

KAZ Minerals PLC

Tailings management
July 2020

Introduction

KAZ Minerals tailings facilities

Facility	Type	First operation	Expected closure date	Status
Aktogay	Downstream	2017	2045	Active
Bozshakol	Downstream	2016	2058	Active
East Region				
Orlovsky	Upstream	1989	2026	Active
Nikolayevsky	Upstream	1980	2020 ¹	Active
Nikolayevsky	In Pit	2020 ¹	2032	Construction
Bozymchak	Dry stack	2014	2032	Active

1. The Nikolayevsky concentrator is expected to transition in 2020 to in-pit tailings disposal.

The safe and effective management of tailings waste is a high priority for KAZ Minerals. The Group currently has five tailings storage facilities, four of which are in Kazakhstan in locations which are not mountainous and have low levels of precipitation. At Bozymchak, in Kyrgyzstan, the Group employs a lined 'dry stack' tailings facility.

Strict operating procedures are in place for the maintenance and monitoring of tailings storage facilities, including regular inspections and testing of nearby ground water. The Group periodically arranges for inspections by independent external experts, with all active tailings storage facilities inspected during 2019.

KAZ Minerals is required to comply with the regulations of the Government of Kazakhstan and the Government of Kyrgyzstan, as applicable, in relation to the design, construction, maintenance and closure of tailings storage facilities. State authorities regularly inspect the Group's tailings facilities to ensure compliance with regulations. Ongoing work programmes, supported by design engineers that act as engineer of record and appropriate external consultants conducting third party external reviews, are in place to develop tailings dams in line with future production plans and to address any issues identified.

At Aktogay and Bozshakol, a down valley discharge method is currently in operation with both facilities to commence Central Thickened Discharge from 2022. This is the most appropriate method for the flat terrain and conditions at these sites. The Bozshakol and Aktogay dams are of a downstream construction design.

In the East Region, upstream tailings storage facilities are located at Orlovsky (Zhezkent) and Nikolayevsky. The Nikolayevsky tailings storage facility is planned to transition to in-pit disposal in 2020, which is inherently safer than above-ground dams. At Bozymchak in Kyrgyzstan, the 'dry stack' tailings facility filters material before storage to reduce moisture content to approximately 14%, before waste is deposited in geomembrane lined cells by mechanical means. The Group does not have any inactive dams or facilities currently undergoing closure.

In 2019, the Group enhanced its internal resources through the recruitment of additional international tailings expertise both centrally and at site, with a focus on tailings construction management. Emergency response plans are in place. Opportunities to strengthen our emergency response plans further have been identified and the Group is working with local authorities to do so. In addition to the Group's internal operating procedures and regular reviews by independent tailings experts, design institutes and state inspectors, an annual comprehensive external review has been scheduled across all facilities.

This report has been produced in support of the tailings disclosure request issued by the Church of England Pensions Board and the Council on Ethics of Swedish National Pension Funds issued in April 2019, on behalf of 96 investors in the mining sector.

The information presented in this document is true to the best of our knowledge, based on our governance, technical and review systems.

Andrew Southam

Chief Executive Officer, KAZ Minerals PLC

Aktogay

1. "Tailings Dam" Name/identifier	Aktogay
2. Location	N 46° 56' 50.62" E 79° 56' 12.04"
3. Ownership	100% owned and operated by KAZ Minerals
4. Status	Active
5. Date of initial operation	2017
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	23m
9. Current Tailings Storage Impoundment Volume	65 Mm ³
10. Planned Tailings Storage Impoundment Volume in 5 years' time.	243 Mm ³
11. Most recent Independent Expert Review	July 2019
12. Do you have full and complete relevant engineering records including design, construction, operation, maintenance and/or closure.	Yes
13. What is your hazard categorisation of this facility, based on the consequence of failure?	Low consequence
14. What guideline do you follow for the classification system?	ANCOLD
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).	Settlement in natural ground beneath internal bunds was addressed by constructing support buttresses in 2019.
16. Do you have internal/in house engineering specialist oversight of this facility? Or do you have external engineering support for this purpose?	Both
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?	High level breach analysis indicates that reach and impacts would be very limited.
18. Is there a) a closure plan in place for this dam, and b) does it include long term monitoring?	a) No b) No. The life of mine plan is scheduled to be updated in H2 2020 and will include this.
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?	Requirement for climate change impact analysis to be assessed.
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.	

Bozshakol

1. "Tailings Dam" Name/identifier	Bozshakol
2. Location	N 51° 50' 51.87" E 74° 17' 29.01"
3. Ownership	100% owned and operated by KAZ Minerals
4. Status	Active
5. Date of initial operation	2016
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	12m
9. Current Tailings Storage Impoundment Volume	105 Mm ³
10. Planned Tailings Storage Impoundment Volume in 5 years' time.	212 Mm ³
11. Most recent Independent Expert Review	July 2019
12. Do you have full and complete relevant engineering records including design, construction, operation, maintenance and/or closure.	Yes
13. What is your hazard categorisation of this facility, based on the consequence of failure?	High consequence: Proximity to production facilities
14. What guideline do you follow for the classification system?	ANCOLD
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).	No
16. Do you have internal/in house engineering specialist oversight of this facility? Or do you have external engineering support for this purpose?	Both
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?	Yes, 2018.
18. Is there a) a closure plan in place for this dam, and b) does it include long term monitoring?	a) Yes b) No. The life of mine plan is scheduled to be updated in H2 2020 and will include this.
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?	Requirement for climate change impact analysis to be assessed.
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.	

Orlovsky (Zhezkent)

1. "Tailings Dam" Name/identifier	Orlovsky (Zhezkent)
2. Location	N 50°55'59,76" E 81°17'28,89"
3. Ownership	100% owned and operated by KAZ Minerals
4. Status	Active
5. Date of initial operation	1989
6. Is the Dam currently operated or closed as per currently approved design?	Operated as per currently approved design
7. Raising method	Upstream
8. Current Maximum Height	14m
9. Current Tailings Storage Impoundment Volume	12 Mm ³
10. Planned Tailings Storage Impoundment Volume in 5 years' time.	15 Mm ³
11. Most recent Independent Expert Review	May 2020
12. Do you have full and complete relevant engineering records including design, construction, operation, maintenance and/or closure.	Yes (post 2008)
13. What is your hazard categorisation of this facility, based on the consequence of failure?	Insignificant
14. What guideline do you follow for the classification system?	Kazakhstan safe operations rules for tailings/slurry storage facilities at hazardous production sites, 2014
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).	No. (Records reviewed for 10 years.)
16. Do you have internal/in house engineering specialist oversight of this facility? Or do you have external engineering support for this purpose?	Both
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?	Dam break analysis has been conducted which indicated limited potential impact on infrastructure or communities.
18. Is there a) a closure plan in place for this dam, and b) does it include long term monitoring?	a) No b) No Closure plan will be updated to take into account most recent raise.
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?	Requirement for climate change impact analysis to be assessed.
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.	

Nikolayevsky

1. "Tailings Dam" Name/identifier	Nikolayevsky
2. Location	N 50° 34' 58.10" E 81° 54' 13.98"
3. Ownership	100% owned and operated by KAZ Minerals
4. Status	Active
5. Date of initial operation	1980
6. Is the Dam currently operated or closed as per currently approved design?	Operated as per currently approved design
7. Raising method	Upstream
8. Current Maximum Height	45m
9. Current Tailings Storage Impoundment Volume	33 Mm ³
10. Planned Tailings Storage Impoundment Volume in 5 years' time.	34 Mm ³
11. Most recent Independent Expert Review	May 2020
12. Do you have full and complete relevant engineering records including design, construction, operation, maintenance and/or closure.	Yes
13. What is your hazard categorisation of this facility, based on the consequence of failure?	Significant: Proximity to production facilities and permanent community
14. What guideline do you follow for the classification system?	Kazakhstan safe operations rules for tailings/slurry storage facilities at hazardous production sites, 2014
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).	Additional buttressing recommended in 2015 was carried out and certified. (Records reviewed for 10 years.)
16. Do you have internal/in house engineering specialist oversight of this facility? Or do you have external engineering support for this purpose?	Both
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?	Dam break analysis has been carried out and the impacts have been assessed and incorporated into emergency plans.
18. Is there a) a closure plan in place for this dam, and b) does it include long term monitoring?	a) No b) No Closure plan is being updated in H2 2020.
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?	Requirement for climate change impact analysis to be assessed.
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 Nikolayevsky facility stores tailings from the Nikolayevsky concentrator, which processes ore from the Artemyevsky and Irtyshsky mines.

Bozymchak

1. "Tailings Dam" Name/identifier	Bozymchak
2. Location	N 41° 15' 33.65" E 71° 5' 12.78"
3. Ownership	100% owned and operated by KAZ Minerals
4. Status	Active
5. Date of initial operation	2015
6. Is the Dam currently operated or closed as per currently approved design?	Operated as per currently approved design
7. Raising method	Other: Dry stacking
8. Current Maximum Height	35m
9. Current Tailings Storage Impoundment Volume	2.5 Mm ³
10. Planned Tailings Storage Impoundment Volume in 5 years' time.	5.1 Mm ³
11. Most recent Independent Expert Review	October 2019
12. Do you have full and complete relevant engineering records including design, construction, operation, maintenance and/or closure.	Yes
13. What is your hazard categorisation of this facility, based on the consequence of failure?	Hazard categorisation 2
14. What guideline do you follow for the classification system?	International Building Code (IBC) 3.04-01-2005
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).	No
16. Do you have internal/in house engineering specialist oversight of this facility? Or do you have external engineering support for this purpose?	Both
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?	Yes 2011
18. Is there a) a closure plan in place for this dam, and b) does it include long term monitoring?	a) Yes b) Yes
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?	Yes
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.	