



the federation for a sustainable environment

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WEST WITS MINING PROJECT – INTEGRATED WASTE AND WATER
MANAGEMENT PLAN IN SUPPORT OF THE INTEGRATED WATER USE LICENCE
APPLICATION.
DHSWS WATER USE NUMBER: WU17195

The following comments are submitted on behalf of the Federation for Sustainable Environment (FSE). The FSE is a federation of community based civil society organisations committed to the realisation of the constitutional right to an environment that is not harmful to health or well-being, and to having the environment sustainably managed and protected for future generations. Their mission is specifically focussed on addressing the adverse impacts of mining and industrial activities on the lives and livelihoods of vulnerable and disadvantaged communities who live and work near South Africa’s mines and industries.

PREFATORY

It is common cause that the Department of Water and Sanitation is experiencing a skills shortage. The NW&SMP found that *“a secure water future will not be achieved without addressing the issue of capacity – the skilled people required to undertake the work.”*

The NW&SMP further states: *“A skills gap analysis conducted by the WRC in 2015 looking at numbers of staff and their skills relative to required skills, showed significant skills gaps in water sector institutions, including DWS, CMAs, water boards and municipalities.”*

We express the hope that the above-mentioned skill shortage will not compromise the regulatory authorities’ review of the IWWMP and the Integrated Water Use Licence Application.

IWWMP STATEMENTS AND THE FSE’s COMMENTS

IWWMP STATEMENT

We infer from the IWWMP that the proposed Project falls within the Central Rand gold fields.

We are informed by the IWWMP that the proposed Project will entail open pit mining (the Mona Lisa Pit), two infrastructure complexes, run of mine ore stockpile, topsoil stockpiles, a waste water treatment plant, which will produce brine and solids, a pollution control dam, pipelines, which will transport sewage and process water, and a Waste Rock Dump.

We are also informed that:

- **The open pit mining will require dewatering and watercourse crossings may be required.**
- **Peat soils may occur within the project area.**
- **The proposed Mona Lisa Bird Reef Pit open cast area falls within a CBA.**
- **Structure could fall within or be located in close proximity to CBAs, ESAs, and threatened ecosystems.**
- **There are six drainage lines flowing through the project area which feed into the Klip River and that there are a number of activities/infrastructures which will alter drainage patterns by reducing the volume of run-off into the downstream catchments.**
- **A section of the Mona Lisa Bird Reef open pit mining area will be located within 100 m of a Klip River tributary.**
- **The Mona Lisa Bird Reef open pit mining area will be within the 500 m regulated zone of three of the Klip River tributaries.**
- **Dolomite is found in a section of the project area.**

OUR COMMENTS

Kindly advise whether the IWWMP has taken cognisance of the water quality standards set by the DWS' guidelines for drinking water quality, in-stream quality objectives and receiving water quality objectives. The receiving water quality objectives approach assumes that the water environment has a finite capacity to assimilate non-hazardous and hazardous wastes discharged into it without violating water quality objectives.

Integrated mine water management must make use of accepted techniques that are capable of temporal tracking qualitative and quantitative variations of water quality and quantity and their impact on surface water and ground water systems, currently and in the future.

In the light of the above-mentioned, the IWWMP should include a long-term monitoring programme for both water quality and quantity. Kindly advise whether this was included in the IWWMP.

The "continual improvement" principle also applies to this Project. Integrated mine water management must include measurable, quantifiable objectives and relevant performance indicators, which must be identified, prescribed, implemented, monitored and audited. Based on the compliance to objectives and targets, the IWWMP should be reviewed on an on-going basis in support of the principle of continual improvement. Kindly advise whether this was included in the IWWMP.

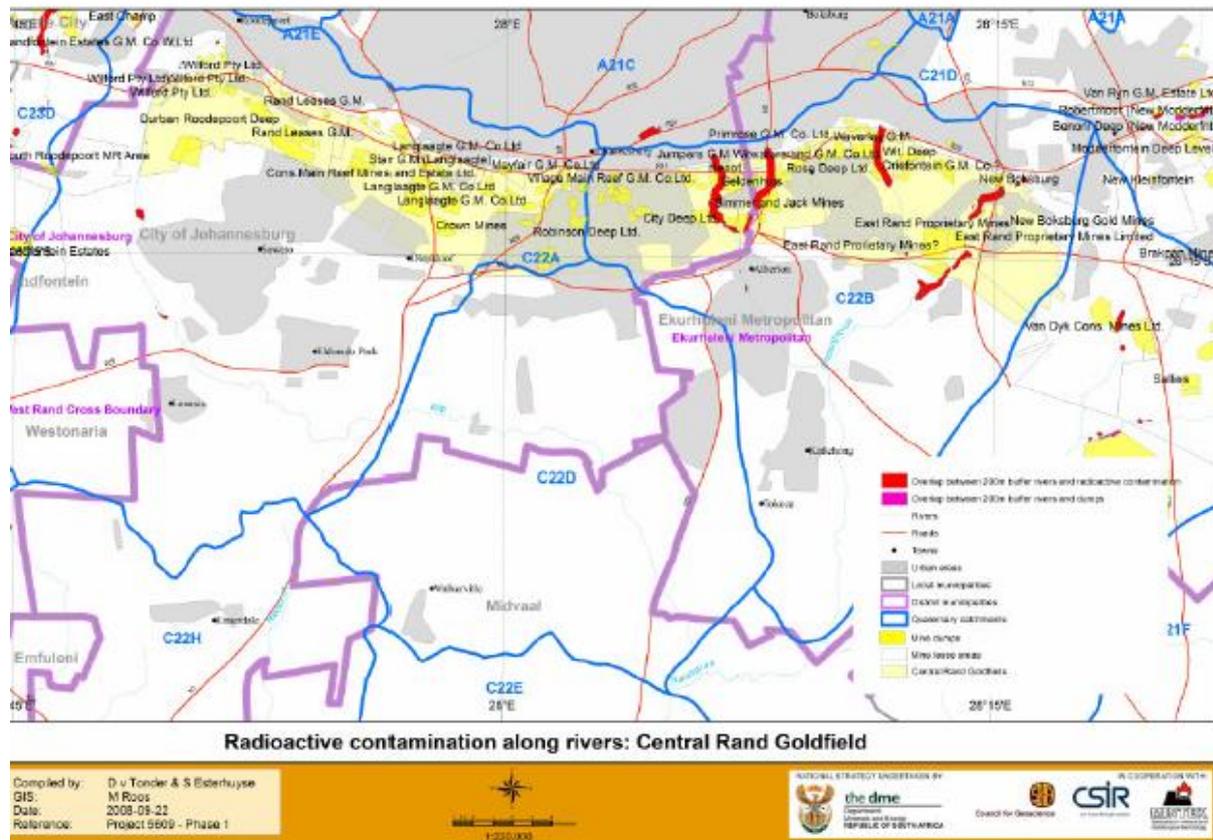
ACCORDING TO THE IWWMP:

The IWWMP informs us that the target commodities to be mined are gold, silver and uranium.

OUR COMMENTS:

Since the ores in the Central Rand Goldfield contain higher than ambient amounts of uranium, the uranium chemical component has the potential to generate a radiogenic and chemical toxicity hazard.

The subjoined Tier Risk map of the Central Rand Goldfields shows localised areas where uranium concentrations are a concern based upon the chemotoxicity of uranium in surface and groundwater. These hotspot areas are depicted in red.



Has the risk of toxicity from uranium and other NORMs been addressed as well as the toxicity risk through bioaccumulation pathways in the IWWMP?

ACCORDING TO THE IWWMP:

The IWWMP informs us that the ore is not acid producing and recommends the lining of the Rock Dump with a Class D liner and not a Class C Liner. A Class D barrier system (stripping topsoil and base preparation) is therefore considered appropriate for the temporary waste rock dumps for the proposed project.

Table 5-9 of the IWWMP, however, informs us that the Sulphate as SO₄ is a “Surface Water Quality Parameter of Concern”.

OUR COMMENTS:

Independent consultants should not put their clients' profitability first. It is therefore trusted that this recommendation by SLR is based on environmental considerations and not motivated by the commercial interests of the Applicant.

Waste rock dumps have very large inventories of fine material and they are much more permeable to oxygen than tailings dams. It is not clear from the IWWMP if the extent of contaminant plumes from the waste rock dump is known.

The IWWMP furthermore informs us that no waste rock dumps will remain following the final rehabilitation. The secondary source of contaminants that remain in the soil after a dump has been removed appears to be ignored since it is assumed that removal of the dump removes all potential for pollution from that site.

The IWWMP's findings that the ore is not acid producing are anomalous to the DWS' Draft Mine Water Management Policy (2017), which states that **all** gold and coal mines are categorised as Category A Mines since pyrite occurs in the mineral deposits, which has an acid generation potential.

The above findings in the IWWMP are furthermore contradictory to the findings of the Council of Geosciences Report No 2008-0174, titled "*Regional Gold Mining Closure Strategy for the Central Rand Goldfield*".

The Report states that "*mineralisation within the gold-bearing conglomerate and associated gold reefs consists largely of SiO₂-rich silicates, gold, gold-bearing and often rounded **pyrite**, which is evidence of deposition in an anoxygenic environment. **Other sulphide minerals** which occur in less abundance include Ni, Co, Cu, Zn and Pb sulphides in the form of galena, sphalerite, gersdorffite, cobaltite, limnite, chalcopyrite, carbon, phyllosilicate (chloritoid and sericite). Heavy minerals in matrix are dominated by pyrite. Others include chromite, zircon, leucoxene, and gersdorffite.... because of mining comminution (crushing and grinding) processes the exposed surface area of **these minerals is greatly increased for oxidation reactions in the presence of oxygen in the air and water.***"

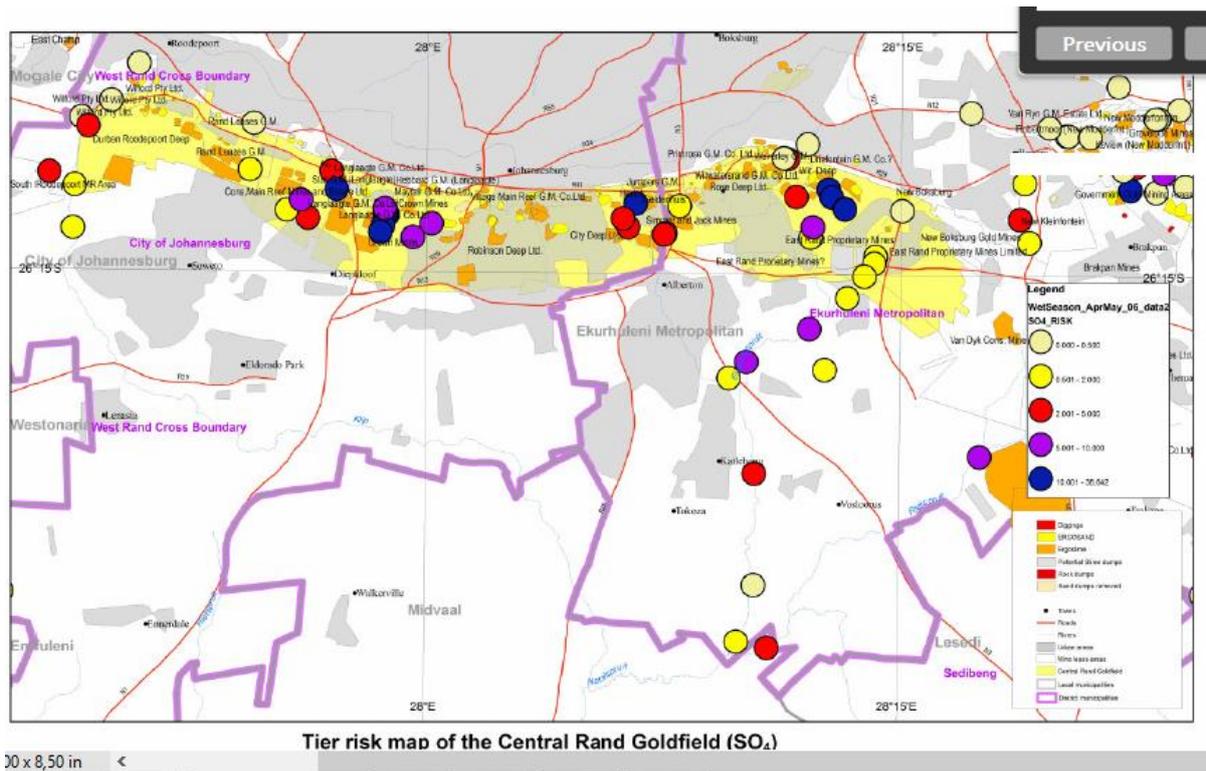
And,

"...over several seasons 86 surface water sampling points in the Central Rand Goldfield area were monitored on behalf of the Department of Minerals and Energy. Results from the surface water monitoring programme conducted over several seasons show the following conclusions:

- *Mines influence on surface water has increased total dissolved solids, as shown by the electrical conductivity values.*
- ***Extremely high SO₄ of some Central Rand Goldfield surface water samples is due to exposure to sulphide minerals associated with the Witwatersrand gold ores.***
- ***High risks were identified for SO₄ and U.***"

(Emphasis added.)

Please also see the Council of Geosciences' subjoined risk map of SO₄.



According to the IWWMP, (page 89) the water quality sampling showed that (SLR, 2019) within the Klip River Catchment

- All four samples were not suitable for human consumption;
- The samples showed elevated concentrations of aluminium, calcium, iron, magnesium, potassium, ammonia, sulphate, manganese, nickel and uranium;
- WITStream 3 also showed high concentrations of lead;
- The pH of WitsStream 1, 3 and 4 ranged between 3.3 and 4.5, indicating the likely presence of acid mine drainage from existing mine residue facilities.

It is therefore surprising that the IWWMP informs us that the ore within the mining area is not acid producing. Please explain.

ACCORDING TO THE IWWMP

We are informed that the proposed Project area falls within the Upper Vaal Water Management Area (WMA) and that the Klip River is the major river within the quaternary catchment.

There are numerous watercourses within the West Wits mining right area. These watercourses include wetlands as well as perennial and non-perennial rivers. The proposed infrastructure layout will be located within 500 m of watercourses and within the buffer zone for the Klip River.

OUR COMMENTS

Management of mine water must be cognisant of the typically significant areal extent of a mineral property, and its range of various mining operations (mine shafts, waste dumps, tailings

disposal facilities, pollution containment dams, mineral/ore processing plants, metallurgical plants, storm water management structures, water treatment facilities, residential complexes with housing, run-off, sanitation, etc.) that contribute towards cumulative and often integrated impacts.

Has the cumulative and/or integrated impact within the mine site been considered and not only for each individual aspect or unit operation of the proposed West Wits Mining project?

The Klip River receives approximately 70 million litres per day of neutralised AMD from the Central Basin AMD Treatment Plan. The Central Basin AMD Treatment Plant currently contributes 203 tons of TDS per day to the Vaal Barrage. The cumulative impacts of the elevated TDS concentrations from the Central Basin AMD Treatment Plan, neighbouring mines such as Harmony Gold Mining Company's Doornkop Operations and the proposed Project may exceed the carrying capacity of the Vaal River and its tributaries.

An assessment of the cumulative impacts is crucial in the light of:

1. The delay in the long-term solution (desalination) of AMD and that depth profile monitoring has found that poor quality water deep in the Basin does not separate (stratify) from the better quality water closer to surface. It was found that there is not an improvement in the raw AMD within the Central Basin.
2. The continuous ingress of surface and groundwater into the underground workings of the Central Rand Basin and the production of AMD when surface and groundwater come into contact with pyritic surfaces in the presence of oxygen.
3. The prerequisite of continuous pumping of underground mine drainage to protect environmental and socio-economic interests from rising AMD levels in the mine voids.

GROUNDWATER/SURFACE WATER

ACCORDING TO THE IWWMP

The IWWMP informs us that the project falls within the Zuurbekom and Upper Klip River dolomitic compartments. The dolomitic compartments have high transmissivity and permeability. According to the IWWMP some boreholes indicate definite mine water signatures with low pH, elevated TDS, sulphate, magnesium, iron, manganese, aluminium, lead and nickel concentrations exceeding the SANS 241 guidelines and a strong mining impact on the groundwater in the vicinity of the proposed Mona Lisa opencast pit.

Has the status of the geohydrological regime been identified, the extent of contamination, preferential pathways and predictions regarding long – term migration? The IWWMP contains limited mitigation or management options that specifically deal with the containment / rehabilitation of contaminated groundwater.

The potential impact on the groundwater from other surface contaminant sources such as the infrastructure, domestic and industrial waste sites are not described. The IWWMP states that these structures will be removed / rehabilitated during decommissioning, but it is not stated if they will have an impact and if groundwater rehabilitation is required.

ACCORDING TO THE IWWMP

Excess water will be discharged directly into watercourses within the project area. Third parties and/or livestock use this contaminated water for drinking purposes. The surface water is already unfit for use.

OUR COMMENTS

Please advise which technology will be used for the treatment of excess process water. The technology should be sustainable, clean (with minimal residuals and/or easily manageable residues) and render the water fit for use (drinking purposes).

ACCORDING TO THE IWWMP

The operational phase will present long-term potential sources and the closure phase will present rehabilitated areas that have the potential to contaminate surface water through long term seepage and/or run-off.

OUR COMMENTS

In terms of the Financial Provisioning Regulations, 2015 (published under Government Notice No. R. 1147 in Gazette No 39425 of 20 November 2015, as amended) adequate financial provision must be made for latent and residual impacts including the pumping and treatment of extraneous and pollution water.

Has adequate financial provision been made in terms of the above-mentioned Regulations and in consideration of the following risks in the determination of the financial provision:

1. The near certainty of contaminated water, which will require some form of decontamination treatment from the underground mines.
2. The near certainty of sulphate, chloride, metal and NORM contamination of soils and sediments from stockpiles, tailings spillages and plant discharges and the potential for contamination of downstream/downwind soils and sediments.
3. The near certainty of sulphate, chloride, metal and NORM contamination of surface water bodies and their sediments, and groundwater, by seepage from the pollution control dam, infrastructure complexes, run of mine ore stockpile, topsoil stockpiles, the waste water treatment plant, which will produce brine and solids, pipelines, which will transport sewage and process water, and a Waste Rock Dump.
4. The potential for salt, sulphate, chloride metal and NORM contamination of crop soils irrigated with contaminated surface and groundwater.
5. The concomitant loss of biodiversity and potentially ecosystem goods and services on disturbed, fragmented or polluted properties.
6. The potential for bioaccumulation of some metals and NORMS by flora and fauna.
7. Since the project falls within a dolomitic region, the potential for structural damage to buildings and other structures, and huma injury, by mining-exacerbated sinkhole formations?

BUSINESS AND CORPORATE POLICIES RELATED TO SAFETY, HEALTH AND THE ENVIRONMENT

ACCORDING TO THE IWWMP:

The IWWMP informs us that the environmental policy will include the establishment and maintenance of a good relationship with surrounding communities, businesses and other interested and affected parties, with regard to the mine's activities. And, that communication of environmental issues and information will be discussed at all general liaison meetings with local communities and other interested and affected parties.

OUR COMMENT

We suggest that the Applicant participates in the Klip River Catchment Management Forum and reports on its water quality results to the Forum on a quarterly basis.

EXEMPTION OF GN 704

The IWWMP informs us that the Applicant will apply for exemption to allow the Mona Lisa open pit mining area and Bird Reef Central Infrastructure Complex to be located within 100 m of a Klip River tributary.

OUR COMMENTS

Since the above exemption will be the only exemption that the Applicant will apply for in terms of GN 704, kindly advise whether all other conditions in terms of the Regulations of Use of Water for Mining and Related Activities aimed at the Protection of Water Resources will be complied with e.g. restrictions on use of material, capacity requirements of clean and dirty water systems, protection of water resources (e.g. prevention of water containing waste or any substance, which causes or is likely to cause pollution of a water resource from entering any water resources, either by natural flow or **by seepage** and must retain or collect such substance or water containing waste for use, re-use, evaporation or for purification and disposal in terms of the NWA; restrict the possibility of damage to the riparian or in-stream habitat through erosion or sedimentation; prevent the erosion or leaching of materials from any residue deposit or stockpile by providing suitable barrier dams, evaporation dams or any other effective measures to prevent this material or substance from entering and polluting any water resources) and effectively fence off any impoundment or dam containing any poisonous, toxic or injurious substance and erect warning notice boards at prominent locations.

ACCORDING TO THE IWWMP

We are informed that rehabilitation will be concurrent with mining. Waste rock will be used to backfill the open pits. Topsoil will be replaced on the waste rock to enable vegetation to re-establish. Following final rehabilitation and adequate stabilisation, each of the areas will be made available in line with post-closure land use objectives.

OUR COMMENTS

Please advise if after the backfilling of the open pits with waste rock, the area will be sealed prior to the replacement of topsoil.

Besides backfilling and the replacement of topsoil, rehabilitation - in terms of the Guidelines for the Rehabilitation of Mined Land (Chamber of Mines of South Africa, 2007) - will require landform-recreation, dealing with soil acidity and metal toxicities, soil amelioration, the prevention of compaction to allow for root penetration, biodiversity re-establishment, etc.

Furthermore, material “swelling” may create overburden and rock waste piles having greater volumes than the pit from which the material was excavated.

Please advise if these aspects were addressed in the IWWMP and whether the open pits will be rehabilitated to a usable condition which is readily adaptable for alternate land uses and create no danger to public health or safety.

Historic mining has caused fractures, fissures and faults in underground compartments. Interconnections between the compartments may result in the migration of polluted water to lower-lying interconnected neighbouring mines. Please confirm that seepage or leaking into groundwater will not occur.

In terms of the MPRD regulations *“the closure of a ...mining operation incorporates a process which must start at the commencement of the operation and continue throughout the life of the operation; ...the land is rehabilitated, as far as is practicable to its natural state or to a predetermined and agreed standard or land use which conforms with the concept of sustainable development.”*

Since they are the ultimate recipients of potential, ongoing and historical pollution and the potential future land users, the requirements of the above-mentioned MPRD Regulations entail that interested and affected parties must be involved in the agreements regarding future land use of affected areas and thus in the decisions regarding the establishment of objectives for such future land use, as well as in discussing the alternatives for engineering interventions, where decisions regarding such options will affect the future land use.

Please advise what the future predetermined or agreed land use is and the specific objectives for concurrent remediation. It will be impossible to determine the specific objectives for concurrent rehabilitation unless the future land use has been determined. Since the MPRDA commits to the NEMA principles, this implies that the Applicant must incorporate the Best Practicable Environmental Option (BPEO) in its rehabilitation objectives, that is, 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 terms.

The FSE does not consider “wilderness status”, “open space” or sloping, grassing/re-vegetation, stockpiling for road building material, etc. as a sustainable future land use. These are at best measures for interim stabilisation.

ADDITIONAL ISSUES

- Kindly advise whether the pollution control dam will be lined.
- Where will the leaching of the gold take place if not in situ?
- Will the pipelines be supported, and will it:
 - contain any flanges for the full length of the wetland/river crossings;
 - contain a continuous HPDE internal liner;
 - contain spillage paddocks; and
 - be fitted with a leak detection system such as a flow meter at the pump station discharge and at the delivery point which is linked to the SCADA system.?

We refer in this regard to the attached document, prepared by Paterson and Cooke for the FSE.

SUBMITTED BY:

Mariette Liefferink.

CEO: FEDERATION FOR A SUSTAINABLE ENVIRONMENT

21 June 2021.