

**VERSLAG NO:
REPORT NO:
ESKBOHLMB107**

**OPEN CYCLE GAS TURBINE POWER PLANT
MOSSEL BAY
CAPACITY EXPANSION
ENVIRONMENTAL NOISE IMPACT STUDY**

**Review report
On
Report: January 2007
Jongens Keet Associates
Prepared by A W D Jongens**



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19 Aril 2007

c.c. Department of Environmental Affairs & Development
Planning.
Jongens Keet Associates.

Dear Sir/Madam Review: Environmental Impact
Assessment; Open cycle Gas Turbine
Power Plant; Mossel bay, Capacity
Extension.

1. Introduction.

This report is compiled in response to an appointment which was received to evaluate the Environmental Impact Investigation contained in the Environmental Impact Report, January 2007, compiled by Jongens Keet Associates; A W D Jongens.

The evaluation is conducted to determine whether the Environmental noise impact investigation was properly conducted in accordance with the latest edition of the National Standard SANS 10328, current at the time of the investigation.

Reference is made to the following Documentation:

- a) Reference Document A.
Report January 2007, dated January 2007 entitled: "Environmental Noise Impact study for the proposed Capacity Expansion of the Open Cycle Gas Turbine Power Plant at Mossel bay".
- b) Reference Document B.
South African National Standard SANS 10328:2003 entitled: "Methods for environmental noise impact assessments".

- c) Reference document C.
South African National Standard SANS 10103:2003
entitled: "The measurement and rating of
environmental noise with respect to land
use, health, annoyance and to speech
communication".
- d) Reference Document D.
Siemens Report PG W7P/2005/031 dd 18 August
2005. Noise protection Concept.
- e) Reference Document E.
Siemens Report W/7P/2005/031 OCGT Eskom-Atantis
Annex A.

Reference will be made to these documents as
Document A, Document B, Document C,
Document D, and Document E, using the Chapter,
Clause and Page references as given in these
documents.

2. CONTENTS.

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3. SUMMARY.

3. SUMMARY.

3.1. Introduction.

The report covers a review of an investigation as given in an Environmental Noise Impact investigation conducted by Jongens Keet Associates on the future noise impact of a Capacity Expansion of the Open Cycle Gas Turbine Power Plant at Mossel bay.

3.2. General.

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3.3. Scope.

The investigation covers an evaluation of a noise impact investigation given in the document identified as "A".

The investigation is to determine whether the procedures followed were in accordance with the National Standard and were reliable and correct and whether the conclusions were correct.

The report comments on the approach followed and it adjudicates any remedies proposed.

The report also makes proposals of whether any investigations should be repeated or additionally conducted and what provisions should be included in the Environmental Noise Impact Management program.

3.4. Discussion.

a) No reference is made to the discussion with the interested and affected parties because this is not required in Document B, as to what should be included in the investigation.

b) The Sound Power radiated from the individual parts of the Power Units are

ambiguous. The values used in the report, being deduced from information which was received from the supplier of the equipment before the first report was drafted. Values received after the first report was compiled are on the optimistic side being somewhat lower than those initially specified by the supplier of the equipment.

- c) The use of the ambient sound Rating Level determined over a short period of time at the site is not comprehensive, and the Acceptable rating level in Document C which is also used, should rather be used. The difference, however is small.
- d) The adjoining farms will bear some impact from the three OCGT units, already under construction as well as the future planned units, especially when operated for a 24 hour day/night period.
- e) A detailed analysis could not be made of the noise impact of the construction phase noise. When used during normal daytime building construction hours, a significant impact is not anticipated. Special permission is indicated for these operations.
- f) It does not seem possible to apply any mitigation measures other than the limitation of the simultaneous operation of all the units, and/or the complete elimination of night time operation. The latter does not seem possible to be guaranteed in the event of shortage of electrical generation capacity.

3.5. Conclusions.

- a) The findings of the report is in general clear and comprehensive.
- b) The use of the existing ambient sound Rating levels determined over short periods during the day is in doubt. The recommended Rating Levels in Document C, which were also used, give more reliable results. The difference is not significant if the 7 dB excess which is permitted by

the existing Noise Control Regulations is applied.

- c) It would have been advantageous if the LFNR test was applied on the noise radiation of the exhaust stack.
- d) A serious noise impact is not anticipated in the developed townships when the three existing units are in operation during the daytime periods.
- e) For the operation of all six units during the daytime hours an impact would be experienced.
- f) The operation of all six units for the 24 hour time period would result in a significant impact in all the undeveloped land for future township development.
- g) No remedial measures seem to be available other than the curtailment of the operation period to the five hour day time period, when all six units are in operation.
- h) Special permission for the construction phase operation, including the pile driving is indicated.

3.6. Recommendations.

- a) The sound power levels of the individual components be controlled with the proponent, and that fixed guarantees be obtained.
- b) Operation of the units be limited to a five hour daytime period only and that a binding undertaking be entered into with the proponent.
- c) The owners of the agricultural land be warned that the use of their land for township development will be limited.
- d) The town planning authority having control over the area be forewarned that the agricultural land use may be restricted for township development.

- e) The proponent must provide a Noise Impact Management plan for the development which would include:
 - i) Upon commissioning of each unit, measurement results by an independent expert, certifying that the guaranteed values have been abided by.
 - ii) Regular follow up noise audits to certify that no deterioration have taken place.

4 . GENERAL .

4. GENERAL.

This report is issued subject to the following conditions:

4.1. Limitation of use of information.

This report is subject to copyright provisions held by the Acoustic Consulting Engineer, No part of this report may be copied, and distributed to anybody other than Bohlweki Environmental (Pty) Ltd, Ninham Shand Consulting Services, Jongens Keet Associates, Eskom, The Western Cape Provincial Administration, and persons, bodies or Authorities directly involved with the project, without the written agreement of the Acoustic Consulting Engineer.

If the report is copied, it must be copied in full, no extracts may be made.

4.2. Information Received.

The information received on which the evaluation is based is contained in those portions of the Documents A, B, C, D and E as given in Section 1. as well as the relevant SANS Standards quoted in this report.

It is accepted that the information so received is, in all respects, correct. Should any deficiencies or incorrectness in the information be discovered, the Acoustic Consulting Engineer must immediately be advised of such inaccuracies, in order to investigate the possible effects of such inaccuracies on the findings of this report.

5. SCOPE.

5. SCOPE.

This report covers an evaluation of the Noise Impact Investigation in accordance with Document A.

This investigation is conducted to determine whether the procedures followed during the Noise Impact Investigation were in accordance with the procedures outlined in Document B. and were reliable, thorough and correct and whether the correct conclusions were made from the findings of the investigation.

It furthermore comments on the approach followed by the person(s) conducting the investigation. It also adjudicates any remedies proposed on their validity and effectiveness.

Proposals are made on which, if any, investigations should be repeated or additionally conducted, and which recommendation(s) and requirement(s) should be additionally stipulated in the Environmental Management Program in order to provide sufficient information to the Department of Environmental Affairs and Development Planning of the Western Cape Province to grant or refuse the application and to approve or disapprove the Environmental Management Program.

6. DISCUSSION.

6. DISCUSSION.

6.1. Introduction.

This discussion will be conducted in accordance with the requirements outlined in Document B, SANS 10328, "Methods for environmental noise impact investigations". Reference will be made to the clause numbers of the above document.

6.2. Investigation of the acoustic implications of the proposed development for the purposes of an Environmental noise impact investigation and assessment.

Document B Clause 7.2. Plan of study for environmental noise impact assessment.

- a) Identification of the noise sources and noise sensitive developments.

Comment:

See Clause 1, 1.1. of Document A.

- c) Identification, with the assistance of all interested and affected parties and description of all the noise sources and noise sensitive developments that are to be excluded from the investigation, with the appropriate reasons for exclusion.

Comment:

These discussions were conducted for the establishment of the initial three OCGT units already under construction.

No noise aspects were raised during these discussions.

Document B. Clause 7.3.1. Determination of the sound emission from the identified noise sources.

Comment:

See Clause 5. Document A.

- a) The anticipated sound power levels of the various components of the installation are given per unit in Table 1 of the JKA January 2007 report.

These values were based on the initial values supplied by the proponent. See the Note.

In document E slightly different values are given for the sound power radiated to the environment, see Table 4 for units 11, 12, 21 and 22. These values also differ from the values guaranteed by Siemens, see Document D Clause 5.

From Document A it is, however clear that the values used by Jongens are slightly higher than the values stated by the supplier of the equipment. Especially in the low frequency bands some considerable differences are noted.

It is, however clear that all the sound power radiation levels from the various sound sources are applicable to one unit only. This is also accepted by Jongens in Document A.

- Note: a) From correspondence with the Author of the report it is evident that the radiated sound power levels given in Document D were received from the proponent long after the initial report was completed. The Octave Band sound power levels given were deduced from the earlier A weighted sound power levels and a sound spectrum initially received from the proponent.
- b) From Table 1. Document A it seems possible that the Exhaust stack may radiate an unbalanced sound spectrum, the components at 31.5 Hz and 63 Hz being quite high. (These values are not so pronounced in the Siemens values given in Document E). It would have been advantageous if an investigation could have been done at an observer position where the predicted Rating Level is in the order of 30 dBA to 40 dBA if a low frequency disturbance would be expected, using the Low Frequency Noise Rating (LFNR) procedure given in Document C, Annex B.

Document B. Clause 7.3.2. and 7.3.3. Estimation of the expected and desired rating level.

Comment:

See section 6.2. of Document A.

From document A it would appear that the existing Western Cape regulations were used in conjunction with the South African Standard SANS 10103 Table 2. to estimate the acceptable rating levels. See clause 2.9.

Comparison with the ambient sound level at the various observation positions would present ambiguous conclusions, because the measurement time periods represented only a small portion of the day time reference time period.

If it is accepted that the ambient sound level may vary considerably during the 16 hour day time and the 8 hour night time reference time periods, the true Equivalent Continuous Rating level could not be reliably obtained during such short measurement time periods. The values obtained were, however realistic values.

It would have been more realistic to have used the Acceptable rating levels given as guidelines in Document C Table 2 for outdoor rating levels for a rural residential area, i.e. L_{Rdn} of 45 dBA for the day time and 35 dBA for the night time periods.

Document B. Clause 7.4. Determination of the noise impact. 7.4.1. Determination of a noise source.

Comment:

See Section 6.3. of Document A.

The following is clear from the summary given in Document A Clause 6.3.

- f) The adjoining farms will bear a significant impact from the OCGT units, already under construction as well as the future planned units, especially for continuous 24 hour operation.

Agricultural land is not considered to be a noise sensitive area and is therefore not really under scrutiny in this investigation, excepting for the inhabitants of the existing residences. In the event of township development on the agricultural land, however, the noise distribution will have to be considered.

6.3. Construction noise.

Comment:

See Section 7. of Document A.

A detailed analysis could not be made of the noise impact of the construction phase noise, because so many unknown factors are present. When used during normal daytime building construction hours, a significant impact is not anticipated, excepting for the pile driving operation. Special permission is indicated for these operations.

6.4. Noise mitigation.

Document B Clause 7.6. Environmental noise impact investigation with regard to the alternatives.

Comment:

See Section 6. of Document A.

The following is clear from the discussion on noise mitigation:

- a) For the operation of the three units under construction, for five hours per day, during day time only, the agricultural land would suffer some impact.
- b) If the three units are used for the full 24 hour period the agricultural land would be significantly impacted for future township development.
- b) If all six units are operated for five day time hours per day, the agricultural land would be severely impacted for future township development.
- c) If all six units are operated for the full 24 hour time period, the impact on all the areas would be severe and cannot be accepted as suitable for future suburban residential development.

It does not seem possible to apply any mitigation measures other than the limitation of the simultaneous operation of all the units,

and/or the complete elimination of night time operation. The latter does not seem possible to guarantee in the event of shortage of electrical generation capacity.

7. CONCLUSIONS.

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7.1. Introduction.

The findings of the report is in general clear and comprehensive.

7.2. Final conclusions.

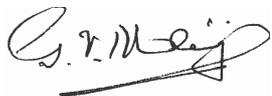
- a) It is clear of which sound power radiation levels are applicable to the OCGT units.
- b) The use of the existing ambient sound Rating levels determined over short time periods is in doubt. The recommended Rating Levels in Document C, which were also used, would give more reliable results. The difference is not significant if the 7 dB excess which is permitted by the existing Noise Control Regulations is applied. Both these options were adequately addressed in the report.
- c) It would have been advantageous if the LFNR test was applied on the noise radiation of the exhaust stack.
- d) A serious noise impact is not anticipated when the three existing units are in operation during the daytime periods.
- e) For the operation of all six units during the daytime hours an impact would be experienced.
- f) For the operation of all six units for the 24 hour time period would result in a significant impact in all the undeveloped land for future township development.
- g) No remedial measures seem to be available other than the curtailment of the operation period to the five hour day time period, when all six units are in operation.
- h) Special permission for the construction phase operation, including the pile driving is indicated.

8. RECOMMENDATIONS.

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The following is to be recommended:

- a) That the sound power levels of the individual components be controlled with the proponent, and that fixed guarantees be obtained.
- b) That operation of the units be limited to a five hour daytime period only and that a binding undertaking be entered into with the proponent.
- c) That the owners of the agricultural land be warned that the use of their land for township development will be limited.
- d) That the town planning authority having control over the area be forewarned that the agricultural land use may be restricted for township development.
- e) That the proponent must provide a Noise Impact Management plan for the development which would include:
 - i) Upon commissioning of each unit, measurement results by an independent expert, certifying that the guaranteed values have been abided by.
 - ii) Regular follow up noise audits to certify that no deterioration have taken place.



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