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Thyspunt Alliance
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Dear Mr Thorpe, Thyspunt Alliance and its members, the St Francis Bay Resident's Association and the St Francis Kromme Trust

RE: ESKOM EIA CONCERNS FOR THE PROPOSED NUCLEAR POWER STATION AND ASSOCIATED INFRASTRUCTURE (DEA Ref. No: 12/12/20/944)

THYSPUNT ALLIANCE

NUCLEAR 1
APP. E23

REVISED DRAFT ENVIRONMENTAL REPORT
NOISE ASSESSMENT

Response compiled by H.Thorpe and submitted on behalf of the St Francis Bay Residents' Association, the St Francis Kromme Trust and the Thyspunt Alliance

Comment 1:

This assessment, together with the Transportation Assessment, feed into the Social Impact Assessment. It is principally concerned with the noise impact of construction on site, and of the construction of new roads. It does briefly, but totally inadequately, mentions the impact on local communities of transportation of materials to site.

This has to be one of the most complacent of all the specialist reports.

Response 1:

The calculation and prediction of road traffic noise is conducted in accordance with South African National Standard (SANS) 10210. It is highly complex taking into account numerous factors including: mean traffic flow, percentage heavy-duty vehicles, mean speed, road gradient, road texture, distance of receptor from the road, ground conditions, screening effects of topography and structures. It is in use for many decades and its accuracy has been validated internationally, locally and by this noise specialist every time, that he has conducted road noise measurements (close on 100 measurements)



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throughout South Africa and applied the prediction model, including this project. Up to 200 m the correlation between measured and predicted $L_{Aeq,T}$ has been within 1 dB!

In terms of SANS 10328 the prediction and assessment of noise from road traffic is to be conducted in accordance with SANS 10210 because of its accuracy and specifically not based on short term measurements (whether one, two or more days duration).

All applicable information regarding existing and predicted future road traffic noise and the associated impact along the R330 south of Humansdorp on surrounding land is concisely contained in Tables 11 and 12 of the noise specialist report. Table 11 considered the worst case scenario, namely, the nearest residences located 10 m from the R330, which happened to be the informal settlement. The same would apply to any other residence at the same distance anywhere along the R330. On inspection it was observed that the majority of the residences were located 70 m or further from the R330. Table 12 in the Noise Impact Assessment (Appendix E23) considers the impact on the nearest of these residences.

The Tables form a small part of a page. Padding the report with many additional paragraphs would not add any further value.

Comment 2:

The reality is that the construction of a nuclear plant at Thyspunt, whose main access road is the R330, will involve hundreds of thousands of heavy to exceptionally heavy loads passing right past a large section of the Kromme River community and St Francis Bay, possibly 24 hours-a-day if a shift system is used, over an already busy and noisy bridge, then up a long and relatively steep hill, which runs from the current town entrance to Homestead Road, past a retirement complex and The Links golf estate, for a period of nine years . The noise impact of this would be massive, continuous, highly disruptive and unmitigable. Despite this, the Executive Summary contains the following statement, which is repeated in the conclusions on p. 38:

“the noise impact (of transportation of materials and equipment to site) on a small number of residences in the nearest informal settlements along the R330 at Sea Vista . . . would be medium.”

Questions arising from this breath-takingly complacent comment are whether the specialist is aware of the existence of St Francis Bay, or has ever been there, or has deliberately chosen to ignore it.

Response 2:

Response by the Noise Specialist:

The future predicted relative and cumulative impact of noise from road traffic on the R330 for each year of construction were based on the assumptions that construction traffic would not take place 24 hours a day but 8-hours per day. This is stated in the report and specifically excludes “...possibly 24 hours-a-day if a shift system is used...”.

South of the traffic circle the R330 passes through a cutting with a maximum gradient of 8% over approximately 100 m at the base of the incline, decreasing steadily beyond each end of this segment of road. The effect of the gradient will be the same for existing traffic noise as it would be for any future traffic. This is irrespective of the effect due to the number of vehicles and percentage of heavy-duty traffic that forms part of the calculations.

A worst case scenario would be for a receptor located 10 m from the edge of the road in the middle of this 100 m segment of road. At this distance the angle-of-view of the road is close to 180 degrees and the sound Intensity Level at the receptor would be almost 100% be due to noise emanating from that segment. The sound Intensity Level at that receptor would be 2,4 dB higher than a receptor located 10 m from the road with no gradient for the same number of vehicles with same percentage heavy-duty vehicles. With reference to the Addendum a level difference of 3 dB or less is insignificant.

With increasing distance from the road the angle-of-view and exposure to noise from this segment of road decreases and the receptor is exposed to an increasing angle-of-view and increasing exposure of noise from other segments of the road. For example, at a distance of approximately 30 m from the road the angle of view of that 100 m segment would be approximately 90 degrees. The effect of only the reduced angle of view, excluding the reduction due to increased distance or intervening topography, would be a reduction in Intensity Level of 3 dB.

The previous paragraphs try to clarify one of many factors that are taken into account in calculating and predicting road traffic noise (SANS 10210). It cannot be expected to dissect each and every step.

Comment 3:

A second question is whether the categorization of the impact as “medium” is based on the Impact Assessment Criteria contained in Chapter 7 of the Revised Draft EIR, Table 3-16.

Response 3:

Response by the Noise Specialist:

Refer to attached Addendum.

Response by GIBB:

Since the publication of the Revised Draft EIR, the Transport Impact Assessment (Appendix E25 of the Revised Draft EIR) has been substantively revised. The outcome of the revision is that heavy delivery vehicles will make use of a bypass to the west of Humansdorp and will use only the Oyster Bay road, and no longer use the R330 through St. Francis. Only passenger vehicles and buses and occasional abnormal heavy haulage will use the R330 and access the Thyspunt site via the proposed eastern access road.

Comment 4:

A third question would be whether the specialist placed a sound monitor on the hill going up from the traffic circle towards Sea Vista. This would be serious low-gear work for heavy vehicles going up, and probably air brakes going down. To claim that this would have a low impact is nonsense.

Response 4:

Response by the Noise Specialist:

It was one of the locations considered. However, nowhere along the incline could the sound level meter be located 10 m from the road and 1,4m above road level and without interference of shrubbery, as required by the above-mentioned SANS standard. With reference to Response 1, calculations based on different measuring points to those used in the Noise Impact Assessment would not have resulted in substantively different results.

With regards to the excessive noise produced by “air brakes”, this type of braking system has been outlawed in Europe (and possibly other countries). They are illegal in these countries and no new heavy-duty vehicle may be manufactured or fitted with this type of braking system. Outside of this study, the noise specialist has previously had discussions with the Department of the Environment and Development Planning of the Western Cape regarding legislating the phasing out of these types of vehicles, with it becoming illegal after a particular date. The specialist was left to understand that this would need to be considered at national level.

Local authorities have the power to legislate by-laws such as prohibiting “air brakes” being activated within their area of jurisdiction. This has been enacted in certain areas. The noise specialist recommends that this prohibition be included in Eskom’s tender and that the representative(s) of the residents make a parallel application to their local authority.

Response by GIBB:

Since the publication of the Revised Draft EIR, the Transport Impact Assessment (Appendix E25 of the Revised Draft EIR) has been substantively revised. The outcome of the revision is that heavy delivery vehicles will make use of a bypass to the west of Humansdorp and will use only the Oyster Bay road, and no longer use the R330 through St. Francis. Only passenger vehicles and buses and occasional abnormal heavy haulage will use the R330 and access the Thyspunt site via the proposed eastern access road.

Comment 5:

St Francis Bay is a highly successful and indeed unique resort town, with a world-wide reputation. It is a testimony to the vision and energy of a South African entrepreneur, who has set in place a very desirable amenity for the potential benefit of the entire country. A significant portion of the permanent population comprises retirees, who have worked their entire lives to enable them to live in what they regard as an incomparable environment. To impose a transportation system of the type envisaged on such a community would be unjust and unreasonable. **Despite this, the specialist does not even mention it.**

Response 5:

Response by the Noise Specialist:

The assessment of noise (on humans) makes no distinction of whatever regarding the demographic or socio-economic standing or age of people affected by noise.

Comment 6:

Attention is drawn to the Nuclear Site Investigation Programme (NSIP), a specific recommendation of which was that the small holiday resorts along the coast be left unaffected. Either the specialist did not study these reports, or Arcus Gibb failed to brief him on this, or it has been deliberately ignored.

Response 6:

Response by the Noise Specialist:

Kindly refer to Response 5 above.

Comment 7:

Impact Assessment Criteria

Attention is drawn to the revised impact assessment criteria contained in Ch 7, Table 7-16, p. 7-32 ff. It would appear that the specialist has not used these new criteria with regard to the noise impact of transportation in the vicinity of the Kromme River and St Francis Bay.

Even here, a problem arises, in that the duration figures given in the table are immediately contradicted by the explanatory notes. The notes seem to follow the original ratings, and have not been revised. Table 7-16 seeks to address an objection raised in the first draft, that nine years was far too long a period for the rating of a duration impact as low. In this particular case, the construction period is expected to be nine years, and this being the case, in terms of Table 7 – 16, any impact arising would be of high duration.

Below is our version of a table for the noise impact of traffic across the Kromme River and past St Francis Bay, based on Table 7 -16 in the revised draft.

Response 7:

Response by the Noise Specialist:

Kindly refer to the attached addendum.

Comment 8:

Kromme River & St Francis Bay

Traffic Noise Impact Assessment

(see similar exercise in comment on Impact Assessment & Revised Draft EIR Table 7 – 16)

Assumptions:	9 year construction period R330 regarded as site Loss of “sense of place” regarded as irreplaceable resource.
Nature	Negative
Extent	Medium (beyond immediate surrounds)
Duration	High (9 years to permanent)
Intensity	High (thousands of heavy-duty vehicles climbing hill, possibly 24 hours per day/night)
Consequence	(Duration, extent, intensity & irreplaceable resource) High
Probability	Definite (unless road re-directed from Kromme & St Francis)
Significance	High (high consequence and high probability).
Reversibility	Medium (Traffic impact reduced, but not removed after construction phase)
Irreplaceable	Yes (sense of place)
Confidence	High
Cumulative	Medium (roads only)

High significance indicates that mitigation measures are required.

Proposed mitigation measures

The only mitigation measures proposed relate to construction on site, road construction and ultra-heavy loads. There is no mention of the impact of heavy to abnormal loads, or of commuter traffic on the surrounding communities. In consequence, the above ratings are not mitigated in any way, nor can they be. In fact the situation is worse than shown in the report, since no attention is paid to the huge increase in traffic over peak holiday periods. This could be 400% over normal traffic.

Response 8:

Response by the Noise Specialist:

The noise assessment was based on quantitative information available. The effect of abnormal loads is included in the report.

Comment 9:

Conclusions

This report is typical of those produced for this EIA. It deliberately or negligently disregards real problem issues, and ends with recommendations which favour the developer. It calls into question the integrity of the entire EIA.

We would argue that a “high significance” overall rating should be given to traffic noise in the St Francis area, and that this should strongly influence the decision to proceed with this aspect of the project.

This being the case, we demand that no access road to Thyspunt should pass within one kilometer of an urban edge. If no suitable road access is possible on this basis, this will be yet another flaw in a flawed site selection.

Response 9:

Response by the Noise Specialist:

It is hoped that with more factual understanding of the response of humans' to noise and of the objective standardised procedures obliged to be conducted, a more balanced view can be formed.

Response by GIBB:

Since the publication of the Revised Draft EIR, the Transport Impact Assessment (Appendix E25 of the Revised Draft EIR) has been substantively revised. The outcome of the revision is that heavy delivery vehicles will make use of a bypass to the west of Humansdorp and will use only the Oyster Bay road, and no longer use the R330 through St. Francis. Only passenger vehicles and buses and occasional abnormal heavy haulage will use the R330 and access the Thyspunt site via the proposed eastern access road.

Comment 10:

Additional note

This response is based only on the impact on St Francis Bay and the Kromme River. It makes no mention of the Transportation Specialist's proposal that all the heavy traffic should use a small residential road called Saffery Street in Humansdorp. If that does not illustrate the naïveté of the transportation report, nothing will. When announced at a public meeting in St Francis Bay, attended by some 200 people, the whole hall simply collapsed in mirth. Since there is no mention of it in the Noise Impact Report, we have to assume that the specialist was either not aware of this proposal, or chose to ignore it. From a noise perspective it is completely unacceptable.

Response 10:

Since the publication of the Revised Draft EIR, the Transport Impact Assessment (Appendix E25 of the Revised Draft EIR) has been substantively revised. The outcome of the revision is that heavy delivery vehicles will make use of a bypass to the west of Humansdorp and will use only the Oyster Bay road, and no longer use the R330 through St. Francis or Saffery Street through Humansdorp. Only passenger vehicles and buses and occasional abnormal heavy haulage will use the R330 and access the Thyspunt site via the proposed eastern access road.

Yours faithfully
for GIBB (Pty) Ltd

A handwritten signature in black ink, consisting of a large, stylized 'S' shape with a small dot above it.

Nuclear-1 EIA Team



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Architectural Acoustics Noise & Vibration Control Environmental Noise Traffic Noise Acoustical Material Research Underwater Sound Nonlinear Acoustics

HUMANS AND THEIR ACOUSTICAL ENVIRONMENT

The methodology used in the Noise Impact Assessment is dictated by SANS 10103, which is based on how humans perceive sound/noise. An attempt is made here to explain two of the numerous aspects of humans' perception of sound.

We perceive the physical world around us by means of our senses: vision, touch, smell, taste and hearing. Our acoustical environment invokes the least tangible of these senses. This may explain the lack of awareness and comprehension by many people of the degree to which sound affects their lives.

A fundamental aspect is that our sensory responses are not linearly related to physical stimuli. An illustrative example is provided below:

Place two loudspeakers closely side-by-side and feed the identical (mono) sound signal first to one loudspeaker and then both. So that your judgement is not influenced, shut your eyes and have someone else connect or disconnect one of the loudspeakers (quietly pull out or put in one of the loudspeaker plugs). Do you hear any difference?

Even with knowledge of what to expect, most of us would have difficulty in perceiving the difference in what we subjectively describe as "loudness" during this experiment. Yet the physical quantity (acoustical power in watts) radiated by two loudspeakers is double that of one loudspeaker. During our daily activities this difference would go unnoticed.

Our sense of hearing follows a logarithmic response to changes in the Intensity of sound at our ears defined as watts per square meter (W/m^2). Hence a different scale is used, namely, the decibel (dB).

Decibel = $10 \times$ Logarithm of the ratio of two powers (W) or of two intensities (W/m^2)

$$\text{Power Level} = 10 \times \text{Log} \frac{\text{Power}}{\text{Power}_{\text{reference}}} \text{ dB}$$

$$\text{Intensity Level} = 10 \times \text{Log} \frac{\text{Intensity}}{\text{Intensity}_{\text{reference}}} \text{ dB}$$

It is not an absolute scale but a relative scale. To distinguish the latter one refers to sound Intensity Level that is referenced to the threshold Intensity of hearing. Refer to the Glossary in the noise specialist's report.

The relative difference between 2 acoustic watts radiated by two loudspeakers compared to 1 acoustic watt radiated by one loudspeaker on a decibel scale is,

$$10 \times \text{Log} \frac{2}{1} = 10 \times 0.301 \approx 3 \text{ dB.}$$

Here we have used the power radiated by one loudspeaker as reference. Thus, doubling the sound power equals a 3 dB increase in Sound Power Level and we would be exposed to a 3 dB increase in Intensity Level.

Because humans are not capable of perceiving a difference in Intensity Level of 3 dB or less, this difference in level is considered to be insignificant when assessing sound.

A fourfold increase in sound Intensity is equivalent to a 6 dB increase in sound Intensity Level. This difference is perceived and considered to be a significant difference in terms of humans' response. Only when the acoustical power, whence Intensity is increased tenfold i.e. 10 loudspeakers resulting in a 10 dB increase in level, would the average human perceive this as "twice as loud" compared to that from a single loudspeaker.

A second aspect is that human response to environmental sound/noise is dependent on the average sound energy received over a period of time, T, and not to the instantaneously varying sounds. The Rating Level, $L_{\text{Req},T}$, is used for assessment of sound/noise. This includes the average sound level with adjustments for tonality and impulsivity of the sound. Refer to the Glossary in the noise specialist's report.

Moving from loudspeakers to road traffic noise. If the $L_{\text{Req},T}$ due to, say, 300 vehicles per time period T at a receptor is 60 dBA then doubling the number to 600 vehicles during the same period will cause a 3 dB increase to 63 dBA due to the doubling of the average sound power emitted by twice the number of vehicles during the same time period. In this example the increase would be insignificant. There would be no detectable increase in "loudness". Notwithstanding this, the increase would fall in the 0 dB to 5 dB excess range and the associated noise impact would be assessed to be **Low**. Refer to 1.2.2 Impact qualifiers in the noise specialist report.

The illustration is based on the same mix of light and heavy-duty vehicles. The road noise prediction calculations applied to the noise study took into account the percentage of heavy-duty vehicles that emit a higher sound power level, road gradient, speed, plus other factors.

Combining the above knowledge one is ready to apply this to understanding the assessment of the impact of noise emanating from road traffic on the average human (receptor) within a residential community.

Refer to Table 11 of the noise specialist report regarding the impact of noise of receptors 10 m from the edge of the R330 south of Humansdorp. This forms two parts:

- a) The existing measured or predicted $L_{Req,T}$ is compared with the typical $L_{Req,T}$ for the particular district (refer SANS 10103 Table 2). If the typical $L_{Req,T}$ is not exceeded the impact of noise is negligible. If the $L_{Req,T}$ due to road traffic exceeds the typical level the level of excess is assessed in 5 dB steps from **Low**, through **Medium**, to **High**.

Based on sound measurements the $L_{Req,d}$ due to existing (Non-Eskom) traffic was found to be 63 dBA. This is 8 dB in excess of the typical level of 55 dBA and falls between the 5 dB and 10 dB excess range with an associated **Medium** intensity of noise impact. Remember, 6 dB increase is significant and 10 dB represents a doubling of "loudness".

Thus, in the absence of any Eskom traffic there already exists a noise impact of **Medium** intensity for receptors located 10 m from the road edge.

During the 1st year of construction the existing traffic plus the Eskom light and heavy-duty traffic combined will result in a predicted level of 69 dBA with an excess in $L_{Req,T}$ of 14 dB. The predicted noise impact of the combined traffic will be **High** (2nd last row of table). It would remain high during subsequent years even with reduced Eskom traffic.

- b) The second part identifies and assesses the relative contribution of Eskom traffic noise to the total $L_{Req,T}$ of the combined non-Eskom traffic plus Eskom traffic. Eskom's relative impact would represent a **Medium** noise impact (last row of table). It would remain Medium for 2nd and 3rd years of construction and reduce to Low during all subsequent years.

It is hoped that this has provided some insight into human hearing and greater understanding of the noise impact assessments.