

# MANAGEMENT OF TAILINGS STORAGE FACILITIES

Polymetal International plc • JUNE 2021



# Introduction

In environmental stewardship, we focus on zero-harm principles when designing and operating our mines. In the countries where we operate, environmental legislation sets out strict requirements to prevent soil and water contamination.

All our tailings storage facilities (TSF) undergo regular audits for compliance with these requirements as well as safety examinations. TSFs are regularly monitored by our on-site environmental and engineering teams. Pipelines, pump stations, water levels and dams are inspected on daily basis. We ensure emergency preparedness and response procedures at all stages of TSF life, from design to operation to closure.

We welcome the new Global Industry Standard on Tailings Management and have committed to achieving compliance in all operations by 2023. We use corporate TSF management system to ensure control and increase the rigour of assessment and management of tailings storage facilities, including emergency response plans. The goal is to eliminate causes of dam failure, such as poor management and inadequate planning for heavy precipitation, which often increases the probability of accidents. We now operate 8 active tailings dams and 1 inactive, and historically there have been no environmental accidents involving tailings facilities at our operations.

Increasingly, we are shifting towards safer methods of waste storage, such as the dry stack (filtered cake) tailings. Dry tailing storage significantly reduces the possibility of dam failure, drastically lowers the potential damage from such accident, and eliminates tailings run-off. We aim to achieve 15% dry-stack tailings storage by 2024 (2020: 11%).

## Technical overview

**In Polymetal, there are two types of tailings storage:**

1. Traditional method of hydraulic filling of tailings in the storage;
2. Tailings filtration and dry stacking in piles.

When designing TSF, the following features are taken into account: engineering and geological conditions, climate conditions (precipitation, evaporation, seismicity) and the availability of materials for construction.

**As of today, Polymetal operates:**

- 4 active and 1 inactive upstream TSFs (when consecutive dam is elevated with partial resting on the previously constructed wall);
- 3 active downstream TSFs;
- 1 active centerline TSF; and
- 2 active dry stacking facilities.

Dry stacking technologies currently deployed at Amursk POX and Voro operations will soon be rolled out to Omolon, Nezhda, POX-2, Dukat and Veduga, whilst also becoming standard in any new tailings storage facilities.

To reduce risks of TSF operation and risks of potential changes in geological conditions, we conduct engineering, seismic, and geological surveys and test pulp at least once in 5 years. Using monitoring data (temperature of soils, depression curve) and physical features of materials used for the TSF foundation and dam construction, we adjust stability calculations and risk assessment. All this enables us to reassess the most severe consequences in case of hydrodynamic accident and we correct accordingly.

Furthermore, we have estimated potential damage areas in case of an emergency. At all of Polymetal's TSFs, emergency failure will have no impact on settlements, buildings, structures or facilities where people may be present. Thus, the risk of loss of human life is minimal.

We thoroughly review all of our TSFs and conduct regular visual, geological, engineering and hydrological surveys. We update thermal, stress-strain and stability calculation, which we use as confirmation to further elevate and operate dams in a safe way.

# Lunnoye TSF

1. Tailings Facility Name/identifier	Lunnoye TSF  Key facts: – raising from the centreline to downstream slope, – valley-fill type, – beach width is not regulated, – water pressure on the dam is permitted, – raised in 7 phases. – 6 phases are completed and made operational
2. Location	N 65°05'00" E 155°05'08"
3. Ownership	Joint Stock Company "Magadan Silver"
4. Status	Active
5. Date of initial operation	2001
6. Is the Dam currently operated or closed as per currently approved design?	Operated as per currently approved design
7. Raising method	Modified raising – from centreline to downstream slope
8. Current Maximum Height	55 m
9. Current Tailings Storage Impoundment Volume	4,802,703 m <sup>3</sup>
10. Planned Tailings Storage Impoundment Volume in 5 years' time	1.01.2021 – 01.01.2026: 1,356,637 m <sup>3</sup> Total by 2026: 6,159,340 m <sup>3</sup> * Figures have been estimated under the corporate long-term plan updated in 2021, adjusted with the filling coefficient.
11. Most recent Independent Expert Review	2019 – Lunnoye silver and gold mine, Tailings Storage Facility Audit Report by Knight Piésold Limited.  2019 – by JSC Russian Scientific and Research Institute named after B.E. Vedeneev.  2019 – Experts' Review of the TSF safety declaration by Scientific, Technological, Design and Expertise Centre Protechexpert.
12. Do you have full and complete relevant engineering records including design, construction, operation, maintenance, and/or closure?	Yes  <ul style="list-style-type: none"> <li>• Safety Declaration after reconstruction ref. No 20-20(04)0018-00-GOR, approved on 16.03.2020, including: <ul style="list-style-type: none"> <li>– safety criteria, 2019;</li> <li>– potential damage estimation, 2019;</li> <li>– experts' review of the facility readiness to emergency consequences mitigation, 2019;</li> </ul> </li> <li>• Experts' Review on the TSF safety declaration after reconstruction ref. No 00-DB-0018-2020.</li> <li>• Safety passport of the TSF after reconstruction, 2020.</li> <li>• Emergency response plan updated annually.</li> <li>• Tailings dam operation procedures after reconstruction, 2020;</li> <li>• Tailings dam hydrological structure safety monitoring project, ref. No 0954-20-32-GR.PM. 2020;</li> <li>• Job description and occupational health and safety guidelines.</li> </ul>

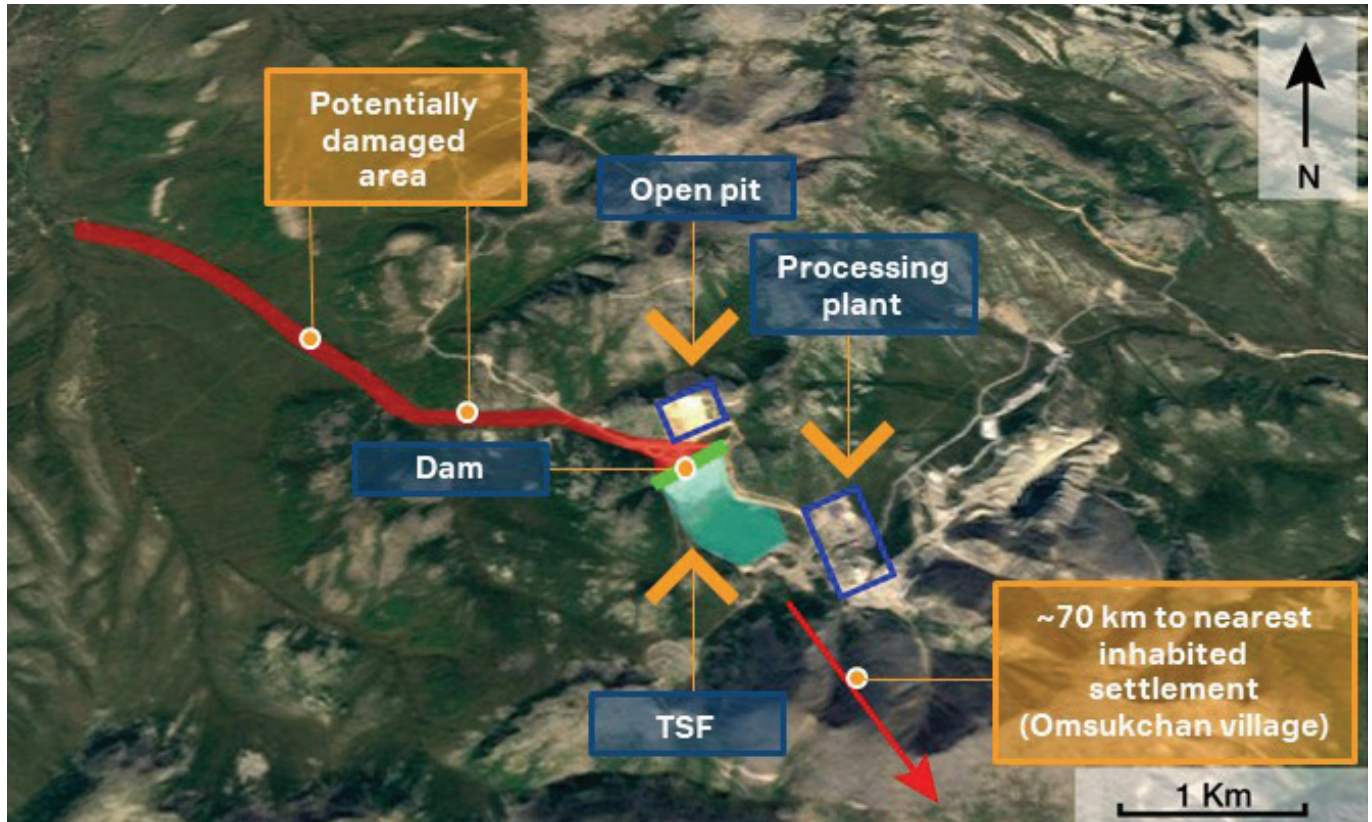
<p>13. What is your hazard categorization of this facility, based on the consequence of failure?</p>	<ul style="list-style-type: none"> <li>• TSF category (depending on consequences of potential hydrodynamic emergency) – IV, low hazard. <ul style="list-style-type: none"> <li>– Number of permanent residents – none;</li> <li>– Living environment is not disturbed;</li> <li>– Harm to ecosystem is not significant with maximum cost of damage rehabilitation estimated at USD 1.5 m;</li> <li>– Potential failure would be within the land plots leased to the company.</li> </ul> </li> <li>• TSF category depending on dam height and ground type – II, high hazard.</li> <li>• TSF category under Dam Safety Reference Book of CDA (CDA, 2019) and the Global Industry Standard on Tailings Management, 2020 – significant.</li> </ul>
<p>14. What guideline do you follow for the classification system?</p>	<p>Russian State Regulation No 986 of 2.11.2013 “On Hydraulic Structure Classification”.</p> <p>Dam Safety Reference Book of CDA (CDA, 2019) – used for corporate purposes as a reference source.</p> <p>Global Industry Standard on Tailings Management, 2020.</p>
<p>15. Has this facility, at any point in its history, failed to be confirmed or certified as stable, or experienced notable stability concerns, as identified by an independent engineer (even if later certified as stable by the same or a different firm)?</p>	<p>The facility did not fail to be confirmed or certified as stable or experience notable stability concerns. No risks affecting stability have been identified during the facility operation. Management efficiency is regularly estimated under the corporate TSF Management System and applicable legal requirements.</p>
<p>16. Do you have internal/in house engineering specialist oversight of this facility? Or do you have external engineering support for this purpose?</p>	<p>During the construction stage we use designer supervision. During operation, we ensure internal control on the TSF condition under the corporate TSF Management System.</p> <p>There are several types of control checks:</p> <p>Scheduled:</p> <ol style="list-style-type: none"> <li>a) Level 1 – carried out by an employee responsible for the TSF at the operation;</li> <li>b) Level 2 – carried out by other technical specialists at the operation;</li> <li>c) Level 3 – carried out by representatives of Polymetal Management Company (as consulting).</li> </ol> <p>Unscheduled:</p> <ol style="list-style-type: none"> <li>a) in case of system processes review – initiated by the Company’s Top Management (Group CEO, COO, managing director of the project);</li> <li>b) in case of multiple violations of legislative, regulatory and other requirements, applied to the TSF;</li> <li>c) in case of identifying adverse trends as a result of statistics analysis;</li> <li>d) in case of accidents (emergencies) affecting safety level at the TSF.</li> </ol>
<p>17. Has a formal analysis of the downstream impact on communities, ecosystems and critical infrastructure in the event of catastrophic failure been undertaken and to reflect final conditions? If so, when did this assessment take place?</p>	<p>Impact assessment of potential hazards for life, health and property in case of TSF failure was done by Promtehnologia LLC, Belgorod in 2018. It was then approved by local governmental authorities (Ministry of Natural Resources and Ecology in the Magadan region).</p>
<p>18. Is there a) a closure plan in place for this dam, and b) does it include long term monitoring?</p>	<ol style="list-style-type: none"> <li>a) There is a closure plan. A land reclamation section is included in the design documentation.</li> <li>b) As for now, the closure plan does not include long term monitoring. The program is a part of a Reclamation Project and will be developed in detail by the time of the TSF closure.</li> </ol>
<p>19. Have you, or do you plan to assess your tailings facilities against the impact of more regular extreme weather events as a result of climate change, e.g. over the next two years?</p>	<p>A scenario of dam failure caused by an externality (natural disaster) is included in the impact assessment described in the question 17 above: the emergency probability there is assessed as low.</p>

20. Any other relevant information and supporting documentation.

Please state if you have omitted any other exposure to tailings facilities through any joint ventures you may have.

- Raising method — raising from the centreline to downstream slope, and the 6th phase of the Northern dam was partly raised on the soil of the TSF beach (silty sands).
- Raised in 7 phases with final elevation of 840 m. Total dam length is 447 m.
- The dam is constructed using local crushed stone with 1.5 mm thick shield of HDPE geomembrane.
- Normative safety factor adjusted for this category of facility for solidity and consequences significance should be equal or more than 1.25. Safety factor calculated for the current TSF equals to 1.957.
- The facility is officially in the Russian Register of Hydraulic Structures  
[http://waterinfo.ru/gts/do\\_look.php?regnum=219440001071000](http://waterinfo.ru/gts/do_look.php?regnum=219440001071000)
- We have a complete package of design documentation and permits on hand.
- Drainage system is in place. A drainage system along dams is available to prevent seepage and includes pipe drains, drain headers, pump stations and cycled water pipelines, designated for the following purposes:
  - arranged diversion of seepage through the dam body and toe;
  - eliminating seepage inflow to the downstream slope and freezing zone;
  - improving the downstream slope stability.
- The watershed area is 3.191 km<sup>2</sup>.
- The TSF is dyked (hydro-protected) by a stream diversion channel, designed to hold maximum seasonal and rainfall flood flows with 0.1% annual exceedance probability.
- Luna TSF is located in the areas with seismic levels of 7 and 8.
- TSF is located in a region prone to earthquakes and has the potential to experience ground shaking levels of Intensity 7 (VII) to 8 (VIII).
- The probability of an earthquake magnitude 7 is 10% within the next 50 years, i.e. once every 500 years, and the probability of an earthquake magnitude 8 is 1% within the next 50 years, i.e. once every 5000 years.
- Seismic microregioning of the assessment of the impact of the local conditions on the seismic activity of the TSF area:
  - TSF bed — seismicity 7.32 and peak acceleration — 0.167 g, or 164.0 cm/s<sup>2</sup>;
  - Enclosing dam — seismicity 6.79 and peak acceleration — 0.111 g, or 109.0 cm/s<sup>2</sup>;
  - Adjacent massifs — seismicity 6.74 and peak acceleration — 0.108 g, or 106.0 cm/s<sup>2</sup>.
- The area flooded in case of hydrodynamic accident at TSF No. 2 would be about 0.2 km<sup>2</sup>.
- Spill discharge volume is estimated at 1,106,000 m<sup>3</sup>.
- Overfilling of the TSF impoundment and the spill over the dam crest may occur in case of:
  - receiving a surface runoff with 1% Annual Exceedance Probability,
  - failure of the stream diversion channel and interception channel (including timely snow clearing) and
  - uncontrolled filling of the TSF with simultaneous suspension of water withdrawal from it.
- The likelihood of a hydrodynamic accident has been estimated to be minimal because the design provides for at least 1.5 m freeboard between the TSF filling level and the dam crest elevation.

# Lunnoye TSF location and affected area in case of dam failure



# Mayskoye TSF

1. Tailings Facility Name/identifier	Mayskoye TSF  Key facts: — downstream raising valley-fill type, — beach width has no limits, — water pressure on the dam is permitted, — raised in 6 phases.
2. Location	N 68°59'24" E 173°44'17"
3. Ownership	Limited Liability Company "Gold Mining Company Mayskoye"
4. Status	Active
5. Date of initial operation	1.04.2012
6. Is the Dam currently operated or closed as per currently approved design?	Operated as per currently approved design
7. Raising method	Downstream
8. Current Maximum Height	27 m
9. Current Tailings Storage Impoundment Volume	4,549,890 m <sup>3</sup>
10. Planned Tailings Storage Impoundment Volume in 5 years' time	01.01.2021 — 31.12.2025: 3,802,091 m <sup>3</sup> Total by 2026: 8,351,981 m <sup>3</sup> * Figures have been estimated under the corporate long-term plan updated in 2021, adjusted with the filling coefficient.
11. Most recent Independent Expert Review	2020/2021 — An audit of the hydrological structure by Knight Piesold Limited, London.
12. Do you have full and complete relevant engineering records including design, construction, operation, maintenance, and/or closure?	Yes
13. What is your hazard categorization of this facility, based on the consequence of failure?	<ul style="list-style-type: none"> <li>• TSF category (depending on consequences of potential hydrodynamic emergency) — IV, low hazard: <ul style="list-style-type: none"> <li>— Number of permanent residents — none;</li> <li>— Living environment is not disturbed;</li> <li>— Harm to ecosystem is not significant damage rehabilitation costs less than USD 1.5 m;</li> <li>— Potential failure would be within the land plots leased the company.</li> </ul> </li> <li>• TSF category depending on dam height and ground type — II, high hazard.</li> <li>• TSF category under Dam Safety Reference Book of CDA (CDA, 2019) and the Global Industry Standard on Tailings Management (2020) — significant.</li> </ul>
14. What guideline do you follow for the classification system?	<p>Russian State Regulation No 986 of 2.11.2013 "On Hydraulic Structure Classification".</p> <p>Dam Safety Reference Book of CDA (CDA, 2019) — used for corporate purposes as a reference source.</p> <p>Global Industry Standard on Tailings Management, 2020.</p>

15. Has this facility, at any point in its history, failed to be confirmed or certified as stable, or experienced notable stability concerns, as identified by an independent engineer (even if later certified as stable by the same or a different firm)?	<p>No</p> <p>An independent audit held by Knight Piesold Limited in 2020/2021 confirmed that the soils are currently frozen, however, taking into account the potential climate change risks, it is recommended to take the following steps to ensure long-term stability:</p> <ul style="list-style-type: none"> <li>– Carry out additional surveys to adjust stability analysis;</li> <li>– Monitor pore pressure and water balance for potential permafrost melting;</li> <li>– Ensure piezometers and digital monitoring tools are in place;</li> <li>– Review seismic surveys.</li> </ul> <p>Management efficiency is regularly estimated under the corporate TSF Management System and applicable legal requirements.</p>
16. Do you have internal/in house engineering specialist oversight of this facility? Or do you have external engineering support for this purpose?	<p>During the construction stage we use designer supervision.</p> <p>During operation, we ensure internal control on the TSF condition under the corporate TSF Management System.</p> <p>There are several types of control checks:</p> <p>Scheduled:</p> <ol style="list-style-type: none"> <li>a) Level 1 – carried out by an employee responsible for the TSF at the operation;</li> <li>b) Level 2 – carried out by other technical specialists at the operation;</li> <li>c) Level 3 – carried out by representatives of Polymetal Management Company (as consulting).</li> </ol> <p>Unscheduled:</p> <ol style="list-style-type: none"> <li>a) in case of system processes review – initiated by the Company’s Top Management (Group CEO, COO, managing director of the project);</li> <li>b) in case of multiple violations of legislative, regulatory and other requirements, applied to the TSF;</li> <li>c) in case of identifying adverse trends as a result of statistics analysis;</li> <li>d) in case of accidents (emergencies) affecting safety level at the TSF.</li> </ol>
17. Has a formal analysis of the downstream impact on communities, ecosystems and critical infrastructure in the event of catastrophic failure been undertaken and to reflect final conditions? If so, when did this assessment take place?	<p>2017 – Impact assessment of potential hazards for life, health and property in case of TSF failure was done by LLC NTTs Spetspromhydrotech, Moscow. It was then approved by local governmental authorities.</p>
18. Is there a) a closure plan in place for this dam, and b) does it include long term monitoring?	<p>Technical measures for closure/reclamation are specified in the TSF design documentation, which was signed-off by the State Commission.</p> <p>According to the legal requirements, a decision on closure is made in accordance with its design life time.</p> <p>Closure project contains the following:</p> <ol style="list-style-type: none"> <li>a) Measures for closure/reclamation;</li> <li>b) People responsible for TSF safety during closure/reclamation (officials or organization);</li> <li>c) Period of closure/reclamation measures;</li> <li>d) Evaluation and forecast of possible changes of natural and man-made conditions of the TSF after its closure/reclamation.</li> </ol> <p>This evaluation can be made by contractor who has permission for design and engineering surveying if this evaluation or forecast was not a part of initial TSF design package.</p>
19. Have you, or do you plan to assess your tailings facilities against the impact of more regular extreme weather events as a result of climate change, e.g. over the next two years?	<p>Yes.</p> <p>A scenario of dam failure caused by an externality (natural disaster) is included in the impact assessment described in the question 17 above: the emergency probability there is assessed as low.</p>



20. Any other relevant information and supporting documentation.

Please state if you have omitted any other exposure to tailings facilities through any joint ventures you may have.

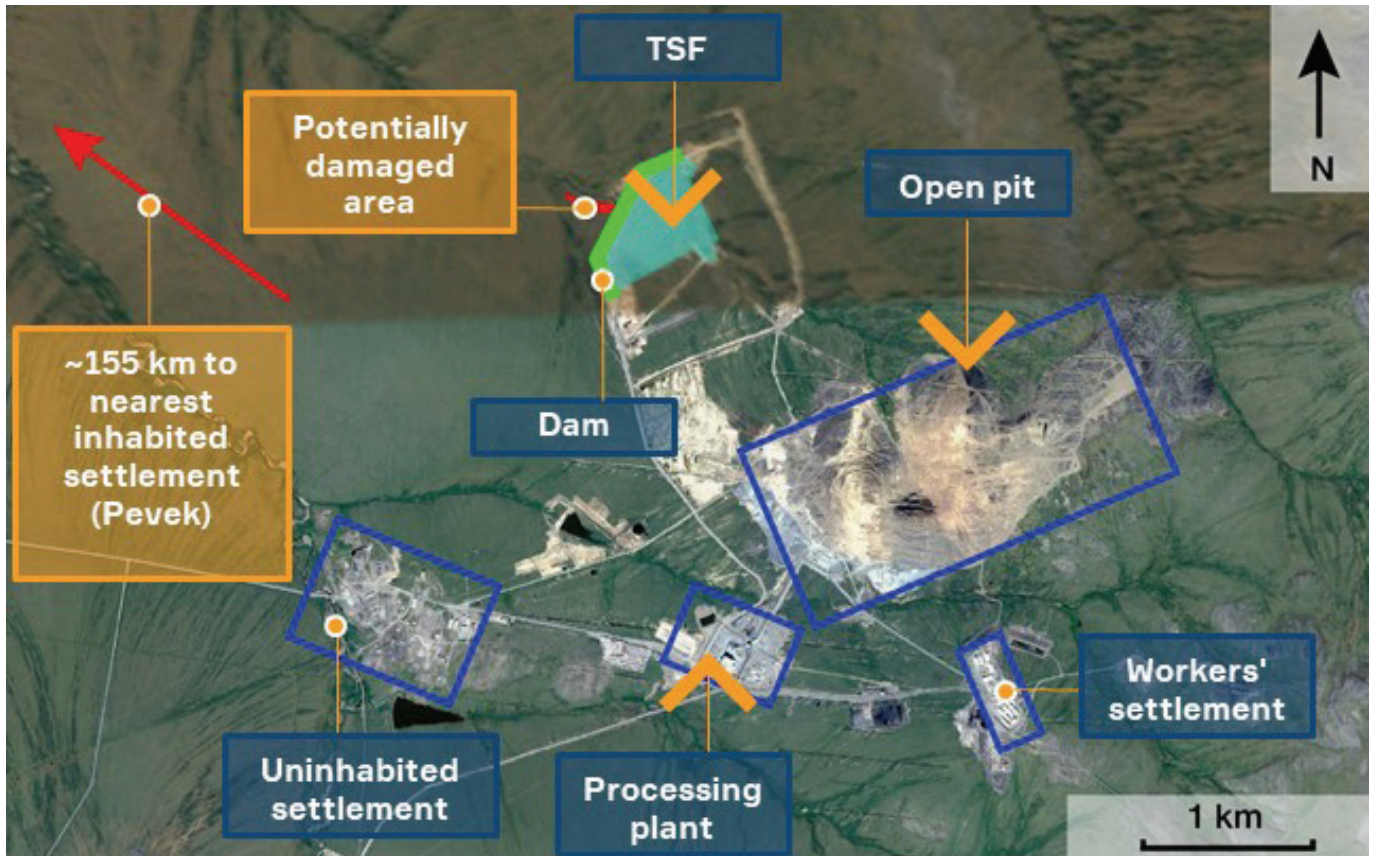
TSF design project done by “JSC Polymetal Engineering” in 2011:

- The dam is constructed using local crushed stone with 1.5 mm thick shield of HDPE geomembrane. In order to eliminate any seepage, a 6 m deep core trench is excavated and filled with loam, where a film shield is embedded.
- The dam crest width is 11 m, upstream slope is 1:3, general downstream slope is 1:2. Maximum total dam height is 23 m.
- The dam is raised in 3 phases using a downstream raising method. The dam crest elevation is 246.0 m for phase 1, 251.0 for phase 2 and 255.0 m for phase 3.
- A drainage system along dams is available to prevent seepage and includes pipe drains, drain headers, pump stations and cycled water pipelines.
- The normative safety factor is adjusted for this category of facility for solidity and consequences significance should be equal or more than 1.20.
- The safety factor is calculated for the current TSF equals 1.38.

TSF expansion project by Promtehnologia LLC in 2019:

- The expansion of the enclosing dam is designed to be constructed using local crushed stone with 1.5 mm thick shield of HDPE geomembrane.
- The dam crest width becomes 12 m, upstream slope is 1:3, general downstream slope is 1:2. Maximum total dam height becomes 33.50 m.
- A drainage system along dams is available to prevent seepage and includes pipe drains, drain headers, pump stations and cycled water pipelines.
- Measuring equipment — four control points are installed on the enclosing dam with thermometric and piezometric wells, and surface marks to monitor the temperature regime, precipitation and dam displacement.
- The normative safety factor is adjusted for this category of facility for solidity and consequences significance should be equal or more than 1.20.
- The safety factor is calculated for the current TSF equals 1.218.
- The facility is officially in the Russian Register of Hydraulic Structures.  
[http://waterinfo.ru/gts/do\\_look.php?regnum=219770000583400](http://waterinfo.ru/gts/do_look.php?regnum=219770000583400)
- We have a complete package of design documentation and permits on hand.
- The TSF is located in a region prone to earthquakes and has the potential to experience ground shaking levels of Intensity 6 (VI).
- The maximum watershed area is 3.96 km<sup>2</sup>.
- The TSF is dyked (hydro-protected) by a stream diversion channel and an interception channel, which are designed to hold maximum seasonal and rainfall flood flows with 0.1% annual exceedance probability as a verification case and 1% annual exceedance probability as a base case.
- The area flooded in case of a hydrodynamic accident would be approximately 4 km<sup>2</sup>.
- Spill discharge volume at maximum capacity is estimated at 941,000 m<sup>3</sup>.
- Overfilling of the TSF impoundment and the spill over the dam crest may occur in case of:
  - receiving a surface runoff with 1% Annual Exceedance Probability;
  - failure of the stream diversion channel and interception channel (including timely snow clearing) and
  - uncontrolled filling of the TSF with simultaneous suspension of water withdrawal from it.
  - The likelihood of a hydrodynamic accident has been estimated to be minimal because the design provides for at least 1.5 m freeboard between the TSF filling level and the dam crest elevation.

# Mayskoye TSF location and affected area in case of dam failure



## Omsukchan TSF 2

1. Tailings Facility Name/identifier	Omsukchan TSF 2  Key facts: — ring-dyke type, — elevated by gradual raising towards upstream slope, each consecutive dam is partly placed on tailings and partly on the previous phase crest, — constructed using imported ground, — beach width has no limits, — water pressure on the dam is permitted, — raised in 4 phases.
2. Location	N 62°31'43" E 155°49'12"
3. Ownership	Joint Stock Company "Magadan Silver" (JSC "Magadan Silver")
4. Status	Active
5. Date of initial operation	Commissioned by former owner — 1984. New launch in 2002 after acquisition by Polymetal's subsidiary (Magadan Silver) in 2000.
6. Is the Dam currently operated or closed as per currently approved design?	Operated as per currently approved design
7. Raising method	Elevated by gradual raising towards upstream slope, each consecutive dam is partly placed on tailings and partly on the previous phase crest.
8. Current Maximum Height	43 m
9. Current Tailings Storage Impoundment Volume	6,780,000 m <sup>3</sup>
10. Planned Tailings Storage Impoundment Volume in 5 years' time	1.01.2021 — 31.12.2025: 1,501,071 m <sup>3</sup> Total by 2024: 8,281,071 m <sup>3</sup> Starting in 2025, transition towards dry stacking * Figures have been estimated under the corporate long-term plan updated in 2021, adjusted with the filling coefficient.
11. Most recent Independent Expert Review	2020 — by inspection team (Polymetal's representatives, Russian Federal Environmental, Industrial and Nuclear Supervision Service (Rostekhnadzor) and Ministry of Emergency Response) — as a check before issuing a permission paper and putting it in official register.  2020 — Experts' Review on the TSF safety declaration after reconstruction by LLC GTS Expert, St. Petersburg
12. Do you have full and complete relevant engineering records including design, construction, operation, maintenance, and/or closure?	<ul style="list-style-type: none"> <li>• Tailings dam No2 and No3 reconstruction project, ref. No 35 02 03 001 00, 2019.</li> <li>• Safety Declaration for tailings dam No2, including: <ul style="list-style-type: none"> <li>— tailings dam monitoring project;</li> <li>— safety criteria;</li> <li>— potential damage estimation;</li> <li>— experts' review of the facility readiness to emergency consequences mitigation;</li> <li>— emergency response plan updated annually;</li> <li>— tailings dam operation procedures;</li> <li>— job description and occupational health and safety guidelines.</li> </ul> </li> <li>• Experts' Review of the TSF safety declaration.</li> </ul>

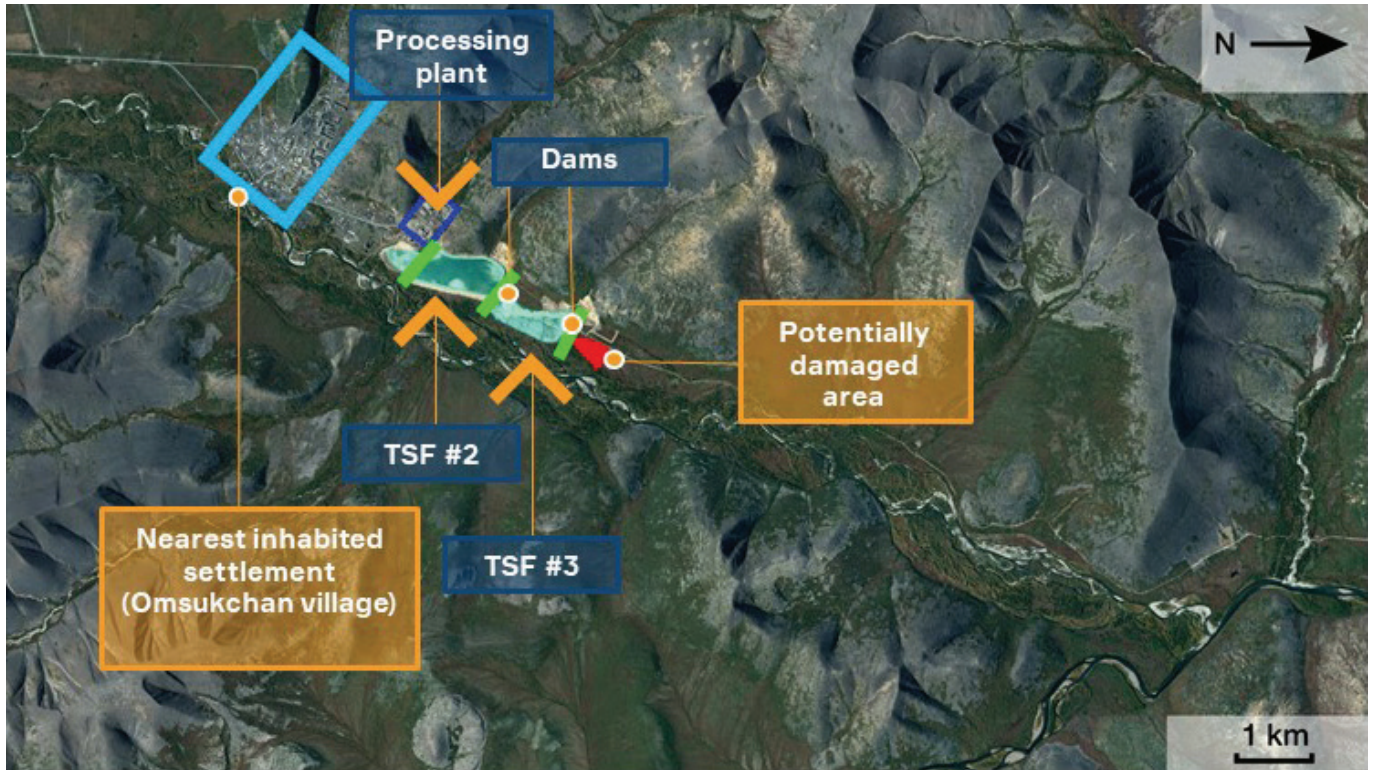
<p>13. What is your hazard categorization of this facility, based on the consequence of failure?</p>	<ul style="list-style-type: none"> <li>• TSF category (depending on consequences of a potential hydrodynamic emergency) – IV, low hazard. <ul style="list-style-type: none"> <li>– Number of permanent residents – none;</li> <li>– Living environment is not disturbed;</li> <li>– Harm to ecosystem is not significant with damage rehabilitation costs less than USD 1.5 m;</li> <li>– Potential failure would be within the land plot leased by the company.</li> </ul> </li> <li>• TSF category depending on dam height and ground type – II, high hazard.</li> <li>• TSF category under Dam Safety Reference Book of CDA (CDA, 2019) and Global Industry Standard on Tailings Management (2020) – significant.</li> </ul>
<p>14. What guideline do you follow for the classification system?</p>	<p>Russian State Regulation No 986 of 02.11.2013 “On Hydraulic Structure Classification”.</p> <p>Dam Safety Reference Book of CDA (CDA, 2019) – used for corporate purposes as a reference source.</p> <p>Global Industry Standard on Tailings Management, 2020</p>
<p>15. Has this facility, at any point in its history, failed to be confirmed or certified as stable, or experienced notable stability concerns, as identified by an independent engineer (even if later certified as stable by the same or a different firm)?</p>	<p>The facility did not fail to be confirmed or certified as stable, or experience notable stability concerns.</p> <p>No risks affecting stability have been identified during the facility operation.</p> <p>Management efficiency is regularly estimated under the corporate TSF Management System and applicable legal requirements.</p>
<p>16. Do you have internal/in house engineering specialist oversight of this facility? Or do you have external engineering support for this purpose?</p>	<p>During the construction stage we use designer supervision. During operation, we ensure internal control on the TSF condition under the corporate TSF Management System.</p> <p>There are several types of control checks:</p> <p>Scheduled:</p> <ol style="list-style-type: none"> <li>a) Level 1 – carried out by an employee responsible for the TSF at the operation;</li> <li>b) Level 2 – carried out by other technical specialists at the operation;</li> <li>c) Level 3 – carried out by representatives of Polymetal Management Company (as consulting).</li> </ol> <p>Unscheduled:</p> <ol style="list-style-type: none"> <li>a) in case of a system processes review – initiated by the Company’s Top Management (Group CEO, COO, managing director of the project);</li> <li>b) in case of multiple violations of legislative, regulatory and other requirements, applied to the TSF;</li> <li>c) in case of identifying adverse trends as a result of statistics analysis;</li> <li>d) in case of accidents (emergencies) affecting safety level at the TSF.</li> </ol>
<p>17. Has a formal analysis of the downstream impact on communities, ecosystems and critical infrastructure in the event of catastrophic failure been undertaken and to reflect final conditions? If so, when did this assessment take place?</p>	<p>Yes.</p> <p>Impact assessment of potential hazards for life, health and property in case of TSF failure was done by Promtehnologia LLC, Belgorod in 2019. It was then approved by local governmental authorities (Ministry of Natural Resources and Ecology in the Magadan region).</p>
<p>18. Is there a) a closure plan in place for this dam, and b) does it include long term monitoring?</p>	<ol style="list-style-type: none"> <li>a) There is a closure plan. A land reclamation section is included in the design documentation.</li> <li>b) As for now, the closure plan does not include long term monitoring. The program is a part of a Reclamation Project and will be developed in detail by the time of the TSF closure.</li> </ol>
<p>19. Have you, or do you plan to assess your tailings facilities against the impact of more regular extreme weather events as a result of climate change, e.g. over the next two years?</p>	<p>A scenario of dam failure caused by an externality (natural disaster) is included in the impact assessment described in the question 17 above: the emergency probability there is assessed as low.</p>

20. Any other relevant information and supporting documentation.

Please state if you have omitted any other exposure to tailings facilities through any joint ventures you may have.

- The dam is constructed using local crushed stone with 1.5 mm thick shield of HDPE geomembrane. Upstream slope is 1:3, general downstream slope is 1:2.2.
- Drainage system is in place. A drainage system along dams is available to prevent seepage and includes pipe drains, drain headers, pump stations and cycled water pipelines, designated for the following purposes:
  - arranged diversion of seepage through the dam body and toe;
  - eliminating seepage inflow to the downstream slope and freezing zone;
  - improving the downstream slope stability.
- The normative safety factor adjusted for this category of facility for solidity and consequences significance should be equal or more than 1.20. The safety factor calculated for the current TSF is more than 1.5.
- The facility is officially in the Russian Register of Hydraulic Structures  
[http://waterinfo.ru/gts/do\\_look.php?regnum=219440000726600](http://waterinfo.ru/gts/do_look.php?regnum=219440000726600)
- We have a complete package of design documentation and permits on hand.
- TSF is located in a region prone to earthquakes and has the potential to experience ground shaking levels of Intensity 7 (VII) to 9 (VIII).
- The probability of an earthquake magnitude 7 is 10% within the next 50 years, i.e. once every 500 years, and the probability of an earthquake magnitude 9 is 1% within the next 50 years, i.e. once every 5000 years.
- Seismic microregioning of the assessment of the impact of the local conditions on the seismic activity of the TSF area:
  - TSF bed – seismicity 7.51 and peak acceleration – 0.194 g, or 190 cm/s<sup>2</sup>;
  - Enclosing dam – seismicity 7.08 and peak acceleration – 0.139 g, or 136 cm/s<sup>2</sup>;
  - Adjacent massifs – seismicity 7.02 and peak acceleration – 0.133 g, or 131 cm/s<sup>2</sup>.
- The watershed area is 1,720 km<sup>2</sup>.
- The TSF is dyked (hydro-protected) by an interception channel, designed to hold maximum seasonal and rainfall flood flows with 0.1% annual exceedance probability, and by a stream diversion header that diverts the creek.
- The area flooded in case of hydrodynamic accident at TSF No. 2 would be about 0.05 km<sup>2</sup>.
- Spill discharge volume is estimated at 89,000 m<sup>3</sup>.
- Overfilling of the TSF impoundment and the spill over the dam crest may occur in case of:
  - receiving a surface runoff with 1% Annual Exceedance Probability,
  - failure of the stream diversion channel and interception channel (including timely snow clearing) and
  - uncontrolled filling of the TSF with simultaneous suspension of water withdrawal from it.
- The likelihood of a hydrodynamic accident has been estimated to be minimal because the design provides for at least 1.5 m freeboard between the TSF filling level and the dam crest elevation.

# Omsukchan TSF 2 location and affected area in case of dam failure



# Omsukchan TSF 3

1. Tailings Facility Name/identifier	Omsukchan TSF 3  Key facts: — elevated by gradual raising towards upstream slope, each consecutive dam is partly placed on tailings and partly on the previous phase crest, — ring-dyketype, — beach width is not regulated, — water pressure on the dam is permitted, — raised in 4 phases.
2. Location	N 62°32'24" E 155°49'27"
3. Ownership	Joint Stock Company "Magadan Silver"
4. Status	Active
5. Date of initial operation	2007
6. Is the Dam currently operated or closed as per currently approved design?	Operated as per currently approved design
7. Raising method	Elevated by gradual raising towards upstream slope, each consecutive dam is partly placed on tailings and partly on the previous phase crest.
8. Current Maximum Height	34.5 m
9. Current Tailings Storage Impoundment Volume	9,902,191 m <sup>3</sup>
10. Planned Tailings Storage Impoundment Volume in 5 years' time	01.01.2021 — 31.12.2025: 2,111,356 m <sup>3</sup>  Total by 2026: 12,013,547 m <sup>3</sup> Starting in 2025, transition towards dry stacking  * Figures have been estimated under the corporate long-term plan updated in 2021, adjusted with the filling coefficient.
11. Most recent Independent Expert Review	28.11.2018 — Experts' Review on the TSF safety declaration after reconstruction, No 80 by LLC GTS Expert, St. Petersburg.  9.10.2018 by inspection team (Polymetal's representatives, Russian Federal Environmental, Industrial and Nuclear Supervision Service (Rostekhnadzor) and Ministry of Emergency Response) — as a check before issuing a permission paper and putting it in official register.  9.04.2018 — Inspection of tailings dams No2 and No3 by JSC Russian Scientific and Research Institute named after B.E. Vedeneev.
12. Do you have full and complete relevant engineering records including design, construction, operation, maintenance, and/or closure?	<ul style="list-style-type: none"> <li>• Tailings dam No2 and No3 reconstruction project, ref. No 35 02 03 001 00, 2019.</li> <li>• Safety Declaration for tailings dam No3, including: <ul style="list-style-type: none"> <li>— tailings dam monitoring project;</li> <li>— safety criteria;</li> <li>— potential damage estimation;</li> <li>— experts' review of the facility readiness to emergency consequences mitigation;</li> <li>— emergency response plan updated annually;</li> <li>— tailings dam operation procedures;</li> <li>— job description and occupational health and safety guidelines.</li> </ul> </li> <li>• Experts' Review of the TSF safety declaration.</li> </ul>

<p>13. What is your hazard categorization of this facility, based on the consequence of failure?</p>	<ul style="list-style-type: none"> <li>• TSF category (depending on consequences of potential hydrodynamic emergency) – IV, low hazard. <ul style="list-style-type: none"> <li>– Number of permanent residents – none.</li> <li>– Living environment is not disturbed.</li> <li>– Harm to ecosystem is not significant and damage rehabilitation costs less than USD 1.5 m.</li> <li>– Potential failure would be within the land plots leased to the company.</li> </ul> </li> <li>• TSF category depending on dam height and ground type – II, high hazard</li> <li>• TSF category under Dam Safety Reference Book of CDA (CDA, 2019) and Global Industry Standard on Tailings Management (2020) – significant.</li> </ul>
<p>14. What guideline do you follow for the classification system?</p>	<p>Russian State Regulation No 986 of 2.11.2013 “On Hydraulic Structure Classification”.</p> <p>Dam Safety Reference Book of CDA (CDA, 2019) – used for corporate purposes as a reference source.</p> <p>Global Industry Standard on Tailings Management, 2020.</p>
<p>15. Has this facility, at any point in its history, failed to be confirmed or certified as stable, or experienced notable stability concerns, as identified by an independent engineer (even if later certified as stable by the same or a different firm)?</p>	<p>The facility did not fail to be confirmed or certified as stable, or experience notable stability concerns. No risks affecting stability have been identified during the facility operation.</p> <p>Management efficiency is regularly estimated under the corporate TSF Management System and applicable legal requirements.</p>
<p>16. Do you have internal/in house engineering specialist oversight of this facility? Or do you have external engineering support for this purpose?</p>	<p>During the construction stage we use designer supervision. During operation, we ensure internal control on the TSF condition under the corporate TSF Management System.</p> <p>There are several types of control checks:</p> <p>Scheduled:</p> <ol style="list-style-type: none"> <li>a) Level 1 – carried out by an employee responsible for the TSF at the operation;</li> <li>b) Level 2 – carried out by other technical specialists at the operation;</li> <li>c) Level 3 – carried out by representatives of Polymetal Management Company (as consulting).</li> </ol> <p>Unscheduled:</p> <ol style="list-style-type: none"> <li>a) in case of system processes review – initiated by the Company’s Top Management (Group CEO, COO, managing director of the project),</li> <li>b) in case of multiple violations of legislative, regulatory and other requirements, applied to the TSF,</li> <li>c) in case of identifying adverse trends as a result of statistics analysis,</li> <li>d) in case of accidents (emergencies) affecting safety level at the TSF.</li> </ol>
<p>17. Has a formal analysis of the downstream impact on communities, ecosystems and critical infrastructure in the event of catastrophic failure been undertaken and to reflect final conditions? If so, when did this assessment take place?</p>	<p>Impact assessment of potential hazards for life, health and property in case of TSF failure was done by Promtehnologia LLC, Belgorod in 2018. It was then approved by local governmental authorities (Ministry of Natural Resources and Ecology in the Magadan region).</p>
<p>18. Is there a) a closure plan in place for this dam, and b) does it include long term monitoring?</p>	<ol style="list-style-type: none"> <li>a) There is a closure plan. A land reclamation section is included in the design documentation.</li> <li>b) As for now, the closure plan does not include long term monitoring. The program is a part of a Reclamation Project and will be developed in detail by the time of the TSF closure.</li> </ol>
<p>19. Have you, or do you plan to assess your tailings facilities against the impact of more regular extreme weather events as a result of climate change, e.g. over the next two years?</p>	<p>A scenario of dam failure caused by an externality (natural disaster) is included in the impact assessment described in the question 17 above: the emergency probability there is assessed as low.</p>

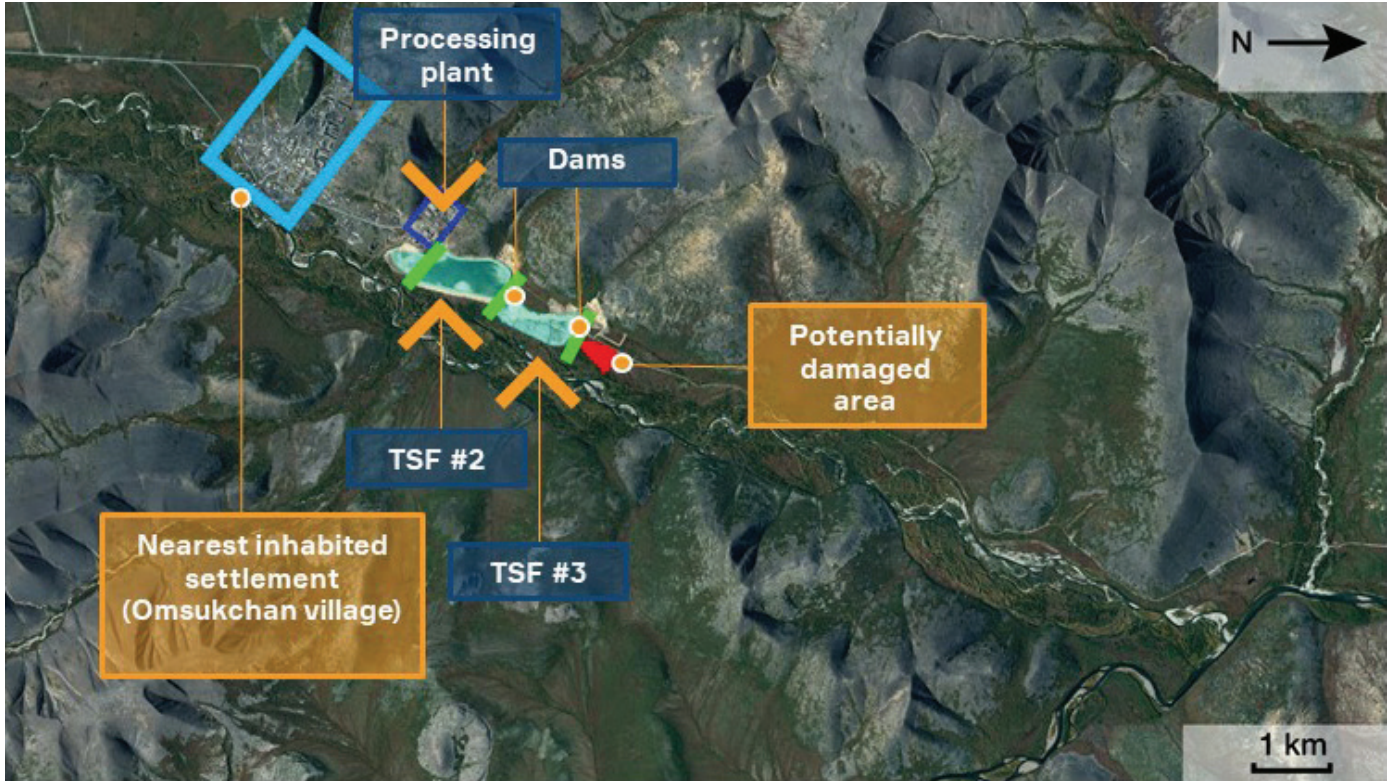


20. Any other relevant information and supporting documentation.

Please state if you have omitted any other exposure to tailings facilities through any joint ventures you may have.

- The dam is constructed using local crushed stone with 1.5 mm thick shield of HDPE geomembrane. Upstream slope is 1:3, general downstream slope is 1:2.2.
- Drainage system is in place. A drainage system along dams is available to prevent seepage and includes pipe drains, drain headers, pump stations and cycled water pipelines, designated for the following purposes:
  - arranged diversion of seepage through the dam body and toe;
  - eliminating seepage inflow to the downstream slope and freezing zone;
  - improving the downstream slope stability.
- The normative safety factor adjusted for this category of facility for solidity and consequences significance should be equal or more than 1.20. The safety factor calculated for the current TSF is more than 1.5.
- The facility is officially in the Russian Register of Hydraulic Structures  
[http://waterinfo.ru/gts/do\\_look.php?regnum=219440000726600](http://waterinfo.ru/gts/do_look.php?regnum=219440000726600)
- We have a complete package of design documentation and permits on hand.
- The watershed area is 3.191 km<sup>2</sup>.
- The TSF is dyked (hydro-protected) by a stream diversion channel, designed to hold maximum seasonal and rainfall flood flows with 0.1% annual exceedance probability.
- TSF is located in a region prone to earthquakes and has the potential to experience ground shaking levels of Intensity 7 (VII) to 9 (VIII).
- The probability of an earthquake magnitude 7 is 10% within the next 50 years, i.e. once every 500 years, and the probability of an earthquake magnitude 9 is 1% within the next 50 years, i.e. once every 5000 years.
- Seismic microregioning of the assessment of the impact of the local conditions on the seismic activity of the TSF area:
  - TSF bed – seismicity 7.32 and peak acceleration – 0.167 g, or 164.0 cm/s<sup>2</sup>;
  - Enclosing dam – seismicity 6.79 and peak acceleration – 0.111 g or 109.0 cm/s<sup>2</sup>;
  - Adjacent massifs – seismicity 6.74 and peak acceleration – 0.108 g, or 106.0 cm/s<sup>2</sup>.
- The area flooded in case of hydrodynamic accident at TSF No. 3 would be about 0.08 km<sup>2</sup>.
- Spill discharge volume is estimated at 97,000 m<sup>3</sup>.
- Overfilling of the TSF impoundment and the spill over the dam crest may occur in case of:
  - receiving a surface runoff with 1% Annual Exceedance Probability,
  - failure of the stream diversion channel and interception channel (including timely snow clearing) and
  - uncontrolled filling of the TSF with simultaneous suspension of water withdrawal from it.
- The likelihood of a hydrodynamic accident has been estimated to be minimal because the design provides for at least 1.5 m freeboard between the TSF filling level and the dam crest elevation.

# Omsukchan TSF 3 location and affected area in case of dam failure



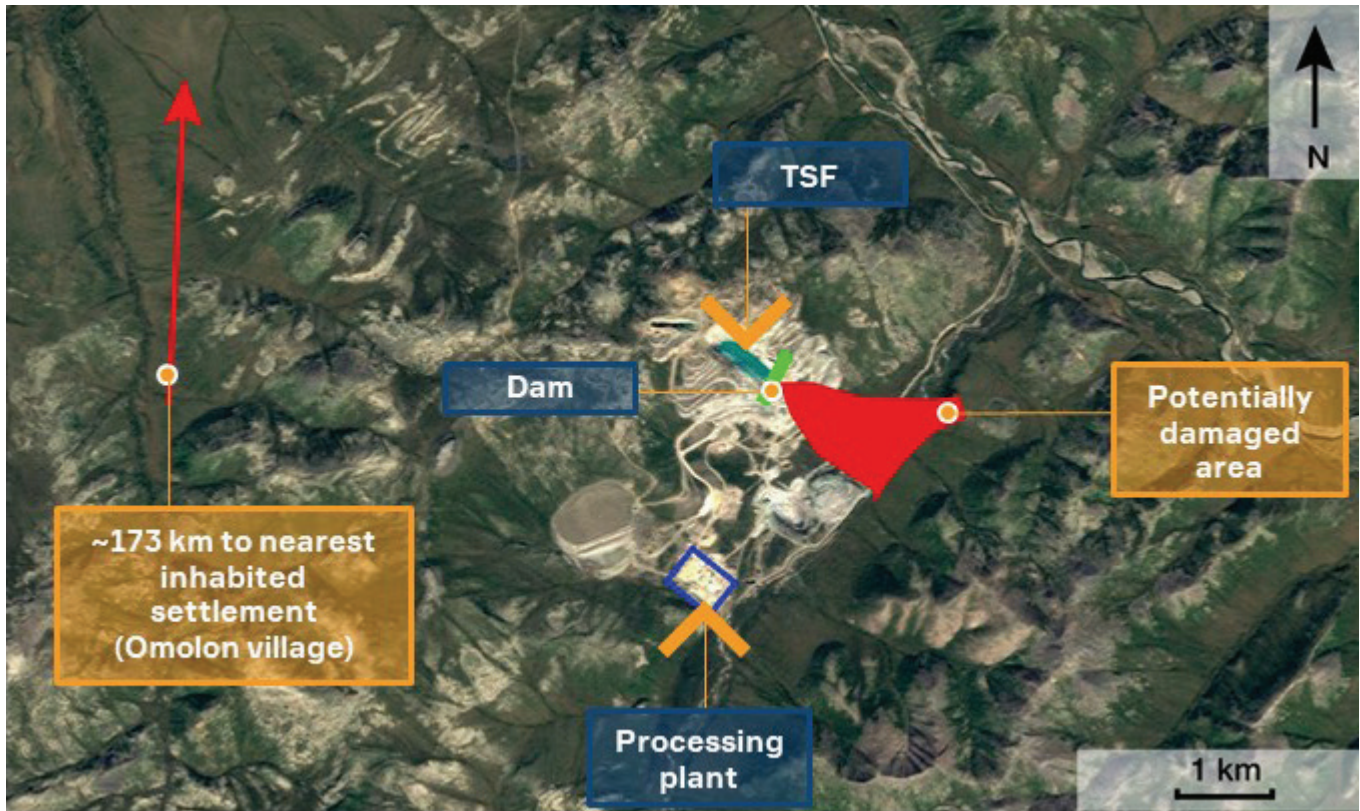
# Omolon TSF

1. Tailings Facility Name/identifier	Omolon TSF  Key facts: <ul style="list-style-type: none"> <li>– upstream (elevated by gradual raising towards upstream slope),</li> <li>– located in depleted open pit mine,</li> <li>– beach width is not regulated,</li> <li>– water pressure on the dam is permitted,</li> <li>– raised in 3 phases,</li> <li>– phase 1 dam is settled on the pit wall, two subsequent phases are placed partly on tailings and partly on the dam crest from previous phase.</li> </ul>
2. Location	N 63°41'16" E 159°59'13"
3. Ownership	Limited Liability Company "Omolon Gold Mining Company"
4. Status	Active
5. Date of initial operation	2010
6. Is the Dam currently operated or closed as per currently approved design?	Operated as per currently approved design
7. Raising method	Elevated by gradual raising towards upstream slope. Phase 1 dam is placed on the pit wall, two subsequent phases are placed partly on tailings and partly on the dam crest from previous phase.
8. Current Maximum Height	28 m
9. Current Tailings Storage Impoundment Volume	6,759,373 m <sup>3</sup>
10. Planned Tailings Storage Impoundment Volume in 5 years' time	01.01.2021 — 01.01.2022: 610,000 m <sup>3</sup> Total by 2022: 7,369,373 m <sup>3</sup>  Starting in 2022, the development of the project to close the TSF and transition towards dry stacking is planned  * Figures have been estimated under the corporate long-term plan updated in 2021, adjusted with the filling coefficient.
11. Most recent Independent Expert Review	2020 — by inspection team (Polymetal's representatives, Russian Federal Environmental, Industrial and Nuclear Supervision Service (Rostekhnadzor) and Ministry of Emergency Response) — as a check before issuing a permission paper and putting it in official register.  21.12.2020 — Experts' Review on the TSF safety declaration — tailings dam expansion at Kubaka process plant within mined out Glavny open pit. GTS Expert LLC, St. Petersburg

12. Do you have full and complete relevant engineering records including design, construction, operation, maintenance, and/or closure?	<ul style="list-style-type: none"> <li>• Design documentation “Tailings dam expansion at Kubaka process plant within mined out Glavny open pit”.</li> <li>• Positive review of Federal Autonomous Organization Main State Expertise, No1144-12_GGE-8315_15 of 7.12.12.</li> <li>• Safety Declaration ref. No 20-21(02)0016-00-ГOP approved on 28.01.2021 including: <ul style="list-style-type: none"> <li>– tailings dam monitoring project;</li> <li>– safety criteria;</li> <li>– potential damage estimation;</li> <li>– experts’ review of the facility readiness to emergency consequences mitigation;</li> <li>– emergency response plan updated annually;</li> <li>– tailings dam operation procedures;</li> <li>– job description and occupational health and safety guidelines.</li> </ul> </li> </ul>
13. What is your hazard categorization of this facility, based on the consequence of failure?	<ul style="list-style-type: none"> <li>• TSF category (depending on consequences of potential hydrodynamic emergency) – IV, low hazard. <ul style="list-style-type: none"> <li>– Number of permanent residents – none.</li> <li>– Living environment is not disturbed.</li> <li>– Harm to ecosystem is not significant and damage rehabilitation costs less than USD 1.5 m.</li> <li>– Potential failure would be within the land plots leased to the company.</li> <li>– In the impact area, there are no sites including workplaces with permanently required human control and presence.</li> <li>– TSF category depending on dam height and ground type – II, high hazard.</li> </ul> </li> <li>• TSF category under Dam Safety Reference Book of CDA (CDA, 2019) and Global Industry Standard on Tailings Management (2020) – significant.</li> </ul>
14. What guideline do you follow for the classification system?	<p>Russian State Regulation No 986 of 2.11.2013 “On Hydraulic Structure Classification”.</p> <p>Dam Safety Reference Book of CDA (CDA, 2019) – used for corporate purposes as a reference source.</p> <p>Global Industry Standard on Tailings Management, 2020.</p>
15. Has this facility, at any point in its history, failed to be confirmed or certified as stable, or experienced notable stability concerns, as identified by an independent engineer (even if later certified as stable by the same or a different firm)?	<p>The facility did not fail to be confirmed or certified as stable, or experience notable stability concerns.</p> <p>No risks affecting stability have been identified during the facility operation.</p> <p>Management efficiency is regularly estimated under the corporate TSF Management System and applicable legal requirements.</p>
16. Do you have internal/in house engineering specialist oversight of this facility? Or do you have external engineering support for this purpose?	<p>During the construction stage we use designer supervision. During operation, we ensure internal control on the TSF condition under the corporate TSF Management System.</p> <p>There are several types of control checks:</p> <p>Scheduled:</p> <ol style="list-style-type: none"> <li>a) Level 1 – carried out by an employee responsible for the TSF at the operation;</li> <li>b) Level 2 – carried out by other technical specialists at the operation;</li> <li>c) Level 3 – carried out by representatives of Polymetal Management Company (as consulting).</li> </ol> <p>Unscheduled:</p> <ol style="list-style-type: none"> <li>a) in case of system processes review – initiated by the Company’s Top Management (Group CEO, COO, managing director of the project);</li> <li>b) in case of multiple violations of legislative, regulatory and other requirements, applied to the TSF;</li> <li>c) in case of identifying adverse trends as a result of statistics analysis;</li> <li>d) in case of accidents (emergencies) affecting safety level at the TSF.</li> </ol>

<p>17. Has a formal analysis of the downstream impact on communities, ecosystems and critical infrastructure in the event of catastrophic failure been undertaken and to reflect final conditions? If so, when did this assessment take place?</p>	<p>Yes.</p> <p>Impact assessment of potential hazards for life, health and property in case of TSF failure was done by Promtehnologia LLC, Belgorod in 2020. It was then approved by local governmental authorities (Ministry of Natural Resources and Ecology in the Magadan region).</p>
<p>18. Is there a) a closure plan in place for this dam, and b) does it include long term monitoring?</p>	<p>a) There is a closure plan. A land reclamation section is included in the design documentation.</p> <p>b) As for now, the closure plan does not include long term monitoring. The program is a part of a Reclamation Project and will be developed in detail by the time of the TSF closure.</p>
<p>19. Have you, or do you plan to assess your tailings facilities against the impact of more regular extreme weather events as a result of climate change, e.g. over the next two years?</p>	<p>A scenario of dam failure caused by an externality (natural disaster) is included in the impact assessment described in the question 17 above: the emergency probability there is assessed as low.</p>
<p>20. Any other relevant information and supporting documentation.</p>	<ul style="list-style-type: none"> <li>• The dam is constructed using local crushed stone, dam will be built in 3 phases, total height of 3 phases is 35 m.</li> <li>• Impermeable screen made of geomembrane is laid on the dam crest and pipe drains are provided within the downstream slope.</li> <li>• Upstream slope is 1:3, general downstream slope is 1:2.3.</li> <li>• A drainage system along dams is available to prevent seepage and includes pipe drains, drain headers, pump stations and cycled water pipelines.</li> <li>• Normative safety factor adjusted for this category of facility for solidity and consequences significance should be equal or more than 1.20.</li> <li>• Safety factor calculated for the current TSF equals 1.22.</li> <li>• The facility is officially in the Russian Register of Hydraulic Structures <a href="http://waterinfo.ru/gts/do_look.php?regnum=219440000489500">http://waterinfo.ru/gts/do_look.php?regnum=219440000489500</a></li> <li>• We have a complete package of design documentation and permits on hand.</li> <li>• TSF is located in a region prone to earthquakes and has the potential to experience ground shaking levels of Intensity 7 (VII).</li> <li>• The watershed area is 140 km<sup>2</sup>. The creeks flood plain elevations in the TSF section are below the pit edge and the TSF dam. No water diversion structures are provided. The sediments in the TSF area are accumulated in the settling pond and are included into the water balance.</li> <li>• The area flooded in case of hydrodynamic accident would be 0.04 km<sup>2</sup>.</li> <li>• Spill discharge volume is estimated at 990,480 m<sup>3</sup>.</li> <li>• Overfilling of the TSF impoundment and the spill over the dam crest may occur in case of: <ul style="list-style-type: none"> <li>– receiving a surface runoff with 1% Annual Exceedance Probability,</li> <li>– failure of the stream diversion channel and interception channel (including timely snow clearing) and</li> <li>– uncontrolled filling of the TSF with simultaneous suspension of water withdrawal from it.</li> </ul> </li> <li>• The likelihood of a hydrodynamic accident has been estimated to be minimal because the design provides for at least 1.5 m freeboard between the TSF filling level and the dam crest elevation.</li> </ul>
<p>Please state if you have omitted any other exposure to tailings facilities through any joint ventures you may have.</p>	

# Omolon TSF location and affected area in case of dam failure



# Albazino TSF 1

1. Tailings Facility Name/identifier	Albazino TSF 1  Key facts: – upstream (elevated by gradual raising towards upstream slope, each consecutive dam is partly placed on tailings and partly on the previous phase crest), – valley-fill type, – beach width is not regulated, – water pressure on the dam is permitted, – raised in 3 phases.
2. Location	N 52°52'45" E 137°54'05"
3. Ownership	Albazino Resources Ltd.
4. Status	Inactive
5. Date of initial operation	2011
6. Is the Dam currently operated or closed as per currently approved design?	Operated as per currently approved design
7. Raising method	Elevated by gradual raising towards upstream slope, each consecutive dam is partly placed on tailings and partly on the previous phase crest.
8. Current Maximum Height	26 m
9. Current Tailings Storage Impoundment Volume	8,250,000 m <sup>3</sup>
10. Planned Tailings Storage Impoundment Volume in 5 years' time	TSF has utilized full design capacity. No further storage is intended.  * Figures have been estimated under the corporate long-term plan updated in 2022 adjusted with the filling coefficient.
11. Most recent Independent Expert Review	2020 – by inspection team (Polymetal's representatives, Russian Federal Environmental, Industrial and Nuclear Supervision Service (Rostekhnadzor) and Ministry of Emergency Response) to check decommissioning process.  2020 – Experts' Review on the TSF No1 safety declaration
12. Do you have full and complete relevant engineering records including design, construction, operation, maintenance, and/or closure?	<ul style="list-style-type: none"> <li>• Safety Declaration for tailing dam No1 includes: <ul style="list-style-type: none"> <li>– tailings dam monitoring project during closure;</li> <li>– safety criteria;</li> <li>– potential damage estimation;</li> <li>– experts' review of the facility readiness to emergency consequences mitigation;</li> <li>– emergency response plan updated annually;</li> <li>– job description and occupational health and safety guidelines.</li> </ul> </li> </ul>

13. What is your hazard categorization of this facility, based on the consequence of failure?	<ul style="list-style-type: none"> <li>• TSF category (depending on consequences of potential hydrodynamic emergency) — IV, low hazard. <ul style="list-style-type: none"> <li>– Number of permanent residents — none.</li> <li>– Living environment is not disturbed.</li> <li>– Harm to ecosystem is not significant and damage rehabilitation costs less than USD 1.5 m.</li> <li>– Potential failure would be within the land plots leased to the company.</li> </ul> </li> <li>• TSF category depending on dam height and ground type — II, high hazard.</li> <li>• TSF category under Dam Safety Reference Book of CDA (CDA, 2019) and Global Industry Standard on Tailings Management (2020) — significant.</li> </ul>
14. What guideline do you follow for the classification system?	<p>Russian State Regulation No 986 of 2.11.2013 “On Hydraulic Structure Classification”.</p> <p>Dam Safety Reference Book of CDA (CDA, 2019) — used for corporate purposes as a reference source.</p> <p>Global Industry Standard on Tailings Management, 2020.</p>
15. Has this facility, at any point in its history, failed to be confirmed or certified as stable, or experienced notable stability concerns, as identified by an independent engineer (even if later certified as stable by the same or a different firm)?	<p>The facility did not fail to be confirmed or certified as stable, or experience notable stability concerns.</p> <p>No risks affecting stability have been identified during the facility operation.</p> <p>Management efficiency is regularly estimated under the corporate TSF Management System and applicable legal requirements.</p>
16. Do you have internal/in house engineering specialist oversight of this facility? Or do you have external engineering support for this purpose?	<p>During the construction stage we use designer supervision. During operation, we ensure internal control on the TSF condition under the corporate TSF Management System.</p> <p>There are several types of control checks:</p> <p>Scheduled:</p> <ol style="list-style-type: none"> <li>a) Level 1 — carried out by an employee responsible for the TSF at the operation;</li> <li>b) Level 2 — carried out by other technical specialists at the operation;</li> <li>c) Level 3 — carried out by representatives of Polymetal Management Company (as consulting).</li> </ol> <p>Unscheduled:</p> <ol style="list-style-type: none"> <li>a) in case of system processes review — initiated by the Company’s Top Management (Group CEO, COO, managing director of the project);</li> <li>b) in case of multiple violations of legislative, regulatory and other requirements, applied to the TSF;</li> <li>c) in case of identifying adverse trends as a result of statistics analysis;</li> <li>d) in case of accidents (emergencies) affecting safety level at the TSF.</li> </ol>
17. Has a formal analysis of the downstream impact on communities, ecosystems and critical infrastructure in the event of catastrophic failure been undertaken and to reflect final conditions? If so, when did this assessment take place?	<p>Yes.</p> <p>“Impact assessment of potential hazards for life, health and property in case of TSF failure” report was done by LLC Scientific and Research Centre Spetspromgidrotek, Moscow in 2020. It was then approved by local governmental authorities.</p>
18. Is there a) a closure plan in place for this dam, and b) does it include long term monitoring?	<ol style="list-style-type: none"> <li>a) There is a land reclamation plan developed in 2021 to be carried out within 15 years; additional assessments are being conducted.</li> <li>b) We plan to operate it until 2044 (the end of Albazino’s mine life), then further monitoring plan will be developed.</li> </ol>
19. Have you, or do you plan to assess your tailings facilities against the impact of more regular extreme weather events as a result of climate change, e.g. over the next two years?	<p>A scenario of dam failure caused by an externality (natural disaster) is included in the impact assessment described in the question 17 above: the emergency probability there is assessed as low.</p>

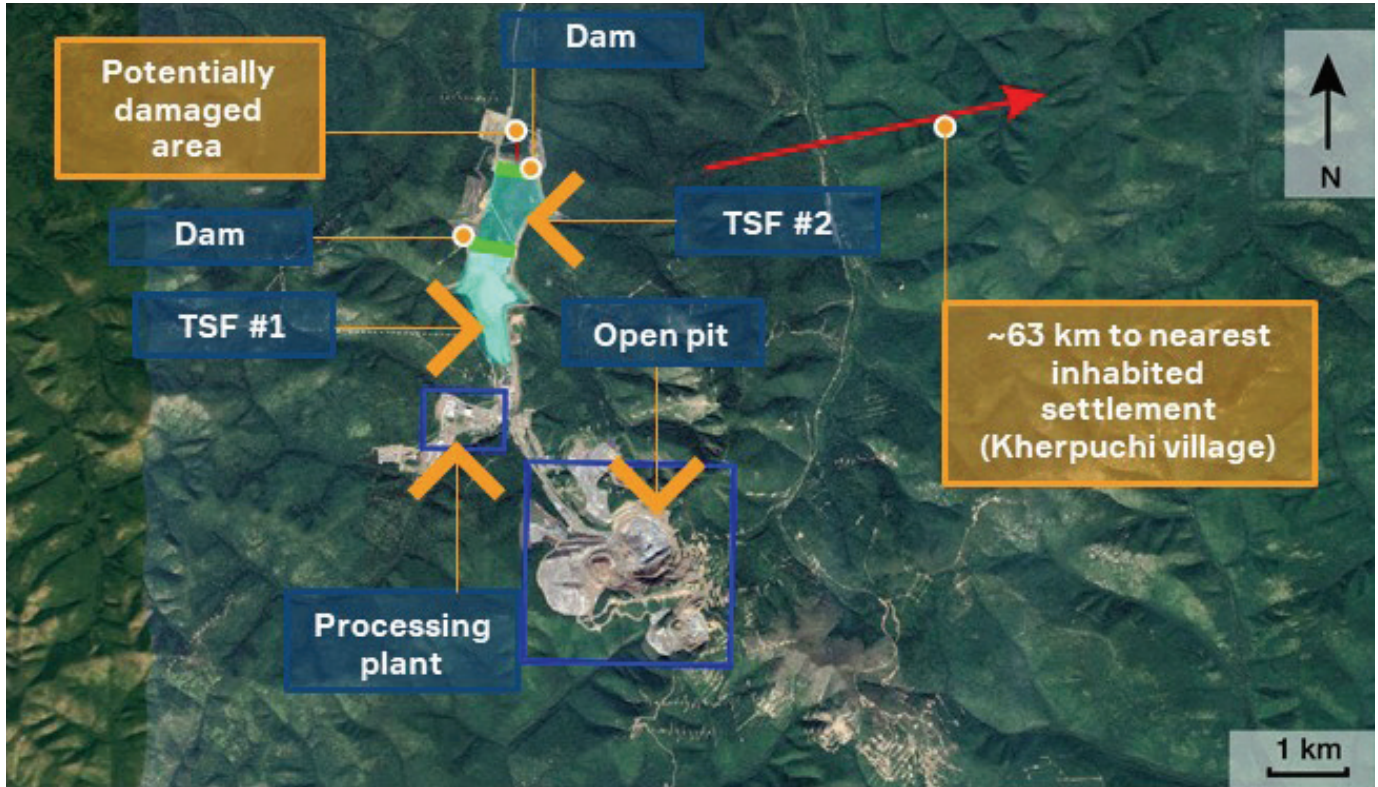


20. Any other relevant information and supporting documentation.

Please state if you have omitted any other exposure to tailings facilities through any joint ventures you may have.

- The dam is constructed using local crushed stone, dam will be elevated in 3 phases.
- The dam is lined with 1.5 mm thick shield of HDPE geomembrane.
- Upstream slope is 1:3, general downstream slope is 1:2.5.
- A drainage system along dams is available to prevent seepage and includes pipe drains, drain headers, pump stations and cycled water pipelines.
- The normative safety factor adjusted for this category of facility for solidity and consequences significance should be equal or more than 1.20.
- The safety factor calculated for the current TSF equals to 1.32.
- The facility is officially in the Russian Register of Hydraulic Structures  
[http://waterinfo.ru/gts/do\\_look.php?regnum=220080000283900](http://waterinfo.ru/gts/do_look.php?regnum=220080000283900)
- We have a complete package of design documentation and permits on hand.
- TSF is located in a region prone to earthquakes and has the potential to experience ground shaking levels of Intensity 7 (VII).
- The watershed area is 1.578 km<sup>2</sup>.
- The TSF is dyked (hydro-protected) by stream diversion channels, designed to hold maximum seasonal and rainfall flood flows with 0.1% annual exceedance probability.
- During the closure process, a drainage ditch was built at the TSF territory, which transports storm and melted water away from the TSF and into a stream.
- Flooded area does not occur. No casualties or affected parties among local population and operational personnel are expected.

# Albazino TSF 1 location and affected area in case of dam failure



# Albazino TSF 2

1. Tailings Facility Name/identifier	Albazino TSF 2  Key facts: — upstream (elevated by gradual raising towards upstream slope, each consecutive dam is partly placed on tailings and partly on the previous phase crest), — valley-fill type, — beach width is not regulated, — water pressure on the dam is permitted, — raised in 3 phases.
2. Location	N52°53'24" E137°54'22"
3. Ownership	Albazino Resources Ltd.
4. Status	Active
5. Date of initial operation	2018
6. Is the Dam currently operated or closed as per currently approved design?	Operated as per currently approved design
7. Raising method	Elevated by gradual raising towards upstream slope, each consecutive dam is partly placed on tailings and partly on the previous phase crest.
8. Current Maximum Height	24 m
9. Current Tailings Storage Impoundment Volume	2,479,250 m <sup>3</sup>
10. Planned Tailings Storage Impoundment Volume in 5 years' time	1.01.2021 — 31.12.2025: 6,185,577 m <sup>3</sup> Total by 2026: 8,664,827 m <sup>3</sup>  * Figures have been estimated under the corporate long-term plan updated in 2021, adjusted with the filling coefficient.
11. Most recent Independent Expert Review	2018 — by inspection team (Polymetal's representatives, Russian Federal Environmental, Industrial and Nuclear Supervision Service (Rostekhnadzor) and Ministry of Emergency Response) — as a check before issuing a permission paper and putting it in official register.
12. Do you have full and complete relevant engineering records including design, construction, operation, maintenance, and/or closure?	<ul style="list-style-type: none"> <li>• Tailings dam project, ref. No 17 01 03 072 03.2015.</li> <li>• Safety declaration for TSF No2. ref. No 18-18(00)0080-00-GOR, including: <ul style="list-style-type: none"> <li>— tailings dam monitoring project;</li> <li>— safety criteria;</li> <li>— potential damage estimation;</li> <li>— experts' review of the facility readiness to emergency consequences mitigation;</li> <li>— emergency response plan updated annually;</li> <li>— tailings dam operation procedures;</li> <li>— job description and occupational health and safety guidelines.</li> </ul> </li> <li>• Experts' Review of hydraulic structure safety declaration.</li> </ul>

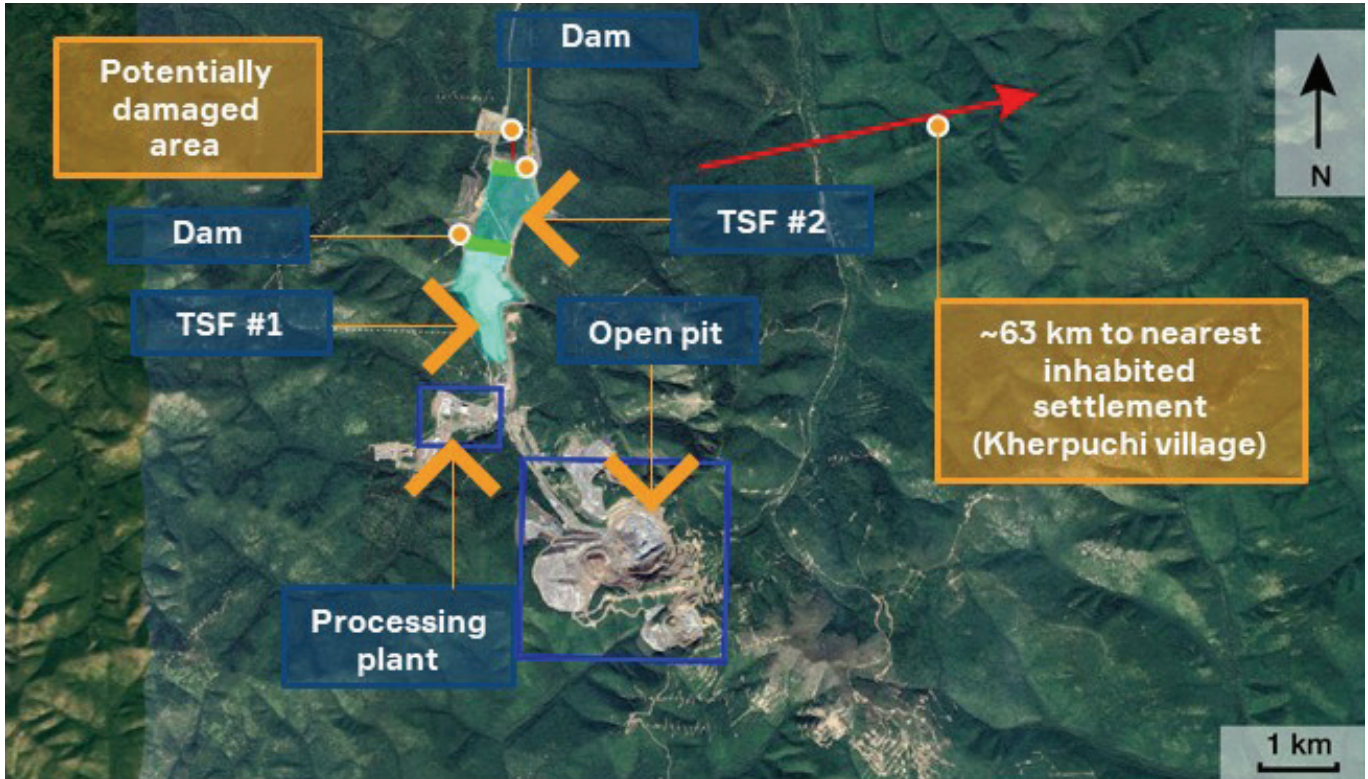
13. What is your hazard categorization of this facility, based on the consequence of failure?	<ul style="list-style-type: none"> <li>• TSF category (depending on consequences of potential hydrodynamic emergency) — IV, low hazard. <ul style="list-style-type: none"> <li>— Number of permanent residents — none.</li> <li>— Living environment is not disturbed.</li> <li>— Harm to ecosystem is not significant and damage rehabilitation costs less than USD 1.6 m.</li> <li>— Potential failure would be within the land plots leased to the company.</li> </ul> </li> <li>• TSF category depending on dam height and ground type — II, high hazard.</li> <li>• TSF category under Dam Safety Reference Book of CDA (CDA, 2014) — significant.</li> </ul>
14. What guideline do you follow for the classification system?	<p>Russian State Regulation No 986 of 2.11.2013 “On Hydraulic Structure Classification”.</p> <p>Dam Safety Reference Book of CDA (CDA, 2014) — used for corporate purposes as a reference source.</p>
15. Has this facility, at any point in its history, failed to be confirmed or certified as stable, or experienced notable stability concerns, as identified by an independent engineer (even if later certified as stable by the same or a different firm)?	<p>The facility did not fail to be confirmed or certified as stable, or experience notable stability concerns.</p> <p>No risks affecting stability have been identified during the facility operation.</p> <p>Management efficiency is regularly estimated under the corporate TSF Management System and applicable legal requirements.</p>
16. Do you have internal/in house engineering specialist oversight of this facility? Or do you have external engineering support for this purpose?	<p>During the construction stage we use designer supervision.</p> <p>During operation, we ensure internal control on the TSF condition under the corporate TSF Management System.</p> <p>There are several types of control checks:</p> <p>Scheduled:</p> <ol style="list-style-type: none"> <li>a) Level 1 — carried out by an employee responsible for the TSF at the operation;</li> <li>b) Level 2 — carried out by other technical specialists at the operation;</li> <li>c) Level 3 — carried out by representatives of Polymetal Management Company (as consulting).</li> </ol> <p>Unscheduled:</p> <ol style="list-style-type: none"> <li>a) in case of system processes review — initiated by the Company’s Top Management (Group CEO, COO, managing director of the project);</li> <li>b) in case of multiple violations of legislative, regulatory and other requirements, applied to the TSF;</li> <li>c) in case of identifying adverse trends as a result of statistics analysis;</li> <li>d) in case of accidents (emergencies) affecting safety level at the TSF.</li> </ol>
17. Has a formal analysis of the downstream impact on communities, ecosystems and critical infrastructure in the event of catastrophic failure been undertaken and to reflect final conditions? If so, when did this assessment take place?	<p>Yes.</p> <p>Impact assessment of potential hazards for life, health and property in case of TSF failure was done by LLC Scientific and Research Centre Spetspromgidrotek, Moscow in 2018. It was then approved by local governmental authorities.</p>
18. Is there a) a closure plan in place for this dam, and b) does it include long term monitoring?	<ol style="list-style-type: none"> <li>a) There is a closure plan. A land reclamation section is a part of design documentation.</li> <li>b) As for now, the closure plan does not include long term monitoring. The program is a part of a Reclamation Project and will be developed in detail by the time of the TSF closure.</li> </ol>
19. Have you, or do you plan to assess your tailings facilities against the impact of more regular extreme weather events as a result of climate change, e.g. over the next two years?	<p>A scenario of dam failure caused by an externality (natural disaster) is included in the impact assessment described in the question 17 above: the emergency probability there is assessed as low.</p>

20. Any other relevant information and supporting documentation.

Please state if you have omitted any other exposure to tailings facilities through any joint ventures you may have.

- The dam is constructed using local crushed stone, dam will be built in 3 phases: Phase 1 with a height of 24 m is raised on natural ground base. Phases 2 and 3 with a height of 5 m each are partly placed on tailings and partly on the previous phase crest.
- The dam is constructed using local crushed stone with 1.5 mm thick shield of HDPE geomembrane.
- Upstream slope is 1:3, general downstream slope is 1:2.2.
- A drainage system along dams is available to prevent seepage and includes pipe drains, drain headers, pump stations and cycled water pipelines.
- Normative safety factor adjusted for this category of facility for solidity and consequences significance should be equal or more than 1.20.
- Safety factor calculated for the current TSF equals 1.35.
- We have a complete package of design documentation and permits on hand.
- TSF is located in a region prone to earthquakes and has the potential to experience ground shaking levels of Intensity 7 (VII).
- The watershed area is 0.93 km<sup>2</sup>.
- The area flooded in case of hydrodynamic accident would be 0.25 km<sup>2</sup>.
- Spill discharge volume is estimated at 222,434 m<sup>3</sup>.
- The TSF is dyked (hydro-protected) by stream diversion channels, designed to hold maximum seasonal and rainfall flood flows with 0.1% annual exceedance probability.
- Overfilling of the TSF impoundment and the spill over the dam crest may occur in case of:
  - receiving a surface runoff with 1% Annual Exceedance Probability,
  - failure of the stream diversion channel and interception channel (including timely snow clearing) and
  - uncontrolled filling of the TSF with simultaneous suspension of water withdrawal from it.
- The likelihood of a hydrodynamic accident has been estimated to be minimal because the design provides for at least 1.5 m freeboard between the TSF filling level and the dam crest elevation.

# Albazino TSF 2 location and affected area in case of dam failure



# Varvara TSF

1. Tailings Facility Name/identifier	Varvara TSF  Key facts: – downstream dam construction, – ring-dyke type, – made of local ground, – raised in 6 phases.
2. Location	N 52°56'06" – 52°58'04" E 62°08'56" – 62°10'47"
3. Ownership	JSC Varvarinskoye
4. Status	Active
5. Date of initial operation	2007
6. Is the Dam currently operated or closed as per currently approved design?	Operated as per currently approved design
7. Raising method	Until 2017, 4 phases with a total height of 18m were constructed, each dam was raised partly on previously placed tailings and partly on crest of the dam which was constructed during previous phase. Starting from 2017, the dam is has been raised on downstream slope.
8. Current Maximum Height	22 m
9. Current Tailings Storage Impoundment Volume	29,962,829 m <sup>3</sup>
10. Planned Tailings Storage Impoundment Volume in 5 years' time	1.01.2021 – 31.12.2025: 11,954,020 m <sup>3</sup>  Total by 2026: 41,916,849 m <sup>3</sup> * Figures have been estimated under the corporate long-term plan updated in 2021, adjusted with the filling coefficient.
11. Most recent Independent Expert Review	2020 – Inspection of tailings storage engineering condition, Government supervision authorities.
12. Do you have full and complete relevant engineering records including design, construction, operation, maintenance, and/or closure?	Design project by State Scientific and Production Association of Industrial Ecology KAZMECHANOBR, 2004. Operation project by State Scientific and Production Association of Industrial Ecology KAZMECHANOBR, 2011. Operation project corrections by State Scientific and Production Association of Industrial Ecology KAZMECHANOBR, 2015. Operation project of TSF phases 5 and 6 by Projecttechstroy, 2018. Detailed working documents – technical procedures of the TSF, 2017. TSF passport dated 01.01.2021 Facility instructions "Operation of hydraulic structures of the TSF" 2018
13. What is your hazard categorization of this facility, based on the consequence of failure?	<ul style="list-style-type: none"> <li>• TSF category (responsibility level): I – high.</li> <li>– Number of permanent residents – none.</li> <li>– Living environment is not disturbed.</li> <li>– Harm to ecosystem is not significant and damage rehabilitation costs less than USD 1.6 m.</li> <li>– Potential failure would be within the land plots leased to the company.</li> <li>• TSF category depending on dam height and ground type – IV.</li> <li>• TSF category under Dam Safety Reference Book of CDA (CDA, 2019) and Global Industry Standard on Tailing Management (2020) – significant.</li> </ul>

14. What guideline do you follow for the classification system?	<p>Construction standards and regulations of Kazakhstan 3.04-01-2013, Appendix 2.</p> <p>Kazakhstan Construction Regulation 1.02-04-2013 “Classification of Construction Facilities and Urban Development Areas Based on Levels of Responsibility“.</p> <p>Recommendations on design and construction of sludge collectors and tailings dams in metallurgical industry, paragraph 3.25, Table 1.</p> <p>Dam Safety Reference Book of CDA (CDA, 2019) – used for corporate purposes as a reference source.</p> <p>Global Industry Standard on Tailings Management, 2020.</p>
15. Has this facility, at any point in its history, failed to be confirmed or certified as stable, or experienced notable stability concerns, as identified by an independent engineer (even if later certified as stable by the same or a different firm)?	<p>Yes.</p> <p>A significant embankment failure occurred to the north of the facility on 14.09.2016 with neither negative consequences nor damage. All responsive measures were taken according to the emergency plan, the dam was remediated. The dam was surcharged with a rock fill buttress against starter embankment.</p> <p>Geophysical research of the TSF was conducted by Almaty-Geocenter, Almaty, 2020.</p> <p>2021 – planned engineering surveys with a subsequent assessment of the stability of the structure.</p>
16. Do you have internal/in house engineering specialist oversight of this facility? Or do you have external engineering support for this purpose?	<p>During the construction stage we use designer supervision.</p> <p>During operation, we ensure internal control on the TSF condition under the corporate TSF Management System.</p> <p>There are several types of control checks:</p> <p>Scheduled:</p> <ul style="list-style-type: none"> <li>a) Level 1 – carried out by an employee responsible for the TSF at the operation;</li> <li>b) Level 2 – carried out by other technical specialists at the operation;</li> <li>c) Level 3 – carried out by representatives of Polymetal Management Company (as consulting).</li> </ul> <p>Unscheduled:</p> <ul style="list-style-type: none"> <li>a) in case of system processes review – initiated by the Company’s Top Management (Group CEO, COO, managing director of the project);</li> <li>b) in case of multiple violations of legislative, regulatory and other requirements, applied to the TSF;</li> <li>c) in case of identifying adverse trends as a result of statistics analysis;</li> <li>d) in case of accidents (emergencies) affecting safety level at the TSF.</li> </ul>
17. Has a formal analysis of the downstream impact on communities, ecosystems and critical infrastructure in the event of catastrophic failure been undertaken and to reflect final conditions? If so, when did this assessment take place?	<p>In 2018, Projecttechstroy PLC issued a report “Estimation and analysis with the purpose of determining consequences caused by damage of enclosure and spillway facilities, boundary of possible flood zone, contamination of groundwater and surface watercourses in case of hydrodynamic accident at the tailings dam of Varvara processing plant.”</p>
18. Is there a) a closure plan in place for this dam, and b) does it include long term monitoring?	<p>a) No. b) No.</p> <p>Reclamation Program will be developed in details by the time of the TSF closure.</p>
19. Have you, or do you plan to assess your tailings facilities against the impact of more regular extreme weather events as a result of climate change, e.g. over the next two years?	<p>A scenario of dam failure caused by an externality (natural disaster) is included in the impact assessment described in the question 17 above: the emergency probability there is assessed as low.</p>

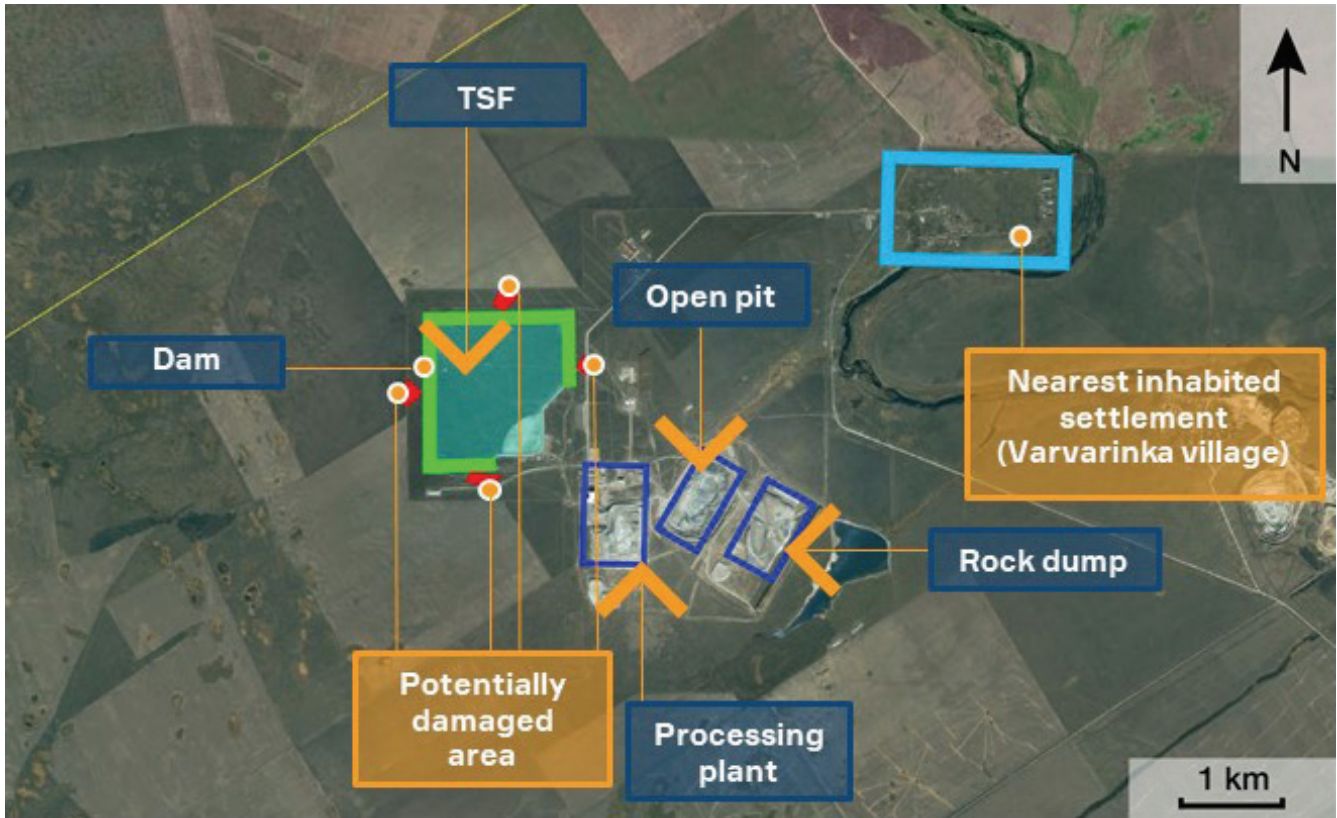


20. Any other relevant information and supporting documentation.

Please state if you have omitted any other exposure to tailings facilities through any joint ventures you may have.

- The dam is constructed under the design project 2004. Dam of Phase 1 (starter dam) is filled around the entire perimeter at a height from 5.0 m to 7.0 m and 1:2.5 slope. Secondary dams (phases) are built from local construction materials (loam) and placed on deposited tailings in the direction of the upstream slope and have a height of 3m each.
- A reconstruction project was completed in 2017: the dam is raised on the downstream slope with rock in two phases. At Phase 5 the dam crest width is 11.0 m, upstream slope – 1:3, downstream slope – 1:1.5. A 12.0 m wide berm is arranged on the downstream slope. Raising is carried out in two phases.
- The dam is constructed with a thick shield of geomembrane.
- A drainage system along dams is available to prevent seepage and includes pipe drains, drain headers, pump stations and cycled water pipelines.
- The normative safety factor adjusted for this category of facility for solidity and consequences significance should be equal or more than 1.20.
- Safety factor calculated for the current TSF equals 1.205.
- We have a complete package of design documentation and permits on hand.
- TSF is located in a region prone to earthquakes and has the potential to experience ground shaking levels of Intensity 6 (VI).
- The watershed area is 1.96 km<sup>2</sup>.
- The creeks flood plain elevations in the TSF section are below the elevations of the pit edge, in which the TSF is located. No water diversion structures are provided. The sediments in the TSF area are accumulated in the settling pond and are included into the water balance.
- The area flooded in case of hydrodynamic accident would be 0.02 km<sup>2</sup>.
- Spill discharge volume is estimated at 1,404 m<sup>3</sup>.
- The existing system of circulating water supply uses 2 floating pumping stations (operating and backup). Also, the design provides for at least 1.5 m freeboard between the TSF filling level and the dam crest elevation. The width of the beach area from the edge of the dam is 100 m. The inflow of surface water from adjacent territory is impossible. Considering that the area of the TSF is more than 1.7 million m<sup>2</sup>, and a pumping station is always operational, a sudden and uncontrollable rise in the water level by 1.5 m is impossible.

# Varvara TSF location and affected area in case of dam failure



# Kyzyl TSF

1. Tailings Facility Name/identifier	Kyzyl TSF  Key facts: – downstream construction, – valley-fill type, – beach width is not regulated, – water pressure on the dam is permitted, – TSF is formed by three dams and a hill slope on the fourth side.
2. Location	N 81°37'41" E 49°42'10"
3. Ownership	Bakyrchik Mining Venture LLC
4. Status	Active
5. Date of initial operation	2018
6. Is the Dam currently operated or closed as per currently approved design?	Operated as per currently approved design
7. Raising method	Downstream. Dam No 1 is raised during 4th phase on the downstream slope. Dams No 2, 3 are raised to full height.
8. Current Maximum Height	30 m
9. Current Tailings Storage Impoundment Volume	3,564,000 m <sup>3</sup>
10. Planned Tailings Storage Impoundment Volume in 5 years' time	1.01.2021 – 31.12.2025: 10,111,000 m <sup>3</sup>  Total by 2026: 13,675,000 m <sup>3</sup>  * Figures have been estimated under the corporate long-term plan updated in 2021, adjusted with the filling coefficient.
11. Most recent Independent Expert Review	2020 – Experts' review on the safety declaration for the enclosing dam №1 (2nd phase) to confirm suitability of further safe operation, done by "Triving LLC".
12. Do you have full and complete relevant engineering records including design, construction, operation, maintenance, and/or closure?	<ul style="list-style-type: none"> <li>• Design project: TSF for storing tailings of sulphide ore flotation and carbon-bearing product of the process plant of Bakyrchik mining venture LLC, including Environmental Impact Assessment (Kazakhstan Design and Engineering Centre "Littera 3", Oskemen, 2016).</li> <li>• Operation project: TSF for storing tailings of sulphide ore flotation and carbon-bearing product of the process plant of Bakyrchik mining venture LLC (Projecttechstroy, Oskemen, 2017).</li> <li>• Detailed working documents.</li> <li>• Industrial safety declaration for hazardous industrial facility of the Bakyrchik mining venture LLC (the city of Semey, 2018).</li> <li>• Industrial safety declaration for the TSF for storing tailings of sulphide ore flotation and carbon-bearing product of the process plant of Bakyrchik mining venture LLC (Oskemen, 2016).</li> </ul>

13. What is your hazard categorization of this facility, based on the consequence of failure?	<ul style="list-style-type: none"> <li>• TSF category (responsibility level): I – high. <ul style="list-style-type: none"> <li>– Number of permanent residents – none.</li> <li>– Living environment is not disturbed.</li> <li>– Harm to ecosystem is not significant and damage rehabilitation costs less than USD 1.6 m.</li> <li>– Potential failure would be within the land plots leased to the company.</li> </ul> </li> <li>• TSF category depending on dam height and ground type – IV.</li> <li>• TSF category under Dam Safety Reference Book of CDA (CDA, 2019) and Global Industry Standard on Tailings Management (2020) – significant.</li> </ul>
14. What guideline do you follow for the classification system?	<p>Construction standards and regulations of Kazakhstan 3.04-01-2013, Appendix 2.</p> <p>Kazakhstan Construction Regulation 1.02-04-2013 “Classification of Construction Facilities and Urban Development Areas Based on Levels of Responsibility”.</p> <p>Recommendations on design and construction of sludge collectors and tailings dams in metallurgical industry, paragraph 3.25, Table 1.</p> <p>Dam Safety Reference Book of CDA (CDA, 2019) – used for corporate purposes as a reference source.</p> <p>Global Industry Standard on Tailings Management, 2020.</p>
15. Has this facility, at any point in its history, failed to be confirmed or certified as stable, or experienced notable stability concerns, as identified by an independent engineer (even if later certified as stable by the same or a different firm)?	<p>The facility did not fail to be confirmed or certified as stable, or experienced notable stability concerns.</p> <p>No risks affecting stability have been identified during the facility operation.</p> <p>Management efficiency is regularly estimated under the corporate TSF Management System and applicable legal requirements.</p>
16. Do you have internal/in house engineering specialist oversight of this facility? Or do you have external engineering support for this purpose?	<p>During the construction stage we use designer supervision.</p> <p>During operation, we ensure internal control on the TSF condition under the corporate TSF Management System.</p> <p>There are several types of control checks: Scheduled:</p> <ol style="list-style-type: none"> <li>a) Level 1 – carried out by an employee responsible for the TSF at the operation;</li> <li>b) Level 2 – carried out by other technical specialists at the operation;</li> <li>c) Level 3 – carried out by representatives of Polymetal Management Company (as consulting).</li> </ol> <p>Unscheduled:</p> <ol style="list-style-type: none"> <li>a) in case of system processes review – initiated by the Company’s Top Management (Group CEO, COO, managing director of the project);</li> <li>b) in case of multiple violations of legislative, regulatory and other requirements, applied to the TSF;</li> <li>c) in case of identifying adverse trends as a result of statistics analysis;</li> <li>d) in case of accidents (emergencies) affecting safety level at the TSF.</li> </ol>
17. Has a formal analysis of the downstream impact on communities, ecosystems and critical infrastructure in the event of catastrophic failure been undertaken and to reflect final conditions? If so, when did this assessment take place?	<p>In 2020, Kaznedroproject LLC has carried out the analysis for the 3d phase of the tailing dam.</p>
18. Is there a) a closure plan in place for this dam, and b) does it include long term monitoring?	<p>a) No. b) No.</p> <p>Reclamation Program will be developed in details by the time of the TSF closure.</p>

19. Have you, or do you plan to assess your tailings facilities against the impact of more regular extreme weather events as a result of climate change, e.g. over the next two years?

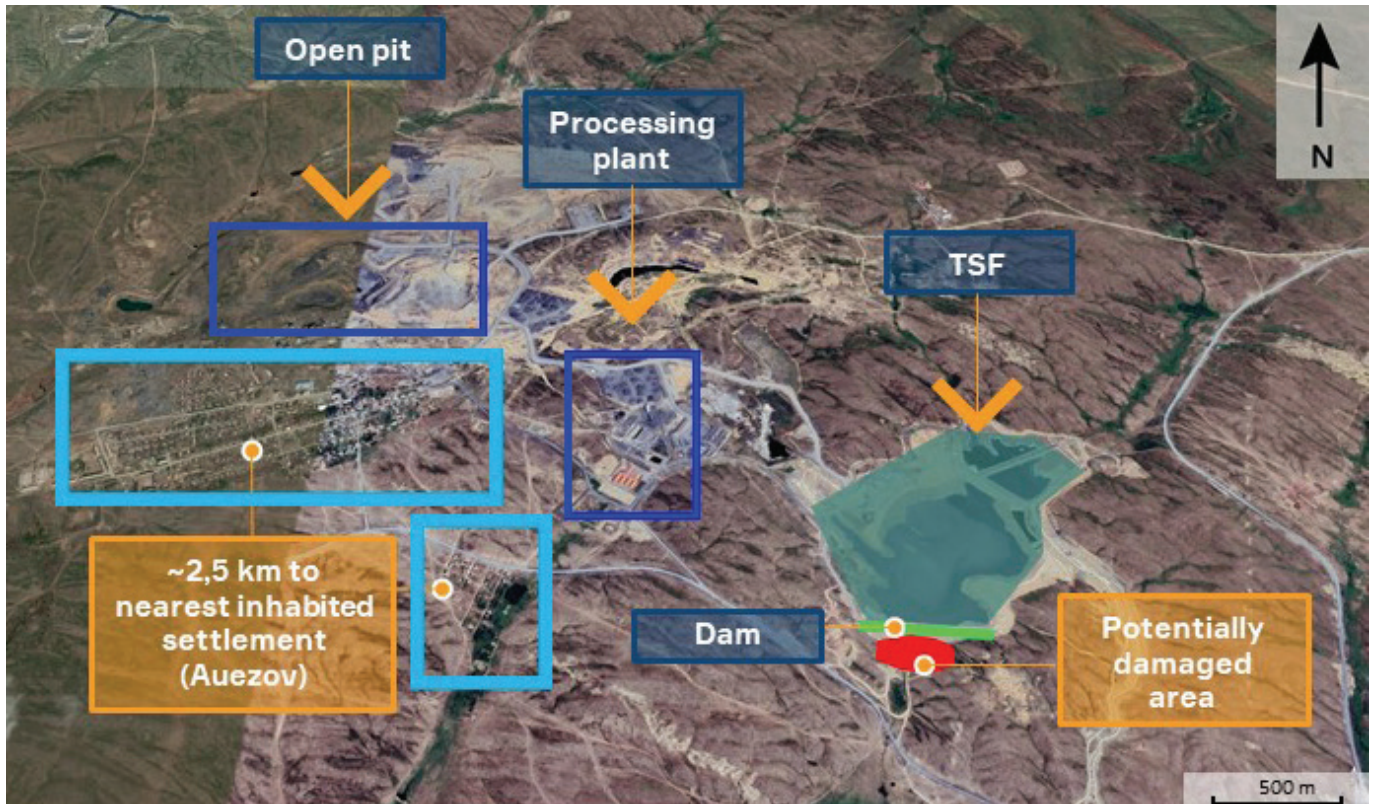
A scenario of dam failure caused by an externality (natural disaster) is included in the impact assessment described in the question 17 above: the emergency probability there is assessed as low.

20. Any other relevant information and supporting documentation.

Please state if you have omitted any other exposure to tailings facilities through any joint ventures you may have.

- Dams No 1, 2, 3 are of rock-fill type.
- Dam No 1 is raised in 4 phases, with total height of 34.5 m.
- Dam No 2 is raised in 1 phase, with height up to 7.5 m.
- Dam No 3 is raised in 1 phase, with height up to 16.5 m.
- Rock fill buttressing.
- On the upstream slope there is impermeable screen of geomembrane up to the dam crest.
- On the downstream slope there is pipe drainage.
- Inclination angle of upstream slope – 1:3.
- Downstream slope – 1:2.5.
- The normative safety factor adjusted for this category of facility for solidity and consequences significance should be equal or more than 1.33.
- Safety factor calculated for the current TSF equals 1.52.
- We have a complete package of design documentation and permits on hand.
- TSF is located in a region prone to earthquakes and has the potential to experience ground shaking levels of Intensity 6 (VI).
- The watershed area is 1,067 km<sup>2</sup>.
- The TSF is dyked (hydro-protected) by a network of interception channels and a stream diversion channel, designed to hold maximum seasonal and rainfall flood flows with 1% annual exceedance probability.
- Spill discharge volume is estimated at 1,110,000 m<sup>3</sup>.
- The area flooded in case of hydrodynamic accident would be 0.4 km<sup>2</sup>.
- Overfilling of the TSF impoundment and the spill over the dam crest may occur in case of:
  - receiving a surface runoff with 1% Annual Exceedance Probability,
  - failure of the stream diversion channel and interception channel (including timely snow clearing) and
  - uncontrolled filling of the TSF with simultaneous suspension of water withdrawal from it.
- The likelihood of a hydrodynamic accident has been estimated to be minimal because the design provides for at least 2 m freeboard between the TSF filling level and the dam crest elevation.

# Kyzyl TSF location and affected area in case of dam failure



# Voro DSF

1. Tailings Facility Name/identifier	Voro DSF
2. Location	N 59°39'7" E 60°18'57"
3. Ownership	Gold of Northern Urals Joint Stock Company
4. Status	Active
5. Date of initial operation	2000
6. Is the Dam currently operated or closed as per currently approved design?	Operated as per currently approved design
7. Raising method	Dry stacking of tailings
8. Most recent Independent Expert Review	February 2019 — audit under the Cyanide Code by Wardell Armstrong International.  9.02.2018 — by inspection team (Polymetal's representatives, Russian Federal Environmental, Industrial and Nuclear Supervision Service (Rostekhnadzor) and Ministry of Emergency Response).
9. Do you have full and complete relevant engineering records including design, construction, operation, maintenance, and/or closure?	<ul style="list-style-type: none"> <li>• Primary Ore Processing Area Upgrading to Increase Throughput to 900,000 tpa, 2008. JSC Polymetal Engineering.</li> <li>• Technical Project of the Vorontsovskoye Gold Deposit Development and Mining, 2013. JSC Polymetal Engineering.</li> <li>• Maintenance manual is a part of Plant Maintenance Procedures.</li> </ul>
10. What is your hazard categorization of this facility, based on the consequence of failure?	Non-hazardous
11. What guideline do you follow for the classification system?	Federal Law "On industrial waste" as of 24.06.1998 No. 89-FZ (with amendments).  Federal Law "On protection of the environment" as of 10.01.2002 No. 7-FZ (with amendments).
12. Do you have internal/in house engineering specialist oversight of this facility? Or do you have external engineering support for this purpose?	During the construction stage we use designer supervision. During operation, we ensure internal control on the storage condition under the corporate procedures.
13. Is there a) a closure plan in place for this dam, and b) does it include long term monitoring?	<ul style="list-style-type: none"> <li>a) There is a closure plan. A land reclamation section is included in the design documentation.</li> <li>b) As for now, the closure plan does not include long term monitoring. The program is a part of a Reclamation Project and will be developed in detail by the time of the TSF closure.</li> </ul>

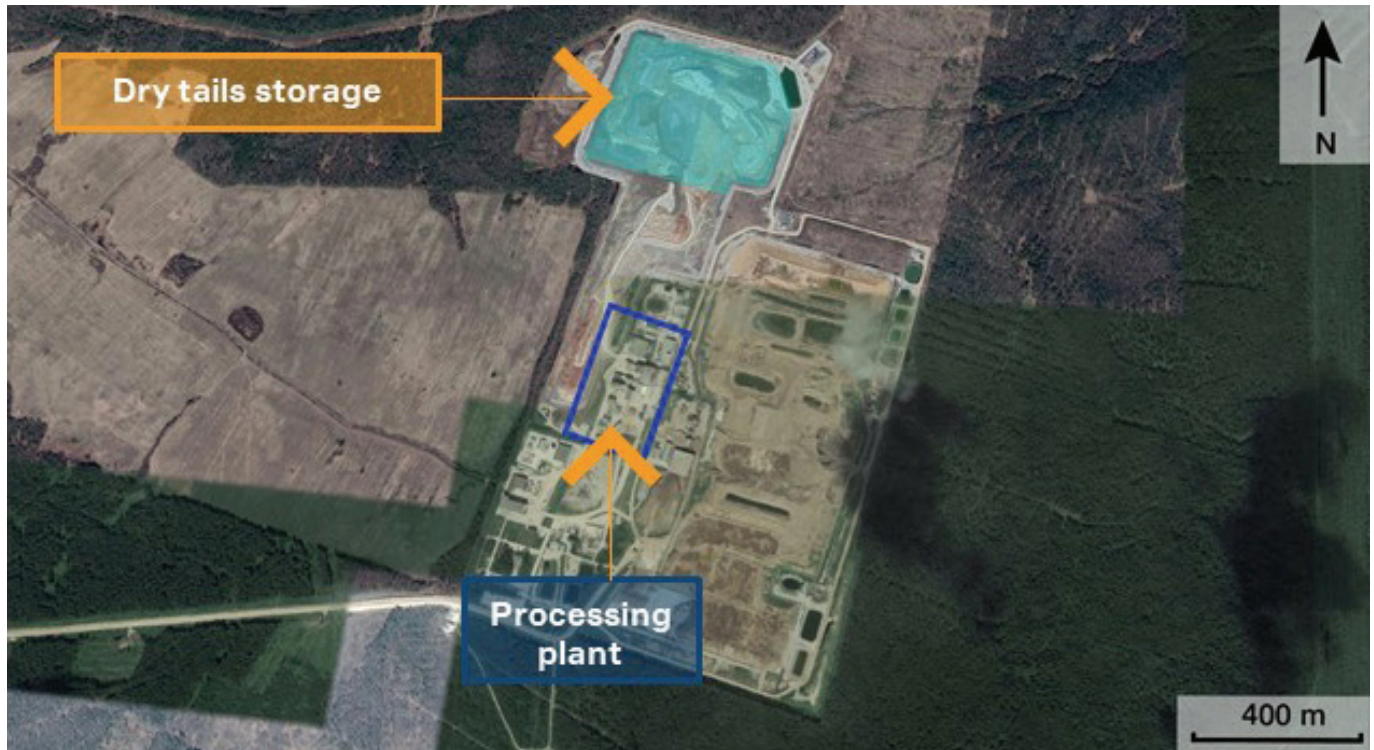
14. Any other relevant information and supporting documentation.

Please state if you have omitted any other exposure to tailings facilities through any joint ventures you may have.

- Tailings produced from the gold recovery process are sent to the filtration system, where the filtrate is collected and recirculated in the process (closed loop system). The filter cake (dry tailings) with less than 20% moisture are deposited in the dry stack facility (DSF).
- The DSF is geosynthetically lined with a 1.5 mm HDPE geomembrane.
- The basement of the DSF is levelled to create a gradient towards the slopes to prevent stagnation of surface storm and melted waters. Geogrid is laid on the slopes to prevent slope slipping and stabilize the protection clay layer.
- Surface water runoff from the DSF is captured along the perimeter with drainage ditches lined with 1.0 mm geomembrane and flows to the surface water runoff pond, and flows to the water treatment plant before being discharged.
- The DSF represents a dump formed in layers with total capacity of 8,720,000 m<sup>3</sup>.
- The safety factor calculated for this type of storages equals 1.20 and the adjusted stability factor for the current DSF equals 1.23.



# Voro DSF location and affected area in case of dam failure



# Amursk DSF

1. Tailings Facility Name/identifier	Amursk DSF
2. Location	N 50°15'18" E 136°49'31"
3. Ownership	Amur hydrometallurgical plant Limited Liability Company
4. Status	Active
5. Date of initial operation	2012
6. Is the Dam currently operated or closed as per currently approved design?	Operated as per currently approved design
7. Raising method	Dry stacking of tailings
8. Most recent Independent Expert Review	November 2018 — audit under the Cyanide Code by Wardell Armstrong International.  8.06.2018 — by inspection team (Polymetal's representatives, Russian Federal Environmental, Industrial and Nuclear Supervision Service (Rostekhnadzor) and Ministry of Emergency Response).
9. Do you have full and complete relevant engineering records including design, construction, operation, maintenance, and/or closure?	<ul style="list-style-type: none"> <li>• Construction of Amursk POX, 2009 by JSC Polymetal Engineering.</li> <li>• Maintenance manual is a part of POX Plant Maintenance Procedures.</li> </ul>
10. What is your hazard categorization of this facility, based on the consequence of failure?	Non-hazardous
11. What guideline do you follow for the classification system?	<p>Federal Law "On industrial waste" as of 24.06.1998 No. 89-FZ (with amendments).</p> <p>Federal Law "On protection of the environment" as of 10.01.2002 No. 7-FZ (with amendments).</p>
12. Do you have internal/in house engineering specialist oversight of this facility? Or do you have external engineering support for this purpose?	During the construction stage we use designer supervision. During operation, we ensure internal control on the storage condition under the corporate procedures.
13. Is there a) a closure plan in place for this dam, and b) does it include long term monitoring?	<p>a) There is a closure plan. A land reclamation section is included in the design documentation.</p> <p>b) As for now, the closure plan does not include long term monitoring. The program is a part of a Reclamation Project and will be developed in detail by the time of the TSF closure.</p>

14. Any other relevant information and supporting documentation.

Please state if you have omitted any other exposure to tailings facilities through any joint ventures you may have.

- Tailings produced from the gold recovery process are sent to the filtration system, where the filtrate is collected and recirculated in the process (closed loop system). The filter cake (dry tailings) with less than 30-33% moisture is deposited in the dry stack facility (DSF).
- The DSF is geosynthetically lined with a 1.5 mm HDPE geomembrane.
- The basement of the DSF is levelled to create a gradient towards the slopes to prevent stagnation of surface storm and melted waters. Geogrid is laid on the slopes to prevent slope slipping and stabilize protection clay layer.
- To prevent filtration of contaminated water from the DSF, a single waterproofing screen made of polyethylene film at the base of the DSF is installed
- Surface water runoff from the DSF is captured along the perimeter with drainage ditches lined with 1.0 mm geomembrane and flows to the surface water runoff pond, and flows to the water treatment plant before being discharged.
- The DSF represents a dump formed in layers with total capacity of 6,656,000 t for first 18 years of operation: 1,745,400t for current (March 2021) and 4,913,600t for further storage.
- Safety factor calculated for this type of storages equals 1.20. Adjusted stability factor for the current DSF equals 1.42.

# Amursk DSF location and affected area in case of dam failure

