



Chemaf

# BRINGING MUTOSHI BACK TO LIFE

Development of the Mutoshi cobalt-copper project DRC

2nd July 2018 - Berlin



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## Agenda

Who we are

Mutoshi Project

Mutoshi Project Delivery

Responsible Supply





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# Who we are



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## Who we are

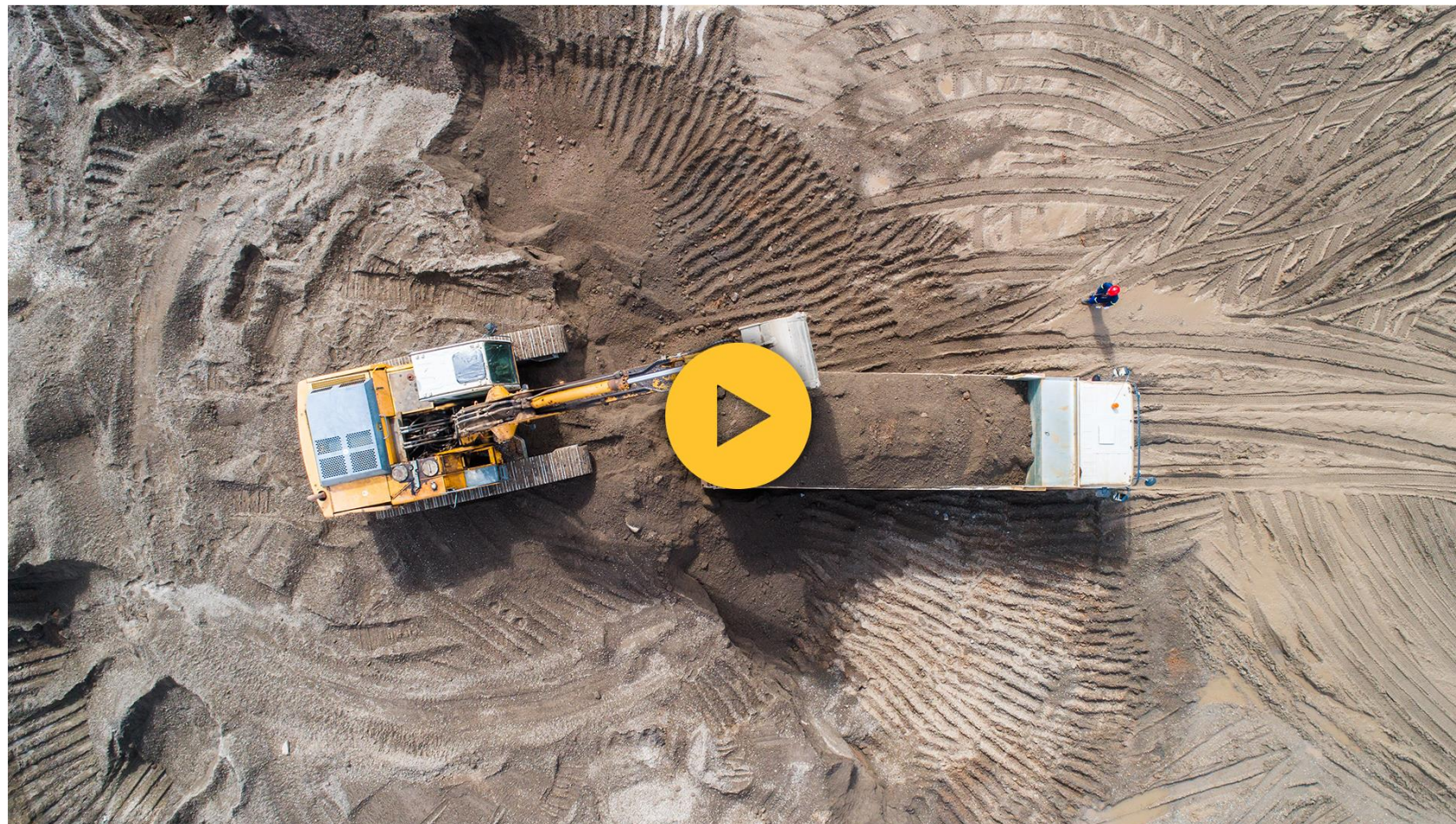
- Chemaf are specialists in mineral exploration, mining and processing with one of the largest and most promising exploration portfolios in the Democratic Republic of the Congo.
- We produce London Metal Exchange (LME) grade cobalt and copper cathode for international markets.
- Established in 2001, Chemaf is a subsidiary of Shalina Resources Ltd., a privately owned company that is wholly owned by the Shalina Group, registered in Dubai.
- Our state-of-the-art assets lower the cost of production, accelerate processing and provide a platform for long-term growth.
- As global demand for copper and cobalt rises we are bringing new supply on-stream, safely and responsibly.
- Chemaf has a well-developed and defined exploration programme that provides a solid foundation for long-term growth.
- Chemaf has more than 100 mining concessions in the DRC, therefore the company is very well positioned with a well-defined exploration programme that provides a solid foundation for long-term growth.





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# Who we are





# Who we are

<b>Etoile Mine</b>	PERMIT: 577
MINERAL RESOURCE	<b>17.66</b> Mt $\text{Cu}$ 2.55% $\text{Co}$ 0.35%

First explored in 1907 by Tanganyika Concessions Ltd., the Etoile ore body, then known as the Kalukuluku mine, was discovered in 1911.

In 2003 Chemaf was granted the mining rights to Etoile and exploration rights to its surrounding areas.

The Etoile pit, which produces copper and cobalt oxides and sulphides, is open cast at 2.55 percent copper and 0.35 percent cobalt.

<b>Etoile Extension</b>	PERMIT: 1538
MINERAL RESOURCE	<b>3.17</b> Mt $\text{Cu}$ 0.31% $\text{Co}$ 0.66%

Offering extensive exploration potential and just 1.5km to the north east of the Etoile mine, the Etoile Extension is a shallow orebody of approximately 300 metres in length and 150 metres wide.

While the deposit has relatively low-grade copper mineralisation, the cobalt mineralisation is estimated to be consistent with the Etoile mine, with a defined mineral resource of 3.17 million tonnes at 0.31 percent copper and 0.66 percent cobalt.

<b>Usoke Production Plant</b>
$\text{Cu}$ <b>31,500</b> COPPER CATHODES (TPM) $\text{Co}$ <b>2,400</b> COBALT IN HYDROXIDE SALT (TPM)

The Usoke Plant, first commissioned in 2002, represents Chemaf's primary processing facility with capacity to produce 31,500 tonnes of copper cathodes and 2,400 tonnes of cobalt salt per annum. The Plant receives copper and cobalt material from Etoile and Luisha.

The plant premises are located some 3kms north east of the central business district of Lubumbashi and some 8km west of the Etoile Mine.

<b>Etoile Production Plant</b>
$\text{Cu}$ <b>20,000</b> COPPER CATHODES (TPM) $\text{Co}$ <b>3,800</b> COBALT IN HYDROXIDE SALT (TPM)

Our new US\$128 million Etoile Processing Plant is based on proven technology developed 'in house' by Chemaf at its Usoke process plant.

The plant is designed to produce 20,000 tonnes per annum of LME "A grade" copper cathodes and 3,800 tonnes of cobalt as cobalt in hydroxide salt per annum.

The first copper cathodes were produced at the plant in October 2016 and the first cobalt hydroxide cake was produced in February 2017.

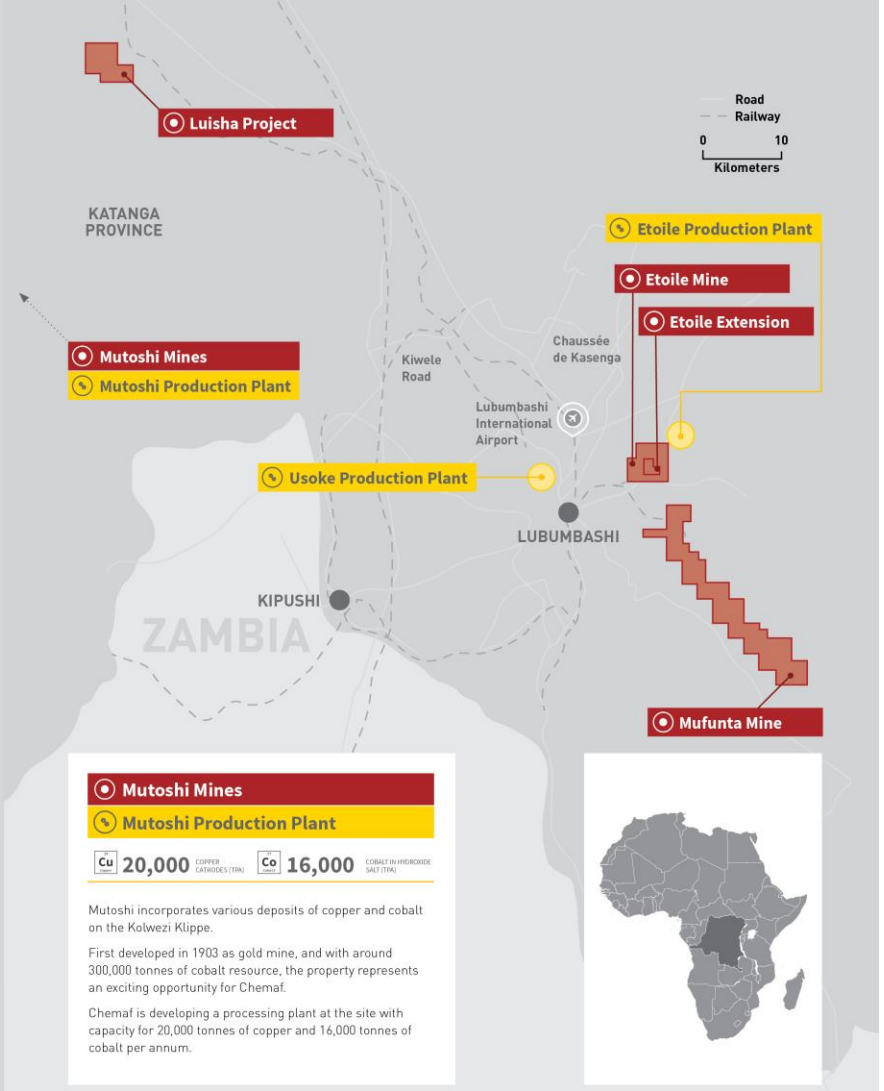
<b>Mufunta Mine</b>	PERMIT: 12113
MINERAL RESOURCE	<b>1.22</b> Mt $\text{Cu}$ 1.51%

The Mufunta concession is located 9km to the south-east of the Etoile mine site. As a mechanised open pit operation the mine produces oxide.

In July 2012, AMC undertook an audit of the drilling work at Mufunta to ensure compliance with JORC standards. In line with their audit, a JORC-compliant resource statement was generated. While there are no significant cobalt deposits at Mufunta, it enjoys 1.22 million tonnes of mineral resource at 1.51 percent copper.

<b>Luisha Project</b>	PERMIT: PE2603
<b>Kanshishi Mine</b>	MINERAL RESOURCE <b>0.3</b> Mt $\text{Cu}$ 1.95%
<b>Kansongwe Mine</b>	MINERAL RESOURCE <b>7.00</b> Mt $\text{Cu}$ 1.43%

Luisha incorporates Kanshishi mine and Kansongwe. First exploited by Union Miniere du Haut Katanga in 1913, and located 75 kilometres northwest of Lubumbashi, Kanshishi benefits from 0.3 million tonnes of mineral resource at 1.95 percent copper. Kansongwe represents a far larger tenement of 7.0 million tonnes at 1.43 percent copper.





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# Mutoshi Project



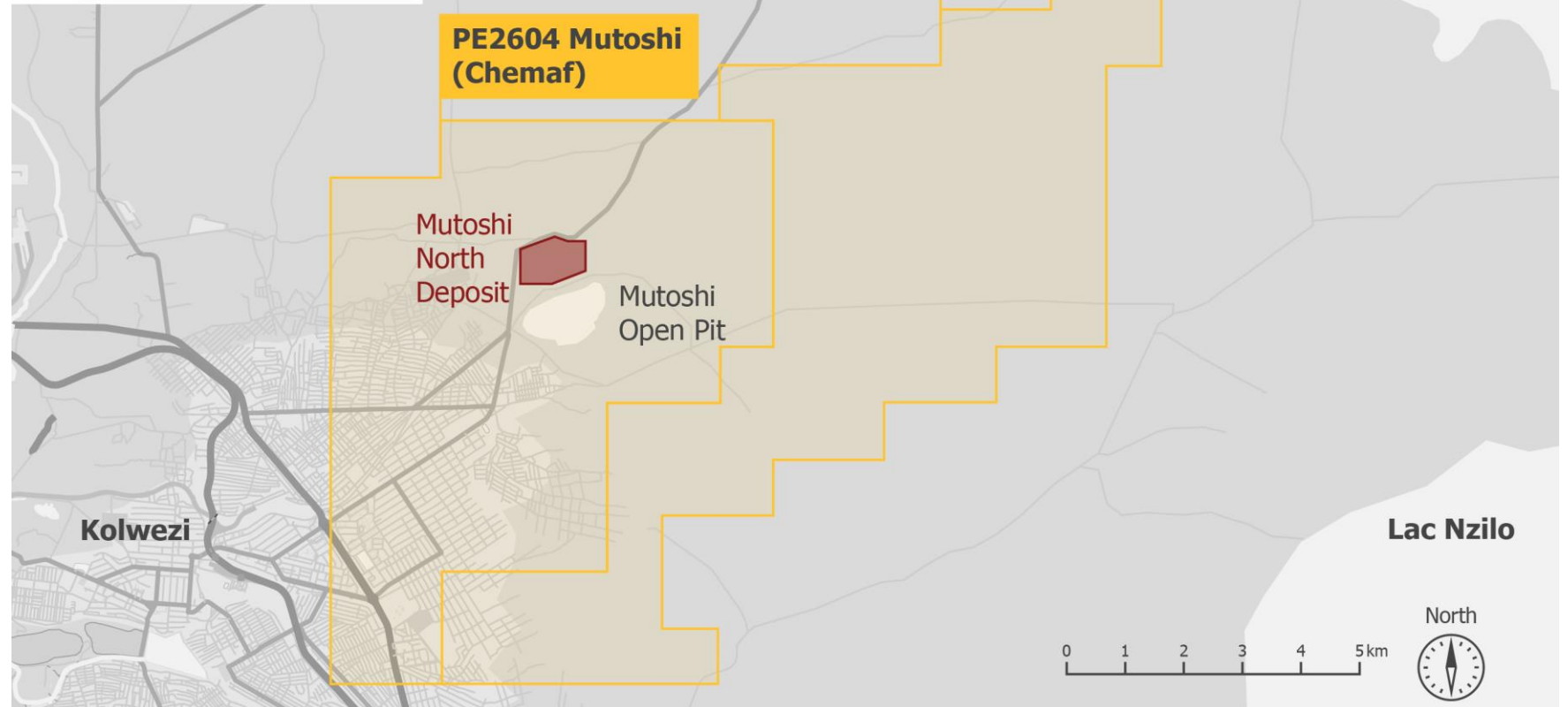
# Mutoshi Project

- Mutoshi incorporates various deposits of copper and cobalt on the Kolwezi Klippe.
- The site was first developed in 1903 as a gold mine and copper and cobalt mineralisation was discovered in 1936 at the northern limb of the open-pit.
- Currently with around 300,000 tonnes of cobalt resource, the property represents an exciting opportunity for Chemaf.
- Chemaf is developing a processing plant at the site with capacity for 20,000 tonnes of copper and 16,000 tonnes of cobalt per annum.





# Mutoshi Project





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**The challenges  
we face**

**Mutoshi Project  
Delivery**





# Mutoshi Project Delivery



- Shortage of basics such as local skills, electricity from local grid, good water quality;
- Heavy reliance on European and South African import. 70% from Europe and 20% from South Africa, with only 10% locally produced;
- Outotec provides the majority of the 70% European supply as prefabricated modules to reduce construction time on site;
- **Shipping logistics alone is a big undertaking with more than 2.000 containers that will be shipped to a port in South Africa and then travel by road over more than 2 countries and 3.000km to site;**



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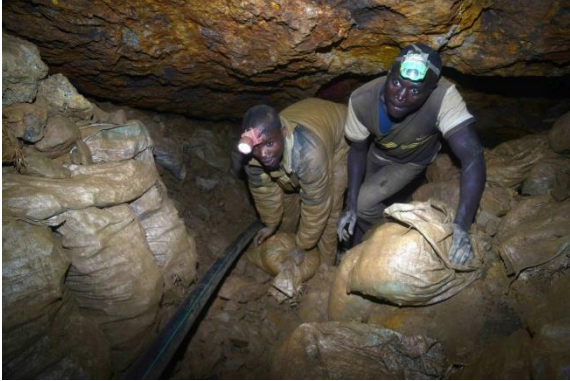
# The challenges we face

## Responsible supply





# Responsible supply



- The boom in demand for cobalt poses significant challenges to the entire supply chain – operational, social and environmental;
- At Chemaf we feel duty bound to drive the responsible supply agenda for the materials we mine;
- Chemaf benefits from operating a highly mechanised portfolio of assets;
- **Chemaf's principle objective remains to develop the Mutoshi mine as a state-of-the-art mechanized operation;**
- BUT... the concession incorporates multiple communities – many of whom who depend on illegal / unregulated ASM and sell to local traders;
- So... how can we safely transition from informal to formal?
- Our solution... A ground-breaking case study of collaboration between the formal mechanised mining sector and the often marginalised ASM mining sector;
- **So what are the risks with ASM??**

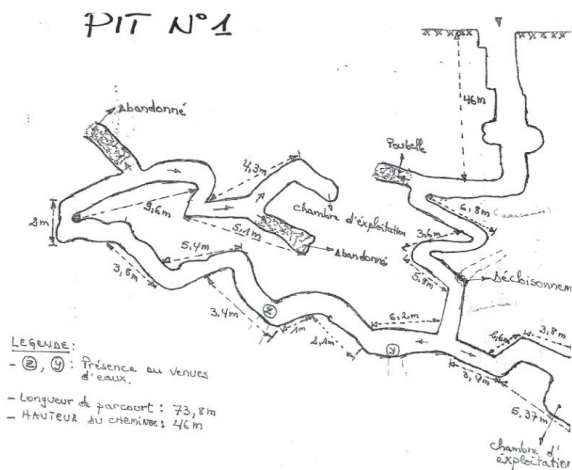


# RISKS:

## Health and safety



- Excessive and / or prolonged manual handling without work breaks;
- Forced or compulsory labour;
- Exposure of workers to excessive noise, dust and vibration, heat stress and dehydration;
- Work in confined spaces;
- Rock falls and pit / tunnel collapses;
- Exposure to eye injuries (e.g. during rock breaking, excavation);
- Inadequate ventilation of underground tunnels;
- Inadequate management of hazardous waste;
- Inrush of water or dangerous erosion by water in mineral production areas;
- Exposure to disease through poor hygiene and sanitation (e.g. through a lack of personal washing facilities, lack of clean areas for eating / breaks).





## **RISKS:** **Illicit sales of material....**

- ASM cobalt buying stations are positioned in close proximity to our operations – theft of material has been a big problem;
- Cobalt ore is typically transported to buying stations by traders in cars / on the back of motorbikes in bags of approx. 1-200kgs;
- Typically there is no verification as to whether traders are licensed or whether they have purchased from legal production points.





## So what's the situation at Mutoshi?

- Multiple communities on the concession, many of whom who depend on illegal / unregulated ASM and sell to local traders;
- **QUESTION:** So how should Chemaf engage with the ASM community? Reject them or work with them??
- **SOLUTION:** Chemaf has specifically made available an area on its concession for temporary exploitation by ASM diggers





# So how have we responded?

## Introducing the **Mutoshi PILOT ASM Project**...

1. Ensure registration of diggers under formal co-operatives;
2. Establish formal controlled / fenced ASM area;
3. Remove waste material to reduce need for tunnelling;
4. Develop and support safe working environment.





## So how have we responded?

5. Controlled relocation of impacted people under close observation of authorities.
6. Monitor and improve conditions and process under close observation by experts including Chemaf safety officers, cooperative safety officers, State regulator for ASM (SAESSCAM), Trafigura and representatives from our NGO partner PACT.





# So how have we responded?

## 7. Purchase material at single controlled buying station



**CHEMAF**  
CHEMAF sprl, Lubumbashi  
GRN - Cum - Mineral Valuation Report

Form No: BEMVAF-01  
Rev No: 01, Rev Date: 11/2009  
Page 1 of 1

STORE  
GRN No: 17710 Physical Item: 0  
Supplier code: MWILA MWILA  
Mine Source: MWILA MWILA  
Vehicle No: \_\_\_\_\_  
Date: \_\_\_\_\_

(i) Certificate of analysis  
Wt. Received = 0.250 MT  
Molality = 0.250 g/l  
Weight (dry) = 0.250 g

Ca	Fe	Mg	Si	Al	Si	20%
<u>0.000</u>	<u>0.000</u>	<u>0.000</u>	<u>0.000</u>	<u>0.000</u>	<u>0.000</u>	<u>0.000</u>

(ii) Valuation  
Weight Received (dry, MT) = 0.250  
Rate Per MT (USD) = 177  
Total Cost (USD) = 44.25

(iii) Remarks

Process	Expert	Stamp	Project & Contract
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Amount Payable

Total Amount Payable	FC	USD
_____	_____	_____

Amount Paid

Less: Amt Paid	FC	USD
_____	_____	_____

Balance Payable

Balance Payable	FC	USD
_____	_____	_____

Signature: \_\_\_\_\_



## So how have we responded?

7. Transport material safely and secured to Lubumbashi for processing (segregated from mechanised production).





# Responsible supply

## Lack of ethical cobalt undermines Tesla debt issue

John Dizard highlights the choke point for the mass production of electric vehicles

FTm



The lack of rail links, poverty, violence and corruption in the DRC hinder the expansion of cobalt production © The Washington Post/Getty Images



3 HOURS AGO by [John Dizard](#)

In the 111-page draft prospectus of Tesla's proposed \$1.5bn senior note offering that came out this past week, the word "cobalt" appears only once. On page 29 you will find a mention of the metal, in a list of potentially at-risk materials including steel, copper and so on.

## FINANCIAL TIMES

US COMPANIES MARKETS OPINION WORK & CAREERS LIFE & ARTS

fastFT London Metal Exchange Ltd [+ Add to myFT](#)

## LME to launch responsible sourcing plan after child labour fears

Our ASM project is yielding positive results. Gradually we intend to wind-down ASM activities but in a manner that **maintains our social license to operate.**

Cobalt producers will remain under **heightened scrutiny by international stakeholders.**

- Multiple enquiries, including unscheduled visits, by journalists to operations;
- Growing demand from potential and existing partners for Chemaf to demonstrate extent and depth of corporate responsibility programme;
- Ongoing demands for assurance from banks that exposures are being managed appropriately.

We believe our approach, whilst challenging, will **enable us to develop our fully mechanised operation at Mutoshi with the full support of the local and international community.**





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**Thank you**

