

ÖkoRess III

Pilot Screening of Environmental Hazard Potentials of Mine Sites

Factsheet:

Yeristovo

Ferrexpo Yeristovo Mining (FYM) , Ukraine

ID: 31

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.

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

Yeristovo

Iron ore

General information 	
Indicator or criteria	Description and values
Name of mine	Yeristovo
Description of mining area	<p>The Yeristovo iron ore mining and beneficiation complex is located in the Kremenchug district some 275 km south-east of the Kapital Kyiv (Kiev) on the banks of the Dnepro (Dnieper) River surrounded by flat agricultural land (GoogleEarth 2018).</p> <p>The Yeristovo deposit of ferruginous (iron-bearing) quartzite was thoroughly investigated in 1977-79 up to 700 m depth. In the south, it borders on the Lavrikovskoye deposit which is operated by Ferrexpo Poltava Mining (FPM) (Ferrexpo 2019b).</p> <p>Yeristovo is one of several geophysical/magnetic anomalies within the early Precambrian metasedimentary and metavolcanic complexes of the Krivoy Rog-Kremenchug structural formation zone of the Ukrainian Shield (Pokalyuk 2017).</p>
Surface extension	69.93km ² 69.93 km ² (Image date: 05.05.2018; Viewing height: 13.43 km) (Google Earth)
In operation since	2012 2012 (GMK 2019)
Operator	Ferrexpo Yeristovo Mining (FYM)
Owner	Ferrexpo Yeristovo Mining (FYM)
Closest town	Horishni Plavni, Poltava Oblast (Google Earth 2019)
Province	Poltavs'ka (Poltava) Region (Google Earth 2019)
Country	Ukraine
Longitude	33.696511°

Latitude	49.049439°
Altitude	90 m a.s.l. 90 m a.s.l. (Google Earth 2019)
Main product and by-products	Main product: Iron (Fe); by-products: None
On-site processing stages	FYM is designed to mine 28 Mt of crude ore per annum and produce up to 10 Mt of iron ore concentrate (dry) with 67.3 % Fe content. FYM production units (estimated capacity in brackets): <ul style="list-style-type: none"> • Iron ore mining (28,500 kt) • Iron ore beneficiation (10,000 kt) • Iron ore pellets (6,000 Kt) (Ferrexpo 2019d).
Annual production	Group iron ore pellets production FY 2018: 10,607 kt. (Ferrexpo 2019c)
Proven Reserves	Ferrexpo Yeristovo Mining, JORC Reserve/Resource Statement as at 31.12.2018: Proven & probable reserves: 611.0 Mt @ 32.66 % Fe (Ferrexpo 2019b).
Probable Reserves	Ferrexpo Yeristovo Mining, JORC Reserve/Resource Statement as at 31.12.2018: Proven & probable reserves: 611.0 Mt @ 32.66 % Fe (Ferrexpo 2019b).

Geology



Indicator or criteria	Description and values	Explanation	Assessment result	Data quality
Preconditions for acid mine drainage (AMD)	Sulphur content of iron ore deposits within the Kremenchug Magnetic Anomaly has been reported as minimal (under 0.05 % S) indicating low to very low preconditions for AMD.	According to the Goldschmidt-Classification, iron is a siderophile element. Based on the measurement instructions for siderophile elements and considering the low to very low AMD potential, the Environmental Hazard Potential (EHP) is evaluated as low.	Low	B1 = medium, can be estimated on the basis of available information

Paragenesis with heavy metals	No paragenesis of heavy metals could be determined	No paragenesis of heavy metals in ore was identified, therefore, the measurement instructions indicate a medium EHP.	Medium	B2 = medium, classified according to measurement instructions
Paragenesis with radioactive components	No indication of paragenesis with thorium (Th) and uranium (U) in iron ore could be determined.	In accordance with the measurement instructions, iron ore deposits are usually evaluated with a medium EHP, if no other information is available.	Medium	B2 = medium, classified according to measurement instructions
Deposit size	Proven & Probable 611.0 Mt @ 32.66 % Fe Resources 1,120.0 Mt @ 32.22 % Fe (Ferrexpo 2019b)	Having operated since 3Q 2012, and assuming an average annual production (ore and waste) of 25 Mt (2018: 28.5 Mt) (Ferrexpo 2019b), the original iron ore reserves of the Yeristovo mine would amount to about 770 Mt with additional resources of 1,120 Mt with an average ore grade of 32.3 % Fe (ibid.), the Yeristovo mine would hold some 610 Mt of contained iron and classified as medium-size iron ore deposit. According to measurement instructions based on Petrow et al. (2008, in Dehoust et al. 2017b), this would indicate a low EHP.	Low	A = high, can be derived directly from available data
Ore grade	32.66 % Fe in proven & probable reserves (Ferrexpo 2019b)	Yeristovo is rated as a medium grade deposit of predominantly magnetite quartzite ore, which indicates a medium EHP according to measurement instructions based on Priester et al. (2019).	Medium	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 mining (GMK 2019)	Conventional solid rock open pit mining is evaluated with a medium EHP. During open pit mining in solid rocks, 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 than in mining of alluvial or unconsolidated sediments.	Medium	A = high, can be derived directly from available data
Use of auxiliary substances	Mining is carried out by drill & blast method and haul truck transportation within the quarry to the crusher plant, rail transport of crushed ore to the processing and beneficiation plant at Ferrexpo Poltava Mining (Ferrexpo 2019b). Currently, all ore processing (crushing, sorting and magnetic separation), beneficiation and pelletizing of Yeristovo iron ore is done at Ferrexpo Poltava Mining (FPM) (Ferrexpo 2019b).	Mining by drill and blast and transportation are currently the only processing activities on site. Ore classification and beneficiation is done outside the Yeristovo mining complex. The Yeristovo mining operation is therefore evaluated with a low EPH.	Low	B1 = medium, can be estimated on the basis of available information
Mining waste	Overburden is transported by haul truck to waste dumps engineered by the company's mine planning department, with designs approved by the Ukrainian Mining Institute Ukgiproruda. (Ferrexpo 2018)	Waste management plans are in place for mine waste dumps which are inspected twice annually, therefore, a low EHP is indicated.	Low	B1 = medium, can be estimated on the basis of available information

	As of end of 2015, 113 million m3 of material was removed (Ordinary business 2019).			
Remediation measures	<p>Yeristovo is still a fairly new operation. “The first minor restoration work of the Yerystivske mine is expected to start after 2032 within the different dump areas, whereas the removal of equipment and the flooding of the pit will only begin at the end of the mine’s life”. (Ferrexpo 2019c)</p> <p>Ferrexpo closely monitors a wide range of environmental factors at its operations, to ensure compliance with local laws and to limit environmental impacts, with the aim of showing year-on-year progress in each area (Ferrexpo 2019e).</p> <p>On-going developments:</p> <ul style="list-style-type: none"> • Removal and stockpiling of fertile topsoil prior to stripping operations with intention of agricultural use • Implementation of an Environmental Management System in accordance with ISO 14001 with the goal to obtain compliance certification in the near term • Consistently meeting the regulatory requirements related to gas and dust emissions and water management (Ferrexpo 2019e) 	<p>Remediation policies are in place and environmental management plans in accordance with ISO 14001 are being developed.</p> <p>Existing monitoring and rehabilitation plans would usually indicate a low EHP; however, a medium EHP is given for industrial mining companies in countries with less stringent law enforcement.</p>	Medium	A = high, can be derived directly from available data

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 Yeristovo mining area is located at the junction of the Psel River and Dnieper River with a medium EHP for floods (rated 2) which determines the evaluation result. The other sub-indicators have a low EHP.	Medium	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 availability 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 Initiative for Responsible Mining Assurance (IRMA 2014).	The mining area is not situated in or near designated protected areas and AZE sites, which results in a low EHP.	Low	A = high, can be derived directly from available data

State Governance

Indicators	
WGI 1 -Voice and Accountability	44.83 ^{ooo}
WGI 2 -Political Stability and Absence of Violence/ Terrorism	6.19 ^{ooo}
WGI 3 - Government Effectiveness	38.46 ^{ooo}
WGI 4 -Regulatory Quality	44.23 ^{ooo}
WGI 5 - Rule of Law	24.04 ^{ooo}
WGI 6 -Control of Corruption	18.27 ^{ooo}
EPI (Environmental Performance Index)	52.87
EITI membership	Yes, since 2013. Current status is “meaningful progress” (EITI 2019)
International Agreements	
ILO 176	Ratification 15 June 2011, Status: “in Force”

<p>Others</p>	<p>Paris Agreement on Climate Change, adopted in Paris, France, under the United Nations Framework Convention on Climate Change, signed by Ukraine 22 Apr 2016, ratified 19 Sep 2016 (UNTC 2019).</p>
<p>Legal framework</p>	
<p>Areas of Law: Environment</p>	<p>According to Ukrainian law, it is necessary for investor to acquire several permits (Fedoruk / Sozanska-Matviychuk 2018):</p> <ol style="list-style-type: none"> 1) Approval of a drilling programme; 2) Permit for performance of hazardous works and use of hazardous equipment issued by the State Labour Service; 3) permit for waste management activities issued by local State administrations (currently not issued due to lack of procedure); 4) air emission permit; 5) environmental impact assessment due to Law of Ukraine “On Environmental Impact Assessment” (from December 2017). <p>The Law of Ukraine “On Waste Products” regulates the storage of tailings and declares, that tailings “shall be made in accordance with the environmental safety rules and with the use of methods providing maximum use of waste. For each place of tailing, storage appropriate passport shall exist. Despite the above, an investor providing storage of tailings shall obtain an appropriate permit for such activity” (Fedoruk / Sozanska-Matviychuk 2018)</p>

<p>Areas of Law: Occupational Health and Safety (OHS)</p>	<p>The Ukrainian Labour Code contains a general obligation for the employer to ensure safe and harmless conditions for workers and they are also obliged to ensure safe environment conditions. Within the mining spheres, health and safety is covered by several laws (Fedoruk / Sozanska-Matviychuk 2018): 1) the Mining Law; the Law of Ukraine “On Ensuring the Sanitary and Epidemiological Safety of the Population”, 2) the Code for Civil Protection, 3) the Law of Ukraine “On Labour Protection”, 4) the Labour Code of Ukraine, 5) the Law “On Mining and Processing of Uranium Ore”, 6) the Safety Rules in Oil and Gas Mining Industry, 7) the Labour Protection Rules for Crushing, Sorting and Processing Mineral Resources and Lumping Ores and Concentrates. Albeit the many laws and protections rules, Ukraine achieves a very low rating in the ITUC Global Rights Index (5 of scale from 1 to 5). It is stated that it is impossible for workers to enforce their rights. This fact is due to the fundamentally failure of governmental institutions to punish those who are responsible for systematic violations of human rights and humanitarian law (ITUC 2018).</p>
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Corporate Social Responsibility (CSR)

Voluntary Standards	
Aluminium Stewardship Initiative (ASI): Is the mine owning company a member?	Not applicable Not applicable
Aluminium Stewardship Initiative (ASI): Is the mine certified?	Not applicable Not applicable
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 available
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“	Not applicable Not applicable
Responsible Mining Index Company indicator „Environmental sustainability“	Not applicable Not applicable
Responsible Steel (RS): Is the mine owner a member of the RS?	No No (Responsible Steel 2019)
Responsible Steel (RS): Is the mine certified?	Not applicable Not applicable
Australian Steel Stewardship Forum (ASSF): Is the owner a member of the ASSF?	No No (ASSF 2019)
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?	No Ferrexpo is developing an environmental management system to be certified in the near term (Ferrexpo 2019e)
CSR-directive 2014/95/EU: Does the mine owning company have its headquarters in an EU country?	No No: Baar, Switzerland. Ferrexpo is a Swiss headquartered iron ore company with assets in Ukraine (Ferrexpo 2019a)
OECD Guidelines: Does the company have its headquarters in a signatory state?	Yes Yes, Switzerland (OECD 2019)
ISO 26000: Does the mine implement ISO 26000?*	No information obtained No information available
Banking Standards	
WB Standards / IFC Performance Standards: Is the mine financed to a major extend by the world bank?	No information obtained No information available
Equator Principles (EP): Is the mine financed to a major extend by a bank adherent to the EP?	No information obtained No information available

*by companies own account.

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A Glossary

Table 1 Legend

Environmental hazard potential



low



medium



high

Data quality



low



medium



high

- 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.

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

- 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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