Legacy of legacy mines: reflections, lessons

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- A legacy mine in the Philippines
  - Impacts
  - Brief history
- How EA professionals can help minimise legacy of legacy mines

1) Canada: ca 10,000 sites, responsibility w/ governments
2) Philippines: 800 sites, responsibility uncertain (Doyle et al 2006)

Agenda
Bad news, good news

Background

Other definitions…

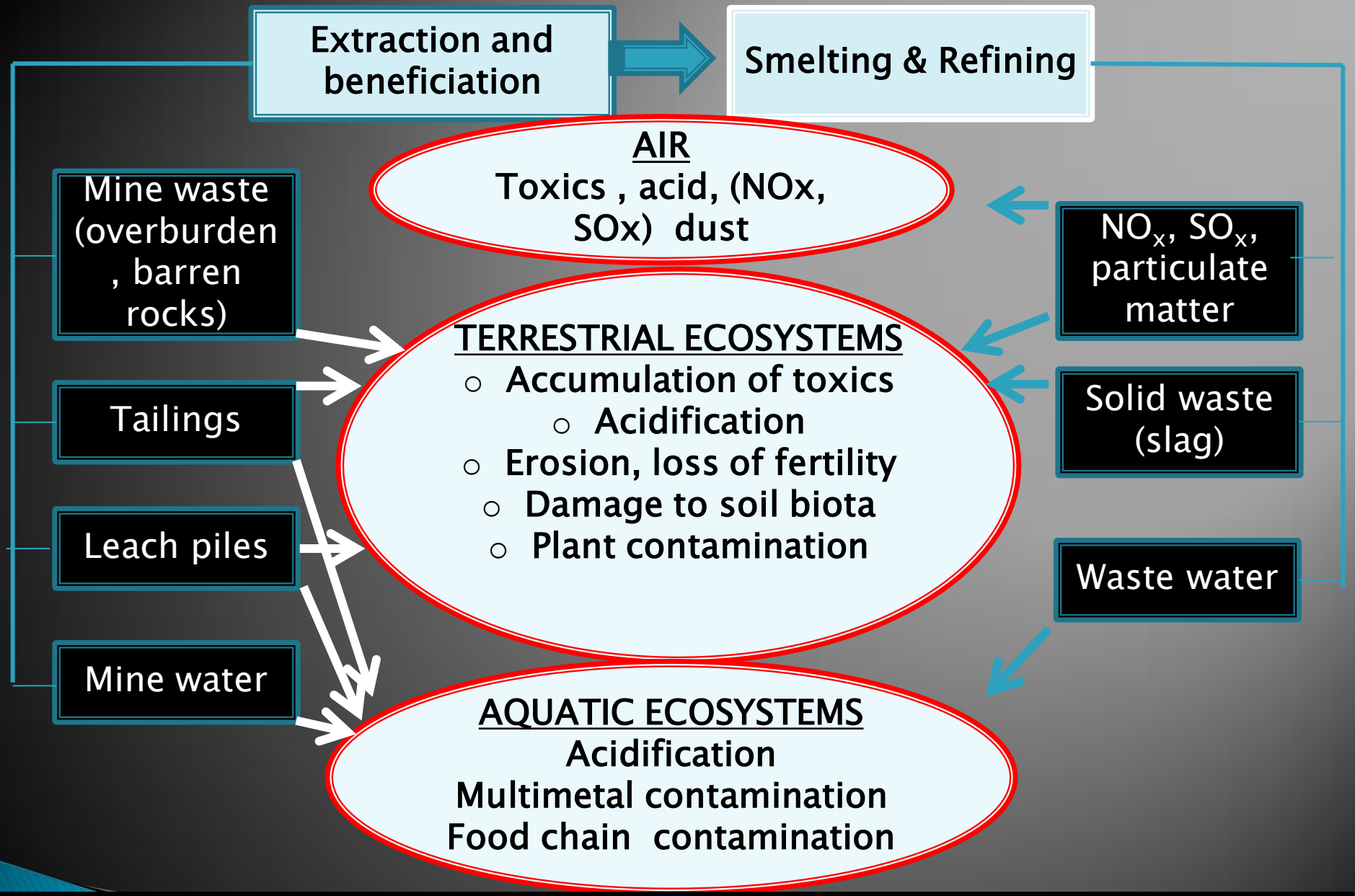
- Abandoned, or orphaned mines – "mines for which the owner cannot be found or financially unable or unwilling to remediate the site"
- "zombies" sites – continue to exert some sort of malevolent effect during their afterlife (Sandlos & Keeling 2013).

To make sense of …

- Legacy of legacy mines
- Understand the context of mining – science, policy, political

Starting argument

- Mining is impact intensive regardless of
  - product,
  - scale,
- location… and
- ? geography of capital?



Mining operations and environmental outcomes

Philippine mineral reserves (Whitmore 2009)

1 of 10 most attractive countries in the world for mining – Fraser Institute

Philippine mineral reserves:

- Gold
- Copper
- Nickel
- Chromite
- Iron
- bauxite
- Marble
- limestone

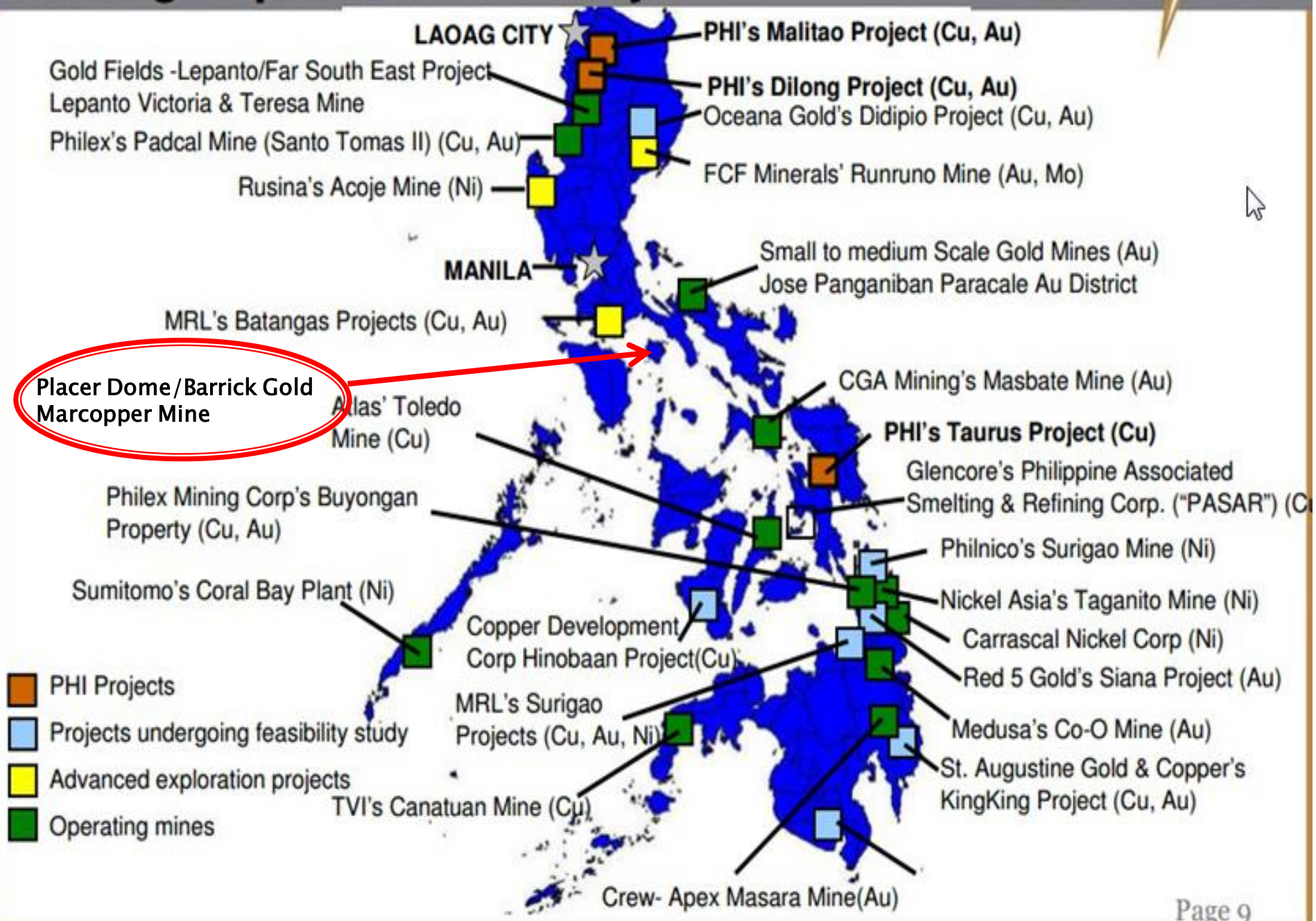
Quantity of Mineral Resources per unit area

- 3rd in the world for gold
- 4th in the world for copper
- 5th in the world for nickel
- 6th in the world for chromite

Contribution of Mining to Philippine economy

- Contribution of mining sector to 2013 **GDP** was **0.7%** (1.4% in previous decades)
  - Ghana at 6.3%
  - Phil Agriculture GDP contribution is at 16.5%
- Jobs created by 26 large mining firms – 158,000 in 2008 or 0.5% to 0.6%
  - Ghana – 4%

Mining Exploration Activity



- 26 large scale mines, ca 300, 000 small miners
- More than 50% of active concessions, more than 2/3 of exploration are in active seismic zones
- 6 to 9 typhoons make landfall each year
- Half of staked lands are in ancestral domains (>100 IPs)

Profile

Country	Population (10^6) 2014	GDP /cap (USD)	GINI Coefficient	Poverty rate (%)	2013 HDI (out of 187)	Literacy rate (2010)
Brazil	203.308	11, 298	0.527 (2012)	21.4 (2009)	0.744 (79)	91.3%
Ghana	27.043	1850	0.428 (2006)	28.5 (2007)	0.573 (138)	71.5%
Philippines	100.410	2765	0.430 (2012)	26.5 (2009)	0.660 (117)	97.6% [f] 97.4% [m]

Sources: various

http://data.worldbank.org/indicator/SI.POV.GINI

http://en.wikipedia.org/wiki/List_of_countries_by_population

http://en.wikipedia.org/wiki/List_of_countries_by_literacy_rate

http://hdr.undp.org/en/content/human-development-index-hdi-table

http://www.transparency.org/country

Pioneering, precedent-setting policy instruments…

- PD 1586 – Environmental compliance certificate requires *social acceptability* from local govt
- IPRA 1997/ DENR 96-37 – in ancestral domains, *Free Prior and Informed Consent* needed from IP; predates UN Declaration 2007
- Both SA and FPIC to be regularly renewed
- Multipartite monitoring team (MMT) required

Policy on abandoned mines

- Abandoned/Orphaned Mines Initiative
- NRCAN Inactive Mines Database
- Reqt of Closure plans (incl financial surety) at the mine development stage)

Canada

- **Mining Act of 1995 : a mine decommissioning plan & fund**
- **S 7 of EO 79 : "All valuable metals in abandoned ores…mine wastes … mill tailing… belong to the State …."… PPP structure for financing rehabilitation, restoration of legacy mines for re-opening**

Philippines

Case 1: Marcopper Mining Corp in Marinduque (managed by Placer Dome – 40% CDN) –1969 to 1996

- Mt Tapian reserve – first open pit mine – Employed ca 1000 mostly locals, spent $10M/yr on goods and services and provides electricity for the province
- 1969 to 1972 : waste & tailings dumped on land
- 1975 – granted permit to dump on Calancan Bay at 2.5 tons/sec WITH a tunnel to Boac River to drain rainwater
- 1975 – 2000 : 200 MMT (80sq km of tailings) dumped in Calancan Bay
- 1990 Mt Tapian depleted, San Antonio ore body opened; granted 10-yr permit to use Mt Tapian pit as tailings pond
- Marcopper constructed a dam in Mogpog River
- 1993: Mogpog dam collapsed -> toxic silt covered nearby towns ->loss of homes, lives, farms, animals
- 1996 Tapian pit plug fractured – 200MMT tailings, 20 villages evacuated, wiped out PhP 2M freshwater& marine life, PhP 5M milkfish fry; Boac River – declared dead; 2001 hi levels Cu, Mn, Pb, Zn in marine sedime

- 1996 – PDI committed ca $70M to construct new dam plug, dredge a tunnel, build levees in the riverbank, constructed homes, airlifted food and supplies. $1M to compensate for lost livelihoods
- 1997 – PDI sold its shares to Barrick Gold, clean up & compensation delayed implementation for 6 yrs
- Dec 2001 – Placer Dome pulled personnel out, abandoned commitments to clean up
- 2014 Barrick Bold signed an agreement with GOP to reopen the mine with the following provisions

(iv) PDI and Barrick Gold Corporation are not subject to the jurisdiction of the Courts of the Republic of the Philippines;

(v) Marcopper's disposal of mine tailings into the Calancan Bay was at all relevant times conducted pursuant to and in accordance with government permits;

(x) the weight of scientific evidence demonstates that the mine tailings present in the Province's waterways do not currently and have not had an unacceptable impact on the environment;

(xi) the Maguila-guila Dam was constructed and operated by Marcopper in accordance with government permits and approvals and conformed to government approved plans and specifications;

(xii) the principal cause of flooding of the village of Mogpog in December, 1993 was typhoon Monang

(xiii) the breach of the Maguila-guila dam was the result of force-majeure and not the result of any act, omission or breach of obligation by either Marcopper or PDI;

Mogpog River toxic silt from 1993 tailings dam collapse

Calancay Bay – (1975-2000) 200MMT wastes 7kmx0.5 km land mass formed

Case 1: Marcopper Mining Corp in Marinduque (managed by Placer Dome – 1969 to 1996

20 years later

3 towns: much higher incidence and rise in diabetes, goiter, renal disease, spontaneous abortion, cancer, & symptoms of heavy metal poisoning

30-year old fisher
Arsenic poisoning

Giant Yellowknife Gold Mines Ltd

- April 1951, a two year old Yellowknives Dene boy on Latham Island (today's Ndlio) died. Cause of death: "acute gastroenteritis caused by arsenical poisoning in drinking water."
- Giant and Con Mines both emitted large amounts of untreated As_2O_3 dust from their roaster stacks, Con from 1948-49 and Giant from 1949 to 1951;
- Reductions in As_2O_3 emissions were incremental over time, leaving the Yellowknife population continually exposed to As in food and in drinking water, from1950s and 1960s at levels above accepted thresholds at the time;
- Water trucked to Ndilo and Dettah – residents were forced to pay for delivery, often from meager welfare payments.
- Archival evidence – many Native people continued to draw drinking water from polluted Back Bay.
- Epidemiological surveys from other regions suggest that the long term exposure to low levels of As in drinking water supplies would have produced higher cancer rates in Yellowknife.

Negative legacies of legacy mines …

Socio-economic

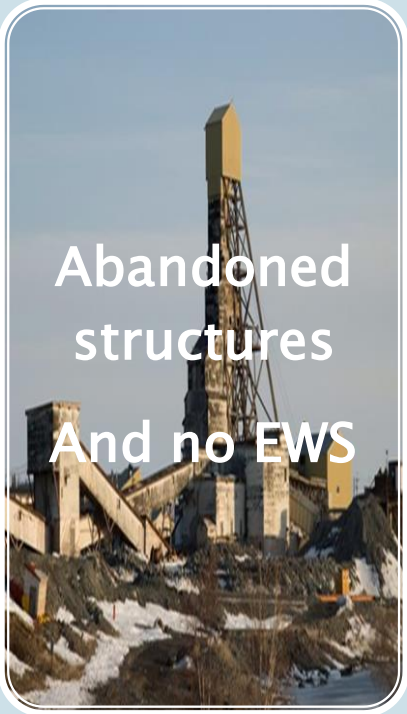
Loss of income & revenues

Loss of livelihoods

Health

Contaminated land, water food chain (AMD, heavy metal, radioactivity)

Safety



Abandoned structures

And no EWS

Political

- Loss of public trust in govt & industry
- Conflict

Analysis

» Concluding thoughts

Analysis: Environmental, social and development impacts of legacy mines

- result from failure to control, manage environmental impacts of mine operations
- are cumulative effects of the mine during its active life

Rehabilitation, remediation, restoration, regeneration …

- Emphasis on the visual aesthetics of obscures as much as it reveals about abandoned mines.
- Real rehabilitation requires dealing with sources of AMD, land and structure stabilisation, toxic waste removal – extremely expensive some are difficult or impossible to treat on site
- Poses its own risks (where does it go, how secure is the new site, how will it be managed and monitored forever?)

Legacy of legacy mines

- COMPLEX – tremendous financial costs of remediation; complicated or ambiguous legal liability implications.
- URGENT – residual environmental impacts pose real & potential threats to human health
- MORAL callousness – cultural & economic impacts from devastated landscapes & loss of livelihoods.

EA practitioners can reduce the legacy of legacy mines

1) improve impact prediction, mitigation and management
2) push (guilt) the client:
   1) ISO 14001, EITI
   2) Plan for, fund closure before commencing development; progressive rehabilitation, closure to meet international standards and post closure monitoring

Thank you.

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Useful References

- Azapagic A. (2004) 'Developing a framework for sustainable development indicators for the mining and minerals industry', *Journal of Cleaner Production* 12: 639-662.
- Bebbington, A., Hinajosa, L., Bebbington, D., Warnaars. X. Contention and Ambiguity; Mining and the possibilities of development.
- Chaloping-March (2006). Collaboration towards social sustainability. the case of a mining corporation, its surrounding communities and local government in Benguet Philippines' *Intl Journal Environment and Sustainable Development* 5(2): 109–125.
- Holden, W.N. and Jacobson, D. (2007) 'Mining amid armed conflict: nonferrous metals mining in the Philippines'; http://onlinelibrary.wiley.com/doi/10.1111/j.1541-0064.2007.00193.x/pd f. accessed 27 Feb. 2014.
- Martinez-Alier J. 2001. Mining justice, environmental justice, and valuation. *Journal of Hazardous Materials*. 86: 153-180
- Phil Working Group on Mining (2008). 2003 Legacy Mines Visit. Atlas Consolidated Mining Development Toledo City Cebu. Environmental and Community Impact.
- Phil Center for Investigative Journalism ((2008) "Chronic illnesses on the rise in Marcopper town: http://pcij.org/stories/chronic-illnesses-on-the-rise-in-marcopper-towns/
- Sandlos, J. and Keeling, A. (2013) Zombie Mines and the (over) burden of history, *Solutions*, 4(3); 80-83.
- Stark, J., Li, J. and K. Terasawa (2006) Environmental Safeguards and Community Benefits in Mining: Recent Lessons from the Philippines. USAID and Foundation for Environmental Security & Sustainability. Working paper no. 1. 18p.
- Walker, D. Whipping legacy mines into shape *Mining Magazine* May 2014.
- (http://www.umich.edu/~snre492/Jones/marcopper.htm)