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## 1. Introduction

'South Africa's top companies are aware of the effect of climate change but are failing to translate this into action, (Ingl, 2007, p. 1) This is the introductory paragraph to a front page article in Business Day on 23 November 2007.

On 22 November 2007 the Carbon Disclosure Project (CDP) released its findings. The project was an attempt to measure the response of top South African Companies to climate change.

On 27 November 2007 after yet another round of severe floods in the Western Cape and numerous destructive storms in Gauteng a banner in Beeld news paper screams 'Klimaat-krisis is hier nie net 'n woord'('Climate Crisis is not just a concept, it is here') (Steyn, 2007, p. 2) .

The same edition of Beeld reports that there is 'Concern over safety of the Vaal River' (Tempelhoff, 2007, p. 19). The Vaal River is the key water resource in the heartland of the industrial province of South Africa, Gauteng. Environmentalists have warned that several other rivers are also under threat, The Mooi River and Wonderfontein Spruit (gold mining), The Steelpoort river, the Olifants river, the Heks river (platinum mining), the Loskop dam, its catchment area and downstream.

From these headlines it is clear that South Africa is facing an environmental crisis involving both air and water. South Africa is responsible for more than 94% of Africa's air pollution. It receives less than 50% of the global average in rainfall. It is a country that is severely stressed when it comes to water. It is, according global scientific opinion one of the countries that will suffer most from global climate change and yet, if the above reports are to be believed, the corporate sector in general and the mining sectors seems largely unconcerned.

This paper will use Anglo Platinum as a case study, generally also referring to other platinum producers. The information contained here is in the public domain and much of it is drawn directly from the reports published by Anglo Platinum in particular and other

corporate in the industry in general. Anglo Platinum is focused on because it is the biggest platinum producer in South Africa and as such it sets the standards for other mining corporations. Anglo should also be commended for the production of very good reports relating to its mining activities in the country and for being prepared to engage in public discussion about the more negative aspects of mining.

It must be understood that the statistics will reflect a national context, simply because local emission figures are not available. In the national context the carbon disclosure figures might well create the impression that the impact of platinum mining on the atmosphere is minimal. However, information gleaned from health practitioners in areas such as the platinum producing area of Rustenburg indicates that local impact is severe. This anomaly results from a complete lack of capacity by local authorities to monitor the environmental impact of industry in general and of mining in particular (Van Wyk, 2007, p. 23).

The paper will focus on the impact of mining on the atmosphere, through the release of gases and particulates, stemming from smelting operations and from waste facilities such as slimes dams, and infrastructure such as roads.

It will then turn to water showing that the extensive water needs by Platinum mines has local, regional and international implications, involving not only South Africa but also its neighbours.

Finally the paper will conclude with a discussion of work place safety arguing that there is a close link between work place fatalities in the industry and the rising global prices for commodities such as platinum.

## **1. Greenhouse gas emissions**

The main constituent of greenhouse gas emissions from the Anglo Platinum is carbon dioxide (CO<sub>2</sub>). Just over 91% of carbon dioxide emissions are indirect due to imported electricity.

In response to the Carbon Deposit Project Question, “Section A – 1 Climate Change Risks, Opportunities and Strategy Question 1(a)(i) – Regulatory risks, ‘for this question, please state the time period and where possible the associated financial implications. What commercial risks does climate change present to your company including regulatory risks associated with current and/or expected government policy on climate change e.g. emissions limits or energy efficiency standards?’”

Anglo Platinum responded with,

“Low regulatory risk at present - Anglo Platinum operations are all located in South Africa, currently a non-annex B country. The risk would increase should South Africa be reclassified in any Kyoto extension.

Anglo Platinum has signed up to the Energy Efficiency Accord between the Government of South Africa, Department of Minerals and Energy and the signatories. The accord requires a final energy demand reduction target for industry and mining sector as a whole of 15% by 2015” ( Responding corporation: Anglo Platinum, 2007)

***Many environmentalists would argue that South Africa should be reclassified given that ‘South Africa also contributes more to global warming than nearly any economy in the world if CO<sub>2</sub> emissions are corrected for both income and population. Greenhouse gas emissions are 20 times higher than even the United States by that measure and the emissions have been worsening over the last decade’ (Bond, 2004). Furthermore Anglo Platinum in its response evades the question about financial implications of compliance, surely if they are serious about meeting the 15% reduction by 2015 their answer would state the annual reduction tranches the annual cost implications of such reductions and the cumulative cost implications over the period. Noting the rapid and massive expansion of Anglo operations in Limpopo given the current global boom it is unlikely that Anglo will be able to meet the national regulatory targets. Should***

***South Africa be reclassified in terms of the Kyoto agreement Anglo will simply be in trouble.***

## **2.1 Indirect emissions from imported electricity**

Indirect carbon dioxide emissions due to imported electricity from the national grid by Anglo Platinum increased from ***4, 94 million tons in 2005 to 5, 41 million tons in 2006, an increase of 10%***. Anglo Platinum claims that the conversion factor to calculate CO<sub>2</sub> emissions from electricity purchased was changed from 0,963 to 0,978 by Eskom, applied to all the 2006 CO<sub>2</sub> data, accounts for 2% of the increase in CO<sub>2</sub> emissions (Anglo Platinum, 2007). ***However, noting Anglo's response to the CDP survey above it is difficult to see how it will meet its regulatory obligations if it is registering at least an 8% per annum increase currently, and given the impact of the commodity boom and increases in production to meet this boom.***

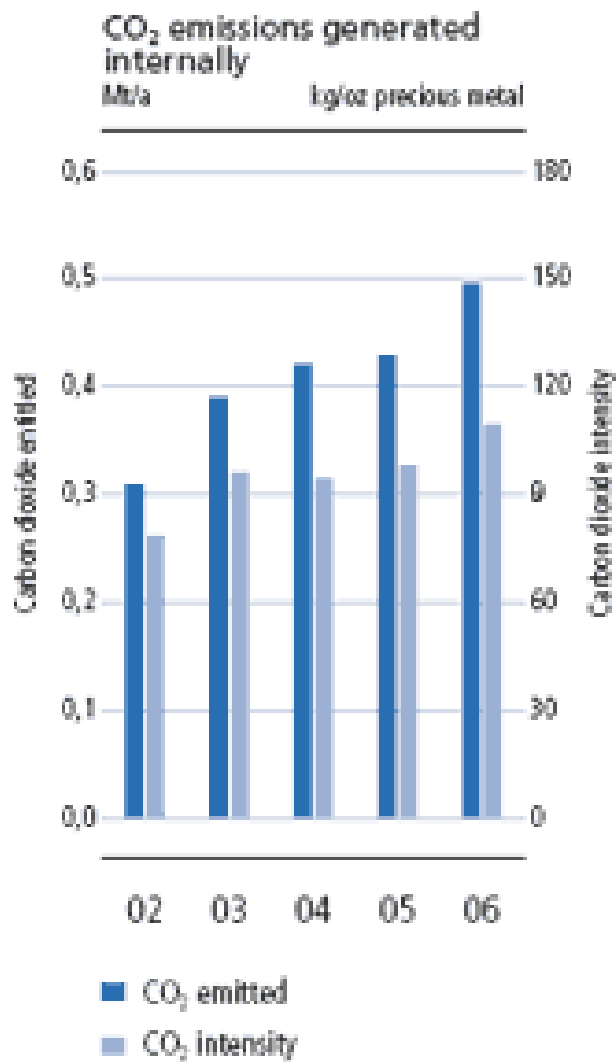
Indirect CO<sub>2</sub> emissions from imported electricity per ounce of precious metal in concentrate increased from 1 117 kg in 2005 to 1 186 kg in 2006. Indirect CO<sub>2</sub> emissions from imported electricity per refined ounce of precious metal decreased by 4% from 1 036 kg in 2005 to 995 kg in 2006. ***We are therefore not seeing a decline in emissions but an increase. This is only logical given the massive increase in platinum mining activity as a result of the current mining boom. At the local level in the platinum producing area where five or six other corporate also operate mines and smelters the cumulative impact must be considerable. The only evidence for this cumulative impact comes from a rapid increase in respiratory disease in communities in the area (Van Wyk, 2007) – pointing to a serious short coming in the Kyoto protocols, the prescripts of which focuses on industries individually and cumulative impact nationally rather than locally per clusters of corporate operations per industry.***

## **2.2. Direct emissions from Anglo Plat operations**

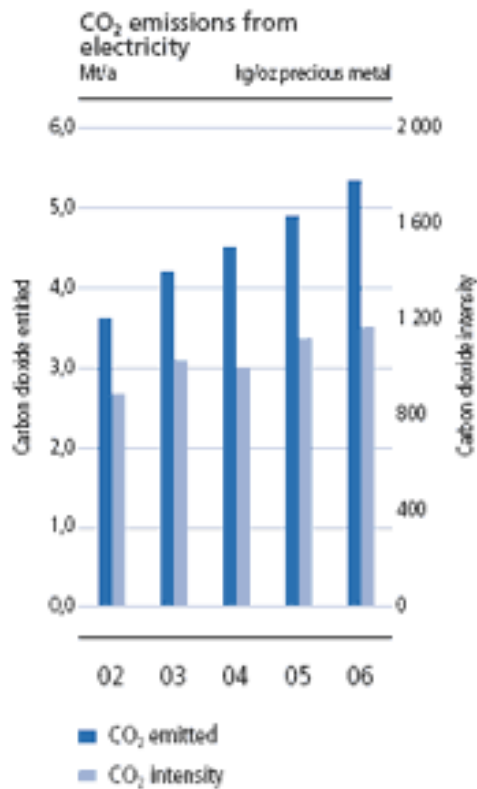
Carbon dioxide emissions generated internally from processes and fossil fuel use increased 15% from 433 kilo tonnes in 2005 to 496 kilo tonnes in 2006. This is primarily

due to increased use of fuel (6%) and coal (14%). **The increased use of fuel relates to vehicles used to transport coal and platinum ore to smelters. 15% represents a very significant increase and can be related to increases in operations as well as in production to take advantage of the commodity boom.**

Direct CO<sub>2</sub> emissions from operations per ounce of precious metal in concentrate increased from 98 kg in 2005 to 109 kg in 2006. Direct CO<sub>2</sub> emissions from operations per refined ounce of precious metal increased by 91 kg in 2005 to 93 kg in 2006 (Anglo



Platinum, 2007).



**Source for Graphs:** (Anglo Platinum, 2007)

### **2.3. Persistent organic pollutants**

The key persistent organic pollutants for Anglo Platinum are **polychlorinated biphenyls (PCBs)**, dioxins and furans. ***The Stockholm Convention requires that equipment containing PCBs must be phased out by 2025.*** Any PCBs recovered in the interim from such equipment must be treated and eliminated by 2028. Current *in situ* equipment, such as transformers and capacitors, may remain in place and operational as long as all reasonable steps are taken to prevent leaks. Some of Anglo Platinum's transformers still contain PCBs. ***According to Anglo Platinum these will be phased out to ensure compliance with the Stockholm Convention (Anglo Platinum, 2007),***

*however stating that this will happen, while giving no hint as to time frames, targets or methodology is extremely problematic and worrying.*

*However, without independent verification and monitoring this cannot be confirmed, and the Department of Minerals and Energy (DME) by own admission lacks capacity for effective health and safety monitoring.*

#### **2.4 Sulphur dioxide emissions**

Sulphur dioxide (SO<sub>2</sub>) is emitted from Waterval, Mortimer and Polokwane smelters and from RBMR. **Total SO<sub>2</sub> emissions (stack and fugitives) increased 8% from 15, 21 kilo tonnes (kt) in 2005 to 16, 38 kt in 2006. SO<sub>2</sub> emissions at Polokwane smelter increased by 63% from 4, 15 kt in 2005 to 6, 78 kt in 2006 (the smelter was off-line for three months in 2005 for a furnace rebuild). Anglo Platinum's reports are silent on the impact of these extraordinarily huge increases in SO<sub>2</sub> emissions on surrounding communities, farmers etc. The problem stems from the fact that the environmental reports and the social responsibility reports are done in silos. The social responsibility report focuses on Anglo Platinum's largesse to communities rather than on the impact of its operations on them.**

Anglo Platinum claims that SO<sub>2</sub> emissions from its Waterval smelter decreased by 24% from 21 tons per day in 2005 to 16 tons per day in 2006. SO<sub>2</sub> emissions from Waterval smelter now account for only 35% of Group emissions. **The decline in the Waterval emissions may be ascribed to the fact that Anglo Platinum has decreased operations here as a result of the proximity of this smelter to the wealthy suburbs such as Bergsig in Rustenburg and the fact that air sampling at Bergsig in 2005 found the SO<sub>2</sub> levels far in excess of what is acceptable (Van Wyk, 2007). The public outcry by the wealthier more powerful residents probably forms an important factor in the reduction of emissions at this smelter.**

Anglo Platinum claims that SO<sub>2</sub> emissions from the smelters have met all provincial scheduled process permit targets and have elicited positive comments from NGOs and the regulator. **The Benchmarks study, the 'Policy Gap' has shown that local and**

***provincial government in Rustenburg and the North West Province is either highly compromised or lacks capacity to effectively monitor SO<sub>2</sub> emissions (Van Wyk, 2007). The same research has found that many NGOs, funded by mining corporate may be considered sweetheart NGOs.***

The SO<sub>2</sub> emissions per total refined ounce of precious metal decreased by 3% from 3, 19 kg/ounce precious metal in 2005 to 3, 06 kg/ounce precious metal in 2006.

The Rustenburg regional environmental department's ambient air quality monitoring network currently comprises seven stationary monitoring stations. All stations continually record SO<sub>2</sub>, particulate matter with an aerodynamic diameter of less than 10 microns (PM<sub>10</sub>) and meteorological data. The results of these measurements are used in dispersion models to predict air quality conditions under various production scenarios.

Anglo Platinum claims that the results show a significant decrease in ambient SO<sub>2</sub> levels since 2005. While there were no exceedances of the daily average SO<sub>2</sub> guideline during 2006 (13 in 2005), ***there were three exceedances of the hourly SO<sub>2</sub> guideline of 134 parts per billion; two at Waterval and one at Klipfontein monitoring stations*** (Anglo Platinum, 2007). ***If this information proves to be accurate the Bench Marks Foundation can register the improvement as a direct result of the positive impact of its report, The Policy Gap. However, given the lack of independent monitoring capacity we only have the word of Anglo Platinum and a very compliant Department of Environmental Affairs and Tourism on this matter.***

According to Anglo's reports, at Polokwane smelter, four ambient monitoring stations have been in operation since 2002 and a further two were commissioned in November 2006. There were no exceedances of SO<sub>2</sub> guidelines recorded during 2006.

## **2.5. Particulate emissions**

### **Particulate emissions from point sources**

While Anglo Platinum reports that the particulate emissions from point sources reduced by 31% year on year due to additional air emission abatement equipment commissioned in 2006, monitoring of **ambient fine particulate (PM10)** concentrations is now done at seven monitoring stations, up from three, ***there were 300 exceedances of four-band scale evaluation criteria for dust deposition the daily average guideline in 2006*** (Anglo Platinum, 2007).

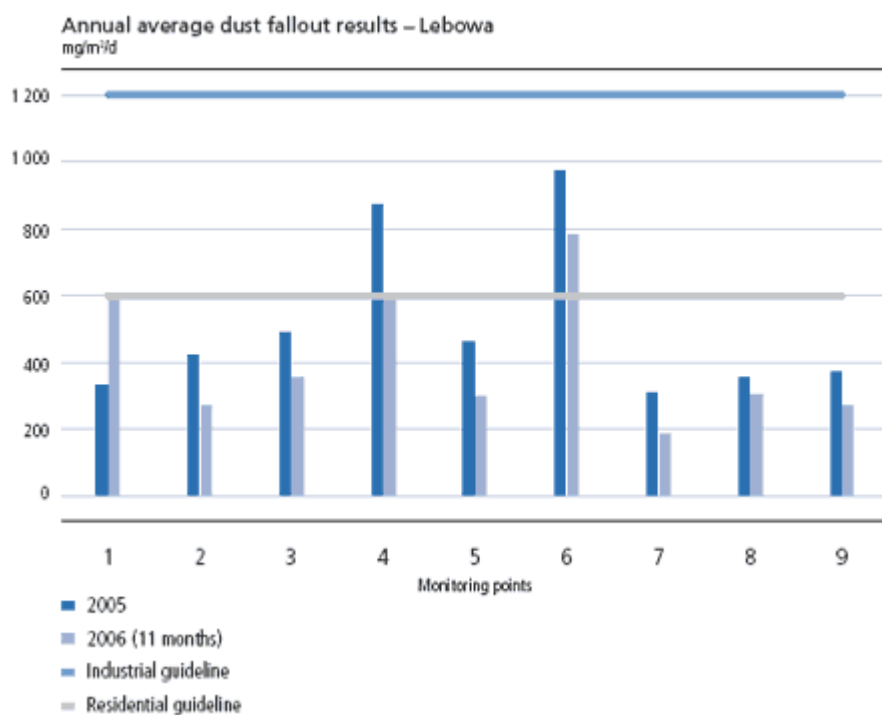
The Paardekraal and Mfidikwe monitoring stations, which are not close to the process plants or concentrators, recorded most of the **high PM10 concentrations**. The most significant sources of PM10 at Paardekraal are ***the tailings dam, unpaved roads, crushers and coal burning***, while the key source at Mfidikwe appears to be ***domestic coal burning*** which is linked to early-morning and late-evening winter periods. ***The 'Policy Gap' established a clear link between the living out allowance for migrant workers, sub-contracting, and informal settlements, many without electricity, where foreign mine workers have been reduced to being shack dwellers dependent of coal and wood or energy*** (Van Wyk, 2007).

## **Dust fallout**

Dust fallout at Anglo Platinum's operations is monitored using an **ASTM International measurement system** to determine monthly average fallout concentrations. **These are compared to proposed guidelines for dust deposition as described in the South African National Standards (SANS) 1929: 2005, Edition 1.1.**

***Although most dust fallout may be associated with dust generated at tailings dams, other sources – such as crusher plants and gravel roads – are also key contributors.*** Pre-control and post-control risk assessments, completed annually for tailings dams, indicate four dams with a high potential to generate nuisance dust. Three are at Rustenburg section and one each at Lebowa.

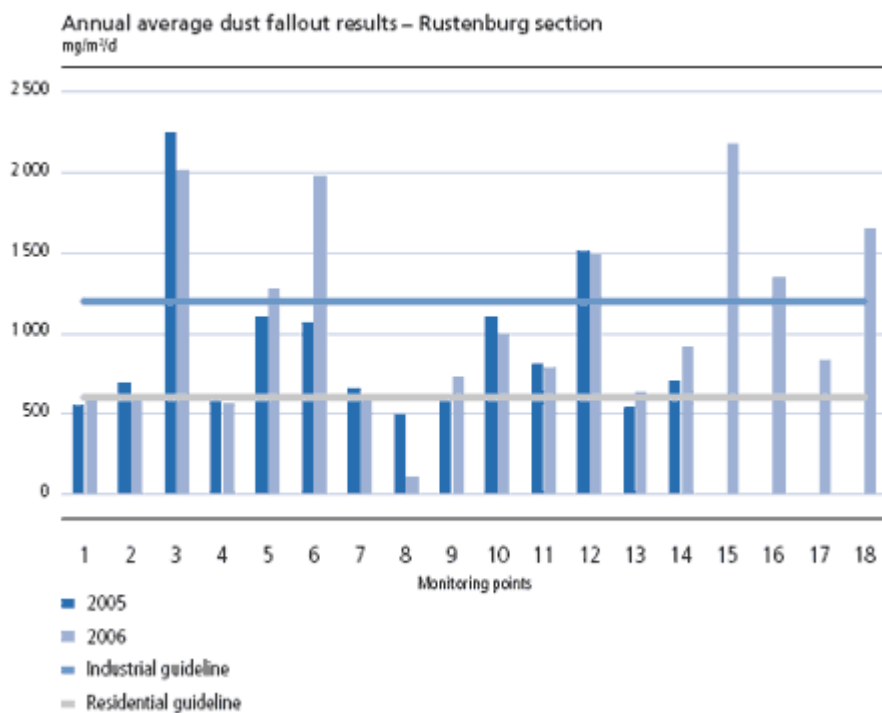
The average 2006 dust fallout decreased at all monitoring stations when compared to 2005 except for one (Anglo Platinum, 2007). ***Bench Marks notes the improvement with regard to dust fallout from Anglo’s operations and would like to believe that this improvement together with more detailed reporting in the 2006 report over previous year may be attributable to the impact of the Policy Gap report. However, what the Anglo report lacks is any reference to the content of the dust from tailings dams. Tailings dust contains all the heavy metals including uranium and is extremely dangerous in terms of both respiratory diseases and cancer.***



(Source: (Anglo Platinum, 2007))

Dust fallout monitoring is conducted in the Rustenburg Platinum Mines (RPM) lease area at 17 sites, four of which are classified as residential sites (2, 4, 13 and 14), while the remaining 13 sites are classified as industrial. Three new industrial sites were added to the network at the end of March 2006, while one site was relocated (Anglo Platinum, 2007).

A comparison of results for 2005 and 2006 for residential areas shows that the Klipfontein offices (point 13) and Klipfontein village (point 14) have slightly **higher dust levels** during 2006, at just above the residential guideline. This is due to increased activity in the area due to the Klipfontein **tailings dam** re-mining and Kroondal opencast mining. **Dust fallout at seven industrial sites is above the guideline values due to their proximity to crushers, tailings dams; haul roads and shafts (Anglo Platinum, 2007)**. Noting the close proximity of Kroondal to the town of Rustenburg itself and the relatively high population density of the area this is a matter of concern.



(Source: (Anglo Platinum, 2007))

### 3. Water

Water use at Anglo Platinum is divided into water used for primary activities; water used for non-primary activities and internally recycled water. Primary activities include all water used to produce the products of the Group, from mining to refining. It excludes domestic and recreational use. Internally recycled water is also excluded from the water used for primary activities parameter.

### 3.1 Impact of Mining on Water

- **Underground water resources are threatened by the pumping out of water from aquifers for mine safety and by the perforation of dykes, which changes the direction of water courses and the level of the water table, this impacts on boreholes, wells and springs. The North West Province, Limpopo and Mpumalanga are all water stressed provinces. The pumping out of underground water could also result in the development of fissures.**
- **Acid Mine Drainage impacts on surface water, especially where tailings dams and rock waste facilities are located in close proximity to streams and rivers. This destroys the aquatic life and makes the water unusable for human consumption.**
- **Mines consume huge quantities of water leading to an imbalance in water consumption. i.e. local communities get deprived of natural water sources which they have used for centuries. When water is commodified as a solution local communities are deprived of the resource as they cannot afford to pay for it.**

### 3.2. Case Study: The Damming (Commodification) of Water in Limpopo and Mpumalanga

Anglo Platinum has teamed up with the Department of Water Affairs and Forestry (DWAF), and other mining companies active in the eastern limb of the Bushveld Complex in Limpopo, to secure essential water resources for its operations to construct dams in this water scarce area so as to facilitate mining. ***Local communities, South African National Parks and key NGOs have protested the construction of these dams, but to no avail. They have argued that the project violates national and international laws and pits ministries against each other.***

“It will boil down to which department has the most political clout,” according to Nick King, executive director of the Endangered Wildlife Trust (EWT), which rejects the dam building project. “Water affairs’ mandate is the delivery of water, environmental affairs

must conserve the resource base and SANParks protects biodiversity” (Macleod, 2006). ***The Department of Environmental Affairs submissive to its ‘senior’ department (Minerals and Energy) backed down in agreeing to the construction of the dams, despite the opposition of environmental groups.***

Construction started on the De Hoop dam in April 2007, following the final go-ahead from the Department of Environmental Affairs and Tourism in October 2006 after a lengthy appeal process. ***Despite all Anglo’s claims to be environmentally concerned it never considered withdrawing from supporting the construction of these dams as profits come first. The appeals focused mainly on the impacts of damming on downstream users and ecosystems. Downstream users include farmers and traditional communities. The dams will deprive them of water.***

DWAF will spend some R5 billion on constructing the De Hoop dam and associated infrastructure. Anglo Platinum will sign a memorandum of agreement with the department and the other mining companies stipulating that costs incurred to construct the dam will be repaid over a 20-year period through an agreed escalated water tariff. While Anglo Platinum and the government claim that the dam will service more than 21 mining companies and approximately 1 million people in several towns and rural communities in Limpopo, including Polokwane and Mokopane, ***EWT in its appeal against the dams asked “How will domestic supply be guaranteed? No evidence is provided that local communities will receive water, let alone be able to pay for it.”*** (Macleod, 2006)

Construction is expected to be completed by 2011 with the De Hoop dam fully operational by 2015. Based on the growth pattern for mines in the area, Anglo Platinum has projected a shortfall of water in the De Hoop dam by 2012/13, as the dam will still be in the filling phase. Anglo Platinum is therefore considering building a dam on Richmond farm as an additional water source, both to alleviate the projected shortage and for long-term water provision to the mine. An environmental impact assessment is under way and focus group meetings with stakeholders are being held to mitigate

concerns on the proposed dam and ensure all concerns and impacts are appropriately managed. ***These consultative meetings with communities and those affected by mining are largely ceremonial as the outcomes of such meetings are not binding. These meetings are also problematic given that there is usually a severe imbalance of knowledge, power and resources, with poor, often semi literate and powerless communities having to face off some of the wealthiest and most powerful mining corporations in the world. The Ga Mawela community has voiced its disapproval of the dam's construction*** (Anglo Platinum, 2007).

Potable water is sourced from parastatal utilities. Non-potable water use at managed operations is low and comes from various raw-water sources. ***The key supplier of non-potable water in the eastern limb is the Lebalelo pipeline, for which water is extracted from the Olifants River. As noted elsewhere environmentalists are extremely concerned about the impact of mining on the Olifants River.*** Grey water is sourced from municipal sewage plants to supply process water to some operations, notably PPRust and Rustenburg section. No surface water is used by any operation. Rainwater collected in the open pit at PPRust and used is, however, included in the surface water parameter. The groundwater parameter includes groundwater from boreholes used for primary and non-primary activities, as well as fissure water from underground operations where this can be measured (Anglo Platinum, 2007).

***Anglo Platinum claims that there are no water sources or related ecosystems (such as Ramsar-listed wetlands) or habitats are significantly affected by the Group's extraction and use of water, however Vera Ribeiro, coordinator of the Mozambican environmental NGO Geosphere, expressed concern not only about the quantity of downstream water on the Mozambican side, but that chemical pollutants and heavy metals from mining would affect water quality (Macleod, 2006). The Steelpoort River feeds into the Olifants River which in turn flows into Mozambique.***

***Ironically, the EWT added, environmental affair's own research had identified the Sekhukhuneland region as one of nine national conservation priority areas***

***because of its high biodiversity and ecosystems service value. At least 20 species of plant found nowhere else on Earth will be flooded by the 1 700ha dam, along with at least 20 animal and reptile species already threatened with extinction (Macleod, 2006).***

#### **4. Work Place health and safety**

The rapid increase in the Platinum price in 2007 continuing an upwards trend that has lasted for more than five years has also seen a dramatic increase in the number of workplace fatalities during 2007. The only source of information for these fatalities at the moment is the newspapers. Current annual reports would reflect the 2006-07 financial year and not the 2007-08 financial year. However concern about work place fatalities in the mining industry has led to a call by President Thabo Mbeki for a safety audit of mining in the country (Brown, 2007). Platinum mines have experienced the same upward trend in mining fatalities in the 2007-08 as gold.

***What most of the media failed to pick up on is that the mines inspectorate of the Department of Minerals and Energy (DME) is severely strained by the fact that in the Medium Term Budgetary Policy Statement, the National Treasury cut the budget for promotion of mine health and safety to R121.85m. The bulk of the R3m was re-allocated to the DME's electricity and nuclear programme and the remainder to administration (Seccombe A. , 2007).***

A further problem is that the Chamber of Mines closed down the Chamber of Mines Research Organisation (Comro) some 15 years ago, for which a primary task was to address safety issues on the mines through basic and applied research (Coldwell, 2007).

At a meeting with the Bench Marks Foundation in October, senior managers committed themselves to improved safety at Platinum mines (Mathews, 2007, p. 17). Such commitments are viewed very sceptically by the National Union of Mine Workers who accuse the mining corporations of putting profits before people in an industry which 'Where death is a corporate norm,' (Baleni, 2007, p. 32).

According to May Hermanus at the Centre for Sustainability in Mining South Africa's mine workers are the worst paid in the industrial sector, which is an inverse situation to other countries where mine workers are paid much better than in other industries. The average mineworker earns between R2500 to R3500 per month. She notes that deep level mining is extremely dangerous, and that these risks added to low worker morale as a result of poor pay (Faul, 2007), bad living conditions (in informal settlements) and dangerous working conditions makes for poor mine safety standards. One may add to this recipe for disaster the rapidly rising commodity prices for minerals in general and platinum in particular to complete the underlying causes of poor mine safety.

## **5. The Challenges**

- The rural and informal sector communities lack the skills to take advantage of the platinum boom that is taking place on their land:
  - They lack the knowledge base to understand the potential impact of mining on their land, the air that they breath and their water resources;
  - They lack the skills and experience to negotiate effective compensation for the loss of land and the loss of their traditional mode of production;
  - They do not understand the opportunity costs or benefits of mining.
- The rural and informal sector communities are malnourished. They have a very poor nutritional profile and they are therefore prone to disease.
- The current response to HIV and AIDS is largely reactive and treatment oriented. Pro-active measures do not go much further than ABC advocacy. The most effective interventions must include improving the nutritional and economic status of communities.
- Mines currently engage with local, provincial and national governments in developing their social and labour plans (required by the mining legislation and the Charter) to align themselves with Integrated Development Plans, Local Economic Development Plans (IDPs & LEDs). Communities are often excluded from these processes.
- These challenges could be turned into labour intensive, profitable opportunities that could give rural and poor communities a share of the wealth generated by

the platinum boom, should mining companies engage more meaningfully with communities.

## **6. Suggested Solutions**

### **6.1. Introduction**

Mines should stop seeing communities as irritants impeding progress and profits. Mining Corporate Social Responsibility programmes should go beyond being propaganda tools for showcasing corporate largesse and should instead be meaningful and sustainable engagements with communities that could become an opportunity for both the corporate and the community to develop a more meaningful and environmentally sound relationship. Environmental challenges and community challenges cannot be separated the problems of the environment and that of communities should be viewed as an integrated challenge requiring integrated solutions.

### **6.2. Air**

- ✓ **Communities could be engaged to monitor and report on issues of air quality. Thus communities could manage dust roads used by mining trucks and vehicles to control dust levels.**
- ✓ **Unused surface mine land could be used for a variety of intensive crop production, including vegetable, bio-fuel and other income generating plants (economically profitable trees and shrubs including pomegranates (medical); Jatropha (fuel) and legumes such as the Gwar Bean (mining) and Aloes (medical)..**
- ✓ **Communities can be engaged to grass or vegetate tailings dams and facilities.**
- ✓ **Communities can observe and report high dust or smoke levels.**
- ✓ **The mines should move away from using organic fuels in energy consumption as well as in the smelting processes. The mines can be a catalyst in supporting community involvement in the new bio-energy strategy of government by assisting communities to move away from wood and coal burning in informal settlements and by supporting communities in becoming involved in production of bio fuel crops.**

## POTENTIAL BIO FUEL PROJECT

Shack dwellers are faced with an added exposure to respiratory ailments due to paraffin, coal and wood smoke inside shelters due to a lack of electricity

- The mines and traditional authorities avail unused and under-utilised land for the development of Jatropha plantations. The seed of this plant contains 40% oil which can be crushed and turned into bio-diesel. The mines consume huge quantities of diesel and can give communities guaranteed off-take agreements. Surplus diesel can also be used to generate electricity for informal settlements;
- For every 1000ha planted 300 jobs are created;
- For every 100ha a bee project to assist with pollination, producing honey, wax and jobs is developed. There is currently a shortage of honey in the world;
- A by product is glycerine which is used in the manufacturing of soap.
- Jatropha plantations need to be protected against veld-fires.
- The community could be mobilised to harvest grass. The grass should be properly harvested and cut and selected into grass for fodder, for thatching, for weaving and for blind manufacturing. That warehouses and a factory be established for processing grass. This will remove the grass, the cause of veldt fires, annually, thus reducing the risk of veldt fire to the Jatropha plantations. Weld fires represents a serious challenge to agriculture in all the platinum producing provinces

- ✓ Smoke emanating from the smelters in the area has seen an 80% increase in respiratory diseases. Mining corporations should study the program and (Swiss) technology adopted by Lafarge Cement in burning waste instead of coal. This technology is extensively applied in Switzerland. The mines are satisfied with merely adhering to international pollution protocols and agreements instead of creatively addressing the issues. The fact that local medical practitioners indicate that 80% of patients they see on a daily basis suffer from respiratory ailments should be a major cause for concern. Consuming the waste generated by mining towns instead of coal could also give rise to a labour intensive waste management solution for the area.”

✓

### 6.3. Water

- The base of tailings dams from which toxic seepage occurs and stream beds affected by seepage be planted with reeds by surrounding communities, which could be harvested for weaving, blind and furniture manufacturing, thatching and export. The reeds absorb the dangerous heavy metals and chemicals seeping from dams, cleaning the water that goes back into the surface water system.
- At the moment the residents of informal settlements such as Freedom Park defecate in the veldt or in pit latrines. Defecating in the veldt in close proximity to surface water streams poses a cholera or diarrhoea risk. Defecating in pit latrines poses a similar risk (note recent events in Delmas (2005)). Mines could engage with communities in informal settlements to introduce ablution facilities that will see the human biological waste be concentrated in bio-gas pits that generate bio-gas for domestic consumption. This will reduce the dependence on coal, wood and paraffin and reduce respiratory problems in the communities.

### 6.4 Waste Management

**Currently waste management is a huge cost to mines. Mining corporations should investigate turning at least some waste manage costs into income opportunities for both the mine and communities:**

- ✓ **Huge rock waste dumps of partially crushed stone covering potential agricultural land could become a source of income for communities given that most of the formal towns located within the platinum producing areas are experiencing a building boom**

## 7. Conclusion

This paper has briefly summarised some of the environmental impacts and challenges that communities face as a result of mining. It has tried to show that these challenges could become opportunities for both communities and mining companies. To realise this mining social responsibility programmes must begin to address the actual impact of mining on communities. The suggested strategy represents a community development approach that will accrue in the following benefits

- ✓ Job creation
  - Every project proposed is labour intensive. 40 000ha of Jatropha trees will create in excess of 12 000 jobs
  - People will find job opportunities beyond mining.

Economic Diversification

- All the projects integrate and interrelate and cover activities from the primary through to tertiary activities
  - Investment in bio-fuel production will help diversify the economy away from being a mono-economy
- ✓ Improved Community Health
- The projects address the negative impacts of mining in the area and turn them into positive opportunities that will improved the natural, social and economic environment
  - The income status of communities will improve and the will be able to afford health care and treatment
  - The nutritional status of communities will improve making them more resistant to disease.
- ✓ Improved Community Skills

The sustainable use of a mineral resource requires that the corporations involved consider issues relating to their operations that go way beyond mining for the sake of profits and also beyond the perimeter fence of their operations. Thus environmental impact does not stop at the perimeter fence; such impacts affect communities in the immediate vicinity of the operations and often hundreds of miles beyond. Water, air and land are part of the global commons, i.e. they belong to the entire humanity and cannot be commoditized, and must be used responsibly by all. If we are able to pass very stringent anti smoking laws because we are concerned for the health of the public in general and that of individuals in particular, we should surely be equal stringent, if not more with corporate polluters.

While mines engage with communities in consultation over EIAs, and with Local Government over social and labour plans, those being consulted should not only be made aware of the opportunity benefits of mining but also of the opportunity costs of mining to communities for which they will never be compensated.

This paper skimmed the surface of the complex environmental, social, economic, health and safety and political issues resulting from platinum mining and because of time constraints have been left unsaid. Hopefully this event is but the start of much more public engagement with corporate in the industry that will lead to a more sustainable future for all South Africans.

**Perhaps then we will be able to move away from the startling headlines that this paper started with.**



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