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Conflicting Minerals in Computing Devices

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Abstract – In present era of life, it is almost impossible to think a life without any electronic devices. Electronic devices make our life more comfortable. These devices provide useful information about anything only on few clicks. Every day, new communication devices are manufactured with extra ordinary facilities. Manufacturing of these devices required several mineral and most of them came from Democratic Republic of the Congo (DRC) and in result DRC become most violent country in the world. DRC is the main source of raw materials like Tin, Tantalum, Tungsten and Gold for electronic devices manufactured companies. These raw materials are known as conflict minerals as it is the reason for violence in DRC. The major challenges are to protect the human rights in DRC. The miner's working conditions are very bad because they have to work under armed forces to protect themselves and their family. The Dodd–Frank Wall Street Reform and Consumer Protection Act becomes in existence. Under this act, the companies declare the origin of the minerals found within their laptops, cell phones and other electronic devices and indicate what steps they are taking to eliminate the use of “conflict minerals” mined in the Democratic Republic of Congo. There is no any restriction to use electronics devices but we must ensure that our devices are manufactured with conflict-free minerals.

Keyword – DRC, human rights, Dodd–Frank Wall Street Reform and Consumer Protection Act, conflict minerals.

I. INTRODUCTION

Human beings are social animal and they require some rights to survive in the world. These rights are called Human right. Whenever these rights are abused by any armed forces then their existence become in dangerous zone.

Procuring an electronic device no one think about violence in the Democratic Republic of the Congo behind that electronic device. These devices negatively impact human being specially miners in the Democratic Republic of the Congo (DRC).

Tantalum, tin, tungsten, and gold are referred to as conflict minerals. They are integral to the technology and other things we rely on every day. Every computing device like laptops, phones, and tablets and even cars, airplanes, lighting, and jewelry contain tin, tantalum, tungsten, and/or gold, which are referred to as "conflict minerals".

Workers are hired for mining on very difficult ways like as gun- point, life threats, and physical forced, you get job to protect you or your family. Their working conditions are also very bad such as difficult location, horrible tools, tons of lifting and may lead to death.

The armed conflict in the Democratic Republic of Congo began in the early 1990s and has its roots in the Rwandan genocide. The conflict has resulted in human rights violations, particularly sexual violence. Since World War II, with over 5.4 million peoples dead and more than 2 million displaced.

Due to its abundant natural resources, Congo is ranked #186 out of 187 on the United Nations Human Development Index.

Conflict minerals are used in a variety of products - from jewelry to cars. However, the electronics industry is one of the largest purchasers of these minerals.

The electronics industry will not be able to support a fully conflict-free trade in Congo on its own, but their far-reaching presence in the minerals sector means they have the opportunity to set an example and encourage other industries to join them.

II. CONFLICT MINERALS & THEIR USES

i. *Conflict Minerals in Industries:*

A. *TIN (Sn) :*

The DRC is the world's sixth leading producer of tin. The Enough Project calculates that the eastern DRC produces over 24,000 metric tons of tin, or 6-8% of global production.

The primary uses of TIN are solders for electric and industrial application, tinplate, chemicals, bronze, float glass etc. Most of industries uses TIN as raw materials such as ICT (e.g. - cell phone), automotive, jewelry etc.

B. *TANTALUM (Ta):*

The DRC is one of the leading producers of this material, estimated by one source at 155 metric tons annually, or 15-20% of global production.

These minerals are mostly used for electronic components, super alloys for jet engine and turbine components, Chemical equipments, carbide cutting tools etc. Some industries are frequently uses these minerals such as ICT, automotive, aerospace, medical, energy etc.

C. *TUNGSTEN(W):*

The Enough Project estimates that annual production of tungsten in the eastern DRC is equivalent to 1,300 metric tons of tungsten, approximately 2-4% of global production. The DRC is the world's 5th largest producer of this mineral.

The primary uses of Tungsten are Cemented carbides, Tungsten emitters, and tungsten wire in copiers & printers, electronics circuit boards. It plays an important role as raw materials in manufacturing, automotive, jewelry, medical, aerospace, energy.

D. *GOLD (Au) :*

Gold from the eastern DRC is the smallest conflict mineral by volume, at 6.5 tons, but second only to tin in its contribution to armed groups. Gold's high value, low-volume nature makes it much easier to conceal and transport than the "3T" metal ores.

One of the primary sources of Gold is jewelry.

ii. *Conflict Minerals in Digital Life:*

A. *Charging Battery (Tantalum):*

Over the years our electronic devices have slimmed down dramatically. A key mineral to thank for this is Tantalum. Tantalum stores electronic charge, packing high capacitance into a small volume.

B. *Camera (Tin, Tantalum):*

Taking a picture activates the camera's logic board which is soldered together with tin. Tantalum Oxide also helps to create thinner, smaller lenses.

C. *Texting/Emailing (Tin, Tantalum):*

With each message sent, we transmit data through a circuit board. Tin is used to solder the circuit board. Tantalum helps to keep highly conductive materials in check and helps signals pass swiftly through the device.

D. *Viewing Contacts (Gold) :*

Gold is highly conductive. Though used sparingly, your SIM card may contain a layer of gold thinner than a strand of hair, assisting every time you pull up a phone number.

E. *Vibration (Tungsten):*

Tungsten creates the familiar vibrating alert of an incoming call or message. Beyond vibrations, Tungsten is a dense, wear-resistant metal used in everything from golf clubs to instrument strings.

iii. *Conflict Minerals in Micro-processor:*

The processor has many complex layers. These key metals are used to make power efficient electrical connections within the silicon chip itself, from chip to the package which carries it, and from package to the circuit board.

1. Tantalum and Tungsten are part of the "wiring" connecting transistors and act as a barrier to maintain the integrity of the transistors inside the chip itself.
2. Tin is used to connect the chip out to the package and the package out to the device board.
3. Gold is highly conductive and used in wires and films when a very pure connection between components is required.

III. THE CONFLICT MINERALS JOURNEY

i. *Mining :*

The four core conflict minerals - Tin, Tantalum, Tungsten (also known as the 3Ts) and Gold- are extracted mainly from mines on the eastern border of the Democratic Republic of Congo. Many of the mines are currently controlled by armed groups who illegally "tax" miners and take advantage of local labour for whom the working conditions are abysmal and the average pay is \$1-\$5 a day.

ii. *Trading & Transmit :*

After the minerals are mined, they are assessed and sorted at local trading houses, processed, bought and sold via exporters, and transported through various transit countries.

iii. *Smelters and Refiners :*

The smelters and refiners can chemically process like materials from conflicted areas as well as from other sources in large furnaces. Since materials from these different sources can be mixed together, prior to processing, then determine which minerals are indeed conflict-free.

iv. *Manufactures :*

The electronics industry is a large consumer of minerals. The manufacturers are processed metals ready to be placed inside popular consumer electronics like phones and computers, as well as a broad range of things we rely on everyday such as cars, planes, lighting and jewelry.

v. *Consumers:*

The last step in the supply chain is you: people around the world who buy and use products whose functions depend on metals like the 3T's and gold.

IV. DEMOCRATIC REPUBLIC OF THE CONGO

(An unspeakable violence)

The minerals are used in our electronic device, we never think about war, crimes and human rights violations in for more than a decade in the eastern part of the Democratic Republic of the Congo (DRC).

The DRC is Africa's third largest country. It is covering nearly one million square miles. This country has Bordering the country are Angola, Burundi, Central African Republic, Republic of the Congo, Rwanda, Sudan, Tanzania Uganda, and Zambia.

Beginning of War:

Since 1996, when the first war erupted in the DRC, some 6 million people have been killed in the conflict by some estimates. The second of the wars officially ended in 2004 and International Rescue Committee estimates that 45,000 Congolese continue to die every month from violence, starvation and disease.

The first war began in 1996 in the DRC, largely between a Rwandan political faction and the existing Congolese regime. The Congolese regime fell in 1997, at which point additional African nations entered what would become the largest war in the history of Africa.

The wealth of Congo's mining shifted to one centered on capturing the control of the DRC's natural resources.

As prices for minerals would increase over the years, and as worldwide demand for digital technology would continue to rise, the violence in DRC would also rage on.

V. THE DODD-FRANK WALL STREET REFORM AND CONSUMER PROTECTION ACT, SECTION 1502

This act plays an important role to protect the violence and human right abusing in DRC. The main objective of this act is "The organizations require disclosing the use of conflict minerals

in their products or in the materials used in their manufacturing processes."

On 21 July 2010, USA President signed into law the Dodd-Frank Act introducing new disclosure requirements required to report annually to the US Securities and Exchange Commission (SEC), for all companies which use 'conflict minerals' sourced in their products. Only if the reporting company concludes that its products do not contain minerals that directly or indirectly benefit armed groups in the DRC or an adjoining country may it label its products 'DRC conflict free'.

If a company shows that its products are not 'DRC conflict free'. Then, it is required to give Conflict Minerals Report details of all such products, facilities used to process the minerals, country of origin of the minerals, and the efforts to determine the mine or location of origin.

Government Supported Initiatives

The major challenges are to keep transparency in supply chain process. It makes a successful effort to represent the working condition of employees or workers.

There are some following programmes that support conflict-free mining process.

i. *Certified Trading Chains Initiative (CTC):*

It was devised by the German Federal Institute for Geosciences and Natural Resources to the adoption of Dodd-Frank. This certifies that the minerals and metals produced with five principles: traceability, fair working conditions, security and human rights, community development and protection of the environment.

ii. *Conflict Free Tin Initiative (CFTI):*

It was initiated by the Dutch government in 2012. Industry partners participating in the initiative source conflict-free tin from DRC based on new tracking and tracing procedures.

iii. *Solutions for Hope (SfH):*

It was launched in July 2011 by US firm Motorola Solutions, to establish a source of conflict-free tantalum in the DRC. It also involves other IT companies, smelters and mining companies. It uses a closed-pipe supply line with an identified set of key suppliers. The programmer's mines are located in the DRC's Katanga province.

iv. *Conflict Free Smelter Programme (CFS):*

It was launched in 2010 in cooperation between US-based EICC (Electronic Industries Citizenship Coalition) and GeSI (Global e-Sustainability Initiative). It provides third-party for procurement and processing of tin, tantalum, tungsten and gold by smelters and refiners to verify the origin of the minerals.

v. *World Gold Council (WGC):*

This council represents 23 members of the international gold industry. It covers the 60% of global gold production. In October

2012, it was launched the Conflict-Free Gold Standard, which is global in scope and stretches from the mine site to the gold refiner.

VI. CONFLICT FREE FROM CONSUMER GADGETS

There are most leading electronics companies, have been started to eliminate conflict minerals from their products. But, these companies have to carry out following challenges.

i. Global adaptively:

This is an important issue in supply-chain. Some points are mentioned below.

- a. Design anywhere.
- b. Build anywhere.
- c. Deliver anywhere.

ii. Growing Complexity & Rising Customer Expectations:

It is almost difficult to trade-off between complexity and customer expectation. Due to supply-chain process transparency, we have to maintain unnecessary policies.

iii. Growing Importance of Sustainability:

We have required extra effort to maintain the sustainability of electronic devices.

iv. Accelerating Cost /Price Uncertainty:

The price also becomes one of major challenges for electronic devices.

VII. OUTSTANDING COMPANY EFFORTS

There are following some companies which have great contribution towards the conflict minerals free electronic devices.

i. INTEL:

Intel was the first electronics company to publicly commit to making a fully conflict-free product. It was manufactured the world's first commercially available microprocessor that is DRC conflict free for all four metals in 2013.

The main objective behind the term "conflict free" refers as suppliers, supply chains, smelters and refiners whose sources of conflict minerals did not or do not directly or indirectly finance or benefit armed groups in the DRC or adjoining countries.

As of December 2013, Intel had visited and conducted reviews at 86 smelter and refiners in 21 Countries.

ii. HEWLETT-PACKARD (HP):

The HP has been started to give their contribution in conflict minerals free at multiple levels. When enough smelters are available then this is their responsibility to use only audited, conflict-free smelters.

The HP is continued with the following responsibilities, as follows:

- a. Helping Congo develop a clean minerals trade.
- b. Purchasing minerals from Congo.
- c. Traveling to eastern Congo to see local systems.

They are also signed onto the multistage holder group on strong SEC (Security & Exchange Commission) regulations.

Some Other Companies also Perform Notable Action on Conflict:

i. APPLE:

It was the first company to publicly identify the number of smelters in its supply chain i.e. 175 and is responsible for its supply chain to use only audited, conflict-free smelters, when enough are available. It also leads smelters training program.

ii. ADM:

It is maker of computer chips, has been performed a leading public voice on conflict minerals. It has been published articles calling for more government action on conflict minerals.

iii. TOSHIBA AND NOKIA:

They have been put a new policies to require all of their suppliers to use only audited, conflict – free smelters, once enough are available.

iv. SAN-DISK:

It is the most improved company being the first company to publish the names of its smelters and begin audits of its suppliers that cover conflict minerals.

v. ACER, LG, PANASONIC AND PHILLIPS:

It is also publicly identified the name of smelters in their supply chain and helping transparency.

CONCLUSION

It was major challenge to manufacture electronic devices with conflict-free minerals. It may happen that some cost of electronic devices will be increased or we should compromise with our expectations. Use of conflict minerals free product will sure protect human rights.

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