

expected to offset significantly the extraction costs of the uranium deposits. Historically, uranium was mined from the Middle Elsburg section of the mine but the plant was decommissioned in the late 1990s following the collapse of the uranium price (Simmer & Jack, 2006).

Simmer and Jack Mines Ltd plans an IPO to raise funds to complete the first phase of the Randfontein project through its Ezulwini subsidiary and fund the second phase. The firm's board is due to give the green light for the initial phase of gold production later in June 2006 and a feasibility study to also mine uranium there in a second phase is due in September 2006, chief executive Gordon Miller said (Reuters, 2006).

On 9 July 2007, the first shipment of ammonium diuranate (ADU) was shipped from the **Dominion Reefs Uranium Mine** near Klerksdorp. ADU is a concentrate containing uranium which, after calcining, is converted into uranium oxide (U₃O₈). The shipment was delivered to the facilities of Nuclear Fuels Corporation of South Africa ('Nufcor SA').

On 18 May 2007, Uranium One Inc. announced the production of the first ADU whilst commissioning the solvent extraction circuit at its Dominion Reefs Uranium Mine near Klerksdorp. The ADU will be further processed into U₃O₈ (yellow cake) in Nufcor's calcining plant.

Processing of underground uranium ore at its Dominion Reefs Uranium Mine commenced on schedule in 2007 following the successful hot commissioning of the atmospheric leach circuit at the Dominion mill (SXR Uranium One, 2007). The South African Department of Minerals and Energy ("DME") has granted SXR Uranium One a new-order mining right for the Dominion Uranium Project under the Mineral and Petroleum Resources Development Act of 2002. The mining right has been granted for an initial period of 30 years. The area covered by the mining right comprises approximately 14,000 hectares (SXR Uranium One, 2006).

In the last week of September 2005, Aflase CEO, Neal Froneman, presided over a small ceremony to clear the ground ahead of the construction of a new ZAR500 million [US\$79 million] processing plant at its Dominion Reefs uranium mine near Klerksdorp. The plant is due to be up and running in the first quarter of 2007, when production is due to begin at Dominion Reefs. The plant is sited alongside Aflase's existing gold plant, and at full production, throughput capacity at the uranium plant is planned to be 210,000 tons a month, with expected recoveries in excess of 90% (Aflase, 2005).

Aflease Gold and Uranium Resources (AFL) announced that it had entered into an agreement in principle with **Harmony Gold (HAR)** whereby Aflease would acquire the right to mine, process and market all of Harmony's uranium in South Africa.

The resource that is included in the agreement is estimated to consist of 155 million pounds (lbs) of uranium oxide [59,619 t U] of high grade dump and tailings material, which could start producing uranium in about two years. A further 145 million lbs of uranium oxide [55,772 t U] low-grade tailings has also been delineated as a future target. The Harmony uranium deposits are situated predominately to the west of Johannesburg and in the Free State province (Business Day, 2005). The project was terminated after drilling results from several of the tailings showed that "the uranium resource fell short of expectations" (Business Report, 26 May, 2005).

On 4 July 2007, **Mintails Ltd** announced that the total resource has been doubled to approx. 21 million lbs U₃O₈ [8,077 t U], 3.5 million lbs [1,346 t U] of which have been upgraded from the "inferred" to the "indicated" category. On 17 May 2007, Mintails Ltd announced an inferred resource of 10.4 million lbs U₃O₈ [4,000 t U] in the 285 million tons of gold tailings owned by the company in the West Rand area.

The major issues that differentiate gold and uranium from platinum and coal are:

- The absolute **toxicity of gold and uranium mine waste facilities;**
- Gold mining is long established, so **exploration is not nearly as intense** as with Platinum and Coal;
- Most gold mining in South Africa is **shaft rather than opencast** mining;
- South Africa's gold mining is **ultra deep level and therefore incredibly dangerous**, with a **fatality record that far outstrips that of both platinum and coal;**
- Gold mining has had and continues to have an **immense impact on both surface and ground water;**
- Gold mining has had an **impact on the geological foundations** of major urban areas such as Welkom, Stilfontein, the West Rand and the East Rand;
- While pollution from gold and uranium mining impacts on both urban and commercial farming communities, these mining sectors do not impact on traditional communal farming communities.

In terms of labour conditions such as wages and remuneration, the situation and the legislative environment gold mining is much the same as that of platinum and coal. This section will therefore not repeat the findings of earlier sections where they are the same but focus on issues particular to gold and uranium mining.

Consequently, the impact of gold and uranium mining on the **three dimensions of sustainable development (economical, environmental and social)** will be discussed.

11.2 FINDINGS AND DISCUSSION

11.2.1 Economic dimension

Do the mining corporations aspire to integrate the interests of all stakeholders with that of their own business goals? (For example local farmers)

It has been found that for farmers, environmentalists and the tens of thousands of people living along the Wonderfonteinspruit catchment, and in the case of those in informal settlements using the water from that water source, the **interests of the corporations and their own do not coincide**. It is clear that no mining operation will ever succeed in integrating the interests of all the divergent stakeholders, particularly those suffering the impact of mining operations.

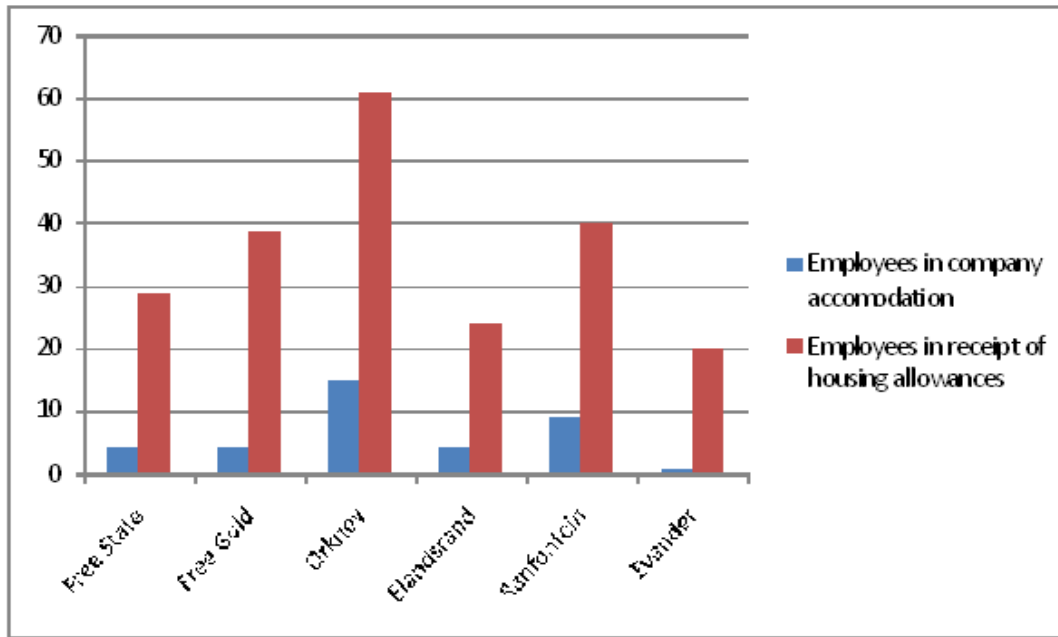
A disturbing fact is that the interests of mining corporations and those of government and the majority party in government seem increasingly coincidental. This is leading to a crisis of democracy in South Africa as people affected by the impact of mining turn to government departments for recourse and defence, but find those departments unresponsive to their needs. The frequency of delivery uprisings in townships, of clashes between members of communities, the police and mining corporations, and the current wave of xenophobic attacks all point to a crisis in democracy, and a ruling party democratically elected out of touch with the electorate.

Do the mining corporations under review develop a transparent process for the inclusion of indigenous peoples as full participants in business decisions?

The gold-mining industry has a long history of employing migrant labour. The Mining Charter requires a gradual scaling down of migrant labour. In finding ways of reducing the migrant labour system, most mines, including the gold mines, have failed to consult with local communities or local and provincial government. The solutions often involve the release of mine workers into local areas around the mines, aggravating the severe housing and infrastructure shortages. The gold-mining companies have provided workers with a variety of options pursuant of finding a solution to the migrant labour issue, including the options of the living-out allowance, employee home ownership schemes, and upgrading hostels into family

accommodation (Gold Fields, 2007). Another option exercised by the gold-mining companies is that of outsourcing work to sub-contractors. Each of these options is fraught with problems.

Figure 13: Harmony Gold, workers in company accommodation vs workers on housing allowance



- **The Living-out allowance**

Google earth images of many of South Africa’s mining operations will show the viewer the close proximity of informal settlements to mining operations. These informal settlements have sprung up and grown from the inception of the living-out allowance. Migrant workers, many of them from Malawi, Swaziland, Mozambique, Lesotho, Zimbabwe and the Eastern Cape have moved out of the hostels and into these informal settlements. They choose the living-out allowance because their families are far away in labour sending areas in neighbouring SADC states, and it would be too expensive to bring them into South Africa. The informal settlements are also preferred because it is cheaper to rent a shack than a house in a township, the nearest townships are often far from the mine and transport to and from work is expensive. Because the mine workers have money, their income attracts local people, shebeen owners, backyard mechanics, sex-workers, spaza shop owners and criminals – the lumpen class of South African society. Informal settlements become a melting pot of what Mahmood Mamdani refers to as ‘natives’ (local South Africans) and ‘settlers’ (foreign Africans). The fact that the mine workers who are ‘settlers’ have jobs and money, is a cause for resentment among

locals, which resentment could easily flare up into violence as we have seen from the recent outbursts of **xenophobic attacks** in the informal settlements next to Reigerpark.

Large numbers of mineworkers living in informal settlements are also bad for mine safety. The workers rely on coal fires and paraffin for energy and heat, the fumes of which are toxic. Often these informal settlements do not have access to clean water or proper nutritious meals. Because they frequently go to shebeens and use the services of sex-workers, many of these mine workers do not rest properly between shifts, are victim to alcohol and substance abuse and contract sexually transmitted diseases such as HIV/AIDS. The living-out allowance may vary from R800 to R1 500 per worker (Harmony Gold, 2007, p. 27).

- **Home ownership**

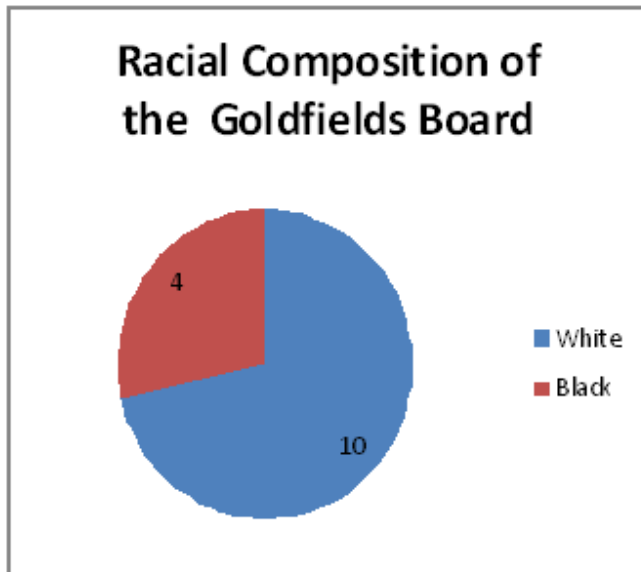
Some workers take advantage of assistance by mining companies to obtain housing bonds as part of the home-ownership scheme. Many of these workers move into proper township houses. Where the mine worker is from a foreign country, or from another part of South Africa, the local people resent the fact, especially in places where local government delivery of houses is perceived as being too slow. Locals ask 'why are foreigners getting houses, but we are not?'

The day-to-day running of mining operations is dealt with at a management level. Macro-economic and business decisions are taken at head office level either in London, New York, Johannesburg or in Canada and Australia. Local management at the operational level make the day-to-day operational decisions. The mining charter requires that mining corporations reflect a 40% HDSA content by 2009. Anglo Platinum reports that it has exceeded the 40% target by achieving 43%. However, top management boasts only 1 African male, and 1 'foreign male', compared to 11 white males and no women.

Goldfields reports that it has spent 43% of total working cost and capital materials with HDSA suppliers, up from 9.7% in 2003.

In terms of ownership, Mvela Resources as a HDSA company acquired a 15% share of Goldfields. The Mining Charter sets a target of 15% HDSA by 2009 and 26% by 2014. In terms of HDSA participation in management, the Board composition of Goldfields is reflected in the graph below:

Figure 14: Racial composition of the Goldfields Board



The Goldfields board is loaded with prominent current and former politicians from the ruling party in South Africa, including, Tokyo Sexwale (former premier of Gauteng), Gill Marcus (senior member of the ANC); and Jakes Gerwel (prominent former civil servant in the office of the President) (Gold Fields, 2007, p. 146).

The board of Uranium One is the exact opposite. It is composed of ten white men (Uranium One, 2008)

Do the mining corporations provide employment and training opportunities for and actively recruit from indigenous communities for all levels of employment? (1.4.C.8)

Most of the mineworkers on gold mines are current or former migrant workers. Some come from the Easter Cape, others from a variety of SADC countries. Harmony Gold reports that foreign labour representation (i.e. employees whose permanent residence is outside South Africa) comprises 32% of the total work-force. 17% of Harmony's employees are defined as migrant, i.e. employees whose permanent residence is outside of the province in which they are employed.

Figure 15: Origin of South African workers at Harmony Gold Operations

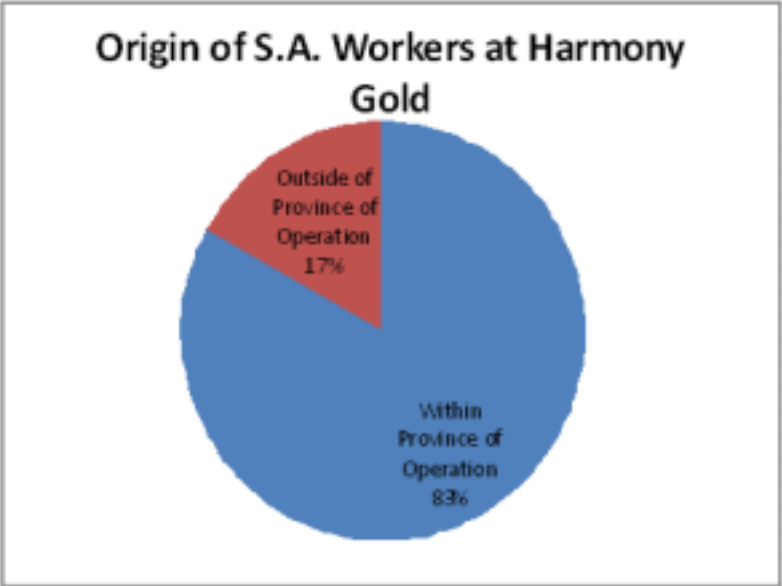
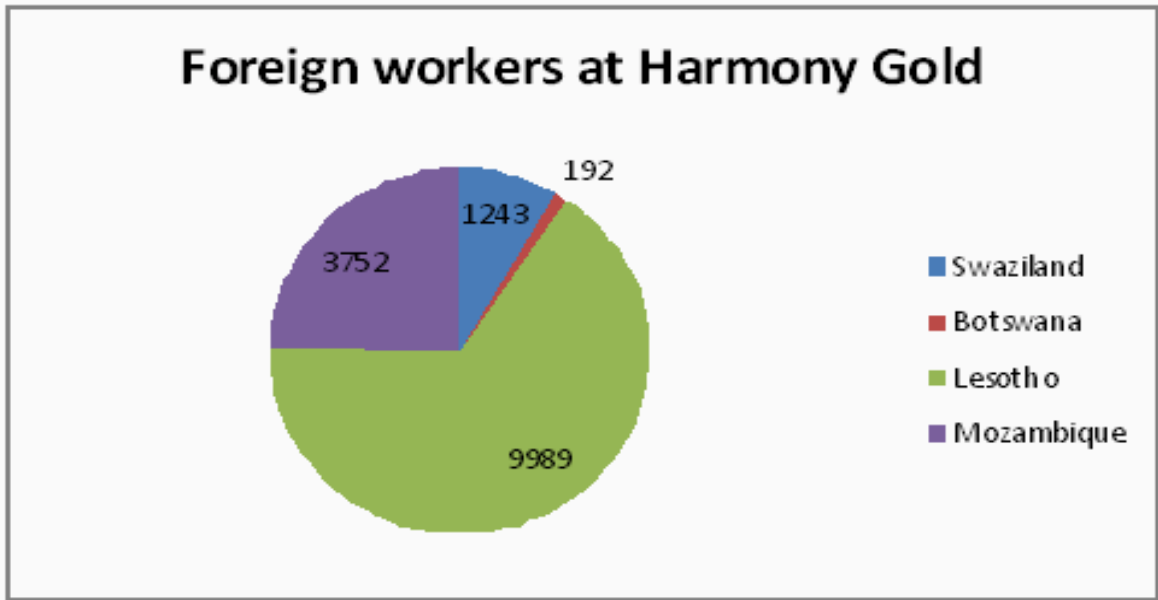


Figure 16: Foreign workers at Harmony Gold Operations



Have the employment equity plans of mining corporations been published and has annual progress in meeting that plan been reported?

All the major gold-mining corporations do report their equity targets in their annual reports as part of their sustainability or corporate social responsibility reports, including reference to progress achieved.

Do the mining corporations under review provide on-going, free and compensated education and training for workers? (2.4.B.10)

As in the case with platinum mines, it has again been found that they do indeed provide training, given the nature of mine work and the fact that productivity issues, health and safety are very much dependent on education and training. However, high fatality levels at South African mines, and especially the gold mines, have brought safety education and training under the spotlight.

Do the mining corporations under review pay sustainable living wages which enable employees to meet the basic needs of themselves, their families, as well as investing in the ongoing sustainability of local communities through the use of discretionary income? (2.1.P.7)

The corporations under review pay wages in compliance with national legislation. However, South African wages lag far behind those of Canada and Australia. There is also a heavy reliance on subcontracted labour on South African mines.

11.2.2 Environmental dimension

Do the mining corporations under review pay careful attention to ensure that their actions do not damage the global and local environment regarding issues such as climate change, bio-diversity and pollution prevention? Do they adopt, as a minimum, internationally recognised standards and ensure that they are implemented universally, regardless of any legal enforcement or lack thereof in any jurisdiction and seek continually to improve their performance? (1.1.c.1)

The gold and uranium mining companies under review would claim that they do. However, their claim is massively contested by civil society activists and farming communities impacted on by their operations.

Gold and uranium mining in South Africa has impacted on the environment at all stages of the mining process from mineral exploration, through development, operations, closure, post-closure, and the post-extraction product chain.

The environment in which mines operate and impact include not only the natural environment, but also the social, cultural, economic and political environments. People living in Gauteng and the North West Province are currently suffering the consequences of **poor planning and decision making** in the exploration decision-making and operations phases over a period of more than 100 years. Many gold-mining operations in these provinces are now of a marginal nature, very dependent on a sustained upward swing in the gold price for their continued existence.

- **Operations**

Annual reports including CSR and CSI Reports focus mainly on operations when dealing with the impact of mining on the environment and biodiversity. The quality of reporting varies greatly with only Anglo Platinum reporting on incidents of non-compliance, clearly setting out targets, and evaluating performance against previous targets. Anglo Gold Ashanti and Harmony Gold (ARM) and Uranium 1 are confronted with a number of challenges, including:

- High operational costs of ultra deep level mining;
- Poor safety at such deep levels;
- Problems of preventing radioactive pollution of land and water in close proximity to waste facilities.

- **The Impact of gold and uranium mining on water and air – impacts on the West Rand:**

Water is critical to a healthy environment and to sustainable biodiversity. Scientists at the Council for Scientific and Industrial Research (CSIR) have warned that the impact of acid mine drainage (AMD) on water is the second most important threat to humanity after global warming (Tempelhoff, 2008, p. 5). The gold and uranium mines of South Africa are the most common source of both trace and heavy metal pollution of South African water. “Heavy metals” refers to all metals with atomic weights greater than that of calcium, and includes metals such as iron, manganese, zinc, mercury and lead (Davies & Day, 1998, p. 194). “Trace elements” refers to all elements, “both metallic and non-metallic that occur in small (trace) quantities in the natural environment. They thus include elements like beryllium and boron and also the rarer heavy metals. Trace metals occur in all natural waters, sometimes in minute quantities, because they are products of geological weathering” (Davies & Day, 1998, p. 194).

Excessive trace element contamination results in a reduction of biological species diversity in aquatic ecosystems as less tolerant species fall prey to such pollution. Mercury, aluminium, beryllium, cadmium, lead, nickel, iron, copper, uranium, chromium, selenium and zinc may all find their way into surface and groundwater sources as a result of mining. *“Antimony and arsenic, although not metals, are also highly toxic trace elements”* (Davies & Day, 1998, p. 194).

These pollutants are extremely dangerous to vertebrates, including humans. Mercury, historically used to extract gold from ore, and currently occurring in high concentrations in South African coal, leads to irreversible damage of the central nervous system; nickel and beryllium damage the lungs; and calcium damages the kidneys and liver. Organisms other than vertebrates are also negatively affected (Davies & Day, 1998, p. 194).

Noting the discussion above, the state of the rivers and streams around Johannesburg is definitely questionable. A report of the Department of Environment and Tourism has found the following:

Sulphates - Mining

Klip River Catchment

KR14 shows runoff from Durban Roodepoort Deep gold mine where level are in excess of 600mg/l. PIN1 shows the impact of mining activity and the Roodepoort West industrial area on Princess dam where levels are bad after being ideal at Skinner dam just upstream.

Also bad - below Johannesburg CBD RP1, 2, NS2 (Unigray), RP3 (Regetta Park) in the vicinity of diffuse pollution from slimes dam leachate and the Main Reef Consolidated Gold mine.

Recommendations

Treat and monitor slimes dam leachate.

Chromium content Mining Industries

Jujskei Catchment

Unacceptable - at RLOUT which shows the impact of the Robertville industrial area, the Consolidated Main Reef mine and the Chrome / nickel refining plant on Rand Leases Dam adjacent to Fleurhof.

Copper content Industries

Jujskei Catchment

Unacceptable (in excess of 10 mg/l) - at Alexandra industrial area west of DWJ14.

Klip River Catchment

Unacceptable - in whole area around NS6 (Natalsspruit) in the Heriotdale, Droste Park, Denver, Benrose and Robertsham industrial areas.

Recommendations

Treat effluent

Rianna Munnik, a Deputy Director in the Department of Water Affairs and Forestry (DWAF) is of the opinion that finding sustainable solutions for the rising water levels in various Witwatersrand gold-mining basins is one of the largest challenges related to mine closure in South Africa (Brindaveni, 2007). The largest impact of polluted mine water on the environment is on the **salinity of water resources**. People living in the middle and lower Vaal river catchments are impacted upon by the increase in salinity of the water, owing to the discharge and decant of saline on mine water in the upper Vaal catchment. This has consequences, such as the increase in treatment cost and scaling (Brindaveni, 2007).

In addition, the persistent activism of Mariette Liefferink, the C.E.O. of the Federation for a Sustainable environment has kept the media attention on the impact of uranium and gold mining on the Wonderfontein spruit catchment area for a number of years. The Nuclear Energy Corporation of South Africa finally admitted publicly in February 2008 (Tempelhoff, 2008) that radioactive toxins from mine waste facilities on the West Rand have so badly polluted soil and water in the area stretching from Randfontein almost to Potchefstroom that food grown in the area would be dangerous for both human and animal consumption (Tempelhoff, 2008). Liefferink found the following:

The Water Research Report, No 1214, entitled "*An Assessment of sources, pathways, mechanisms and risks of current and potential future pollution of water and sediments in gold-mining areas of the Wonderfontein spruit Catchment*" on page 152 states:

"9.7.3 Health effects by route of exposure

Inhalation exposure

The health effects of uranium particles inhaled seem to depend on two factors - the size of the particles and the water-solubility of the particles.

Small particles (≤ 2 micron in diameter) are carried by the inhaled air stream all the way into alveoli (the deep respiratory tract). Here the particles can remain for periods from weeks up to years (ICRP, 1994, NCRP, 1997), depending on their solubility. Highly insoluble uranium compounds may remain in the alveoli, whereas soluble uranium compounds may dissolve and pass across the alveolar membranes into the bloodstream, where they may exert systemic toxic effects. In some cases insoluble particles are absorbed into the body from the alveoli by phagocytosis into the associated lymph nodes.

Larger particles, being more susceptible to gravitational forces, tend to deposit higher in the respiratory tract. They are cleared from the respiratory tract by the formation of mucous, which is swept up into the mouth, and expurgated or swallowed into the gastrointestinal system. The latter fate of the particles is converted from the pulmonary system to the gastrointestinal system. The gastrointestinal system is more chemically aggressive than the pulmonary system, and uranium compounds that would not dissolve in the lungs may become systemically available due to chemical dissolution in the gut.

*Acute pulmonary effects have, however, been ascribed to chemical toxicity as opposed to radiotoxicity of uranium in observations of experiments with rabbits. **However, insoluble particles may reside in the lungs for years causing chronic radiotoxicity to be expressed in the alveoli.***"

In terms of the National Nuclear Regulator's Report No TR-RRD-07-0006, entitled "*Radiological Impacts of the Mining Activities to the Public in the Wonderfonteinspruit Catchment Area*" it was found:

Page 40 (S 5.1.1)

"It has to be mentioned that the near-surface atmospheric air presents commonly the third relevant medium at mining sites, because emissions of radon and/or contaminated dust may cause elevated radiation exposures of the public by inhalation and/or contributions to food chain pathways. Such exposures are likely to occur in the vicinity of the slimes dams located in the Wonderfonteinspruit catchment area but they are not part of the present project."

Page 42 (S 5.1.3)

"The uptake of sediments during cattle watering at banks of dams, ponds, furrows, etc. is an important pathway, which can cause contributions to the effective doses that are some orders of magnitude above the contributions stemming from pure water uptake by cattle."

"During the stay on contaminated sites, unintended ingestion of soil (small soil particles with diameter less than 0.5 mm) presents a realistic exposure pathway, which especially for "playing kids" can cause contributions to the effective doses in the same order as the external gamma radiation."

P 57 (S 5.2.3.4)

"The scenario comprises four exposure pathways. The pathways $p = \text{WaPaCa}$ and $p = \text{WaSoCa}$ concern the uptake of radionuclides with cattle fodder (pasture grass, clover and other forage plants) and the direct uptake of contaminated soil during grazing, respectively. The use of radioactively contaminated water for the irrigation of pasture land contaminates the upper soil layer. This contributes to the path WaPaCa via the radionuclide transfer from soil to plant, and determines the exposure pathway WaSoCa . Additionally, the exposure pathway WaPaCa takes into account the interception of activity by forage vegetation leaves during irrigation."

"...Similarly, the exposure pathway $p = \text{WaPaPo}$ comprises direct pasture contamination (activity interception by leaves of forage vegetation during irrigation) and indirect pasture contamination due to the previous contamination of the root zone of soil."

P 89 (S 6.1)

"However, in total it seems that - apart from the transfer factor problem - the dose calculations presented in this report draw a picture of the radiological situation in the WCA that is not too far from reality. Even the assessment of the incident site MP38 (Bridge, Carletonville) indicates a serious long term problem concerning the transport of slimes into the environment (runoff water erosion from the very steep slopes of the slimes dams located throughout the WCA)."

In terms of the Water Research Commission Report 1214/1/06 entitled : "*An Assessment of Sources, Pathways, Mechanisms and Risks of Current and Potential Future Pollution of Water and Sediments in Gold-Mining Areas of the Wonderfonteinspruit Catchment*" it was found:

P 154 (S 9.7.4)

"Death

...Animals exposed to uranium compounds by the inhalation route have died, the cause of death being traced to damage to the renal system."

P 119 (S 9.1.2)

"Risk assessment

Exposure assessment

Principal modes of contact are ingestion of water and food products, and inhalation of dust and aerosols."

"Plant and animal uptake of uranium

Uranium mobility may also be increased owing to the formation of soluble complexes with chelating agents produced by micro-organisms in the soil. Uranium may be transported to vegetation by air or by water. It can be deposited on the plants themselves by direct deposition or resuspension, or it can adhere to the outer membrane of the plant's root system, with potential limited absorption. Similarly uranium deposited on aquatic plants or water may be adsorbed or taken up from the water.

The plants, aquatic or terrestrial, may be eaten directly by humans or consumed by land or aquatic animals which provide food for humans. The uptake or bioconcentration of uranium by plants or animals is the mechanism by which uranium in soil, air, and water enters into the food chain of humans...Because of the higher root sorption of uranium, consumption of radishes and other root vegetables grown in uranium-containing soils may be a source of human exposure."

Systemic effects (ATSDR, 1999)

Respiratory effects: Prolonged exposure to high levels of insoluble uranium dust may damage the lungs by chemical action

Renal effects: Uranium is nephrotoxic, exerting its toxic effect by chemical action mostly in the proximal renal tubules in humans and animals.

P 156 (9.7.4)

"...laboratory experiments have revealed that, where there are very high concentrations of uranium in tissues (including bone) prolonged action of the uranium on cells exerts a definite carcinogenic effect.

"...in other words, there is no safe limit for carcinogens."

In terms of ss 13.6.7 of the *State of the Environment Report 2002, North West Province*, it is found:

“Wind blown dust from mine rock and sand dumps and slimes dams could pose a health hazard due to inhalation of uranium contaminated dust particles. Also radionuclide-contaminated dust can be dispersed far distances from the source, affecting agricultural lands for fruit and crop plantations.”

(Similar fact evidence can be found in the effects of the Chernobyl nuclear disaster in 1986. The clouds of radiation contaminated particles which drifted over Scandinavia resulted in elevated cancer levels in these countries, as well as the need to slaughter thousands of cattle because of elevated radiation levels in their milk.)

*“If uranium is inhaled or ingested, it poses **increased risks of lung cancer and bone cancer**. By its insidious nature the effect of radioactive exposure of the general population, cancer may take anything up to 40 years to manifest itself. Where the effect is genetic, anomalies may take generations to appear.”*

Bone is the principal storage site in the body, and the rest is distributed to other organs and tissues. Uranium deposited in the bones and other organs is subsequently released back to the blood stream with at least two different half lives. Similar to other heavy metals causing neurotoxic problems, uranium can cross the blood-brain barrier. Of particular concern to women are studies with laboratory animals which found uranium in the placenta, foetus, and milk of females and in the tissues and urine of offspring fed milk from exposed females.

“Mutagenic effects of radiation occur in the form of genetic mutations passed on to subsequent generations and do not necessarily depend on a dose threshold (stochastic effects) –ss 13.6.7

And

“Number of cancer cases reported in a potentially contaminated area directly attributed to the chronic effects of radioactivity e.g. pancreatic cancer.” – ss 13/6/11 Ibid.

“There is a growing body of evidence pointing that both the long- and short-term effects substances present in the environment may be impacting on the health of the population ..., particularly in the gold-mining areas.”

“Gold mine dumps need to be rehabilitated and revegetated where possible to mitigate the effects of wind-blown radioactive dust contamination of surrounding urban and rural areas.” – Ibid.

- **Air quality and gold and uranium mining**

The Safety in Mines Research Advisory Committee's (SIMRAC) reports that occupational lung diseases are major preventable causes of premature retirement and death among people working in the South African mining industry. The Mine Health and Safety Act requires employers to take measures to assess and reduce the risk of these diseases (Guild, Ehrlich, Johnston, & Ross).

Mining-related lung diseases listed for compensation purposes in South Africa are *inter alia*:

- Silicosis in miners and surface workers exposed to silica dust
- Silicotuberculosis in miners and surface workers
- Obstructive airways disease in miners
- Progressive systemic sclerosis or scleroderma, in miners exposed to silica dust

Dust-related lung diseases overshadow mine accidents in numbers of workers affected. Among the 429 000 persons at work in all mines in 1998 there were 371 reported fatalities (0.85 per 1 000) and 6 064 reported injuries (14.1 per 1 000). By comparison there were 5 603 new or upgraded certifications for pneumoconiosis with or without tuberculosis and over 5 000 new cases of tuberculosis (>20 per 1 000).

In 1996 the total direct costs of occupational lung disease in the gold-mining industry were estimated at R343 million. The total direct and indirect costs of occupational lung disease to the economy is cumulative and difficult to estimate, but could be about 3 percent of the gold-mining industry's annual contribution to the gross domestic product, or approximately R558 million. The mineral dust diseases share the common feature that they are caused by dust particles that are small enough to reach the alveoli or gas exchanging part of the lung. Such dust particles are termed respirable dust.

Dust particles in the respirable range that are deposited in the tiny airways deep in the lung will be engulfed by alveolar macrophages (defensive cells in the lung) and carried across the respiratory epithelium into the lung tissue itself. Crystalline silica (usually quartz) particles, especially when newly generated are toxic to macrophages and result in cell death. This recurring cycle of defensive cell death results in a low-grade inflammatory process in the lung. Gradually the dust particles are sealed off in areas of fibrotic (scar) tissue that replaces normal lung tissue. This scar tissue is in the form of rounded nodules in the cases of silicosis.

Where environmental damage does occur, do the corporations under review make every effort to reduce its impact immediately, to provide technical data to those working on the containment and repair, to restore the damaged ecosystem and to ensure appropriate measures are taken to redress injuries to persons caused by environmental hazards created by the company? (1.1.C.7)

Mintals and Harmony gold, together with the Western Basin Environmental Corporation (WBEC) and the Western Utilities Corporation (WUC) have announced that they will purify the water referred to in (1) above to the level of grey water which will then be sold to the steel industry in Vanderbijlpark and the platinum mining industry in Rustenburg. Harmony and

Mintals will use the same grey water in recovering gold and uranium from 25 tailings and waste facilities around Krugersdorp and Randfontein (Tempelhoff, 2008, p. 5).

In this case the damage has occurred over decades and it is not just the water that has been affected. The land in the area concerned has also registered unacceptably high levels of radio activity. However, this 'solution' is already causing problems in that the mining companies involved are proposing that the sludge and tailings from the gold and uranium recovery process will be dumped on the farm Raatskraal near Fochville (Tempelhoff, 2008, p. 17). Farmers near Fochville insist that the entire effort is just a means of shifting the mine waste pollution problem from Randfontein and Krugersdorp to Fochville.

11.2.3 Social dimension

Do the mining corporations provide adequate technical training, which contributes to the advancement of all workers, especially women and the disabled? (2.1.a.B)

Most of the large gold-mining companies do provide training and promotion opportunities for all workers and women. However, there is no reference to such training for women.

Do the mining corporations under review provide training for their directors and employees regarding ethical issues, corporate social responsibility issues and codes of conduct? (2.6.C.1)

Yes the major corporations do. The junior and smaller corporations are silent on this question.

Do the mining corporations under review have a policy of employing people with disabilities and of providing the resources and facilities which enable them to achieve progression in employment in the company and to receive training and promotional opportunities without discrimination? (2.3.C.2)

The gold-mining corporations seem not to consider the disabled as HDSAs. They have no policies concerning the employment, education, training or advancement of people living with disabilities. Workers who become disabled or too ill to continue working seem to be released from employment adding to the social costs of mining on communities receiving such former employees.

Do the mining corporations under review have an effective internal compliance process of training, onsite inspections and audits of suppliers and vendors? (2.4.B.4)

Yes, the major companies under review do.

Do the mining corporations under review provide a working environment that supports health and wellness?

All the major gold-mining corporations do report policies, strategies and targets with regard to creating a working environment that supports health and wellness. However, most of the gold-mining corporations note an increase in fatalities and work-related accidents for 2007.

In 2007:

- Goldfields reported 29 fatalities;
- Harmony Gold reported 27 Fatalities;

The major cause of fatal accidents in the gold-mining industry is falls of ground induced by seismic activity and gravity.

- **Occupational Diseases in South African gold mines**

The following diseases are most commonly reported:

- HIV/Aids is not considered an occupational disease, but it is very prevalent among mine workers;
- Occupational lung disease – silicosis;
- Noise-induced hearing loss.

While all the mining companies under review claim that they are doing their utmost to improve work-place health and safety, COSATU points out the poor health and safety record of the South African operations of many mining companies and claims that much more can be done. COSATU wants management to be held criminally liable for work-place accidents and disasters. Other commentators feel that mining corporations should suffer financial penalties that would force mining companies to comply with international best practice in mine health and safety.

Do the mining companies under review affirm that workers have a right to a work-place that is free of toxic substances and all forms of health hazards, including second-hand smoke? (2.2.P.2)

Geological faults, dust, noise, gas and moving equipment are serious problems that mine workers have to deal with in their work-places. Workers by law have the right to refuse to work in situations that they deem to be hazardous and life threatening. However, productivity bonuses and the hierarchical structure of work teams militate against this right. Workers are intimidated by their peers who are keen to realise productivity bonuses and are therefore

prepared to enter into and work in risky environments. Work-team supervisors such as shift bosses are able to override worker reluctance to enter a dangerous situation by declaring the concern unfounded and the area concerned safe for entry.

Do the mining companies under review subscribe to the principle that every worker has the right of access to health care, including accessible and affordable medicines (2.2.P.3)?

Yes, the major corporations do as long as the employee is in their employment. A large number of workers medically affected are boarded. Such workers then become the responsibility of the Department of Labour. Bureaucratic inefficiencies severely restrict the access of many boarded workers to proper health care and affordable medicines.

Do the mining companies under review adopt specific principles to ensure that the work-place is free of toxic substances and all kinds of risks; is properly ventilated and appropriate, free, protective equipment and hygienic bathrooms and changing rooms for workers, especially for women and young workers provided? (2.2.C.1)

Yes, the major corporations do. However, the use of untreated water from local municipalities to cool equipment such as rock drills is very problematic and a threat to worker health. The control of dust, pollution and due regard to seismicity leaves a lot to be desired.

Do the mining corporations under review ensure participation by workers from all levels of employment in education, examination and monitoring processes on issues of occupational health and safety? (2.2.C.2)

Yes, the major mining corporations do.

Do the mining companies under review ensure that workers can elect representatives through democratic processes to health and safety committees? That they have rights to have regular monitoring of the work-place, to have full access to all the information related to occupational health and safety issues, and to not be penalised when they assume their duties? (2.2.B.3)

The mines employ staff to health and safety departments, and safety information in the form of billboards and posters is displayed prominently everywhere. However, these notices are often in English. High levels of illiteracy in the work-place also negate such notices.

Do the mining companies under review adopt a policy of non-discrimination and commit to programmes to overcome discrimination and stigmatisation of employees with HIV/AIDS? (2.2.C.5)

Yes, the major mining corporations do. Their HIV/AIDS programmes are very sophisticated.

Do the mining corporations under review provide an ongoing education on the prevention of HIV and training to overcome the stigmatisation of employees with HIV/AIDS and provide support systems to employees and their families such as counselling? (2.2.B.7)

Yes, they do. However, workers working for subcontractors, and migrant workers whose families reside far away or in distant countries do not.

12. COAL MINING IN MPUMALANGA

12.1 INTRODUCTION AND BACKGROUND

Researchers received no cooperation from coal-mining companies approached. Exxaro and Anglo Coal did not respond at all. Xstrata did respond to the corporate questionnaire sent to them by phoning and communicating via e-mail. Xstrata and ARM concluded a BEE joint venture that saw the emergence of ARM Coal. However, by the time the report had to be completed, Xstrata had not yet completed the questionnaire. Researchers did speak to members of communities and attended some consultative meetings between coal-mining companies and communities.

There are some significant **contextual differences and similarities with regard to the situation in Limpopo:**

Differences

- Most coal mining in Mpumalanga occurs in commercial farming areas rather than on the land of traditional communities.
- Coal-mining companies are therefore obliged to engage with individual land owners rather than with communal land owners.
- Different land and property laws apply.
- Commercial farmers tend to be better educated and more aware of their rights than communal farmers.
- There is less focus on coal mining in Mpumalanga than on platinum mining in Limpopo.
- There are more active NGOs and CBOs engaging in the issues in Limpopo than around coal in Mpumalanga.

Similarities

- The same mining laws apply.
- The sector has moved from an oligopolistic situation to a more competitive situation post-1994.
- There are many new junior corporations emerging in this sector.
- The sector is less labour intensive than Platinum, Gold or Uranium.
- Coal is also experiencing a boom in prices on the back of rapid economic growth in South Africa, but also in China, Brazil and India.
- Mine fatalities have rapidly increased in the last year.
- Coal mining poses a threat to rivers throughout Mpumalanga and beyond.

Apart from the poor response from coal producing companies, the annual general reports from these companies lack the depth and detail contained in the reports of Platinum mining corporations. Despite their huge impact, these companies have also largely escaped NGO and CBO attention.

South Africa's coal reserves are limited. According to estimates only 34 billion tonnes remain, and based on current consumption, the country will only have 7 billion tons remaining by 2040 (Mbendi, 2004). Noting the limits to South Africa's coal reserves, and the fact that the country is already responsible for 94% of Africa's air pollution, the present government's commitment to expanding the number of coalpower-fired stations seems rather short-sighted.

Key findings with regard to the impacts of coal mining on the **dimensions of sustainable development (economic, environmental and social)** will be discussed in the following section.

12.2 FINDINGS AND DISCUSSION

12.2.1 Economic dimension

Do the mining corporations recognize that the presence of coal within Mpumalanga is an asset of the communities on whose land it is found within that province? (1.1.C.3)

The coal in Mpumalanga is found largely on the land of commercial farmers, and the mining companies involved most certainly do not see the coal as an asset of the farming community of that province. The relationship between farmers and the coal-mining companies is generally hostile.

Do the mining corporations under review complete environmental assessments in which the unused, unexploited natural resources are stated as assets of the community? (1.1.C.4)

All mining corporations are required to complete EIAs and EMPs. However, none of these corporations would consider the unused, unexploited natural resources as assets of the community. The MPRDA has established the mineral wealth of the country as a national asset. However, the state's management of this asset on behalf of the people of South Africa leaves a lot to be desired.

Do the corporations, in consultation with the local community, establish a policy that incorporates into their business plans the best interest of the community now and into the future? (1.3.C.2)

The notion of community among commercial farmers is one that is very different from a traditional communal farming community. However, as elsewhere, coal-mining companies in Mpumalanga do interact with local and district government structures around the possible participation in LED and IDP processes. However, here the spend is not as obvious as it is in the rural traditional communities in Limpopo. However, while commercial farmers are more educated about their rights, the very individualistic nature of commercial farming, in terms of ownership, prevents the emergence of a collective solidarity. The financial and resource imbalance makes taking on coal-mining corporations in court cases a very daunting task.

Do the coal-mining corporations under review affirm the central importance of sustainability for communities (in the present and in the future), for the integrity of human beings, culture, society, economic well-being, environmental responsibility and the way of life of the people? (1.3.C.2)

The sustainability horizon for coal mining itself is very limited. By 2050 most of South Africa's coal will have been depleted at current rates of mining. Noting the escalation in global heating, and the search for alternative renewable sources of energy, the life of coal might even be more limited. If coal-mining companies were really concerned about sustainability in the present and into the future they would surely be investing heavily into the search for sustainable alternative sources of energy. Given the central energy, environment, food and population challenges facing humanity, the current 'way of life' is no longer sustainable.

Do the mining corporations under review evaluate all their operations in the light of community sustainability? (1.3.C.3)

Coal mining and commercial farming cannot exist on the same piece of land. Many farmers in the Belfast area of Mpumalanga complain that most of the coal mines impacting on their farming community are operating on an illegal basis as they do not yet have their water licences and are trucking their water in daily. This also causes many other environmental issues such as dust pollution, noise pollution, disturbance to the general farming of the cattle and making their water toxic. They are also convinced that their complaints to government fall on deaf ears. Many farmers feel that the government is unresponsive because of the involvement of former senior government officials and politicians in coal mining.

Do the mining corporations under review aspire to integrate the interests of all stakeholders with that of their own business goals? (1.3.C.B)

Most South African mining corporations including coal-mining corporations do have progressive procurement policies, as required by the Mining Charter and the Balanced Scorecard. However, apart from suppliers, other stakeholders such as farmers will have very divergent and even opposing interests from those of mining corporations. Those concerned with global heating, clean air and water also find coal mining problematic (Morris, 2006).

12.2.2 Environmental dimension

Do the mining corporations under review pay careful attention to ensure that their actions do not damage the global and local environment regarding issues such as climate change, bio-diversity and pollution prevention? Do they adopt, as a minimum, internationally recognised standards and ensure that they are implemented universally regardless of any legal enforcement or lack thereof in any jurisdiction and seek continually to improve their performance? (1.1.c.1)

Coal mining impacts massively on the environment in all the phases of mining including exploration, development, operations, the post-extraction production chain, closure and post-closure.

- **Impact in the Exploration Phase**

Impacts of exploration on biodiversity are often overlooked. South African Law does not require that EIAs and EMPs be done for the exploration phase, yet this phase is crucial for determining the location of future mining operations. Current high prices for coal, driven by economic growth and the energy crisis in South Africa, as well as the opening up of the coal-mining sector to competition has seen an explosion in exploration for coal.

While the direct impacts are not obvious, the indirect impacts such as the development of access roads, the setting up of exploration rigs, noise and vibration, potential small diesel and oil spills do have an impact. Exploration is usually done by junior mining companies who have a low public profile. The actions of such small companies often happen outside public vision. The exploration phase involves a sizeable investment with a high risk of small or no returns. The small exploration companies therefore cut costs - often at the expense of biodiversity.

The production of coal itself is extremely problematic in that much of the climate change problems we face in the world today can be traced back to the consumption of coal in mining, industry and electric energy production.

Coal mining in South Africa occurs mainly in the form of pit or strip mining. So once the exploration process has identified a resource and the mining licence is applied for and granted massive change will happen with respect to the local environment, biodiversity and pollution.

Farmers in Mpumalanga province resent exploration because the exploring company does not have to obtain consent before obtaining an exploration licence and commencing with exploration, it merely has to demonstrate that it consulted with affected stakeholders. The arrival of exploration rigs therefore means, more often than not, a loss of land for farmers, or where the exploration takes place on a neighbouring farm it means the prospective pollution of both ground and surface water as well dust pollution in the future once mining commences.

- **Impact in the development phase**

Decisions made during the development will lay the foundations for the future mining operations and for what will happen after closure. It is during the development phase that the EIA is done and the EMP is drawn up. Roger Blench argues that Environmental Impact Assessments (EIAs) are becoming one of the most troubling aspects of mining activities that have a major impact on the local environment. This is because there is little transparency in the awarding of contracts and the scientific refereeing of reports produced, while oversight of effective compliance is extremely limited (Blench, 2001).

Direct biodiversity, environmental and pollution impacts are relatively low during the mining development phase. However, mining decisions during this phase are typically taken by small closed groups focusing on financial and technical considerations. However, good planners will factor in environmental, bio-sphere and pollution issues into cost benefit analysis already at this early stage. South African mining legislation calls for consultation with stakeholders concerning EIAs, EMAs and social and labour plans before the mining licence is awarded. However the legislation does not require community or stakeholder consent as a prerequisite to awarding the mining licence.

Both mining and government technocrats and civil servants as well as affected communities, farmers etc. lack the tools, skills, information and incentives to deal effectively with biodiversity, climate change and pollution issues.

- **Impact in the operational phase**

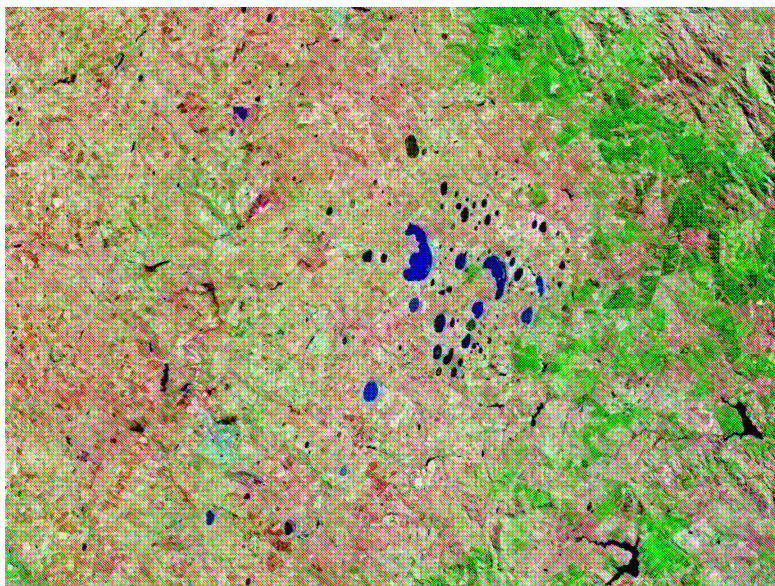
Mining corporations including coal companies often become involved in nature conservation programs, mostly unrelated to their impact on the environment. Poor planning in the exploration and planning phases often leads to massive unforeseen negative impacts on the bio-sphere, climate change and pollution. In some countries NGOs have launched campaigns

such as 'leave the coal in the hole' campaign. Coal mining involves processing huge amounts of coal, often by means of scrapping up the layers of coal close to the land surface, which has a significant direct impact on environmental change.

Backfilled and rehabilitated opencast coal mines in the eastern Highveld fill with water within 5 to 10 years. The water becomes acidic and enriched in sulphates due to oxidation of iron sulphide in the waste rock. Once filled, the polluted water from the void begins to decant and discharges on surface, causing pollution of surface water resources. Pans are particularly vulnerable to this form of pollution, as there is no possibility of removal of the toxic materials by natural flushing. Proposed opencast mining within the catchments of pans in the Mpumalanga Lake District thus presents a very severe threat to this unique and pristine wetland ecosystem in the form of Acid Mine Drainage (AMD).

This phenomenon does not only affect the Loskop dam region, but also the entire Chrissies Lake Catchment district, the Kruger National Park, across our borders to Mozambique Massinger Dam and beyond.

Picture 23: A LANDSAT image of the Chrissiesmeer pan field



AMD is caused by the outflow of acidic water from abandoned and active metal or coal mines and where sub-surface mining often progresses below the water table. To prevent this, water must constantly be pumped out of the mine in order to prevent flooding. When the mine is abandoned and pumping ceases, water floods the mine. This introduction of water then later infiltrates the sub-surface water tables and eventually contaminates and pollutes the surface water in the surrounding areas for miles around.

The Loskop Dam, although vitally important to the area in which it is situated, is only but a small part of the region that has been affected by the mining, both legal and illegal in the greater Chrissies Lake and Mpumalanga Lakes District (MLD). The Mpumalanga Lakes District is known to be the largest freshwater catchment area in the Southern Hemisphere and is under severe threat of annihilation from the irresponsible manner in which both the DME and the DWAF have handled their affairs in the granting of mining concessions and water licences to all and sundry as and where they seem fit, or so it appears, where it is going to directly benefit them.

Coal mining in South Africa has also involved more significant wider changes in financial, social, political and physical assets and power relations. Wilge originated in the boom which resulted from the massive demand for goods from the outposts of the British Empire both during and after World War II. This industrial boom saw a rapid increase in the demand for electricity in South Africa. Rapid industrial growth quickly outstripped the infrastructural capacity of South Africa, including that of electricity supply.

Then, like now, the demand for electricity far outstripped supply and Eskom then also resorted to "load shedding". Power cuts were so common then that ESKOM asked the predominantly white consumers who had access to electricity to voluntarily effect their own restrictions – this was a time when the Afrikaner Nationalists rose to power by winning the election of 1948 and implemented a massive Afrikaner empowerment programme. An affirmative action programme ensured Afrikaners being appointed and promoted in key civil service positions, taking control also of the security and repressive apparatus of the state and directing all the key parastatals such as Sasol, Eskom and Iscor, etc. The famous Italian sociologist Vilfredo Pareto will perhaps not be surprised by the huge similarities between the Afrikaner Nationalist assumption of power in 1948 and that of the African Nationalist assumption of power in 1994. In fact, this seeming repetition of history, involving only two groups of different racial composition could be easily accommodated in his theory of elite class circulation (Rossides, 1978, pp. 335-340).

As in the past, the integration of the South African economy into the global economy drove industrial growth. Industrialisation needed power and in 1954 the Wilge power station was

completed at a cost of £11 million, marking the beginning of the large-scale exploitation of the Eastern Highveld coal fields for the generation of power. Ever since then the coal fields of what is now Mpumalanga has been driving the economic development of South Africa with new power stations coming online at regular intervals (Bloom, 2007, p. 56).

The Wilge Power Station was decommissioned and destroyed in 1995 and the town of Wilge wilted like a tree deprived of water. Ironically, the wilted Wilge might well yet revive as Umcebo Mining (owned by Calulo which belongs to Mpo Diale and Mkhuseleli Faku) (E-Prop.co.za, 2005), one of the many new black empowerment mining companies; the mining “juniors” have set up shop in Wilge. Umcebo has a subsidiary called Ehlobo Holdings of which Alistair Ruiters (former Director General of the Department of Trade and Industry) and Rafiq Bagus are directors. Ehlobo has a 70% stake in Karebo Coal (Enselin, 2006). Marx wrote that history does indeed repeat itself, and in Wilge this indeed seems the case only its renaissance is not owed to Afrikaner empowerment, but to black economic empowerment and the emergence of a new black ruling elite, and the South African working class and the rural African poor, “which had imagined that by a revolution it had increased its power of action, suddenly finds itself set back into a dead epoch and, in order that no doubt as to the relapse may be possible, the old data again arise, the old chronology, the old names, the old edicts, which have long become a subject of antiquarian erudition, and the old henchmen, who had long seemed dead and decayed” (Marx, 1978, p. 596).

Coal, South Africa’s black gold has become critical in the development of the South African black middle class elite, the so-called “black diamonds”. While the world is gasping for breath and we are faced with the immanent prospect of climate change, South Africa’s government has embraced coal as an essential part of its social engineering project to create a black middle class, no matter what the cost. This middle class is seen as the cornerstone of realising the ANC’s vision of a national democratic society (Netshitenzhe, 2007, pp. 18-19), i.e. a society in which the ruling ideas of the epoch will be that of the black middle class – much as the Afrikaners strove for a racially defined “democracy” and the ANC seems to be ditching its commitment to non-racialism in favour of its obsession with this black middleclass.

This class project is evidenced by the frequent calls for black South Africans to emulate the Afrikaner empowerment strategies of the 1940s. Thus in May 2007, the ANCYL proposed a “Black Broederbond” to further “economic emancipation of the black majority to consolidate the broad-based empowerment strategy”, which it said was flawed even in its new format (Webb, 2007).

There is a constant stream of cases exposed in the media where senior ANC people, some in political office, others in the civil service, others in the private sector, many with their fingers in

two or more of the mentioned pies, benefit from “affirmative procurement”. It is no different in the power supply industry from coal mining through to electricity generation and supply. Thus the Mail and Guardian of November 23 to 29, 2007 front page banner boldly proclaims “ANC front wins huge tender: Chancellor House cashes in on Medupi power station” (Brummer, 2007, p. 4). Chancellor House is part of a consortium that won a tender to manufacture a multi billion Rand power station.

Medupi House was created in 2003 and is wholly owned by the Chancellor House Trust whose trustees are Popo Molefe (former Premier of the North West Province) and Salukazi Dakile-Hlongwane, a prominent businesswoman.

There are several **conflicts of interest** here:

- Chancellor House is an ANC front organisation dedicated to funding the ANC;
- Dakile-Hlongwane is a director of Eskom Enterprises. Eskom is contracting the consortium of which Chancellor House is a part; and
- Popo Molefe is the partner of Valli Moosa through Lereko Investments. Moosa is also the chairman of Eskom.

Given the above information this entire project is incestuous to say the least, and it all sounds very similar to the infamous “arms deal”.

Before 1994 the coal industry dominated by an oligopolistic situation: large mining houses dominated the ownership of coal resources and exploited the biggest of these resources through large-scale mining operations. By virtue of *Apartheid* there was no black ownership, as access to mineral rights were circumscribed by *Apartheid* laws such as the Scheduled Persons Clause and the Mines and Works Act which were in force until 1987. Consequently ownership and access to prospecting permits for black South Africans were out of the question. Coal export entitlement vested in the hands of a few Richards Bay Coal Terminal (RBCT) shareholders who were part of the oligopoly that controlled both the resource and the export facility at Richardsbay.

This meant that there was no room for HDSA empowerment, and no competition. No new or junior emerging mining companies could develop in coal mining in South Africa. The members of the coal-mining oligopoly owned and controlled the only export facility at Richardsbay; they owned and controlled the rolling stock necessary to transport coal from the interior to the coast and they owned and controlled the washing facilities, thus both the coal assets and the means of distribution were monopolised. This made the restructuring of the coal industry inevitable.

The state intervened to break the coal monopoly and used the instruments of the Mineral and Petroleum Resources Act (MPRDA), the Mining Charter, the legal prerequisite for mining companies to convert from old-order rights to new-order rights, the balanced score card and the “use it or lose it” rule. According to the MPRDA, the ownership of the mineral resources of the country belongs to the state and corporations would have to apply for licences to prospect for and mine such resources. This opened the door for foreign investors, particularly from Canada, Australia and China, to penetrate the South African mining industry and for HDSAs in partnership with such foreign investors to obtain access.

In 2002, following research by the South African Mining Development Association's (SAMDA) research, the Coal Industry Task Team (CITT) was created, chaired by the Deputy Director General of the Department of Minerals and Energy. The CITT included:

- Senior and junior coal producers
- Transnet
- Eskom
- Matola Port, Durban Port and Richardsbay
- Richardsbay Coal Terminal (RBCT)
- DME
- The CITT agreed to create 4 million tons per annum entitlement at RBCT

This resulted in a new order in coal mining based on the Mining Charter, which was published on 11 October 2002, the MPRDA which was promulgated on 1 May 2004, and the active participation of junior or emerging miners in the industry. Junior miners in South Africa are defined as those with an asset base of R18 million to R1 billion and with a turnover of between R30 million and R1 billion.

Have these mining corporations adopted and implemented company-wide environmental codes? (1.1.C.1)

The corporations reviewed do all have company-wide environmental codes. These codes are not as well published as in the cases of the platinum mines in the North West Province and Limpopo. This is perhaps because these mines have not attracted as much attention from civil society organisations. NGOs and CBOs are more likely to fight for the preservation of traditional communities than for the preservation of commercial farming communities.

Have the Boards of the mining corporations under review established an active environmental committee which reports back to it regularly? (1.1.C.2)

Exxaro reports that it has established it a Safety Health and Environment Committee as part of its executive governance structures. Anglo Coal and ARM Coal all employ environmental officers and engage environmental consultants. However, as in the case of platinum mining, this does not guarantee sound environmental policies.

Do the mining corporations under review produce regular public reports on their environmental performance and future plans? These are based on a pattern of environmental auditing and reporting according to minimum, internationally recognized standards and include data for each facility (1.1.C.5).

Yes, they do. However, these reports, plans and audits suffer from the same problems as those associated with platinum mining in South Africa.

Where environmental damage does occur, do the corporations under review make every effort to reduce the impact immediately, to provide technical data to those working on the containment and repair, to restore the damaged ecosystem and to assure appropriate measures are taken to redress injuries to persons caused by environmental hazards created by the company? (1.1.C.7)

The coal mines in Mpumalanga are placing the surface water systems in that province under severe strain, and have done so for decades. It is only now that some of the mining corporations are starting to admit liability and to take action. What follows is a discussion of the legal framework in South Africa relating to water and mining, the impact of mining on water in Mpumalanga and the response by certain corporations in an attempt to answer the question above.

Bell *et al.*(2001) explains acid mine drainage as follows: “the chemical composition of surface water percolating into the old mine workings (at Middelburg Colliery in the Witbank Coalfield) is rapidly changed through contact with the pyrite that is oxidized, resulting in the formation of typical low-pH and high TDS acid mine drainage water” (Bell, 2001, p. 215).

Bell *et al.* (2001) explains that the acid nature of the water has largely destroyed vegetation in the 3 ha area between the seepage points and the water course (Bell, 2001). High concentrations of aluminium are typical of acid mine drainage water ... The content of aluminium in the Blesbokspruit varied between 80 and 240 mg l⁻¹ compared to 0.59-8 mg l⁻¹ for stream water that was not polluted (Bell, 2001, p. 208).

A mine has impact on water resources by firstly taking water from a water resource¹ and secondly, by discharging waste into the water. Thirdly, as can be seen from Bell's explanation above, by the mining of minerals changing the characteristics, like the pH of the water. Fourthly it removes, discharges or disposes of water found underground if it is necessary for the efficient continuation of an activity or for the safety of people. All these are covered by Section 21 of the National Water Act (NWA) that defines water use (Bell, 2001).

In general, water use must be licensed unless it is listed in Schedule 1 as an existing lawful use, is permissible under a general authorisation, or if a responsible authority waives the need for a licence.² In terms of the *Mineral and Petroleum Resources Development Act*, any holder of a mining right or mining permit may, subject to the National Water Act, use water above or below the ground for use for mining on such land.³ Section 26(1) (h) of the *NWA* gives the Minister of Water Affairs the competence to prescribe waste standards relating to waste which may be discharged into or allowed to enter a water resource. He must also prescribe the outcome that must be achieved through the treatment of waste,⁴ before it is discharged into a water resource.⁵

DWAF has accordingly published *Best Practice Guidelines* stating that "the implementation of integrated water and waste management (IWWM) at a mine may, in many instances, require the incorporation of a certain degree of water treatment. Water treatment may be required to improve the quality of the water to such an extent that it can be re-used by the mine or other users. Water treatment may also be required as a final step to render water suitable for discharge in accordance with the conditions of a water use authorisation, catchment management objectives, reserve requirements and/or downstream user requirements" (Department of Water Affairs and Forestry, 1999).

The Minister of Water Affairs and Forestry has made regulations on the *Use of Water for Mining and Related Activities aimed at the Protection of Water Resources*.⁶ (Hereafter referred to as the *Water for Mining* regulations)

¹ Compare S21(a) of the *NWA*.

² *NWA* Chapter 4; Part 1; Introduction to general principles in S21-26.

³ S5(3)(d) of the *M&PRDA*, summarised.

⁴ S26(1)(i)

⁵ Section 22(2)(c) of the *NWA* states that where the discharge or disposal of waste or water containing waste takes place in terms of Section 26(1)(h) and(i), a mine must comply with any applicable waste standards or management practices prescribed in the regulations in Section 26 mentioned above.

⁶ GN 704 in GG 20119 of 4 June 1999

“Activity”, means:

- any mining-related process on the mine including the operation of washing plants, mineral processing facilities, mineral refineries and extraction plants,
- the operation and the use of mineral loading and off-loading zones, transport facilities and mineral storage yards, whether or not situated at the mine.
- in which any substance is stockpiled, stored, accumulated or transported for use in such process; or
- out of which process any residue is derived, stored, stockpiled, accumulated, dumped, disposed of or transported.⁷

Picture 247: A river with mineral residue disposal evidence



Picture 24 shows how residue is being disposed of as a result of the operation of a mineral storage yard (and the refinery process) situated at a factory. The refinery process at a factory is not covered by the definition of activity, but the operation of a mineral⁸ storage yard out of which process any residue⁹ is disposed of, is arguably covered. The definition of residue includes beneficiation plant waste.

⁷ Definitions are contained in R1 of the *Water for Mining* regulations

⁸ According to S1 of the *M&PRDA* 'mineral' means any substance, whether in solid, liquid or gaseous form, occurring naturally in or on the earth or in or under water and which was formed by or subjected to a geological process, and includes sand, stone, rock, gravel, clay, soil and any mineral occurring in residue stockpiles or in residue deposits, but excludes-

- (a) water, other than water taken from land or sea for the extraction of any mineral from such water;
- (b) petroleum; or
- (c) peat;

The *Water for mining* regulations prohibit activities likely to pollute water from taking place in the vicinity of water. They are activities like the placing of any residue deposit,¹⁰ within the 1:100 year flood-line or within a horizontal distance of 100 metres from any watercourse, borehole or well, or on waterlogged ground or ground likely to become undermined.¹¹

Every person in control of a mine or activity must also collect the water arising within any dirty area, including water seeping from mining operations, outcrops or any other activity, into a dirty water¹² system.¹³ There are also detailed regulations with regard to the design, maintenance and construction of dirty water systems.¹⁴ Similarly, a person in control of a mine or activity must also take reasonable measures to “prevent water containing waste or any substance which causes or is likely to cause pollution of a water resource from entering any water resource, either by natural flow or by seepage”.¹⁵ This consists not only of a duty to prevent pollution, but also of a duty to manage the waste water. She (or he) must retain or collect such substance or water containing waste for “use, re-use, evaporation or for purification and disposal in terms of the Act”.

The possibility of “damage to the riparian or in-stream habitat through erosion or sedimentation, or the disturbance of vegetation, or the alteration of flow characteristics” should be prevented.¹⁶ The flow of any surface water or floodwater into mine workings, opencast workings, other workings or subterranean caverns should be minimised.¹⁷

Any dam or any residue deposit or stockpile¹⁸ used for the disposal or storage of mineral tailings, slimes and ash should be managed so that the water or waste therein will not result in

⁹ 'residue', includes any debris, discard, tailings, slimes, screenings, slurry, waste rock, foundry sand, beneficiation plant waste, ash and any other waste product derived from or incidental to the operation of a mine or activity and which is stockpiled, stored or accumulated for potential re-use or recycling or which is disposed of; in terms of R1 of the *Water for Mining* regulations

¹⁰ 'Residue deposit' includes any dump, tailings dam, slimes dam, ash dump, waste rock dump, in-pit deposit and any other heap, pile or accumulation of residue in terms of R1 of the *Water for Mining* regulations

¹¹ R4(a) of the *Water for Mining* regulations. These regulations are detailed. Matters of space prevent me from discussing it in detail.

¹² 'Dirty water system', includes any dam, other form of impoundment, canal, works, pipeline, residue deposit and any other structure or facility constructed for the retention or conveyance of water containing waste in terms of R1 of the *Water for Mining* regulations

¹³ R6(c) of the *Water for Mining* regulations.

¹⁴ See R6 (d)-(f) of the *Water for Mining* regulations.

¹⁵ R7 (a) of the *Water for Mining* regulations.

¹⁶ R7 (b) of the *Water for Mining* regulations.

¹⁷ R7(c) of the *Water for Mining* regulations.

¹⁸ R1 of the *Water for Mining* regulations. 'Stockpile', includes any heap, pile, slurry pond and accumulation of any substance where such substance is stored as a product or stored for use at any mine or activity;

the failure thereof.¹⁹ he/she should prevent the leaching of materials from any residue deposit or stockpile and contain material that has been leached in such an area by providing suitable barrier dams, to prevent this material or substance from entering and polluting any water resources.²⁰ Water used in any process at a mine or activity should be recycled as far as practicable. Any facility used for recycling water should be of adequate design and capacity to prevent the spillage, seepage or release of water containing waste at any time.²¹

Every person in control of a mine or activity must cause any impoundment containing any injurious substance to be effectively fenced-off so as to restrict access thereto, and must erect warning notice boards.²² There should be access control in any area used for the stockpiling or disposal of any substance which is likely to cause pollution of a water resource.²³

The Minister of Water Affairs may, after consultation with the Department of Minerals and Energy and the Department of Environmental Affairs and Tourism, in writing require any person in control of a mine or activity to arrange for a technical investigation or inspection to be conducted on any aspect aimed at preventing pollution of a water resource incidental to the operation or any part of the operation of a mine.²⁴

The Minister of Water Affairs may in writing require any person in control of a mine or activity to submit a programme of implementation to prevent or rectify any pollution of a water resource or damage to the in-stream or riparian habitat as recommended by the investigation within the time period that the Minister may specify.²⁵

Those in control of a mine or activity must submit plans and specifications to prevent pollution of a water resource (approved by a professional engineer)²⁶ to the Minister, prior to:

- Commencement of activities relating to the construction of any surface dam for purposes of impounding waste;
- The implementation of any pollution control measures at any residue deposit or stockpile; and
- The implementation of any water control measures at any residue deposit or stockpile.²⁷

¹⁹ R7(d) of the *Water for Mining* regulations.

²⁰ R7(e) of the *Water for Mining* regulations.

²¹ R7(f) of the *Water for Mining* regulations...

²² R8(a) of the *Water for Mining* regulations

²³ R8(b) of the *Water for Mining* regulations

²⁴ R12(1) of the *Water for Mining* regulations

²⁵ R12(4) of the *Water for Mining* regulations

²⁶ R12(6) of the *Water for Mining* regulations

²⁷

Those mining or establishing coal residue deposits must rehabilitate such residue deposits so that:

- All residue deposits are compacted to prevent spontaneous combustion and minimise the infiltration of water; and
- The rehabilitation of the residue deposits is implemented concurrently with the mining operation.²⁸

The *MPRDA* states that if any mining operations result in ecological degradation, pollution or environmental damage which may be harmful to the health or well-being of anyone and requires urgent remedial measures, the Minister may direct the holder of the relevant right, permit or permission to:

- Investigate, evaluate, assess and report on the impact of any pollution or ecological degradation;
- Take such measures as may be specified in such directive; and
- Complete such measures before a date specified in the directive.²⁹

The Mpumalanga Lakes District (MLD) is a totally unique region in Southern Africa, perhaps even globally. It represents the last fragment of one of the most ancient land surfaces in southern Africa. As a pan field it is also unique, and there is no other region with such density of perennial pans in Southern Africa. Moreover, the pans are in an essentially pristine state. This physiographical uniqueness may well be reflected in biological uniqueness, and the chances of finding endemic species in the area are high. Unfortunately, the biota of the region have not been studied in great detail. There is little doubt that opencast coal mining will disrupt the hydrology of the pans and irreversibly pollute the water in the pans. If mining is permitted, the pans will, in time, evolve to become toxic pools, devoid of all but bacterial life forms. The nation will have lost one of its true gems.

There is an urgent need to ring-fence the MLD and to exclude all exploration and mining from the area. Moreover, farming practices need to be reviewed and any potentially polluting activities stopped. The MLD is a unique geomorphic province and biotic habitat and must be conserved for future generations. Riana Munnik of the DWAF admits that the impact on polluted mine water from the coal mines in the Witbank and Middleburg area affects downstream areas and results in the increase of salinity and the decrease of the buffer capacity of the Loskop dam and the middle and lower Olifants River catchment. This poses a risk to the sustainable use of the water resource in the Olifants River catchment and could

²⁸ R11 of the *Water for Mining* regulations

²⁹ S45(1) of the M&PRDA

pose a risk to the ecology of this system. Currently, in the Western mining basin decants at Kromdraai, the polluted mine water affects the surface water resource and is a threat to the ground water resource of the area (Brindaveni, 2007).

Although the mining industry is often criticised for its negative impact on the environment, Munnik notes that many initiatives are forthcoming from mining companies. She refers to the Emalahleni Water Reclamation Project, a joint venture between Anglo Coal and BHP Billiton. This joint venture is responsible for the construction of a treatment works to treat polluted mine water and sells it to the local community for use (Brindaveni, 2007). The problem with this solution is that Anglo Coal and BHP Billiton will be selling the treated water to communities, which means that poor communities and farmers will in effect be subsidising the cleaning up of mine polluted water, this amounts to Robin Hood economics in reverse.

12.2.3 Social dimension

Do the corporations under review hold public consultations and seek collaboration from interested individuals and groups to review both past performance and its future plans, including the location of new plants? (1.1.C.6)

The corporations in the coal-mining sector are obliged by law to consult with stakeholders, communities and local government in the drafting of EIAs, EMAs, and social and labour plans. Past performance, future plans and the location of new plants, however, are considered management and shareholder issues. Meetings with stakeholders, though compulsory, are consultative and therefore not decisive.

- **The case of a corporate/community meeting in Belfast, Mpumalanga 2007**

As independents, two Bench Marks researchers were afforded the opportunity to attend a "Public Participation Meeting" between Xstrata Alloys and the concerned residents of Wonderboomspruit near Belfast, Mpumalanga, in October 2007. There were nine (9) highly qualified technical engineers from the mining fraternity present at the meeting. These comprised 1 white female, 1 Indian male, 1 black male and 6 white males. The residents, however, comprised Mr Koos Pretorius, (a white male farmer), an elderly white male farmer, 2 black gentlemen and one black female. It is important to note that the only person with any experience of any form of engineering or legal expertise was Mr Pretorius. This was not because he had any formal qualifications in these fields, but rather because he had made it his duty to go and study what he needed to know to be able to assist his entire community in their fight against those that seek to destroy, pollute and contaminate their lands.

Mining houses are all the more prepared to baffle the rural communities by their eloquent use of engineering, technical and scientific terminology in meetings with communities who totally lack any such knowledge and therefore by definition lack the ability to engage with corporations on an equal footing. In any case, as the legislation currently stands, these consultations towards the acquisition of prospecting licences, mining licences and water use licences are meaningless as mines in their reports back to the Department of Minerals and Energy merely have to show evidence of consultations, i.e. the date and time of such events. The reports to DME do not have to include lists of those present at the meetings, the agenda discussed or the issues and concerns raised by communities.

On the basis of such “evidence” of consultation, licences are issued. Prospecting licences allow prospectors the right to enter into the private or communal land of farmers and communities, “private property” supposedly guaranteed by the “Property Clause” in the Constitution of South Africa and prospect, i.e. sink prospecting boreholes, make access roads, set up camp etc. Once mining licences are granted, communities and farmers have no protection and can summarily be pushed off their land.

Do the mining corporations under review recognise various stakeholder groups and establish an inclusive and exhaustive relationship with them? (1.3.C.9)

The mining corporations in the coal-mining sector, as in all other minerals, recognise a wide spectrum of stakeholder groups. The extent of the relationship depends very much on how important the particular stakeholder group is to the interests of the mining corporation.

13. CONCLUSION AND RECOMMENDATIONS

13.1 CONCLUSION

A summary of the findings reveals that corporate social responsibility in the mining communities is relatively ineffective in terms of facilitating sustainable development. In fact, in many areas corporate social responsibility is either negligible or non-existent. Where corporate social responsibility directives exist, specifically pertaining to the environmental factors, substandard practices continue to persist. This is despite structured monitoring systems being in place. Where philanthropic corporate social responsibility takes place, the impact on the community is generally insignificant, specifically from the point of view of the affected community members. The result of this has been that communities continue to experience the consequence of the **gaps between policy and practice, policy and human rights** and **practice and human rights**, which impact heavily on the potential for sustainable development. Added to this is that the South African mining environment is characterised by a **fragmentation of responsibilities** to the extent that it inhibits the benefits or effectiveness of any kind of CSR and efforts made towards sustainable development. The level of fragmentation in the mining environment has exposed the impact of **poor integration** among the various institutions providing services and the needs of the service recipients. The effects of the fragmentation of developmental activities in the mining communities have resulted in differing expectations at all levels and raise issues of **disempowerment** as well as **capacity concerns**.

This research revealed **vast differences between expectations, perceptions and needs of the different role-players** in the mining environment. The only way to start an alignment process of these expectations, perceptions and needs is to embark on a community engagement process aimed at **mutual understanding and improved community relations**. Serious efforts have to be made to start establishing common ground among the role-players and to address the lack of trust and vast differences in expectations and perceptions that this survey has unveiled. Community engagement initiatives, through **participative communication programmes**, linked to the mining companies' communication strategies are the vehicles that should be used to address the current lack of common ground and mistrust among the role-players.

Broadly speaking, improvements should come about as a **result of better communication, integration and power relations within and among communities, implementing institutions and government**. Acknowledgement of power and how it impacts on other role-players is important because if it is not used well it can result in further exploitation of others.

There are **power struggles** and **lack of coordination** within these institutions which can hamper development. Therefore to achieve effective change and sustainable development, these issues have to be addressed and dealt with. However, it is important that the **South African government takes a leading role** in achieving these objectives, as this is its legitimate role and responsibility **to protect the human rights of its citizens at community as well as individual level**. The aim should be to get a better understanding of each of the role-players' needs and to then work towards supporting one another. It is also important to note that, at this stage, most communities are focussing on basic needs and therefore may not be full partners to the sustainable development agenda.

Although **Corporate Social Investment (CSI)** is often the starting point of companies' involvement, companies must also move on to the natural second step of **Corporate Social Responsibility (CSR)** igniting a conscious awareness that a business should build a strong public reputation for social responsibility **inwardly** (work-force practices) and **outwardly** (treatment of and respect for customers, stakeholders and the environment) (Njenga & Smit, 2007:4-8). Lastly, it is very important to think "new and differently" about **sustainable development in Africa**. Economic growth without **job creation** is not sustainable; **technology and innovation** are very important principles in this regard (Vollgraaff, 2007:9). **New developmental initiatives and paradigms**, contrary to a philanthropic approach, must be considered (Anon, 2007:10). One example in this regard is the newly founded **Pan-African Infrastructure Developing Fund (PAIDF)**; what is special regarding this fund, is that it is the first fund for the development of infrastructure in Africa being launched by Africans (Mulder, 2007:10).

13.2 RECOMMENDATIONS

13.2.1 Contextualisation for recommendations

First of all the lack of development in the mining sectors from the countries being studied could be linked to the **poor structure of the SADC region** as a whole. The organisation (SADC) and every one of its members lack the human, financial and institutional capacity to realise (or facilitate by means of other actors) most of SADC's objectives and plans. This affects practically every facet of the region, including the mining sector. The members are too poor, their governance mechanisms and institutions are too weak, their needs too great, their skilled staff too few, the demands of usefully participative capacity in all the national, regional, continental, global and other initiatives too onerous (Oosthuizen, 2006/7).

Thus far the research has been focused mainly on the **negatives**, which is understandable as it is mainly based on the perceptions of communities who have been disadvantaged and feel that they have been exploited for the past few years post-privatisation. This is the reality for these communities and it is impossible to address these perceptions if the mines do not know what exactly these perceptions and expectations entail. However, when making recommendations, it can be advantageous to focus on the **positives** each role-player can bring to the relationship. The negatives are important for understanding what the communities have been going through – occasionally as a result of their own actions, but more often as a result of those of other role-players (e.g. government and mining companies) - and can be used as a lesson that must not be repeated. On the other hand, if the negatives are not managed well, they can leave the role-players accused of exploitation, feeling vulnerable and force them to make quick, dramatic responses and decisions which can be detrimental to the entire process of achieving sustainable development.

13.2.2 Specific recommendations

Against the background and context sketched above, the following are some of the recommendations for the **region (SADC)**:

- Mining companies as well as the South African government must work towards achieving the **Principles, Criteria** and **Bench Marks** of CSR, as laid down in the framework (Principles for Global Corporate Responsibility: Bench Marks for measuring Business Performance) of the Bench Marks Foundation (2003).
- There are serious concerns about the legislative environments within which mining corporations operate throughout SADC. The researchers would **recommend that legislation be standardised throughout the region** so as to avoid some countries becoming 'pollution havens' for unscrupulous mining corporations; in the "divide and rule" rush for mineral investments, some African countries may fall prey to abuse and exploitation.
- Communities are characterised by **high cash dependency** with no informal activities relating to extra income-earning projects such as cottage industries, back yard vegetable gardens, etc. Consequently the levels of poverty are dependent on the employment status of the community members. **Continuous sustainable projects** that generate local employment are thus crucial; also with the possibility of future mine closure in mind.
- Community projects require **creative marketing strategies** and **comprehensive business plans**. Project consultants can be used in this regard.
- Mining companies are listed on the **International stock exchanges**; therefore are able to raise more money than African governments in some cases. Consequently

they have been able to enter into international agreements with national governments which national governments cannot overturn in order to implement their CSR policies. Strategies must thus be found to enable governments to **utilise legislation** to overcome these financial deficits.

- Mining companies' **cost accounting** must include the environment, economic and social costs of the communities.
- The research highlighted **infrastructure** as one of the major priorities. A good working relationship and partnership between all parties (the mining companies, national and local government, NGOs, traditional leaders and communities) are crucial to resolving the housing issue.
- **Mine management plus key employees require training** with regard to community engagement, communication and dealing with communities and traditional leaders at different levels. A strategic alignment process is needed to align employees, especially those on middle management level with company values as expressed in the policy documents of the mine. In order to achieve this, the mine could make use of training and research institutions such as universities, or business consultancies, which can assist with this long-term process.
- **Technical language** with regard to environmental affairs often leaves a large proportion of the communities in the dark about the efforts and improvements that mining companies are making towards the environment. When dealing with community members, the mines need to appreciate that there is a difference between what is scientifically acceptable and what is socially acceptable and understandable in terms of environmental issues.
- With regard to the high amount of **mining accidents** that occur throughout the region, this research strongly recommends that companies invest in and **regularly upgrade** their mines with the **newest technology** available in terms of **mine safety**. There are numerous products available that not only ensure a safer working environment, but **also boost productivity**. These are products like the Khuluma Kanjaan **winch signalling system** that improves the safety of all personnel involved in the operation of underground winches; or **anti-collision warning systems** which enhances the safety of locomotive operations by providing early warning through radio-frequency detection.
- In this regard, the research also recommends **stricter and standardised legislation** from governments, regarding the application of the highest technologically available **safety standards** in mines.
- The SADC governments must develop the capacity to have **control of mineral resources** in **processing, manufacturing and marketing** the minerals that are currently being undertaken beyond national borders.

- **Governments should take a lead role** in the sustainable development of mining communities and corporate social responsibilities.
- Governments, together with other stakeholders in the mining communities, should develop **strategies for effective community engagement** as an important part of the sustainable development process of CSR and sustainable development. **Clear communication channels** at all levels are essential in this regard.
- Governments and other stakeholders should **establish one vision for corporate social responsibility and sustainable development** for the mining communities.
- Research must be undertaken at the **micro, meso and macro levels** to **ascertain capacity** to be part of a CSR strategy to achieve sustainable development through CSR.
- Strategies must be formalised by government that include **training, capability, engagement, governance** and **commitment** to prepare all role players (at micro, meso and macro levels) who will be involved in the **implementation of sustainable development through CSR legislation**.
- **Welfare legislation** must take into account community members burdened with obligations to support other community members suffering with HIV/AIDS and TB. **Tax incentives** for employees must support this state of affairs.
- Legislation must have identified **monitoring agencies** and targets embedded within it. Capacity of monitoring agencies must be effective and targets must be realistic.
- Governments should undertake either **structural or upgrade infrastructure** as a necessary and non-negotiable requirement for sustainable development in the mining communities.
- Development projects should focus on employment creation as a priority in order to lay the foundation for community members to set up **income generating projects**.
- **Self-help projects** to focus only on those with entrepreneurial motivation rather than income generating reasons.
- An **ongoing developmental process** must be achieved through reviewing and evaluation of progress.
- Companies should also do more in the area of **CSR reporting**. Companies operating in Southern Africa must aim at **regularly disclosing** issues relating to sustainability, CSR strategies (including projects) and policies in a **uniform and truthful manner**. This will not only help companies in gaining and maintaining their SLOs and improve on their corporate image (e.g. community perceptions), but it will also form part of bridging the 'gap' in communication that is currently in existence between companies and their stakeholders.
- To achieve effective CSR and sustainable development in the surrounding mining communities, government and other stakeholders must also act in a **transparent** way in all their actions.

The following recommendations are more specifically aimed at the **South African mining sector**:

- Mining corporations in Limpopo must accept that the impact of their operations on the environment and bio-diversity stretches well beyond the site of operations. They must therefore **become involved in biodiversity issues beyond the mine site**.
- Mining corporations must consider **opportunities for added-value** to biodiversity from mining operations.
- Mining corporations must effect the integration of biodiversity issues into **environmental and social management** and **reporting systems** and report **transparently** and **honestly** on these issues.
- Mining corporations must structure their land-use management to integrate mining with **wider landscape uses**.
- Mining corporations should **collect, produce and share information** on biodiversity and environmental issues with their competitors, affected communities, government and other stakeholders.
- Mining corporations should ensure open, transparent and diverse processes for **monitoring and dialogue**.
- Mining corporations and government should develop systems to **engage groups** which operate 'below the radar'
- Mining corporations' **compliance** with the legal requirement of doing closure plan for post-closure activities during development (e.g. financial and institutional provisions) **should be closely monitored**.
- **Closure plans should be updated** at regular intervals, at least every three years.
- Stakeholders, particularly communities on whose land the mining operations occur should be **consulted and constantly informed** of closure plans.
- Closure plans should consider different long-term **conservation and land use options**.
- Closure plans should adopt product and mine site **life cycle approaches**.
- Mining corporations in consultation with stakeholders, including government and communities should **establish frameworks to clarify company responsibilities**.
- Mining corporations should ensure **equitable stakeholder power in decision-making**.

In line with the outcomes of Mining Minerals and Sustainable Development (MMSD) conference and workshops (O'Keefe, 2001) findings, to which most of the bigger mining corporations are signatories it is recommended that:

- Mining companies in South Africa should commit to **responsible exploration policies and procedures**.
- Mining companies should incorporate biodiversity information into site assessment, including surveys done by **environmentalists rather than environmental consultants** paid from a non-corporate source where appropriate.
- Mining corporations must establish transparent and accountable procedures with external **(independent) monitoring** of the exploration process.
- The government must establishing **proper government frameworks**, regulation and oversight for land use and exploration procedures.
- **Provision of expertise and information** by conservation organisations, community based organisations and credible NGOs that have the trust of communities.
- Initiatives should be established to ensure that **juniors follow best practice**.
- Government must introduce **financial incentives for good practice** (taxes, investment conditions, etc).
- Government must introduce **financial penalties for bad practice**, with the revenue thus generated going to a central fund on which communities can draw for access to independent expertise, layers etc.

The MMSD also provides a good source of reference with regards to recommendations in the mining development process. Some of these recommendations are already encapsulated in South African law, however the **government through the DME lacks the capacity to effect compliance**, while the DME simultaneously seems jealous of its terrain and reluctant to allow other Departments a role, hence the whole debate about NEMA. All companies are, by law required to have EIAs, EMAs, Social and Labour Plans in order to secure mining licenses. However, informants in communities, including their legal representatives often complain that these **documents are not readily available for public scrutiny**. There is a serious **problem concerning the content of annual reports** from many corporations in this regard:

- Legally mines are compelled by the MPRDA to plan for closure, such plans include: decommissioning plans; financial arrangements and mechanisms, land tenure arrangements, etc. However, communities on whose land the mining is to take place are not informed, although the DME is. Communities are therefore reliant on the DME to look after their best interests. The DME's primed objective is the promotion of mining, not the promotion of social welfare or environmental sustainability. It is therefore recommended that **social plans go to the departments of social welfare, local government and housing**, while **labour plans are submitted to the Department of Labour**, while **environmental assessments and plans are submitted to the DEAT for approval**.

- Mining corporations should **develop frameworks** for incorporation of biodiversity, environmental and social expertise and information **within all decision-making processes** (EIA, EMS, SIA, Social and Labour Plans).
- Ensure decision-making is transparent and involves equitable stakeholder participation, respecting the rights of stakeholders especially communities **and individuals** in those communities to say no.

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