

Mercury-free Processing Plant in Mongolia

For further information, see <http://www.sam.mn/en.html>

Favorable conditions on the ground:

- ASGM community with a vision for a Hg-free life developed a proposal for a Hg-free processing plant, supported by the Ministry of Mining, Mineral Resources Authority of Mongolia, and Sustainable Artisanal Mining (SAM) Project, funded by SDC
- Miners from various provinces increasingly aware of dangers of Hg and willing to adapt to non-mercury use.
- Geology: the ores were compatible with gravity concentration; otherwise, the technical solution could have easily failed
- Prohibition on Hg use in ASGM since 2008
- Most of the equipment locally available and preferred by the miners.

A pilot plant clearly demonstrating the economic, health, and environmental benefits of Hg-free technologies leads to widespread adoption and investment by the Mongolian government, private investors, and even the miners.

Hg-free gold

- Gold particles after acid clean up before smelting.



Outcomes:

- Final table concentrate has about 70-90% gold content after acid cleaning, depending on other minerals.
- Increased economic benefits to miners and host communities. The plant was the largest employer in the county and a major economic driver, supporting many local businesses.
- Seeing these numerous benefits, more miners and private investors replicated these techniques, resulting in wider scalability and adoption.
- Availability of a Hg-free technical solution reduced incidences of clandestine Hg amalgamation, which arose after the 2008 ban on Hg use in ASGM.
- Replication has been done in other countries.

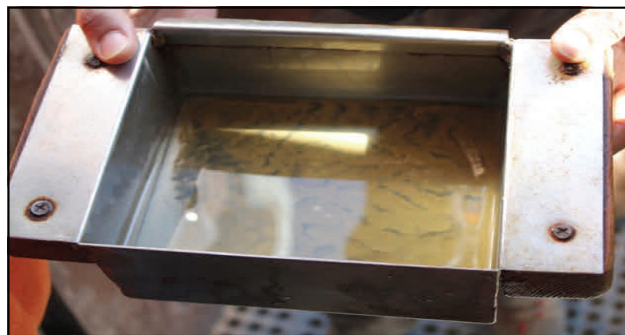
Existing process:

Miners were practicing whole ore amalgamation, which resulted in serious environmental contamination.

Intervention:

Highly efficient secondary gravity concentration:

Techniques for concentration in series, including optimized grinding and gold liberation, sluices, and shaking table, were introduced at the processing plant. Heavy minerals in the resulting concentrate were removed by leaching with nitric acid. Borax was used as a flux for final smelting stage.



Reasons for success

Hg reduction alternatives were tested and accepted by the miners based on **operational evidence and clear benefits in recovery, health, and environment**, resulting in broad support for adopting new techniques and incentivized miners and companies to change. A strong technical team on the ground also demonstrated the technologies and trained miners on application.

Miners were part of the change process and took part in the experimental phase, bringing in their ores and comparing the higher gold recovery results with previous ore amalgamation results. Eventually, miners invested in the technology and scaled-up the pilot plant.

The Ministry of Mining provided miners with loans to replicate the Hg-free technologies. Donor agencies and projects also played a “temporary support role”. These replications were based off **locally available equipment and knowledge** that miners previously employed. Thus, the parties worked together to make existing processes and equipment compatible with Hg-free ones.