БАИМСКАЯ
ГОРНОДОБЫВАЮЩАЯ КОМПАНИЯ

Baimsky GOK, Peschanka Copper Project

ENVIRONMENTAL AND SOCIAL MANAGEMENT PROGRAMME (ESMP)

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BAIMSKY GOK, PESCHANKA COPPER PROJECT

ENVIRONMENTAL AND SOCIAL MANAGEMENT PROGRAMME (ESMP)

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This Report shall be written in Russian and in English. Both language versions are considered to be equally authentic. In the event of any discrepancy between the two aforementioned versions, the English version shall prevail in determining the content of the Report.

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1. INTRODUCTION

GDK Baimskaya LLC (the Company) owns the license (AND 14673 TR) to survey, explore and mine non-ferrous and precious metals within the Baimka Prospecting Area in the Bilibinskiy Municipal District of the Chukotka Autonomous Okrug (Chukotka AO). Geological exploration continues in the Peschanka Ore Field with a view to developing a mine and processing plant (the Project) for exploitation of copper and gold reserves. It is also intended to create a facility at Pevek that will be used for shipping out the finished product. Fluor Canada Ltd. (Fluor) was awarded EPCM services for the plant and infrastructure on the Peschanka Copper Project. The Owner is directly managing the design of the mine, and all other facilities are designed by third parties.

In parallel with the feasibility study it is necessary to conduct an environmental and social assessment on the Project and all associated infrastructure. Such assessments consist of two major components. The first component is a formalised Environmental and Social Impact Assessment (ESIA) that complies with international lender requirements and the International Finance Corporation (IFC) performance standards in particular. The second component is complying with the Russian regulatory requirements that are needed for approval of the Project, which are made up of the OVOS and the preparation of Design Documentation.

The IFC's Performance Standard 1 requires (i) integrated assessment to identify the environmental and social impacts, risks, and opportunities of projects; (ii) effective community engagement through disclosure of project-related information and consultation with local communities on matters that directly affect them; and (iii) the client's management of environmental and social performance throughout the life of the project. It is in respect of item 3 that the borrower is expected, as a function of the environmental and social risks, to develop the following: (i) policy; (ii) identification of risks and impacts; (iii) management programs; (iv)organizational capacity and competency; (v) emergency preparedness and response; (vi) stakeholder engagement; and (vii) monitoring and review.

It is simply not possible to develop the above at this stage of the project but at the same time the ESIA contains important findings on the environmental and social risks posed by the project. The ESIA also contains proposed mitigation to reduce or prevent such risks whilst enhacing the benefits that would be brought about by the project. The overarching role of this ESMP is to provide a management framework that can be applied during construction and operations, and that details what must be implemented as part of the project to give effect to the environmental and social management obligations that derive from the ESIA, the IFI and the Russian regulatory framework.

1.1. Purpose of this ESMP

This document serves to provide an Environmental and Social Management Programme (ESMP) for implementation of the Baimsky GOK, Peschanka Copper Project. The purpose of the ESMP is to ensure that:

a. All potential impacts on the environment and society as a result of the construction and operation of the Baimsky GOK, Peschanka Copper Project are recognised and understood and provision made for the effective management of such impacts. Management implies preventing or minimising negative impacts while maximising the positive impacts (benefits) of the activity;

b. All relevant environmental and social legal requirements are recognised, planned for and complied with during the design, construction and operation of the Baimsky GOK, Peschanka Copper Project;

c. International lender requirements are recognised, planned for and complied with during the design, construction and operation of the Baimsky GOK, Peschanka Copper Project

d. Good industry practice is promoted in implementing the required environmental and social management functions.

2. BAIMSKY GOK, PESCHANKA COPPER PROJECT

2.1. Project History

The Peschanka gold-copper-molybdenum deposit was discovered in 1972 and explored in the 1970s–1980s. Since then, the property has been investigated and studied by different entities with the Company initiating its involvement in 2009. In 2011, the Company commissioned a TEO (the Russian equivalent of a feasibility study) to determine what would be required to commercially exploit the deposit. The Company under the guidance of the Regional Mining Company LLC, then conducted further exploration. IMC Montan[1] estimated the mineral resources in the Peschanka deposit in October 2011 using 0.40 % copper equivalent cut-off grade and defined a Measured and Indicated Resource of 1.3 billion metric tonnes.

In 2016, a JORC geological model was developed, that indicates 1,428 Megatonnes (Mt) of Measured and Indicated ore and 774 Mt of Inferred and Unclassified ore.

In 2017, the Final Mining Feasibility Study[2] (in Russian 'TEO Postoyannykh Konditsiy') (further referred as TEO) was developed. The geologic reserves as for 01.01.2017 are presented in Table 1. The 2017 TEO estimates 1,237,813.8 ktonnes reserves of sulphide ore (cut-off grade of 0.4% of copper equivalent).

Table 1. Peschanka deposit mineral resources

		Measured	Indicated	Inferred	Total
Mineral resources	Mt	139	1,289	774	2,202
Copper grade	%	0.72	0.44	0.36	0.43
Contained copper	Mt	1.0	5.7	2.8	9.5
Gold grade	g/t	0.39	0.26	0.16	0.23
Contained gold	Moz	1.7	10.8	4.0	16.5
Silver grade	g/t	4.0	2.4	2.0	2.4

Source: https://www.kazminerals.com/our-business/baimskaya/

[1] IMC Montan. 2011. Scoping Study for the Development of Peschanka Deposit

[2] GIPRONIKEL INSTITUTE. 2017. The Final Mining Feasibility Study [Tekhniko-ekonomicheskoye obosnovaniye postoyannykh razvedochnykh konditsiy] for the Peschanka Deposit, Saint-Petersburg, GIPRONIKEL INSTITUTE, 2017.

The collected data allowed the Company to describe the geology of the deposit and to develop a structural model of the ore mineralization and tectonic conditions. Since that time there has been further exploration and the development of a mine plan and definition of the process that would be required to extract the minerals from the ore.

2.2. Project Overview

2.2.1. Location of the Deposit and the Project Site

The deposit is located in north-eastern Siberia, Russia, in the Bilibinsky Municipal District of the Chukotka AO (also referred to as Chukotka). The main Project site (also referred to as the Peschanka site) is 187 km southwest of the district centre of Bilibino and 650 km west of the regional capital of Anadyr (Figure 1). The deposit lies in the valley of the Peschanka River at an elevation of +/- 400m.

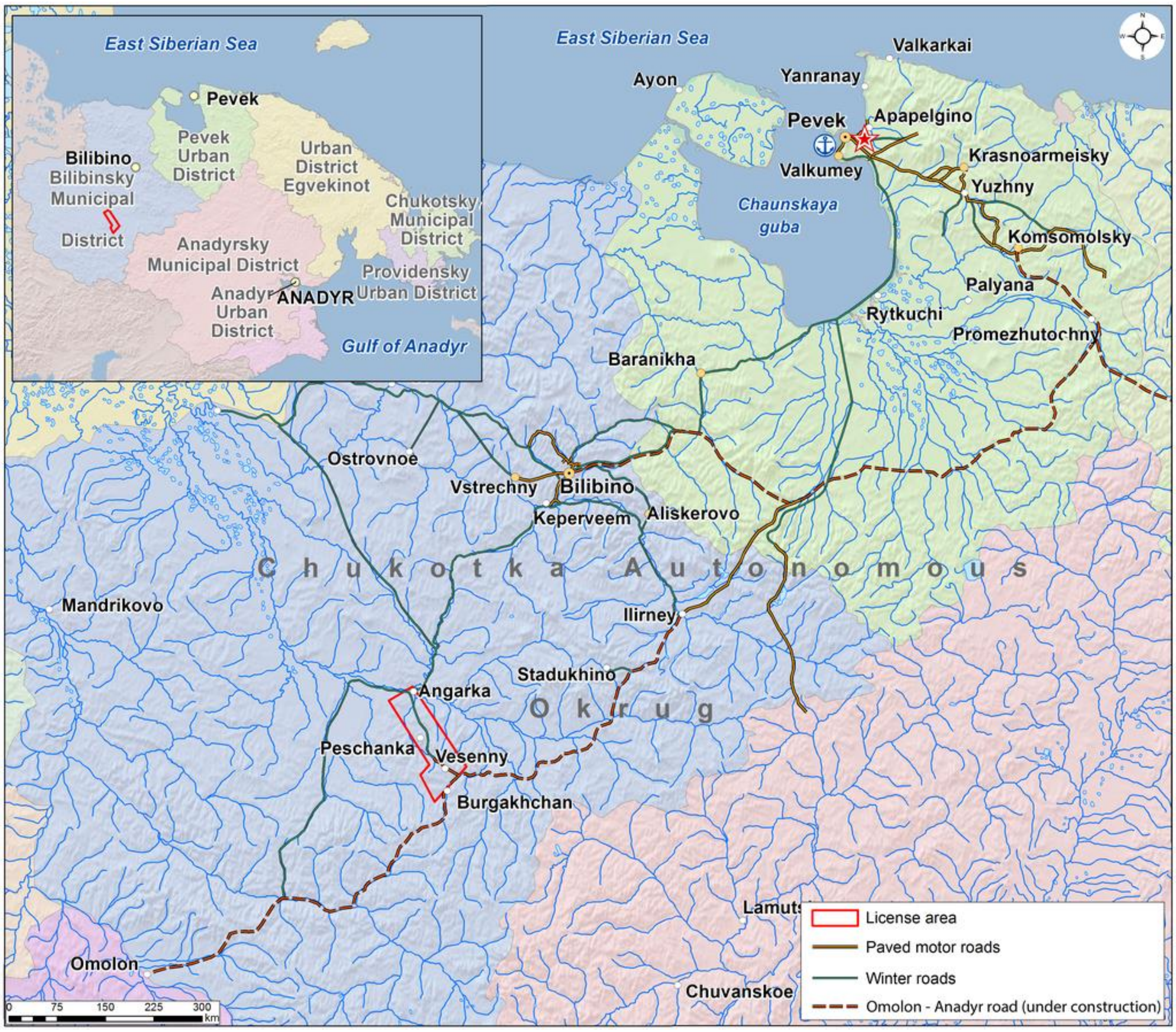

Figure 1. The location of the Baimsky GOK, Peschanka Copper Project in Northeastern Siberia

2.2.2. Geology

The Peschanka gold-copper-molybdenum deposit is a porphyry type deposit. Porphyry copper deposits are large volumes of hydrothermal alteration centered on porphyritic intrusive stocks. Typical of deep-level copper porphyry systems, Peschanka hosts significant Cu+Au+Mo mineralisation. The Peschanka copper porphyry deposit is located on the Chukotka Peninsula in Russia, at 66° 36'N 164° 30'E in far northeastern Siberia. As one of the largest of a group of deposits that define the Baimka Ore Field, the copper porphyry at Peschanka is confined to a north-south trending, eastward dipping, sheet-like stockwork (a complex system of structurally controlled or randomly oriented veins containing the mineralisation).

Regional geology

The Peschanka deposit is located in the central part of the Baimskaya metallogenic zone and is genetically related to Late Jurassic – Early Cretaceous intrusive complex that forms a 40 km by 9 km north-north-east trending Yegdegkychsky massif[3]. Localized in the Baimka Ore Field, the Peschanka deposit is controlled by deep faulting that transects the outer part of the Cretaceous Okhotsk-Chukotka magmatic belt. The ore-bearing hydrothermally altered Early Cretaceous intrusive rocks comprise of monzodiorite and monzonite, quartz monzonite, and seyenite porphyries.

Local geology

The Peschanka deposit is associated with multiphase stockworked quartz monzonite-porphyry, and quartz monzodiorite-porphyry hosted in a monzodionitic stock. It is a typical copper porphyry deposit with associated gold. Mineralisation is hosted in quartz stockworking, within and extending from the causative intrusives with predominantly bornite and chalcopyrite in the quartz stockwork and with potassic alteration extending into the host intrusion. The 7 km long, up to 1.5 km wide stockwork is broken by transverse and diagonal strike-slip faults into three blocks. The porphyry mineralisation is faulted and fractured in orthogonal directions to the regional structure with mineralisation primarily being oriented NW-SE.

The current 2016 JORC geological model indicates 1,428Mt of Measured and Indicated ore. The JORC model also indicates 774Mt of Inferred and Unclassified (IU) ore. A 2019 metallurgical testing program and 2019 supplementary drilling program have been designed to target the IU classified ore.

2.3. Project Schedule

The broad Project schedule is as follows:

- Project commencement: 2021;
- Construction: 2021 to 2026;
- Mine operations: 2023 to 2044; and
- Concentrator operations: 2025 to 2044.

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[3] IMC Montan. 2011. Scoping Study for Development of Peschanka Deposit.

2.4. Project Components

The Baimsky GOK, Peschanka Copper Project is made up of the following components:

- An open pit mine that will consist of three pits;
- Overburden and waste rock dumps;
- Ore stockpiles;
- A concentrator;
- A tailings storage facility (TSF);
- Accommodation, site offices, canteen and clinic facilities, vehicle and equipment workshops, stores, recreational facilities and so forth;
- A waste incinerator;
- Electrical power distribution;
- Industrial and potable water supply systems;
- Service roads connecting the various site components;
- An analytical laboratory;
- Sewage treatment plants for both construction and operations;
- A site refuelling facility;
- An aerodrome; and
- An explosives manufacturing and storage facility (for drilling and blasting purposes).

2.5. The Proposed Mine

Given the geology described above, the mine would be established as an open pit operation using a conventional shovel and haul truck operation to mine 1,295Mt of ore over the 20-year life of the mine. The mine has a life-of-mine (LOM) grade of 0.47% and a central core of higher-grade material that will deliver copper content of 0.54% copper over the first ten years. The first activities in establishing the mine pit are pre-stripping which serves to expose the main ore body. Ore recovered during the pre-stripping will be stockpiled for later use as will be lower grade ores, as the mine plan is based on mining the high-grade ores first. This targeting of high-grade ores is done to maximise the revenue generated in the early part of the mine life so as to amortise the capital investment as quickly as possible. In the first years of establishing the mine it can be seen that there is a relatively low waste content in the ROM and a high copper concentration in the concentrator feed. From 2030, the ROM waste quantities increase.

Based on the cut-off grade, 2,533 Mt will be mined of which 1,163.9 Mt will be waste. A portion of that waste will be dumped on the waste rock stockpiles with the remainder ending up as tailings in the tailings storage facility (TSF). The difference between the total movement of materials and the total ROM is the ore that is double-handled through initial stockpiling and later reclaiming.

The mine layout is shown in Figure 2 showing the three mining pits that will be established (main pit, central and north pit) and the positions of the waste rock dumps and the oxide and low-grade stockpiles. The Company will undertake the mining with activities including pre-stripping, in-pit haul road construction and maintenance, excavation and haulage of ore and waste rock out of the pits. The in-pit works will also include drilling and blasting, loading, hauling, pit dewatering, in-pit dust control, in-pit electrical distribution, and pit slope monitoring. Mine works outside of the open pits will include mine haul roads, waste rock dumps, ore stockpiles and reclaiming and surface water monitoring. Facilities required for operation and maintenance of the mine will be constructed at the concentrator site approximately 2 km from the ultimate open pit limit. A contractor will provide blasting products and services.

The facilities will be designed in accordance with Russian codes and standards, as well as applicable international standards, as appropriate. Full compliance with Russian regulations will be ensured through the project documentation that will be developed during the detailed engineering. As the main Project site is located at a remote site with harsh climatic site conditions and minimal local infrastructure, simple and time-effective building erection utilising both regional and similar applicable international construction practices will be implemented.

2.6. The Concentrator

2.6.1. Introduction

The minerals processing plant (also referred to as the concentrator) is designed to be capable of around 60 megatonnes per annum and producing approximately 250 kt per annum of payable copper in concentrate and 400 koz of gold on average over the first ten years of the project. This product will be transported by truck and ship to smelters, primarily in China. The process design criteria for the concentrator are summarised in Table 2.

Table 2. Process design criteria for the concentrator proposed for the Baimsky GOK, Peschanka Copper Project

Parameter	Unit	Value
Ore throughput	dmt/a	70 million (M)
Overall plant availability	%	92
Operating schedule	days/a	365
Annual plant operating hours (considering availability)	h/a	8,059

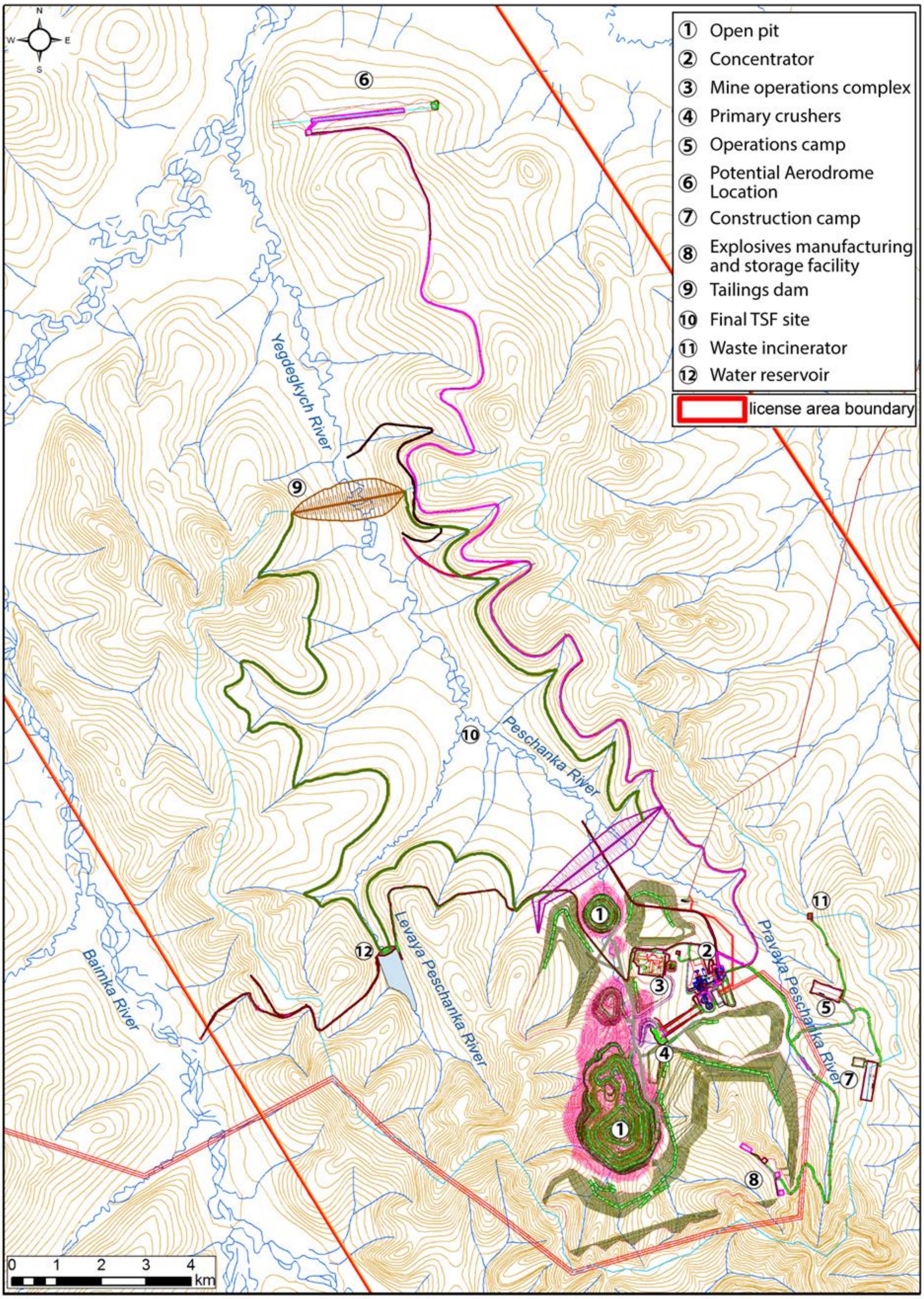

Figure 2. Mine pits, ore stockpiles and waste dump locations for the Baimsky GOK, Peschanka Copper Project

2.6.2. An Overview of Generic Concentrator Processing

In general terms, the ore processing is one of crushing and grinding the ore that is mined to grain size sufficient such that a sufficient number of grains will contain the desired mineral only. The undesired grains with no commercial value are known as gangue and are a waste product. Flotation processes are then used to separate out the desired minerals from the gangue by using the hydrophilic (water seeking properties) of the gangue versus hydrophobic (water repelling properties) of the minerals. The crushed material is mixed with water to create a slurry, to which reagents are added to enhance the hydrophobicity of the minerals. The slurry is also aerated, and the minerals then attach themselves to the air bubbles and ultimately end up in the froth that forms on the surface. That froth is a concentration of the required minerals. The flotation process has three stages namely rougher, cleaning and scavenging phases.

The rougher stage is a ‘first pass’ stage and produces a rougher concentrate. Here the principle is to remove as much of the valuable mineral as possible with relatively coarse particles even though the quality of the concentrate may be poor and require further processing. Importantly, the rougher stage separates some but not all gangue from the minerals leaving a smaller mass of material for further grinding without wasting energy on grinding what is ultimately a waste. The principle is then one of trying to maximise the mineral recovery with as coarse a grain as possible so that further grinding targets principally the mineral particles.

The rougher concentrate is then moved on to the next stage, which is the cleaner stage. The rougher concentrate is first passed through a regrind mill to further reduce particle size where after the slurry again undergoes flotation. In the cleaner phase, the principle is one of maximising the quality of the concentrate by removing more of the gangue. The final stage is the scavenging stage, which is applied to the waste from the rougher tailings to try and recover any minerals that may still be contained in the tailings. The minerals are recovered using either further regrinding or more rigorous flotation processes. Similarly, the tailings from the cleaner process may also be put through the scavenger process also to recover minerals that might still be contained in the tailings.

2.6.3. The Concentrator Proposed for the Baimsky GOK, Peschanka Copper Project

Parallel processing lines

The concentrator is designed with two parallel processing lines of equal capacity that are sufficiently independent to allow for the processing of different ores from different sources. The description that follows is for a single line, but it should be remembered that such a line is duplicated for the project.

Run-of-mine

Run-of-mine (ROM) ore, which is the unprocessed ore that has been mined, will be transported from the mining area to the concentrator by haulage dump trucks.

Primary crushing and coarse ore stockpile

The haul trucks will dump ore into a primary crusher dump pocket enclosure which is open but protected from the wind. The primary crusher will reduce the ore to a size 80 % passing 153 mm. The dump pocket enclosure combined with water sprays will serve to contain dust generated during dumping. The sprays will only be operational in the summer, otherwise the water will freeze. The primary crusher will be enclosed in a heated structure installed to provide maintenance services to the crusher. This subgrade structure will be equipped with a dust collection system.

The stockpile conveyor will then move the crushed ore from the primary crusher to the coarse ore stockpile. This conveyor will be covered to contain dust and spillage as well as provide protection from the elements during maintenance. The conveyor will not be fully covered but will have half-moon covers to provide wind protection. The conveyor discharge point will be equipped with water sprays to minimize dust generation. The sprays will only be operational in the summer, otherwise the water will freeze. The coarse ore stockpile will not be covered.

Coarse ore reclaim

Underneath the coarse ore stockpile there will be a chamber (tunnel) holding three reclaim feeders and a portion of the SAG mill feed conveyor. The reclaim feeders will retrieve ore from the stockpile at a suitable rate and deliver it to the semi-autogenous grinding (SAG) mill feed conveyor. The reclaim tunnel will be equipped with dust collection systems. Upon exit of the reclaim tunnel, the SAG mill feed conveyor will have wind protection to contain dust and spillage as well as provide protection from the elements during maintenance.

At the exit of the reclaim tunnel, an above grade structure will provide storage and handling systems for the addition of grinding media (steel balls) and dry pebbled lime to the ore on the SAG mill feed conveyor. The SAG mill feed conveyor will deliver ore, grinding media and lime into the SAG mill located in the grinding area of the main concentrator building.

Grinding

The process of grinding is one of further reducing the size of the ore to physically separate grain sizes for the further processes used to extract the desired elements of copper and gold. The grinding circuit will comprise a SAG mill, two ball mills, hydro cyclones, and pebble crushing equipment.

The reclaimed ore and process water will enter the SAG mill (a large rotating drum containing ore slurry and grinding media (steel balls referred to earlier). Upon exiting the SAG mill, the SAG screen will separate oversized particles (pebbles) from the finer slurry. The pebbles will be harder material that has been resistant to breakage. These pebbles will be fed to cone crushers and subsequently to high pressure grinding rolls for breakage as these processes are more energy efficient than milling.

The SAG mill discharge slurry will be combined with crushed pebbles and ball mill discharge in the cyclone feed pump box. The hydro cyclones will classify the solid particles by size. Particles that are fine enough will proceed to flotation while particles that are too coarse will be returned to the ball mill for further grinding. Ball mills operate in a similar fashion to SAG mills except that the grinding media is smaller leading to a smaller grind size. To prepare the ore for flotation, potassium amyl xanthate and dithiophosphate aqueous (collectors), and fuel oil (collector) will be added in the grinding circuit.

As the pebble crushing circuit will operate “dry”, dust collection systems will be used. The conveyors in the pebble handling circuit will be covered to contain dust and spillage as well as provide protection from the elements during maintenance. The grinding and pebble crushing areas will be equipped with containment and area sumps for cleanup. The grinding and pebble crushing circuits will be located in heated buildings.

Rougher flotation

Product from the grinding circuit will report to the rougher flotation circuit. There will be two banks of rougher flotation circuits per processing line. To enable the flotation process, sodium sulphide, potassium amyl xanthate and dithiophosphate aqueous (collectors), lime slurry, and pine oil (frother) will be added in this step. These reagents are routinely used in concentrators globally. The bulk rougher flotation step will target maximum recovery of target metals into a concentrate stream for further upgrading. The tails (waste stream) from the rougher flotation step will report to the tailings storage facility. The rougher flotation areas will be equipped with containment and area sumps for cleanup, and will be located in the heated main concentrator building.

Rougher concentrate regrind

The rougher concentrate will be further ground to a smaller size to increase the degree of mineral liberation and facilitate removal of additional gangue (waste) such that the concentrate can be upgraded to the desired metal concentration. The regrind circuit will comprise hydro cyclones and grinding mills. These grinding mills will utilize ceramic grinding media (beads) instead of steel balls. To prepare the ore for subsequent flotation steps, potassium amyl xanthate, sodium sulphide and dithiophosphate aqueous (collectors), fuel oil (collector), and lime slurry will be added in the regrinding circuit. The concentrate regrind areas will be equipped with containment and area sumps for cleanup, and will be located in the heated main concentrator building.

Cleaner/scavenger flotation

Re-ground rougher concentrate will report to the cleaner/scavenger flotation circuit for further concentration. Product from this circuit will be concentrate slurry. It is further concentrated in the 2nd stage cleaner flotation. Waste from the circuit (tailings) will report to the TSF. To enable the flotation process, potassium amyl xanthate and dithiophosphate aqueous (collectors), lime slurry, and pine oil (frother) will be added in this step. These reagents are routinely used in concentrators globally. The cleaner/scavenger flotation areas will be equipped with containment and area sumps for cleanup, and will be located in the heated main concentrator building.

Concentrate thickening

Final cleaner concentrate will be pumped to the bulk concentrate thickener where a portion of the process water in the slurry will be recovered for reuse within the process water circuit. The thickened slurry will report to the copper concentrate filters. To facilitate the thickening processes, flocculent will be added to the thickeners. The concentrate thickening areas will be equipped with containment and area sumps for cleanup, and will be located in the heated main concentrator building.

Copper concentrate handling

The thickened copper concentrate will be pumped to the copper concentrate filters where it will be dewatered in vertical pressure filter units. The filter filtrate (removed water) will be recycled and the filter cake (concentrate) will be conveyed to the bagging plant. The bagging plant will package the copper concentrate into 2 tonne bulk bags for shipment to Pevek and ultimately to the customer.

The conveyors in the copper concentrate handling circuit will be covered to contain dust and spillage as well as provide protection from the elements during maintenance. The copper concentrate filters will be located in the heated main concentrator building. The bagging plant will be housed in a dedicated heated building equipped with dust collectors.

Tailings thickening

Tailings from the rougher flotation and cleaner/scavenger circuits will be collected in the tailings thickeners. There will be two high-density tailings thickeners (also called high compression thickeners) per line, producing tailings underflow at 62% solids. At 62% solids, it is likely that the tailings will need to be pumped to the TSF. To facilitate the thickening process, flocculent will be added to the thickeners.

The tailings thickeners will be covered and located outdoors at a lower elevation than the concentrator to facilitate gravity flow of tailings to the thickeners. The thickener cones will be in the ground and subterranean pumping chambers will be located under each thickener. The chambers will be heated and equipped with containment and area sumps for cleanup. The tailings thickeners will recover process water, which will report to the process water tanks by gravity flow. Thickened tailings will be pumped to the TSF.

Containment of liquids and slurries

All process liquid and slurry containing vessels will be provided with secondary containment designed according to regulatory requirements. Surface runoff (precipitation) from the concentrator area will report by gravity to the TSF where it will be contained.

Indoor air quality

Processing buildings will be heated to maintain a minimum temperature of 5°C. Fresh air exchanges will be supplied per regulations to maintain worker health. Dust collection, tank lids and overflow pipe seal pots, wet scrubbers, partitioning walls and enclosed flotation cells will be utilised to maximize indoor air quality.

Reagents

The reagents needed for the concentrator are summarized in Table 3 along with delivery formats and relevant safety precautions that will be taken. The reagents will be mixed and stored in annexes to the main concentrator building. Each processing line will have dedicated reagent systems including separate buildings for the handling of flammable/combustible reagents. Each reagent will have a dedicated secondary containment and spill collection sumps.

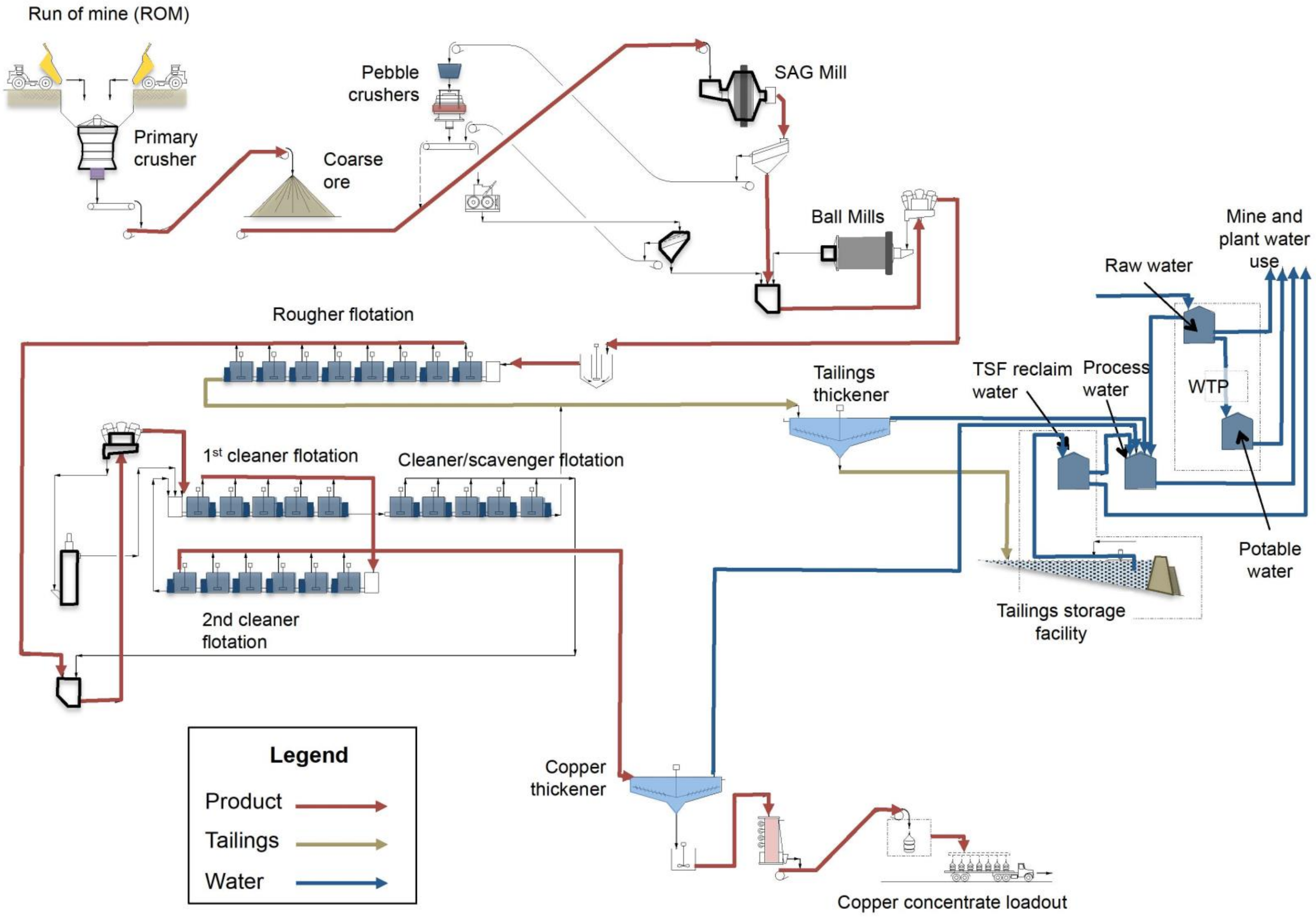

Figure 3. Process flow diagram for the minerals processing planned for the Baimsky GOK, Peschanka Copper Project (the process is described in detail in the text)

Table 3. Chemicals used at the concentrator together with their purpose, how they are delivered to the site and then dosed, and applicable safety requirements

Chemical	Purpose	How Delivered and Dosed	Safety Requirements
Antiscalant	To prevent scale formation in pipes, pumps and tanks	Delivered in liquid form in bulk containers, unloaded into storage tanks and then distributed to the process water circuits using pumps	The storage tank will be covered and vented. Safety showers and eyewash stations provided.
Dithiophosphate Aqueous	A secondary collector used in the flotation circuits	Delivered to site in liquid form in bulk containers, unloaded to storage tanks and pumped to the grinding and flotation circuits.	Safety showers and eyewash stations provided.
Potassium Amyl Xanthate (PAX)	A primary collector used in the flotation circuits	Delivered in granular form in 1 tonne bulk bags, dissolved in reclaim water and pumped to the grinding and flotations circuits.	Safety showers and eyewash stations provided. Dust control of the PAX is provided through a dedicated dust collection system
Oxanol (Oxal T-92) and Pine oil mixture	Frother used in the flotation circuits	Delivered to site in liquid form in bulk containers, unloaded to storage tanks and pumped to the flotation circuits.	The storage tanks are covered and vented. Safety showers and eyewash stations provided. Area is classified for fire protection (electrical grounding etc.)
Sodium Sulphide (Na2S)	Collector used to float the oxide component of the ore	Delivered in 1 tonne bulk bags, dissolved in reclaim water and pumped to the flotation and regrind circuits.	Safety showers, hydrogen sulphide gas detectors and alarms. An independent scrubbing system treats fumes from both the covered and vented mixing and distribution. Safety showers and eyewash stations in area.
Flocculent (Tailings)	Used to aid solids/ liquid separation in the thickeners	Dry polymer, supplied in 1 tonne bulk bags, will emptied into a feed hopper and mixed with reclaim water before being added to the tailings thickeners by pump	The flocculent system is contained in independent containment areas with sump pumps and emergency safety shower units

Chemical	Purpose	How Delivered and Dosed	Safety Requirements
			Safety showers and eyewash stations in area
Coagulant	Used to aid solids/liquid separation in the thickeners	Dry polymer, supplied in 1 tonne bulk bags, will emptied into a feed hopper and mixed with reclaim water before being added to the tailings thickeners by pump	The coagulant system is contained in independent containment areas with sump pumps and emergency safety shower units Safety showers and eyewash stations in area
Flocculent (Concentrate)	Used to aid solids/ liquid separation in the thickeners	Dry polymer, supplied in 1 tonne bulk bags, will emptied into a feed hopper and mixed with reclaim water before being added to the concentrate thickeners by pump	The flocculent system is contained in independent containment areas with sump pumps and emergency safety shower units Safety showers and eyewash stations in area.
Test Reagent	Unknown	A circuit will be provided for an unknown reagent. The circuit is designed to receive either dry solids or liquids and dosing pumps will be provided. The destination of the reagent is unknown.	Dust control of the test reagent is provided through a dedicated dust collection system and the mixing and storage tanks are covered and vented. Safety showers and eyewash stations in area.
Lime	Increase pH in the flotation process to suppress iron	Delivered in bulk bags and pneumatically transferred into a storage silo. Some of the lime will be added dry and some will be slaked with reclaim water and added to the grinding and flotation circuits as lime slurry by pump.	Safety showers and eyewash stations in area. Dust control of the lime is provided through a dedicated dust collection system

2.7. Other Facilities on the Plant Site

2.7.1. Site Water Facilities

Raw water

Raw water will only be used for potable water production. Potable water uses will include drinking, bathing, safety showers and the analytical laboratory. Potable water will not be used in the metallurgical process.

Raw water will be sourced from a raw water dam that will collect water from spring melt every year, located in the valley of Levaya Peschanka River. The raw water will be pumped from the water dam and stored in a raw water tank. The raw water tank will supply the potable water treatment plants. Raw water for construction needs will be sourced from taliks (year round unfrozen ground) within the Baimka River valley. Water from taliks will be treated using a potable water treatment plant. The potable water treatment plants will use a calcium hypochlorite system to achieve potable water standards. The mine operations complex, process complex, operations camp and construction camp will each have independent potable water treatment plants.

Process water

Process water is defined as water that is used in the metallurgical process. Process water will be used throughout the concentrator for:

- Dilution and slurry density control,
- Flocculent dilution, and,
- Slurry line flushing.

Both types of process water will be recovered at the concentrator using the concentrate and tailings thickeners. The process water is sourced from the tailings storage facility. The process water circuit will be replenished via the reclaim water system as a portion of the process water will report with the tailings to the tailings storage facility. The process water storage tanks will be located outdoors with adjacent heated pump houses. The process water tank areas will have secondary containment and spill collection sumps.

Reclaim and treated reclaim water

The Peschanka Copper Project has maximized the use of reclaim water to minimize the consumption of raw water. Reclaim water is defined as water that is pumped from the tailings storage facility to the metallurgical processing facility and the mine operations complex. As such, reclaim water comprises of process water that has been discharged with the tailings to the TSF, and precipitation from the catchment. Reclaim water will be pumped from the tailing storage facility (TSF) to the reclaim water tank where it will be further distributed. A portion of the reclaim water (approximately 15%) will be treated (filtered) and distributed to:

- Gland water
- Reagent mixing,

- Filter cake and filter cloth washing,
- Cooling water service,
- Other uses (dust suppression and wash down)
- Fire water make-up.
- The remaining approximately 85% of the reclaim water is used to replenish the process water tanks.

2.7.2. Domestic Sewage Treatment

The mine operations complex, process complex, operations camp and construction camp will each have independent domestic sewage treatment plants. Treated grey water from the sewage treatment plants will be pumped to the tailings storage facility. Solids will be treated by incineration.

2.7.3. Cooling Tower System

The grinding circuit equipment in each parallel processing line will use mechanical draft type cooling towers (one system per line). A glycol water mixture will be circulated in a closed system as the heat transfer fluid. Reclaim water will be used as the evaporating liquid. During winter months, the water sprays and fans in the cooling towers will be stopped, and a heat recovery system will reclaim heat for use in the concentrator to reduce the overall building heating costs. Treated reclaim water is sprayed in the summer over cooling tower coils to utilize evaporative cooling feature and increase cooling capacity of the cooling towers.

2.7.4. Analytical Laboratory

The analytical laboratory will be housed in a standalone building. The laboratory will be equipped to provide chemical and physical analysis of the process materials as well as environmental analysis such as water quality. Various streams from within the concentrator will be analysed for process control and environmental samples will be analysed to ensure compliance with regulations. The laboratory will be equipped with appropriate fume extraction and dust collection, as well as chemical storage.

2.7.5. Transport infrastructure

Road

There is currently no permanent road connection outside of the Project site. There is a long-term state plan to develop a permanent road from Magadan to Anadyr, which will pass close to the main Project site and the mine will then build a connecting road to that new road. The construction of the road has commenced from the port of Pevek and so far approximately 230 km has been completed. The Project is assuming that the permanent road to Pevek and the connection to the plant site to be completed at the start of the operation of the processing facility. During the construction period the Project will use winter roads.

Air

Air transportation to the region is currently available with an existing airport at Keperveem near the town of Bilibino. The company will build an aerodrome for transportation of personnel during construction and operations. The aerodrome will be located in close proximity to the plant site at a suitable topographic location north of the plant site. A helicopter pad will be located near the plant site to provide emergency evacuation to Bilibino until the site aerodrome is built.

2.7.6. Tailings disposal

The disposal of tailings is generally considered to be a significant source of environmental and social risk for any mining operations such as the Peschanka Copper Project. Tailings are the waste product from the concentrator and have negligible economic value. The safe disposal of tailings is key to overall Project sustainability and long-term success of the Peschanka mining operations.

Tailings

Tailings (mineral waste) from the Peschanka concentrator will consist of a crushed rock and water slurry together with any of the reagents from the flotation process that remain in the slurry after the minerals processing. The treatment of up to 70Mt of run of mine ore per year is expected to lead to approximately 68Mt/a of tailings material for a total life of mine disposal requirement of approximately 2.349 Bt. The tailings will be sent to thickeners to reduce the water content and then transported to the tailings storage facility.

Tailings storage facility

The safe, permanent disposal of the tailings requires a purpose built facility that will not only contain all the tailings for the life of the operation, but indeed well into the future after the mine operations cease. The tailings storage facility (TSF) will take the form of a dam on the downslope side of the valley (Figure 4). The tailings are deposited into the TSF on the upslope side and as the tailings flow downhill the solid material settles out of the slurry with the ‘clean’ water (referred to as ‘supernatant’) continuing downhill to where it is contained by the embankment (essentially the dam wall). A large portion of the supernatant is transported back to the concentrator via a water reclaim pumping and pipeline systems. The embankment is progressively raised over time as the TSF fills always maintaining sufficient dam freeboard to avoid any spills. A secondary containment will also be constructed downslope of the embankment to contain seepage that may flow under the main embankment.

Surface runoff from the catchment within which the TSF is situated also flows into the facility, as does precipitation that falls directly over the facility (Figure 5). Water is also lost from the facility as a result of evaporation and sublimation. Since Peschanka is located in a permafrost environment, seepage into the ground is expected to be lower than a typical TSF in non-permafrost environment. The water that is contained by the embankment is also pumped from the TSF back to the concentrator. As such it is necessary to determine a ‘water balance’ that details the inflows into the TSF, the outflows and the remaining volume of water over the life of the Project so that the TSF can be designed accordingly and provision made for the various safety margins need for safe operation. The water balance also includes probable climatic events especially heavy rainfall events so that the facility is designed for all plausible in- and outflows that could occur during lifetime of the TSF. The amount of make-up water is minimized by maximizing the reuse, recycling, and treatment of process water especially return of the supernatant from the TSF to the concentrator.

For recovery of the supernatant a floating pumping station in the TSF will reclaim water using vertical turbine pumps and direct the water via overland pipeline to a reclaim water storage tank at the concentrator site. The TSF pond will be sufficiently large to allow for proper sedimentation (settlement of the solids from the tailings) operation of the supernatant reclaim system and to ensure the pond volume can sustain winter operations.

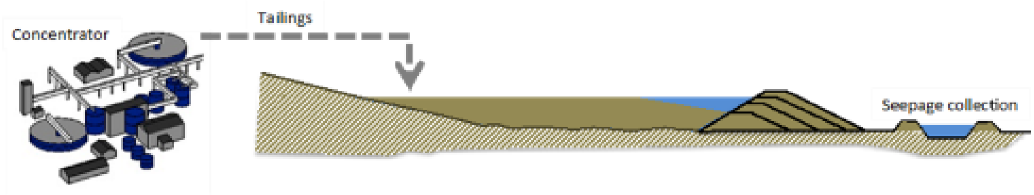

Figure 4. Schematic presentation of the major components of a tailings storage facility (TSF) that will be required at the Baimsky GOK, Peschanka Copper Project

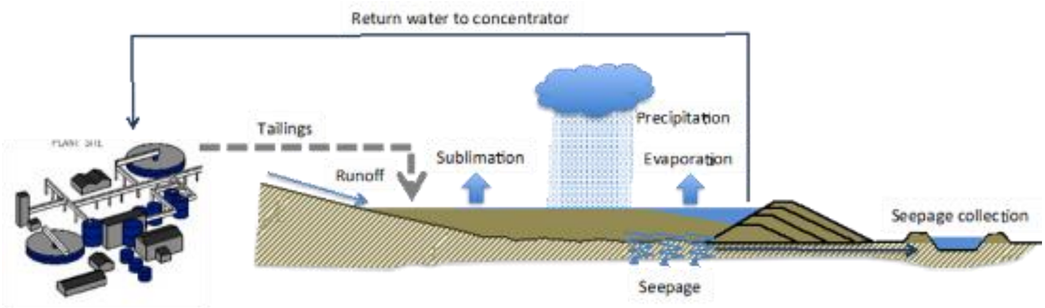

Figure 5. Schematic presentation of the major components of the tailings storage facility (TSF) together with the inflows into and outflows from the facility

In addition to the water saving requirements, the TSF must comply with two key environmental and social management requirements, namely:

- To ensure that there is no release of contaminated wastewater; and,
- That the facility retains its structural integrity.

The TSF proposed for the Baimsky GOK, Peschanka Copper Project

The TSF will be formed by an embankment that is approximately 110 m high (elevation 330 m) at the end of life of the mine. An initial (starter) embankment will be constructed to contain the initial 4 years of tailings deposition. The facility will be designed to hold runoff from spring melt and inflow from 7-day Probable Maximum Flood (PMF). The TSF will be a zero discharge TSF during operations.

The embankment will be designed as a rockfill structure with an impervious liner on the upstream face to prevent water from percolating through the embankment. A seepage collection system located downstream of the main embankment will collect seepage that may percolate through the embankment foundation. The embankment will be raised sequentially from the initial starter dam elevation to the final approximately 330 m elevation.

The foundation of the embankment will be excavated to eliminate soils from the footprint allowing the foundation of the embankment to be constructed over sound foundation materials hence significantly improving geotechnical performance and stability.

Water balance

Water delivered to the facility with the tailings materials will remain partially entrapped with the tailings. A portion of the water will be free and available to be returned to the plant for re-use in the concentration process. Additional water from rainfall run off will be managed within the facility, temporarily accumulating against the main embankment before is pumped back to the plant.

Geothermal Modelling indicates permafrost conditions will not be lost. It is expected therefore that seepage into the ground will be minimal and long-term seepage through the embankment foundation will be minimal if at all and will reduce to zero once permafrost of the foundation materials and the embankment base is re-established.

The TSF pond will be sufficiently large to allow for proper sedimentation, operation of the supernatant reclaim system and to ensure the pond volume can sustain winter operations when there are no natural inputs to the TSF. The runoff from the mine pit and the concentrator will be collected in the TSF.

Location of the TSF

The TSF for the Baimsky GOK, Peschanka Copper Project is proposed to be established in the Yegdegkych River valley and extend in a north northwesterly direction from the mine pits and concentrator. The final area of the TSF will be some 45 km^2 within a total catchment area of some 173 km^2. The TSF design is still under development. The alternative TFS sites with the preferred facility location option are shown in Figure 2.

2.7.7. Waste Rock Dumps

Runoff captured from the waste rock dump (WRD) sites and the surrounding areas will not be allowed to discharge directly into existing natural streams due to potentially elevated suspended solids from the WRDs. The runoff water from each WRD site and their surrounding catchments will be routed to the TSF.

2.7.8. Electrical Power Supply and Distribution

The primary electrical utility (Magadan) will supply a maximum of 350 MW of permanent electrical power for the Project. In addition, a secondary electrical utility of 110 kV from Pevek, will supply 20 MW of construction and emergency electrical power for the Project from a 110 KV power line from Pevek. A 220 kV transmission line from Magadan will deliver the electrical power to the site substation at the concentrator. The transmission line will be delivered by the responsible power authorities, as necessary to support the Project construction and operation, but is not considered part of the Project being assessed here. The plant will have an emergency diesel generating system that will supply 50 MW of power into the plant, when the main source of power from the 220 KV pole line is interrupted.

2.7.9. Fuel Supply

Diesel fuel will be transported from Pevek by tanker truck to tanks located adjacent to the mine operations complex area. Diesel will be trucked to other on-site storage sites as needed. Diesel fuelling stations will be located near the fuel storage tanks for dispensing fuel to light and medium vehicles, and for filling fuel dispensing vehicles used for in-pit fuelling of equipment and other ancillary equipment, such as generators. The fuel storage and dispensing areas will include secondary containment. Construction diesel fuel will be transported from Pevek by tanker truck to fuel storage bladders on the site until the permanent tanks can be fully utilized.

2.7.10. Communications

In general, the communications systems will comprise plant wide fibre optic network with link to Magadan by a digital trunked radio channel; and a plant wide business LAN complete with Voice-Over-Internet-Protocol (VOIP) telephone. The plant site will have Wi-Fi and LTE coverage.

2.8. Marshalling Yard at Pevek

Export of the finished products will take place via the port at Pevek some 550 kms north east of the Peschanka site. There is an existing port at Pevek, but it is understood that there will be a general upgrade to the port facilities independent of the Project export requirements. The mine and processing plant would simply capitalise on the upgraded facilities and will not play a direct role in the upgrade.

To facilitate the export of products via Pevek, a stand-alone marshalling yard will be constructed close to the town, which would include an office, warehouse and segregated storage areas. This facility, which is a direct component of the Baimsky GOK, Peschanka Copper Project, would be established at an early stage of the construction programme to facilitate import of goods and equipment needed for the Project via the port: they will be stored at the yard before transporting to the site of the mine and processing plant. During the operations phase marshalling yard will be used for storage of incoming goods and equipment and finished products delivered from the Peschanka site.

2.9. Project Execution

2.9.1. Overview

The Owner's Project Management team will manage the Engineering Procurement Construction Management (EPCM) Contractor and various project interfaces; engineering contracts; construction contracts; and coordination of services to complete all project scope Inside Battery Limits

(ISBL) of the Project. This will include all project controls, Quality Assurance/Quality Control (QA/QC) and health, safety and environment (HSE) functions to confirm that all contracts and services are controlled and executed in a safe manner.

2.9.2. Mining Rights

In accordance with the license agreement on the license for subsoil use AND No. 14673 (license type TR) GDK Baimskaya LLC undertakes to provide for the following:

- Engineering design for development of the Peschanka Copper deposit and its approved reserves in a manner such that the design will be approved by the state expert reviewers;
- Construction of the infrastructure facilities necessary for the support of the mining operations and process facilities;
- Commercial mining of copper and associated minerals in accordance with the approved engineering design and in a manner to achieve full design throughput of the metallurgical operations; and
- A TEO Konditsi and a report with the estimate of resources for the state expertise as per set procedures, which has been completed and approved.

2.9.3. Mineral Resources Conservation and Subsoil Protection

GDK Baimskaya LLC (the subsoil user) is obliged to provide for the following:

- Perform a geological survey to confirm accurate evaluation of the mineral reserves and proper procedures for mining operations
- Compliance with the law and approved standards (rules and regulations) for operation methods related to subsoil use and prevention of subsoil pollution during operations
- Extraction of copper and other associated minerals in accordance with the approved process procedures. Accurate recording of extracted copper and other minerals and reconciliation of those left in the subsoil
- Protection of the license area from flooding or and other situations which might affect the quality of minerals and commercial value of the deposit.

2.9.4. Industrial and Occupational Safety

The subsoil user (the company) undertakes to provide for industrial and occupational safety requirements viz:

- To provide for health and safety of production staff during exploration and construction and operation of the mining facility in accordance with the law;
- Develop guidelines for industrial and occupational safety for the personnel employed at hazardous production facilities and to provide personal protection equipment to persons working there; and

- Control air quality and containment of hazardous and explosive gases and dust over the pits. Provide special measures to ensure safety of mining operations and to protect the environment in case of industrial accidents.

2.9.5. Environmental Protection

In terms of environment protection, the subsoil user undertakes to provide for the following

- Perform a study to provide baseline state of the environment within the license area in accordance with the programme;
- Monitor the environment (atmosphere, subsoil, water bodies, soil) within the license area in accordance with the programme;
- Construction of industrial runoff collection and treatment facilities to prevent industrial pollutants from entering the environment; treatment of pit and mine water prior to discharge;
- Arranging waste rock dumps and processing facilities with minimal effect on the environment; and,
- Using overburden for technical and biological reclamation.

2.9.6. Participation in Social and Economic Development

The Company plans to provide for the following activities for social and economic development of the region:

- Compensate the land (forest or pasture) owners for any losses and damages in the manner and within the terms prescribed by Russian legislation for land and forestry;
- Engage enterprises of the Chukotka AO as contractors or suppliers for manufacture of equipment, facilities and performance of various services; and
- Create employment opportunities for the population of the region in which the mine is located and make maximum use of local labour during development and operation of the deposit.

2.9.7. Associated Facilities

Associated facilities are those facilities that appear external to the main Project site such as road and electricity supply infrastructure, but which have been established specifically for the Project and would not be established in the absence of the project. The international lender requirements dictate that such associated facilities must be assessed in the same way as the other Project components. For the Peschanka Copper Project the following associated facilities are identified: two dedicated transmission lines will be constructed to supply electrical power to the Peschanka site (a 200kV primary facility from Magadan and a 100kV secondary facility from Pevek), and access road to the site from the all weather road b from Pevek to Magadan (currently being constructed as per the governmental plan), and some upgrade of the Pevek port facilities. For all these facilities there will be subject to specific environmental impact assessments, but these are not included in the scope of this ESIA.

2.10. Environmental and Social Aspects for the Baimsky GOK, Peschanka Copper Project

2.10.1. Environmental and Social Aspects Defined

For each of the identified activities it is necessary to list the associated environmental and social aspects. Environmental and social aspects are defined as 'an element of an organisation's activities, products or services that can interact with the environment', and it is the identification and quantification of the aspects that provides the key to assessing impacts. The environmental and social aspects of the proposed Baimsky GOK, Peschanka Copper Project are presented in Table 4 below.

Table 4. List of the principal environmental and social aspects associated with construction activities on the Baimsky GOK, Peschanka Copper Project

Category	Aspect	Aspect	Estimated Construction Quantity	Units
Resource use	Water	Industrial	600 to 650	m^3/annum (m^3/a)
		Potable	25 to 470	m^3/a
	Energy	Mining	173,400	MWh/a
		Liquid fuels	36	m^3/a
	Raw materials	Explosives	160,000	tonnes per annum (t/a)
		Lubricants	190	litres per annum (l/a)
	Waste	Sewage	69,000 to 1,272,670	m^3/a
		Non-hazardous	2,267,388	kg/a
		Hazardous	1,221	kg/a
		Medical waste	132	kg/a
		Waste oil	4,571	l/a
Outputs	Energy emitted	Maximum noise (from construction machinery)	120	maximum dBA
		Maximum noise (from blasting)	105 to 135	1,000m from blast in dBl
Socio-Economic	Jobs	Jobs	up to 5,000 (peak quantity)	
	Spending	Total Capital Expenditure	4,061	million USD

Note: the environmental and social aspects have been estimated as a function of available information and should be viewed as indicative only

Table 5. List of the principal environmental and social aspects associated with operational activities on the Baimsky GOK, Peschanka Copper Project

Category	Aspect		Estimated Operations Quantity	Units
Inputs	Water	Industrial*	57,000,000	m^3/a
		Potable (From River)	25 to 470	m^3/a
	Energy	Mining	191,000	MWh/a
		Concentrator	1,953,000	MWh/a
		Other Infrastructure	256,000	MWh/a
		Tailings storage facility	87,000	MWh/a
		Liquid fuels	140	m^3/a
	Land	Mine pits	497	hectares (ha)
		Stockpile areas	566	ha
		Waste rock dump areas	1,371	ha
		Overall mine area including concentrator	182	ha
		TSF	4,874	ha
		Aerodrome	207	ha
	Raw materials	Explosives	46,000	t/a
		Antiscalant	1,542	m^3/a
		Dithiophosphate Aqueous	6,000	t/a
		Potassium Amyl Xanthate (PAX)	12,000	t/a
		Oxanol, Oxal T-92 & Pine Oil Mixture (50:50)	14,000	t/a
		Sodium Sulphide (Na2S)	41,000	t/a
		Flocculent (Tailings)	3,000	t/a
		Flocculent (Concentrate)	38	t/a
		Test Reagent	12,000	t/a
		Sodium Hydrosulphide (NaHS)	9,000	t/a
		Lime	68,000	t/a
		Lubricants	275	1000 l/a
		Coolant	38	1000 l/a
Outputs	Products	Payable copper in concentrate	250,000	t/a
		Gold in concentrate	400,000	koz/a
	Effluent	Mine water	1,035 to 2,235	m^3/day
		Storm water **	28	Mm^3/a
		Sewage (after 2026)	199,000 to 220,000	m^3/a
	Waste	Waste rock	1,164	million tonnes (LOM)
		Tailings	69,000,000	t/a (dry solids)
		Waste oil	813,000	l/a

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Category	Aspect		Estimated Operations Quantity	Units
		Domestic waste	2,555	t/a
		Sewage sludge	2,400	t/a
		Industrial waste	215	t/a
		Hazardous waste	100	t/a
	Energy emitted	Maximum noise (plant)	105	dBA
		Noise (blasting)	105 to 135	1,000m from blast in dBl
		Maximum vibration	<170	kN
	Atmospheric emissions	Total CO_2 emissions	447,000	t/a
		PM emissions (Mine site)	300	t/a
		NO_x emissions (Mine site)	6,300	t/a
		SO_2 emissions (Mine site)	800	t/a
		PM emissions (Off site)	50	t/a
		NO_x emissions (Off-site)	900	t/a
		SO_2 emissions (Off site)	100	t/a
Socio-Economic	Jobs	Jobs (operations)	up to 1,000	

** Reclaim water from TSF to plant at 5,070 m3/hr*
*** From run-off either diverted as non-contact water or collected in the TSF for process use*
Note: the environmental and social aspects have been estimated as a function of available information and should be viewed as indicative only.

Manpower is expected to grow quickly through 2020 to a level of +/- 1,000 by early 2021, rapidly ramping up thereafter at increments of 1,000 -1,500 per annum to peak at ca. 5,000 during the period 2024/ 2025. The Project is expected to achieve mechanical completion in 2026.

3. THE ENVIRONMENTAL AND SOCIAL MANAGEMENT APPROACH

3.1. Overview

The environmental and social management approach is illustrated schematically in Figure 6. The approach consists of five broad components namely:

- An overarching environmental policy;
- Planning;
- Implementation and operation;
- Checking and corrective action; and,
- Management review.

Each of these components is described below in more detail in terms of what will be done to meet the requirement during implementation of the Baimsky GOK, Peschanka Copper Project.

3.2. Environmental and Social Policy

The Environmental and Social Policy defines the broad intent of how environmental and social risks would be managed during the design, construction and operation of the Baimsky GOK, Peschanka Copper Project. As such the policy provides the internal (company) decision-making context for any future environmental and social management decisions as well as a platform for sustained improvements over time.

3.3. Planning

3.3.1. Objectives-based planning

Planning involves identifying and defining the various environmental aspects and related potential impacts that can result from the project and ensuring that appropriate management and mitigation measures are identified and effectively planned. The approach that has been used here is based on the principle of 'objective-based' planning. Objective-based planning involves identifying the slew of environmental requirements that need to be effected during implementation of the project, and:

- For each environmental requirement an objective is specified. The objective serves to translate the requirement into a statement of achievement so that if the objective is met then the requirement will have been met. Note that several different requirements could be satisfied by a single objective and a single requirement could have several objectives – there is not necessarily a one-to-one relationship between requirements and objectives; and,
- For each objective specified an indicator is defined that will provide an indication of whether the objective is being met or not. To provide a metric for the indicator, targets are set which serve to reflect the performance aspirations of each objective.

The combination of objectives, indicators and targets provide an explicit set of measures that can be used at any stage to assess the effectiveness of the environmental and social management function. There are then two primary mechanisms for elaborating what needs to be done to meet the specific targets, namely management and mitigation plans and design requirements and criteria.

3.3.2. Management and mitigation plans

Management and mitigation plans apply to activities and define what needs to be done (in terms of management and mitigation) to meet the targets. For the purposes of effective implementation the plans must also detail who is responsible for the implementation of the same, why, where, when and how they must be implemented.

3.3.3. Design requirements and criteria

The control of environmental and social risks can also be achieved through ensuring that specific facilities are equipped with specific attributes that serve to control the environmental and social aspects. Design requirements refer to the attributes while design criteria refer to specific performance requirements.

3.4. Implementation and operation

Implementation and operation serves to define how the management plans and environmental design criteria will be implemented. The following plays an important role in ensuring implementation:

3.4.1. Contractor management

A key element of any large scale project is ensuring that Contractors on site understand and properly implement the environmental and social management requirements as part of their contracted activities. Where the risk of impact occurs and where mitigation must be applied to ensure that the risks are effectively managed.

3.4.2. Roles and responsibilities

The first and most important mechanism for implementing the environmental and social management requirements lies in clearly articulating the roles and responsibilities in respect of the various environmental and social management requirements. It is important to note that roles and responsibilities include dedicated environmental and social management roles as well as the establishing roles and responsibilities for all company personnel.

3.4.3. Training

Together with defining the roles and responsibilities it is necessary to develop an overarching training programme that will serve to equip project personnel to fulfil their roles and responsibilities, whilst both sustaining (refreshing) and then advancing the overall levels of capability. Training may and should extend across awareness building, dedicated task specific training, ‘out of the box’ training that serves to find new and innovative ways of improving performance and training that ensures that personnel who are required to fulfil an environmental and social management function understand the requirement, believe in the importance of the requirement, and have the necessary skills and capacity to fulfil that function.

3.4.4. Operational procedures

The various activities that are required in implementing a large-scale project must be defined to ensure that the associated potential impacts are properly understood and that mitigation for the significant aspects can be both identified and effectively implemented. That requirement is best effected through the modification of operational procedures for conducting such activities or procedures that are specifically developed to manage environmental and social risks across several activities. Ultimately what is required here is ensuring that whenever an activity is undertaken that presents an identified potential risk to the environment or society, that the required mitigation is implemented to prevent or reduce such risks to tolerable level.

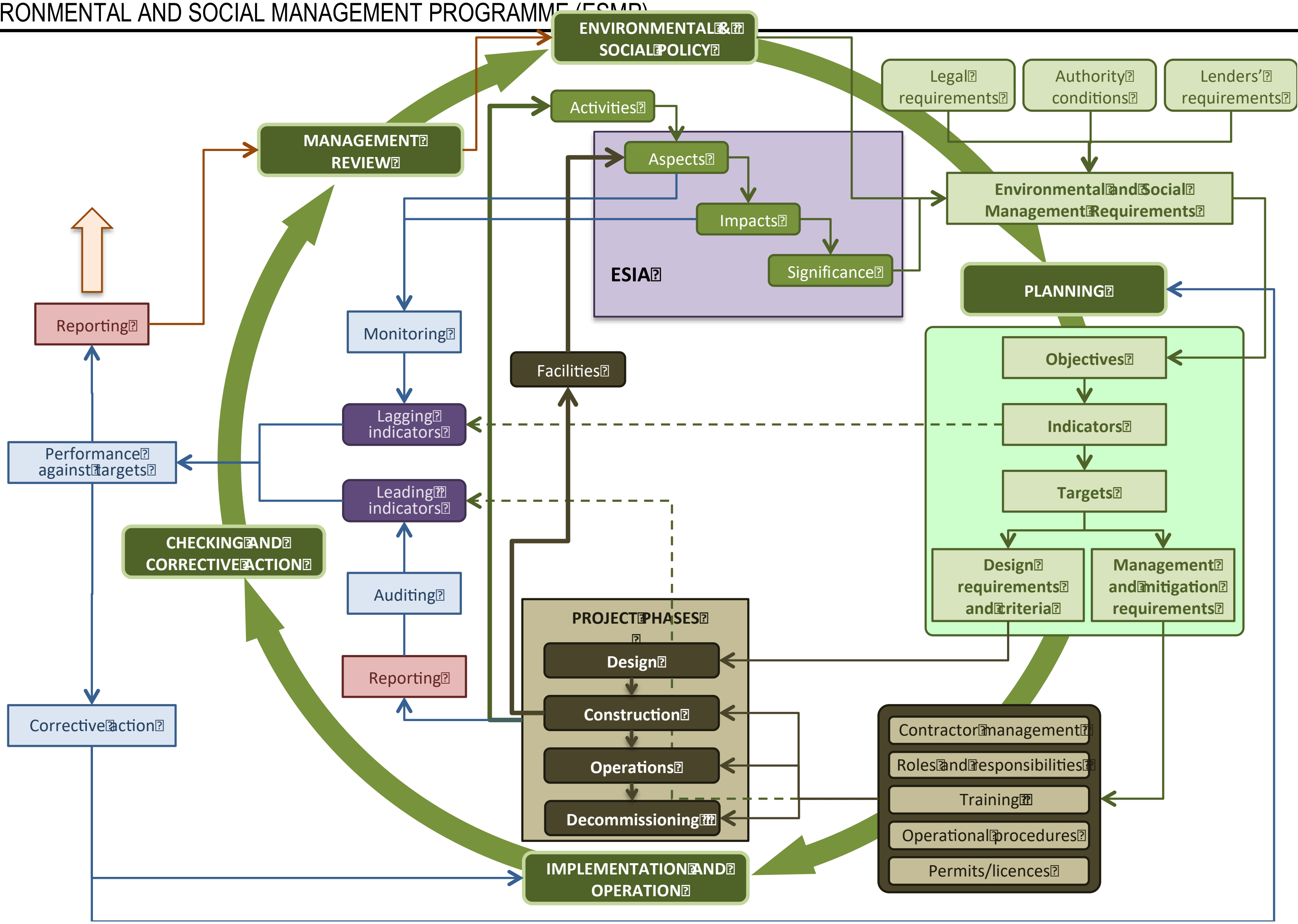

Figure 6: Schematic illustration of the environmental and social management philosophy for the Baimsky GOK, Peschanka Copper Project. The various components of the approach are described in more detail in the text).

3.4.5. Permits and licences

All permits and licences must be in place timeously so that no activities take place without being authorised. In addition, permit and licence conditions must be documented and associated as appropriate with the managerial requirements to which they apply.

3.5. Checking and Corrective Action

3.5.1. Leading and lagging indicators

Checking and corrective action forms the fourth component of the ESMP and serves to ensure that the:

- Required environmental and social management activities are being implemented; and,
- Objectives are being achieved as indicated by meeting the stated targets.

A key underpinning principle for checking and corrective action is the concept of leading and lagging indicators. Leading indicators serve to pre-emptively indicate whether the required management actions are in fact being implemented, while lagging indicators present a measure of performance. It is simply inadequate to track only lagging indicators because they will always reflect only what has been achieved (or not) in retrospect.

As such checking and corrective action includes four key lagging indicators. These are:

- Incident recording and review;
- Monitoring selected environmental quality variables as defined in the objectives and targets;
- Monitoring and review of complaints and complaints management; and,
- Ongoing inspections of the facilities and activities to identify potential non-compliances.

Leading indicators derive from direct reporting from the implementers on what has and has not been implemented supplemented by an auditing regime that serves to verify the validity of that reporting.

3.5.2. Reporting

The findings of all of the above need to be structured into instructive reporting that provides information to all required parties on environmental and social management performance, together with clearly defined corrective action, where this is seen to be required. All of the above must be conducted systematically and continuously and preferably independently of the activity or facility in question. Records of the information must be maintained and protected but the information itself must be readily and easily accessible on an ongoing basis. Within the reporting structure it is necessary to create a review function that continuously assesses the reporting and prescribes the necessary corrective action. Reporting will also include the provision of information on the environmental and social management performance to external stakeholders who may have an interest in or be affected by the mine and marshalling yard at Pevek.

3.6. Management review

The final component of the ESMP is a formal management review that takes place annually. The purpose of the management review is for senior management to review the environmental and social management performance during the preceding period and to propose measures for improving that performance in the spirit of the requirement of continual improvement. An essential part of the management review process is ensuring that senior managers appreciate their responsibilities and obligations in providing leadership and direction so that environmental and social management performance is commensurate with the nature of the business and that the spirit of continual improvement is both supported and promoted.

4. ENVIRONMENTAL MANAGEMENT FOR THE BAIMSKY GOK, PESCHANKA COPPER PROJECT

4.1. The Baimsky GOK, Peschanka Copper Project's Environmental and Social Policy

The Company's Vision on Occupational Health, Safety and Environment:

"All our people make the right decisions to ensure safe, incident-free and effective performance"

The Company's Beliefs:

- All injuries and incidents are predictable and preventable: our goal is zero harm
- A safe operation is an effective operation
- The environmental impacts of our activities should be minimized

Supported by Corporate Values to achieve Company's Vision and Beliefs, the Company will strive to continuously improve its occupational health and safety and environmental performance by adhering to the following key principles:

- All employees and contractors have a responsibility to work safely, adhere to safety procedures and use the approved tools and equipment provided to perform their work.
- Company's leaders openly and visibly demonstrate an unrelenting passion and commitment towards the wellbeing of our employees and environment.
- HSE risks are proactively identified, assessed and managed on an ongoing basis.
- HSE procedures must be risk based, simple and non-negotiable.
- "Lessons learned" must be swiftly identified and widely shared.

4.2. Planning

4.2.1. Facilities

The proposed mine and processing plant comprise the following key production facilities:

- an open pit mine that will consist of three pits,
- overburden and waste rock dumps,
- ore stockpiles,
- a concentrator (processing plant), and
- a tailings storage facility (TSF).

The auxiliary facilities of the proposed mine and processing plant include:

- an explosives manufacturing and storage facility,
- a construction camp (at the construction phase),
- an operations camp comprising offices, accommodation, a canteen and clinic facilities, stores, recreational facilities and so forth,
- industrial and potable water supply systems,
- sewage treatment plants,
- a waste incinerator,
- workshops,
- a site refueling facility,
- an analytical laboratory,
- electricity supply and distribution,
- service roads connecting the various site components, and
- a landing strip (before its commissioning – a helicopter pad)

The proposed facility at Pevek would be a large-scale marshalling yard.

4.2.2. Activities and aspects

The major activities associated with the implementation of Peschanka Cooper Project are:

- Surface stripping,
- Excavation works,
- Construction of infrastructure,
- Drilling,
- Blasting,
- Materials transport,

- Crushing and grinding,
- Minerals concentration,
- Servicing and maintenance of vehicles, plant and machinery,
- Administration and,
- Food preparation and lodging,
- Logistics of people, materials, products.

The environmental and social aspects of these activities are detailed in the Project description presented in Section 2.

4.2.3. Impacts

The potential impacts the Baimsky GOK, Peschanka Copper Project are summarised in Table 6. Please note that the impacts have been derived directly from the ESIA that was conducted on the project as part of the decision-making process.

Table 6: Summary listing of impacts as assessed in the ESIA

Risk/Benefit		Inherent Risk/Benefit	Residual Risk/Benefit
Risk	Adverse human health effects	High	Low
Risk	Damage to vegetation and reduced habitat	Moderate – high	Low
Risk	Risk of material reductions in environmental quality	Moderate	Moderate
Risk	Deterioration of surface water quality	Moderate	Moderate
Risk	Deterioration of groundwater quality	Moderate	Moderate
Risk	Risk of reduced fish populations	Moderate – high	Moderate
Risk	Risk of reduced terrestrial fauna populations	Moderate – high	Moderate
Risk	Risk of impaired ecosystem services	High	Low
Risk	Contribution to climate change and its consequences	High	Moderate
Benefit	Net improvements in human welfare	Moderate – high	High
Risk	Net reductions in human welfare	Moderate – high	Low
Risk	Risk of reduced livelihoods	Moderate – high	Low

4.2.4. Legal requirements

The legal requirements are described in general terms in the ESIA. The specific requirements will have to be identified as a function of the OVOS process.

4.2.5. Objectives, indicators and targets

The various requirements detailed above have been reviewed to identify all the environmental and social management requirements that need to be met during the implementation of Baimsky GOK, Peschanka Copper Project. These requirements have then been expressed as overriding objectives for the ESMP. These objectives together are listed in Table 7, together with the indicators that can be used to ascertain the degree to which the objectives are being met, and the associated targets in respect of the indicators.

4.2.6. Management plans

As a function of the planning process the following management plans have been identified:

- Emergency Response Plan
- Atmospheric emissions management
- Ground and surface water management
- Mineworker, health and safety management
- Waste management (mineral and non-mineral wastes)
- Biodiversity management plan
- Stakeholder Engagement Plan

Table 7: Summary listing of objectives, indicators (and their units) and targets for each indicator which serves to define whether an objective is being met or not (in accordance with IFC requirements).

Category		Indicator	Units	Target
Emergency Response Plan	Emergency conditions on the mine or at Pevek do not result in fatalities, injuries or environmental or community damage	Fatalities	No.	0
		Injuries	No.	0
		Environmental damage		None
Atmospheric emissions	Atmospheric emissions from the Peschanka Cooper Project do result in adverse human health effects or environmental damage	Dust fallout	mg/m^2/month	tbd
		Ambient PM_{10} concentrations	24 hr $\mu g/m^3$	100
			Annual $\mu g/m^3$	50
		Ambient SO_2 concentrations	24 hr $\mu g/m^3$	50
			10 min $\mu g/m^3$	500
		Ambient NO_x concentrations	1 hr $\mu g/m^3$	200
			Annual $\mu g/m^3$	40
		Direct greenhouse gas emissions	Kilotonnes CO_2 eq pa	<450
		Indirect greenhouse gas emissions	Kilotonnes CO_2 eq pa	tbd
Ground and surface water	Water use is optimized, the maximum practicable utility is derived from the water that is used and impacts on water resource quality are prevented or minimised by discharge water quality remaining within prescribed limits to prevent off-site reductions in water quality and associated potential impacts.	Water use	Ml	tbd
		pH	pH	6-9
		BOD	mg/l	30
		COD	mg/l	125
		Total nitrogen	mg/l	10
		Total phosphorous	mg/l	2
		Oil and grease	mg/l	10

Category		Indicator	Units	Target
		Total suspended solids	mg/l	50
		Total coliform bacteria	mg/l	400
Mine worker health and safety	Operations of the mine do not result in worker fatalities, injuries nor adverse health effects	Lost time injury frequency ratio	LTIFR	<1.2
		Fatalities	No.	0
		Lost time injuries	No.	0
		First aid cases	No.	0
		Near misses	No.	0
		Community injury (including fatalities)	No.	0
		Adverse human health effects	No.	0
		Human rights abuses	No.	0
Waste management	Waste is properly classified, accurate records kept and intermediate storage, transport and final disposal is done safely and in compliance with national regulatory requirements and good practice.	Quantities of waste per waste class generated per month	tonnes	Comprehensive information
		Quantities of waste per waste class disposed per month together with the disposal mechanism	tonnes	Comprehensive information
	Emissions from the incinerator do not result in risks to human health or the natural environment	Total suspended particulates (TSP) emissions	mg/m^3	tbd
		Sulphur dioxide (SO_2) emissions	mg/m^3	50
		Oxides of nitrogen (NO_x) emissions	mg/m^3	200-400
		Hydrochloric acid (HCl) emissions	mg/m^3	10
		Dioxins and furan emissions	ng TEQ/m^3	0.1

Category		Indicator	Units	Target
		Cadmium (Cd)emissions	mg/m^3	0.05-0.1
		Carbon monoxide (CO) emissions	mg/m^3	50-150
		Lead (Pb)emissions	mg/m^3	See total metals
		Mercury (Hg) emissions	mg/m^3	0.05-0.1
		Total metals emissions	mg/m^3	0.5-1
		Hydrogen fluoride (HF) emissions	mg/m^3	1
Biodiversity	Biodiversity outside of the direct mine, marshalling yard and access road footprints is not materially affected by the Peschanka Copper Project activities	Off-site environmental damage to vegetation	Incidents	None
		Unregulated discharge downstream of the TSF	Incidents	None
		Poaching of game or fish	Incidents	None
Stakeholder Engagement Plan	Stakeholders who are potentially affected by or have an interest in the Peschanka Copper Project are consulted and informed of mine activities on an ongoing basis.	Number of public meetings	No.	tbd
		Number of communiqués to stakeholders	No.	tbd
		Number of complaints	No.	0

4.3. Implementation and operation

The operational controls described earlier have been developed at two levels. The first of these is for general implementation of the ESMP while the second is for the implementation of a specific management plan. In the section that follows the former category viz. general operational controls are detailed. The operational controls that lie in the individual management plans are detailed in the plans themselves.

4.3.1. Roles and responsibilities

There are three primary role players on the Baimsky GOK, Peschanka Copper Project and these together with their respective roles are detailed in the section that follows.

The Project Owner

The managing company will be responsible for interactions with IFIs including the formulation and financing of the requirements of the Environmental and Social Action Plan (ESAP), the Stakeholder Engagement Plan (SEP) and this ESMP. The managing company will be the ultimate custodian of the environmental and social management requirements and be regularly informed of the status of the same. Should these requirements be found wanting the managing company will launch interventions to ensure the effective implementation of the management requirements.

The Baimsky GOK, Peschanka Copper Project Operating Company

The role of the Baimsky GOK, Peschanka Copper Project Operating Company is to ensure that all the environmental and social management requirements are effectively operationalized. By this is meant that the environmental and social management requirements are implemented and that there is regular checking and corrective action to ensure implementation. The Baimsky GOK, Peschanka Copper Project Operating Company shall regularly assess performance against the targets set and where the performance is not resulting in the required performance, developing and implementing the corrective action required to meet the required performance.

Contractors

Contractors shall be contractually bound to the Baimsky GOK, Peschanka Copper Project's environmental policy and environmental and social management requirements. Ensuring that contractors are bound to these requirements will require references to these obligations in the contracts established between the Peschanka Copper Project and the contractors and the development of an environmental and social specification that outlines in detail the contractual obligations of the contractors. Contractors will be expected to maintain their own environmental and social management programmes and will be expected to have at least one full time EHS accountable person on site (for smaller contracts a full-time role may not be necessary). The principle must be one of obliging the contractors to take full accountability for the environmental and social risks that derive from their on-site activities and to manage those risks accordingly but with a strong oversight role from the Peschanka Copper Project Operating Company.

4.3.2. General training

Formal environmental and social management training

As part of the implementation of the ESMP, specific training needs will need to be identified together with the mechanisms needed to respond to those training needs (in-house training, external training courses and so forth). The purpose of the training is to ensure that all personnel performing activities related to environmental and social management are trained, qualified and competent. In-house training programmes must also be developed for especially non-environmental specific personnel (particularly management) and these will need to be rolled out widely during the early part of project operations. This training must include

- Modern environmental and social management principles and obligations to lenders,
- Integrated environmental and social management systems,
- The structure and function of the ESMP;
- Objectives, indicators and targets and the actions needed to meet the targets;
- Environmental and social performance benchmarking; and,
- The environmental and social legal context within which the project operates.

General environmental and social awareness training

Broad level environmental and social awareness courses must also be developed for all workers on the project. Environmental and social awareness training will focus on the following topics:

- What is environmental and social management ?
- Why do these items need to be managed/conserved/protected?
- What are the environmental and social aspects of the Peschanka Copper Project;
- What can individuals do?
- Environmental and social management principles.

Induction

Over and above the training described earlier it is essential that an environmental and social management induction module be developed. The induction should serve to both alert staff, visitors and contractors to the environmental and social management functions at the mine and to advise them on elements to be aware of while visiting the mine while at the same time building the identity of the mine as being committed to upholding world class environmental and social management functions.

5. CHECKING AND CORRECTIVE ACTION

5.1. Monitoring

A series of environmental variables that are to be monitored during project operations are presented below. Data from the environmental baseline studies prior to the construction and commissioning of the Baimsky GOK Peschanka Copper Project are to be considered as the reference data for air, surface water, noise and the terrestrial environment.

5.1.1. Data quality

The monitoring programmes detailed here must apply approved methods for sample collection, preservation and analysis. Sampling must be conducted by or under the supervision of trained individuals. Analysis should be conducted by entities permitted or certified for this purpose. Sampling and Analysis Quality Assurance/Quality Control (QA/QC) plans should be prepared and, implemented. QA/QC documentation should be included in monitoring reports.

5.1.2. Quantitative monitoring variables

1. Ambient air quality including
    - Dust fallout
    - SO_2
    - NO_2
    - PM_{10}
2. Lost time injury frequency ratio
3. Worker Fatalities
4. Worker Lost Time Injuries (LTI)
5. Worker First Aid Cases
6. Worker Near Misses
7. Water use (including pumped groundwater)
8. Discharge water quality
    - pH
    - Biological Oxygen Demand (BOD)
    - Chemical Oxygen Demand (COD)
    - Total nitrogen
    - Total phosphorous
    - Oil and grease
    - Total suspended solids
    - Total coliform bacteria
9. Community injury (including fatalities)

10. Waste recycled
11. Quantities of waste per waste class generated per month
12. Quantities of waste per waste class disposed per month together with the disposal mechanism
13. Number of public meetings
14. Number of communiqués to stakeholders
15. Number of complaints
16. Incinerator emissions
    - Total suspended particulates (TSP)
    - Sulphur dioxide (SO_2)
    - Oxides of nitrogen (NO_x)
    - Hydrochloric acid (HCl)
    - Dioxins and furan
    - Cadmium (Cd)
    - Carbon monoxide (CO)
    - Lead (Pb)
    - Mercury (Hg)
    - Total metals
    - Hydrogen fluoride (HF)

5.1.3. Qualitative monitoring variables

1. Off-site vegetation damage
2. Spillages of hazardous materials

5.2. Inspections

Regular and systematic visual inspection provides an important source of information on environmental and social management performance. Most notably inspection serves to assess activities and the degree to which these reflect the project's environmental and social management requirements. At the same time some potential impacts are difficult to monitor quantitatively, such as soil erosion and waste management. For this reason inspections are a key component of checking and corrective action and indeed of the ESMP as a whole. Inspections would be scheduled in such a way that all activities across the project are inspected consistently and regularly.

5.3. Audits

Audits are systemised and formalised methods of assessing the degree to which the requirements of the ESMP have been implemented. Audits are thus used to ensure that procedures, monitoring, reporting and other management functions are operating as they are intended to as components of the overall management philosophy providing an opportunity for improvement. Audits must be scheduled regularly to ensure that the components of the ESMP that allow it to work as a system, are being regularly checked for effectiveness.

5.4. Implementation

As part of the overall checking and corrective action regime it is important to maintain an index of the implementation of required management actions. In order to do so it is necessary to track the various activities that must be implemented as well as their implementation status. The implementation status can be derived from audits and inspections and the submission of progress reports that detail the specific implementation status of given actions.

5.5. Corrective Action

The management component of the ESMP derives from evaluating all the information that becomes available on a monthly/quarterly and annual basis. It is important to note that the ESMP is based on two types of indicators namely leading and lagging indicators. Leading indicators are more proactive and serve to highlight whether or not 'the right things are being done' whereas lagging indicators reflect on historical events but indicate whether or not 'things are being done right'. The environmental and social management function is then conducted by reviewing the lagging indicators to see the overall performance (assessing performance against targets) and then using the leading indicators to develop an understanding of why a target was missed. Information availability is thus critical to the success of the ESMP and a key implementation discipline is to ensure that reporting is timing, effective and accurate.

Where a non-conformance is identified it is necessary to evaluate the reason for the non-conformance and to define and process the necessary corrective action. It is important to recognise that corrective action can take many different forms, but it is fundamentally about changing a component of the overall management approach. For example, it may be that implementation has been ineffectual, or the defined management actions have been fully implemented but they are simply not working. Whatever the cause, it must be identified, and action taken to rectify the cause. Whatever corrective action is defined, it must be recorded and formalised and implementation of the corrective action tracked. In this manner a record of corrective action can be established that serves as a reference for future corrective action. Where corrective action is seen to result in the desired effect, the ESMP must be updated accordingly to reflect that corrective action and ensure that is adopted as practise into the future.

ANNEX 1. MANAGEMENT PLANS

1. EMERGENCY RESPONSE PLAN

1.1. Overview

For any large-scale mining activity such as the Baimsky GOK Peschanka Copper Project there are multiple potential causes of emergency conditions. In order to ensure that there are no on- nor off-site fatalities or injuries, nor environmental or property damage it is necessary to anticipate the type of emergency conditions that could occur and develop plans that would reduce the probability of the emergency conditions occurring and that if the conditions do occur, that the associated negative consequences are prevented or minimised.

1.2. Activities that may Result in Emergency Conditions

All mining and processing plant and associated activities can potentially translate into emergency conditions. Particular concerns for Baimsky GOK Peschanka Copper Project are:

- Extreme weather (snow, temperature, wind);
- Rock falls/pit wall failure;
- Spillage of hazardous materials;
- Fire of plant or equipment;
- Wildfire;
- Explosion;
- Dam failure or collapse;
- Power failure;
- Earthquake; and,
- Motor vehicle accident.

1.3. Risks

This management plan serves to mitigate or prevent the following risks:

- Risk of death or injury to mine workers, contractors and third parties;
- Risk of property damage or financial loss; and,
- Risk of environmental damage as a result of uncontrolled discharges of contaminated material.

1.4. Objective

Given the risks stated above, the following objective prefaces the emergency response plan for the Baimsky GOK Peschanka Copper Project:

- Emergency conditions on the mine do not result in fatalities, injuries or environmental or community damage.

1.5. Indicators and Targets

Indicators		Targets
Fatalities		0
Injuries		0
Environmental damage		None
Community damage		None

1.6. Legal requirements

1. Federal Law "On Industrial Safety of Hazardous Production Facilities" of 21.07.1997 No. 116-FZ (as amended on 29.07.2018)
2. Federal Law "On Protection of the Population and Territories from Natural and Man-Made Emergencies" of 21.12.1994 N 68-FZ (as amended on 03.08.2018)
3. Safety Regulations for Geological Exploration Activities, USSR Ministry of Geology, 1991 (as amended on November 23, 1993)
4. The RF Governmental Decree of August 26, 2013 N 730 "On Approval of the Regulations on the Development of Emergency Localization and Response Action Plans for the Hazardous Production Facilities"

The RF legislation requires the enterprises with hazardous production facilities to develop an Emergency Response Plan.

The Plans include a description of the facilities, for which the action plan is developed; possible scenarios of occurrence and development of emergencies at the facilities, as well as sources (places) of occurrence of accidents; characteristics of accidents inherent in the facilities, for which the action plan is developed, and description of injuries at such facilities, determine the plan of actions in the event of an accident at the facility in accordance with the requirements established by the federal norms and rules in the field of industrial safety.

The validity of the Action Plans is 1 year for the facilities where opencast mining or mineral processing is performed.

1.7. Management and mitigation requirements

1.7.1. Training

- Ensure that all personnel that use or handle hazardous materials are trained and certified, if required, in the use and potential dangers of the materials;

- Employees must be trained on emergency response procedures required to counter the nature and hazards of an accidental release;
- Employees must be familiar with and have received the appropriate training regarding the handling and storage practices, for all containers with which they will come into contact.
- Train vehicle drivers to be aware of the loads they are carrying, spill prevention in respect of the loads and the possible spillages of materials that could arise in the event of a vehicle accident or collision with infrastructure such as a pipe that could be ruptured by the collision;
- Only trained employees must be entitled to refuel equipment. The training of employees for refuelling must include spillage prevention, containment and cleanup and the necessary reporting of spills that do occur;
- Train operators in the safe transfer and filling of the hazardous material, and in spill prevention and response;
- Conduct employee training on inspection and maintenance procedures.

1.7.2. Material types

- None of the following hazardous substances are to be allowed on site:
    - CFCs,
    - PCBs, or
    - Persistent organic pollutants (POPs) (in pesticides)
    - Ozone depleting substances (ODSs); and,
    - Asbestos.
- Reduce materials containing volatile organic compounds and formaldehyde;
- Maximise the use of recycled and recyclable materials.

1.7.3. Control planning for hazardous materials on site

- Document the types and amounts of hazardous materials present on the project site including the following information:
    - Name and description (e.g. composition of a mixture) of the hazardous material;
    - Classification (e.g. code, class or division) of the hazardous material;
    - Regulatory reporting threshold quantity of the hazardous material;
    - Quantity of hazardous material used per month;

  - Characteristic(s) that make(s) the hazardous material hazardous (e.g. flammability, toxicity);
  - Analysis of potential spill and release scenarios using available industry statistics on spills and accidents where available;
  - Analysis of the potential for uncontrolled reactions such as fire and explosions;
  - Analysis of potential consequences based on the physical geographical characteristics of the site, including aspects such as its distance to settlements, water resources, and other environmentally sensitive areas.
- Identify locations of hazardous materials and associated activities on an emergency plan site map;
- Detail the availability of specific personal protective equipment and training needed to respond to an emergency; and,
- Detail availability of spill response equipment sufficient to handle at least initial stages of a spill and a list of external resources for equipment and personnel, if necessary, to supplement internal resources.

1.7.4. Uncontrolled releases

- Implement all measures detailed in the spill prevention management plan;
- Prevent uncontrolled releases of hazardous materials to the environment or uncontrolled reactions that might result in fire or explosion using engineering controls (containment, automatic alarms, and shut-off systems) commensurate with the nature of hazard;
- Implement management controls (procedures, inspections, communications, training, and drills) to address residual risks that have not been prevented or controlled through engineering measures;
- Store all hazardous (reactive, flammable, corrosive and toxic) materials in clearly identified, fit-for-purpose containers or vessels;
- Describe response activities in the event of a spill, release, or other chemical emergency including:
  - Internal and external notification procedures;
  - Specific responsibilities of individuals or groups;
  - Decision process for assessing severity of the release, and determining appropriate actions;
  - Facility evacuation routes, and,
  - Post-event activities such as clean-up and disposal, incident investigation, employee re-entry, and restoration of spill response equipment.

1.7.5. Reaction, fire, and explosion prevention

- Reactive, flammable, and explosive materials must be managed to avoid uncontrolled reactions or conditions resulting in fire or explosion. Such prevention practices include:
    - Storage of incompatible materials (acids, bases, flammables, oxidizers, reactive chemicals) in separate areas, and with containment facilities separating material storage areas;
    - Provision of material-specific storage for extremely hazardous or reactive materials;
    - Use of flame arresting devices on vents from flammable storage containers;
    - Provision of grounding and lightning protection; and,
    - Storage of hazardous materials in an area of the facility separated from the main construction activities.

1.7.6. Mechanical integrity

- Inspection and maintenance procedures must be developed and documented to ensure mechanical integrity of equipment, piping, and instrumentation and to prevent uncontrolled releases of hazardous materials;
- The specific process components of major interest include pressure vessels and storage tanks, piping systems, relief and vent systems and devices, emergency shutdown systems, controls, and pumps. Recommended aspects of the inspection and maintenance program include:
    - Developing inspection and maintenance procedures;
    - Establishing a quality assurance plan for equipment, maintenance materials, and spare parts;
    - Conducting equipment, piping, and instrumentation inspections and maintenance;
    - Identifying and correcting identified deficiencies;
    - Evaluating the inspection and maintenance results and, if necessary, updating the inspection and maintenance procedures; and,
    - Reporting the results.

1.7.7. Planning coordination

- Procedures should be prepared for:
    - Informing the public and emergency response agencies,
    - Documenting first aid and emergency medical treatment,

  - Taking emergency response actions,
  - Reviewing and updating the emergency response plan to reflect changes, and ensuring that employees are informed of such changes; and,
  - Using, inspecting, testing, and maintaining the emergency response equipment.

1.7.8. Storage of hazardous materials

- Locate chemicals stored in drums in areas with a secondary containment capacity of at least 110% of the maximum container;
- Bund walls are to surround above ground outdoor storage tanks containing flammable liquids and these must be able to contain the biggest tank volume of the contents plus 10% in case of spillage;
- 0.5m height bund walls are to surround outdoor containers flammable and combustible liquids storage;
- Emergency spillage tank for indoor flammable and combustible liquids storage with volume 30% of the total storage capacity but at least of biggest tank volume;
- Concrete pad with 0.15m height bund wall are to surround outdoor containers dry chemicals storage;
- Drum stack heights must not exceed two drum heights on pallets. All defective pallets shall be replaced immediately. A minimum space of 80 cm shall be left open between stacks and 100 cm between stacks and a wall;
- Secure chemical products must be secured when not needed to prevent tampering and vandalism;
- Provide warning notices, fire-fighting facilities and protection from weather damage;
- Shift supervisor or safety officer is to report on the integrity of the hazardous materials storage;
- Keep products in their original container unless they are not re-sealable; with all stored products and containers being labelled, and original labels and MDS retained.
- Store acetylene, propane, and oxygen cylinders in dedicated areas where they will protected from collision or ignition sources; and;
- Label containers so that the hazard nature of the material is clear.

1.7.9. Handling of hazardous materials

- Obtain Material Data Sheets (MDS) for all chemical formulations before use and all materials must be handled according to the instructions;

- In response to and in addition to the information contained on the MDS the following must also be determined:
  - Location, or where the material is to be moved;
  - The weight of the container so that proper personnel and/or equipment will be utilized during handling;
  - Access and egress routes;
  - What personal protective equipment (PPE) is required;
  - What emergency actions may be needed (i.e., first aid, fire fighting media, etc.); and
  - Containers holding flammable materials to be grounded during any transfers of contents

1.7.10. Transport of hazardous materials

- Transporters of hazardous materials must ensure that:
  - The vehicle is suitable and registered for the purpose it is being used;
  - The vehicle displays clear markings in Russian and English indicating the nature of the materials being carried, what to do in the event of an emergency, and an emergency telephone number (24 hour) of a responsible person who can provide advice in the event of an emergency.

1.7.11. Flammable liquids

- No combustible material (e.g. wood, rags, carton boxes, etc.) are to be kept in the presence of flammable liquids;
- ‘No Open Flames’ and ‘No Smoking’ symbolic signs are to be displayed in the vicinity of the flammable liquid storage areas;
- Flammable liquids are to be issued only on a need-to-use-basis and strict control is to be exercised to ensure that persons do not draw more than what is needed for the specific job;
- All cables are to be grounded as appropriate.
- An adequate number and type of fire fighting equipment is to be available in the close vicinity of the flammable liquid store.
- Flammable liquid stores are to be equipped with approved flameproof electrical equipment;
- Flammable liquid stores are to be well ventilated and free of explosive vapours;
- Flammable liquid containers in the flammable liquid stores are to be clearly marked / labelled as to their contents. They are to be provided with earthed drip trays;

- Locations are to support MDS information and handling/storage instructions. MDSs are to be available for all flammable/hazardous products at the location where such substances are present.
- The number of 200 litre drums containing flammable liquids is to be kept to a minimum and the position is to be strictly controlled. The necessary signs should be visible at these storage areas.
- Flammable liquid tanks are to be properly earthed in order to prevent static electricity accumulating.
- Drainage points on flammable liquid tanks are to be provided with threaded caps or blanking plates.
- Bund walls are to surround storage tanks containing flammable liquids and these must be able to contain the entire volume of the contents plus 10% in case of spillage.
- Earthing is to be tested regularly; and,
- Adequate precautions must be taken, such as wearing relevant protective equipment when handling substances.

1.7.12. Spill prevention

- Implement inspection programs to maintain the mechanical integrity and operability of pressure vessels, tanks, piping systems, relief and vent valve systems, containment infrastructure, emergency shutdown systems, controls and pumps, and associated process equipment;
- Prepare written Standard Operating Procedures (SOPs) for filling storage tanks or other containers or equipment as well as for transfer operations by personnel and for the management of secondary containment structures, specifically the removal of any accumulated fluid, such as rainfall, to ensure that the intent of the system is not accidentally or willfully defeated
- Monitor containment areas, valves, tanks, and pipelines for potential ruptures, failures or overfilling;
- Shift supervisor is to report on the status of spillage prevention infrastructure in the area of their jurisdiction confirming that it is in a serviceable state or requesting that maintenance be effected;
- Bund above ground outdoor fuel and flammable and combustible liquids storage tanks to contain at least 110% of the largest tank;
- 0.5m height bund walls are to surround outdoor containers flammable and combustible liquids storage.
- Emergency spillage tank for indoor flammable and combustible liquids storage with volume 30% of the total storage capacity but at least of biggest tank volume.

- Concrete pads with 0.15m height bund wall are to surround outdoor containers dry chemicals storage.

1.7.13. Refuelling

- Fuel dispensing hoses shall be of approved non-electrically conductive types with automatic shut off nozzles;
- Nozzles used for vehicle and equipment fuelling should be equipped with an automatic shutoff to control drips;
- All fuelling equipment is to be inspected regularly and all leaks must be repaired immediately.
- Absorbent spill cleanup materials should be available at fuelling areas and should be disposed of properly after use;
- Fuelling stations and trucks must be equipped with fire extinguishers.

1.7.14. Overfill protection

- Overfilling of vessels and tanks must be prevented as this is one of the most common causes of spills resulting in soil and water contamination, and among the easiest to prevent.
- Overfill protection measures must include:
    - Written procedures for transfer operations that includes a checklist of measures to follow during filling;
    - Operations and the use of filling operators trained in these procedures;
    - Installation of gauges on tanks to measure volume inside; and,
    - Use of dripless hose connections for vehicle tank and fixed connections with storage tanks.

1.7.15. Spill containment and countermeasures

- Spill response procedures must be prepared and suitable spill response equipment available when and where required – locate spill response equipment at various strategic locations across the project site;
- In the case of a spill, immediate action must be taken to stop and contain the spill;
- Any observed spills / leakage must be removed and the cause remedied.
- Spill reporting procedures to be posted at all storage facilities so that the appropriate emergency response can be mobilised.

- Spills into a containment area are to be removed/pumped out of the containment area. The water release valve is not be used to used to drain the spill; and,
- The recovery of all spills to be treated as hazardous waste – this includes all contaminated materials such as sand, soil, gravel and stones - and appropriate temporary storage, transport and final disposal to meet the requirements for hazardous waste.

1.7.16. In-pit emergencies

It is not within the remit of the ESMP to prepare a detailed in-pit emergency response plan related to rockfalls/pitwall failure and the like but that will need to happen to comply with Russian regulatory and lender requirements. The broad principles of an in-pit emergency response plan would need to address and include4:

- Establishing a planning team;
- Conducting a capability and hazard assessment including a detailed risk assessment;
- Developing the plan including emergency management, emergency response procedures and recovery actions;
- Test the plan by conducting drills and refine the plan as needed; and,
- Implement the plan effectively.

1.8. Monitoring

There are no specific environmental monitoring requirements other than the ongoing inspection and audits detailed above together with detailed 'post mortems' of the emergency drills to identify, develop and implement corrective and improvement actions.

4 Modified after *Developing a Comprehensive Emergency Preparedness Planning Manual for Underground Mining Operations, West Virginia Office of Miners' Health, Safety and Training and West Virginia University – Mining Extension Service, 2008.*

2. ATMOSPHERIC EMISSIONS MANAGEMENT PLAN

2.1. Overview

A key environmental concern for the proposed Peschanka Copper Project is the effect the mine and associated activities would have on prevailing air quality. The mine will have multiple sources of atmospheric emissions including emissions from all fuel burning appliances, plant and machinery, vehicles, mechanically generated dust, emissions from blasting, aeolian (wind-generated) dust especially in respect of the tailing storage facility (TSF) and other emissions. Although localised air quality impacts are unlikely to be significant given the remoteness of the mine from inhabited areas it would nevertheless be important to control all atmospheric emissions. Included in these emissions sources are greenhouse gas emissions and again, while these are not considered significant relative to the scale of such emissions for the country as a whole it would be necessary to control such emissions through judicious energy management practices.

2.2. Activities that may result in dust generation

The following activities are potential sources atmospheric emissions and as such the conducting of any of these activities must invoke the dust control measures (as appropriate) that are presented later in this plan):

- Operations of vehicles and mobile machinery;
- Blasting;
- Excavations and top soil recovery;
- Rock crushing, conveyor, transfer and grinding;
- Operations of the tailings storage facility (TSF); and,
- Final product handling.

2.3. Risks

This management plan serves to mitigate or prevent the following risks:

- Risk of adverse human health effects with a particular concern being the possible exposure of workers,
- Risk of off-site environmental damage as a result of atmospheric emissions from the mine site; and,
- Risk of accidents as a result of visibility reduction.

2.4. Objective

Given the risks stated above the following objective prefaces air quality management at the Peschanka Copper Project:

- Air pollution emissions from the Peschanka Copper Project do not result in adverse human health effects, environmental damage or nuisance.

2.5. Indicators and targets

Indicator	Units	Target
Ambient PM_{10} concentrations	24 hr µg/m^3	tbd
	Annual µg/m^3	50
Ambient SO_2 concentrations	24 hr µg/ m^3	50
	10 min µg/ m^3	500
Ambient NO_x concentrations	1 hr µg/ m^3	200
	Annual µg/ m^3	40
Direct greenhouse gas emissions	Kilotonnes CO_2 eq pa	<450
Indirect greenhouse gas emissions	Kilotonnes CO_2 eq pa	tbd

2.6. Legal requirements

The main legislative requirements for the atmospheric air protection and the control of pollutant emissions are specified in the following legislative acts:

1. Federal Law “On Environmental Protection” of 10.01.2002 N 7-FZ (as amended on 27.12.2018)
2. Federal Law “On Atmospheric Air Protection” of 04.05.1999 N 96-FZ (as amended on 29.07.2018)
3. “On Approval of Hygienic Standards GN 2.1.6.3492-17 “Maximum Permissible Concentrations (MPC) of Pollutants in the Air of Urban and Rural Settlements” Order of the RF Chief State Sanitary Doctor of December 22, 2017 No. 165
4. GOST 17.2.3.02-2014 Regulations for establishing the permissible limits of harmful pollutants emissions from industrial enterprises

All enterprises of negative environmental impact category I (hereinafter referred to as NEI) should develop the standards for maximum permissible emissions (MPE) and organize control over the implementation of agreed MPE.

2.7. Management and mitigation requirements

2.7.1. Dust control on the tailings storage facility

- Nine months of the year the tailings will be frozen and for the remaining 3 months they will be mainly wet from melt and summer rains so dust production is expected to be low;
- Nevertheless, TSF surface will be monitored and appropriate dust suppression measures wil be applied in case of dusting; and,
- For dried beaches investigate the use of chemical stabilisers should there be a problem with windblown dust.

2.7.2. Motor vehicle emissions

- Motor vehicles and plant are to be maintained and serviced according to manufacturer's specifications;
- Motor vehicles must not be allowed to idle for extended periods of time. Optimum idling time for effective performance must be defined for all vehicles on the mine and marshalling yards and these must be adhered to.

2.7.3. Energy management

- Identification, and regular measurement and reporting of principal energy flows for the different key facilities on the mine and at the marshalling yard.
- Prepare mass and energy balances to identify areas of possible improvement in energy efficiency;
- Define and regularly review energy performance targets
- Regular comparison and monitoring of energy flows with performance targets to identify where action should be taken to reduce energy use, which may include comparison with benchmark data, to confirm that targets are appropriate and comply with good practise.

2.8. Monitoring

Ambient air quality monitoring shall be implemented as follows:

a. Dust fallout;

b. SO_2;

c. NO_2; and,

d. PM_{10}.

Incinerator emissions for:

a. Total suspended particulates (TSP);
b. Sulphur dioxide (SO_2)
c. Oxides of nitrogen (NO_x)
d. Hydrochloric acid (HCl)
e. Dioxins and furan
f. Cadmium (Cd)
g. Carbon monoxide (CO)
h. Carbon dioxide (CO_2)
i. Lead (Pb)
j. Mercury (Hg)
k. Total metals; and,
l. Hydrogen fluoride (HF).

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3. GROUND AND SURFACE WATER MANAGEMENT PLAN

3.1. Overview

The Peschanka Copper Project occurs in an area of extensive surface water systems that are potentially vulnerable to water quality impacts that may be brought about by unrelated discharges of waste water. The key risk source would be TSF, although the design requirements are for a zero discharge facility. There may also be downstream water quality impacts as a result of construction of the dam wall for the TSF and for the water reservoir.

3.2. Activities that may result in impacts on ground and surface water

The following activities may result in impacts on ground and surface water:

- Mine dewatering;
- Excavations;
- General earthworks;
- Batch plant operations (during construction); and,
- Operations of the tailings storage facility (TSF).

3.3. Risks

This management plan serves to mitigate or prevent the following risks:

- Contamination of ground and surface water and possible environmental risks such as fish kills, as a consequence.

3.4. Objective

Given the risks stated above the following objective prefaces water management at the Peschanka Copper Project :

- Fresh water use is minimized, the maximum practicable utility is derived from the water that is used and impacts on water resource quality are prevented or minimised by discharge water quality remaining within prescribed limits to prevent off-site reductions in water quality and associated potential impacts.

3.5. Indicators and targets

Indicators		Targets
Water use (including pumped groundwater)	Ml	tbd
pH	pH	6-9
BOD	mg/l	30
COD	mg/l	125
Total nitrogen	mg/l	10

Indicators		Targets
Total phosphorous	mg/l	2
Oil and grease	mg/l	10
Total suspended solids	mg/l	50
Total coliform bacteria	mg/l	400

3.6. Legal requirements

The main requirements for the protection of surface and ground waters from pollution due to production activities are indicated in the following legislative acts:

1. Federal Law “On Environmental Protection” of 10.01.2002 N 7-FZ (as amended on 27.12.2018)
2. “Water Code of the Russian Federation” of 03.06.2006 N 74-FZ (as amended on 02.08.2019)
3. “On the Procedure for Preparation and Decision-Making on Provision of a Water Body for Use”. The RF Governmental Decree of December 30, 2006 N 844 (as amended on 20.03.2018)
4. Order of the RF Ministry of Agriculture of December 13, 2016 N 552 “On Approval of Water Quality Standards for Fishery Water Bodies, including Standards of Maximum Permissible Concentrations of Hazardous Substances in the Waters of Fishery Water Bodies” (as amended on 12 октября 2018 г.)
5. Order N 246 of 02.06.2014 “On Approval of the Administrative Regulations of the Federal Agency for Water Resources for the Provision of Public Services of Approval of Standards for Permissible Discharges of Substances (Excluding Radioactive Substances) and Microorganisms into the Water Bodies for the Water Users in Coordination with the Federal Service for Hydrometeorology and Environmental Monitoring, the Federal Service on Customers' Rights Protection and Human Well-Being Surveillance, the Federal Agency for Fisheries and the Federal Service for Supervision of Natural Resources”.

3.7. Management and mitigation requirements

3.7.1. Seepage control in the TSF

- Proper preparation of dam foundation including the removal of loose diluvium/alluvium materials and ice to reach low-permeable deposits formed by erosion processes or bedrock layer;
- Mandatory application of seepage control measures for the dam foundation and slopes; and,
- Installation of seepage collection system on the downstream face of the dam to collect and recycle seepage water back to the TSF.

- As tailings will accumulate in the tailings storage facility, tailings layer will increase thickness of isolating layer thus providing a better protection of permafrost.
- Engineering geological investigations were conducted at the TSF site including the dam and its shoulders.

3.7.2. Water balance

- Develop a detailed water balance for the mine, processing plant and all other water uses/sources.

3.7.3. Mine pit drainage

- When tectonically weak zones are encountered in the frozen or thawed pit walls, advance drainage wells should be drilled in order to reduce groundwater pressure.

3.7.4. Water treatment

- Mine water will be discharged to the TSF directly without treatment, which will minimize impact on environment.
- Water from water reservoir will be treated for domestic use only by ensuring its quality for staff use.

3.7.5. Wash water

- Cement-laden water may only be discharged at the batch plant facility which provides for the settlement of silt in the wastewater and the reuse of the same for washing of cement/concrete vehicles;
- Water from washing large concrete-mixing equipment (mixers and the like) shall not be discharged overland;
- All washing operations shall take place at the dedicated wash bay that will be established for that purpose;
- No detergents may be used;
- Workshops, refuelling depots and washing areas shall be bunded.
- Any spilled fuel collected within bunded areas around the refueling area will be separated from runoff water using an oil separator. The clean water will then be discharged to the TSF.

3.7.6. Erosion prevention

- Erosion and sedimentation control measures will include:
    - Minimising removal of vegetation;

- Clearly demarcating boundaries in order to limit construction activities;
- All vehicles utilize dedicated routes.
- Where erosion and/or sedimentation occurs such areas require immediate recovery and implementation of further preventative measures.

3.7.7. Metals leaching potential

- Although it has been accepted that there is a low risk of acid generation it must still be confirmed that metal leaching potential is insignificant;
- In the event that metal leaching potential is significant, the Peschanka Copper Project will need to develop and implement mitigation measures commensurate with the risk.

3.8. Surface and ground water monitoring

An environmental monitoring system must be established. List of components to be monitored, monitoring methods and periodicity will be described in detailed construction and operation monitoring plans and procedures.

3.8.1. Monitoring of pumped groundwater

The following parameters must be monitored:

1. Water use (including pumped groundwater);
2. pH;
3. BOD ;
4. COD ;
5. Total nitrogen;
6. Total phosphorous;
7. Oil and grease;
8. Total suspended solids; and,
9. Total coliform bacteria.

4. MINEWORKER HEALTH AND SAFETY MANAGEMENT PLAN

4.1. Overview

Mining is by its nature a hazardous operation due to extensive use of explosives. There are also numerous other hazards that need to be considered when managing mineworker health and safety. This plan should be read in conjunction with Emergency Response (Plan 1).

4.2. Activities that may result in mine worker health and safety risks

All mine related activities present potential hazards that can result in death, injury or adverse heath effects. The following serves to define the key occupational hazards:

- General workplace health and safety;
- Hazardous substances;
- Use of explosives;
- Electrical safety and isolation;
- Working at heights;
- Physical hazards;
- Ionizing radiation;
- Fitness for work;
- Thermal stress;
- Noise and vibration.

4.3. Risks

This management plan serves to mitigate or prevent the following risks:

1. Death, injury or increased morbidity to mineworkers;

4.4. Objective

Given the risks stated above the following objective prefaces air quality management at the Peschanka Copper Project :

- Operations of the mine do not result in worker fatalities, injuries or adverse health effects

4.5. Indicators and targets

Indicators		Targets
Lost time injury frequency ratio (per million man-hours)	LTIFR	<1.2
Fatalities	No.	0
Lost time injuries	No.	0
First aid cases	No.	0
Near misses	No.	0

4.6. Legal requirements

The activities of mining enterprises in the filed of health and safety are regulated by the following requirements of the RF legislation:

1. “Labor Code of the Russian Federation” of 30.12.2001 N 197-FZ (as amended on 02.08.2019)
2. Federal Law “On Industrial Safety of Hazardous Production Facilities” of 21.07.1997 N 116-FZ (as amended on 29.07.2018)
3. Federal Law “On Protection of the Population and Territories from Natural and Man-Made Emergencies” of 21.12.1994 N 68-FZ (as amended on 03.08.2018) [5]
4. Safety Regulations for Geological Exploration Activities, USSR Ministry of Geology, 1991 (as amended on November 23, 1993)[6]

4.7. Management and mitigation requirements

4.7.1. General health and safety[7]

- Mining exploration and development activities should manage occupational health and safety hazards as part of a comprehensive health and safety management plan incorporating the following aspects:
  - Preparation of emergency response plans specifically applicable to exploration and production activities (considering the often geographically isolated nature of mining sites) and including the provision and maintenance of necessary emergency response and rescue equipment;

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[5] http://www.consultant.ru/cons/cgi/online.cgi?req=doc&ts=3505371510740288701590176&cacheid=6ABC6410CA85B1E06CAF315B071FA496&mode=splus&base=LAW&n=320014&rnd=C16F8752B3CD3502B304DB06605BB14E#2kc4xt08512

[6] http://docs.cntd.ru/document/1200029875

[7] These requirements have been take directly from the IFC’s EHS Guidelines for Mining. The requirements provide no more than an overarching framework and should not be seen to comprehensively address mineworker health and safety risks. It is expected that the Peschanka Copper Project would further develop this plan to address all mineworker health and safety risks comprehensively

- Sufficient number of first aid trained employees to respond to emergencies;
- Implementation of specific personnel training on worksite health and safety management including a communication program with a clear message about corporate management's commitment to health and safety. The communication program should also include regular meetings such as daily talks prior to initiation of work shifts;
- Integration of behavioral considerations into health and safety management, including on- the-job behavioral observation processes;
- Training of employees on the recognition and prevention of occupational hazards specifically applicable to work in remote areas such as safety with respect to wildlife; protection against the elements; thermal stress; acclimatization; disease exposure; and navigational aids to avoid becoming lost;
- Illumination systems should be adequate and safe for the planned working conditions in travel paths, mine working areas, and within and around surface facilities and dumpsites of mines (see the illumination guideline values presented in Section 2.0). Additional illumination guidance includes adherence to local standard requirements for illumination for mobile equipment operating above ground and on public roads;
- Signage in hazardous and risky areas, installations, materials, safety measures, emergency exits, and other such areas should be in accordance with international standards (including standards of cleanliness, visibility and
- Considering the need to avoid such things as glare or potential sources of ignition.
- As a general rule, mobile equipment should produce an illumination level of 50 Lux across the passage at a distance of 1.5 times the stopping distance reflectance in areas of potentially poor illumination or sources of dust and pollution), be known and easily understood by workers, visitors, and as appropriate the general public;
- To the extent that alternative technologies, work plans or procedures cannot eliminate or sufficiently reduce a hazard or exposure, the mine operators should provide workers and visitors with the necessary personal protective equipment (PPE), and provide instruction and monitoring in their appropriate maintenance and use. Applicable PPE include, at a minimum, safety helmets and footwear, in addition to ear, eye, and hand protection devices.
- Occupational health assessments should be conducted for employees on a regular basis, based on exposure to risk.

4.8. Health and safety monitoring

The following parameters shall be monitored:

- Lost time injury frequency ratio;
- Fatalities;
- Disabling injuries;
- Lost time injuries;
- First aid cases; and,
- Near misses.

5. WASTE MANAGEMENT PLAN

5.1. Overview

For the Peschanka Copper Project a distinction is made between waste (the typical waste types that would be produced by various industrial activities) and mineral wastes, which are the wastes specifically associated with mining. In general terms the Peschanka Copper Project does not generate the waste types that could be generated in minerals processing and as such the mine is not considered to be a significant source. Good waste management is still required for both waste types and the management requirements are accordingly detailed in this plan.

5.2. Activities that may result in waste generation

The following activities are potential sources of waste and as such the conducting of any of these activities must invoke the waste management measures (as appropriate) that are presented in this plan:

- General earthworks;
- Mining operations;
- Vehicle, equipment and machinery maintenance;
- Accommodation and administration; and,
- Operations of the processing plant (the minerals concentrator).

5.3. Risks

This management plan serves to mitigate or prevent the following risks:

- Contamination of soil;
- Contamination of surface water; and,
- Contamination of ground water.

5.4. Objective

Given the risks stated above the following objective prefaces waste management at the Peschanka Copper Project :

- Waste is properly classified, accurate records kept and intermediate storage, transport and final disposal is done safely and in compliance with national regulatory requirements and good practise.

5.5. Indicators and targets

Indicators		Targets
Quantities of waste per waste class generated per month	tonnes	Comprehensive information
Quantities of waste per waste class disposed per month together with the disposal mechanism	tonnes	Comprehensive information

5.6. Legal requirements

The RF legislation in the field of waste management is reflected in the following legislative acts:

- Federal Law “On Environmental Protection” of 10.01.2002 N 7-FZ (as amended on 27.12.2018)
- Federal Law “On Production and Consumption Wastes” of 24.06.1998 N 89-ФЗ (as amended on 26.07.2019)
- Order of the RF Ministry of Natural Resources and Environment of August 5, 2014 N 349 “On Approval of the Guidelines for Development of Draft Standards for Waste Generation and Limits for their Disposal”

5.7. Management and mitigation requirements

5.7.1. Waste characterisation and recording

- Characterise and quantify all waste streams across the project in terms of quantity, hazard, generation frequency and define and implement disposal options;
- For each waste type create a MDS that is always available to accompany the waste;
- As part of the characterisation define opportunities for source reduction, as well as reuse and recycling;
- Ensure segregation of hazardous wastes from non-hazardous wastes;
- Enforce appropriate occupational health and safety requirements, with all relevant regulations, guidelines and codes of practice for waste management/handling facilities;
- In case of transporting waste, the Peschanka Copper Project must comply with the codes of practice and guidelines for licensing of waste transport vehicles and the regulation and monitoring of transport operations;
- Complete delivery and transport of wastes as per the approved regulations and guidelines.

- See the hazardous materials management plan for safe handling, storage and use of hazardous substances, to protect employees and the environment from related risks; and,
- Maintain a waste register for materials removed from the site, indicating type, quantity, date, haulage contractor, delivery point, and so forth.

5.7.2. Waste segregation

- Waste must be properly segregated into different types according to its intended final disposal
- Flammable substances must be kept away from sources of ignition and from oxidizing agents
- Acids must be segregated from alkalis, and from other substances with which they could react dangerously;
- Waste from different sources must not be mixed;
- Retention time for temporary storage of a waste generated shall not lead to a risk of health hazard or odour.

5.7.3. Waste transport (for Pevek marshalling yard)

- Conduct on-site and off-site transportation of waste so as to prevent or minimize spills, releases, and exposures to employees and the public.
- All waste containers designated for off-site transport should be secured and labelled with the contents and associated hazards, be properly loaded on the transport vehicles before leaving the site, and be accompanied by a shipping paper (i.e., manifest) that describes the load and its associated hazards; and,
- Upon delivery of the waste consignment at the final waste disposal facility, the facility operator must source a suitable disposal certificate.

5.7.3.1. Waste Rock Dumps

Recommendations for management of waste rock dumps include the following:

- Dumps should be planned with appropriate terrace and lift height specifications based on the nature of the material and local geotechnical considerations to minimize erosion and reduce safety risks;
- Design of waste rock dumps to provide for such potential deterioration of geotechnical properties with higher factors of safety. Stability / safety assessments of existing facilities should take these potential changes into account.

5.7.3.2. Tailings

Recommended tailings management strategies include:

- Design of tailings storage facilities should take into account the specific risks / hazards associated with geotechnical stability or hydraulic failure and the associated downstream risks Environmental management planning should thus also consider emergency preparedness and response planning and containment / mitigation measures in case of catastrophic release of tailings or supernatant waters;
- Seepage management and related stability analysis must be a key consideration in design and operation of tailings storage facilities;
- Design specifications should include the probable maximum flood event and the required freeboard to safely contain it (depending on site specific risks) across the planned life of the tailings dam, including its decommissioned phase;
- Where potential liquefaction risks exist, including risks associated with seismic behaviour, the design specification should take into consideration the maximum design earthquake.

5.7.3.3. Hazardous Waste

Recommended practices for the management of hazardous waste include the following:

- Hazardous wastes should always be segregated from non-hazardous wastes. Hazardous waste management should ensure prevention of harm to health, safety, and the environment, as follows:
    - Understanding potential impacts and risks associated with the management of any generated hazardous waste during its complete life cycle
    - Compliance with applicable local and international regulations
    - Hazardous waste should be stored so as to prevent or control accidental releases to air, soil, and water resources in an location where:
        - Commingling or contact between incompatible wastes is prevented and allows for inspection between containers to monitor leaks or spills;
        - Store in closed containers;
        - Secondary containment systems should be constructed with materials appropriate for the wastes being contained and adequate to prevent loss to the environment;
        - Provide adequate ventilation where volatile wastes are stored.

- Hazardous waste storage management must be conducted by employees who have received specific training in handling and storage of hazardous wastes:
    - Information on chemical compatibility must be readily available to employees, including labelling containers
    - Preventing access to hazardous waste storage areas to employees who have not received proper training
    - Clearly identifying (label) and demarcating the area, including documentation of its location on a facility map or site plan
    - Conducting periodic inspections of waste storage areas and developing corrective actions on non-compliance
- Preparing and implementing spill response and emergency plans to address their accidental release; and,
- Avoiding underground storage tanks and underground piping of hazardous waste.

5.7.3.4. Operations of the incinerator

- Conduct waste segregation and/or presorting to avoid incineration of wastes that contain metals and metalloids that may volatilize during combustion and be difficult to control through air emission technology (e.g., mercury and arsenic);
- Follow applicable national requirements and internationally recognized standards for incinerator design and operating conditions, including:
- Introduce wastes into the incinerator only after the optimum temperature is reached.
- Prevent the addition of waste if the operating temperature is below the required limits;
- Minimize uncontrolled ingress of air into the combustion chamber;
- Implement maintenance and other procedures to minimize planned and unplanned shutdowns;
- Avoid operating conditions in excess of those that are required for efficient destruction of the waste;
- Minimize formation of dioxins and furans by preventing particulate control systems from operating in the 200 to 400oC temperature range; identifying and controlling incoming waste composition; using primary (combustion-related) controls.

5.8. Monitoring

- Monitoring activities associated with the management of hazardous and non-hazardous waste must include:

    - Regular visual inspection of all waste storage collection and storage areas for evidence of accidental releases and to verify that wastes are properly labelled and stored.
- Monitoring records for hazardous waste collected stored, or shipped should include:
    - Name and identification number of the material(s) composing the hazardous waste;
    - Physical state (i.e., solid, liquid, gaseous or a combination of one, or more, of these);
    - Quantity (e.g., kilograms or litres, number of containers);
    - Waste shipment tracking documentation to include, quantity and type, date dispatched, date transported and date received, record of the originator, the receiver and the transporter (including for waste disposed by incineration at the mine site);
    - Method and date of storing, repacking, treating, or disposing at the facility, cross-referenced to specific manifest document numbers applicable to the hazardous waste; and,
    - Location of each hazardous waste within the facility, and the quantity at each location

6. BIODIVERSITY MANAGEMENT PLAN

6.1. Overview

The Peschanka Copper Project would be developed in an area of sensitive and almost pristine habitats where the mine and marshalling yard footprints at least will result in such habitat being completely destroyed. Against the background though of the extent of the wilderness area in which the Peschanka mine would be established, this impact is not deemed significant but is essential that the mine and the marshalling yard ensures that the impacts do not extend beyond the direct footprint of the facilities.

6.2. Activities that may result in off-site biodiversity risk

- Releases of contaminated water into downstream environments;
- Uncontrolled vehicles access to off-site areas;
- Excess emissions of dust from especially the mine facilities;
- Poaching by mine personnel of either game or fish; and,
- Runaway fires

6.3. Risks

The fundamental risk to be managed is ensuring that the near pristine habitat that exists beyond the physical footprints of the various facilities that make up the project (which will be destroyed by the mine) is not materially, negatively impacted by mine activities. As has been described in the impact assessment, poaching and/or runaway fires started by mine personnel could cause damage that is way more significant than that posed by the environmental aspects associated with the mine activities.

6.4. Objective

Given the risks stated above the following objective prefaces biodiversity management at the Peschanka Copper Project:

- Biodiversity outside of the direct mine, marshalling yard and access road footprints is not materially affected by the Peschanka Copper Project activities.

6.5. Indicators and targets

Indicators		Targets
Off-site environmental damage to vegetation	Incidents	None
Unregulated discharge downstream of the TSF	Incidents	None
Poaching of game or fish	Incidents	None

6.6. Legal requirements

The RF requirements for the biodiversity conservation in the commercial development of territories are regulated in the following legislative acts:

1. Federal Law "On Environmental Protection" of 10.01.2002 N 7-FZ (as amended on 27.12.2018)
2. Federal Law "On Wildlife" of 24.04.1995 N 52-FZ (as amended on 03.08.2018)
3. "Forest Code of the Russian Federation" of 04.12.2006 N 200-FZ (as amended on 27.12.2018)
4. Order of the RF Ministry of Natural Resources and Environment of April 28, 2008 N 107 "On Approval of Methods for Calculating the Extent of Damage Caused to the Wildlife Objects Listed in the Red Book of the Russian Federation, as well as to Other Wildlife Objects that are not Related to the Objects of Hunting and Fishing and their Environment" (as amended on December 12, 2012)
5. Strategy and Action Plan for the Conservation of Biological Diversity of the Russian Federation. Ministry of Natural Resources, 2014

6.7. Management and mitigation requirements

6.7.1. Surface water

- Establish and maintain a special protection regime for water protection zones and riparian strips as required by the Russian environmental legislation;
- Ensure all waste water (any water potentially contaminated by activities on the mine site) is directed to the TSF;
- Use treated wastewater as much as possible in the closed-loop water supply systems at the processing plant and for other purposes;
- Schedule the construction of all water management facilities in water bodies and river channels in a manner that helps minimize adverse impacts, i.e. complete construction works during the cold or low-flow months, before and after floods, and take into account the aquatic ecosystem requirements (wintering periods and habitats, spawning areas, feeding habitats and key migration routes);
- Implement erosion control and bank strengthening measures to protect soil against erosion.
- Establish a surface water quality monitoring regime that will provide assurance that there are no surface water impacts downstream of the TSF.

6.7.2. Habitat

- All earthworks and excavations should be carried out in strict compliance with the design provisions and within the delineated construction site boundaries;
- Prevent unauthorized temporary roads at the industrial site and adjacent areas during the construction, commissioning and operation of Project facilities;

6.7.3. Biodiversity

- Ensure strict compliance with design provisions and standards pertaining to emissions and discharges, and limit surface disturbance to within the Project site boundaries;
- Prevent access by vehicles to adjacent areas of barren tundra;
- Maintain and enforce a strict anti-poaching regime at the mine with strict punitive measures for non-compliance;
- Maintain a fire prevention regime across the mine site together with a fire crew that is able to quickly extinguish a tundra fire that may have been started inadvertently by mine personnel or activities;

6.7.4. Soil

- Relevant Russian standards require that the fertile topsoil layer during the site preparation be stripped and stored for later use in reclamation activities except where the topsoil needs to be retained to protect the underlying permafrost;
- Engineering ecological surveys performed on site states that topsoil on site does not meet national soil fertility requirements;
- Such excavated topsoil is to be used as soon as possible, for example, in reclamation of construction infrastructure that is decommissioned;

6.7.5. Ecosystem services

- Develop and implement an ecosystem services management programme, with the overarching purpose of ensure that the mine and associated activities do not result in further ESS impairment than that described in the impact assessment;
- The programme will require an effective monitoring regime that provides a direct indication of the impacts of the mine on ESS.

6.8. Monitoring

Exact monitoring program, methods and parameters are to be defined in special procedures.

The monitoring and evaluation program should include the following: (i) baseline, measures of the status of biodiversity values prior to the project's impacts; (ii) process, monitoring of the implementation of mitigation measures and management controls; and (iii) outcomes, monitoring of the status of biodiversity values during the life of the project, compared to the baseline.

Monitoring activities must include regular monitoring of surface water bodies, soil and habitats.