



Centre for Environmental Rights

Advancing Environmental Rights in South Africa

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Copied to:

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Our ref: CER 12.4/RH NL
31 May 2018

Dear Gabriele

COMMENTS ON THE ATMOSPHERIC IMPACT REPORT PUBLISHED AS PART OF THE ATMOSPHERIC EMISSION LICENCE APPLICATION FOR PROPOSED IPP THABAMETSI COAL-FIRED POWER STATION

1. We confirm that we act for Earthlife Africa and groundWork (“our clients”), registered interested and affected parties (“I&APs”) in relation to this matter.
2. We refer to the notification of the application for an atmospheric emission licence (AEL) submitted by Thabametsi Power Company (Pty) Ltd to the Department of Environmental Affairs (DEA) (“the notification”) of 2 May 2018 advising that an atmospheric impact report (AIR) was available for public consideration and comment by 31 May 2018.

Objection to the Public Participation Process

3. We point out that, in terms of the Air Quality Act, 2004 (AQA), an applicant is required to make the **entire AEL application** available – not just an AIR. Section 38(3) states that:

“(a) An applicant must, immediately after the submission of the application to the licensing authority, take appropriate steps to bring the application to the attention of relevant organs of state, interested persons and the public.

(b) Such steps must include the publication of a notice in at least two newspapers circulating in the area in which the listed activity applied for is or is to be carried out—

(i) describing the nature and purpose of the licence applied for;

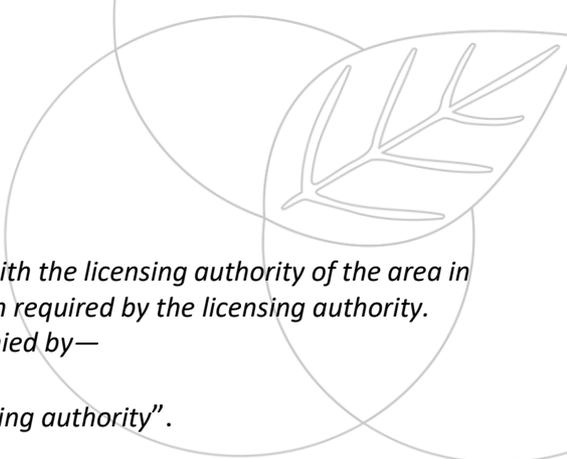
(ii) giving particulars of the listed activity, including the place where it is or is to be carried out;

*(iiA) indicating where a **copy of the application** can be obtained;*

(iii) stating a reasonable period within which written representations on or objections to the application may be submitted, and the address or place where representations or objections must be submitted; and

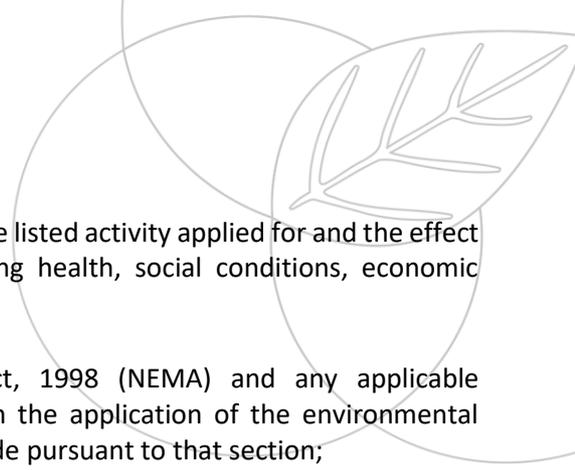
(iv) containing such other particulars as the licensing authority may require” (our emphasis).

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4. Section 37 of AQA provides as follows:
“(1) A person must apply for an atmospheric emission licence by lodging with the licensing authority of the area in which the listed activity is or is to be carried out, an application in the form required by the licensing authority.
(2) An application for an atmospheric emission licence must be accompanied by—
(a) the prescribed processing fee; and
(b) such documentation and information as may be required by the licensing authority”.
 5. We have exchanged correspondence with Savannah Environmental (Pty) Ltd (“Savannah”) advising that the mere publication of the AIR is not sufficient to constitute compliance with section 38(3)(iiA) of AQA, and that the full application – as submitted to DEA - must be made available to I&APs. Savannah have now argued that the AIR “*is the application*” and that DEA “*confirmed that if all relevant information for the application (AIR) has been provided to the stakeholders, then this fulfils the requirement of the legislation.*”
 6. We dispute that this fulfils the requirements of the legislation. The notification states, “*With reference to this project, the applicant **has submitted an on-line Atmospheric Emissions License (AEL)** (sic) **Application** to the National Department of Environmental Affairs (DEA). The Atmospheric Impact Report (AIR), detailing the potential emissions expected to be generated by the Thabametsi Power Station has been made available for review and comment from 02 May 2018 – 31 May 2018*” (emphasis added).
 7. It is that application, as submitted to DEA, that must be made available to I&APs. Savannah has, in a previous email of 8 May, stated the AIR is “*the supporting document to the AEL application*”, confirming that the AIR forms part of the AEL application, but does not, on its own, constitute the entire AEL application as submitted to DEA.
 8. It is not within the discretion of the environmental assessment practitioner or the DEA to decide what information is made available to I&APs. Section 38(3)(iiA) is quite clear that a copy of the AEL application must be made available. This must be the full application as submitted to DEA, including the application form and all its annexures, as well as “*such documentation and information as may be required by the licensing authority*”.
 9. **Our clients’ rights are fully reserved and we maintain that section 38 has not been complied with by the applicant. On this basis alone, we submit that the AEL application should be refused, and the applicant should be required to advertise its application and make the legally-required documentation available for a fresh comment period.** Nevertheless, we set out our clients’ more detailed objections to the granting of an AEL and comments on the AIR below.

Objections to the Granting of an AEL

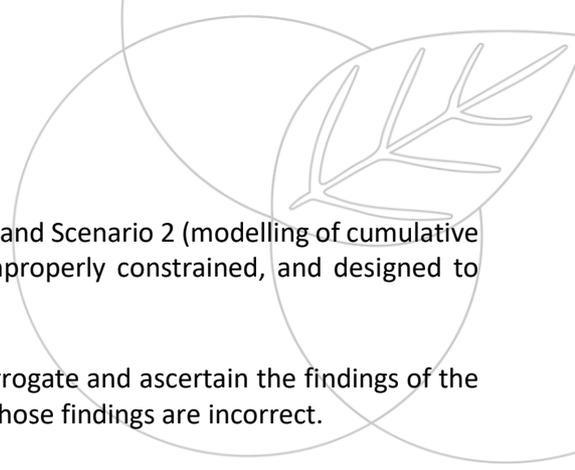
10. Our clients’ main concerns with the impact assessment as set out in the AIR are the following:
 - 10.1. the failure to include sufficient, verifiable information in the AIR and to accurately calculate and account for the Thabametsi project’s emissions, through, *inter alia*, the use of patently incorrect pollutant emission rates as the basis for modelling the project’s impacts;
 - 10.2. the failure to adequately assess the cumulative impacts of the Thabametsi project; and
 - 10.3. the failure to adequately assess the health impacts of the Thabametsi project.
11. Section 39 of AQA lists factors that a licensing authority must take into account when considering an application for an AEL; these include, *inter alia*:
 - 11.1. any applicable minimum standards set for ambient air and point source emissions that have been determined in terms of AQA;

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- 11.2. the pollution being or likely to be caused by the carrying out of the listed activity applied for and the effect or likely effect of that pollution on the environment, including health, social conditions, economic conditions, cultural heritage and ambient air quality;
 - 11.3. section 24 of the National Environmental Management Act, 1998 (NEMA) and any applicable environmental impact assessment done, the decision taken on the application of the environmental authorisation, and any applicable notice issued or regulation made pursuant to that section;
 - 11.4. whether the applicant is a fit and proper person as contemplated in section 49;
 - 11.5. any submissions from organs of state, interested persons and the public; and
 - 11.6. any guidelines issued by the Minister or MEC relating to the performance by licensing authorities of their functions.
12. In this regard, we submit that it is relevant and necessary that the licensing authority give proper consideration to all of the above factors, including:
- 12.1. the Waterberg's designation as an air quality priority area (the Waterberg-Bojanala Air Quality Priority Area) under section 18 of AQA and the area's current and anticipated further non-compliance with national ambient air quality standards;
 - 12.2. the pollution likely to be caused by Thabametsi and the effect of that pollution on human health, the environment, and the economy – including the external costs of that pollution; and
 - 12.3. whether the applicant, Thabametsi Power Company (Pty) Ltd, is, in fact, a fit and proper person.
13. We submit that the **application should be refused due to, *inter alia*:**
- 13.1. **the environmental assessment practitioner's failure and refusal to make Thabametsi's full AEL application available for consideration and comments, as required by section 38(3) of AQA;**
 - 13.2. **fatal flaws and shortcomings in the AIR, which result in the impacts of Thabametsi's emissions not being properly assessed or reflected;** and
 - 13.3. **various section 39 factors and requirements not being met.**
14. We set out our clients' more detailed submissions below.

Flaws and shortcomings in the AIR

Failure to include sufficient, verifiable information in the AIR and accurately calculate and assess Thabametsi's emissions

15. Dr Ranajit Sahu – an independent consultant and air quality expert from the USA, with over 28 years of experience in the fields of environmental, mechanical, and chemical engineering - has analysed the AIR and, in a report attached hereto marked **A** ("Sahu May 2018 report"), Dr Sahu has identified numerous issues with the modelling and assessment of the emissions. Two of the main issues identified by Dr Sahu are that:
- 15.1. the AIR does not provide sufficient technical detail in order to verify its methodology and inputs into its analysis; and



- 15.2. the Scenario 1 (dispersion modelling for Thabametsi’s emissions) and Scenario 2 (modelling of cumulative emissions) frameworks within the model are artificially and improperly constrained, and designed to under-predict impacts.
16. We submit that the AIR, firstly, does not provide sufficient detail to interrogate and ascertain the findings of the AIR, and secondly, where information and findings have been provided, those findings are incorrect.
- i. Insufficient verifiable information*
17. Crucial data and modelling information have been omitted from the AIR. The result is that the findings of the AIR cannot be relied upon. Dr Sahu’s report states that “[w]ithout a thorough discussion of how all of the meteorological data was processed, validated, and otherwise used in the analysis, including all inputs and assumptions made by the analyst, the predictions made in the AIR cannot be assumed to be reliable.”¹
18. The DEA Code of Practice (“the Code of Practice”), Appendix A to the Regulations regarding Air Dispersion Modelling GN 37804,² 11 July 2014 (“the Regulations”) requires, in chapter 7, that the following must be submitted with an AIR: input and output files for models; input and output files for pre-processors; input and output files for post-processors; digital terrain files; and plot files. According to the Code of Practice, “the report (AIR) shall include a description of electronic files” and “the report shall include a discussion on deviations from the modelling protocol”.³ Section 5 of the Regulations states that “a relevant authority **must refuse to accept air dispersion modelling results, if any person or organ of state fails to comply with the Code of Practice for Air Dispersion Modelling as contained in Appendix**” (emphasis added).
19. A May 2018 statement of Dr Andy Gray – attached marked “B” – explains the importance of access to air dispersion modelling files and data.
20. Access to the modelling files is critical for I&APs to be able to properly exercise their rights of access to information,⁴ as well as their rights to an environment not harmful to health and wellbeing and to have the environment protected.⁵
21. Dr Gray concludes in his statement that “it is not sufficient to merely prepare a written modeling report – it is incumbent upon a responsible air modeler ... to make the supporting computer files available to all interested parties.”
- 22. Our clients request access to the supporting documentation that has been submitted with the application – as is required by AQA and the Regulations.**
23. In addition, in respect of the assessment that has been conducted, various crucial emissions relating to the proposed project have not been accounted for. There is no mention of any of the transfer and transportation sources associated with the various material movements (i.e., of coal from the mines to the proposed Thabametsi plant; lime from its source to the plant and ash from the plant to the dump, etc.). There are no references to engineering drawings that would provide the basis for characterising these sources and their assumed emissions and release characteristics. Furthermore, the calculation of emissions from “materials handling” is not supported by any engineering detail or drawings. Material handling encompasses many different activities, including many

¹ Page 3, Sahu May 2018 report.

² Available at <https://cer.org.za/wp-content/uploads/2010/03/Air-dispersion-modelling.pdf>.

³ See 7.3, at page 75.

⁴ S32, the Constitution of RSA, 1996.

⁵ S24, the Constitution of RSA, 1996.

transfers across various conveyors, “drops”, and the like. Emissions from each of these activities should first be estimated and then aggregated. That was not done.

24. It is also not clear what type of coal Thabametsi proposes burning. This should be specified in the AIR.
25. Dr Sahu concludes in his May 2018 report that, *“the predictions contained in the AIR, which already predict exceedances of the national standards, cannot be relied upon. I stress that significant technical details are either not discussed or not provided in the AIR.”*

ii. *Incorrect calculation of Thabametsi’s emissions and impacts*

26. The AIR modelling is based on the use of patently incorrect pollutant emission rates, and thus is fatally flawed.
27. The stack emission rates for the project should be based on compliance with the new plant minimum emission standards (MES). The plant should be designed to meet the MES, and the AIR should be based on emissions at the MES limit values, not on emission factors. The AP-42 stack emission factors are derived from measurements of stack emissions from a variety of US plants, with a range of capacities and employing different emission control technologies. It appears that the AIR is based on stack emission rates calculated using the AP-42 factors listed in Table 9 (in particular, the last 4 values for PM₁₀, SO₂, NO_x and CO), assuming coal feed rates of 179 tons per hour (the “maximum feed rate”). However it is not clear how the AP-42 factors were used, if they were used at all, to obtain the “average emission concentration” for each pollutant in Table 11 of the AIR, and the emission rates in Table 12. **The modelling should be based on emissions at the limit values of the MES, at constant rates. This is not what has been done in the AIR.** To illustrate, the error in this approach, in Table 11 of the AIR, the AIR apparently assumed a “maximum emission [stack] concentration” of 0.7 mg/Nm³ for PM₁₀ (particulate matter) instead of the MES limit of 50 mg/Nm³. In other words, an emission concentration less than 1/70th (0.7/50) of the regulated emission concentration was apparently assumed for modelling impacts. The stack PM₁₀ concentration of 0.7 mg/Nm³, in the AIR, appears to correspond to the annual emission rate (per stack) of 17.6 tons/annum, Table 12 of the AIR. If the AEL were to be granted, the plant would be licensed to operate at a stack concentration of 50 mg/Nm³, a value **70 times greater than that used in the AIR modelling**. Similar comments apply to the emission rates assumed for SO₂ and NO_x: for SO₂, a concentration of 269.2 mg/Nm³ is assumed, compared with the MES value of 500 mg/Nm³; for NO_x, a value of 262.2 mg/Nm³ is assumed, compared with the MES value of 750 mg/Nm³, with corresponding emission rates of 7288.1 tons per annum and 7099.4 tons per annum for SO₂ and NO_x respectively. These are gross miscalculations, which render the findings of the AIR incorrect.
28. In short, the AIR should be assessing impacts (essentially ambient concentrations) of the proposed plant, based on the expected emission rates. Modelling is used to estimate the ambient concentrations in the vicinity of the plant, based on the expected emissions. For calculating expected emissions (in expectation that the plant would conform with the MES values), the MES values should be used, but the AIR used far lower values.
29. Dr Sahu also confirms – in the May 2018 report - that the emission factors in the AIR appear to be incorrect and understated.⁶
30. It also appears that fine particulates (PM_{2.5}) emission rates, from stack emissions, have not been accounted for in the AIR,⁷ which is also a fatal oversight, given the significant impacts of PM_{2.5} as explained below.
31. **With these inaccuracies and shortcomings, the AIR grossly understates the likely impacts of the proposed plant, and is thus fatally flawed.**

⁶ Page 13, Sahu May 2018 report.

⁷ Page 7, Sahu May 2018 report.

Failure to adequately assess cumulative impacts

32. It appears that **only** emissions from neighbouring Eskom coal-fired power stations Medupi and Matimba, were considered as, according to the AIR, these are *“the only other major elevated sources of SO₂, NO_x and particulates... In the cumulative assessment, only stack emissions from Thabametsi, Matimba and Medupi are included in the modelling.”*⁸
33. It is not clear why – nor is it appropriate that - only elevated (i.e., stack) emissions from the 3 power plants were considered. Dr Sahu’s report confirms that this is unfounded and unacceptable *“[e]specially for particulates [where] the major emissions occur not from the stack but as fugitive emissions from the coal mining activities, the coal and lime processing activities, their transportation and storage, and from ash handling, transport and disposal. By not including these many significant sources of particulate emissions in the Scenario 2 cumulative modeling, by design, the predictions of the Scenario 2 with regards to particulates are obviously under-predicted.”*⁹ Dr Sahu notes that *“[f]or this reason alone, and setting aside the important shortcomings with regards to modeling noted earlier, all Scenario 2 cumulative impact results for particulate matter reported in the AIR are meaningless and should be set aside.”*¹⁰
34. The particulate matter (PM) emissions of the coal mines in the vicinity, some of which would supply Thabametsi, in addition to other pollutants and pollution sources (such as frequent combustion at the Grootegeluk mine) - are not included in the assessment of cumulative impacts in the AIR. This is an unacceptable omission.
35. The Code of Practice, referred to above, requires that *“all levels of assessments must consider the background concentrations of air contaminants. The intent is to compare the ambient air quality to the cumulative impact of new emissions and existing baseline conditions”*.¹¹ As stated above, according to the Regulations, a relevant authority must refuse to accept air dispersion modelling results, if any person or organ of state fails to comply with the Code of Practice.
36. Furthermore, it appears that the emissions of Medupi and Matimba have not been correctly calculated and accounted for in the AIR - that is:
- 36.1. In respect of Matimba, they should be the emissions at **maximum** permitted production rates and with the plant operating at the maximum stack concentrations, in accordance with Matimbas’s AEL. This is not what has been done in the AIR, as **Matimba emission rates have been underestimated (for modelling purposes) by 35%-66%**. Matimba’s 2016/17 annual emission rates, compared with the AIR assumed emission rates are as follows:

Pollutant	2016/17 emissions(tons/year) ¹²	Adjusted ^a 1016/17 emissions (tons/year)	AIR assumed emissions (tons/year) ¹³	AIR/actual emissions, adjusted
PM ₁₀	1667	4790	1640	34%
SO ₂	428642	492692	320320	65%
NO _x	76811	147148	59752	41%

Adjusted for load factor (87%) and assuming PM₁₀, NO_x average stack concentrations of about 40% and 60% respectively of AEL limit values, and average SO₂ concentrations are about equal to the AEL value.

⁸ Page i. AIR.

⁹ Page 5, Sahu May 2018 report.

¹⁰ Page 5, Sahu May 2018 report.

¹¹ At 2.3.11.

¹² Matimba Annual Report 2017/2017

¹³ AIR, Table 21, page 41.

- 36.2. In respect of Medupi, it is assumed that all units of the plant will have been fitted with flue gas desulphurisation (FGD) by 2025. We know, however, that this is not correct as Eskom has indicated that it only intends to retrofit Medupi with FGD at each unit **6 (six) years after the commissioning of each unit**,¹⁴ and intends to apply for a further postponement of the new plant MES in light of its inability to comply with the standards, as none of its units have yet been retrofitted with FGD, nor is it clear when this will be done. The environmental impact assessment process for the retrofitting of FGD is still underway with an environmental impact report having been recently published for comment. It is unrealistic and inaccurate to presume that all units of Medupi could feasibly be retrofitted with FGD by 2025 given the circumstances.
37. These miscalculations will have a very significant impact on the assumed cumulative emission rates (and the cumulative ambient concentrations) for Thabametsi. The conclusions of the AIR therefore cannot be accepted because they fail to model (or, at least, they significantly understate) SO₂ emissions under a reasonably-foreseeable scenario in which Phase 1 of the Thabametsi project begins operation before the FGD project at Medupi is completed.
38. The AIR further fails to adequately assess cumulative impacts in that it does not consider the cumulative emissions from the plant operating at full 1200MW capacity and limits the assessment to 630 MW. This is contrary to the environmental authorisation for Thabametsi, which is for the full 1200MW plant. Because operation of the plant at full capacity is reasonably foreseeable, and has been authorised by the DEA, the AIR should have included, in its cumulative impact assessment, emissions from the plant operating at **full** capacity.
39. A March 2018 report by Dr Ranajit Sahu – attached marked “**C**” (“Sahu March 2018 report”) - which makes findings based on air dispersion modeling for SO₂, NO_x and PM_{2.5}, for the proposed Thabametsi power plant (all 4 proposed units, at 1200 MW in total) along with the Matimba and Medupi power plants, concludes that:
- 39.1. *“there will be significant increases in the impacts (i.e. concentrations) of SO₂ in the areas surrounding the power plants. SO₂ impacts from just the three power plants [Thabametsi, Medupi and Matimba] (even without factoring in other emissions sources such as transportation sources and their SO₂ emissions) would exceed South Africa’s health-based National Ambient Air Quality Standards (NAAQS), at least at some of the receptor locations”*,¹⁵ and
- 39.2. *“NO_x and PM_{2.5} emissions from the power plants [Thabametsi, Medupi and Matimba] alone do not appear to exceed the ambient standards (mainly because of the large dilution accorded to the stack emissions by virtue of their very tall stacks). Nonetheless, when added to baseline levels of NO_x and PM_{2.5} in the area, which already hover near maximum allowed ambient levels due to other significant, existing sources of NO_x and PM_{2.5} in the area, such as mobile sources as well as the existing Grootegeluk Mine (which provides the coal for Matimba and Medupi, and is also expected to supply coal to Thabametsi), NO_x and PM_{2.5} emissions from the three power plants will cause levels of NO_x and PM_{2.5} to exceed NAAQS. However, because there are currently too few air monitors, and those that are functioning are not appropriately sited, the extent of ambient air pollution in the area is not being accurately measured.”*¹⁶
40. It is vital, for purposes of conducting an accurate and comprehensive impact assessment, that cumulative emissions be properly assessed and accounted for in the AIR and as part of the AEL application – that means **assessing all external surrounding sources of air pollution** (not just Medupi and Matimba); and correctly calculating the emissions from all of these sources, including the anticipated emissions of Thabametsi at full capacity.

¹⁴ See

<http://www.eskom.co.za/OurCompany/SustainableDevelopment/EnvironmentalImpactAssessments/medupi/Final%20DSR/App-D8-CRR.pdf> at page 1.

¹⁵ Page 1, Sahu March 2018 report on Thabametsi Mine and Power Plant Modeling.

¹⁶ Page 1, Sahu March 2018 report on Thabametsi Mine and Power Plant Modeling.

Inadequate assessment of health impacts

41. In Earthlife Africa's 2015 appeal of Thabametsi's environmental authorisation, one of the grounds of appeal was that the health impacts of the proposed power station had not been adequately considered in the environmental impact assessment (EIA). In the Minister's appeal decision it was held that "***the Atmospheric Impact Report which will form part of the AEL application process, will provide details of the facility's impact on human health and the receiving environment. Since this application was not submitted as an integrated application, information in this regard will consequently be required during the AEL application process***" (emphasis added).¹⁷ The Minister confirms that the AIR must provide a detailed assessment of the health impacts of the proposed Thabametsi project.
42. Our clients do not regard the AIR as an adequate assessment of health impacts in that:
- 42.1. the assessment seems to focus entirely on compliance with NAAQS but does not assess - in any sufficient detail - the actual potential impacts of Thabametsi's emissions on human health – irrespective of compliance with NAAQS;
 - 42.2. there is no full life cycle (extraction; to combustion and disposal; to remediation and project closure) analysis of the health impacts of the project throughout the proposed plant's lifespan and cycle;
 - 42.3. there is no assessment of other harmful pollutants such as mercury or organochlorines – only SO₂, PM, and NO_x are assessed. A proper health impact assessment for the power station would require an assessment of **all** the pollutants that will be emitted by the power station and their potential impacts on human health;
 - 42.4. there needs to be a full quantitative baseline assessment of air quality in order for there to be a proper and accurate assessment of the health impacts of the plant; and
 - 42.5. there is no quantification of the costs of the plant's likely health impacts.
43. The above issues need to be fully addressed, as the AIR falls woefully short of constituting a proper assessment of the health impacts of the Thabametsi project.
44. Furthermore, as stated above, as the project and cumulative emissions have been understated, this also means that the conclusions in the AIR regarding potential health impacts (or rather NAAQS exceedances) cannot be relied upon. The AIR states that "*the only predicted exceedances of the limit value of the NAAQS in the modelling domain occur in a small area to the south of Matimba where 4 exceedances are predicted in the 3 years modelling period. It is unlikely that the emissions from the stacks at Thabametsi have a significant contribution to the predicted exceedance.*"¹⁸
45. In this regard, we also refer to the Sahu March 2018 report referred to above, which finds that the NAAQS will be exceeded if Thabametsi becomes operational (at full capacity as planned). Although the AEL application appears to be for just phase 1 of the plant, a comprehensive health impact assessment should take into account the health impacts of the plant at full capacity (1200MW) as planned and as authorised in the environmental authorisation – this would also be in line with the Minister's confirmation in her appeal decision (referred to above) that the health impacts for the power station would be assessed in the AIR.
46. Furthermore, coal-fired power is – and particularly the Thabametsi power station will be – a significant contributor to climate change, which the World Health Organisation (WHO) calls the greatest threat to global health in the

¹⁷ Page 17, Minister's appeal decision.

¹⁸ Page 51, AIR.

21st century.¹⁹ Climate change affects many of the determinants of health, ranging from the quality of air to the safety and security of food and water supplies,²⁰ and it is already resulting in many premature deaths worldwide.²¹ The WHO estimates that climate change will result in 250 000 additional premature deaths per year by 2030 from heat stress, diarrhoea, malaria and malnutrition.²² The AIR needed to assess Thabametsi's contribution to these (climate-change related) health impacts as well, particularly given: Thabametsi's very high anticipated greenhouse gas (GHG) emissions, as outlined in Thabametsi's own climate change impact assessment,²³ and hence significant contribution to the effects of climate change; and South Africa's extreme vulnerability to climate change and the fact that poor and marginalised communities, already suffering from the health impacts of burning coal, will be worst affected by these impacts.²⁴

Section 39 factors to be considered by the decision-maker

47. While the inadequate publication of the AEL application as required by section 38(3) AQA and the errors and inaccuracies in the AIR alone should require the refusal of the AEL application, we also set out in more detail below, the AQA section 39 factors, which must be considered by the decision-maker in considering the application, and which should weigh heavily against the AEL being issued.

48. We submit that the following factors, if properly considered, would require the application to be refused.

Compliance with applicable standards

49. The 2012 National Framework for Air Quality Management ("the Framework") states "*activities that result in atmospheric emissions are to be determined with the objective of achieving health-based ambient air quality standards. Each new development proposal with potential impacts on air quality must be assessed not only in terms of its individual contribution but in terms of its additive contribution to baseline ambient air quality i.e. cumulative effects must be considered.*"²⁵ The Framework is binding on all organs of state.²⁶

50. The Sahu March 2018 report shows that if Thabametsi were to become fully operational, the NAAQS for SO₂, NO_x and PM would be exceeded. The SO₂ emissions of Thabametsi, Medupi, and Matimba alone would bring about an exceedance of the NAAQS. The licensing authority should not view phase 1 of the Thabametsi project in isolation and must consider the full 1200MW project as planned and authorised by DEA, and the impacts thereof.

51. Furthermore, the DEA 2017 State of the Air Report confirms that ambient air in the Waterberg Bojanala Priority Area is already out of compliance with NAAQS in certain areas.²⁷ Licensing this project would result in worsening the air quality at a regional level and would certainly contribute to bringing ambient air quality within the priority area, out of compliance with the NAAQS. The stacks for Thabametsi are 185m high, as such it is certainly

¹⁹ World Health Organization (WHO). 2016. WHO Director General Keynote address at the Human Rights Council panel discussion on climate change and the right to health.

<http://www.who.int/dg/speeches/2016/humanrightscouncil/en/>

²⁰ Watts N et al., 2015. Healthy and climate change policy responses to protect public health. The Lancet. 386 (10006).

[http://www.thelancet.com/journals/lancet/article/PIIS01406736\(15\)608546/](http://www.thelancet.com/journals/lancet/article/PIIS01406736(15)608546/)

²¹ DARA and the Climate Vulnerable Forum. 2012. Climate Vulnerability Monitor 2nd Edition. A Guide to the Cold Calculus of a Hot Planet. <http://daraint.org/wpcontent/uploads/2012/09/CVM2ndEdFrontMatter.Pdf>

²² World Health Organization (WHO). 2014a. Quantitative risk assessment of the effects of climate change on selected causes of death, 2030s and 2050s.

http://apps.who.int/iris/bitstream/10665/134014/1/978924157691_eng.pdf?ua=1

²³ See page 19 of the summary report, available at <https://cer.org.za/wp-content/uploads/2016/07/Thabametsi-Final-Summary-Report-Jun17.pdf>.

²⁴ Page 8, National Climate Change Response White Paper, available at

https://www.environment.gov.za/sites/default/files/legislations/national_climatechange_response_whitepaper.pdf.

²⁵ Page 79. The 2012 Framework.

²⁶ S7(3) AQA.

²⁷ See http://www.airqualitylekgotla.co.za/assets/2017_1.3-state-of-air-report-and-naqi.pdf.

conceivable that Thabametsi would degrade air quality in the priority area by dispersion and through formation of secondary PM.

52. As stated above at paragraph 27, it has not been shown that Thabametsi will be able to meet the MES.

53. Accordingly consideration of section 39(a) AQA would require that the application be refused.

The pollution to be caused by Thabametsi

54. The Sahu March 2018 report shows that in fact Thabametsi – and the new mine to accompany it – will (contrary to the content of the AIR) cause significant air pollution, and the Sahu May 2018 report as well as the submissions above demonstrate why the findings in the AIR cannot be relied upon.

55. Even if – as Thabametsi asserts – the project's emissions will meet the MES and will not contravene the NAAQS (which, as shown above, is disputed), this does not mean that the Thabametsi project's emissions will not cause irreversible and catastrophic harm to human health.

56. Section 39(b) of AQA specifically requires a decision-maker to **consider the pollution to be caused and its impacts on human health**. This is a separate consideration from the applicant's ability to comply with applicable standards (in terms of section 39(a) as referred to above). It is not enough to simply assert that Thabametsi will meet the MES or not result in NAAQS non-compliance (which – we submit - it will not in any event), as compliance with these standards does not negate health impacts or pollution. As shown above, the AIR does not adequately assess the potential health impacts of the project or the extent of these impacts.

57. Neither the concentration limits set by the South African government nor the WHO's air quality guidelines are fully protective of health, as associations between low background levels of air pollution and adverse health outcomes are now frequently observed in the epidemiological literature well below these thresholds.²⁸ The AIR should accurately reflect how Thabametsi's emissions could affect the health of communities living in the Waterberg, and they have a constitutional right to be informed fully of these impacts. This is in line with the right of access to information²⁹ and the right to an environment not harmful to health or wellbeing.³⁰

58. We emphasise that coal-fired power stations and coal mines have significant impacts on human health. They release large volumes of health-damaging substances including SO₂, NO_x, and fine particulate matter (to name but a few) that can travel long distances. Exposure to these pollutants significantly increases the risks of developing cardiovascular and respiratory diseases, leading to hospital admissions and premature deaths. A 2017 report by Dr Mike Holland³¹ confirms that PM_{2.5} emissions from Eskom's coal-fired power stations alone cause more than of 2 200 equivalent attributable deaths and over 996,600 cases of lost working days annually.

59. Each step in the coal life cycle generates pollution that can affect health, and must therefore, be fully considered and assessed by the applicant and licensing authority, namely:

59.1. mining: fugitive dust from excavation, loading and unloading, and stock piling contributes to harmful particulate emissions – mine haul roads being a massive contributor in South Africa³² - and emissions from combustion in mines;

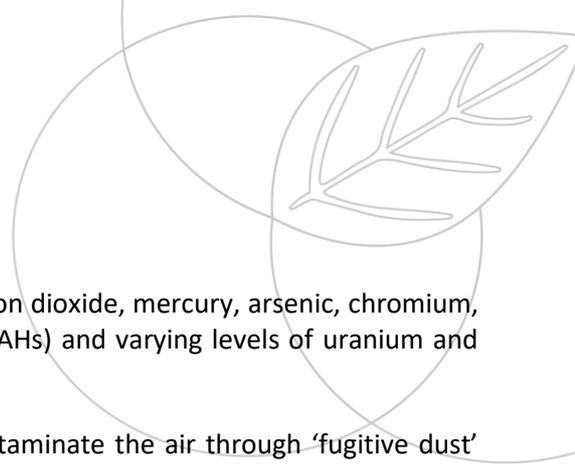
²⁸ Risk of Nonaccidental and Cardiovascular Mortality in Relation to Long-term Exposure to Low Concentrations of Fine Particulate Matter: A Canadian National-Level Cohort Study. 2012. Dan L. Crouse, *et al.* Environ Health Perspect. 2012 May; 120(5): 708–714. Published online 2012 Feb 7. doi: 10.1289/ehp.1104049. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3346774/>

²⁹ S32, the Constitution of the Republic of South Africa, 1996.

³⁰ S24, the Constitution of the Republic of South Africa, 1996.

³¹ Available at <https://lifeaftercoal.org.za/wp-content/uploads/2017/04/Annexure-A4.pdf>.

³² Approximately half of the particulate matter in the Highveld Priority Area is attributable to mine haul roads. See page x, <http://www.saaqis.org.za/documents/HIGHVELD%20PRIORITY%20AREA%20AQMP.pdf>



- 59.2. transport: fuel emissions contribute to local air pollution;
- 59.3. coal combustion: air-borne pollutants include: PM, SO₂, NO_x, carbon dioxide, mercury, arsenic, chromium, nickel, other heavy metals, acid gases (HCL, HF), hydrocarbons (PAHs) and varying levels of uranium and thorium in fly ash; and
- 59.4. coal ash: pollutants in the fly ash are dispersed by wind and contaminate the air through ‘fugitive dust’ landfills that leak fly ash waste contaminate water supplies.
60. On a global scale, outdoor air pollution is responsible for approximately 3.7 million premature deaths per year from heart disease, strokes, chronic obstructive pulmonary disease, lung cancer and acute lower respiratory infections among children.³³
61. Populations especially vulnerable to health effects from air pollution include children, the elderly, pregnant women, and people with lung conditions like asthma and chronic obstructive pulmonary disease.
62. Two new public health studies, based on data after 8 oil and coal plants in California closed, reveal that babies benefit from reduced air pollution and fertility rates of women increase. One study, published in the American Journal of Epidemiology, found a 20–25 % drop in premature births. The biggest declines were recorded for African-American and Asian women.³⁴ Babies born prematurely can have long-term health problems and learning difficulties. The other study, published in Environmental Health, found fertility rates increased by 8 births per 1000 women within 10 kilometres of the 8 plants after their closure.³⁵
63. Inhalation of PM_{2.5} has been linked to cardiovascular disease and death. The WHO estimates that worldwide, 5% of cardiopulmonary deaths are due to PM pollution. Long term exposure to PM_{2.5} can accelerate the development of atherosclerosis and increase emergency room visits and hospital admissions for ischaemic heart disease and congestive heart failure. An 8-18% increase in cardiovascular deaths is estimated to occur per 10g/m³ increase in average PM_{2.5} concentration.
64. There is a close and measurable relationship between human exposure to ambient concentrations of PM₁₀ and PM_{2.5} and increased illness and related mortality over time. In other words, there is a strong correlation between improving ambient air quality and an increase in the quality and length of human life. This is undisputed and also demonstrated by the WHO.
65. For PM, the WHO states that **there is no acceptable threshold for acceptable exposure levels; in other words, even at very low levels, exposure to PM results in adverse health impacts.**³⁶ This demonstrates why a mere assertion of compliance with NAAQS or MES is **not** sufficient for an assessment of the pollution, and particularly the health impacts of the proposed project, quite apart from the fact that South Africa’s standards are considerably weaker than the outdated 2005 WHO guidelines and only apply to specific pollutants (leaving other harmful pollutants such as mercury unregulated).

³³ World Health Organization (WHO). 2014. Ambient (outdoor) air quality and health. Fact sheet N°313 Updated March 2014. <http://www.who.int/mediacentre/factsheets/fs313/en/>

³⁴ See <https://academic.oup.com/aje/advance-article-abstract/doi/10.1093/aje/kwy110/4996680?redirectedFrom=fulltext>.

³⁵ See <https://ehjournal.biomedcentral.com/articles/10.1186/s12940-018-0388-8>.

³⁶ WHO Air quality guidelines for particulate matter, ozone, nitrogen dioxide and sulfur dioxide Global update 2005 at p9, available at:

http://apps.who.int/iris/bitstream/handle/10665/69477/WHO_SDE_PHE_OEH_06.02_eng.pdf;jsessionid=0EE7C1034DDFBFA33093015019A00B41?sequence=1

66. For PM_{2.5}, the 2005 WHO annual guideline is a mean of 10µg/m³, and a mean of 20µg/m³ annually for PM₁₀.³⁷ **These 2005 guidelines are widely considered to be outdated with the current health evidence base and are in the process of being reviewed by a WHO expert committee. Despite this, South Africa's equivalent standards – the NAAQS - are double as lenient: at 20µg/m³ as the PM_{2.5} annual mean and 40µg/m³ as the PM₁₀ annual mean.**
67. Effects on the respiratory system are caused by pollutant-induced oxidative stress which leads to inflammation, cytotoxicity, and cell death. PM emitted during coal combustion generates small particles less than 2.5 micrometers (PM_{2.5}) which travel deep into the airways and lead to: respiratory symptoms, asthma, decrements in lung function, emergency room visits and hospital admissions for infections and chronic obstructive pulmonary disease. A 10g/m³ increase in PM_{2.5} is associated with a 1% to 3.4% decrease in forced expiratory volume in the first second (FEV1),³⁸ a measure of lung function, in asthmatic children. Long-term exposure to PM_{2.5} is causally linked to the development of lung-cancer.
68. SO₂ emitted by coal-fired power plants leads to inflammation and hyper-responsiveness of the airways, aggravates bronchitis, decreases lung function, and increases hospitalisations for asthma and other respiratory conditions, in susceptible individuals, particularly among children and adults over 65 years. Even low concentrations of SO₂ are associated with increased risk of death from heart and lung conditions. For every 10 parts per billion increase in SO₂ concentration, there is a 0.4 – 2% increased risk of death.
69. NO_x are by-products of fossil fuel combustion and react with chemicals in the atmosphere to create ozone (smog) and nitrogen dioxide (NO₂). NO₂ exposure among asthmatic children can increase wheezing, cough, and decrements in lung function. It increases susceptibility to viral and bacterial infections, increases hospital admissions and emergency room visits for respiratory causes, and at high concentrations can cause airway inflammation.
70. Mercury emissions from anthropogenic sources, particularly coal-fired power stations, are highlighted as a particular concern globally. Research papers evaluating the health damage from mercury in economic terms generally estimate the monetary value of lost IQ points associated with mercury emissions:
- 70.1. A conservative estimate of annual health benefits is some USD 39 – 47 per gram of atmospheric mercury emissions eliminated.³⁹
- 70.2. More recently, a new study in the EU considered lost IQ costs due to mercury exposure. The IQ benefits from controlling mercury pollution were translated into economic impacts based on the calculated current life-time income benefits from a higher IQ level. The report states that there is little doubt that global benefits substantially exceed USD 20 billion.⁴⁰ The total annual benefits of exposure prevention within the EU were estimated at more than 600 000 IQ points per year, corresponding to a monetary economic benefit.⁴¹
71. Thabametsi's emissions will unquestionably have impacts on human health. The extent of these impacts is not addressed in the AIR. In any event, the decision-maker must give consideration to these impacts as set out above.

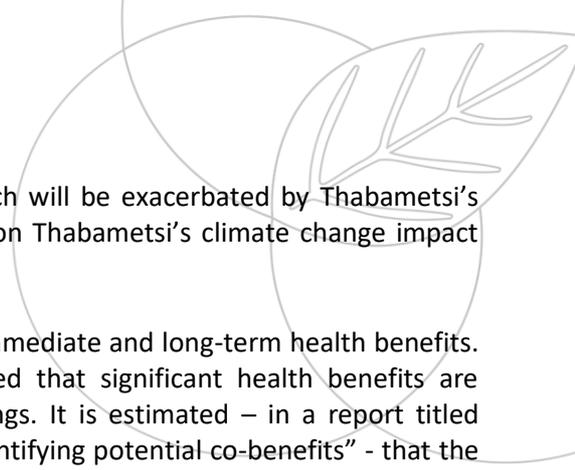
³⁷ Air quality measurements are typically reported in terms of daily or annual mean concentrations of PM₁₀ or PM_{2.5} particles per cubic meter of air volume (m³). Routine air quality measurements typically describe such PM concentrations in terms of micrograms per cubic meter (µg/m³).

³⁸ The volume of air that can be forced out in one second after taking a deep breath, an important measure of pulmonary function.

³⁹ Pacyna, J et al. 2010, "An assessment of costs and benefits associated with mercury emission reductions from major anthropogenic sources". J Air Waste Manag Assoc 60 (3): 302-315.

⁴⁰ Bellanger, M et al. 2013, "Economic benefits of methylmercury exposure control in Europe: Monetary value of neurotoxicity prevention" Environ Health. 2013; 12:3. available at: <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3599906/>

⁴¹ <http://ec.europa.eu/environment/integration/research/newsalert/pdf/321na5.pdf>

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72. We again also emphasise the health impacts of climate change – which will be exacerbated by Thabametsi’s extremely high GHG emissions (see above and our clients’ comments on Thabametsi’s climate change impact assessment).⁴²
73. Many of the actions needed to tackle climate change can create both immediate and long-term health benefits. The second Lancet Health and Climate Change Commission concluded that significant health benefits are associated with the transition to renewable energy, among other things. It is estimated – in a report titled “Assessing the missed benefits of countries’ national contributions: Quantifying potential co-benefits” - that the actions needed to keep global temperature increases below 2°C would prevent 40 000 premature deaths per year in the EU, 20 000 per year in the U.S. and 1.1 million per year in China, by reducing exposure to fine particulate matter in the air.⁴³
74. **We emphasise that any health and pollution impacts of Thabametsi cannot be justified, particularly considering that: there is no need for additional electricity capacity from Thabametsi;** and if/when there is a need for additional electricity capacity, this can be met much cheaper with other electricity sources, which do not have these extensive impacts and high costs. In this regard, we refer to research by the Energy Research Centre, which modelled the impacts of including the two preferred bidder coal independent power producers (IPPs) (Thabametsi and Khanyisa) into the electricity system. It confirms, *inter alia*, that:
- 74.1. a least-cost electricity build plan for South Africa **does not** include new coal plants, in each scenario the coal IPPs have to be forced into the model in order to evaluate their impacts;
- 74.2. the inclusion of the coal IPPs in South Africa’s electricity build plan significantly raises the total system costs and GHG emissions, compared to a scenario without the coal IPPs - the additional present value cost of building the coal IPPs is R19.68 billion;
- 74.3. even in the best case for the coal IPPs, assuming that competing alternatives are expensive and the IPPs can mitigate their emissions significantly, the overall increase in system costs is R16bn, and the increase in emissions is 97Mt. By contrast, in the worst case for the coal IPPs, the increase in system costs is R23bn and the emissions increase by 218Mt; and
- 74.4. the coal IPPs will increase emissions by 205,7Mt CO₂eq over the 30 year period of the plants operating and the GHG emissions of the coal IPPs will almost offset DEA’s National Energy Efficiency Strategy and the emission savings of the entire carbon tax. The costs of meeting South Africa’s climate change commitments will be dramatically raised if the IPPs are built.⁴⁴

Thabametsi is not a fit and proper person

75. Japanese company Marubeni – the 100% shareholder in Axia Power Holdings B.V, which owns 24.5% shares in Thabametsi Power Company (Pty) Ltd - has previously been fined USD 88 million for bribes to officials and politicians. In 2014, Marubeni entered into a plea of guilty for its participation in the scheme to pay bribes to high-ranking government officials in Indonesia to secure a lucrative power project.⁴⁵

⁴² Available at <https://cer.org.za/wp-content/uploads/2016/07/ELA-Comments-on-Final-Thabametsi-CCIA-PIA-31-7-17.pdf> and copies can be made available on request.

⁴³ Page 6, Day et al., 2015. Available at <https://newclimate.org/wp-content/uploads/2015/10/cobenefits-of-indcs-october-2015.pdf>.

⁴⁴ See <https://cer.org.za/wp-content/uploads/2018/05/ERC-Coal-IPP-Study-Report-Finalv2-290518.pdf>.

⁴⁵ See <https://www.justice.gov/opa/pr/marubeni-corporation-agrees-plead-guilty-foreign-bribery-charges-and-pay-88-million-fine>.

76. The “responsible person” cited in the AIR is an employee at Marubeni, and we regard Marubeni’s criminal conviction a relevant fact in terms of section 49 AQA, that must be taken into account in determining whether the applicant is a fit and proper person.

77. Marubeni’s previous transgressions, especially the nature of the transgressions, should surely weigh heavily against Thabametsi in the consideration of whether it is a fit and proper person – particularly as Marubeni is fully responsible for the operation and maintenance of the project.⁴⁶

Conclusion

78. In the circumstances, and based on the above, our clients recommend and request that the application be refused.

Yours faithfully

CENTRE FOR ENVIRONMENTAL RIGHTS

per: 

Nicole Loser

Attorney

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⁴⁶ See Thabametsi’s NERSA licence application.