For Orongo: How much ore is processed per day and how much gold is daily produced? What is the gold recovery rate?

Marcelo Veiga

Namosi as a company has 4 sites of which 3 sites are in Kenya and 1 in Buhemba Tanzania. From each site we processed approximately 1 ton of ore per day. From the one ton of ore, we get about 5 grams depending on the richness of ore being processed resulting to 5 to 15 gram per site. The recovery rate of gold is 75% to 90% depending of the effectiveness of the artisan recovering gold from the ore.

For Orongo: What happens to the ore after processing the gold because from experience using that method the ASM will further want to treat the ore for heating? Or the process and there ?

Kudai Henry

For us, after processing the ore using Mitambo technology, we store the (synate) remains for a long period in a protected site and later re-wash using the same Mitambo technology. Thus the process does not end with the 1st processing.

For Orongo: In what proportion aprrox the gold recovery got improved after the machine?

Gustavo Vargas

It terms of proportion to which the gold recovery got improved after discovery and making use of Mitambo technology is 15% to 30% above mercury depending on the patience, effectiveness and efficiency of the artisan recovering the gold from the ore.

For Winslow: how much roughly the cost of gas and chemicals is compared to the cost of mercury (half, same, double)?

Gustavo Vargas

The useful life of the carpet is approximately 1-3 months of useful use and ability to retain gold effectively. The duration varies depending on the availability of the fine processed gold recovery explaining in the frequency of usage when processed ore are more; carpet must be changed within 30 days but when is very frequent take up to 90 days then it must be changed.

For Winslow: Can you control the input parameters for the Gold Katcha as suggested by Winfrida? So for example the water pressure and sluice ?

Carla Neefs

Yes, we have tested tailings in Ghana using the gravity concentrator and it recovered some amount of gold. This has been done in more than 5 mining regions. We found out that these tailings contained gold. Since most operations in Ghana take place using mercury, the concentrator recovers mercury too.

For Winslow: Processing is mainly done by women in Kenya. Why gender dimensions need to be considered? To ensure that this intervention does not promote exclusion of women? Keeping in mind majority of women lack the skills and expertise required.

Kathy Njuguna

This assistance is either virtual or on-site or has another cost.

For Stephen Yebah: How much difference between direct smelting and cupellation on gold purity?

Buyambauren Odgerel

Direct smelting and cupellation follows a similar process. They can be done together. After direct smelting, you can use cupellation if there is high lead content and to increase purity of the gold recovered.

For Orongo: good day, what is the useful life of the carpet and when the concentrate is obtained, how is the gold separated?

Affam Arias Sacramento

Gold separation from the carpet is well illustrated in our video available in the planet gold website. Nonetheless the entire process is by mere thorough washing of the carpet using water that get pour on the carpet as the washed concentrate get retained in another plastic basin till the desired volume of the concentrate containing gold is attained based on the personal judgment of the artisan recovering gold from the carpet.

For Stephen Yebah: Have anybody test the tailings from the gravity concentrator? How much gold are you in the tailings as free gold what is recovered in the gravity circuit?

Henry Salvado

Yes, we have tested tailings in Ghana using the gravity concentrator and it recovered some amount of gold. This has been done in more than 5 mining regions. We found out that these tailings contained gold. Since most operations in Ghana take place using mercury, the concentrator recovers mercury too.

For Stephen Yebah: Was the tailings analyzed by fire assay for gold?

Henry Salvado

We are yet to undertake an official fire assaying analysis with SGS. Various academic literature show that artisanal and small scale miners get just about 30-35% of their gold. The tailings are either liberated with improved milling or sent through a concentrator to recover free gold.

The solutions are geared towards free milling gold at quite a small-scale, any considerations for scalability and treatment of other ore types?

Thambale Meyo

Hi Anil. Thanks for question. Lead vapors are toxic and must be treated with respect. I meant to highlight this in my remarks. Care must be taken to protect workers from toxic fumes, and smelting should never be done in close proximity to living or eating quarters. In the cupellation furnace, most of the lead is absorbed into the cupel (as litharge), but some can be released from the furnace as (toxic) lead vapors.

For Jason Gabor / Daniel Stepper: For Cupellation, what would be the fate of the lead that is used?

And Sookeo

For us, after processing the ore using Mtambo technology, we store the (synate) remains for a long period in a protected site and later re-wash using the same Mitambo technology. Thus the process does not end with the 1st processing.

For Daniel Stepper: the metallurgical term is Quartering, not Cupellation...adding a metal to collect gold when it is melted. In this case silver would be the best choice instead lead...which produces toxic vapors. Have you tried to use silver?

Marcelo Veiga

Actually it is not really about evaporating Marcello. Actually, in cupellation generally 88-99% of the lead or bismuth is absorbed into the cupel. Jason has in fact done test work to confirm this. (weighing the cupels after, to see how much lead they absorbed). But YES, lead fumes are dangerous and must ASUARLUT be treated with a high level of respect (i.e. similar to mercury fumes). Miners that I’ve worked with in Indonesia use the quartering method to refine gold. This “quartering process” is also described in detail in the UNEP practical guide on reducing mercury use, available here: https://wedocs.unep.org/handle/20.500.11822/11524

This is an illustration that John is showing. This is known and used for centuries. What is novel point thing about this carpet and the treatment of other ore types?

Henry Salvado

This assistance is either virtual or on-site or has another cost.

For John Richmond: what is the processing capacity of sluices (kg/hr)? -in case I did not catch that from the presentation.

Gustavo Vargas

Approximately 100 kg/hr depending on the density of the pay dirt being processed.

For John Richmond: is it gold drop more or less efficient in clays or white sands than in black sands?

Gustavo Vargas

The efficiency is the same as long as the clay soil is liquified and the sand is wet prior to scooping into the feed funnel.

For Orongo: Sintering vapors is carcinogenic.

Marcelo Veiga

We have yet to find a site so devoid of magnetite that it could not be gathered and reused. Also, mercury is imported so why not magnetite? It’s worth it for the recovery and can be reused. Hg cannot recover gold particles smaller than 70 microns. Cleangold recovers gold as small as 5 microns. We’ve also recovered fine gold coated in oxides and sulphides which resisted amalgamation and cyanidation.

For Krista Shaffer: Magnetic separation is very efficient with black sands rich in magnetite and pyrrhotite. But with other types of sands with sulfides and oxides of other non-magnetic metals, how can you do this separation?

German Marquez

We have yet to find a site so devoid of magnetite that it could not be gathered and reused. Also, mercury is imported so why not magnetite? It’s worth it for the recovery and can be reused. Hg cannot recover gold particles smaller than 70 microns. Cleangold recovers gold as small as 5 microns. We’ve also recovered fine gold coated in oxides and sulphides which resisted amalgamation and cyanidation.

From Orongo with NANSIO: The technical assistance and training required is for efficiency and effectiveness in gold recovery by use of Mitambo technology would be on construction of Mitambo machine, carpet laying and the general fine power washing on a Mitambo through recovery from the carpet to actual gold separation from the mixture of concentrate, separation of fine gold from other residues to heating of the gold into pure gold free from mercury.

For all: All these technologies include technical assistance and training for a period of time.

Dallas Noelia Gonzalez

Direct smelting and cupellation follows a similar process. They can be done together. After direct smelting, you can use cupellation if there is high lead content and to increase purity of the gold recovered.

For Stephen Yebah: How much difference between direct smelting and cupellation on gold purity?

Buyambauren Odgerel

Direct smelting and cupellation follows a similar process. They can be done together. After direct smelting, you can use cupellation if there is high lead content and to increase purity of the gold recovered.
From Orongo with NANSIO: It has been seen to see assistance in coordination with other projects kind of attitude among most miners so that the miners are disincentivized, because most of miners argue that they have good technology, but when there is no assistance they abandon the project i.e the technology promotion. The scenario with Nansio is that we trust our technology and we are as quickly building the confidence of the small scale miners who are increasing yearning for the technology having seen its effectiveness as the only best option available in the region. Nansio shall therefore continue with the promotion of the technology unless a superior and environmental friendly technology is found to rid the planet earth of the mercury peril in the mining industry.

The way forward is to continued research on stable and environmental friendly gold extract methods as we too work to improve on the Mitambo technology for the future good of the people and general environment. Mercury usage must be spun on earth hence research and improvement on some likely viable technology to be promoted.

For all: It has been seen to see assistance in coordination with other projects so that the miner is not disincentivized, because most of them argue that they are good technologies, but when there is no assistance they abandon the project.

Dallas Noelia Gonzales Malca

From Orongo with NANSIO: It has been seen to see assistance in coordination with other projects kind of attitude among most miners so that the miners are disincentivized, because most of miners argue that they have good technology, but when there is no assistance they abandon the project i.e the technology promotion. The scenario with Nansio is that we trust our technology and we are as quickly building the confidence of the small scale miners who are increasing yearning for the technology having seen its effectiveness as the only best option available in the region. Nansio shall therefore continue with the promotion of the technology unless a superior and environmental friendly technology is found to rid the planet earth of the mercury peril in the mining industry.

The way forward is to continued research on stable and environmental friendly gold extract methods as we too work to improve on the Mitambo technology for the future good of the people and general environment. Mercury usage must be spun on earth hence research and improvement on some likely viable technology to be promoted.

For all: It has been seen to see assistance in coordination with other projects so that the miner is not disincentivized, because most of them argue that they are good technologies, but when there is no assistance they abandon the project.

Dallas Noelia Gonzales Malca

For all: It has been seen to see assistance in coordination with other projects kind of attitude among most miners so that the miners are disincentivized, because most of miners argue that they have good technology, but when there is no assistance they abandon the project i.e the technology promotion. The scenario with Nansio is that we trust our technology and we are as quickly building the confidence of the small scale miners who are increasing yearning for the technology having seen its effectiveness as the only best option available in the region. Nansio shall therefore continue with the promotion of the technology unless a superior and environmental friendly technology is found to rid the planet earth of the mercury peril in the mining industry.

The way forward is to continued research on stable and environmental friendly gold extract methods as we too work to improve on the Mitambo technology for the future good of the people and general environment. Mercury usage must be spun on earth hence research and improvement on some likely viable technology to be promoted.

For all: It has been seen to see assistance in coordination with other projects so that the miner is not disincentivized, because most of them argue that they are good technologies, but when there is no assistance they abandon the project.

Dallas Noelia Gonzales Malca

For all: It has been seen to see assistance in coordination with other projects kind of attitude among most miners so that the miners are disincentivized, because most of miners argue that they have good technology, but when there is no assistance they abandon the project i.e the technology promotion. The scenario with Nansio is that we trust our technology and we are as quickly building the confidence of the small scale miners who are increasing yearning for the technology having seen its effectiveness as the only best option available in the region. Nansio shall therefore continue with the promotion of the technology unless a superior and environmental friendly technology is found to rid the planet earth of the mercury peril in the mining industry.

The way forward is to continued research on stable and environmental friendly gold extract methods as we too work to improve on the Mitambo technology for the future good of the people and general environment. Mercury usage must be spun on earth hence research and improvement on some likely viable technology to be promoted.

For all: It has been seen to see assistance in coordination with other projects so that the miner is not disincentivized, because most of them argue that they are good technologies, but when there is no assistance they abandon the project.

Dallas Noelia Gonzales Malca
**Question/Answer Report - Tech Fair Day 2 - 7 October 2021**

**Question**
For German Marquinez, thanks. What happens to the mercury collected by this mobile unit?

**Answer(s)**
The mercury collected is delivered to a colombian company that is in charge of handling hazardous waste.

**Question**
For Tambayasuren Odgerel, the reagent that you gave to the National Service of training, is it for training or miners can benefit from it (in gold processing)

**Answer(s)**
Equipped delivered to the national learning service can be used for: 1. Training. 2. Pilot test. 3. Small production.

**Question**
Thanks for sharing this information. Is this information available to share with artisanal small miners in other regions

**Answer(s)**
Of course, this information is available to share with small numbers on other sites. Please contact me by email.

**Question**
For Francois Dumont, what is the recovery rate with your technique?

**Answer(s)**
Anna Bugmann
Anna, our lab-separator is equipped with various standards and custom-made equipment, all provide a recovery superior to 90%.

**Question**
For German: What is the cost of reagents with your technique?

**Answer(s)**
Anna Bugmann
Anna, the cost of reagents is USD$3.80 per kg.

**Question**
For German/Francois/ JW: Thank you very much for the presentation. My name is Benjamin Mchawapika from NEMC-Tanzania. Our main problem is that our miners are mostly involved in hard rock mining and not alluvial. They are many in number and it is not easy to organise them to have groups or cooperatives. What could be the alternative technology to mercury that can suit such huge number of miners who are scattered all over the country dealing with reef or hard rock gold mining? Thanks

**Answer(s)**
Benjamin Mchawapika
From GoldFinx, Benjamin, my company will be in Tanzania in mid-2022 most probably. Best is to interface with German, if you still have not resolved your situation next year, please contact me directly at GoldFinx.com

**Question**
For Kristin: How does the cost of CNL compare to cyanide?

**Answer(s)**
Stephen Mutzaff
In Stephen's overview, the overall cost of reagents is comparable if not cheaper than cyanide.

**Question**
For Kristin: What is the cost of the reagent Christina?

**Answer(s)**
Anna Bugmann
Anna, the cost of reagents is USD$5.80 per kg.

**Question**
For Kristin: Do you think your method applicable in ASGM in the Amazon which takes place adjacent/in river bodies? Any studies that you have made on impacts on biodiversity, others? Many thanks

**Answer(s)**
Beatriz Torres
Hi Beatriz, This answer needs a bit more info, what scale is planned, how much reagent will be released back to the environment, what local biodiversity is there around the surrounding areas. Happy to set up a technical meeting with you to discuss this. Feel free to email us at info@cleanmining.co

**Question**
For Kristin: In which countries these CNL reagent has been used for commercial purposes already?

**Answer(s)**
Anonymous Attendee
Our CNL reagents are available globally. We are currently working on our distribution logistics and blending in numerous parts of the world.

**Question**
For Kristin: The reagent bag cost 25kg?

**Answer(s)**
Kudzai Henry
Our reagent is USD$5.80 per kg.

**Question**
For Douglas: Are there any example of successful use of amino acid acid assisted leaching?

**Answer(s)**
Anna Bugmann
Yes, we have 3 project sites in Indonesia that have successfully adopted this technique to the same degree. We were also able to pilot a comparative trial directly in an ASGM facility that produced better results than their traditional method using unoptimized cyanidation.

**Question**
For Tom Boston: What is the fate of mercury when processing mercury-contaminated tailings? Thank you!

**Answer(s)**
Jane Denison
Jane, the Cyclusys process removes Mercury, as well as toxic heavy metals selectively with proprietary mains, then the Mercury is stabilized and disposed of responsibly in an accepted way similar to radioactive materials.

**Question**
For Marcello Vaggia: I suggest using pipetation and not quartering.

**Answer(s)**
Anonymous Attendee
From Marcello, our CNL reagent does dissolve some mercury. However, the reagent we use is selective for gold so mercury should not report to the eluate. This is one dependant though.

**Question**
For Kristin/Awty: Does CNL complex/dissolve mercury and affect elution?

**Answer(s)**
Stephen Mutzaff
From Kristin/Awty: Our CNL reagent does dissolve mercury. However, the reagent we use is selective for gold so mercury should not report to the eluate. This is one dependant though.

**Question**
For Marcello: Transportation of artisanal ore to processing centers is difficult to impossible in many regions. Many thanks.

**Answer(s)**
Stephen Mutzaff
From Marcello: Transportation of artisanal ore to processing centers is difficult to impossible in many regions. If you still have not resolved your situation next year, please contact me directly at info@cleanmining.co

**Question**
For Patay: Can our cassava in the northern part of Nigeria be used to get cyanide from it?

**Answer(s)**
Bello Yahaya Gasah
Hi Bello, If you have bitter cassava, you can. Because bitter cassava has high level of cyanogenic glycosides so more free cyanide. You can follow the process of how to generate free cyanide from cassava in our published paper. We supposed to come to Nigeria, analyse cassava there and start a pilot plant, but Good - situation did not let us do that.

**Question**
For Niecy: Some time in June this year I did send an email enquiring about this technology after I participated on your webinar which was done some time in June or May. But the email up-to-date was not responded. I have been following your project for long...

**Answer(s)**
Kudzai Henry
Hi Niecy, My apologies for this, I will follow up on my end but in the mean time please send me an email on nicole.jooney@cleanmining.co This way it will go personally to me and you will get a reply.

**Question**
For German: What do you do with the recovered mercury amalgam? What is the final disposal?

**Answer(s)**
Janeth Lazeza
The mercury collected is delivered to a colombian company that is in charge of handling hazardous waste.

**Question**
For German: What is the recovery percentage?

**Answer(s)**
Janeth Lazeza
We are conducting laboratory analysis to quantify gold recovery. By visual analysis it may be above 85%.

**Question**
For Norlie Mutemeri: Is it possible to have the French version of the Gender in ASGM document? Thanks.

**Answer(s)**
Anna Bugmann
Unfortunately it is not yet available in French.

**Question**
For German Marquinez, about understanding of process optimisation is really so fundamental. Even simple testing for gold loss with ASMs is such a helpful and eye opening exercise.

**Answer(s)**
Daniel Stapper
From German Marquinez: We have tested over 150 different ore types. Our reagent was made to be able to extract gold from varied ore sources including sulfide ore. The gold needs to be liberated for extraction to work, same as any other type of leaching process. If the gold is locked in an arsenopyrite structure then it is unlikely to be recovered without pre-treatment.

**Question**
For Kristin: I would like to know if the reagent you propose is suitable for any type of mining material, what happens with arsenic-rich gold material. Is the reagent selective for gold?

**Answer(s)**
German Marquinez
Hi Kristin! We have tested over 150 different ore types. Our reagent was made to be able to extract gold from varied ore sources including sulfide ore. The gold needs to be liberated for extraction to work, same as any other type of leaching process. If the gold is locked in an arsenopyrite structure then it is unlikely to be recovered without pre-treatment.

**Question**
For German Marquinez, thanks. What happens to the mercury collected by this mobile unit?

**Answer(s)**
Tambayasuren Odgerel
The mercury collected is delivered to a colombian company that is in charge of handling hazardous waste.