

05 August 2105



Tshwane

Lynnwood Corporate Park
Block A, 1st Floor, East Wing
36 Alkantrant Road
Lynnwood 0081
PO Box 35007
Menlo Park 0102

Tel: +27 12 348 5880
Fax: +27 12 348 5878
Web: www.gibb.co.za

Our Ref: J27035/ J31314

Your Ref: Email received 07 August 2011

Thyspunt Alliance
St Francis Bay Resident's Association
St Francis Kromme Trust

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

**RESPONSE TO SECOND DRAFT ENVIRONMENTAL IMPACT REPORT
APPENDIX E 10, Section 2.3.3, p.68 – 72 AIR QUALITY SPECIALIST REPORT**

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:

1. Introduction

The direction and strength of the wind in the area around Thyspunt is one of the key factors in determining the viability or otherwise of the site. As such it should have been the subject of its own special report. The fact that it has been relegated to a mere four pages, in an obscure place in a report which is ostensibly on air quality, indicates how inadequately this issue has been addressed.

Whilst a decision on this is the responsibility of the National Nuclear Regulator, they will undoubtedly be influenced by the specialist reports which have been produced for the ROD in the EIA. It is therefore imperative that the Air Quality Report, which addresses these matters, is scrupulously accurate; is based on verifiable evidence; and draws the correct conclusions.

In the event, the quality of this section of the air quality report is so poor as to suggest that there is a deliberate conspiracy to camouflage what is in fact a threat to the whole project.

2. Wind direction & speed

Wind direction and speed are critical considerations. They affect the extent to which radio-nuclides released from the site, whether routinely or accidentally, travel overland or out to sea; the impact which this could have on the safety of persons and properties; and what the implications are in terms of viability of the site. It is a fundamental issue.

The Air Quality Report begins by repeating Eskom's confident assertion, based on a report from 1987, that "it is clear that the most dominant wind direction in this region is from the west northwest to northwest." No evidence is given for this view, which is pure fiction. If it were correct, it would mean



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that most releases of radio-nuclides from Thyspunt, whether routine or accidental, would be blown out to sea.

The most conclusive evidence of the prevailing wind direction at Thyspunt is the by-pass headland dunefield (one of three in the area), from Thysbaai, next to Thyspunt. This runs overland from south west to north east and directly to Sea Vista Township and St Francis Bay. This is clearly visible from aerial photographs of the area, and in figures published in the report, such as fig 10.1a of the Transportation Specialist Study. It reflects a high-energy prevailing wind which has blown for centuries, if not millennia, and has blown sand overland for 12 kilometers before re-joining the sea at St Francis Bay, to the east of the headland.

The region surrounding Thyspunt has one of the highest wind energy capacities in the country, hence the proliferation of applications for wind farms in the immediate vicinity.

The reality at Thyspunt is that the prevailing wind is from the west to southwest; that it is frequently experienced in the area; that it is a high-energy wind; and that it blows directly towards either Cape St Francis or Sea Vista township and St Francis Bay, which are between 11 & 12 kilometers away. The implication of this is that, in the event of an accidental nuclear release while the prevailing wind was blowing at the claimed average of 5.8 m/sec (21 kph), the communities of Rebelsrus, Mostert's Hoek, Cape St Francis, Sea Vista Township and St Francis Bay, stretching over 10 kilometers of coastline would have 30 minutes to evacuate, down one escape route, which would in any case be cut by the nuclear cloud. At times the wind speed is anything up to five times this average. The wind direction & strength have a direct bearing on the viability of the Thyspunt site.

It is inexplicable that there is no reference whatsoever to the by-pass headland dunefields in the Air Quality Report, which depends instead for its conclusions on evidence supplied by Eskom, and short-term measurements conducted in the area. This despite the fact that it has been raised as an issue in every submission and at every stakeholder's & public meeting held to-date. The fact that it has not been considered at all by the specialist indicates either negligence, in the form of failure to consider issues raised by I&APs, or a deliberate attempt to mislead the responsible authority.

It is, of course, in Eskom's interest to state that the prevailing wind is north westerly, as this would safeguard the viability of the site.

3. The Air Quality Report

This crucial issue is dealt with in some four pages of the Air Quality Report (Report E10, p. 68 – 72).

We believe that it is deficient in a number of respects:

- I. It begins with an acknowledgement that measurements taken on site are not sufficient for any long-term analysis, and mentions an attempt from December, 1986 to September 1989, which led to limited data recovery due to vandalism of equipment. According to the report, the best data was taken from the period January to September, 1987. This excluded the period October to December, which is locally acknowledged to be the windiest period of the year. This is clearly far too short a period of time to draw any conclusions.
- II. Eskom's claim that the prevailing wind is north westerly is contradicted by the evidence of the by-pass headland dunefield in the area, and by all the evidence supplied. None of the wind roses displayed in figs 2-25 – 2-27 or Table 2-23 support this conclusion. Indeed the report itself conceded that the 21 month survey at Thyspunt indicated westerly, rather than north-westerly winds at Thyspunt.
- III. Despite this, the report does nothing to refute the confident assertion regarding the predominant north westerly direction of the wind.

4. Conclusion

This report is typical of this EIA, in which everything is presented in a way which favours a successful application for an ROD. It is sufficiently misleading to justify a formal complaint to the DEA and even prosecution, and undermines confidence in the entire EIA process.

The most reliable recent data comes from a wind mast placed east of Oyster Bay by the CSIR as part of the current S.A.Wind Generation Programme. This has only been in operation for some 9 months, but details are available from the CSIR website, wasadata.csir.co.za. It is not known whether this is the information referred to in the Air Quality Report. It will clearly confirm that the prevailing wind is west to south west, and not west north west to north, as alleged by Eskom.

We request that this component of the Air Quality Report be rejected, and that the EAP be censured for allowing this inaccurate and fundamental information to remain in the report without being challenged.

We also demand an explanation from the EAP as to why the input from the local community has been completely ignored in this important component of the report.

Response 1:

Your comments as well as all other comments in this regard have been noted and documented (Please see the Issues and Response Report attached as Appendix E8 to the Revised Draft EIR). Please find an official response from the Air Quality specialist, Dr. Lucian Burger attached.

Yours faithfully
for GIBB (Pty) Ltd



The Nuclear-1 EIA Team

1.1.1

1.1.2 AIRSHED PLANNING PROFESSIONALS (Pty)

1.1.3 Reg. No.: 2002/023269/07



30 SMUTS DRIVE

MATUKA CLOSE, HALFWAY GARDENS

P O BOX 5260, HALFWAY HOUSE, 1685

Our Ref: AG/06/02_pn 11/01

ARCUS GIBB (Pty) Ltd
P O Box 2700
Rivonia
2128

Attention: Ms J-M Ball

TEL
+27 (0)11 805
1940

FAX
+27 (0)11 805
7010

e-mail mail@airshed.co.za

Your Ref:

23 AUGUST 2011

Subject: THYSPUNT ALLIANCE NUCLEAR 1: RESPONSE TO SECOND DRAFT ENVIRONMENTAL IMPACT REPORT APPENDIX E 10

This memorandum provides comments to:

THYSPUNT ALLIANCE NUCLEAR 1: RESPONSE TO SECOND DRAFT ENVIRONMENTAL IMPACT REPORT APPENDIX E 10, Section 2.3.3, p.68 – 72 AIR QUALITY SPECIALIST REPORT by H.Thorpe and submitted on behalf of the St Francis Bay Residents' Association, the St Francis Kromme Trust and the Thyspunt Alliance

The above-mentioned document has been referred to as the *RESPONSE* in the discussion below.

General Comment

It would appear that main contention in the *RESPONSE* is the reference and discussion in the Air Quality Report of the wind data collected and analysed by Eskom during an early monitoring campaign (1987). The *RESPONSE* claim that this data portrays a picture that is meant to mislead the reader into believing that the prevailing wind at the proposed site is from the west-north-western and the western sectors, which according to the *RESPONSE*, carries air pollutants over the ocean and away from residential areas such as St. Francis Bay, Cape St Francis, Rebelsrus, Mostert's Hoek and Sea Vista Township.

As a result and in conclusion, the *RESPONSE* request that "...this component of the Air Quality Report be rejected, and that the EAP be censured for allowing this inaccurate and fundamental information to remain in the report without being challenged."

As will be shown below,

- the reference to the Eskom historical data was included as part of a summary of available wind data at the time of the investigation, which also included data from a weather station located on the proposed Thyspunt Site and the South African Weather Services' station located in Cape St. Francis;
- that the conclusion reached from the Eskom data, as far as that particular dataset is concerned, is correct; and supporting figures from their report was included in this response;
- that the conclusions reached in the discussions with regards to the Thyspunt data do not contradict the *RESPONSE*'s comments, and especially confirms the movement of the headland-bypass dune-fields;
- that the Eskom data was not used to quantify any of the predicted air pollution impacts;
- that the hourly-averaged data, collected over a 21-month period on the proposed Thyspunt site, was used to conduct the dispersion calculations, which were reported in the study; and
- that, unless it is still strongly felt to confuse the reader of the Air Quality Report, there should be no reason to remove the discussion of the old Eskom dataset.

Comments on the RESPONSE

In order to address all the concerns, more detailed comments have been below given for each paragraph of the *RESPONSE*, as numbered below.

Introduction

- 1) *The direction and strength of the wind in the area around Thyspunt is one of the key factors in determining the viability or otherwise of the site. As such it should have been the subject of its own special report. The fact that it has been relegated to a mere four pages, in an obscure place in a report which is ostensibly on air quality, indicates how inadequately this issue has been addressed.*

The Air Quality Report states (Section 2.3.3) that the dispersion of air pollution is largely a function of the wind field. The wind speed determines both the distance of downward transport and the rate of dilution of pollutants. The generation of mechanical turbulence is similarly a function of the wind speed, in combination with the surface roughness. The influence of wind speed on the dispersion of air pollutants is significantly non-linear and is therefore best described through the use of dispersion models and not only through a qualitative description of the wind patterns as depicted by wind roses. An analysis of wind roses provides an indication of the area of most impact (i.e. likelihood), but not necessarily the magnitude. For instance, releases near ground level would result in high ground level concentrations during calm wind conditions at night, whereas the same atmospheric conditions in the case of elevated releases would result in the lowest ground level concentrations. It is therefore also important to consider the wind speed, atmospheric stability and release height together with the wind direction when qualitatively estimating the area of impact. These concepts were also discussed in the Air Quality Report (Section 2.3.2). So, although the *RESPONSE* indicates that only four pages were dedicated to the direction and the strength of the wind, a significant portion of the Air Quality Report discusses the more important result of the assessment, i.e. the predicted ground level concentration patterns, which take into account a number of

meteorological parameters in addition to wind speed and direction. A discussion of the latter two parameters alone cannot provide adequate information on the behaviour of the atmospheric dispersion.

- 2) *Whilst a decision on this is the responsibility of the National Nuclear Regulator, they will undoubtedly be influenced by the specialist reports which have been produced for the ROD in the EIA. It is therefore imperative that the Air Quality Report, which addresses these matters, is scrupulously accurate; is based on verifiable evidence; and draws the correct conclusions.*

It is important to source information that would be useful and essential for the prediction of air pollution impacts. The three sources of meteorological data available at the time of the assessment included

- Eskom meteorological stations located at four sites in the vicinity of Thyspunt, namely De Hoek, Thyspunt, Klippepunt, and Brakkeeduine (December 1986 to September 1988).
- The South African Weather Services' weather station located at Cape St. Francis. Data collection started in 2004.
- Onsite station which consists of a 10 m mast, fully equipped with meteorological instrumentation to measure the wind vector, air temperature, relative humidity, barometric pressure and rainfall. Data have been collected since 10 January 2008.

The reference to the Eskom measurements was included merely to provide background discussion on the historical information. These measurements were not used in any of the calculations. The atmospheric dispersion modelling was done using the onsite data for the period January 2008 to September 2009. The results included the simulations for every hour of this period and therefore considered actual measurements of the meteorological parameters experienced on the site. The results included in the Air Quality Report therefore did not rely on speculation of impacts due to a discussion of specific wind directions based on wind roses, but were based on actual measurements of all meteorological parameters.

The results which the National Nuclear Regulator would be reviewing are therefore based on the onsite information available at the time of the assessment. In any event, the National Nuclear Regulator follows a very rigorous procedure, in line with the International Atomic Energy Agency, which requires continually updating onsite information and syntheses of these (including onsite meteorological data and dispersion modelling).

- 3) *In the event, the quality of this section of the air quality report is so poor as to suggest that there is a deliberate conspiracy to camouflage what is in fact a threat to the whole project.*

There is no deliberate conspiracy to camouflage the information as started in the *RESPONSE*. Subsection 2.3.3 contains a general description of all the meteorological parameters that influence atmospheric dispersion. As explained previously, wind speed and direction constitute only two components of the overall atmospheric dispersion process. The section was not meant to provide results on the ground level concentrations, but merely some significant meteorological observations. The actual predicted impact is described by the calculated dispersion patterns which are given elsewhere in the report.

The *RESPONSE* focuses on the description of the Eskom wind direction results, which were in any event not used in the dispersion calculations. In the same section (Subsection 2.3.3 (c)(i)), the results from the observations at Thyspunt are discussed. It clearly states that “...westerly winds dominate, with approximately 20.5% occurrences during the period. This wind direction also experiences the highest frequency of strong winds, i.e. winds in excess 10 m/s occurring 1.5% of the year. Winds in excess of 15 m/s occur 0.1% of the period. Strong winds in excess of 15 m/s also occur from the west-south-west (~0.03%) and south-west (~0.02%). Winds from the north-north-east to northerly sector are on average the lowest (~3.9 m/s), compared to the average of 6.2 m/s from the east-north-east and eastern sector, and 5.8 m/s from the west-south-west to western sector.”

It continues in the next paragraph with “...the western wind component is prevalent during all four seasons (Figure 2-23). However, the eastern wind component is more prevalent during spring and summer. The frequency of strong westerly winds increases during winter months (July to August). Winter also witnesses an increased amount of wind from the west-north-west.”

These observations were also compared to the Cape St. Francis measurements; and the similarities and differences shown in comparative wind roses and discussed accordingly.

Wind direction & speed

- 4) *Wind direction and speed are critical considerations. They affect the extent to which radio-nuclides released from the site, whether routinely or accidentally, travel overland or out to sea; the impact which this could have on the safety of persons and properties; and what the implications are in terms of viability of the site. It is a fundamental issue.*

We agree with this, as also discussed in the Air Quality Report. The dispersion calculations have to take all meteorological parameters into account.

- 5) *The Air Quality Report begins by repeating Eskom’s confident assertion, based on a report from 1987, that “it is clear that the most dominant wind direction in this region is from the west northwest to northwest.” No evidence is given for this view, which is pure fiction.*

The historical dataset produced by Eskom is given in Figure A (summer) and B (winter) below (originally contained in the *EIA Inception Report*). The figures indicate that the most dominant wind direction measured was from the west northwest to northwest.

The figures further illustrate the differences between the day and night-time conditions, with the latter observing increased winds from the northwest and north-northwest, indicating the land-sea breeze interactions expected at a coastal site.

- 6) *If it were correct, it would mean that most releases of radio-nuclides from Thyspunt, whether routine or accidental, would be blown out to sea.*

If the calculations were based on the Eskom measurements, the long-term patterns may well be towards the southeast. However, as stated before, the dispersion calculations were based on measurements at Thyspunt and not these observations.

- 7) *The most conclusive evidence of the prevailing wind direction at Thyspunt is the by-pass headland dunefield (one of three in the area), from Thysbaai, next to Thyspunt. This runs overland from south west to north east, and directly to Sea Vista Township and St Francis Bay. This is clearly visible from aerial photographs of the area, and in figures published in the report, such as fig 10.1a of the Transportation Specialist Study. It reflects a high-energy prevailing wind which has blown for centuries, if not millennia, and has*

blown sand overland for 12 kilometres before re-joining the sea at St Francis Bay, to the east of the headland.

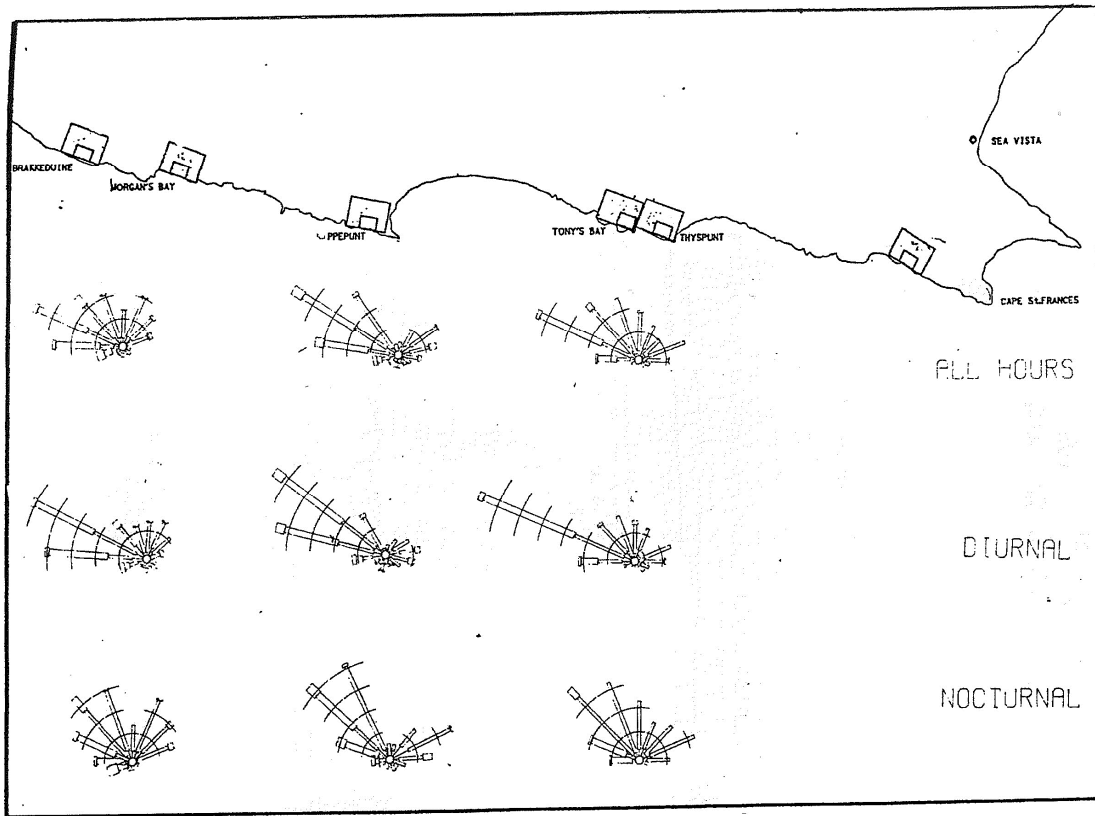


Figure A: Wind roses for summer conditions (Eskom January 1987)

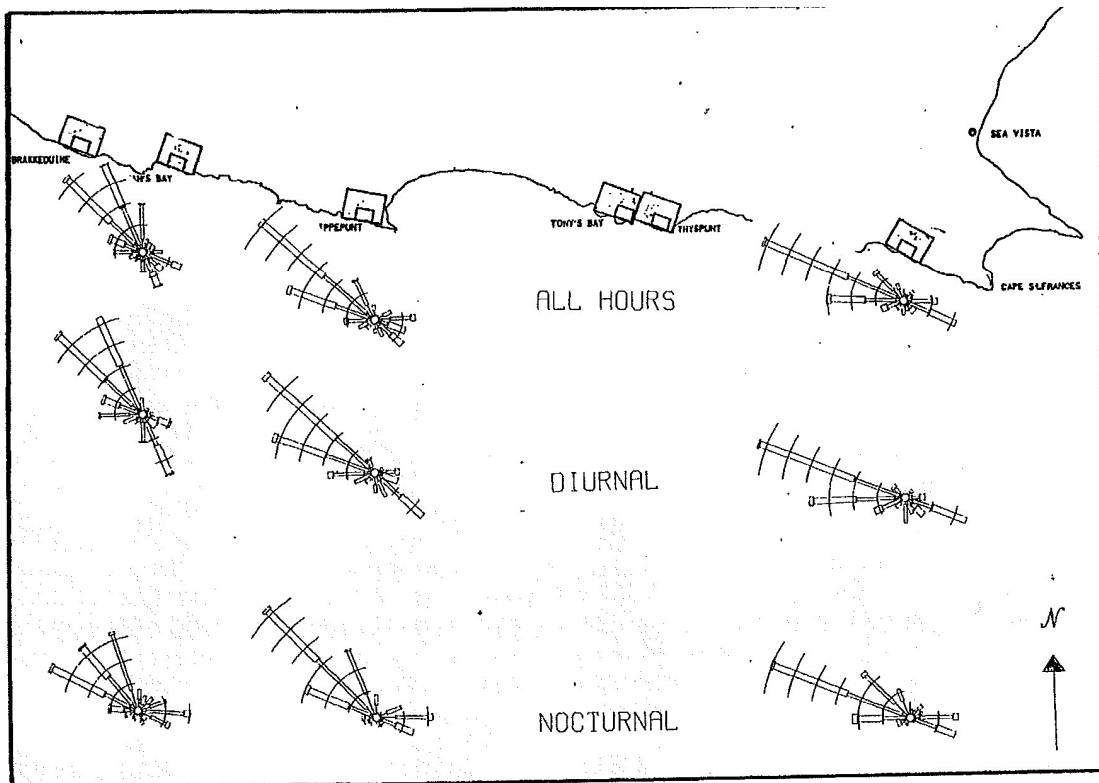


Figure B: Wind roses for summer conditions (Eskom, July 1987)

As shown in Figure C, the wind observations at Thyspunt indicate a dominant westerly wind, followed by a north-north-westerly. However, the dominant **strong** wind conditions occur mostly from the west, west-south-west, east and east-north-east. These are also reflected in the South African Weather Services' observations at Cape St. Francis. Dune movement are influenced by these strong winds (typically above 6 m/s) and supports the wind measurements at Thyspunt.

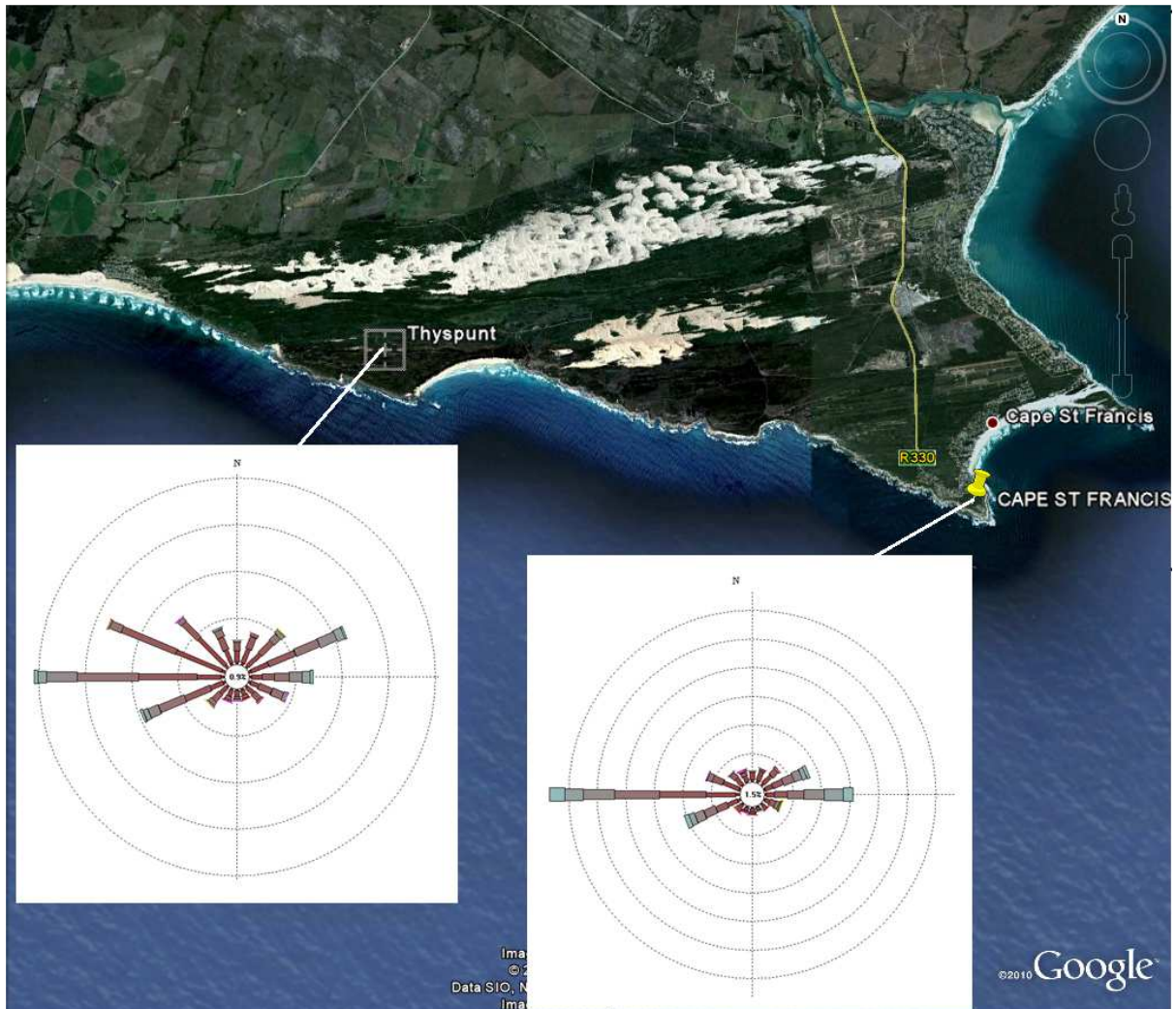


Figure C: Wind roses for Thyspunt and Cape St. Francis, also showing the headland-bypass dune-fields

- 8) *The region surrounding Thyspunt has one of the highest wind energy capacities in the country, hence the proliferation of applications for wind farms in the immediate vicinity.*

This is correct and the statement made in the *RESPONSE* is confirmed by the very low incidence of calm wind conditions, which is less than 1%.

- 9) *The reality at Thyspunt is that the prevailing wind is from the west to southwest; that it is frequently experienced in the area; that it is a high-energy wind; and that it blows directly towards either Cape St Francis or Sea Vista township and St Francis Bay, which are between 11 & 12 kilometres away. The implication of this is that, in the event of an accidental nuclear release while the prevailing wind was blowing at the claimed average*

of 5.8 m/sec (21 kph), the communities of Rebelsrus, Mostert's Hoek, Cape St Francis, Sea Vista Township and St Francis Bay, stretching over 10 kilometres of coastline would have 30 minutes to evacuate, down one escape route, which would in any case be cut by the nuclear cloud. At times the wind speed is anything up to five times this average. The wind direction & strength have a direct bearing on the viability of the Thyspunt site.

The predicted dispersion patterns, as shown in the Air Quality Report (Figures 3-30 to 3-23), were based on the observed hourly average meteorological measurements for a 21-month period at Thyspunt. It should be noted that improved dilution occurs under strong wind conditions. The calculations to determine the worst-case concentrations during accidental releases considered all meteorological combinations based on these measurements.

10) *It is inexplicable that there is no reference whatsoever to the by-pass headland dunefields in the Air Quality Report, which depends instead for its conclusions on evidence supplied by Eskom, and short-term measurements conducted in the area. This despite the fact that it has been raised as an issue in every submission and at every stakeholders' & public meeting held to-date. The fact that it has not been considered at all by the specialist indicates either negligence, in the form of failure to consider issues raised by I&APs, or a deliberate attempt to mislead the responsible authority.*

The conclusions of the study were not based on the Eskom data. The conclusions were reached using onsite data. The predicted dispersion patterns, as shown in the report (Figures 3-30 to 3-23), were based on the observed hourly average meteorological measurements for a 21-month period at Thyspunt. It should be noted that improved dilution occurs under strong wind conditions. The calculations to determine the worst-case concentrations during accidental releases considered all meteorological combinations based on these measurements.

11) *It is, of course, in Eskom's interest to state that the prevailing wind is north westerly, as this would safeguard the viability of the site.*

Refer to item 3 above.

The Air Quality Report

12) *This crucial issue is dealt with in some four pages of the Air Quality Report (Report E10, p. 68 – 72). We believe that it is deficient in a number of respects: i) It begins with an acknowledgement that measurements taken on site are not sufficient for any long-term analysis, and mentions an attempt from December, 1986 to September 1989, which led to limited data recovery due to vandalism of equipment. According to the report, the best data was taken from the period January to September, 1987. This excluded the period October to December, which is locally acknowledged to be the windiest period of the year. This is clearly far too short a period of time to draw any conclusions. ii) Eskom's claim that the prevailing wind is north westerly is contradicted by the evidence of the by-pass headland dunefield in the area, and by all the evidence supplied. None of the wind roses displayed in figs 2-25 – 2-27 or Table 2-23 support this conclusion. Indeed the report itself conceded that the 21 month Survey at Thyspunt indicated westerly, rather than north-westerly winds at Thyspunt. iii) Despite this, the report does nothing to refute the confident assertion regarding the predominant north westerly direction of the wind.*

Refer to item 3 above.

Conclusion

13) *This report is typical of this EIA, in which everything is presented in a way which favours a successful application for an ROD. It is sufficiently misleading to justify a formal complaint to the DEA and even prosecution, and undermines confidence in the entire EIA process.*

The basis for claiming that the Air Quality Report is misleading is not correct. All calculations were done on the measured data at the proposed Thyspunt site. There was also no attempt made to “camouflage” any data or results, as implied by the *RESPONSE*.

14) *The most reliable recent data comes from a wind mast placed east of Oyster Bay by the CSIR as part of the current S.A.Wind Generation Programme. This has only been in operation for some 9 months, but details are available from the CSIR website, wasadata.csir.co.za. It is not known whether this is the information referred to in the Air Quality Report. It will clearly confirm that the prevailing wind is west to south west, and not west north west to north, as alleged by Eskom.to the DEA and even prosecution, and undermines confidence in the entire EIA process.*

The meteorological data recorded at the Thyspunt weather station is considered adequate for the purposes of the assessment. It is not clear why the data generated at the CSIR wind mast should be considered more reliable. The mast is located more than 6.5 km inland and approximately 20 km northwest of the site. In spite of this, the latter dataset was not available for any comparison since monitoring only commenced after the assessment was completed.

15) *We request that this component of the Air Quality Report be rejected, and that the EAP be censured for allowing this inaccurate and fundamental information to remain in the report without being challenged.*

It is with regret that the *RESPONSE* may have misinterpreted the information given in the Air Quality Report. The Eskom information was provided as background only and was not used in any of the calculations. The prevalence of north-north-westerly winds is clearly shown in the Eskom results, as provided in Figures A and B (Item 5, above). The Air Quality Report merely stated this observation from these set of results. Its inclusion or exclusion from the report does not change any of the results.

All calculations were based on onsite measurements at the proposed Thyspunt site. The Air Quality Report also illustrated and discussed the similarities and differences between the observations made the Thyspunt weather station and Cape St Francis.

I trust that the views expressed will be taken in good faith.

Yours sincerely,

Dr L W Burger
Managing Director