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Attention: Professor F. Ellery

Dear Sir

ESKOM ENVIRONMENTAL IMPACT ASSESSMENT (EIA:12/12/20/944) FOR A PROPOSED NUCLEAR POWER STATION AND ASSOCIATED INFRASTRUCTURE: COMMENTS ON THE DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Your correspondence to Ms. Bongi Shinga of Acer (Africa) entitled *"Comment on the Expert Reports"* refers.

Arcus GIBB acknowledges receipt of the above-mentioned letter. We thank you for your comments and your participation in the Eskom Nuclear Power Station (NPS) Environmental Impact Assessment (EIA) process to date. Your questions and comments concerning the Nuclear-1 have been noted.

Responses to your comments / questions are as follows:

Your comment (1a)

Failure to recognise the occurrence, distribution and threats of debris flows in this landscape

Introduction
This is a summary of what I think is important to understand about the Oyster Bay headland-bypass dunefield in respect of possible developments linked to the proposed Thyspunt nuclear power plant. It constitutes a fundamentally different view of the processes involved in the structuring and functioning of the Oyster Bay Headland Bypass Dunefield than the one presented by Dr Werner Illenberger in his specialist report for the proposed nuclear power plant at Thyspunt. The important difference relates to the roles of wind and water in the structuring of the headland-bypass dunefield, particularly with respect to the intermittent occurrence of debris flows. Failure to describe debris flows and to explain their occurrence is a concerning omission by the specialist, particularly since they are a threat to infrastructure that will provide vehicular access to the power plant. Furthermore, the involvement of one or more vehicles in a debris flow is potentially hazardous, as a debris flow would potentially bury a vehicle and its contents.

At the outset it should be noted that deposits resulting from debris flows are present in the sedimentary record around St Francis Bay, reflecting their occurrence before humans altered the landscape appreciably. This suggests that debris flows are natural and will happen again. I am alarmed that as far as I can tell, these features have been nowhere described in the specialist reports. Until their origin can be understood, and their extent in this landscape fully described, I believe that the specialist reports are fundamentally flawed. Even more alarming is the fact that I drew this to the attention of a number of specialists earlier in the process, but due attention was not paid to my comments or suggestions.

Response (1)

The contributions made by wind and water to the sediment dynamics of the Oyster Bay Dunefield are clearly expounded in the Dune Geomorphology Report, and were first recognized and described long before Prof Fred Ellery and his colleagues first visited the area.

Dr Werner Illenberger was asked in June 2010 to investigate the supposed debris flows and debris flow deposits as well as the November 2007 flood. The investigations have not been presented as an Addendum Report to the Dune Geomorphology Report. A preliminary summary of his findings, presented without prejudice and reserving the right to make changes subject to the outcomes of the Addendum Report, are:

1. Dr Illenberger has never in his numerous field visits, including some visits shortly after flood events of the Sand River, found any evidence of debris flows or debris flow deposits. Dr Illenberger has perused the literature and consulted with a number of specialists well-versed in sedimentology and with extensive knowledge of the area, and their unanimous opinion is that the supposed debris flow deposits are conventional river flood deposits of sand, some mud, a few pebbles, and some plant debris, made by the Sand River. The quicksands that occur during floods of the Sand River result from lateral or upward pressure of groundwater in some areas. Vehicles are not washed away by these floods; they may settle in quicksands generated by the Sand River when in flood. These statements have been substantiated in the Addendum Report.

2. The November 2007 flood Prof Fred Ellery alludes to was a case of erosion and transport of sediments by strongly-flowing floodwaters along the steep V-drains along the R330, which sediments were subsequently deposited in the style of alluvial fans where flow speed dropped. These floodwaters did not originate from the Sand River. These statements have been substantiated in the Addendum Report.

Regarding consultation with Prof Fred Ellery and the "Rhodes Research Group", Dr Illenberger first contacted Prof Ellery by phone in October 2008. It was agreed that a field visit should be conducted to the sites that Prof Ellery and the "Rhodes Research Group" had studied. This site visit never took place, despite numerous communications from Dr Illenberger. Numerous telephone and e-mail correspondences followed, including other members of the "Rhodes Research Group": Ms Lauren Elkington, Ms Gillian McGregor & Prof Richard Cowling. When Dr Illenberger requested (and received) from Ms Lauren Elkington her MSc project proposal, Prof Ellery also supplied a document "RhodesUStudyModel.doc" that contained some preliminary results from Ms Elkington's fieldwork: 16 measurements of surface elevation, groundwater depth, and groundwater electrical conductivity, along a 6 km length of the Oyster Bay Dunefield (the dunefield is 18 km long). This was in May 2009. She requested that no data be used until her thesis was completed; and it was agreed in December 2009 (when the draft Dune Geomorphology Report was being completed) by Prof Ellery and other members of the "Rhodes Research Group" that the below statement should be placed in the Dune Geomorphology Report:

> "A study investigating the structure and functioning of the Oyster Bay Dunefield system is being undertaken by a group led by Prof Fred Ellery and involving Gillian McGregor and Lauren Elkington, all from the Department of Environmental Science, Rhodes University; Richard Cowling from the Nelson Mandela Metropolitan University. An MSc thesis entitled "Morphology, patterns and processes in the Oyster Bay Dune field system" by Ms Lauren Elkington is at an advanced stage of preparation. This is a work in progress, and the data collected cannot be presented or discussed here until the MSc is completed. However, if the thesis is completed before the final Environmental Impact Assessment Report is completed, the results of the thesis will be incorporated. This course of action was agreed upon after discussion with Prof Ellery and his group."

This statement is on page 34 of the Dune Geomorphology Report, under the heading "2.3.7 Academic investigations currently underway", which was included in the Draft EIR provided for public comment in March 2010.

Dr Illenberger checked with Prof Ellery and members of the "Rhodes Research Group" on numerous subsequent occasions regarding the status of Ms Lauren Elkington's MSc, the last being an e-mail sent on 18 May 2010, to which Prof Ellery replied that the MSc is still not complete, and that the above statement was still valid. Prof Richard Cowling responded in an e-mail dated 24 May 2010, saying that he thought information that would help the EIA should be made available.

At the public participation meeting of 25 May 2010 held at St Francis Bay, Prof Ellery agreed that he should release information and data for inclusion in the Dune Geomorphology Report. A 2-hour meeting of Prof Ellery and Dr Illenberger was held on 16 June 2010, but Prof Ellery forgot to bring his photographs of the supposed debris flows. He promised to e-mail them, and sent three photographs and a brief description on 25 June 2010. Dr Illenberger requested more detailed photographs; he did not receive any, but Dr Pete Illgner kindly supplied further photographs. Prof Ellery was requested to supply the locality of the supposed debris flows and a paper on wetlands in preparation (i.e. unpublished) in an e-mail of 2 July 2010, and he sent these in an e-mail on 6 July 2010. This paper did not investigate any wetlands in the greater Cape St Francis – Oyster Bay area, and debris flows are not mentioned at all in the paper. Dr Illenberger requested permission to use groundwater levels from the 16 measurements in the aforementioned document "RhodesUStudyModel.doc". To date (21 July 2010) no reply has been received. It does not seem that blame for poor communication and correspondence with Prof Ellery and the "Rhodes Research Group" should be placed on Dr Illenberger.

It is stated in the comments that Prof Ellery of Rhodes University Department of Environmental Affairs has detailed knowledge of the by-pass headland dune system, and is able to point out concerns regarding potential debris flow and liquefaction of any road using this unstable sand system for heavy-load traffic. Dr Illenberger is not aware of any scientific publications on the above-mentioned subjects by Prof Ellery; when asked to provide scientific publications, Prof Ellery said that there were none. It is requested that the St Francis Kromme Trust please bring to the attention of Dr Illenberger any formal scientific writings that would form the basis for meaningful scientific debate. Additionally, Dr Illenberger would appreciate a CV detailing Prof Ellery's experience in the Oyster Bay Dunefield and the greater Cape St Francis area.

Your comment (2)

Our study approach

The approach of the research group from Rhodes University to understanding this problem has been multifaceted. This does not mean that we do not place value on what has been done previously, because the work of Drs. Jennifer Birkinshaw and Werner Illenberger is extremely valuable and of exceptional quality. But, the nature of science is to question in the hope of shedding new light, and this was our intention. We do not wish to discredit or undermine the work of colleagues working in the same field as ourselves.

The interest of the Rhodes Research Group was on understanding the formation and dynamics of wetlands in the area of the bypass dunefield, because these sorts of wetlands have never before been described in South Africa. It became clear that in order to understand the structure and function of these wetlands required analysis of the geomorphic processes operating in the landscape. This led us to discover the debris flows in the sedimentary record and to start asking questions about why these occur. The links between wind, sand and water then became clear, and our approach led us to developing new ways of thinking about this system. Our argument simply is that the Oyster Bay Dunefield is not just about wind and sand as suggested by the specialist reports, but that groundwater

(and occasionally surface water where it transports large quantities of sediment as “debris flows”) is a critical further factor to consider. Given this, our data comprises the following:

- The current overall morphology of the mobile dunefield and its relationship with adjacent stabilised land surfaces
- The elevation of the groundwater surface of the dunefield measured monthly over the period of 1 year
- The electrical conductivity of groundwater and its variation as measured monthly over the period of 1 year, giving a measure of insight into the operation of the groundwater system.
- The distribution of vegetation based on plant functional types in wetlands in the dunefield, giving an indication of the dynamics of the dunefield and groundwater system
- Variation in grain size of sediment in the dunefield – a standard geomorphic measure of downstream transport capacity
- Variation in the position (and “size”) of dunes over several decades as measured from orthometrically rectified aerial photographs, providing a sense of sediment flux through the landscape.

It is the synthesis of these data that have provided the basis for our current understanding of the structure and functioning of the headland-bypass dunefield. I will not present these data in detail, because this is in the process of being written up as a Masters Thesis by Lauren Elkington from the Geography Department at Rhodes University. I would like to make these data available to the proponents of the proposed nuclear power plant, but the data are not in my possession and Lauren Elkington is overseas and not able to readily provide the data as they are in a preliminary form. What we will do here is present the material findings such that her Master’s Degree is not compromised in any way.

Response (2)

As mentioned previously, the acknowledgement of the contributions made by wind and water to the sediment dynamics of the Oyster Bay Dunefield are clearly expounded in the Dune Geomorphology Report (Appendix E2 of the Draft EIR), and were first recognized and described before Prof Ellery and his colleagues first visited the area.

The overall morphology of the mobile dunefield and its relationship with adjacent stabilized land surfaces have been studied and described by many specialists, and are discussed in the Dune Geomorphology Report and Geology Report.

Dr Jenny Burkinshaw undertook a study of variation in grain size of sediment in the dunefield in her PhD thesis. She did a very careful and detailed study of variation in the position and size of dunes over several decades using aerial photographs and orthophotographic maps covering the time period 1942 to 1993. She also monitored individual dunes at three-monthly intervals over a period of one year using accurate survey techniques, and did numerous other measurements. She investigated in great detail the nature and rate of wind-blown sand transport, using inter alia detailed wind profiles obtained from five arrays of anemometer masts deployed along the length of and then across the Oyster Bay headland-bypass dunefield.

In summary the investigations done by the “Rhodes Research Group” as detailed by Prof Ellery do not appear to be groundbreaking. Their field work done on groundwater and wetlands does not extend into the area under consideration for the proposed nuclear power station and ancillary infrastructure, (see Responses to Comments by St Francis Kromme Trust), but relevant data would be added to the Dune Geomorphology Report if it were available, as this would certainly enhance the Report.

This data is apparently in the possession of Ms Lauren Elkington who was overseas at the time of preparation of this response, and is not accessible, according to Prof Ellery (See Comment (2) by Prof

Ellery). If her data became available, Dr Illenberger would gladly integrate relevant portions into the Dune Geomorphology Report. The data should also be incorporated in the wetlands report.

If Prof Ellery has relevant findings further to the above, Dr Illenberger would gladly integrate these into the Dune Geomorphology Report.

Your comment (3)

The structure and functioning of the dunefield
The dunefield has an asymmetric longitudinal morphology in that it slopes gently upwards from west to east to the crest of the dunefield with a slope of 1:135 (0.74%). The dunefield has a central portion that is relatively flat over a distance of 1km. Eastwards of the flat central section the dunefield slopes downwards towards the east with a slope of 1:85 (1.2%). The slopes on the land surface are matched by slopes on the groundwater surface. We find it interesting to consider why the dunefield is asymmetrical and is matched by slopes on the groundwater surface.

Movement of sediment across the dunefield is in the form of mobile dunes. Westward of the head of the dune system, the toes of the dunes erode to the lowest elevation of the groundwater surface. Rainfall raises the elevation of the groundwater surface such that ponds form ahead of these dunes. Eastwards of the central flat section of the dunefield, the groundwater surface also has the same slope as the land surface. We are not sure why this is the case, but notice that it is accompanied by a change in the character of the dunes, such that the system is characterised by long eastward to north-eastward oriented interdune depressions and wetlands that are dominated by a richer diversity of species than in the western part, including plants that are woody. These data, together with groundwater electrical conductivity, suggest that the dunes in the eastern part of the system are more stable than in the western part, and therefore that sediment transport by wind through the dunefield is less efficient in the eastern part of the system than the western part. Our view is that transport of sediment eastwards of the elevated central section of the dunefield is primarily by water. As mentioned by Illenberger in his specialist report (p 26 para 3), the Sand River transports some sediment eastwards into the Kromme River. Our sense is that water is the primary means of sediment transport eastwards in the dunefield, and while the Sand River transports sediment in the northern part of the eastern section, debris flows are an important means of transporting sediment eastwards in the southern part of the eastern section of the dune system. Therefore, the episodic debris flow in November of 2007 in the town of St Francis Bay, was a “normal” event in terms of the functioning of the dune system.

Our view is that failure to recognise the occurrence of debris flows is an extremely important omission in the specialist reports, particularly as these are events that threaten access to and from the proposed nuclear power plant. Should they occur in the vicinity of the power plant, it is possible that the facility itself might be compromised.

In addition to the omission of a discussion of debris flows from the geomorphological study, it was not considered in the transport infrastructure study.

Response 3

The figures Prof Ellery quotes above for the slopes of the dunefield coincide exactly with the data given in the Dune Geomorphology Report, Section 2.3.3, page 26, and are at variance with values based on his work (document “RhodesUStudyModel.doc”, received by Dr Illenberger on 19 May 2009). It would be appreciated that data derived elsewhere than the findings of the “Rhodes Research Group” should be appropriately acknowledged by Prof Ellery, as is usual scientific practice.

The transport assessment is currently being revised and will be amended with any new relevant information with respect to the Thyspunt site.

Your comment (4a)

Hard development in a soft landscape is inappropriate
A comment related to the above, but of a more general nature, simply relates to the worldview of development that arrogantly and shamefully disregards the wonders and workings of the natural environment. I would describe the area between Oyster Bay and St Francis Bay as a "soft landscape". We are cautioned from ancient times to avoid building houses on sand. While the power plant will be founded on rock, the surrounding landscape is soft and mobile! It can be mobilised on a massive scale by wind and water. It is an environment where sand behaves like a liquid when slope thresholds exceed 1.2 %. It is an environment that experiences coastal erosion when trees are planted on shifting dunesands. It is a complex environment that we understand in part – especially with respect to how wind, sand and water interact to produce debris flows that potentially engulf the engineered environment. Not prone to earthquakes, but where failure to consider natural processes can have similar consequences, Eskom has chosen to develop in a landscape that neither it nor its consultants understand.

These comments apply not just to Eskom, but to much development in the area between Oyster Bay and St Francis Bay. Tread lightly and develop softly, or the sand beneath your feet may engulf you.

Response (4a)

Humans have without unusual mishap built numerous structures on and built roads across "soft landscape[s]". As far as Dr Illenberger is aware, none of the numerous existing developments in the St. Francis Bay and indeed greater Cape St. Francis - Oyster Bay area have been significantly destroyed or washed away by debris flows, river floods, engulfed by sand, or otherwise damaged, apart from damage to the houses that were partially filled with sediment in the November 2007 flood and damage to the R330 that was repaired within two weeks.

If local residents know of other damage events, Dr Illenberger would be very grateful if he were supplied with such information. He would like the date of and any photographs of the previous flood that caused damage to the houses damaged in the November 2007 flood. [Dr Illenberger is aware of beach erosion events.]

Your comment (4b)

… Eskom has chosen to develop in a landscape that neither it nor its consultants understand.

Response (4b)

Our opinion is that all available and relevant evidence about the landscape has been studied and that the landscape is sufficiently understood for the purpose of the Environmental Impact Assessment.

Your comment (4c)

These comments apply not just to Eskom, but to much development in the area between Oyster Bay and St Francis Bay. Tread lightly and develop softly, or the sand beneath your feet may engulf you.

Response (4c)

We take note of your comment.

Your comment (5a)

The Oyster Bay Headland Bypass Dunefield as a sediment transport system with marine links was not sufficiently emphasised

The Oyster Bay Headland Bypass Dunefield has links with the marine environment that were poorly described in this study. Firstly, sediment transport as longshore drift along from west to east along the coast, is the source of sediment for the bypass dunefield. The sediment is transported onto land by the prevailing wind, which is westerly to south-westerly. The sediment transported onto land at Oyster Bay would otherwise be transported along the coastline in the absence of the bypass dunefield. Its fate in the nearshore environment east of Oyster Bay is uncertain:

- should the headland-bypass dunefield be rendered ineffective, or,
- should developments along the coast interrupt sediment transport – such as a nuclear power plant with infrastructure that draws in water and pumps it back out to sea.

Response 5a

Your comments are noted.

Your comment (5b)

The links of the headland-bypass dunefield with the marine environment has been very casually investigated, and constitutes a fatal flaw in the study.

For example, the long-term stabilisation of currently mobile dunes is likely to lead to erosion in St Francis Bay. Similarly, the alteration of the sea bed in the vicinity of the proposed power plant, particularly the installation of features that stick out of the sea bed and increase bed roughness in the nearshore environment, will lead to the localised accumulation of sediment that will aggravate coastal erosion down-current. Who will cover the costs of increased coastal erosion caused by installation of the Nuclear Power Plant? In all likelihood it will be borne by the local residents and the local authority. These costs will be aggravated by climate change as erosion of the coastline will increase with sea-level-rise. Failure to take responsibility for this is negligent, and its omission from the specialists report is concerning.

Response 5b

Your comments are noted. Stabilization of mobile dunefields that resulted in major coastal erosion took place in the 1960s. No permanent or long-term stabilization of currently mobile dunes is needed to build the proposed Nuclear Power Station.

Your comment (5c)

The favourability of the area between Oyster Bay and St Francis Bay as a spawning ground for squid ("chokka") may be related to the effect that strong onshore winds have on the characteristics of the residual sediment transported in the nearshore environment by longshore drift. Onshore wind removes the fine fraction from sediment transported by longshore drift along the coastline, leaving a relatively coarse fraction in the nearshore environment between Oyster Bay and St Francis Bay. Perhaps this is

what makes this area so favourable for breeding of this important commercial taxon. This suggestion needs critical investigation as a part of this study.

Response 5 (c)

Your comments are noted. Matters relating to the spawning of squid fall within the sphere of and have been addressed in the Marine Impact Assessment. The Marine Impact Assessment is currently being revised in order to consider additional information that SASMIA has indicated they have in regard to chokka spawning ad fishing grounds. A revised report will be made available for public review and comment as part of the revised Draft EIR.

Your comment (6)

Inadequate planning for the disposal of unconsolidated overburden from the site
The disposal of the unconsolidated overburden that will be removed from the site during the construction phase has been inadequately considered, and represents a serious flaw in the planning process and the environmental study. Disposal of the spoil on the mainland is problematic as the spoil will have hydrological, geomorphological and ecological impacts that at this point have been inadequately considered. Disposal in the marine environment will alter substratum characteristics with potential impacts on flora and fauna as well as sediment fluxes in the nearshore environment. Localised currents and wave action may also be altered due to altered water depth, with possible consequences for local beach erosion and recreational activities. The offshore dumping of dredged spoil from the Durban Harbour has led to refraction of waves, leading to increased wave height and energy on the city's northern beaches. These factors have led to increased wave heights and coastal erosion, and to particularly devastating flooding of the built environment during storm surges. Similar consequences should be expected in the coastal environment between Oyster Bay and Cape St Francis, and it should be possible to determine the nature and magnitude of impacts in this case. No studies have been undertaken to examine such impacts.

Response 6

Response from the Oceanography Specialist:

Sediment transport in the marine environment was assessed by PRDW in the Eskom report, "Environmental Impact Assessment for the Proposed Nuclear Power Station ('Nuclear-1') and Associated Infrastructure, Marine Disposal of Sediment. Report No. J27035. November 2009.

To reduce the impact of the sediment mound on wave refraction in shallow water the following was considered by PRDW:

- the shore-normal dimension of the mound should be less than the shore-parallel dimension.
- the thickness of the mound should be less than approximately 10% of the water depth. The thickness of the mound was standardised to approximately 3 m for all sites assessed, i.e. given the sediment volume to be disposed, the length and width of the mound are selected to give a thickness of approximately 3 m, assuming that all the sediment initially remains on the mound.

Therefore the impact of the spoil material on wave heights and subsequently coastal erosion is only likely to be significant for the shallow water disposal sites at Duynefontein and Bantamsklip, since in these cases the thickness of the proposed sediment mound exceeds 10% of the water depth. However the offshore site is the preferred disposal site at both of these locations, and therefore the impact of wave refraction at the shallow disposal site was not considered further.

Your comment (7)

The heritage value of the headland-bypass dunefield was not adequately addressed
The Oyster Bay Headland Bypass Dunefield is a remarkable example of such a natural system that is nationally significant and part of the heritage of our country. The Oyster Bay dunefields were correctly described in Illenberger's specialist report as "the most spectacular and last 2 remaining active examples of large-scale mobile headland-bypass dunefields on the south coast of South Africa". It arises as a result of the co-incidence of an abundant sediment supply in the nearshore environment delivered by longshore drift, prevailing wind conditions that are strong and oriented across the headland, climate (high rainfall) that sustains a high water table, and geological circumstances that provides a resistant lithology that maintains the headland and the elevated terrain at the crest of the dunefield. This set of circumstances is rare, and the Oyster Bay Headland Bypass Dunefield is the most spectacular of these sorts of systems in South Africa, and one of the best examples of such a system globally. We should look after this heritage.

There is already pressure due to inappropriate development, to limit (halt) debris flows, and this pressure will grow in order to protect infrastructure for the proposed power plant. The environment forever pays for inappropriate development and human folly in unacceptable ways. Thyspunt will forever compromise the integrity of the bypass dunefield system such that its heritage value is lost.
The fact that the headland-bypass dunefield is not on the site of the nuclear power plant does not mean that the dunefield will not be affected directly by the power plant and its associated infrastructure.

Response 7

Dr Illenberger concurs with Prof Ellery on the heritage value of the headland-bypass dunefields at Cape St Francis, and further adds that the vegetated dunes ridges are classic, almost pristine example of a suite of Holocene and Pleistocene dune ridges with a variety of origins (Dune Geomorphology Report, Section 4.3.7, pages 60-61).

Your comment (8)

The wetland study, while exemplary, came to a conclusion that was not supported by the data collected in the study.

Dr Liz Day produced the kind of work for the wetland study that engaged very seriously with developing appropriate knowledge for the problem at hand. It is testimony to the kind of work that needs to be done to assess impacts. Once again, the study focused heavily on the area of the footprint (and its immediate surroundings), and little could therefore be said about wetlands in the area that were not directly impacted.

The wetlands in the area between Oyster Bay and St Francis Bay are spectacular in respect of their diversity and overall environmental setting, rivalling those of the Isimangaliso Wetland Park, which is a World Heritage Site and a Ramsar Site (a recognised wetland system of international importance). The wetlands between Oyster and St Francis bays should form part of a Ramsar Site with a high level of protection.

Unfortunately, the conclusion that the development of the power plant will maximise the protection of the wetlands in the area is nowhere supported by data collected for the study. Since this conclusion could not be supported by the data collected in this study, it should be removed.

Response 8

Response to comments on Ramsar status for site

Dr. Liz Day fully agrees that the wetlands and the associated dune system should form part of a Ramsar site – this is noted in the EIA wetlands report. Ideally, accordance of Ramsar status should have taken place outside of any development proposal. Unfortunately, the proposed Nuclear-1 development is the largest of several developments already planned for the area. The size of the proposed conservation area, and the active conservation management of this area that would be incumbent on Eskom into the future, would however not preclude according RAMSAR status to the area even with a Nuclear site. One of the requirements for RAMSAR status is in fact formal management of the site. The wetlands report recommends that, if the development is approved, this aspect must be pursued by Eskom.

Response to comments on the conclusions of the wetlands report

This comment can be best addressed by a more detailed discussion of the assessment rationale, and Dr. Day's understanding of what is entailed by the "no development" option at the Thyspunt site.

The wetlands report identifies a number of significant information gaps and uncertainties, particularly regarding surface / groundwater linkages, which have resulted in the recommendation that the "no development" option should be applied to the Thyspunt site. However, the report notes that the "no development option" is also associated with a strong likelihood of impact to the wetlands on and off the site.

Existing developments, including small holiday houses within the Eskom site, as well as those adjacent to the site to the east, have all resulted in some level of degradation to the wetlands in their vicinity. Activities associated with degradation include abstraction (including the creation of weirs and reservoirs in wetland areas), the spread of alien plant material into wetlands, *ad hoc* construction of roads / causeways across wetland flow pathways; the construction of fences across wetlands and dune areas; *ad hoc* passage of vehicles through dunes; uncontrolled trampling and grazing of cattle through wetlands. In the wetlands to the east of the existing site, existing (approved and partially implemented) development rights will permit further fragmentation of the so-called eastern valley bottom system. The expansion of other cluster-type development along the area to the east of the site, between the Oyster Bay dunefield and the Thysbaai dunefield is not unlikely, and would contribute to piecemeal fragmentation and degradation of the system as a whole.

Such impacts would not however be likely to threaten the large-scale function of wetlands such as the Langefonteinvlei. These wetlands would however possibly (in the opinion of Dr. Day, probably) function at a lower ecological status class, as a result of encroaching development. By contrast, the present levels of uncertainty regarding the detailed interaction and direction of flow movement between nearby wetlands and the underlying aquifers, and the feasibility of designing a system that effectively limits the radius of draw-down, suggest that there is a significant risk at present that the proposed Nuclear-1 development could result in outright loss of function of the Langefonteinvlei, as well as affect a large proportion of coastal seep wetlands on site.

Given this, the wetlands report recommended the "no development option" and accorded the proposed development a high negative impact significance rating.However, given the conservation problems inherent in the "no development" option, the report also noted that, should the uncertainty regarding wetland / geohydrological linkages be resolved, such that it can be shown **with high confidence** that neither the mobile dune wetlands, nor the Langefonteinvlei wetlands will be affected by drawdown, and that impacts to the coastal seeps can be significantly reduced, then there is scope to consider the development in a more positive light.

Such an assessment assumes that the above aspects can be guaranteed, and that the additional setbacks and on-site mitigation measures referred to in the report are applied. In order to address the

certainty of residual impacts to coastal seep wetlands, however, the report recommends offset mitigation – namely, the inclusion of a significant extent of the duneslack wetlands associated with the Oyster Bay dunefield, as well as the "eastern" valley bottom wetland system, from the site boundary to its point of passage into the Links golf course site. In order to achieve this, the wetland report specifies that the erven shown in the attached figure, east of the site, would all be managed exclusively as conservation areas. The expanded site would include nearly all of the Oyster Bay dunefield, and its mosaic of duneslack wetlands. The dunefield would not be crossed by any new roads, and the hydrological connectivity of the dunes to its dependent wetlands would remain intact.

Dr Day considers that active conservation of a significant extent of these wetlands and their ecological support areas is adequate offset mitigation for the inevitable loss / degradation of coastal seepage wetlands that would be associated with the proposed Nuclear 1 development. Degradation of these wetlands is moreover also considered a reality in terms of the no-development option too – all of the coastal seeps in proximity of the existing houses on the site have been impacted to some or other degree by human activities.

The attached map indicates the area that would be included in the conservation area, in the event that the development was approved. However, the positive rating accorded to the development applies only in light of the current information gaps being adequately filled, and such information supporting the view that the proposed development does not pose any threat to the ongoing functioning of the Langefonteinvlei and the Oyster Bay duneslack wetlands, and that all other mitigation measures are considered feasible, and enforceable.

Your comment (9)

Failure to integrate individual studies to produce systems-level understanding (and an assessment of impacts at the landscape scale)

I found the individual studies compartmentalised and felt that they failed to develop an appreciation of the systems-level (landscape-scale) impacts of the proposed development. This pattern of dividing disciplines is contrary to what we encourage in the Department of Environmental Science at Rhodes University, where synthesis and integration across disciplines is encouraged. We need professionals who can analyse effects at the broadest scale relevant to a development, so that impacts can be truly described and mitigated. While there was a level of cross-pollination between a limited number of studies, this interaction seems to have been concentrated amongst the scientists working in the terrestrial environment. It concerns me that the landscape-level interactions between what happens in the terrestrial and the marine environments was nowhere integrated.

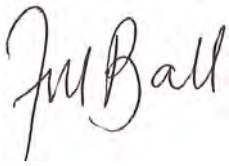
Response 9

Your comments are noted. The practice of individual specialist studies is, however, common and accepted practice in EIAs. There have been many occasions of interaction and integration which ensure dialogue between specialist EIA disciplines, including combined site visits and integration meetings. In addition, specialists have been required to consider the findings of other specialist studies that may be allied to or may influence their own findings and they have done so.

Should you have any queries with respect to the above please do not hesitate to contact Arcus GIBB.

Yours faithfully

For Arcus GIBB (Pty) Ltd



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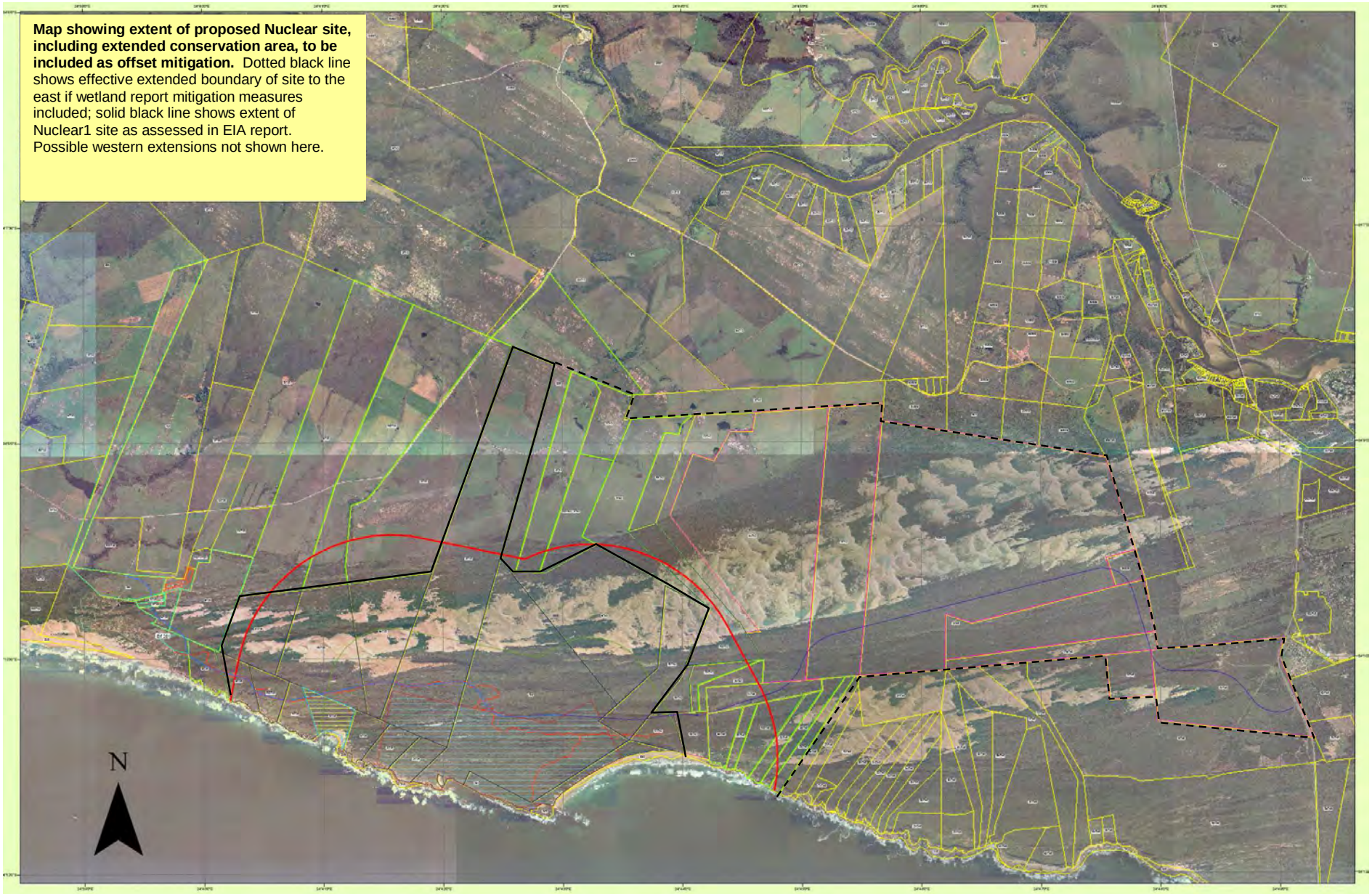
Jaana-Maria Ball
Nuclear-1 EIA Manager


Map showing extent of proposed Nuclear site, including extended conservation area, to be included as offset mitigation. Dotted black line shows effective extended boundary of site to the east if wetland report mitigation measures included; solid black line shows extent of Nuclear1 site as assessed in EIA report. Possible western extensions not shown here.
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