

ÖkoRess III

Pilot Screening of Environmental Hazard Potentials of Mine Sites

Factsheet:

Mont-Wright mine

ArcelorMittal, Canada

ID: 19

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>

Mont-Wright mine

Iron ore

General information 	
Indicator or criteria	Description and values
Name of mine	Mont-Wright mine
Description of mining area	The Mont-Wright Mine is part of the AMEM Operation, which also includes Fire Lake Mine and Port-Cartier Plant in Quebec. If possible, the evaluation is based on the Mont-Wright Mine. Both mines (Mont-Wright and Fire Lake) are located in the highly-folded and metamorphosed southwestern part of the Labrador Trough. The hematite iron, as the most important rock type in the area, forming wide, massive deposits that often form high ridges that extend several kilometers in the Quebec-Labrador region (ArcelorMittal 2019 p. 242). Labrador is a geographic and cultural region within the Canadian province of Newfoundland and Labrador. The landscape is covered by forests or woodlands with over 50 % of total land surface and less than 1 % has been converted for development (Notzl et al. 2013).
Surface extension	66.27km ² 66.27km ² (Image date: 25.09.2019; Viewing height: 15.50 km) (Google Earth)
In operation since	1976 1976 (ArcelorMittal 2019 p. 242).
Operator	ArcelorMittal
Owner	ArcelorMittal
Closest town	Fermont (10 km E of the mine)
Province	Quebec
Country	Canada
Longitude	-67.324018°
Latitude	52.757216°

Altitude	800 m a.s.l. 700-800 m a.s.l. (Google Earth)
Main product and by-products	Main-product: iron ore; by-products: none (ArcelorMittal 2019 p. 242).
On-site processing stages	The Mont-Wright operation consists of open pit mines and a concentrator. The ore is crushed in two gyratory crushers and the concentrator operates with seven lines of spiral classifiers and horizontal filters. The mining complex has a production capacity of approximately 26 Mt of concentrate per year (ArcelorMittal 2019 p. 242).
Annual production	2018: 15 Mt iron concentrate (incl. Fire Lake mine) (ArcelorMittal 2019 p. 242). Specific data for Mont-Wright only is not available.
Proven Reserves	1917 Mt , 30.2 % iron content (for AMEM Operation) (MDO 2019). Specific data for Mont-Wright only is not available.
Probable Reserves	197 Mt, 29.2 % iron content (for AMEM Operation) (MDO 2019). Specific data for Mont-Wright only is not available.

Geology

Indicator or criteria	Description and values	Explanation	Assessment result	Data quality
Preconditions for acid mine drainage (AMD)	Iron ores are usually present in oxidic minerals, whereby the respective general association (including accompanying minerals) can often also contain sulfides. In these cases, a medium rating is recommended.	Sulfidic rock types are present but not predominant, also Iron is a siderophil element, therefore AMD poses a medium Environmental hazard potential (EHP).	Medium	B2 = medium, classified according to measurement instructions
Paragenesis with heavy metals	No indication of paragenesis with heavy metals could be determined.	Mining of metals generally poses a certain risk to contamination with heavy metals. Accordingly, the EHP is medium.	Medium	B2 = medium, classified according to measurement instructions

Paragenesis with radioactive components	No indication of paragenesis with thorium (Th) and uranium (U) could be determined.	In accordance with the measurement instructions, iron ore deposits are evaluated with a medium EHP, if no other information is available.	Medium	B2 = medium, classified according to measurement instructions
Deposit size	From 1975 to 2014, 331 Mt of ore were extracted (Government of Canada 2016). The total reserves of about 2,114 Mt of crude iron ore with an estimated average ore grade of 30 % Fe adds up to 634 Mt of iron content.	By adding 39 years of production with 331 Mt of ore and 4 years of production with 15 Mt per year (2014-2018) to the total reserves would equal to 751 Mt iron. According to the measurement instructions the estimated deposit size of 751 Mt Fe can be classified as medium-sized. A medium EHP is assigned.	Medium	B1 = medium, can be estimated on the basis of available information
Ore grade	Approximately 30.1 % in reserves (MDO 2019)	The updated measurement instructions categorize iron ore with grades between 30 % and 60 % as medium grade deposits (Priester et al. 2019). Accordingly, the EHP for the indicator ore grade at AMEM operations and Mont-Wright 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 (ArcelorMittal 2019 p. 242).	Open-pit mines are usually limited to an area that is only slightly larger than the projection of the ore body to the surface. Accordingly, the EHP of the indicator mine type is medium.	Medium	A = high, can be derived directly from available data
Use of auxiliary substances	No direct information could be obtained. Description of on-site processing stages (ArcelorMittal 2019 p. 242) and analysis of satellite imagery indicates a wet processing route after extraction is in place due to visible TSFs. This would require grinding and milling after excavation.	The extraction and processing is likely to involve steps that require the use of auxiliaries. A wet processing route would require high-intensity magnetic separation with the involvement of floatation agents. Accordingly the EHP resulting from extraction and processing is estimated to be medium.	Medium	C = low, no concrete information, no general specifications in the measuring instructions, (expert)
Mining waste	Satellite images indicate TSFs right next to each other. The area of the TSFs are estimated to be approx. 20 km ² and 3 km ² . For 2014, it was reported that 103 Mt of waste rock were stored in dumps and 44 Mt were stored in TSFs (Government of Canada 2016).	Assuming a conservative depth of 1 m, the volume of the largest TFS is approx. 20 km ³ . According to the definition of (ICOLD 2018), the estimated TSF volume is considered to be large (> 3 Mio m ³). Large TSF's are evaluated with a high EHP.	High	C = low, no concrete information, no general specifications in the measuring instructions, (expert)
Remediation measures	According to Arcelor Mittal's Plan "Mont Wright 2045" the company will build an expansion for their tailings storage facility (TFS) that will ensure the operations until 2045. The expansion of the TFS will be in accordance with existing regulations and with all required approvals obtained from Environment Canada, Fisheries and Oceans Canada and the Ministry of Sustainable	The EHP is evaluated as low due to the companies plan to comply with Canadian regulations and laws.	Low	B2 = medium, classified according to measuring instructions

	Development, Environment and the fight against climate change (ArcelorMittal n.d.).			
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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 all sub-indicators (earthquakes, flood, landslide, tropical storm, arctic region) is low for the mining area.	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 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 mine is not situated in a desert area, which results in a low EHP.	Low	The water stress for the mining area is low and the mine is not situated in a desert area, which results in a low EHP. 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	The mining area is not situated in designated protected areas and AZE sites, which results in a low EHP.	Low	A = high, can be derived directly

	EHPs corresponds to the method first described in the draft standard of the Initiative for Responsible Mining Assurance (IRMA 2014).			from available data
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State Governance

Indicators	
WGI 1 -Voice and Accountability	96.1 ^{ooo}
WGI 2 -Political Stability and Absence of Violence/ Terrorism	88.6 ^{ooo}
WGI 3 - Government Effectiveness	97.1 ^{ooo}
WGI 4 -Regulatory Quality	97.6 ^{ooo}
WGI 5 - Rule of Law	95.7 ^{ooo}
WGI 6 -Control of Corruption	95.7 ^{ooo}
EPI (Environmental Performance Index)	72.18
EITI membership	No

International Agreements	
ILO 176	No
Others	No further information
Legal framework	
Areas of Law: Environment	<p>In Canada, provinces have jurisdiction over mining affairs and their own Mining Acts and industry related incentives or economic development programmes. However, the federal ministry, Natural Resources Canada (NRCan), is an important player in the mining field. Compliance with both, federal and provincial legislation, is mandatory. Relevant matters that specifically fall under federal jurisdiction include: nuclear energy (including uranium mining), federal land, environmental protection and conservation (shared with the provinces), and integrated management of ocean-related activities (pers. comm. Aarti Soerensen).</p> <p>Environmental Impact Assessments are required for every mining project, even though the specific process may differ across Canada (Abdel-Barr / MacMillan 2018). For closure and restoration, plans have to be approved by the provincial government prior to any mining activities (Abdel-Barr / MacMillan 2018).</p> <p>On a federal level, the Canada’s enhanced Corporate Social Responsibility (CSR) Strategy, “Doing Business the Canadian Way: A Strategy to Advance Corporate Social Responsibility in Canada’s Extractive Sector Abroad” (Global Affairs Canada n.y.) provides in-depth Guidelines on CSR for companies in the mining sector operating abroad.</p>

<p>Areas of Law: Occupational Health and Safety (OHS)</p>	<p>Occupational health and safety (OHS) in Canada is part of provincial or territorial legislations and therefore not uniformly regulated. The provincial or territorial legislations set the framework for obligations on owners, supervisors and employees. Some provinces have regulations and legislations which directly apply to the mining industry (Abdel-Barr / MacMillan 2018). The regional government of Ontario, for example, has specifically developed recommendations for OHS in underground mines (Government of Ontario n.d.). A set of rules that the mining industry in Canada largely adheres to but which is not state-driven, was established by the Mining Association of Canada in the framework of the Towards Sustainable Mining (TSM) (MAC 2019a).</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>Yes Yes (MAC 2019b)</p>
<p>Towards Sustainable Mining (TSM) outside Canada: Are TSM standards implemented*?</p>	<p>Not applicable Not applicable</p>

Initiative for Responsible Mining Assurance (IRMA): Is the mine owning company a member?	Yes Yes (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
Responsible Mining Index Company indicator „Working conditions“	0.537 0.537 (RMI 2018a)
Responsible Mining Index Company indicator „Environmental sustainability“	0.166 0.166 (RMI 2018a)
Responsible Steel (RS): Is the mine owner a member of the RS?	Yes Yes (Responsible Steel 2019)
Responsible Steel (RS): Is the mine certified?	No No (Responsible Steel 2019)
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 (ArcelorMittal 2015)

CSR-directive 2014/95/EU: Does the mine owning company have its headquarters in an EU country?	Yes Yes (for ArcelorMittal S.A.)
OECD Guidelines: Does the company have its headquarters in a signatory state?	Yes Yes
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.

Sources

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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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