GIBB
ENGINEERING & SCIENCE

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

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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 APP 24: HUMAN HEALTH RISK 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:

General comment

One of our objections to this entire EIA process is the tendency to exclude important material negative factors which could influence the decision-making process. The most extreme is the exclusion of the NNR from the EIA, and with it the awkward question of the viability of the Thyspunt site in terms of emergency planning & evacuation. This is one of the major issues at the Thyspunt site. There is evidence of these exclusions in this report, and it is difficult not to conclude that there is a deliberate policy at high level to evade the implications of viability, and its potential impact on human health issues throughout the EIA. The report is entirely theoretical and pays no attention to the specific issues related to reach site.

COMMENT FORM INDEPENDENT NUCLEAR SPECIALIST
The is a correct statement of the regulatory situation - there is no exclusion of the NNR the EIA process is but one part of an overall set of processes of which the NNR licensing process is another governed by different legislation

Response 1:

As indicated repeatedly in public forums and in EIA documentation, the separation between the EIA process and the NNR licensing process is based on the legislative provisions of the relevant Acts, namely the National Environmental Management Act, 1998 and the National Nuclear Regulator Act, 1999, as well as the DEA / NNR co-operative agreement, which governs the consideration of radiological issues in EIA processes and the interaction between the DEA and the NNR in terms of their respective mandates for environmental and radiological safety (See Appendix B4 of the Revised Draft EIR). The agreement clearly stipulates that issues of radiological safety are within the mandate of the NNR. Furthermore, it is not within the mandate of the Environmental Assessment

Practitioner to question the legal mandates of either of these statutory bodies or the validity of their agreement. We must, therefore, conduct the EIA based on their mandates and their agreement.

In this regard you are also referred to the then DEAT's approval of the Scoping Report, dated 19 November 2008, where the following is stated:

> 2.21 All radiological issues raised during the EIA process, which are not comprehensively addressed, must be explicitly referred to the NNR to be addressed as part of their process.

This response by the DEAT clearly acknowledges that there are some radiological issues that cannot be comprehensively addressed in the EIA process and can only be addressed in the NNR's nuclear licensing process. However, in recognition of requirements in the NEMA, associated legislation such as the Promotion of Administrative Justice Act, 2000 (Act No. 3 of 2000) and other legal precedents that require the consideration of all relevant socio-economic factors in an EIA process, an assessment of radiological impacts of the proposed power station is included in the current version of the EIR. Although this approach of including an assessment of the radiological impacts of the proposed power station results in a risk of duplication between the EIA and the NNR licensing processes, the risk to the EIA in terms of possible appeals, based on the exclusion of substantive issues such as health issues from the EIA process, is regarded as greater than the risk of duplication. The current version of the EIR therefore departs substantially from the approach in the previous versions of the EIR in terms of the consideration of radiological impacts.

The Human Health Risk Assessment is based on the assumption that the power station will comply with all relevant legal requirements and criteria stipulated by the National Nuclear Regulator. Provided that such compliance is achieved, there will be no health impact on the public during normal operating conditions.

Comment 2:

Specific comment

Accidental releases
Attention is drawn to the total absence of any discussion on unscheduled/accidental releases, and their implications for human health and viability.

Response 2:

Please refer to Appendix E33 of the revised Draft EIR (Version 2) for a discussion on Beyond Design Basis Accidents..

Comment 3:

Generation III technology
The entire EIA is based on the assumption of use of Generation III technology. This is defined in Chapter 3, section 3.5, and has a number of good qualities. These include standardized design, simplifying the process; simple, rugged construction, reducing vulnerability; high availability and longer life; reduced possibility of core meltdown; minimal effect on environment; higher burn-up optimizing fuel use and reducing waste; and absorbers to extend fuel life. All of these are significant potential improvements, but unfortunately the government has pronounced that Gen III is unaffordable!

Everything is expressed in relative terms, in comparison with Gen II. There are no absolutes. Nobody has yet claimed an "inherently safe" technology (apart from the PBMR which was rejected). Even Gen III still requires EPZs, albeit claimed reduced ones.

Response 3:

In 2009, Eskom abandoned the procurement process due to funding constraints particularly in the context of the global financial crisis. At that stage Government supported this decision to ensure that Eskom does not over-extend its balance sheet and that Eskom's ability to provide the economy with competitively priced energy is not jeopardized. The procurement process will now be led by Government.

To make an absolute statement that there can **never** be an incident with a nuclear power station would clearly be deceptive. No technology, whether nuclear or non-nuclear, is completely fool-proof. However, the question that needs to be answered is whether the risk can be mitigated to an acceptable level. The risk of nuclear incidents in a Generation III power station is, due the passive cooling systems, orders of magnitude smaller than with a Generation II power station, such as the Fukushima Daiichi plant, of which the first unit started operating in 1971. In terms of the reduction of the possibility of core melts the IAEA has issued guidance that while a Core Damage Frequency (CDF) of 10^{-4}/yr is acceptable for current reactors, new construction should achieve 10^{-5}/yr as required by the EUR. Construction of Fukushima Daiichi started in 1967. There have been huge advances in nuclear power station safety designs in the intervening four decades. Please consult the Radiological Impact Assessment and the Beyind Design Accident Report in Appendix 32 and 33 respectively.

Comment 4:

"EURs"
The reduced EPZs are in terms of so-called "EURs" – European Utility Requirements (N.B **not** European Union Regulations, as might be expected from the acronym). These are a product of the European nuclear industry, to further its own agenda. There is extreme scepticism in the public mind regarding EURs, which have not been recognized by any national nuclear regulator anywhere in the world. Were South Africa to use EURs as their regulatory criteria, we would be the first country in the world to do so.

Response 4:

The EUR is a specifications document drawn up by electricity utilities to give guidance to designers and vendors on the expectations of the utilities. It is thus not a document that is approved by the Regulatory Authorities. Current plants being plant, EPR and the AP1000, comply to the EUR requirements on the EP zones.

Comment 5:

Fig 3.1, p.7
One of the strategies being employed by Eskom is to suggest that the prevailing wind in the area is from the north-west (for example in the Air Quality assessment). This is a complete fabrication, sucked out of their thumb by Eskom during the nineteen eighties, and not supported by any of the scientific evidence. The reality is that the prevailing wind is from the west to south-west, with a lesser frequency from the east. North-west is fairly rare in this area, and normally associated with a berg wind, which precedes the arrival of a cold front. This materially affects the potential impact on human health, since a north-westerly wind would blow any radio-nuclides released from the plant out to sea (bad news for the chokka industry!), whereas a westerly to south-westerly wind would blow them directly onto the Greater St Francis communities, all of which are within the internationally recognized 16 kilometre EPZ.

We therefore question the source material from which Fig 3.1. on p.7 is drawn. Whilst it does reflect the prevailing westerly and easterly winds, it also reflects a surprisingly large bulge to the south, which would not normally be expected from a westerly or easterly wind. We request the DEA to require evidence of the source material used.

Response 5:

With regards to the issue of wind direction and the potential impact on St. Francis, please refer to the attached detailed response by air quality specialist. Portions of this response relevant to the above-mentioned comment are reproduced for convenience below. GIBB furthermore welcomes any scientifically verifiable data and statements to what is provided by the specialist below:

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). A significant portion of the Air Quality Report discusses the 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.

The sources of the data used in the Air Quality report are indicated below. 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 Brakkeduine (December 1986 to September 1988);*
- *The South African Weather Services' weather station located at Cape St. Francis. Data collection started in 2004; and*
- *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 that 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).

Comment 6:

Page 8, para 3
Once again, the Greater St Francis area, which includes Rebelsrus, Mostert's Hoek, Cape St Francis, Sea Vista and St Francis, with an estimated holiday population in excess of 30000, is completely ignored. All of these communities fall within the current internationally recognized 16 km EPZ. The questions raised are why this is, and whether the omission derives from the specialist, or from editing of the report by the EAP. Either way, it is totally unacceptable, and reflects on the allegation contained under "General comment" above.

Response 6:

The dispersion modelling in the Air Quality Assessment is based on risk i.e. it focuses on the area that could experience potentially highly significant impacts.

As far as the EAP's editing of specialist reports is concerned, the editing was focused primarily on:

- grammatical and formatting corrections;
- ensuring that the specialist reports sufficiently answered the questions raised in the EAP's Terms of Reference provided to each specialist;
- ensuring that all specialists correctly and consistently applied the impact assessment criteria for determining impact significance; and
- General quality control.

The EAP has not in any way edited the technical findings of the specialist reports.

Comment 7:

Page 11, section 4.1.2 "Initiating events"
Who in this world is able to predict whether an activity will occur once in 100, or a million years? As a yardstick, this area has had "one-in-200-year" floods four times in the last 15 years. The reality is that accidents do happen, sometimes as a result of human error, sometimes through over-optimistic service & replacement intervals and sometimes through an extreme natural event. In the past few years we have left a spanner in the turbine at Koeberg, have blown up a R3 billion generator at Duve[1] (sic) Power Station, and have had an "inconceivable" tsunami at Fukushima. The three different categories of risk are desk-top exercises, exploring different theoretical categories. They have no practical application. The reality is that nuclear power generation remains a hazardous and potentially catastrophic technology, which demands a strong application of the precautionary principle, especially in the light of Fukushima.

Response 7:

An assessment of risks must include an analysis not only of the intensity or severity of an impact, but also of the likelihood that it will occur. Such risk-based approaches are used commonly in engineering (for instance, in determining the areas subject to inundation during a 1:50 year flood event) in order to ensure human safety.

It goes without saying that the future cannot be predicted with absolute certainty. However, your statement implies that it is worthless to use a risk-based approach by applying statistical analysis to determine the possible return period of major event. To use an analogy, this would for instance mean that return period flood-line analysis (1:50 year analysis is currently used in South Africa)

[1] Presumably a reference to Duvha Power Station

could ever be safe enough to protect residential areas from flooding. This would effectively sterilise decision-making for urban planning purposes.

Return periods of catastrophic events are correspondingly larger in the case of nuclear power station planning, specifically to cater for potential nuclear disaster situations. For instance, nuclear power station planning is based on 1:1,000 and 1:10,000 year extreme rainfall events, with and without climate change. As indicated in the Hydrology Specialist Report (Appendix E6 of the revised Draft EIR), the 1:10 000 year rainfall event is specifically selected in the case of Nuclear Installations with a view to build in a large safety factor.

RESPONSE FROM THE INDEPENDENT NUCLEAR SPECIALIST

Agreed - a risk based approach can identify the likelihood of when and event may transpire but not when - such risk informed decision making is present in most engineering endeavours and where the risk is unacceptable - having applied appropriate conservatism then engineered measures and deterministic assessment is normally applied

Comment 8:

Assessment in terms of pure theory
The assessment is purely theoretical, as is the Social Impact Report. There are no specific impact assessments, no reference at all to the three sites under review, or to unscheduled releases, or to variations in local conditions. It is a pure text-book exercise, and is worthless in terms of assessment of sites for Nuclear 1.

Response 8:

The Air Quality Assessment is based on sound empirical atmospheric data and internationally recognised dispersion modelling techniques. Should you have any information to dispute the validity of the scientific methods used in this specialist study, kindly provide us with a reasoned motivation for your statement.

Yours faithfully
for GIBB (Pty) Ltd

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Nuclear-1 EIA Team