



the federation for a sustainable environment

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**Comments on the Draft Environmental Impact Assessment  
and**

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**Environmental Management Plan for Listed Activities Associated with the Canyon Resources (Pty) Ltd, Proposed Palmietkuilen Mining Project near Springs, Gauteng**  
**DMR Reference Number: GP 30/5/1/2/2(10047)MR**

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I write on behalf of the Federation for a Sustainable Environment (FSE).

INTRODUCTION AND BACKGROUND

Recognising that the Palmietkuilen Mining Project:

1. Is a greenfields development planned on Portions 1, 2, 4, 9, 13 and 19 of the Farm Palmietkuilen 241 IR.
2. The coal resource will be mined using open pit methods due to the seemingly depth of the coal reserve (between 12 and 60 m below the surface).
3. The life of mine for the Project is 53 years.
4. Five pans are located on the area to be affected by the open pit.
5. The dominant soils, the Hutton and Clovelly forms have high agricultural potential.
6. The Project area is located within the threatened ecosystems: Blesbokspruit Highveld Grassland.
7. The proposed Project is within the Aston Lake catchment, surrounded by wetlands and drained by the the Dwars-in-diewegvlei and the Verdrietlaagte stream on either sides. The Lake discharge flows into the Blesbokspruit.

8. The wetlands are providing important hydrological services such as flood attenuation, streamflow regulation during low flow periods and water quality improvement. The wetlands are important for the provision of the crops and for the cattle raised on the properties. Furthermore, these wetlands are an important water source for the land owners and surrounding communities. Due to the significant extent of hillslope seep wetlands, which indicate perched groundwater, the wetlands will also play an important role in the catchment water recharge.
9. Operational activities will be occurring within an ecologically sensitive catchment and thus the handling, stockpiling and transport of the coal will have some impacts to the wetlands, particularly with respect to the haul road that crosses the NFEPA Rank 1 wetland, upstream of Aston Lake.
10. Post-mining water decant is predicted to occur once the final void has been rehabilitated and groundwater levels are allowed to return back to natural level. It is anticipated that this decant will be acid forming (acid mine draining, AMD).

Interpolation:

It is to be noted that as early as 1987, the US Environmental Protection Agency recognised that “.....*problems related to mining waste may be rated as second only to global warming and stratospheric ozone depletion in terms of ecological risk. The release to the environment of mining waste can result in profound, generally irreversible destruction of ecosystems.*”

It is furthermore to be noted that Acid Mine Drainage (AMD) is responsible for the most costly environmental and socio-economic impacts.

Production of AMD may continue for many years after mines are closed and tailings dams decommissioned. AMD is not only associated with surface and groundwater pollution, degradation of soil quality, for harming aquatic sediments and fauna, and for allowing heavy metals to seep into the environment. Long-term exposure to AMD polluted drinking water may lead to increased rates of cancer, decreased cognitive function and appearance of skin lesions. Heavy metals in drinking water could compromise the neural development of the fetus which can result in mental retardation.

There was no assessment conducted of the economic costs of the above-mentioned impacts.

In view of the aforesaid, the FSE is of the considered and firm opinion that the proposed Palmietkuilen Mining Project (“the Palmietkuilen Mine”):

1. Will result in unacceptable pollution, ecological degradation and damage to the environment;
2. Is not ecologically sustainable; and
3. Cannot be economically justified.

#### ISSUES OF CONCERN

The FSE alleges that the:

1. The Need and Desirability of the Project

2. The accumulative impacts, including residual or latent impacts of the Project
3. The Mining and Biodiversity Guideline
4. A Cost/Benefit Analysis
5. The Best Practicable Environmental Option
6. Radioactivity

were not adequately assessed and/or justified.

In substantiation:

#### 1. NEED AND DESIRABILITY

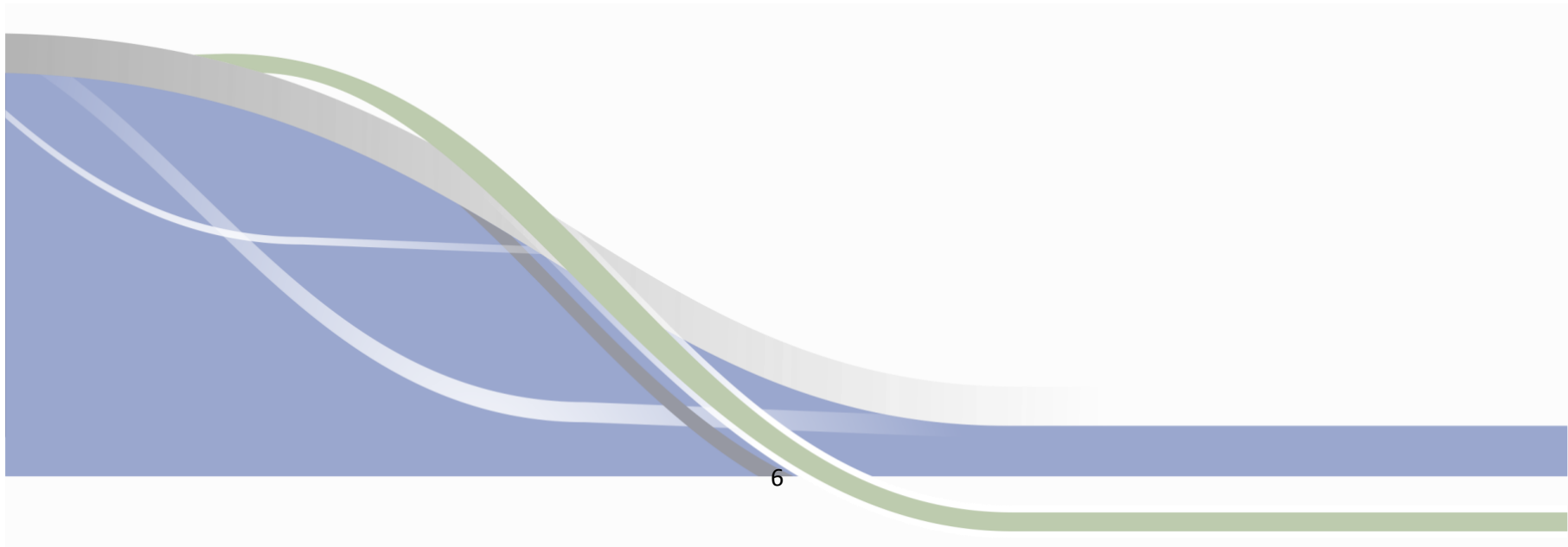
If we, as a country, are to mine all minerals (and in the case under consideration, coal) in the ground, then there should be no regard for the environment since all of South Africa, as a resource rich country, will in any event be mined. If, however, not all minerals are to be mined and some will be left in the ground, then a decision on which areas to mine and the areas in which to leave the minerals in the ground, should be made.

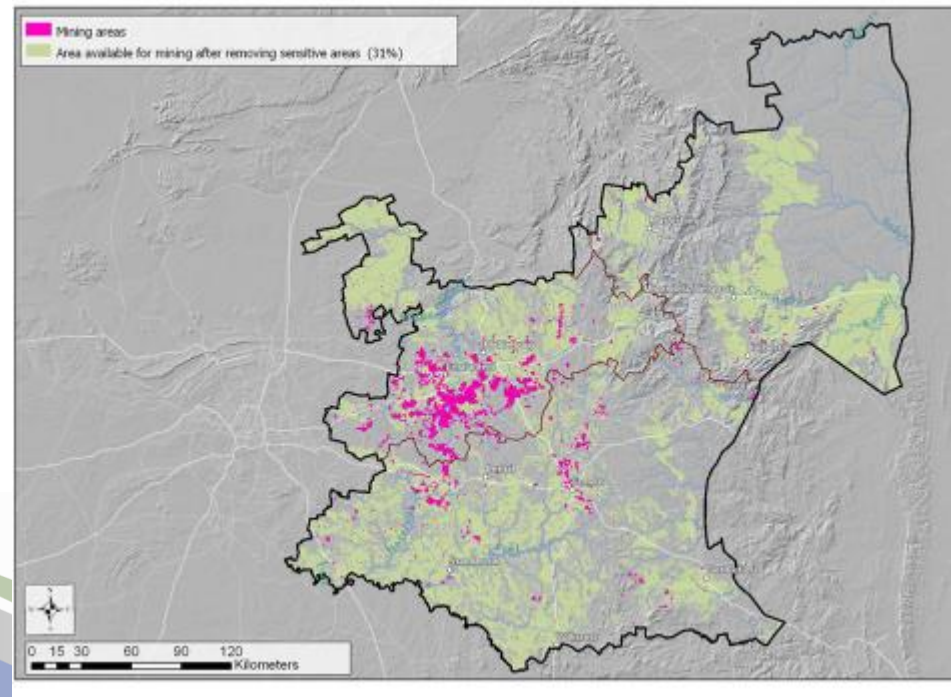
It is our submission that the first scenario is not sustainable and thus not an option. The second scenario has a direct application in this matter.

With coal resources in South Africa estimated at some 31 billion tonnes, and production of approximately 260Mt per year (according to estimates in 2014), South Africa has coal resources for the next 200 years. It is anticipated that South Africa will exploit its coal resources for the next 20 or 30 years. Coal resources for the remaining 180 years will therefore remain in the ground.

The need and desirability of the activity in the context of the aforesaid, namely in the context of South Africa's vast coal resources and the identification of alternatives with the lowest level of environmental sensitivity ought to have been assessed and considered in the EIA/EMPr.

The FSE strongly dissents from the statement by the EAP that there is a need for the Palmietkuilen Mining Project to be established, in view of the aforesaid, in a greenfields and highest biodiversity important area. The entire Upper Vaal is underlain by coal. There are alternative areas, which are not classified as biodiversity priority areas, where coal can be extracted. See e.g. the subjoined map .





We also refer to the proposed exploitation of vast coal reserves within the Waterberg.

Of relevance too is General Notice No. 891 of 2014 titled: GUIDELINE ON NEED AND DESIRABILITY IN TERMS OF THE ENVIRONMENTAL IMPACT ASSESSMENT (EIA) REGULATIONS and in particular the “*opportunity costs*”. It is discussed below (page 23/21 of the guidelines).

*“Opportunity costs refer to the process of considering and comparing the social and economic costs, implications and opportunities of different alternatives. Choosing a specific option, alternative or path may result in other options (and its associate opportunities) being foregone – the loss of these opportunities are referred to as the opportunity cost of the preferred option. Assessing the opportunity costs of different options will also assist in the search for alternatives that will result in-*

- *The understanding of the value of the foregone opportunities*
- *Optimising positive impacts;*
- *Minimising negative impacts*
- *The maintenance of ecological integrity and environmental quality*

*The above is also linked to the positive duty to find the “best practice environmental option”, which is define in NEMA as “the option that provides the most benefit or causes the least damage to the environment as a whole, at a cost acceptable to society, in the long term as well as in the short term.”*



*The need to consider the opportunity costs of different options are particularly relevant in instances where resources are limited, environments are under stress. Examples where the consideration or opportunity cost is relevant include the option of redeveloping a public open space into a parking area. Another example is here it is confirmed that there are adequate water resources to service a development proposal.*

*“Applying the “opportunity cost” principle would change the question being asked, by placing a positive duty to consider if the proposed development will constitute the best use of the available water resources (i.e. the best practicable environmental option.)”*

The alternatives considered for the Project did not include alternative land uses<sup>1</sup> and/or activities or sites which are underlain by coal, but are not categorised as of high or highest biodiversity importance.

## 2. ACCUMULATIVE IMPACTS

It is common cause that the Blesbokspruit system (which includes Aston Lake) and particularly the Marievale section has the highest Ecological Importance and Sensitivity (EIS) rating since it is a Ramsar site providing habitat for various reed dwelling and other aquatic bird species.

It is also common cause that the capacity of the ecosystem is under pressure as indicated by the low species diversity and low average score per taxon (ASPT).

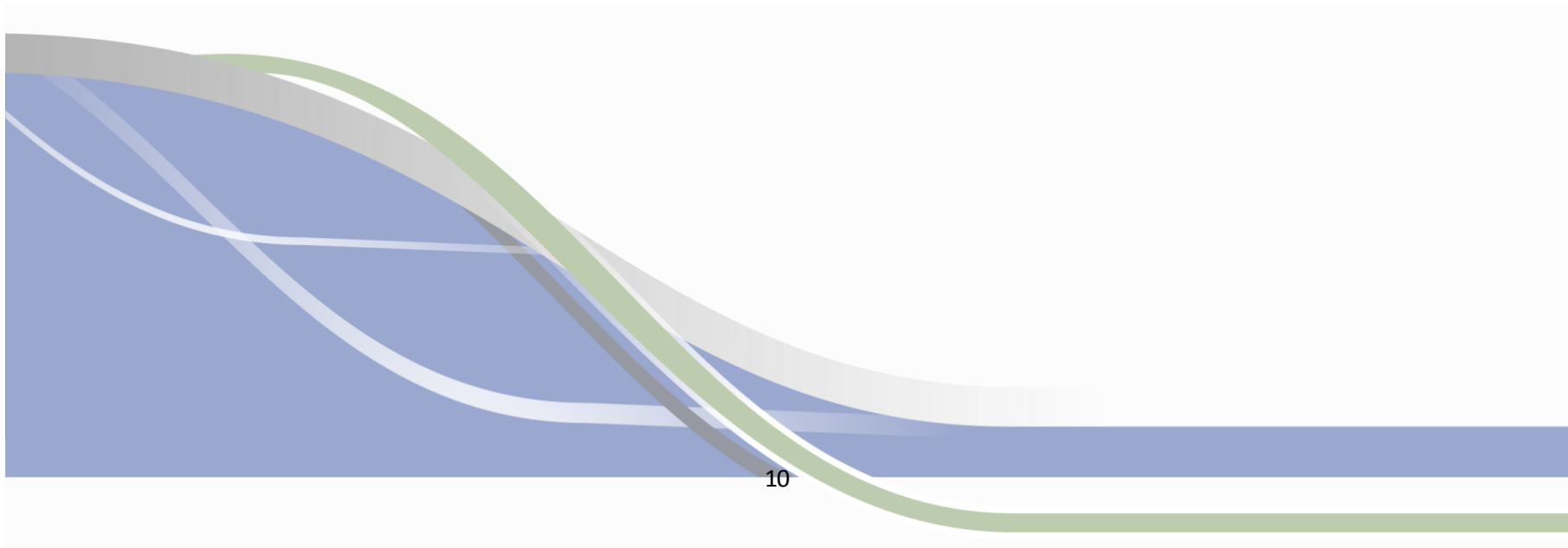
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<sup>1</sup>To exemplify: Since the dominant soils, namely the Hutton and Clovelly forms, have high agricultural potential, alternative land use, such as agriculture, was not considered.

The capacity of the ecosystem is currently further reduced and at risk as a result of the discharge of more than 100 million litres per day of neutralised Acid Mine Drainage (AMD), containing elevated levels of sulphate, into the Blesbokspruit.

The conditions required for a Ramsar Wetland status are that the salinity should not exceed 300mS/m. The current discharges fall within 250mS/m.

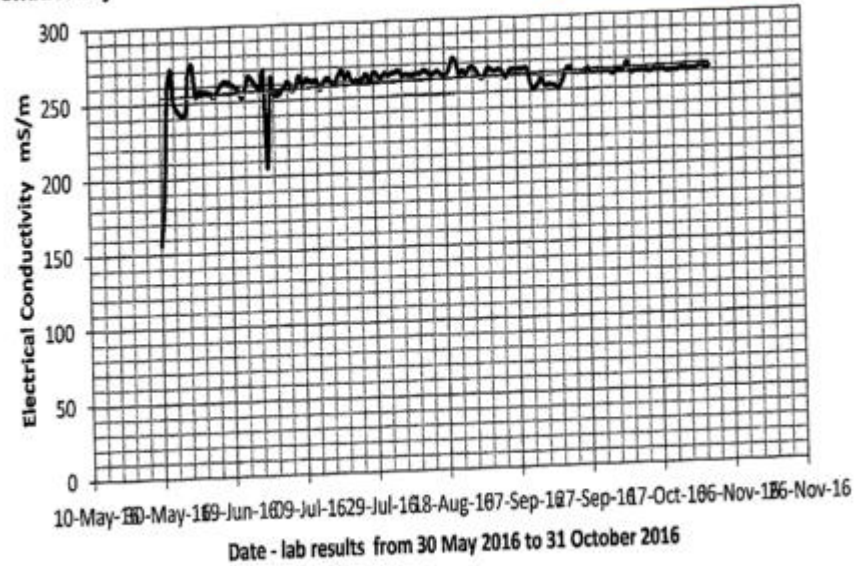
See subjoined graphs.

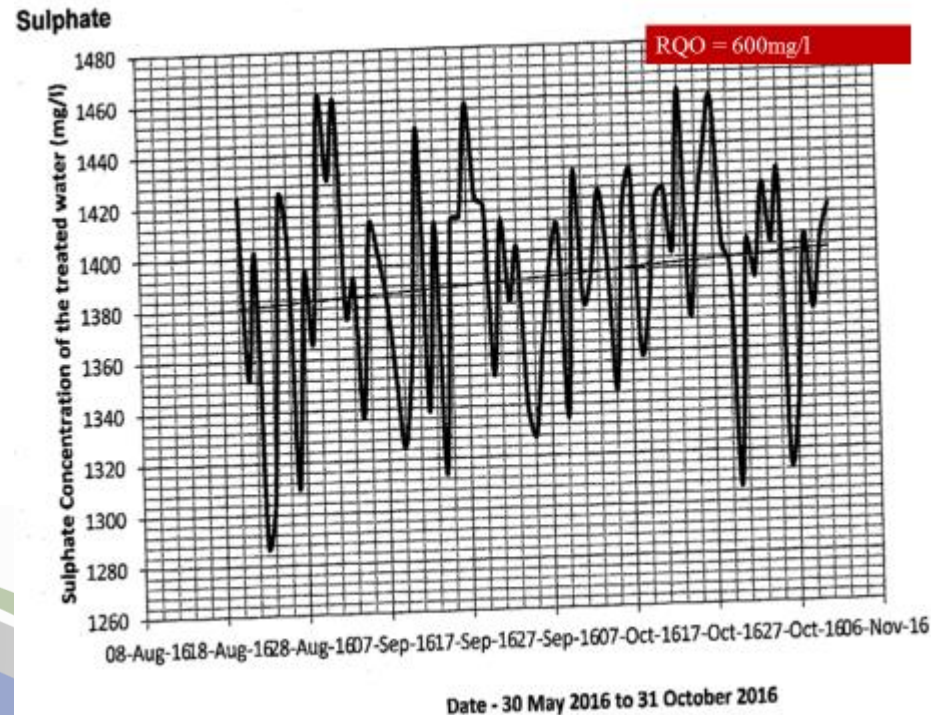


Water Quality Results (Eastern Basin)

RQO = 111 mS/m

Conductivity





The additional salinity from the proposed Palmietkuilen Mine will result in unacceptable levels of salinity, profound and irreversible impacts on the Blesbokspruit's eco-system and water security risks to the Integrated Vaal River System, including downstream water users.

With reference to the current treatment of AMD within the East Rand gold fields: The following determinants in the mine void water exceed the Maximum Allowable Limits (Class II) of the SABS 241 Drinking Water Standard, in many cases by several orders of magnitude: pH, EC, TDS,

So<sub>4</sub>, Fe, Mg, Ca, Mn, Al, Pb, Co and Ni. It can be assumed with a reasonable amount of certainty that most of the other metals would also be present in elevated concentrations. As a consequence of the uraniferous nature of the ore, Witwatersrand tailings and other mining residues often contain significantly elevated concentrations of uranium and its daughter radionuclides, with the decay series of U<sub>238</sub> being dominant<sup>2</sup>.

It should be noted that the current short term treatment (neutralisation) of AMD within the Eastern Basin gold fields does not cause the metals in AMD to disappear but merely change the metals into a different oxidation state, which change them from a soluble form to a solid form. The process can be reversed and the contaminants mobilised, should the water become acidic. The metal sludge including radioactive metals, in toxic concentrations, is currently discharged into boreholes and Grootvlei Shaft 3. There has been no EIA conducted in order to determine the impacts of the metal sludge on the surface and groundwater and downstream water users.

It is the FSE's considered opinion that the accumulative impacts of the short term treatment of AMD and the potential, latent and residual impacts of the proposed Palmietkuilen Mine on the Blesbokspruit system (wetlands, biodiversity, ground- and surface water) and downstream water users have not been adequately assessed in the EAP's EIA.

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<sup>2</sup> (Harmony Environmental Impact Document titled "Impact of the discharge of Treated Mine Water, via the Tweelopies Spruit, on the receiving Water body Crocodile River System, Mogale City, Gauteng Province" (DWAF 16/2/7/C221/C/24) (3 December 2006)

(The pollution and destruction threat of gold mining waste on the Witwatersrand - A West Rand case study. S.H.H. OELOFSE, P.J. HOBBS, J. RASCHER and J.E. COBBING. CSIR, Natural Resources and the Environment, PO Box 395, Pretoria, South Africa, 0001)

(Institute for Water Quality Studies, 1995; Institute for Water Quality Studies, 1999, Department of Water Affairs and Forestry, 2003. Radiometric Surveying in the Vicinity of Witwatersrand Gold Mines. H. Coetzee. Mine Closure. 2008.)

It should furthermore not be omitted that the FSE dissents from the Aquatic Ecology Report’s findings that *“The central cause of the poor ecological status was found to be associated with various agricultural practices which have resulted in habitat modification of the assessed river reaches.”*

In substantiation:

- In terms of the Department of Minerals and Energy (2008) *Regional Mine Closure Strategy for the East Rand Goldfields*, poor ecological status can be attributed to the non-adherence by the Mines to their Water Use License conditions and to the discharge of partially treated mine water into the Blesbokspruit thus polluting the water and changing its ecology.
- The Report titled *“Flooding of Central and East Rand Gold Mines: An investigation into Controls over the Inflow rate, Water quality and the Predicted Impacts of Flooded Mines”* by R Scott (WRC Report No 486/1/95) provides scientific evidence of the impact of mining activities in the East Rand (Springs) on the ground- and surface water and ecology. Extracts from the Report reads: *“Mining has been conducted with no concern for groundwater... and “mining has an enormous effect on the natural environment.”* The said Report refers to the mines being a major contributor to the overall degradation of the water.

In addition to the impacts of the historical mining activities, the recent failures in duty of care by the Grootvlei Mine and the current discharges of highly saline neutralised AMD, and the disposal of toxic and radioactive metal sludge in boreholes and in the Grootvlei No 9 Shaft undoubtedly contribute to the poor ecological status of the Blesbokspruit system.

### 3. MINING AND BIODIVERSITY GUIDELINE



In terms of the South African National Biodiversity Institute’s Atlas of Freshwater Ecosystem Priority Areas in South Africa, the Blesbokspruit is classified as a Wetland Freshwater Ecosystem Priority Area (NFEPA). In terms of the DMR’s Regional Mine Closure Strategy for the East Rand Gold Fields (2008), *“radical management plans should be implemented if this valuable natural resource is to be preserved for future generations”*.

In terms of the Mining and Biodiversity Guideline FEPAs, a 1km buffer around these FEPAs and Ramsar Sites are classified as *“Highest biodiversity importance”* and the risks for mining are identified as the *“highest.”* The implications for mining according to the said Guideline are as follows:

*“Environmental screening, environmental impact assessment (EIA) and their associated specialist studies should focus on confirming the presence and significance of these biodiversity features, and to provide site-specific basis on which to apply the mitigation hierarchy to inform regulatory decision-making for mining, water use licences and environmental authorisations.*

*If they are confirmed, the likelihood of a fatal flaw for new mining projects is very high because of the significance of the biodiversity features in these areas and the associated ecosystem services. These areas are viewed as necessary to ensure protection of biodiversity, environmental sustainability and human well-being.*

*An EIA should include the strategic assessment of optimum, sustainable land use for a particular area and will determine the significance of the impact on biodiversity.*

*This assessment should fully take into account the environmental sensitivity of the area, the overall environmental and socio-economic costs and benefits of mining as well as the potential strategic importance of the minerals to the country.*

*Authorisations may well not be granted. If granted, the authorisation may set limits on allowed activities and impacts, and may specify biodiversity offsets that would be written into licence agreements and/or authorisations.”*

In terms of NEMA section 24 an environmental authorisation must include all regulations.

It is the FSE's considered opinion that the EIA/EMP for the Palmietkuilen Mining Project did not fully assess the environmental sensitivity of the area, the overall environmental and socio-economic costs and benefits of this mining application according to the recommendations of the Mining and Biodiversity Guideline.

#### 4. COST/BENEFIT ANALYSIS

Coal Mines are classified in terms of the DWS' Policy on the Management of Mine Water as Class A mines, that is, acid producing mines or any mines where pyrite occurs in the mineral deposits. In terms of the *National Environmental Management Act (107/1998): Regulations pertaining to the Financial Provision for Prospecting, Exploration, Mining or Production Operations*, the Palmietkuilen Mine will be required to make financial provision for latent or residual environmental impacts which may become known in future, including the pumping and treatment of polluted or extraneous water. The costs associated with the pumping and treatment of mine water may render the Project economically unsustainable.



The economic costs of the Palmietkuilen Mine pertaining to the latent or residual environmental impacts and the potential pumping and treatment of acidic mine water were not adequately assessed in the EIA.

With reference to the economic assessment and the argument that the Mining Project will create employment for the local residents, the FSE submits: Economic costs and benefits must be evaluated in the context of the fact that mining is by its very definition unsustainable since it depletes a non-renewable resources. It is imperative to also assess the post-closure economic impacts since the post mining phase will not only result in job losses but may well rob communities of actual or potential livelihood opportunities. While some of the community may benefit during the life-time of the project, future generations may well have their livelihood opportunities, and their quality of life, reduced by polluted water, degraded soil and land.

It should furthermore be acknowledged that low level agricultural jobs may be lost by community members who are unable to get one of the new jobs created by the Palmietkuilen Mining Project as these require a highly level of skill. Livelihoods lost are thus seldom directly replaced through mine employment. This problem becomes particularly critical where there can be no post-mining land-use.

communities will have to live with the negative legacies, such as polluted groundwater, loss of employment,

##### 5. EVALUATION OF THE BEST PRACTICABLE ENVIRONMENTAL OPTION (BPEO)<sup>3</sup>.

This includes an assessment of the opportunity costs, e.g.<sup>4</sup>:

<sup>3</sup> Section 2(4)(b) of the National Environmental Management Act, 107 of 1998

- Understanding the value of the foregone opportunity/opportunities;
- The achievement of the desired aim/goal for the specific area;
- Optimising of positive impacts;
- Minimising of negative impacts;
- Equitable distribution of impacts; and
- The maintenance of ecological integrity and environmental quality.

The “*opportunity cost*” principle was not adequately considered by the EAP namely if the proposed development will constitute the best use of the resources (i.e. the best practicable environmental option).

## 6. RADIOACTIVITY

The gold ores of the Witwatersrand contain appreciable concentrations of uranium and its radioactive progeny. Mining has resulted in the dispersal of radioactive material into the environment via windblown dust, waterborne sediment and the sorption and precipitation of radioactivity from water into sediment bodies.

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<sup>4</sup> General Notice No. 891 of 2014 titled: GUIDELINE ON NEED AND DESIRABILITY IN TERMS OF THE ENVIRONMENTAL IMPACT ASSESSMENT (EIA) REGULATIONS, 2010.

Since the Palmietkuilen Coal Mining Project falls within the East Rand gold fields and since, as a consequence of the uraniferous nature of the gold ore, Witwatersrand tailings and other mining residues often contain significantly elevated concentrations of uranium and its daughter radionuclides, with the decay series of U238 being dominant, a radiological assessment ought to have been conducted.

SUBMITTED BY:

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