

ÖkoRess III

Pilot Screening of Environmental Hazard Potentials of Mine Sites

Factsheet:

Discovery Bay

New Day Aluminum LLC , Jamaica

ID: 89

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>

Discovery Bay

Bauxite

General information



Indicator or criteria	Description and values
Name of mine	Discovery Bay
Description of mining area	The mine is located in St. Ann and falls under a Special Mining Lease (SML72) granted to the operator. The area is in close proximity to the Cockpit Country Protected Area (Jamaica Observer 2019) The area is formed of Cenozoic sedimentary rocks (Chorlton 2007)
Surface extension	1.35km ² 1.35 km ² (Image date: 10.12.2019; Viewing height: 1.57 km) (Google Earth)
In operation since	1952 1952 – major expansion in 1988 and again in 2011 (Jamaica Bauxite Institute 2019a)
Operator	New Day Jamaica Bauxite Limited
Owner	New Day Aluminum LLC
Closest town	Kingston Town is approximately 80 km south-east of the mine
Province	St Ann
Country	Jamaica
Longitude	-77.42°
Latitude	18.4602°
Altitude	100 m a.s.l. 100 m a.s.l
Main product and by-products	Main product: Bauxite; by-product: None
On-site processing stages	None; truck and shovel method used for extraction of bauxite ore, that is then shipped via rail to Port Rhoades (Jamaica Bauxite Institute 2019b).

Annual production	Annual production numbers cannot be found as the mine is held by a private company in 2019, with no legal obligation to publish annual production. The operations have a reported capacity of up to 5.4 Mt of bauxite ore (Jamaica Bauxite Institute 2019b)
Proven Reserves	No information obtained
Probable Reserves	No information obtained

Geology



Indicator or criteria	Description and values	Explanation	Assessment result	Data quality
Preconditions for acid mine drainage (AMD)	No specific information on St. Ann/Discovery Bay could be obtained.	Aluminium is a lithophile element and bauxite forms oxidic ore deposits (Dehoust et al. 2017b).	Low	B2 = medium, classified according to measuring instructions
Paragenesis with heavy metals	No specific information on St. Ann was obtained on the heavy metal paragenesis.	As there is no direct information on the paragenesis with heavy metals available, the measurement instructions are referred to. The extraction of metallic raw materials is often connected to heavy metal- and/or arsenic-related problems. Accordingly, a medium Environmental Hazard Potential is estimated (Dehoust et al. 2017b).	Medium	B2 = medium, classified according to measurement instructions

Paragenesis with radioactive components	No specific information on St Ann could be obtained.	In accordance with the measuring instructions, bauxite deposits are evaluated with a medium EHP, if no other information is available. This class division is based on average thorium and uranium activity levels in Chinese bauxite deposits (Dehoust et al. 2017).	Medium	B2 = medium, classified according to measurement instructions
Deposit size	No specific information on St Ann could be obtained and actual production figures could not be identified. The mine is in production since 1952 and the permit is valid until 2030. Calculating with an annual production of ca. 4 Mt of bauxite. The total deposit is estimated to contain ca. 300 Mt of bauxite.	In accordance with the measuring instructions the EHP resulting from the deposit size is high (Dehoust et al. 2017b).	High	C= No concrete information, no general specifications of the measuring instructions, expert estimation.
Ore grade	No specific information on St Ann could be obtained. The average grade of bauxite ore in Jamaica is 45 % Al ₂ O ₃ (Lancashire 2014)	Jamaican bauxite mines have average grades that correlate with median concentrations of globally assessed mines (Meyer, 2004). Accordingly, the mine is assigned a Medium EHP.	Medium	C= No concrete information, no general specifications of the measuring instructions, expert estimation.

Technology 				
Indicator or criteria	Description and values	Explanation	Evaluation result	Data quality
Mine type	Open-pit mining (Jamaica Bauxite Institute 2019b)	Mining on sedimentary deposits leads to shallow depths and large surface areas	High	A = high, can be derived directly

		to be disturbed, leading to a high EHP being assigned, according to the measuring instructions (Dehoust et al 2017).		from available data
Use of auxiliary substances	Extraction of bauxite involves truck & shovel/loader techniques. There are no auxiliary substances used (Jamaica Bauxite Institute 2019b).	The bauxite ore is not processed and no auxiliary substances are used. Accordingly the EHP is low for this indicator.	Low	A = high, can be derived directly from available data
Mining waste	No information could be obtained for St Ann.	With no information available on how mining waste has been managed, and to what extent backfilling has been undertaken, the production quantities over the life of the mine lead to a High EHP being assigned to this mine.	High	C= No concrete information, no general specifications of the measuring instructions, expert estimation.
Remediation measures	The Jamaican Bauxite Institute describes on their website that mined-out land is rehabilitated by the companies following a four-step method. (Top-soil reshaping, restore by planting with pasture grasses, Inspection by officers from the Commissioner of Mines, the JBI, the Ministry of Agriculture, and the Forestry Department, after certification mined-out land is used for farming, housing, etc. (Jamaica Bauxite Institute 2019c)	Mined-out land is rehabilitated. It is assumed that it takes place in parallel to production; given the long time of production and comparably small areas disturbed in current satellite images. Accordingly, the EHP resulting from remediation measures is low.	Low	B1= Assessable on the basis of available information.

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. 2017a)). 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, floods, tropical storms, arctic region) is low except for landslides which is medium, resulting in an overall Medium 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 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 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	68.97 ^{ooo}
WGI 2 -Political Stability and Absence of Violence/ Terrorism	62.86 ^{ooo}
WGI 3 - Government Effectiveness	70.67 ^{ooo}
WGI 4 -Regulatory Quality	62.98 ^{ooo}
WGI 5 - Rule of Law	46.15 ^{ooo}
WGI 6 -Control of Corruption	50 ^{ooo}
EPI (Environmental Performance Index)	58.58
EITI membership	No
International Agreements	
ILO 176	Not ratified

Others	No major mining/enviornment international agreement noted
Legal framework	
Areas of Law: Environment	<p>The Mining Act (1947, amended in 1995), Mining Regulations (1947, amended in 2004) and the Quarries Control Act (1984) govern mining’s impact on the enviornment and public health.</p> <p>In 1994, under an MoU the responsibility for enviornmental management of bauxite/alumina sector was delegated to the Jamaican Bauxite Institute (JBI), by the Natural Resources Conservation Authority (NRCA). The JBI conducts regular reviews of mining companies and monitors air emissions, water quality monitoring, waste management, and updates on implementation of projects geared towards improving enviornmental quality (Jamaica Bauxite Institute 2019d)</p>

<p>Areas of Law: Occupational Health and Safety (OHS)</p>	<p>The Occupational Health and Safety Act (1970) is the primary act addressing labour safety in general, with a new OHS Act being debated in Jamaica (2018). The 1970 act covers basic areas of worker rights, employer obligations, workplace hazards and OSH inspections by the government.</p> <p>The Mining Act (1947) is the main legislation that addresses the protection of mining and quarrying workers, but it does not address the issue fully. The Law only requires that the holder of a mining lease take all 'due and proper' precautions for the safety of all persons employed on the mine site. (Ministry of Labour and Social Security, Jamaica 2019)</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>No No (ASI 2019)</p>
<p>Aluminium Stewardship Initiative (ASI): Is the mine certified?</p>	<p>No No (ASI 2019)</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</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?	??? (RMI 2018a)
Responsible Mining Index Company indicator „Working conditions“	Not applicable Not Applicable (RMI 2018b)
Responsible Mining Index Company indicator „Environmental sustainability“	Not applicable Not Applicable (RMI 2018b)
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?	No information obtained No indication found

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 indication found
Banking Standards	
WB Standards / IFC Performance Standards: Is the mine financed to a major extend by the world bank?	No information obtained No indication found
Equator Principles (EP): Is the mine financed to a major extend by a bank adherent to the EP?	No information obtained No indication found

*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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