Mercury Management in Gold Mining Sector

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Brasilia, May 21/22, 2012
1. Why does the gold mining produce mercury?

2. Mercury management

3. Alternatives for the future
Why does the gold mining produce mercury?

- Mercury is naturally present in the gold containing ores.
- Mercury accompanies the gold and silver through the recovery process.
- Mercury is separated from the gold by retorting prior to the smelting that produces the gold dore.
Mercury and Gold Mining

- The amount of mercury depends on the ore composition.
- It is not direct proportional to the gold production.
Mercury management

Retorting and Collection

The recovered mercury is stored in special flasks (aprox 30 kg)
Storage on Site

The flask are storaged in spetial containers. Aprox: 1 ton/container

The storage on site is inside the refinery (controled area) until it is sold to Bethlehem Apparatus (EEUU)
Mercury Transportation

Inspection of flask labeling

Final sealing
Mercury Transportation

Container inspection before loading and monitoring

Safety briefing and last control (check list)
Mercury Transportation

Loading

Monitoring during loading
Mercury Transportation

Fixing of containers

Closure and monitoring
Mercury Transportation

Transportation out of the site

2 trucks with emergency response equipment as escort

Delivering to the port
Controls

- Training to the workforce
- Emissions control system
- Housekeeping
- Monitoring in the refinery
- Health controls to workforce
- Environmental Monitoring
Emissions Control

Retort in the refinery

Active carbon columns
Additional Measures

Heat exchanger
Good Housekeeping

Cleaning any mercury present in the refinery

Mercury aspirators
Monitoring in the Refinery

25 µg/m³ (8 hours exposure)
16 µg/m³ (12 hours exposure)
Monitoring in the Refinery

On line monitoring

- On line equipment
- Sensors in different areas of the refinery
Monitoring in the Refinery

Point Monitoring
- Used equipment: Jerome
- Measurements in specific points
- Measurements for specific tasks
Procedure: Preventive Program for Mercury Exposure

The procedure includes:

• Urine analysis every 6 months to all personnel working in the refinery (inc. security, cleaning and administrative)

In case of values over 50 µg Hg/L urine
  • Second analysis (urine and blood)
  • If confirmed then rotation
Monitoring

- Emissions monitoring
- Soil monitoring
- Water monitoring
- Aquatic life monitoring
LEGEND
ME = Elemental Mercuriy
PE = Potential de Emission
● = Monitoring Point
Emission Monitoring

Isokinetic measurements in stacks
What do we produce?

- **Elemental Mercury**
  - Sell to Bethlehem Apparatus in USA

- **Carbon with Mercury**
  - Security landfill
  - Temporary storage on site
  - Sell to Bethlehem Apparatus in USA
Options under Study

- Long term storage as elemental mercury
  - Study of site alternatives
  - Design criteria

- Physical-Chemical stabilization and final disposal
  - Chemical stabilization as cinnabar
  - Physical-Chemical stabilization process
What do we need?

- Feasible solution that does not make gold mining impossible
- Clear and stable legislation
- Secure approved (permitted) facilities for mercury disposal
- Stabilization processes approved (permitted)
Thanks!