be processed economically; and
- Waste rock, which is the rock surrounding the ore body that has to be removed to access the ore. This rock will be transported to the Waste Dump.

Waste Dump in numbers	
Volume	163 million cubic metres
Waste rock mass	419 million tonnes
Height	About 100 metres above the original ground level Two 50 metre high, stacked levels
Area	374 hectares

Blasting is a standard technique used in mining to loosen and break up the rock mass. This will be achieved by drilling a series of regularly spaced holes into the rock, packing explosives into the holes and then detonating a series of controlled explosions. The explosions break up the rock and allow the rocks to be removed by rope-shovels. The arrangement of drill holes and quantity of explosives will be designed so that the explosion is only as large as needed to sufficiently break up the rock in a controlled manner.

Rope shovels will be used to load the ore or waste rock from the blast pile into haul trucks. Haul trucks will transport the ore to the ore stockpile at the processing plant, or the waste rock to Waste Dump.

Because groundwater will be present in the pit and underground workings, the water must be pumped out of the mine workings for mining to take place safely. Mine water is presently pumped out of the underground workings and discharged into the Akbastaubulak brook. During the Project the mine water will be pumped to the pit drainage water settling sump, which is an existing open pit that will be blocked with a dam wall and used as process water reservoir. The water from this reservoir will be pumped to the process plant for minerals processing.

UNDERGROUND MINING

The underground mining method for the Project will be the underhand cut and fill method. Underhand cut and fill is a mining method where the ore deposit is mined from the top downwards. In this way, the mine keeps getting deeper with each year of production.

Ore breaking and blast hole drilling and charging will be carried out using special equipment with telescopic sliding arms. After blasting, the broken ore will be collected using load-haul-dump trucks, which will deliver the broken ore to an underground storage area. Underground haulage trucks will take the ore from the underground storage area to the surface, and exit the underground workings via an opening in the bottom of the pit. Ore will be placed in a temporary ROM ore pad located in the pit bottom before being taken to the ore processing facility.

Mining Production in Numbers	
Open pit design production rate	1.8 million tonnes ore per year
Underground design production rate	1.2 million tonnes ore per year
Open pit gold grade	6.9 grams gold per tonne ore
Underground gold grade	8.5 grams gold per tonne ore
Minerals Processing in Numbers	
Processing plant gold recovery	93.44%
Concentrate production rate	220,000 tonnes concentrate per year
Sulphide concentrate product gold grade	99.2 grams gold per tonne concentrate

As parts of the ore body are removed from underground, it is necessary to replace the removed ore with something else so that the underground tunnels, where mining takes place, do not collapse. The design for the Project is to pump the tailings, which is waste material from the processing plant, to a backfill plant where the tailings will be mixed with cement and water. The product from the backfill plant is known as paste backfill, and this material is pumped back underground and sprayed into the tunnels where ore has been removed. Once the backfill hardens enough to support the weight of the surrounding rocks underground, it is possible to mine a new underground tunnel adjacent to the hardened backfill material and so extract the next portion of gold-containing ore.

Ventilation shafts will be sunk and will operate on a push-pull air system approach. Surface intake and exhaust air fans will be located at the ventilation shafts and will draw fresh air into the mine and extract stale air.

PROCESSING PLANT

The main parts of the ore processing facility are the buffer ore stockpile, ore preparation facility and processing plant. Mined ore from the open pit or from underground will be hauled to and dumped on the buffer ore stockpile.

The ore is then fed to the ore preparation facility, consisting of a jaw crusher, conveyors, and a crushed ore stockpile. The ore is broken down into a small size by the jaw crusher, before being conveyed and deposited on the crushed ore stockpile. The stockpile is formed over a tunnel that contains another conveyor belt and crushed ore feeder. This conveyor belt then transports the crushed ore to the SAG mill in the processing plant where water is added to create a slurry.

The processing plant is the area where a detailed flow sheet has been designed to handle, and efficiently process, the complex ore in the Kyzyl Deposit. Multiple milling, flotation, and flash flotation steps are used, resulting in three main outputs from the plant.

Closure and reclamation goals

Ensure future public health and safety are not compromised;

Minimise any residual environmental impacts;

Ensure that environmental resources will not be subjected to Project-related physical and chemical deterioration over the long term;

After-use of the site is beneficial and sustainable in the long term and acceptable to the mine owners, the local communities and the regulatory authorities;

Any adverse impacts on local communities are minimised;

All socio-economic benefits are maximised;

Closure and rehabilitation will be fully funded without recourse to public funds

The main outputs from the processing plant are:
The product: Sulphide concentrate
The byproduct: Carbon product
The waste: Tailings

The Sulphide concentrate will be dried and packed into 1.5 tonne capacity bags, and loaded into a concentrate storage area using overhead cranes. The concentrate will be collected periodically using trucks that will take the concentrate to the railway station at Shalabay or Charsk for dispatch to far eastern Russia.

The high levels of carbon in the processed ore result in a carbon concentrate being produced. The carbon product still contains gold. For this reason, the carbon will be temporarily stored in the carbon storage facility until new, cheaper technology is developed for processing this kind of material, or the price of gold rises enough to make processing the carbon concentrate profitable.

The tailings material, which is the finely milled ore that has practically no gold left in it, will be discharged, with water, to the Tailings Storage Facility. The majority of the solid material that is fed to the processing plant leaves as tailings in this slurry form.

TAILINGS STORAGE FACILITY (TSF)

The purpose of the TSF is to store the tailings from the process plant, and prevent it from being discharged into the environment or rivers. It is also designed to temporarily store water and provide a water source for mine and processing plant requirements.

The TSF will be designed with a number of water discharge and reclaim pipelines. Water will be removed from tailings material in the processing plant thickeners, before the thickened tailings will be discharged into the tailings facility. Water reclaim pumps that will float on the TSF will pump water back from the dam to the process plant for reuse in milling and flotation.

During Stage 2 of the Project, a tailings slurry pipeline will pump pulp from the TSF to the backfill plant located near Capital Shaft, where paste backfill will be prepared for use in the underground mine workings.

EMPLOYMENT AND WORKING HOURS

The mine will generally operate for 21 hours per day, seven days per week. Excluding shut-down periods for planned maintenance, severe weather conditions, and other aspects of mine development, the mine is expected to operate 365 days per year.

The projected number of employees during each phase of the Project will be:

- 608 during open pit mining operations; and
- 1,084 during underground mining operations.

The Project will employ people from the neighbouring towns and villages. Local recruitment will be a priority for the Project. Only when skilled job roles cannot be filled by residents of Zharminsky District, residents of East Kazakhstan Oblast, or Kazakh nationals, will these roles be filled by suitably qualified expatriates on fixed-term contracts.

CLOSURE AND POST-CLOSURE MONITORING

When mining ends, the Project area will be returned to a land use that is acceptable to all stakeholders including the mine owners, local community members, and regulatory authorities. Previous land uses would be resumed following a period of aftercare.

General rehabilitation activities will include demolishing and dismantling buildings, and removing onsite equipment. Surfaces will be graded and smoothed to create slopes that are as close to the natural terrain as possible.

It is expected that the open pit will fill with water at the end of the mine life, when dewatering pumping stops. Pond formation in the pit will be allowed to proceed, and it is expected that surround land in the pit will be actively revegetated. l


View of one of the existing pits

The waste rock dump reclamation will comprise self-revegetation, with rehabilitation assisted by using seeding. To assist the natural revegetation process, final slopes will be angled to support vegetation growing and topsoil will be applied to all dump surfaces. This topsoil will have been cleared from the footprint of the waste dump before dumping began, and stored in a managed topsoil stockpile area.

The carbon concentrate storage area will be rehabilitated by grading the surface using a bulldozer, applying a thick clay layer and compacting the surface.

To close and reclaim the TSF it will first be necessary to dewater with facility. Excess free water will be discharged from the facility through a constructed ditch into a receiving water body during the flood period. This will dilute the water being discharged to allow it to meet discharge standards after mixing in the river. At the same time as water is discharge, all water and slurry pipelines and pumps will be dismantled. After the water has been completely removed from the TSF, and the groundwater level in the TSF area has dropped below the level of the tailings sediment, the dry tailings surface will be compacted and filled with debris and rubble soil across the whole tailings facility area. Grading the surface and topsoil application will follow, before revegetation with shrubs and trees followed by a period of aftercare.

PROJECT IMPACTS AND ENVIRONMENTAL AND SOCIAL MANAGEMENT

INTRODUCTION

This chapter provides a brief summary of the baseline conditions and impact assessment presented in the ESIA for various environmental and social elements. Each subsection includes the following:

- The state of the environmental or social element prior to the Project's implementation;
- The impacts that may result from Project activities;
- Measures to be implemented to avoid, reduce or manage the impacts; and
- Predicted impacts that may remain after the management measures are applied (known as residual impacts).

The geographical range varies slightly for each environmental or social element, but the general areas affected by the Project are shown below.

GREENHOUSE GAS EMISSIONS AND CLIMATE CHANGE

There is scientific consensus that climate change is partially caused by Greenhouse Gas (GHG) emissions from human activities. New industrial activities that release GHGs, including this Project, add to the emissions and so contribute towards global climate change.

There are a number of gases that are known to influence climate change. The most well-known is CO_2, but other gases include methane, nitrous oxide, and hydro fluorocarbons (used as a refrigerant). Some of these other gases are stronger GHGs than others and this is accounted for by expressing all GHG emissions as though they were CO_2. This is known as calculating their CO_2 equivalents (CO_{2e}).

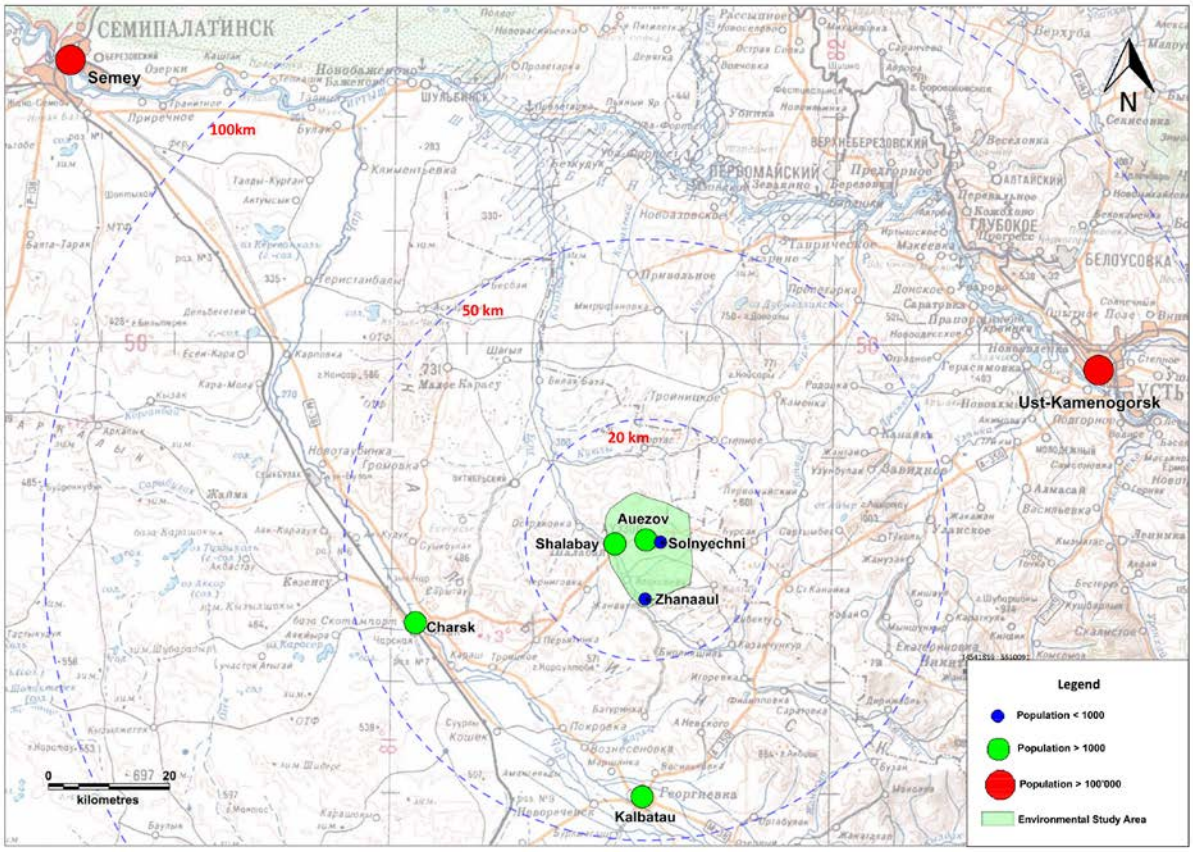
WHAT ARE THE LOCAL CLIMATE CONDITIONS IN THE PROJECT AREA?

At the Project area, summers are generally dry and hot, with occasional dust storms. Winters are cold and snowy, with a greater frequency of high winds. Temperatures can vary between -40C and +40C, in what is described as an extreme continental climate. In the summer extreme weather events include prolonged period of drought, combined with dry winds and dust storms. In winter extreme weather conditions include air temperatures <-20°C, blizzards, ice, and resulting in a prolonged period of snow cover.

In Kazakhstan, rapid rates of warming have started to occur over the last 35 years, and this has resulted in a higher frequency of warm years.

WHAT ARE THE POTENTIAL IMPACTS OF THE PROJECT ON EMISSIONS?

The main source of GHG emissions from the Project includes burning fossil fuels (carbon dioxide and methane as well as nitrous oxide) in construction and mining equipment and transportation vehicles for employees; land use during construction (removing vegetation that would have otherwise captured carbon emissions); explosives detonated during blasting; burning coal at boiler houses and heating units for heating administrative buildings and underground mine ventilation; and use of non-renewable electricity generated off site. The total GHG emissions associated with the construction phase of the project have been estimated to be 17582 tonnes of carbon dioxide equivalent (tCO_2e) . The average annual emissions associated with the open pit phase of operation and the underground phase have been estimated to be 208,160 tCO_2e/year and 185,183 tCO_2e/year, respectively.



WHAT WILL BE DONE TO MANAGE OR CONTROL IMPACTS?

The main sources of GHG emissions will be fuel combustion and electricity usage. Emissions will be reduced through the design of the Project by:

- minimising the land clearance for project facilities;
- site design ensuring minimised distances of travel from the mine site to the overburden dump;
- site design to ensure minimised distances of travel from the mine site to the mineral processing facility;
- inclusion of heat insulation on water pipes in water recycling facility;
- providing insulation for buildings to minimise heat losses;
- using vegetation clearance and implementation of a liner in the tailings dam to reduce potential for methane emissions from submerged vegetation; and

- using modern, energy efficient electrical equipment and mobile plant with fuel-efficient engines.

Further GHG mitigation opportunities are being explored, and these include reconsidering the choice of vehicles used for the mine fleet, using vehicles at Kyzyl more efficiently, and upgrading energy-intensive machinery. In addition, the RoK has recently adopted a more progressive renewable energy policy. If this policy continues the proportion of electricity generated from renewable sources, supplied to the project from the grid, will increase with time. Using more electricity from renewable sources will reduce indirect GHG emissions from the Project. Consideration will also be given to employing renewable energy generation directly at the site, including wind and solar power.

Finally, as part of the decommissioning phase of the Project, it may be possible to implement the construction of wetland areas on the site, which would promote the future re-absorption of carbon from the atmosphere.

WHAT RISKS AND IMPACTS WILL REMAIN?

The Project will continue to seek to reduce its GHG emissions throughout its lifecycle. Reporting, in compliance with IFC/EBRD requirements, which will be undertaken prior to commencement of development and annually for the duration of operations, will allow targeted efforts to improve efficiency and reduce emissions.

It is acknowledged that whilst the main impact associated with GHG emissions is their contribution to climate change, the Kyzyl Project is one of many human sources impacting the emissions of GHGs and contributing to climate change, and projected changes in local, regional, and global climate cannot be attributed in isolation to the proposed Project.

GEOCHEMICAL IMPACTS

PRESENT STATE OF GEOLOGY AND GEOCHEMICAL FACTORS

North-eastern Kazakhstan is underlain by a continuous belt of Palaeozoic sedimentary and volcanic rocks, running from the eastern flank of the southern Ural Mountains, east into western Mongolia and southern Siberia (Russia). The Project is in an area known to contain gold deposits.

Several studies have been undertaken on the geochemical characterisation of the ore, waste rock and tailings from the Project area, to assess the potential for acid rock drainage (ARD). ARD can potentially occur when water and oxygen come into contact with certain rocks that contain acid-generating materials. This acid then potentially dissolves metals in the exposed pit walls, waste rock and ore stockpiles, surface tailings facilities and the waste backfilled into mined out stopes, and could allow metals to discharge into the environment.

ARD is not considered to be a major issue at Kyzyl, but ongoing geochemical studies and regular monitoring are required to continually assess whether this finding holds throughout the life of the Project.

WHAT ARE THE POTENTIAL GEOCHEMICAL IMPACTS OF THE PROJECT?

The potential impacts of the construction, operation and closure of the Kyzyl Gold Project from acid rock drainage (ARD) and metal leaching have been assessed with reference to soil and water resources.

The potential impact from ARD and metal leachate (the liquid containing dissolved metals such as arsenic) is that water resources could become contaminated. Potential sources of contamination, without applying mitigation measures, are:

- Generation of ARD and/or metal leachate from the cemented waste material used as backfill underground;
- Generation of contaminated ARD and/or metal-rich water through runoff and seepage;
- Contamination from carbon cake storage facilities from runoff and seepage;
- Contamination from the TSF through seepage and/or pumped tailings water; and
- Generation of contaminated water from stored ore material, particularly from low grade ore stockpiles left for extended periods of time.

WHAT WILL BE DONE TO MANAGE OR CONTROL GEOCHEMICAL IMPACTS?

All mine waste and low grade ore stockpile management structures will incorporate measures in their design, construction and operation to:

- Prevent or minimise the generation of ARD;
- Control any metal leachate generation;
- Ensure geochemical stability;
- Control surface water seeping into, and runoff from, waste dumps and low grade stockpiles; and
- Prevent migration of metal leachate or ARD to surface water, groundwater and soils.

The Project's Mine Closure and Rehabilitation plan outlines how long-term geochemical effects will be managed. The plan includes actions and procedures related to the open pit, waste dump, TSF and carbon cake storage facility.

With appropriate mitigation measures in place, the effect of acid rock drainage and metal leaching on soil and water resources is not likely to be significant. The ESMP provides a framework for constant monitoring to assess effectiveness of mitigations. The risk of adverse impacts on soils and water from ARD and metal leaching during construction will be reduced to negligible and during operations to minor.

WHAT RISKS AND IMPACTS WILL REMAIN?

Once the mine reaches the closure stage, the revegetation of many areas within the Project site will have been in place for some years, so the effectiveness of ARD and metal leaching controls will have been monitored for an extended period.

Acid rock drainage and arsenic leaching is therefore not expected to cause a significant effect in the long term.

AIR QUALITY

PRESENT AIR QUALITY CONDITIONS

The activities of major urban and industrial centres typically cause the air quality to become poorer with time, due to emissions from road vehicles and industrial processes. In the rural environment, such as at Kyzyl and around Auezov, human activities, such as intensive agriculture and mining, can also cause an effect on air quality, but to a very small degree compared to industrial emissions.

There are no major urban or active industrial centres near the Project that give rise to significant gaseous and particulate emissions. Some gaseous emissions enter the atmosphere from the settlements surrounding the Project because of vehicle exhausts or domestic heating and fires. Although Auezov settlement is classified as

industrial due to its proximity to the mine, it can be defined as residential in character since baseline conditions are not specifically influenced by industry.

The most common airborne emission in the local area is dust or particulate matter. This is released when vehicles travel over paved and unpaved roads, or when wind erodes particles from open storage of loose solid materials, exposed soil surfaces and unpaved roads. At Kyzyl, a survey of particulate matter confirmed that levels are below WHO international guidelines and EU Ambient Air Quality Directive Limits.

A number of existing sources of emissions can be detected at Kyzyl, including dust emissions from the dismantling of older infrastructure at the mine and emissions from the settlement's coal-fired boiler house. An air quality survey showed that arsenic concentrations at Kyzyl appear to be high, however the approved Kazakh method of calculating arsenic in dust differs from international norms, making it difficult to compare existing levels of arsenic with levels experienced elsewhere.

Monitoring over the past year has shown that baseline concentrations of two gaseous pollutants SO_x and NO_x (oxides of sulphur and nitrogen) in the air around the Project site are well below World Health Organisation (WHO) guideline levels. These pollutants are common in urban areas because of high volumes of road traffic, so the low concentrations in the Project area are as expected.

Finally, computer modelling shows that the predicted dispersion of various pollutants across nearby settlements will be less than international guidelines for ambient air quality limits devised to protect human health.

WHAT ARE THE POTENTIAL IMPACTS ON AIR QUALITY?

NUISANCE DUST

During construction, dust will be generated from earthworks and constructing roads, buildings and other infrastructure. During operations, dust emissions will occur when drilling, blasting, loading, hauling, unloading, crushing, transporting and placing ore and barren rock. The main source of dust emitted to the environment will be from the wheels of haul vehicles raising dust from the surfaces of the haul roads. Another major source of dust will be the ore crushing plant, where mechanically breaking rocks into smaller particles produces dust that can be subsequently released into the air in the absence of mitigation. An assessment of nuisance dust effects, taking into account climatic (temperature, wind, precipitation) conditions at the site, indicates that the effect of dust is likely to be negligible and therefore the impact will not be significant.

FINE PARTICULATE MATTER

The principal sources of fine particulate matter, small particles that can be inhaled by humans and cause health issues, are combustion activities such as vehicle exhausts, woodstoves, and boiler houses. At Kyzyl, the main sources of fine particular matter are likely to be domestic emission sources and the unpaved roads within Auezov, and overall counts are therefore likely to be low. Results from a survey and computer models indicate that, based on the distance from Project activities, levels of fine particulate matter in Auezov should be low and are not predicted to exceed guideline recommended values. In addition, to complement monitoring for fine particulate matter throughout the Project's lifetime, an Air Quality Management Plan will be implemented by Polymetal, which will require action to be taken should the guidelines not be met during construction and operations.

ARSENIC IN DUST

Chronic inhalation of inorganic arsenic is associated with skin and mucous membrane irritation and other health effects. Medical staff serving the communities have not reported any of these issues amongst the population in Auezov.

The potential sources of airborne arsenic are from activities where material with high arsenic concentrations are disturbed, and so generate fugitive dust. This could be from construction activities where old waste dumps will be moved to allow the construction of project infrastructure, from legacy arsenic on site from windblown dust, or during operations when blasting rock within the ore generates dust from rocks with higher arsenic concentrations.

A site with high arsenic concentrations is the existing arsenic waste storage dump to the east of the Project area. However, this facility has been capped with a plastic liner and sandy loam material, so is not at risk of producing airborne arsenic emissions as long as it remains undisturbed. No arsenic waste will be generated by the Project, and so the facility will not be used.

GASEOUS EMISSIONS

The Project's main traffic flow will be along the mine haul roads leading from the pit to the waste dump and ore preparation facilities. Based on a survey carried out across the area, the impact of gaseous emissions from vehicles operating at and around the Project site on residents in Auezov is anticipated to be insignificant.

Two new coal-fired boiler houses will be constructed during the open pit stage (Stage 1) of the Project. Stage 2 of the Project, which involves underground mining, will require additional heating capacity for underground ventilation.

NUISANCE ODOURS

Unpleasant odours could be generated from decomposing domestic waste and from domestic wastewater treatment and disposal. There are two sewage treatment facilities within the Project area, including the existing facility and a new sewage treatment facility to be constructed at the ore processing facility, and improper operation of these have the potential to cause moderate short-term local impacts to the air. However, in order for residents of Auezov to be impacted by smells from these facilities, the facilities have to be improperly operated and the wind has to blow from the south west, which only happens under 10% of the time, meaning that the significance of the impact of nuisance odours is generally not significant.

WHAT WILL BE DONE TO MANAGE OR CONTROL IMPACTS?

DUST AND PARTICULATES - MONITORING

The Project has been designed to incorporate several techniques to manage fugitive dust emissions from the site. Particulate monitoring will be carried out at a number of locations outside the SPZ, to record environmental exposure. Dust monitoring will monitor for fugitive dust, suspended particulates and arsenic suspended in dust. Monitoring will take place continuously, 24 hours a day and 7 days per week.

GASEOUS EMISSIONS AND NUISANCE ODOURS

To control gas emissions from vehicles and other combustion sources, equipment will be regularly maintained, and built-in emission control equipment will be kept in good working order. In addition, combustion emissions from stacks will be reduced by constructing sufficiently high stacks so that combustion gas emissions do not mix close to the ground, using reduced or low emissions options wherever possible, installing automatic emissions monitoring systems on the stack, and installing ambient air quality monitoring stations within the Project area.

Controlling dust and particulates

The crushing plant will be enclosed in buildings, thus containing the dust generated by the crushers.

Crushed rock will be conveyed in a covered conveyor, and water sprays will be used to trap particles

Haul roads and other dusty access roads will be sprayed with water or treated with non-hazardous chemicals to control dust

Other measures include controlling vehicle speeds on mine roads, and constructing of vegetative barriers.

To reduce impacts from nuisance odours sewage treatment facilities will be operated properly and monitored for operational performance, including nuisance odours.

WHAT RISKS AND IMPACTS WILL REMAIN?

It is considered that the impact of the Project on air quality in light of safety for humans will be of minor significance in the short term and not significant in the long term.

With appropriate management of sewage facilities, nuisance odour-related impacts are not considered to be significant.

NOISE AND VIBRATION

Noise and vibration are measures of what can be heard and felt from industrial processes. The assessment considers how local communities will experience these impacts.

PRESENT SOURCES OF NOISE AND VIBRATION

The noise environment around Auezov settlement is quiet and residential in nature. It is influenced by the presence of animals, mostly dogs and cattle. The main source of noise in the settlement is from occasional traffic flowing to and from the mine facilities in the industrial area in the north of Auezov. Noise from the industrial area of Auezov, where current mine plant and support facilities exist, is generated as a result of the plant wrecking and salvage. The noise monitoring carried out in August, 2016 indicate that the existing daytime and night time noise levels are well within the prescribed international standards.

WHAT ARE THE POTENTIAL NOISE IMPACTS?

Construction activities that will generate noise include clearing soil and preparing foundations, operating concrete and aggregate batching plants, and heavy vehicle movements. During mining operations, noise will result from drilling and blasting, movement of haul trucks transporting ore and barren rock along the haul roads, the action of the crushers, and operation of the conveyor and processing plant.

Noise from vehicle movements and processing plant equipment is expected 21 hours per day during the operational phase, except during planned shutdowns for maintenance or as a result of bad weather conditions. Noise and vibrations as a result of blasting will occur daily (Monday – Saturday). There will be instantaneous noise from blasting combined with vibrations transmitted through the air and ground. However, there are no buildings within the zone where the stability of property would be affected. Communities that will potentially be affected by noise from the Project are Auezov and Solnyechni. Shalabay is located too far away to be affected. Herders and animals grazing near the mine may also be disturbed by noise emissions.

Noise modelling, using numerical methods, indicates that the most significant source of potential noise impacts are from the drill rigs operating during the first years of open pit mining. Open pit mining during this time could cause noise levels to exceed World Health Organisation standards. This is a potentially significant impact, however, noise levels remain below Kazakh standards throughout the life of mine during both day and night time operations.

WHAT WILL BE DONE TO MANAGE OR CONTROL NOISE IMPACTS?

Noise sound levels reduce exponentially with increasing distance from the source of the noise. Generally, a person placed 1km or more away from a noise source will not be adversely affected by noise, although operations may still be heard.

To reduce noise emission levels from open pit mining activities, a number of operational noise management actions will be taken. The most critical mitigation measures are those to control noise from drilling.

Other noise management activities will include only blasting when the prevailing wind is blowing away from Auezov.

Once operational, the processing plant will undergo regular inspection and maintenance to ensure that all mufflers are performing adequately.

Roads will be maintained and a speed limit will be imposed, to further reduce noise emissions.

As mining proceeds, the pit will get deeper. As the pit gets deeper the mining equipment will operate below ground level and noise emitted from the open pit mining equipment will be shielded by the pit walls, greatly reducing the noise that reaches households in Auezov.

A number of noise abatement best practice measures will be implemented during operations. Workers will be trained to keep noise levels as low as possible. Complaints related to noise will be monitored throughout the stakeholder engagement activities and the Project's complaints and grievance process.

Noise control for drilling equipment

Fit drill rig engines with noise-reducing enclosures

Only undertake drilling during daytime hours

WHAT RISKS AND IMPACTS WILL REMAIN?

With drill rigs fitted with noise reducing enclosures, noise levels experienced in Auezov will be within WHO guidelines during daytime operations, with the main source of noise being the large haul trucks. For each passing year of mining, noise levels experienced in Auezov will reduce as mining activities take place deeper in the pit. By the third year of open pit mining the pit will be deep enough so that the walls of the pit block most of the noise from drilling equipment and haul trucks in the pit. Once underground mining begins, noise levels during day and night are predicted to be within the WHO standards in most places around Auezov.

SOILS AND LAND USE

All project activities which will take new areas of land will have potential impact on soils.

PRESENT STATE OF SOILS

Mountain chestnut soils are the most common soil type in the Project area, found across large areas of steppe grasslands located at the same altitude as the Project. They are generally consisting of organic matter rich topsoil over subsoil with high rock content.

The results of a soil chemistry survey showed that concentrations of the potential contaminants were within the safe values (GAC UK standards) for the most demanding land use, small-scale gardening, where direct human contact with the soil is most frequent and food is produced.

The survey also identified that concentrations of arsenic, cadmium and nickel were higher in areas where soil was disturbed by mining activity and where bedrock or rock dust could have been introduced. Concentrations of vanadium are naturally high in the area. The soils within the footprint of the TSF, processing plant and other facilities have heavy metal concentrations similar to those in a natural soils typically found in this area.

WHAT ARE THE POTENTIAL IMPACTS ON SOILS?

The potential impacts of the Project include:

- disturbance and removal of soils;
- changes in soil quality during storage;
- change in soil chemistry and quality through soil contamination resulting from accidental spills or discharges; and
- loss of soil through wind and water erosion.

Without appropriate mitigation, the Project will cause important changes to soils, with total loss of soils from disturbed areas likely to occur. The Project would thus, without mitigation measures, have an overall moderate impact on soils in the area.

WHAT WILL BE DONE TO MANAGE OR CONTROL IMPACTS ON SOIL?

In order to reduce the level of significance of the residual impact on soils, appropriate mitigation measures are required. These mitigation strategies include restricting construction of the Project to the area required to develop the mine, optimising infrastructure design, installing impervious liners in the TSF structures, and avoiding the mixing of soil from existing industrial areas with topsoil from undisturbed areas.

In addition, training will be provided on implementing accident, emergency, and oil spill response plans. This would be in order to mitigate the potential for adverse impacts to soil and water quality in the event of an accidental spill or release during normal construction or operating conditions. All employees and contractors will be bound by the procedures in the Plan.

The potential does exist for the land to be rehabilitated upon mine closure, turning it back into a steppe habitat capable of being used by herders. After underground mining ceases, the open pit will be rehabilitated. Soil will be placed on shallower gradients and sown to grassland. The perimeter of the pit will be fenced, to exclude animals.

WHAT RISKS AND IMPACTS WILL REMAIN?

The proposed mitigation will keep soil loss and soil disturbance to a minimum, and allow most of the Project footprint to be restored. Some soil loss and land alteration will occur, however, characteristics and quality of the soils after the Project will be changed only partially. The residual effect on soils, at and around the Project area, will not be significant when mitigation measures are applied.

WATER RESOURCES (HYDROLOGY AND HYDROGEOLOGY)

Water resources include surface water in rivers, streams, wetlands, lakes and reservoirs; and groundwater in aquifers, which exist beneath the land surface.

PRESENT STATE OF WATER RESOURCES

Surface water features

The Kysylsu river

Several seasonal brooks (Kysyltu, Akbastau-bulak, Kholodnyi Kliuch, Jumataybastau, Mayranbastau and Alaaigyr)

The four existing open pits (West, Central and East pits, and the Dalneye Pit);

The Kysylsu surface water supply reservoir

The Alaaigyr reservoir.

Groundwater features

The Kysyltu borefield

The underground workings

SURFACE WATER

The river system in the general area of the Kyzyl mine has a number of streams draining the project area. All of these streams are tributaries of the Kysylsu River and flow in a south-westerly direction. There are four open pits in the vicinity of the mine site. The water contained in these pits originated from both surface run-off and groundwater inflows. The Kyzylsu reservoir is located on the Kyzylsu River about 8km south of the mine site. The Alaaigyr reservoir is located just under 4km southeast of the mine site, receives water from the Alaaigyr Brook, and is used by locals for fishing and other recreational activities. The brook flows out of the reservoir to join the Kyzylsu River.

GROUNDWATER

A geological formation underground that is porous enough to allow significant quantities of groundwater to flow through it is known as an aquifer. Groundwater exists beneath the surface in the aquifer system. Water flow through an aquifer is slower than surface water drainage. Water from an aquifer can reach the surface through springs, rivers, and wetlands, or where the underground water level rises to the ground surface during heavy rain.

WHAT ARE THE POTENTIAL IMPACTS ON WATER RESOURCES AND WATER USERS?

Construction, operation and closure activities carry potential impacts which could affect the water environment. These can be divided into impacts on surface water and groundwater quality and quantity.

SURFACE WATER

It is predicted that the Project will have limited impact on surface water during the construction and closure phases.

During the operational phase, the mining activities will have a moderate impact on the surface water quantity and thus aquatic flora and fauna, with a moderate change to flora and fauna, though these are not unique or critical habitats, and will be mitigated by the continued presence of species in the unaffected reach upstream of the stream diversion. The overall flow reaching the Kysylsu River should remain unchanged except for an additional discharge from mine dewatering.

During the operational phase, the mining activities will have an impact deemed to be negligible on the surface water quality of local watercourses given the requirement for mine water discharge compliance with relevant environmental approvals and the likely compatibility of diverted water with that in the receiving Kholodnyi

Kliuch Brook. Nevertheless, mining activities could have an adverse impact on the quality of water at Alaaigyr Brook in the unlikely event of a failure of the TSF dam, following which tailings material would flow into the Alaaigyr brook.

GROUND WATER

Abstraction of groundwater from the Kyzyltu wellfield will have a low impact on groundwater levels around the site, and is unlikely to affect other groundwater users in the area due to the relatively low rate at which water is pumped. The mining activities will not affect the operation of the Kyzytu wellfield both in terms of quantity and quality.

Open pit water inflows will rise from 1,500 to 3,000 m^3 per day. Dewatering the open pit will create a cone of depression, which is a region underground where the ground water level drops because of the pumping. The cone of depression will extend away from the open pit and intercept some of the nearby streams. This in turn can cause some of the surface water to flow, via groundwater, to the open pit. This will have a moderate impact on the surface water, water users, and the environment.

During the operational phase, the mining activities will have a low impact on the groundwater quality. The cone of depression created by the open pit dewatering will draw and contain any run-off water from the mine infra-structure infiltrating underground.

WHAT WILL BE DONE TO MANAGE OR CONTROL IMPACTS?

SURFACE WATER

Current on-site monitoring will be continued throughout each phase of the operation. During the construction and operational phases, drainage ditches and storm water control measures will be constructed around the waste dump and the TSF. These will channel rain and melting snow runoff away from the waste dump and the lined TSF areas into the existing stream network. The TSF and dam walls will be monitored to provide an early warning of potential problems, to prevent dam failure. Dam failure is considered to be highly unlikely.

GROUNDWATER

Current on-site monitoring will be continued throughout each phase of the operation. The monitoring network may need to be adjusted to include active sumps and additional boreholes, as some existing boreholes will be lost following the construction of the mine infrastructure.

WHAT RISKS AND IMPACTS WILL REMAIN?

For surface water resources, once mine closure is undertaken, the TSF will be dried out and rehabilitated, and so will pose no further dam failure risk. Drainage ditches and storm water control measures will remain in place around the waste dump and the TSF.

For groundwater resources, current on-site monitoring will be continued. Post mining the pumps in the under-ground mine will be turned off and groundwater levels will rebound to their pre-mining level causing the open pits to flood. The open pit will be restored as a lake.

BIODIVERSITY

The baseline studies undertaken for the ESIA include species and habitats that are important for national or international conservation efforts, and those that are valued locally.

The poor use of natural resources can lead to:

Degradation of the soil-plant ecosystem;

A decrease in the biological productivity of the soil;

Changes in floral composition and species densities;

Decreases in crop yield.

IMPORTANT PLANTS AND ANIMALS IN THE PROJECT AREA

Plant composition and diversity in an area can be used to determine how healthy an ecosystem is. At present, the land within the project footprint is has been disturbed as a result of its mining legacy. Within the undisturbed areas, where future mining operations will take place, no critical habitat have been identified in the baseline surveys..

The flora of the Project area is dominated by herbaceous perennials, followed by semi-shrubs and herbaceous annuals. Many plant species identified in the area are of economic importance, for example being used as a food or fodder crop, having medicinal uses, or being used as a raw material.

The Project study area is situated on a spur of Kalba Range and its foothills. The landscape is mainly associated with the lowland dry steppe belt although parts are situated in the foothill draughty steppe belt. The Project lies within the 'Western and northern foothills of the Kalba Range' International Bird Area (IBA), however the 816 hectare Project site (including the existing industrial areas) only accounts for 0.1% of the 657,000 hectare IBA.

Eight rare and endemic plants have been identified within the Project study area, however, these species are not considered to be unique to the site (priority biodiversity feature, PBF), nor is the vegetation considered a Critical Habitat in nature as outlined by the EBRD's Performance Requirement 6. Large Heath Butterfly, classed as rare in the Red book of Kazakhstan, was recorded in 'natural habitats' 1.5 to 5.0km from the industrial area. No mammals, fish or reptiles listed in the Red book of Kazakhstan or classed as globally threatened in the IUCN Red List have been identified within the project site. However, Pond Bats are listed as Near Threatened by the IUCN and were observed within residential areas and technical facilities where disturbance already occurs.

Thirteen species of birds of prey were observed in the study area, all observations were of single individuals. The golden eagle is a migratory species, it is common internationally, but has a sporadic distribution in RoK and is listed in the Red Book of Kazakhstan. A single individual was observed at very high altitude above the site in October 2011. The species does not nest in the vicinity of the site and it is likely that the site forms only a very small part of its wide hunting territory. Similarly, lone individuals of the IUCN Red listed bird species (Near Threatened status) pallid harrier were also observed at height on hunting flights in 2010 and 2011 as well as steppe eagle (Endangered status). Pallid harriers and steppe eagles do not nest in the vicinity of the site. The project will not disturb the habitat of either of these species.

The diversion of the Akbastaubulak Brook to the north of the waste dump will reduce the flow to the section of the brook below the diversion. This has the potential to impact the ecology of this watercourse, however studies show that the negative impact of these actions will be low because no ecologically or culturally important fish populations can be found in the brook.

WHAT ARE THE POTENTIAL IMPACTS ON WILD-LIFE AND HABITATS?

Construction, operation and closure activities will affect wildlife and habitats in the Project area as a result of land use change, disturbance, social changes, and other environmental changes that affect a wider area. Species will lose some habitat completely and some remaining habitat will be reduced in quality as a result of the Project.

The floral survey report only specifically identified wild rosemary as potentially being directly affected by the development. Baseline surveys have identified that all other plant species of conservation importance are not located within areas within the physical footprint of the development. Wild rosemary is not internationally designated as an endangered species (IUCN Red list as Least Concern) due to the large range of the species and its stable population.

Important Biodiversity Components Affected by Project Infrastructure

Wild rosemary in an area close to the new Project development, near the Kyzylsu River

The large heath butterfly in 'natural habitats' of the sanitary protection zones, which includes areas within the Project footprint

Pallid harrier, steppe eagle and a golden eagle were observed on hunting flights over the TSF site

Infrastructure/activity within area between pit and Auezov will impact on birds of prey -- black kite and common kestrel, which were recorded nesting around the existing industrial facilities

Pond bats within residential areas and technical facilities.

WHAT WILL BE DONE TO MANAGE OR CONTROL IMPACTS?

A number of general good-practice measures have been incorporated into the Project design with the aim of minimising impacts on habitats and species. These include the use of downward-directed lighting and controlling speeds on roads to reduce dust and prevent injury to animals.

WHAT RISKS AND IMPACTS WILL REMAIN?

It is recognised that, despite best efforts to restore the Project site after mining ends, it will not be possible to fully restore the natural habitats that currently exist at Kyzyl. However, the site is not deemed to be a critical habitat for any species of plant or animal, and no effects are considered to be significant.

ECOSYSTEM SERVICES

Ecosystem services are the benefits that people get from the natural environment, often without having to pay for them. They include timber, herbs, fish and fresh water, but also natural processes such as pollination of fruit trees or natural vegetation that prevents soil erosion. Ecosystem services also include enjoyment of the natural environment for walking, relaxing or the view. The Project will affect the supply of some services or the ability of people to continue using them as they do now.

PRESENT CONDITION OF ECOSYSTEM SERVICES

The Project area provides many services, including meat and milk from grazing livestock. The pasture land in the area is considered to be productive because of its moderate soil quality and water supply. Many people value their traditional ways of life, including daily herding of animals.

The footprint of the processing plant and TSF facility is currently used for grazing and for foraging berries and mushrooms by people in the area. The river catchments around the Project are used for fishing and recreational activities. Local communities have strong traditional links with the land, and want to maintain the full range of ecosystem services that they use. They appreciate the landscape and biodiversity in the area and are aware of its value. Because of its industrial history, most of the Project area does not support a large number of species.

Ecosystem Services

BENEFITS THAT PEOPLE GET FROM THE NATURAL ENVIRONMENT

WHAT ARE THE POTENTIAL IMPACTS ON ECOSYSTEM SERVICES?

The most important potential impacts of the Project on ecosystem services relate to topsoil removal and storage required for project development, which could potentially lead to the removal of vegetation and erosion. Surveys show that the diversion of Akbastaubulak Brook will not negatively impact any species used for fishing or hunting by local people.

The Project does not negatively impact upon primary production and water cycling, crops and livestock, fisheries, biomass fuel, freshwater supplies, genetic resources and biochemicals. In addition, the Project is not predicted to impact upon the role of ecosystems in regulating air quality, climate, water flows, purifying water and treatment waste, pollination, or in regulating diseases. Finally, from a cultural perspective, the assessment has concluded that the Project will not impact on ecosystem services in light of recreation and ecotourism, ethical and spiritual values, and aesthetic value.

WHAT WILL BE DONE TO MANAGE OR CONTROL IMPACTS?

Impacts on grazing undertaken by seasonal herders around the future site of the processing plant and TSF facility will largely be avoided by creating a wide enough corridor to the east of Auezov settlement allowing for herders to pass through and to use their conventional area for grazing. Polymetal will liaise with local herders to ensure they are aware of the extent of the Project's anticipated fenced-off areas well in advance of actions.

Environmental management measures should minimise impacts of dust and pollution on herbs, mushrooms and other foods harvested from the wild.

Changes in traditional ways of life and people's sense of place and enjoyment of the landscape are difficult to manage. The Project is making efforts to minimise visual impacts and is working with local communities to ensure that their livelihoods will be maintained.

Monitoring of aquatic species numbers, diversity and health will continue so that impacts on the aquatic system of watercourses in and around the mine can be assessed and appropriate remediation implemented.

Annual surveys of the vegetation surrounding the project will be undertaken throughout the life of the site. These surveys will include monitoring crop yields from farming activities as well as identifying any invasive species whose arrival is linked to the Kyzyl project. Should any degradation linked to the Kyzyl project occur, then remedial action will be taken to improve these areas.

WHAT RISKS AND IMPACTS WILL REMAIN?

Some grazing and cropland will be permanently lost. Partly as a result of the availability of jobs at the Project, it is likely that some cultural aspects of the traditional herding life will be altered. Some aquatic habitat will be reduced or altered due to reduced flows in the Akbastaubulak brook.

ARCHAEOLOGY AND CULTURAL HERITAGE

In general, the Project area and surrounding industrial and agricultural zones have undergone strong influence by industrial activity since mining operations began in the 1950s. As a result, the discovery of sites of archaeological significance within the Project footprint is unlikely.

PRESENCE OF ARCHAEOLOGICAL ARTEFACTS AND CULTURAL HERITAGE

In the wider region, anecdotal evidence and reports from the oblast-level East Kazakhstan Ministry of Culture suggests there are a number of sites of archaeological importance, and some have already undergone archaeological investigations. This area is reported to have been originally settled from the Mesolithic era through part of the Bronze Age (12,000 – 3,000 years ago), with a vast majority of archaeological sites located near major rivers, including the Irtysh River and its major tributaries.

All the surveys to date indicate that, within the mining license area, there are currently no objects of identified historical and cultural value as defined by Kazakh legislation. During the initial surveying process of the Project, Polymetal came across a Muslim cemetery located in one of the existing open pits. The graves were moved, along with those found at a burial site in the area designated for the TSF facility, to a newly-built mausoleum located near the road between Auezov and Shalabay. A tombstone commemorating the herder Bakyrchik Kazhy Mamai Uly, one of the founders of the settlement, was also found in the cemetery at the open pit; it was also moved to the new mausoleum.

WHAT ARE THE POTENTIAL IMPACTS ON ARTEFACTS AND HERITAGE?

Any construction, operational, or mine closure activities that involve digging up land, disturbing land, or dumping stockpiles of material onto land have the potential to damage or destroy previously unidentified archaeological artefacts.

WHAT WILL BE DONE TO MANAGE OR CONTROL IMPACTS?

During construction and operations new artefacts may also be discovered. Polymetal will train all employees to follow the Chance Finds Procedure that will prepare employees to be aware of potential cultural artefacts, how to temporarily stop work when items are found, and the ways to work with government and experts if finds are scientifically important.

WHAT RISKS AND IMPACTS WILL REMAIN?

Operations at the Kyzyl mine are not thought to result in impacts to known and potential cultural heritage sites. The Project activities have no known significant effects on cultural heritage.

TRANSPORT SERVICES AND INFRASTRUCTURE

PRESENT TRAFFIC NETWORK AND INFRASTRUCTURE

The road network in the district of the Project consists of gravel and paved bitumen roads. There is a network of dirt side roads, heavy going in spring slush and winter snow drift seasons.

The Project site is accessed via the existing road from Almaty-Semey national highway and from the Almaty-Ust-Kamenogorsk road in the east. The nearest railhead of the new Ust-Kamenogorsk - Almaty- Charsk railroad line is at Shalabay settlement and the Charsk junction station, 50km from Auezov settlement. The rail connection at Charsk and Shalabay give the project access to material supplies from China and Russia.

WHAT ARE THE POTENTIAL IMPACTS ON TRAFFIC?

Impacts relating to traffic associated with this project include direct increases in traffic on the local road network, potentially affecting journeys, junction capacity and safety; and increased wear and tear of road surfaces as a consequence of increased HGV traffic to and from the Project and a potential increase in environmental impacts such as noise and air quality resulting from increased traffic.

Deliveries to the Project will be transported to Charsk or Shalabay railway station by rail. From there materials, spares, and consumables for the project will be transported to the storage facilities at the Processing plant via road. Deliveries will take place along the new Bakyrchik-Bursak bypass road that goes south around Auezov. The product from the plant will be dispatched via road to the railway station, and then transported via freight rail to far-east Russia.

WHAT WILL BE DONE TO MANAGE OR CONTROL IMPACTS?

The Bursak bypass road will redirect the heaviest traffic away from the populated areas of Auezov and so mitigate reduce the chance for road accidents in the settlement, so increasing road safety. A number of survey and engineering related infrastructure measures on certain roads and junctions may need to be implemented to mitigate the impact of increased HGV use as a consequence of the Project.

A Transport Management Plan will be developed by Polymetal, which will include formal arrangements to minimise and mitigate the impact on residents of Auezov and Shalabay.

Key mitigating measures would be those which lessen the impact of transporting construction materials, the operational workforce, and staggering vehicular movements whilst also maximising the payload of HGVs.

WHAT RISKS AND IMPACTS WILL REMAIN?

The combined impact of the transport requirements of the construction and operational phases will be low to moderate for residents of Auezov and Shalabay. During the construction phase some unusually large loads will be transported to the Project, and these could interrupt normal traffic flow. However, these disruptions will only last for a relatively short period of time (a number of hours along any particular stretch of road).

Train at Shalabay station

SOCIAL IMPACTS

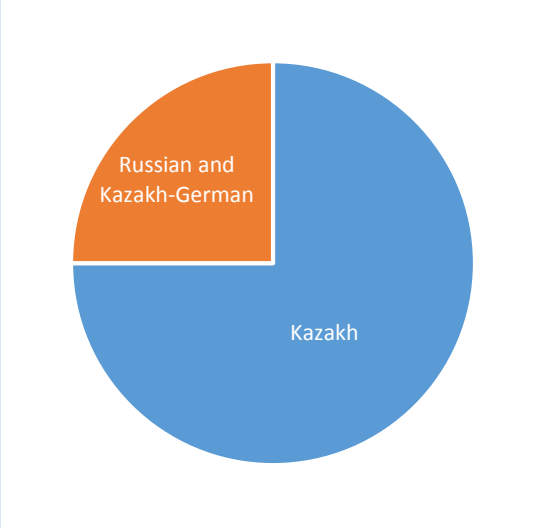
PRESENT STATE OF COMMUNITIES

Communities in Numbers

Population
Auezov: 2742 (down from 1997 peak of 8000)
Shalabay: 1124

Average Occupancy:
Auezov: 2.7 people per house
Shalabay: 4 people per house

Ethnicity:



Household income (annual average):
Auezov: 60,000 KZT
Shalabay: 97,850 KZT

The two nearest settlements to the Project are Auezov and Shalabay.

A survey of Auezov households reveals that there is a relatively low dependency ratio for the community as a whole, with around one working age resident for every dependency age resident. Many residents rely on seasonal incomes, so the household income during the winter months may be quite limited.

Nearly three-quarters of households surveyed in Auezov and Shalabay were ethnically Kazakh, with the rest reporting themselves to be either Russian or Kazakh-German. Most households (79%) were bilingual Kazakh-Russian. The survey revealed that a quarter of households in Auezov reported that their only source of income was through state pensions for the elderly. Main items of household expenditure are food, mortgage, debt, and transportation payments.

Many in Shalabay are either directly or indirectly earning a living through Shalabay LLP, a local farm specialising in the breeding of Kazakh White breed cattle.

Around a quarter of Auezov households reported owning livestock, including sheep, cows, horses, and chickens, which they mostly keep for food. In Shalabay, this figure was much higher, with 85% of households owning at least one animal. Nearly all households surveyed in both settlements owned a TV and appliances whereas most had central electricity, satellite TV. Around half of households reported owning a car.

Conditions are largely similar in the off-shoot hamlets of Solnyechni and Zhanaaul, located in Auezov and Shalabay municipalities, respectively, although residents there are more reliant on subsistence farming.

WHAT ARE THE POTENTIAL IMPACTS ON COMMUNITY DEMOGRAPHICS, ECONOMICS, AND LIVELIHOODS?

EMPLOYMENT

The Project will employ between 608 and 1,084 workers during the peak of open pit and underground mining operations, respectively. Polymetal have committed to prioritising local employment; however, due to skills requirements, it is anticipated that some jobs will go to people from outside the local area.

Kyzyl Project will employ 608 people during open pit mining; 1,084 people during underground mining

The income earned by mine workers will be higher than current average salaries in the local communities. Increased employment at the mine will potentially cause the expansion of restaurant and entertainment facilities in Auezov, and increased sales of consumer goods and services. People producing agricultural products may find it easier to market their goods, and will be able to use more regular links to Ust-Kamenogorsk or Semey to reach larger markets.

However, there will be drawbacks to increased employment in the area, including a potential shift from traditional ways of earning a living toward mining and industrial work, including a loss of social traditions, wage inflation and increases in some living costs.

PEOPLE MIGRATING TO THE AREA

The development of a project of this scale will be seen as an economic opportunity, potentially attracting people from outside the immediate area in search of work. Given the recent trend of young people (males in particular) leaving for work, the development of the Project may encourage these family members to stay in, or return to, the area after leaving due to outmigration when previous operations went to Care and Maintenance. If new migrants come into the area they will increase the resident population in the towns, which would change the nature of communities and existing social structures. In-migrants might include families moving into the area if the breadwinner has gained a job with the Project. Traders and small- to medium-sized enterprise owners are likely to arrive, hoping to capture the increased disposable income that people in the area will have as a result of mining-related employment. It is most likely that inward migrants would settle in Auezov, because of its proximity to the Project, but certainly also in Shalabay.

The capacity of existing services, such as the healthcare system or local schools, within affected communities, has been assessed to ensure that an increase in population would not put undue pressure on service delivery for the host population. At present, most services are under-used and would benefit from additional demand.

The introduction of new people, both workers and in-migrants, to an area can bring with it social challenges. The sudden increase in salaried employment available locally, combined with potential differences between local customs and the customs of people moving into the area, can also cause social impacts. Social issues that have been experienced by similar projects in Kazakhstan and elsewhere in the world include an increase in alcohol consumption, prostitution and related sexually transmitted diseases, and increased crime and violent behaviour.

The introduction of new people, both workers and in migrants, to an area can bring with it social challenges.

ECONOMICS

The revenue generation of the Project is generally considered positive. As there are concerns in many countries about the importance of tracking revenues paid by mining and oil and gas projects to government, and given the public desire for transparency around how non-renewable resource revenues are made, Polymetal intends to publish details of its payments to government entities at least annually and will support any RoK government decision to participate in the Extractive Industries Transparency Initiative (EITI).

The development of the Project is likely to have an impact on local inflation. This is driven through increased spending power within the local economy, driving up demand and prices over time. Inflationary pressures may influence purchased items within the communities as well as the local housing market. Inflationary effects are likely to particularly impact households who are reliant upon a cash-based economy either through renting or purchasing property or purchasing food items.

LIVELIHOODS

As a consequence of the restricted access to land reserved for the TSF facility and processing plants, impacts will be experienced by herders who use these areas to graze the animals belonging to Auezov residents, and to collect hay. Local residents will also lose access to some of the sites where they have traditionally collected plants, herbs, and mushrooms for food and medicine, although Polymetal will ensure that the Project's land take is minimised. A survey of local fishermen showed that no fishing takes place in the vicinity of the planned stream diversion at Akbastaubulak brook.

LAND ACQUISITION AND RESETTLEMENT

Due to their proximity to the mine, Polymetal resettled residents from 27 properties on Sotsialisticheskaya Street. The process of acquiring the land from each household has been completed and all agreements have been finalised. The properties have now been evacuated and demolished. Under the international standards of the European Bank for Reconstruction and Development, the resettlement process is considered to be of a voluntary nature because the properties in question were located outside the sanitary protection zone of the mine and because Polymetal, during meetings with the local community, showed intention to adapt the mine plan in order to eliminate the need for resettlement. Residents of the houses were informed and their consent was obtained in order for the process to proceed.


Polymetal staff and contractor accommodation

WHAT WILL BE DONE TO MANAGE OR CONTROL IMPACTS?

The Project has a dedicated Community Liaison Officer (CLO) and Project General Manager, together responsible for oversight of potential social impacts and engaging regularly with affected stakeholders. Affected community members can raise any concerns they may have with the Project and its potential impacts through the community grievance mechanism, as well as during interactive town meetings, as described in detail in the Stakeholder Engagement Plan (SEP).

Polymetal is committed to prioritising local employment. The social effect of the retrenchment associated with transitions from construction to operations and from operations to mine closure will be managed through effective, early consultation and planning. Retrenchment planning will also be required from Polymetal's contractors.

In-migration risks to decrease local job opportunities. The Project will address the in-migration risk through its accommodation strategy for construction and during operation. The workforce will therefore have controlled interaction with the local communities, minimising the economic demand associated with a large workforce and therefore reducing the attraction of the area to opportunist in-migrants.

Some workers will also be housed in hotels ('Hotel California' and 'Hotel Kazakhstan') in Auezov and in proximity to the Project area. All employees and contractors will be required to agree to the Polymetal Code of Conduct which stipulates expectations for behaviour. Failure to comply with the Code would lead to disciplinary measures for employees and contractors. Given the under-use of most services within the local communities at present, it is anticipated that additional population growth will not overwhelm service delivery. This will be closely monitored by the company in co-operation with local government authorities.

Other steps that Polymetal will take to ensure the Project has a positive impact on the local community include purchasing goods and products locally, whenever possible. Effective two-way communication will be maintained with the already established CLO, so that any problems resulting from potential in-migration can be addressed quickly and with the support of the community.

All employees and contractors will be required to agree to the Polymetal Code of Conduct

Polymetal will continue to publish the amount of royalties and taxes it pays, in addition to reporting on the amount of land tax paid to communities each year. Inflationary pressures will be monitored by the Project and are being managed through efforts to keep salaries in line with industry norms in Kazakhstan.

The Project has been designed to minimise impacts to herders through location of Project facilities in areas outside of those known to be important to herders, where possible. Regardless, herders will lose access to some pasture land, and access to other areas will be restricted. The impacts of these changes are difficult to predict, though likely minimal, and they will be monitored during Project implementation to determine whether additional mitigation is necessary. While areas currently used for foraging will be lost or subject to restricted access during the mine life, this is not expected to impact upon local communities due to the widespread availability of the same items outside the Project area and close to affected communities.

When mining concludes, closure and rehabilitation activities will restore access to most of the land previously lost, allowing it to return to previous grazing use. Some land, however, will not be able to be returned to its previous use.

WHAT IMPACTS WILL REMAIN?

The Project will result in a number of long-term impacts to the area, including positive economic impacts from heightened levels of business in the region, including employment opportunities and through the Project's supply procurement policies. Project employees and members of the local community with indirect connections to the Project will have an increased spending capacity, benefitting the region as a whole.

Even with mitigation measures in place, significant in-migration could still occur. Polymetal will work with local administrators to assist in planning for community expansion. The introduction of non-residential workers and the potential for job-related in-migration to Auezov could affect the level and type of social problems experienced within the community. This will be monitored and additional mitigations put in place as necessary.

The effects of directly employing people at the Project are expected to last longer than the life of the Project, as during the Project individuals will develop new skills and the economy will grow larger. These positive effects will be moderated, however, by the negative effects of major retrenchments at transition points in the Project. Efforts to track and monitor purchasing by the mine, and training initiatives, will help with the overall improvement of the economy.

Not all sectors of the economy will benefit from the development of the mine. It is likely that the agricultural sector will be significantly impacted, through a combination of reduced land availability, agricultural workers seeking employment in the mining project, and changes within society which move away from the traditions of agricultural practices.

Some access restrictions to Project land will remain after closure. The former open pits and TSF are not likely to be suitable for grazing use due to topography and safety considerations.

COMMUNITY HEALTH, SAFETY AND SECURITY

PRESENT HEALTH CONDITIONS AND FACILITIES

The communities in the Project area currently have sufficient medical services and hospitals for the number of people resident in the area. There is also a functioning ambulance system in place, thanks in part to sponsorship from Polymetal. Medication availability is limited in public health facilities, although Auezov has one private pharmacy.

Most Auezov and Shalabay residents have access to potable piped drinking water, though this is not the case for satellite hamlets Solnyechni and Zhanaaul. Sewerage systems in rural communities are usually not present. Domestic waste collection is limited, currently privately run and insufficient in capacity and regularity, and has been identified by authorities as a major area of concern.

The major health concerns in Kazakhstan are associated with diseases that are not infectious and are not spread between people. In general, the burden of disease in the study area follows a similar pattern, with heart disease, obesity, and diabetes reported as the most common health concerns. Levels of sexually transmitted infections are low in the area, as are those of tuberculosis.

WHAT ARE THE POTENTIAL IMPACTS ON HEALTH, SAFETY AND SECURITY?

The Project is expected to bring about a number of community health improvements. These include reductions in the incidence of water, sanitation and waste-related diseases, although the incidence of these is already low, through structural improvements made to waste management and improved wellness education related to non-communicable diseases.

It is also expected that the Project could result in some community health, safety and security drawbacks. The most significant of these are an increased risk of sexually transmitted diseases, increased number of road traffic accidents, and a new risk of security conflict between the mining company and communities affected by the Project.

The amount of road traffic travelling to and from the mine site will significantly increase, leading to a potential increased risk of road traffic accidents and noise. The road infrastructure, in particular as a result of newly built roads, will have sufficient spare capacity to accommodate the increased traffic flow.

The Project's security presence could create conflict if security services use force inappropriately. This presence will be complemented by Auezov's police force.

WHAT WILL BE DONE TO MANAGE OR CONTROL IMPACTS?

HEALTH SYSTEM IMPACTS

Doctors in Auezov and Shalabay are confident that healthcare services can cope with the demographic changes associated with reopening Bakyrchik mine, at least in the short-term. The Project will monitor demographic changes in the communities studied and work with local health authorities to determine if available health facilities remain adequate for the needs of the community. The Project will ensure that its health services can adequately cater for the needs of the workforce in terms of occupational health and emergency care.

SEXUAL HEALTH AND COMMUNICABLE DISEASES

The Project will manage sexual health issues in a number of ways. There will be direct engagement with the workforce, through policies, codes of conduct, and education programmes for employees that encourage responsible and respectful behaviour in the host communities, and prohibit sexual harassment. The sexual health and sexually transmitted infection programmes will also apply to contractors. The accommodation strategy chosen for this Project has been designed to minimise these risks. All accommodation constructed for workers will meet international standards to minimise the risk of communicable disease transmission

Doctors in Auezov and Shalabay are confident that healthcare services can cope with the demographic changes associated with reopening Bakyrchik mine

ACCIDENTS AND INJURIES

To deal with the risk of an increased rate of accidents because of mining and associated activities, the Project will develop a community security and safety management plan based on a risk assessment of planned activities. This will include emergency preparedness and response plans for both, community related accidents and also for the workplace. Measures such as setting and policing speed limits for heavy goods vehicles making deliveries to the site, enforcing roadworthiness standards, and enforcing a drug and alcohol policy, are some of the things the Project will do to help prevent accidents.

SECURITY CONFLICT AND HUMAN RIGHTS

To deal with the potential for conflict between the communities and the company (including its security officers), Polymetal will provide adequate training of security personnel on core human-rights issues. Security guards will all be given effective training and their performance will be carefully monitored.

WHAT IMPACTS WILL REMAIN?

Health care benefits achieved during the life of the Project are likely to continue after the Project ends. Despite management measures, traffic accidents remain a possibility as the behaviour of third parties on public roads is beyond Polymetal's control. It is acknowledged that security conflicts is an issue that will need careful monitoring.

CUMULATIVE IMPACTS

Cumulative impacts occur when environmental and social impacts of the Project interact with effects from other sources, which can be natural processes, projects, or other activities in the area.

WHAT ARE THE POTENTIAL CUMULATIVE IMPACTS ASSOCIATED WITH THE PROJECT?

Project impacts predicted by this ESIA to be either Minor or Moderate include those affecting the atmosphere, noise levels, soils, water resources, biodiversity, and local communities. In this context, there are no identified potential cumulative impacts associated with the Project, especially due to a lack of other industrial developments in Auezov settlement and predicted minor impacts on companies operating 6km away in Shalabay, such as Shalabay farm.

Potential cumulative effects may occur off site, in the location that the further processing is due to take place. Any potential cumulative effects that are caused as a result of the importation of the Kyzyl processed material will be subject to Polymetal separate Due Diligence processes.

WHAT WILL BE DONE TO MANAGE OR CONTROL THE CUMULATIVE IMPACTS?

Polymetal should remain informed about the development of future sources of impact in Auezov and Shalabay, in particular industrial or agricultural ventures that may interact with and amplify the environmental and social impacts of the Project.

PROJECT ALTERNATIVES

Potential alternatives for the Kyzyl Project have been considered in detail. The options considered included different types of mining and processing technologies, and alternative locations for elements of mine infrastructure. For example, it was vital to consider locations for the selection of the waste rock dump location, the tailings storage facility and processing plant location, final processing location, use of district water, diversion of Akbastaubulak brook, concentrate processing and rail facilities, construction of a new road, proposed water pipeline, and diversion of the transmission line.

PROJECT TECHNOLOGY ALTERNATIVES

The deposit at Kyzyl is readily amenable to conventional open pit mining as well as underground mining. A combination of the two techniques was selected.

Why the mining method was selected

1. Open pit mining is the most economic option for near-surface deposits of the grades and characteristics defined at Kyzyl;
2. Technological risks are lower using both open pit and underground mining methods;
3. Initial open pit mining allows longer term development of underground mining;
4. Initial open pit mining allows for higher recoveries of the mined orebody.

PROCESSING TECHNOLOGY ALTERNATIVES

Commonly used technologies for extracting gold from ores are gravity separation, mercury amalgamation, and cyanide leaching from either heaps of ore, or finely milled particles.

The remaining gold in the Bakyrchik deposit is bound tightly within the mineral lattice of the ore, and does not suite the previously mentioned processing methods. Tests have shown that the gold at Kyzyl can be recovered using conventional multistage flotation techniques, using a complex flowsheet.

Kyzyl Project approach is to produce a concentrate as a product, with about 99 grams per tonne of gold contained within it, and then send the concentrate for further processing at a facility in Russia. This approach has an environmental benefit for the Project as it avoids the use of hazardous chemicals, such as cyanide, on site.

There are a number of potential alternatives to the existing proposed diversion of the Akbastaubulak brook channel, these include the creation of a storage dam upstream, diverting water from the north around the waste dumps or the re-alignment of the waste dump itself.

PROJECT SITING ALTERNATIVES

The location and orientation of the mineral deposit itself determines the location and configuration of the open pit. However, other components of the Project can be located according to operational convenience, appropriate topography, and environmental and social constraints or sensitivities. The site design process has considered both technical and non-technical issues, such as land suitability, legal requirements, as well as technical, economic, environmental, and social criteria.

At Kyzyl, the siting of the Project components has been based largely on the existing mining and industrial layout, as well as on maintaining access to the ore body. Both the waste dump and TSF are located close to the other components. Care has been taken to keep major mining infrastructure separate from Auezov and Solnyechny settlements. The waste rock dump location was a result of consideration of options around the site and to some extent a prioritization process taking into account the location of other mine facilities. The open pit is located

over the economically exploitable ore deposit and therefore its location is determined by the exploration results and mine design.

Infrastructure has also been located so that mining utility networks, such as water supply, heating, and electricity, are separate from Auezov's utility networks. Both the processing plant and tailings lagoon were capable of expansion and the valley to the south of the tailings facility had sufficient capacity to contain the projected tailing volumes.

INFRASTRUCTURE ALTERNATIVES

Polymetal are constructing a new pipeline from the Kyzylsu reservoir. This pipeline will be the main source of water supply to the Auezov settlement. The benefits that result as a consequence of constructing a reliable source of water supply for the Kyzyl project and to the residents of Auezov outweigh the short term environmental disturbance which will occur during the construction of the pipeline.

New coal fired boilers will be installed at the Kyzyl project to provide heat to the site operations and to the district heating system in Auezov. Alternative fuel sources were considered (biomass, gas and heating oil) but were discounted due to the cost effectiveness and efficiency of transporting the fuel to the Kyzyl project. Coal can be easily stored on site, can be sourced from within Sarykol field of Maikuben basin within Kazakhstan, and will not require any major changes in heating infrastructure on site or within Auezov, and as such was chosen as the preferred energy source.

Power will be supplied from the national power transmission. An alternative of using large scale renewable energy to power the mine instead of taking electricity direct from the Kazakhstan national grid was discounted due to a number of factors. The industrial power requirements for a mining operation of this size would be greater than could practically and reliably delivered through renewable energy sources alone without a substantial storage facility.

The highway between Shalabay and the Kyzyl will be subject to an increase in vehicle movements resulting from the transport of workers, materials, and contractors to and from the site. The alternative of not constructing the bypass would be to continue to direct a project-related traffic through the centre of Auezov past residential properties/ and other local facilities (shops and restaurants). A significant number of the vehicles using the site will be larger trucks, and running these through the existing village of Auezov would result increase levels of noise and dust, and result in increased surface wearing of the local road network.

Due to the scale of the operations required to transport the expected volume of material, no alternatives to Shalabay station were assessed as it is the closest rail facility to the site.

ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

The Project is implementing an Environmental and Social Management Plan (ESMP) covering all design requirements, mitigation and management measures, and monitoring activities defined in the ESIA. The ESMP outlines the project commitments to manage environmental and social impacts and details out the organisational and monitoring requirements to ensure that the necessary measures are taken to avoid potentially adverse effects on the environment and local communities.

The ESMP comprises of detailed discipline specific management plans which include the following:

- **Waste and Wastewater Management Plan (WWW MP**) - The water and wastewater management plan includes the projects commitments to manage impacts on the surface and ground water quality associated with the proposed mining operations. The WWW MP includes measures to manage the impacts on Akbastau and Kyzyltu brooks due to the waste rock dump, tailing storage facility and overburden storage and compaction operations. The Plan also details out measures to manage the impacts on the Holodniy Klyuch brook due to the stream diversion along with measures to prevent impact on groundwater resources arising due to the proposed mining operations.

- **Tailings Storage Facility Management Plan (TSF MP)** - The TSF MP describes the proposed management of the tailing storage facility with a particular emphasis on 'high risk' areas such as dam stability and environmental contamination for seepages. The TSF MP provides an effective system for effective management of the tailings to minimise adverse environmental effects during all phases of the project and provides a sound basis for ongoing rehabilitation and mine closure, reducing post-closure liabilities (such as monitoring and maintenance of reclaimed areas), and plays an important role in ensuring that the mine's legal compliance and social licence are met.

- **Waste Management Plan (WMP) –** The WMP describes measures to effectively manage the solid wastes generated from project facilities such as construction camps, vehicle maintenance areas, temporary waste and recycling storage facilities. An integrated waste management system has been proposed as part of the WMP which will serve as a management tool to provide information on the characteristics and volume (weight) of waste being generated from the Project and will act as a control mechanism for the safe handling, transport, treatment and disposal of waste to ensure environmental health and safety compliance.

- **Emergency Preparedness and Response Plan (DP 01-008) –** This plan provides a documented procedure for identification of potential accidents (emergencies), prevention of these and requirements for documenting the response to real emergencies /accidents.

- **Mine Closure and Rehabilitation Plan (MCRP) -** The Plan outlines the broad principles for developing a comprehensive and detailed plan and process towards the eventual closure and rehabilitation of the proposed Kyzyl Project. The Plan provides a mechanism for initiating the process of on-going planning and development of the closure and rehabilitation of the Kyzyl mine, detailing proposals for post-closure aftercare and monitoring arrangements, informing stakeholders about the closure proposals and establishing estimates of the closure and rehabilitation costs.

- **Air Quality Management Plan (AQMP) –** The AQMP provides measures for management of fugitive dust emissions associated with the project operations and emissions associated with the coal – fired boilers proposed for providing heat for the settlement, mining and processing facilities' needs. The plan

also includes measures for managing and reporting greenhouse gas emissions associated with the project and nuisance odours likely to be anticipated with the project.

- **Framework Soil Management Plan –** The Soil Management Plan details out project commitments to protect the soil and its important functions during the Project activities, especially topsoil removal from large areas required for the waste rock drainage, tailings storage facility, and concentrate processing areas. The plan includes measures in accordance with the best industry practice for soil stripping and storage to minimise damage to soil's important properties such as organic matter (carbon), nutrient content and biological activity.

- **Biodiversity Management Plan (BMP) –** The BMP describes mitigation and management measures, identifies the parties responsible for their implementation and specifies the required monitoring and monitoring schedule.

- **Traffic Management Plan (TMP) –** The TMP provides the measures to enhance the efficient transport of plant components and materials to / from site, whilst minimising congestion and disruption which might affect general traffic and in particular the emergency services.

- **Stakeholder Engagement Plan (SEP) –** The SEP provides measures for managing communications with the stakeholders throughout the life of the project and provides a mechanism for managing any community grievances.

Cultural Heritage Management Plan (CHMP) – The CHMP details out measures for consultations with local community groups in relation to cultural heritage

- **Social Management Plan (SMP) -** The SMP details out the comprehensive set of mitigation measures and action plans to minimise the impact and maximise benefits of the project for local stakeholders and, in particular, for those living nearest to the Project in the Settlement of Auezov and surrounding villages.

- **Archaeological Chance Finds Procedures –** This document provides a detailed procedure for managing any chance finds encountered during project operations.

- **Noise Management Plan –** The Plan describes the measures for managing the noise and vibration impacts associated with the project operations. The plan includes measure to manage noise from open pit mining, mobile plant including the transport to the processing and waste areas, and noise from air overpressure resulting from blasting and ground vibrations from blasting to extract rock within the open pit and certain other Project specific activities.

Polymetal has overall responsibility for the ESMP for all project phases, which commenced during Project design and will continue through the construction, operation, and closure of the mine. Polymetal will ensure that the commitments are adhered to by all contractors involved in the Project. Contractors will be evaluated in terms of their environmental and social capability and performance prior to contract award, and bid packages will include the Project commitments. All contractors will be supervised by Polymetal's environmental and social specialists to ensure that compliance with the ESMP is maintained at all times.

For the duration of the Project, Polymetal will publish an annual monitoring report that will assess the effectiveness of the management plans and their implementation and, where necessary, advise on changes to the ESMP. These annual reports will be made available to affected communities (through the Community Liaison Officer), other relevant authorities, and the financial lenders, with a summary report released for public disclosure. The ESMP requires Polymetal to continuously develop the mine closure plan and progressively restore areas of the mine that are no longer in use. During the operational phase, further research, including the revegetation programme, will inform closure and rehabilitation planning, so that the detailed plan will be finalised, published and agreed at least two years before mine closure.

STAKEHOLDER ENGAGEMENT

Polymetal will work with the local community and interested stakeholders to ensure that environmental and social risks of the mining project are professionally managed, and developmental opportunities are pursued.

STAKEHOLDER ENGAGEMENT

Stakeholder engagement for the Kyzyl Project has been ongoing for many decades, but has been progressively formalised since 2010. Formal impact assessment related consultations at Kyzyl were carried out as part of the ESIA process in 2011 and included minuted meetings held at Auezov and Charsk.

A Stakeholder Engagement Plan (SEP) has been developed to guide stakeholder consultations and communications during the period of the main ESIA studies and throughout the life of the Project, including post-ESIA and closure. The SEP will be updated on a regular basis by Polymetal, not less than annually, providing a roadmap for engagement in monitoring the effectiveness of impact mitigation measures.

Periodic community engagement events are currently held with Auezov residents, which focus mainly on environmental monitoring as well as any impacts identified. These are usually held monthly, unless specific grievances or issues require more frequent discussions with residents. Polymetal held a public hearing in August 2014 under the theme, 'Preliminary evaluation of the impact on the environment' (preOVOS phase), developed based on the outcome of the Feasibility Study of mining parameters at the Bakyrchik deposit. The feasibility study and preOVOS report included decisions relating to mining (open pit and underground), infrastructure, and ore processing. In July 2015, a public hearing was held regarding the OVOS entitled 'Assessment of the Impact on the Environment', which was written in accordance with RoK legislation. The OVOS is currently passing through a series of public consultations.

Consultation and engagement for the social portion of the ESIA was conducted in June-July 2015, including meetings in Auezov as well as surrounding communities as well as on the Oblast-level in Ust-Kamenogorsk. In addition to formal meetings and hearings, the CLO, who is a well-known resident of Auezov, carries out regular informal meetings and discussions with individuals and groups of individuals. These engagement mechanisms are not currently guided by a single stakeholder engagement plan or any other document, and tend to be governed by the specialist's own initiative and time constraints.

During the exploration and feasibility phases, the main aim of stakeholder engagement has been to establish two-way communication between Polymetal and stakeholders at national, regional and local levels to ensure stakeholder views are incorporated into the ESIA and the project design. Stakeholders are invited to review and provide feedback on this SEP. Polymetal will ensure this document is available and accessible to stakeholders in Russian and Kazakh.

Key stakeholder issues identified so far relate to the Project's impact on the quality of air, water, soils, as well as impacts on biodiversity, human health, and pasture land. In addition, the Project's processing methods and the long-term economic viability of the mine have been identified as issues of interest to stakeholders.

A public consultation hearing was held on 3 December 2015 in Auezov on the subject of the draft ESIA report and complementary Non-Technical Summary (NTS). The event, which took place in the hall of Auezov's school, was widely advertised across the company and the local communities of Auezov and Shalabay. The NTS was made publicly available on the local Akimat's website 20 days in advance of the event.

As part of the EBRD's disclosure requirements relating to the release of the most recent version of the ESIA and accompanying SESR report, 3 information sessions will be held in Auezov, Shalabay and Ust-Kamenogorsk. Printed versions of the ESIA and SESR will be made available in Russian and Kazakh. These documents will also be made available on the websites of Polymetal, the EBRD and the local Akimats. Residents are encouraged to submit their questions in writing either beforehand, through the grievance boxes at the Akimat or Polymetal offices, or on the day of the sessions themselves. The documents must be publically disclosed for 60 days and the information sessions will be held midway through this disclosure period.

SOCIAL INVESTMENT

BMV and Polymetal policy outlines its aims to support community-based projects that make a difference in a sustainable way without creating dependency. Polymetal has supported a number of community and social development activities in the local community.

Polymetal Invests in

Educational and social facilities

Healthcare infrastructure

Financial assistance for social activities

Subsidies and gifts for needy pensioners, low-income families and WWII veterans

Coordination and funding of social events and festivals

GRIEVANCE MECHANISMS

A procedure for collecting and resolving grievances is an important method that will be used throughout the Project, to be publicised by all staff that have contact with external stakeholders. Community newsletters and notice boards located at the entrance to the Project site and at Auezov and Shalabay akimats will provide further details on the grievance mechanism and the process of registering a grievance.

PUBLIC PARTICIPATION

Engagement relating to the ESIA process is currently underway and will continue until the ESIA and associated management plans are approved for implementation in the construction and operation phases and for funding by the EBRD. The main proposed methods of engagement for the remainder of the ESIA process include Public Hearings and Project and Information Meetings.

Polymetal will maintain a programme of communication with communities, the Government of Kazakhstan, local and international Non-Governmental Organisations and other stakeholders, guided by the SEP.

The EBRD will disclose the ESIA and all supporting documents. Polymetal are expected to respond to grievances and provide updates to the community in line with the Stakeholder Engagement Plan as the Project develops. Further information on the Project can be obtained from:

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The ESIA can be viewed on the EBRD website, in its London headquarters and in the Kazakhstan EBRD Resident Office, on Polymetal's website and locally in various locations, such as the Akimats of Auezov and Shalabay, for a minimum of 60 calendar days prior to consideration of the Project by EBRD's Board of Directors	

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Kyzyl ESIA Report
Non-Technical Summary

October 2016