

ÖkoRess III

Pilot Screening of Environmental Hazard Potentials of Mine Sites

Factsheet:

Chogart

National Iranian Steel Co. (NISCO) , Iran

ID: 29

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>

Chogart

Iron ore

General information 	
Indicator or criteria	Description and values
Name of mine	Chogart
Description of mining area	The mine is located in the Yazd Province 125 km southeast of the town Yazd and ca. 580 km south-east of Iran's capital Teheran (Monjenzi et al. 2009). Chogart is located in the Precambrian Central Iranian Plateau which is characterized by sedimentary, volcanic, intrusive rocks as well as schist, marble and gneisses (Shayestehfar et al. 2006). The main ore mineral is magnetite with the accessory minerals apatite, pyrite, alkali, amphiboles, calcite, talc, quartz, monazite, davidite and allanite (Moore / Modabberi 2003).
Surface extension	19.27km ² 19.27 km ² (Image date: 06.12.2019; Viewing height: 6.79 km) (Google Earth)
In operation since	1970 1970 (Monjenzi et al. 2009)
Operator	National Iranian Steel Co. (NISCO)
Owner	National Iranian Steel Co. (NISCO)
Closest town	Bafq (ca. 10 km south east of Chogart)
Province	Yazd Province
Country	Iran
Longitude	55.467222°
Latitude	31.7°
Altitude	1100 m a.s.l. 1100 m a.s.l.
Main product and by-products	Main product: Iron ore; By-products: none

On-site processing stages	No information available
Annual production	3.25 Mt of iron ore (production capacity in 2015) (Hastorun 2018)
Proven Reserves	100 Mt (Iran Mining n.d.)
Probable Reserves	n.a (Iran Mining n.d.)

Geology



Indicator or criteria	Description and values	Explanation	Assessment result	Data quality
Preconditions for acid mine drainage (AMD)	Sulfides, mostly pyrite occur as microscopic inclusions in the magnetite. Overall there is a low sulfide to iron oxide ratio (Moore / Modabberi 2003).	Iron is a siderophile element. Siderophile elements often are sulfidic but also mined in oxide ores as in the present case. Sulphide minerals are present but not predominant accordingly, preconditions for acid mine drainage result in a medium environmental hazard potential (EPH) (Dehoust et al. 2017).	Medium	A = high, can be derived directly from available data
Paragenesis with heavy metals	No indication for paragenesis with heavy metals could be determined.	As there is no direct information on the paragenesis with heavy metals available, the measurement instructions are referred to. These indicate that oxidic iron ores can be associated with heavy metals such as lead, zinc, copper, chrome, and arsenic. Accordingly, heavy metals and arsenic may have a limited relevance in the extraction of oxidic iron ores, leading	Medium	B2 = medium, classified according to measurement instructions

		to a medium EHP (Dehoust et al. 2017).		
Paragenesis with radioactive components	A radioactive anomaly of thorium has been observed in the orebody by ground radiometric and spectrometric surveys. Thorium levels of up to 40.40 ppm have been measured (Khoshnoodi et al. 2017).	According to the measuring instructions the measured thorium concentrations are low since the substrate is suitable for the usage as building material (Dehoust et al. 2017). Therefore, the EHP resulting from paragenesis with radioactive components is low.	Low	A = high, can be derived directly from available data
Deposit size	The mine began production in 1970. At a production capacity of 3.25 Mt of ore, a total of ca. 160 Mt of iron ore has been extracted. Adding the reserves a total of 260 Mt of iron ore is found in the deposit. At a grade of ca. 55 % Fe the mine contains approximately 143 Mt of iron (Iran Mining n.d.; Kordzadeh 2016).	The deposit size is medium according to the measuring instructions. Larger deposits potentially have a greater expected total impact on the natural environment. Accordingly, Chogart's EHP resulting from the deposit size is medium. Since no up to date information from the mine owners on reserves is available, the data quality is low.	Medium	C = low, no concrete information, no general specifications in the measuring instructions
Ore grade	Low phosphorus 55-56 % Fe High phosphorus 53-54 % Fe (Kordzadeh 2016)	Priester et al. (2019) categorize iron ore with grades between 30 and 60 % as medium grade deposits. Accordingly, the environmental hazard potential caused by the ore grade at Chogart is medium	Medium	A = high, can be derived directly from available data

Technology 				
Indicator or criteria	Description and values	Explanation	Evaluation result	Data quality
Mine type	Open pit hard rock mining (Monjenzi et al. 2009)	Open-pit mines are usually limited to an area that is only slightly larger than the projection of the deposit body to the surface. Accordingly, the EHP resulting from the mining method is medium.	Medium	A = high, can be derived directly from available data
Use of auxiliary substances	No concrete information could be obtained. It is likely that the iron ore is extracted by drilling and blasting. Afterwards it is probably grinded and milled. A wet processing route is probable since tailings storage facilities for wet residues can be seen in satellite images.	The extraction and processing likely involves steps that require the use of auxiliaries. At Chogart probably blasting and / or floatation agents could be involved in the process. Accordingly the EHP resulting from extraction and processing is estimated to be low since no concrete information could be obtained.	Medium	C = low, no concrete information, no general specifications in the measuring instructions, (expert)
Mining waste	Satellite images indicate that several tailing storage facility right next to each other are present. The total area of the impoundments is estimated to be ca. 1.6 km ² . Significant amounts of waste seem to be stockpiled in the east of the mine.	No concrete information concerning the waste management has been available. Satellite images indicate tailing storage facilities and large waste dumps are present. Accordingly, the EHP resulting from waste management is estimated to be high.	High	C = low, no concrete information, no general specifications in the measuring instructions, (expert)
Remediation measures	No information concerning remediation measures could be obtained.	WGI indicators for Iran rank among the lowest. It can be assumed that generally	High	C = low, no concrete

		authorities have a low probability of scrutinizing mines properly. In consequence, it is assumed that companies may not put as much effort into remediation as they would in a country with stricter control. This might even be amplified by the fact that the mine owner is a state owned company.		information, no general specifications in the measuring instructions, (expert) estimate
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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). 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 earthquakes is high which determines the evaluation result although the EHP for the other sub-indicators is low.	High	B2 = medium, classified according to measurement instructions
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 EHP for water stress is high and the mine is situated in a desert area. Both results alone already determine the high EHP result.	High	B2 = medium, classified according to measurement instructions
Protected areas and AZE sites	Georeferenced data for designated protected areas are used to assess hazards posed by	The mine is situated in a protected area which determines a medium EHP.	Medium	B2 = medium, classified

	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).			according to measurement instructions
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State Governance

Indicators	
WGI 1 -Voice and Accountability	12.81 ^{ooo}
WGI 2 -Political Stability and Absence of Violence/ Terrorism	15.71 ^{ooo}
WGI 3 - Government Effectiveness	45.19 ^{ooo}
WGI 4 -Regulatory Quality	10.1 ^{ooo}
WGI 5 - Rule of Law	25.96 ^{ooo}
WGI 6 -Control of Corruption	20.19 ^{ooo}
EPI (Environmental Performance Index)	58.16
EITI membership	No

International Agreements	
ILO 176	Not ratified
Others	No information obtained
Legal framework	
Areas of Law: Environment	<p>The Mining Law dates back to 17 May 1998. The original Act has been amended in 2011. The Ministry of Industry, Mine and Trade is responsible for issuing mining licenses (Ghaffari 2013; Nateq-Nouri 2018). Holders of mining licenses aiming at “optimal exploitation and conservation of mineral deposits by enhancing productivity, research, development and exploration and preservation of environment in their mines” can save up to twenty percent (20 %) from payment of royalties (Islamic Republic Iran, Ministry of Industry, Mine and Trade 2011).</p> <p>There is an Environmental Protection Law in place which dates back to 1974 and identifies four categories of protected natural areas: national parks, wildlife refuges, protected areas, and national nature monument (Wagner n.d.).</p> <p>IMIDRO (Iranian Mines & Mining Industries Development & Renovation) is responsible for the implementation of the mining framework and often serves as a joint venture partner, particularly for large mining projects (Al Barazi et al. 2016).</p> <p>No information concerning mine closure, rehabilitation or public consultations could be obtained or has been mentioned in the translated Mining Act (Islamic Republic Iran, Ministry of Industry, Mine and Trade 2011).</p>

<p>Areas of Law: Occupational Health and Safety (OHS)</p>	<p>Occupational Health and Safety is regulated by the Labour Law of 1990. Mining is not addressed specifically. Employers are required to address health and safety issues. The requirements are inspected by the Ministry of Health, the Ministry of Labour and the national insurance organization (Ghaffari 2013).</p>
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Corporate Social Responsibility (CSR)

Voluntary Standards	
<p>Aluminium Stewardship Initiative (ASI): Is the mine owning company a member?</p>	<p>Not applicable Not applicable</p>
<p>Aluminium Stewardship Initiative (ASI): Is the mine certified?</p>	<p>Not applicable Not applicable</p>
<p>International Council of Mining & Metals (ICMM): Is the mine owning company a member?</p>	<p>No No (ICMM 2019)</p>
<p>Towards Sustainable Mining (TSM) Is the mine owning company a member of the Mining Association of Canada (MAC)?</p>	<p>No No (MAC 2019)</p>
<p>Towards Sustainable Mining (TSM) outside Canada: Are TSM standards implemented*?</p>	<p>No No (MAC 2019)</p>

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 (RMI 2018)
Responsible Mining Index Company indicator „Environmental sustainability“	Not applicable Not applicable (RMI 2018)
Responsible Steel (RS): Is the mine owner a member of the RS?	No information obtained No information obtained
Responsible Steel (RS): Is the mine certified?	No information obtained No information obtained
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?	No No (ASSF 2019)
ISO and CSR reporting	
ISO 14001 (ISO 14004): Is the mine ISO 14001 certified?	No information obtained No information available

CSR-directive 2014/95/EU: Does the mine owning company have its headquarters in an EU country?	No No
OECD Guidelines: Does the company have its headquarters in a signatory state?	No No
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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