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Rumah EMAS KITA

(Edukasi Memakai Air raksa agar Selamat)

Salam Emas

In this second issue of our newsletter we focus on burning mercury more safely. This is because the public health issue of mercury vapor in the air is a serious issue which must be addressed with practical information and advice.

At the start of September, our team was given further training to build their capacity to broadcast this message to the mining community and to demonstrate safer technology, such as retorts. Directly after the training, our mercury-reduction campaign was officially launched. This public event was well attended by the local community, broadcast live by local radio, and reported on by the major provincial newspaper, the Kalteng Post.

Following this event, our trainers from the Departments of Health, Education, Environment and Mining held a public-awareness campaign over the six weeks leading up to Idul Fitri. We have held public lectures, screened films and distributed brochures to hundreds of residents in Kereng Pangi to raise awareness on mercury issues. Furthermore, we have visited the students of the elementary, junior high and senior high schools of the town to educate the younger generation on this, and other health issues.

We are now ready to meet and train miners returning to the field once again. We are pleased that the people of Kereng Pangi are willing to listen and to learn about the dangers of mercury. We are also very grateful for the support and assistance of the district government in our efforts to raise the awareness of the public.

Wishing you a safe and prosperous new year,

Sumali Agrawal
Editor

The GMP Campaign Launch

The aim of the GMP is to share the knowledge and experience of the UNIDO technical team with miners and the urban community, including the owners of gold shops. The project focus is not only on the health and environmental impacts of gold processing but also on improving the incomes of miners through optimizing simple technologies.

In his speech, Duwel Rawing said that he welcomes the initiative and supports the objectives of the project. He also commented on the danger to health from mercury exposure, and the environmental impact. The community should be able to improve their livelihoods by adopting the more efficient gold processing equipment and technologies.

The Global Mercury Project Team in Central Kalimantan

At the launching, the Bupati of Katingan District, Duwel Rawing, assisted by the Head of Mining and Energy Department , Marzaki Djimat, introduced important equipment for gold processing that can help reduce the use of mercury and the impact on miners and the environment, and improve livelihoods.

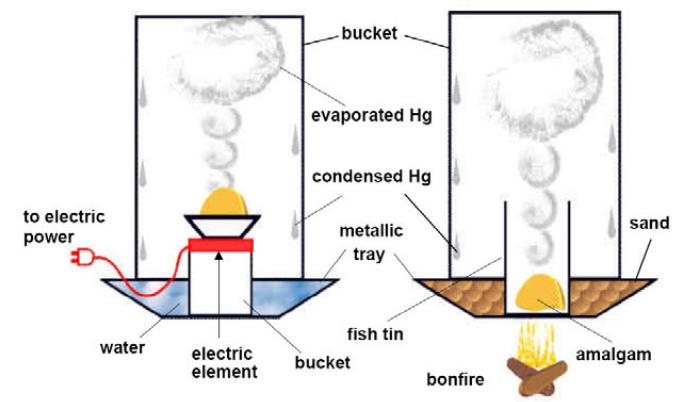
The UNIDO team demonstrated an improved sluice box with different types of carpet to capture more gold. They also showed how to reduce and recycle mercury, and the use of a retort and fumehood to capture mercury.

Fumehood demonstration

Retorts: Solutions from around the world

A retort is a container in which the gold-mercury amalgam is placed and heated; volatile mercury travels up through a tube and condenses in an adjacent cooler chamber. With retorts, mercury recovery is usually higher than 95%. Substantial reduction in air pollution is obtained. There are a large variety of retorts. Some of them are made with stainless steel while others use inexpensive cast iron.

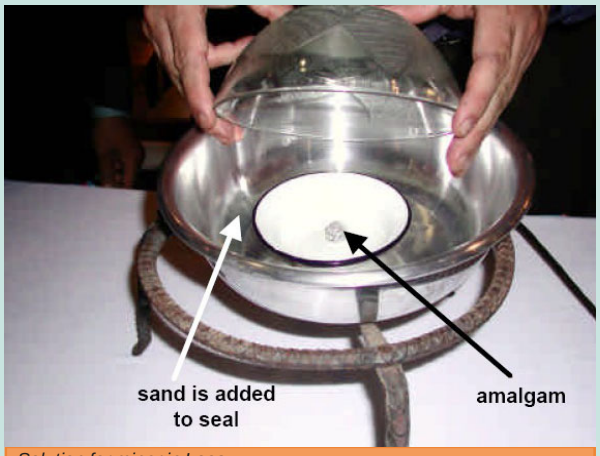
Home-made retorts can also be made of steel tins, an inexpensive option for retorting that has been applied in Papua New Guinea and China. The Chinese two-bucket retort consists of a metallic bucket and a bowl filled with water. A larger bucket covers the first bucket containing the amalgam.



A home-made retort from China(left) dan Papua New Guinea (right)

The PNG “fish-tin” retort employs the same concept, but uses fish tins and wet sand instead of water. In both cases, mercury vapors condense on the cover-bucket walls.

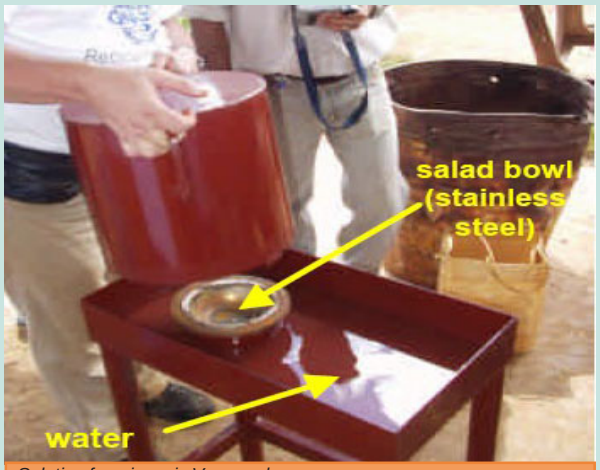
Using the same principle of the fish-tin retort, UNIDO built a retort using kitchen materials for the ASM in the Mekong River in Lao PDR. On a metallic support, a small enameled steel tray with amalgam is placed inside another larger steel bowl, covered with a glass bowl and sealed with sand. The glass bowl allows the miners to see the amalgam decompose, but it can be replaced with a metallic bowl. Mercury condenses on the bowl walls and drops into the sand. This retort cost less than US$ 10 to build. Miners can recover the condensed mercury by panning the sand placed around the small tray. To avoid discoloration of gold, miners use a glazed-steel (enameled) bowl as a crucible.



Solution for miner in Laos

The idea of using kitchen bowls covered with a bucket was also used by UNIDO to fabricate a retort in El Callao, Venezuela. This was a more elaborate retort built on a steel table but using a stainless steel bowl as a crucible. The table was filled with water and the amalgam burned with a blowtorch from the bottom. As the crucible was thin, the retorting time was short (10 minutes). Mercury condensed on the wall of the cover and dripped into the water. This retort took 10 to 15 minutes to eliminate most of the mercury from the amalgam using a propane blowtorch. A serious inconvenience of this, and other retorts, is that sometimes miners remove the cover (bucket) from the crucible while the retort is hot. When this occurs, miners are exposed to mercury vapor.

Marcello Veiga
Chief Technical Advisor - The Global Mercury Project



Solution for miners in Venezuela

Using Retorts Safely

- Always seal the retort tightly so that no gas escapes during the burning process.
- Kitchen bowls can be sealed by placing upside-down in a bed of wet sand or water.
- Tins such as fuel-tins can be placed in a deep tray of water. Small holes made around the edge of the tin will allow the gas to dissolve into the water more easily, but these holes should be at least 15cm below the water-level.
- Use stainless steel or enamel bowls as crucibles to avoid discoloration of gold
- Burning in a retort will remove 95% of the mercury from the gold. Further burning and melting of the gold will remove this residual mercury, but it should be done inside a ventilated fume-hood or a chimney with a blower, to avoid breathing the 5% that remains.

Gold like this contains residual mercury and should be burned again inside a fumehood

Kitchen Bowl Retorts

These are efficient retorts that have the advantage of cooling more quickly than pipe retorts. If a glass bowl is used as a cover, the burning process can be observed.

However, glass takes longer to cool down than metal, so it is far better to use a stainless steel bowl as a cover, as it will cool down in only 5 minutes.

The use of simple kitchen-bowl retorts can reduce the mercury in air to safe limits, as proved by UNIDO in Mozambique. If a gas torch is used, the burning process can be done very quickly, and these retorts can also be cooled very quickly.

Pipe Retorts

Pipe retorts are very strong, and can be heated until gold melts inside the crucible. Although this takes a long time to achieve, the gold will therefore be of high purity.

Above: *closed tightly, the retort is ready to use*
Below: *the simple components are easy to open*

Advice from the Clinic

A warm retort may still contain mercury as a gas. Do not open a retort unless it is quite cool. Use a wet towel and a bucket of clean water to cool a retort more quickly. Mercury evaporates at room temperature so retorts should always be closed to prevent the mercury that is stuck to the inner surfaces from escaping. It is also best to store the retort in a closed container or under a wet towel when not in use.

KLINIK KELILING Rumah EMAS (Edukasi Memakai Air raksa agar Selamat)

Two Steps for Purifying Gold Safely

Why use a retort?

The principle of a retort is that amalgam is heated inside a closed system. This allows the mercury to evaporate (it becomes a gas) and then to condense (it becomes a liquid again) so that it is separated from the gold and so that it can be used again.

Step One: Use retort to burn the gold safely

New retorts

To prepare a new retort for use, burn all the metal surfaces inside and outside first and allow it to cool. Before using gold amalgam, slowly burn a little mercury inside the retort. This mercury is likely to stick to the surfaces inside the retort and may not come out.

The retort can now be used for gold, but it is advisable to dust the crucible with baby powder at first, to prevent any gold from sticking to the surfaces.

Using a fumehood

A fumehood is a ventilated chimney that sucks contaminated air away from the operator.

A good retort will remove 95% of the mercury from gold amalgam and this mercury can be used again. However, 5% of the mercury may remain in the amalgam and this residual mercury also needs to be processed safely.

Step Two:Use a fumehood to purify the gold further

To purify the gold further, operators must burn the gold again and also melt the gold. Good ventilation is very important at this stage as mercury gas is always dangerous.

High doses of mercury can be fatal to humans, but even low doses can have serious impacts on the central nervous system, kidneys and liver. Mercury also causes tremors, loss of vision and hearing, paralysis, insomnia and emotional instability.

It is therefore important to use a fumehood during the final stages, so that the residual mercury will not poison the operator.

Blowers and fans should always be used when gold is being purified. The fumehood below uses a blower to suck fumes away from the operator and into a water tank that captures the vapor.

It must be remembered that mercury vapors are dangerous to all people, and should always be contained as much as possible. With the technology of retorts, most of the mercury can be removed safely, and the gold can then also be purified safely using a fumehood that blows the contaminated air into a filter.

Prototype fumehood, designed and built by the technical school in Palangka

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Rumah Emas Kita adalah buletin yang terbit dua bulan sekali untuk memberikan informasi kegiatan Global Mercury Project di Galangan-Kalimantan Tengah

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