ÖkoRess III

Pilot Screening of Environmental Hazard Potentials of Mine Sites

Factsheet:

Krasnooktyabrsk Bauxite Mine

Eurasian Resources Group (ERG), Kazakhstan

ID: 88

German Environment Agency

Umwelt Bundesamt

Note

The qualitative assessment of Environmental Hazard Potentials (EHPs) in this factsheet was conducted according to the method developed in the precursor project ÖkoRess I "Discussion of the environmental limits of primary raw material extraction and development of a method for assessing the environmental availability of raw materials to further develop the criticality concept"[1] (Dehoust et al. 2017a). The measurement instructions applied here are described in Dehoust et al. 2017b. The method is tested and further developed within this project (ÖkoRess III).

The information in this factsheet refers exclusively to publicly available, designated sources that have been classified as serious by the authors. It is specifically pointed out that no statement is made about the implementation and quality of agreements or standards that are applied. The implementation of agreements through memberships, certifications, etc. is the responsibility of the companies.

The surface extension of each mine area has been estimated based on publically accessible satellite images as official land-use plans from the public authorities or mine operators are not consistently available. It therefore only corresponds to the apparent area where mining, processing facilities, heaps, etc. and related infrastructure are clearly identifiable.

The fact sheets make no claim to completeness of all relevant voluntary standards. Mentioning a membership in one of the listed voluntary standards does not imply an assessment of the suitability of the standard in itself, nor does it make any statement about the member's success in implementation.

[1]TEXTE 87/2017 https://www.umweltbundesamt.de/publikationen/discussion-of-the-environmental-limits-of-primary

Krasnooktyabrsk Bauxite Mine

Bauxite

General information

Indicator or criteria	Description and values
Name of mine	Krasnooktyabrsk Bauxite Mine
Description of mining area	The Krasnooktyabrsk is part of a mining complex (KBRU Krasnooktyabrskoye Mining Unit) consisting of three operating open pits (Ayatsky, Belinsky und Krasnogorskyin) in the north of Kazakhstan (Region Kostanay 2015). The deposit is located near the eastern Ural and ca. 130 km distant to the Russian border (PorterGeoconsultancy 2012). Krasnooktyabrsk lies within a rural region characterized by an dry and continental climate and less vegetation (Länder-Lexikon n.d.). The deposit is covered by a 40 m thick layer of cenozoic sediments and consists of lower Carboniferous carbonates and intermediate volcanic rocks. Main minerals are gibbsite, hydrohematite, hematite and kaolinite, with smaller amounts of siderite and calcite (PorterGeoconsultancy 2012)
Surface extension	62.73km^2 62.73 km^2 (Image date: 17.7.2019; Viewing height: 12.51 km) (Google Earth)
In operation since	1962 1962 (bauxite mining) (Region Kostanay 2015)
Operator	Aluminium of Kazakhstan JSC
Owner	Eurasian Resources Group (ERG)
Closest town	Krasnooktyabrskij (Google Maps)
Province	Kostanay Region (Google Maps)
Country	Kazakhstan
Longitude	62.355901°
Latitude	52.018861°

Altitude	200 m a.s.l. 200 m a.s.l. (Google Earth)
Main product and by-products	Main product: Bauxite (Ammann et al. 2013 p. 180), by-product: none
On-site processing stages	None
Annual production	4.8 Mt in 2012 (Ammann et al. 2013 p. 171)
Proven Reserves	26.5 Mt with an ore grade of 43.4 % Al2O3 (2012) (Ammann et al. 2013 p. 180)
Probable Reserves	63.0 Mt with an average ore grade of 43.0 % Al2O3 (2012) (Ammann et al. 2013 p. 180)

Geology

Indicator or criteria	Description and values	Explanation	Assessment result	Data quality
Preconditions for acid mine drainage (AMD)	Aluminium, which is extracted from bauxite, is a lithophilic element. Litophilic elements are usually extracted from oxide deposits. In general, AMD requires the presence of sulphide minerals (Dehoust et al. 2017b). No indication was found, that the deposit is associated with sulfide ores.	The extraction of oxidic minerals has a low environmental hazard potential with regard to AMD.	Low	A = high, can be derived directly from available data
Paragenesis with heavy metals	No indication of paragenesis with heavy metals	The main constituents of bauxite are Al hydroxides and Fe oxides. According to the measurement instructions, aluminium ores may be associated with zinc, copper and chrome. Hence, the EHP for this indicator is evaluated as medium.	Medium	A = high, can be derived directly from available data

Paragenesis with radioactive components	No indication of paragenesis with radioactive components.	The measurement guidance suggests a low EHP for sedimentary rocks such as limestones. As the present bauxite is a weathering product of carbonate rocks of sedimentary origin, a low EHP is assumed in consequence.	Low	B2 = medium, classified according to measurement instructions
Deposit size	89.5 Mt with an ore grade of 43.1% results in a current deposit size of 38.6 Mt Al2O3 (Ammann et al. 2013 p. 180)	The deposit size is estimated based on the total reserves of 89.5 Mt of bauxite, and a production since 1962 (46 years, 4 Mt bauxite /year) of about 184 Mt of bauxite. This sums up to around 273 Mt of bauxite with an average content of 43.1 % applicable Al2O3. Thus, the deposit size in total is about 118 Mt Al2O3. The deposit can be considered as large (>100 Mt ores) according to the measurement instructions.	High	A = high, can be derived directly from available data
Ore grade	43.1% Al2O3 (Ammann et al. 2013 p. 180)	Considering specifications in Meyer 2004) bauxite with 40% to 52 % ore grade are considered to pose a medium EHP.	Low	A = high, can be derived directly from available data

Technology

Indicator or criteria	Description and values	Explanation	Evaluation result	Data quality

Mine type	Hard rock open-pit mine	Conventional solid rock open pit mining is evaluated with a medium EHP. During open pit mining in solid rocks, the mining activities are restricted to the horizontal and vertical extension of the ore body/mineralized zone. The impact is higher than in underground mining but less pronounced then in mining of alluvial or unconsolidated sediments.	Medium	A = high, can be derived directly from available data
Use of auxiliary substances	Ore extraction is carried out with trucks and shovels/loaders after drilling and blasting of hard rock sequences. Concentration is done by froth flotation under addition of lime and flotation reagents . Sintering furnace production capacity is 440 tons of alumina per hour (Dostoyanie 2015)	Flotation is often conducted with the help of toxic additives such as chemical solvents, leading to a high EHP in the evaluation result.	High	A = high, can be derived directly from available data
Mining waste	There are four large tailing dams around the mine and one slurry storage at the refinary. Waste rock from the mine is rarely used for backfilling but mostly deposited in the tailing dams. The slurry storage at the Pavlodar refinery has annually generated ca. 50 Mt of slurry but not much of this material has been utilized (Dostoyanie 2015)	The disposal of waste in large-volume and large-scale tailing dams are evaluated with a high EHP	High	B = medium, classified according to measurement instructions
Remediation measures	In 1983-2000 the company rehabilitated an area of 387 hectares. In recent years similar activities have been planned, but not actively undertaken due to lack of funding. As described below, closure planning must be integrated into operational activities. There is a detailed remediation plan for each mine of	The EHP is determined as medium due to the recultivation in the past with a simultaneous lack of financial resources for planned reclamation measures in the last years.	Low	B = medium, classified according to measurement instructions

	the complex where e.g., progressive backfill, revegetation, landscape design, decontamination etc. are addressed (ERG 2019a).			

Framework conditions natural environment

Indicator or criteria	Description and values	Explanation	Evaluation result	Data quality
Accident hazard due to floods, earthquake, storms, landslides	The rating system for the 4 sub-indicators uses georeferenced data from publicly available risk maps (see measurement instructions Dehoust et al. 2017b). Metrics are directly taken from the given risk assessment. The indicator total is determined by the highest hazard level of the sub-indicators.	The EHP for all sub-indicators (earthquakes, flood, landslide, tropical storm, arctic region) is low.	Low	A = high, can be derived directly from available data
Water Stress Index (WSI) und desert areas	The WSI by Pfister et al. (2009) provides characterization factors on the relative water availablility at watershed level. Absolute water shortages in dry areas is supplemented by desert areas. The highest hazard level of the sub-indicators determines the total result.	The water stress for the mining area is low and the complex is not situated in a desert area, which results in a low EHP.	Low	A = high, can be derived directly from available data
Protected areas and AZE sites	Georeferenced data for designated protected areas are used to assess hazards posed by mining extraction. The metric to evaluate EHPs corresponds to the method first described in the draft standard of the	The mine is not situated in designated protected areas and AZE sites, which results in a low EHP.	Low	A = high, can be derived directly from available data

	Initiative for Responsible Mining Assurance (IRMA 2014).			

State Governance

Indicators	
WGI 1 -Voice and Accountability	15.76 °°°
WGI 2 -Political Stability and Absence of Violence/ Terrorism	45.71 °°°
WGI 3 - Government Effectiveness	54.33 °°°
WGI 4 -Regulatory Quality	60.1 °°°
WGI 5 - Rule of Law	35.58 °°°
WGI 6 -Control of Corruption	36.06 °°°
EPI (Environmental Performance Index)	54.56
EITI membership	Meaningful progress
International Agreements	

ILO 176	No
Others	None
Legal framework	
Areas of Law: Environment	The Ministry of Investment and Development (the "MID") regulates solid minerals contracts and regulates the mining industrie throug its subordinate, the Committee on Geology and Subsoil Use. The most important legislation for environmental aspects of mining activities is the Law on Subsoil and Subsoil Use and Article 109 of this law in particular. It is necessary for ”subsoil users” to submit preliminary project documentation, and project documentation for State ecological and sanitary-epidemiological examinations. Moreover environmental impact assessments and an environmental protection section is required. Mine closure must be conducted on the basis of a liquidation or conservation plan that has been (i)” developed by a licensed project company, (ii) agreed to by authorities in the fields of environmental protection, study and use of subsoil, industrial safety, sanitary-epidemiological service, land resources management, and (iii) approved by the subsoil user”. Mining companies are obliged to work on liquidation and conservation of the operation, immediately after termiantion of mining activities (Yerkebulanov 2015).

Areas of Law: Occupational Health and Safety (OHS)	Most requirements for employers and employees in relation to health and safety can be found in Article 115 (Ensuring Subsoil Use Conditions Safe for Population and Staff) of the Subsoil Law. These include e.g. equipment, protective clothes, air quality monitoring and prohibition of life-threatening tasks. There has to be a specialised person in each mining company which is responsible for health and safety. Workers who are directly involved in potentially dangerous activities must regularly pass several safety certifications and tests (Yerkebulanov 2015)

Corporate Social Responsibility (CSR)

Voluntary Standards	
Aluminium Stewardship Initiative (ASI): Is the mine owning company a member?	No No (ASI 2019)
Aluminium Stewardship Initiative (ASI): Is the mine certified?	No No (ASI 2019)
International Council of Mining & Metals (ICMM): Is the mine owning company a member?	No No (ICMM 2019)
Towards Sustainable Mining (TSM) Is the mine owning company a member of the Mining Association of Canada (MAC)?	No No (MAC 2019)
Towards Sustainable Mining (TSM) outside Canada: Are TSM standards implemented*?	No information available No information obtained

Initiative for Responsible Mining Assurance (IRMA): Is the mine owning company a member?	No No (IRMA 2018)
Initiative for Responsible Mining Assurance (IRMA): Is the mine certified?	No No (IRMA 2018)
Responsible Copper (RC): Is the mine owning company a member of RC?	Not applicable Not applicable
Responsible Copper (RC): Is the mine certified?	Not applicable Not applicable
Responsible Mining Index (RMI): Has the mine been rated?	No No (RMI 2018)
Responsible Mining Index Company indicator „Working conditions“	0.402 0.402 (RMI 2018)
Responsible Mining Index Company indicator „Environmental sustainability“	0.102 0.102 (RMI 2018)
Responsible Steel (RS): Is the mine owner a member of the RS?	Not applicable Not applicable
Responsible Steel (RS): Is the mine certified?	Not applicable Not applicable
Australian Steel Stewardship Forum (ASSF): Is the owner a member of the ASSF?	Not applicable Not applicable
Australian Steel Stewardship Forum: Is the mine certified?	Not applicable Not applicable
ISO and CSR reporting	
ISO 14001 (ISO 14004): Is the mine ISO 14001 certified?	Yes Yes (ERG 2019a)

CSR-directive 2014/95/EU: Does the mine owning company have its headquarters in an EU country?	Yes Yes (Luxembourg) (RMI 2018)
OECD Guidelines: Does the company have its headquarters in a signatory state?	Yes Yes (Luxembourg)(RMI 2018)
ISO 26000: Does the mine implement ISO 26000?*	No information obtained No information obtained
Banking Standards	
WB Standards / IFC Performance Standards: Is the mine financed to a major extend by the world bank?	No information obtained No information obtained
Equator Principles (EP): Is the mine financed to a major extend by a bank adherent to the EP?	No information obtained No information obtained

*by companies own account.

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A Glossary

Table 1 Legend

Environmental hazard potential

low

medium

high

Data quality

low

- No concrete information, no general specifications of the measurement instructions, expert estimation.
- Assessment not possible due to lack of data at the site, as there is also no evidence for an assessment and there are no generalized assessment rules.

medium

- Assessable on the basis of available information.
- Generalized classification according to measurement instructions.

high

- Can be derived directly from available data.

B Abbreviations

EHP	Environmental hazard potential
FY	Financial year
kt	Kilo tonnes
m a.s.l.	Meters above sea level
Mt	Million tonnes
OHS	Occupational Health and Safety
t	tonnes
TSF	Tailing Storage Facility
WGI	World Governance Indicators
WHS	Work Health and Safety

C Imprint

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