



**PEER REVIEW: AIR QUALITY IMPACT AND CLIMATOLOGY ASSESSMENT REPORT
FOR THE PROPOSED NUCLEAR POWER STATION**

06 December 2015

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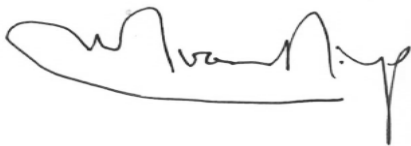
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List of Abbreviations

AQIA	- Air Quality Impact Assessment
EIA	- Environmental Impact Assessment
GES	- Gondwana Environmental Solutions (Pty) Ltd
NDCR	- National Dust Control Regulations
ToR	- Terms of Reference

1 Declaration

I, Martin van Nierop, as duly authorized representative of Gondwana Environmental Solutions (Pty) Ltd (GES), hereby confirm my independence as a specialist. Neither I nor GES have any interest, be it business, financial, personal or other, in any proposed activity, application or appeal, other than fair remuneration for work performed, specifically in connection with the review of the Air Quality Impact Assessment Report for the proposed Nuclear Power Plant ('Nuclear 1'). The views expressed in this document are objective, even if the views and findings are not favourable to the applicant/client.



Full Name: Dr. Martin van Nierop

Title / Position: Director

Qualification(s): PhD (Chem Eng)

Experience: 12 years

2 Introduction

Eskom proposes to construct a new Nuclear Power Station in the Western or Eastern Cape. As part of the Environmental Impact Assessment (EIA) process, Airshed Planning Professionals (Pty) Ltd conducted an Air Quality Impact and Climatology Assessment (AQIA) of the proposed mining activities (Burger, 2010).

Gondwana Environmental Solutions (Pty) Ltd (GES) was appointed by Gibb to undertake a peer review of the report submitted by Airshed Planning Professionals in 2010.

3 Scope of Work

The scope of the work conducted for this report is to peer review the report submitted for the AQIA against the terms of reference (ToR) for the AQIA project.

3.1 AQIA Terms of Reference

The Terms of Reference for the AQIA assessment are quoted in the AQIA report (Burger, 2010) as follows:

- a) Assess current conditions with respect to air quality using available air quality data otherwise qualitatively, population distribution and general atmospheric characteristics, especially prevailing wind directions (including meso- and micro meteorological characteristics of the site and region);
- b) Review of previously completed reports and other available data;
- c) Describe the local meteorological parameters, important for the prediction of future air pollution impacts;
- d) Provide a general description of the dispersion potential;
- e) The above must include the collection of and / or development of parameters that can be justified and used to predict atmospheric dispersion of materials released from the proposed facility;
- f) Describe the current air quality in the area using available air quality data otherwise qualitatively;

- g) List other sources of air pollution that may contribute to the area of impact;
- h) Identify sensitive receptors (e.g. residential areas) and potential impacts on air from both non-radioactive and radioactive air emissions;
- i) The receptors to be identified should include ecological (non human) as well as human receptors;
- j) Establish an emissions inventory, conduct dispersion simulations and health risk impacts through cross-reference to the human health risk specialist assessment study;
- k) Detailed analyses of the atmospheric dispersion potential, current air quality (using available air quality data) and syntheses of legal and health criteria;
- l) Assess the contribution of the atmospheric pathway to a human health impact through cross-reference to the human health risk specialist assessment study;
- m) Assess the intensity of the expected impacts, based on existing information along the routes;
- n) Simulate emissions using NNR approved atmospheric dispersion model/s;
- o) Compare non-radioactive air concentrations against the South African standards for criteria pollutants, and to internationally accepted guidelines for non-criteria pollutants;
- p) Determination of current and future (proposed nuclear power station) compliance to South African air emissions legal requirements;
- q) Address the assumption that insignificant amounts of radionuclides would be released during the decommissioning and closure phases.
- r) Detailed literature survey and information gathering session for all local climate data for the sites and surrounding areas;
- s) Describe the status quo of the climate for the various site alternatives;
- t) Detailed assessment of the radionuclide content of ventings and purgings; decay periods involved; whether or not they could be cumulative; types of radiation predicted; and potential impact on surrounding communities;
- u) Assessment of potential radionuclide emissions during malfunction or accident, to determine time frames and significance of risk;
- v) Detailed literature survey and information gathering session for all local climate data for the sites and surrounding areas;
- w) Describe the status quo of the climate for the various site alternatives;
- x) Predict the dispersal of any emissions from the site, under different archetypical large-scale wind fields;
- y) Model the trajectory of air parcels;

- z) Provide estimates of the probability of dispersal around each site, which must provide information regarding the expected radius and direction of dispersal;
- aa) Assess the accuracy of these dispersal patterns;
- bb) Predict likely scenarios in view of projected climatic changes and the associated implications for each site.

3.2 Peer Review Terms of Reference

The peer review Terms of Reference were provided to GES by Gibb (Nortje, 2015) as follows:

1. Assess the document/ report in terms of its fulfilment of the Terms of Reference set;
2. Consider whether the report is entirely objective;
3. Consider whether the report is technically, scientifically and professionally credible;
4. Consider whether the method and the study approach is defensible;
5. Identify whether there are any information gaps, omissions or errors;
6. Consider whether the recommendations presented are sensible and present the best options;
7. Consider whether there are alternative viewpoints around issues presented in the report and if these are clearly stated;
8. Consider whether the style of the report is written so as to make it accessible to non-specialists, technical jargon is explained and impacts are described using comparative analogies where necessary; and
9. Report on whether normal standards of professional practice and competence have been met.

4 Expertise of the Reviewer

4.1 Martin van Nierop

Martin van Nierop has a doctorate in Chemical Engineering from the University of the Witwatersrand, Johannesburg. He has 12 years of experience in managing project in Atmospheric Science. Dr van Nierop worked at the University of the Witwatersrand, Johannesburg as a Research Officer until 2002 and has since co-founded and managed Gondwana Environmental Solutions (Pty) Ltd.

5 Review of 'Nuclear 1' AQIA

The Air Quality Impact and Climatology Study (Burger, 2010) is a detailed and comprehensive assessment of the potential impact from the proposed Nuclear Power Station.

The following is an assessment of compliance of the report with each point of the AQIA ToR:

- a) Achieved – while there is limited ambient air quality monitoring data available, that which is available is described;
- b) Achieved – while no specific mention of a report related to this project is mentioned (there may not be one), a wide range of literature related to the project is referenced;
- c) Achieved;
- d) Achieved;
- e) Achieved;
- f) Achieved;
- g) Achieved;
- h) Achieved;
- i) Achieved – Ecological impacts with respect air pollution were not addressed explicitly, however, as the study found that impact with respect to human health are small – the assumption can be made that the same holds for ecological impacts;
- j) Partially achieved – no reference is made to a human health risk specialist study, (there may not be one, or it was not available at the time of the writing of the report);
- k) Achieved;
- l) Partially achieved – no reference is made to a human health risk specialist study;
- m) Achieved;
- n) Achieved;
- o) Achieved;
- p) Achieved;
- q) Achieved;
- r) Achieved;
- s) Achieved;
- t) Achieved;
- u) Achieved;
- v) Achieved;
- w) Achieved;
- x) Achieved;

- y) Achieved;
- z) Achieved;
- aa) Achieved;
- bb) Achieved.

As the report was compiled in 2010, it is not up to date on some legislative developments. For example, in 2013 the National Dust Controls Regulations (NDCR) were published. However, for the purpose of this study, the assessment of dust fall in the report, which was based on the proposed standard will not be changed in the light of the NDCR.

It would be beneficial to include an appendix that provides the options used for various modelling parameters required by Aeromod. This would enable a third party to more thoroughly assess or duplicate the modelling should this be required.

6 Conclusions and Recommendations

An air quality impact assessment was undertaken for the proposed Nuclear Power Station by Airshed Planning Professionals. As a result of the review, the following is concluded:

1. The report fulfills the Terms of Reference set for the study;
2. The report is objective;
3. The report is technically, scientifically and professionally credible;
4. The method and the study approach are defensible;
5. Information gaps have been adequately addressed in the report. No omissions or errors were identified;
6. The recommendations presented are sensible and present the best options;
7. The most contentious issue is probably related to accident based releases of radioactive material. This has been addressed in the report;
8. The style of the report is written so as to make it accessible to non-specialists, technical jargon is explained; and
9. Normal standards of professional practice and competence have been met in this study.

It is recommended that the report is accepted as it stands.

7 References

Burger, L, 2010, Air Quality Impact and Climatology Assesment for the Proposed Nuclear Power Station ('Nuclear 1') and Associated Infrastructure, Airshed Planning Professionals.

NEMA:AQA 2013. National Environmental Management: Air Quality Act (39/2004): National Dust Control Regulations. No 827 of 2013, Government Gazette. 827(36974). 1 November, Government Notice 827. Cape Town: Government Printer.

Nortje, E, 2015, RE Nuclear-1 EIA Review of the Air Quality Report - Updated proposal, Pers. Comm., email dated 24 November 2015