



Technical solutions for mercury reduction

Paul Cordy, PhD

Background

Annex C of Minamata convention requires that the NAP contain:

(b) Actions to eliminate:

(i) Whole ore amalgamation;

(ii) Open burning of amalgam or processed amalgam;

(iii) Burning of amalgam in residential areas; and

(iv) Cyanide leaching in sediment, ore or tailings to which mercury has been added without first removing the mercury;

(e) Strategies for promoting the reduction of mercury in artisanal and small-scale gold mining and processing, including mercury-free methods;

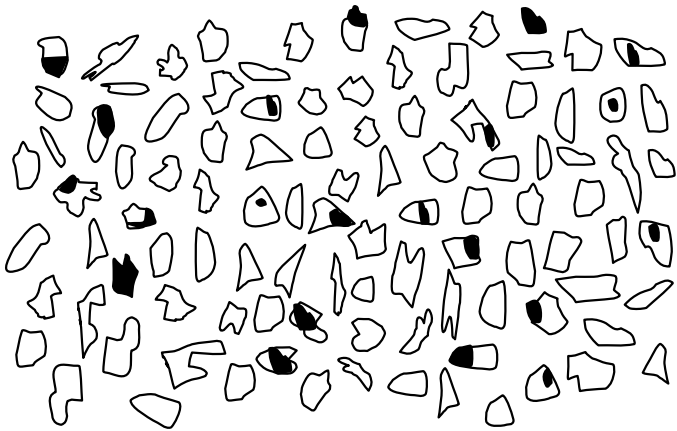
Main Themes

- Skilled local engineering resources
- Miner training
- Equipment supply and support
- Financing
- Better/direct access to markets



➤ Good concentration requires good gold liberation

Gold Not Liberated



0.07 mm

Liberated Gold



Gravity Separation



Yani Mine, Bolivia

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Bolivia video: this kind of operation would require an intervention of precisely the kind I will show in the next video on Asoplayon mine in Colombia.

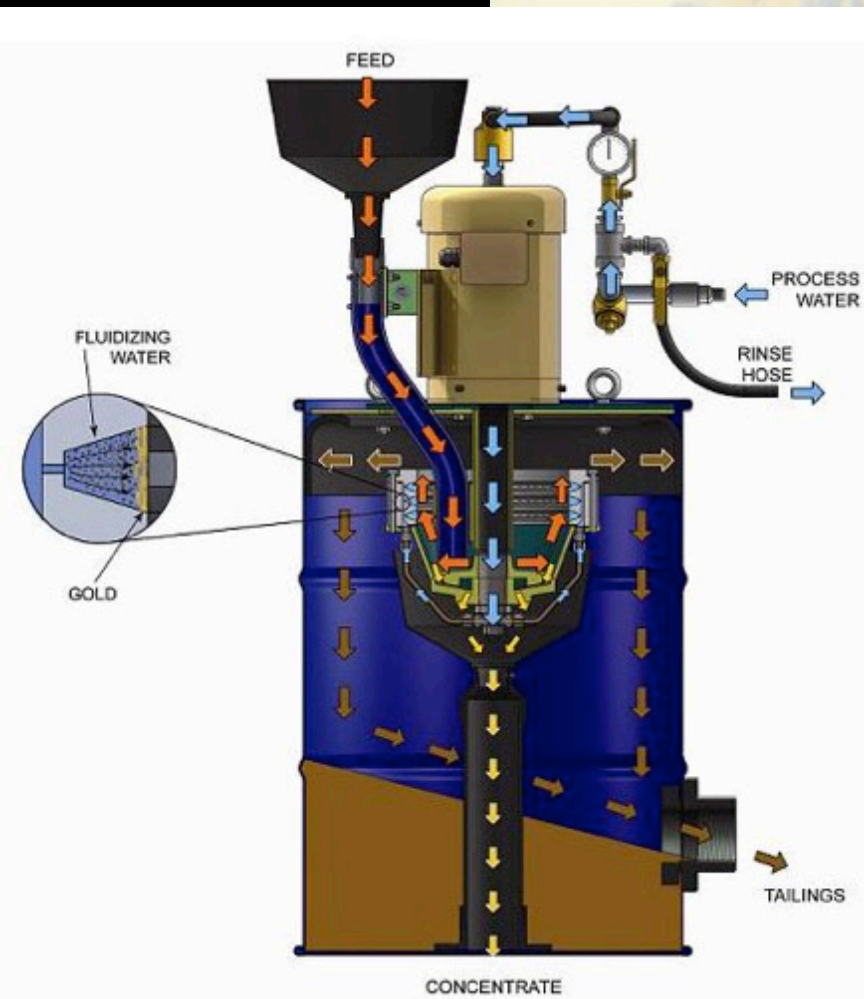
Miner Training



Skilled local engineering resources



Equipment supply and support



Yani Mine, Bolivia



Asoplayon, Antioquia, Colombia





Cue Asoplayon video

Here's how you would reform the Bolivian mine in the previous video



The old method: mercury inside ball mills that operate 7-10 hours, grinding the ore and contaminating the whole ore.



A large ball mill, with crushers feeding it the optimal sized material, liberates the gold without mercury.



The ball mill discharges to a jig, which concentrates most of the free gold. The lighter fraction that is not concentrated by the jig pours onto the shaker table, which produces a concentrate of what the jig missed.



Evidence of good liberation... black sands (left streak) the sulfides (sparkly gold coloured streak) separate nicely. The middling grains (white with black flecks to the right of the sulfides) are later fed to the secondary mill for further liberation, the milky fines flowing off the end of the right side of the image are subjected to flotation.



Yet another concentration phase catches the fine gold that no other process can get. Flotation with pine oil and foaming agents. All of the concentrates go into cyanidation. Previously they would get 40% of the gold in their ore, and their new process gets them 80% or more.

Retorta: tratamiento de los precipitados

ANTES



AHORA



AHORA



AHORA



Successful elimination of whole ore amalgamation, Colombia

35 processing centres made significant changes in mercury use thanks to UNIDO and Corantioquia.

40-50% reduction in mercury use
in each processing centre

4.4 tons per year less Hg applied to ore

5.5 tons per year Hg recovered for reuse

UNIDO in Antioquia, Colombia

Mitigation

Training



Better milling

Centrifugal concentration



Mill leaching

Vapour capture

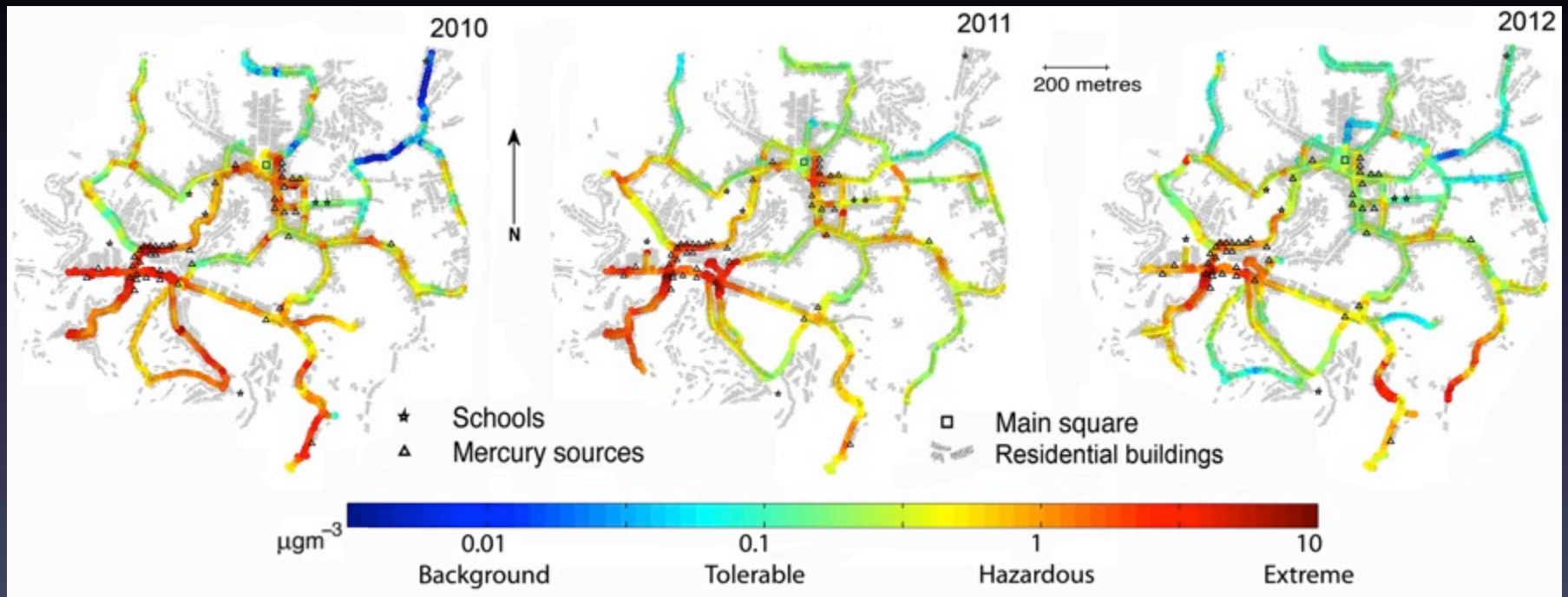


Conclusions

50% reduction in airborne mercury

20% increase in gold production

70% effective reduction in airborne mercury





PROGRAMA DE ORO RESPONSABLE

Solidaridad

CASO: MINERA YANAQUIHUA Y SU MODELO DE INCLUSIÓN SOCIAL A TRAVÉS DEL CÓDIGO DE PRACTICAS RJC



MINERA YANAQUIHUA

Ubicación: Distrito de Yanaquihua, Provincia de Condesuyos, Arequipa

N° Trabajadores: 442

Procesamiento: 130 ton/día

Producción: 30 kg/mes

Acopio: 40%

Mineros artesanales: 105

Pallaqueras: 15

Cumplimiento: Normativa nacional, internacional (ICMI, Minamata, OIT, EITI)



Alluvial: Colombia, Canada, Perú

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Choco, Colombia



Caucasia, Colombia



Cue Lillooet3 video



Microsoft PowerPoint

In Lillooet, Canada, profitable mines are operating with similar capital investment levels and scale as in Choco and Norte Antioquia (open pit) and using concentration equipment that could be applied to river alluvial also. This mine contributes no silt or toxics to the environment, and uses no mercury, cyanide or any other chemicals.



This would fit on the largest river barges, or you could build a scaled down version... multistage sluices and jigs instead of only a single sluice as in many ASGM operations in South America



The concentrate of the larger sluice complex is further concentrated by jig, sluice, magnetic separator, shaker table, wave table... chemical free concentration is all anyone ever need in alluvial mining.

BGI is also working in cooperation with this project. Puno area alluvial miners use mercury in concentrate amalgamation in lined ponds.

Coordinación con el Proyecto ABC-LA de USAID/DAI

Colombia

Financiamiento conjunto de un estudio de la cadena de valor de oro

Perú

Actividades conjuntas en Puno:

- Identificación de operaciones mineras, con proceso de formalización concluido.
- Apoyo en análisis GAP y en certificación de empresas seleccionadas: CECOMSAP, LIMATA, entre otras



Honduras v. Burkina Faso

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Rastra mills are the most inefficient method imaginable.
El Corpus, Honduras (UNDP)



ARTISANAL GOLD COUNCIL

Making Artisanal Gold Work for Development



Cue AGC video: they built a plant in Burkina that miners are paying back in gold produced. The intention is to set up a revolving system of loans that will help propagate these mercury free plants across the community and beyond.

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