PROFESSIONAL OPINION ON THE NOISE ASPECTS OF THE FFP RETROFIT AT THE GROOTVLEI POWER STATION

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1. INTRODUCTION

Grootvlei Power Station is a 1200 MW coal-fired power station, consisting of 6x200MW units. Eskom commenced construction of Grootvlei in the late 1960's and the station was mothballed in the early 1990's. In 1995, the decision was taken to return the station to service (RTS) due to the increase in electricity demand.

All six units where originally commissioned with Electrostatic Precipitator (ESP) technology for particulate abatement. During the RTS project in 2005, units 1, 5 and 6 where retrofitted to Fabric Filter Plants (FFPs) while units 2, 3 and 4 ESP units were refurbished to fully existing operational conditions. The functioning of the ESPs does not allow the station to meet the new emission standards promulgated by the Department of Environmental Affairs (DEA), and Eskom proposes that the remaining three units with ESPs be retrofitted with FFPs.

2. PURPOSE OF THE NOISE INVESTIGATION

The purpose of this noise report is to:

- Identify the key noise aspects of the retrofitting the remaining units;
- Identify the noise sensitive receptors that may be affected by the noise emissions from the retrofitted units;
- Identify factors that will influence the propagation of noise into the environment; and
- Provide a qualitative assessment of the impact of noise emissions on present ambient noise levels in the environment.

3. METHODOLOGY OF THE NOISE INVESTIGATION

3.1 SITE VISIT

A site visit was undertaken on 4 June 2012. This included a presentation by the client describing the technical aspects of the retrofitting process. The existing FFP for unit 1 was inspected in order to gain more insight into its technical and structural aspects.

3.2 GENERAL SOURCES OF NOISE

A power station is a complex source of noise emissions to which a large number of components contribute across a wide frequency spectrum. This includes low frequency noise generated by sources such as large fans and the boiler house processes. Mid- to high frequency noise is caused by sources such as rotating

machinery, e.g. electric motors and pumps, steam releases and cooling water systems.

3.3 MAJOR SOURCES OF NOISE AT THE ESP'S AND FFP'S

The major source of noise for the existing ESP's and FFP's are the large extraction fans and their electric motors. Their noise emissions mainly are at the low end of the frequency spectrum.

It is understood that the fan/electric motor units of the existing ESP's will be replaced with new and somewhat more powerful ones. These may or may not be noisier than the original equipment. However, even a doubling in the amount of noise energy emitted will at most cause an increase of only 3 dBA. It can be assumed with a high degree of certainty that this will not be the case.

Furthermore, the noise emissions from the new FFP's will only form a relatively small part of the total noise emissions from the power station. The actual increase in the total noise emission levels will in all events not be measurable.

No physical noise measurements were taken on the boundaries of the Grootvlei power station and as a result no comments can be made on the compliance of the present ambient noise levels with the 70 dBA recommended by SANS 10103:2008 'The measurement and rating of environmental noise with respect to annoyance and to speech communication' for industrial districts. However, based on experience the consultant is confident that the ambient noise levels, determined for a period of 24 hours, at the boundary of the power station are below 70 dBA.

3.4 NOISE SENSITIVE RECEPTORS IN THE ENVIRONMENT

The noise sensitive receptors within any realistic distance from the centre of the area at the power station where the retrofitting will take place are:

- The village of Grootvlei associated with the power station lying immediately north west of the plant (903 m);
- The village of Grootvlei associated with the old coal mine lying at some distance to the South (2800 m); and
- A number of farmsteads at varying distances in the general environment of the power station (1865 m to 3581 m).

A satellite image which identifies the locations of these noise sensitive receptors is provided in Figure 3.4.1.

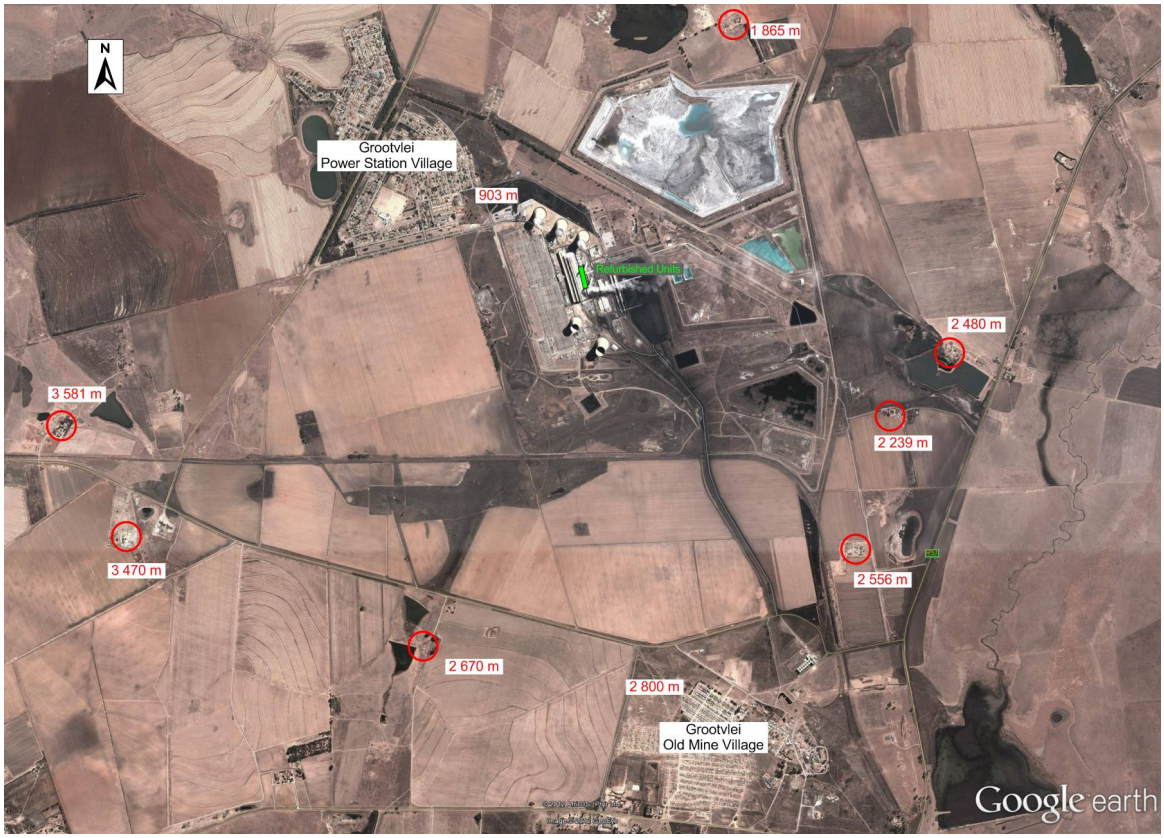

Figure 3.4.1: Image showing the locations of the noise sensitive receptors. The red circles indicate the locations of the farmsteads and the red numbers the approximate distances to the area, indicated in green, where the FFP retrofitting will take place.

From Figure 3.4.1 it can be seen that generally the distances to the potentially affected noise sensitive receptors are in excess of 2 000 m. It is extremely unlikely that any changes in the noise emission levels of the power station will be measurable, and much less audible.

Two receptors are closer than 2 000 m, i.e.:

- The farmstead located at a still substantial distance of approximately 1 865 m north east of the FFP's. In addition the large ash dam forms a substantial acoustically screening barrier between source and receptor. Therefore, it also is very unlikely that any changes in the noise emissions from the power station will be noticeable; and

- The south eastern corner of the Grootvlei village associated with the power station is at a considerably shorter distance of approximately 903 m. Apart from the fact that the new FFP's will contribute only an insignificant part to the total noise emissions from the power station, the boiler house and turbine hall provide effective acoustic screening against the noise emissions in the direction of the village.

Furthermore, at all the identified noise sensitive receptors the new FFP's will not introduce a new kind of noise into the environment and, considering the above discussions, are very unlikely to be noticed.

4. CONCLUSIONS

It is the professional opinion of the consultant that:

- The proposed new FFP's are very unlikely to cause any measurable change in the total noise emissions from the power station during the construction and the operation of the FFP's. Therefore, if the Grootvlei power station presently complies with the 70 dBA criterion recommended by SANS 10103 for industrial districts retrofitting of the remaining three units is very unlikely to change this;

- It can be assumed to a high degree of certainty that any possible change in the ambient noise levels and noise emission characteristics from the power station will not be measurable or audible at any of the identified noise sensitive receptors; and

- That there is no reason why, from a noise impact perspective, the FFP retrofitting at the Grootvlei power station should not be approved.

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