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Dear Mr Becker

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

Comment 1:

Introduction
This document has been prepared by the Koeberg Action Alliance (KAA) in response to the invitation for public participation and comment on the Environmental Impact Assessment for Eskom's proposed Nuclear-1 project.

KAA is a civil society grouping of South African citizens with deep reservations about the use of Nuclear Energy in South Africa.

We are particularly concerned with the actual and potential risks;

- to the health of citizens,
- to the environment,
- related to Nuclear Waste, and,
- to the economy.

KAA is therefore particularly keen to see that the EIA for the Nuclear-1 project is as accurate and complete as possible. We have therefore brought together a team of experts in various fields to examine to volunteer their time to analyse some aspects of the draft report. Of particular interest was the scientific accuracy of the studies, and whether the draft report is objective, or shows bias towards the applicant.

Last year we assessed the first Draft EIR for Nuclear-1 and found that it was incomplete, biassed and erroneous. We identified 36 specific and detailed corrective actions that would have to be performed in order for the EIA to be acceptable. We have now analysed the newly revised EIR in terms of those same issues, and have used the same 13 section headings as before. For details of the required corrective actions please refer to out previous submission. In this report they are simply paraphrased under the title of 'what we asked for'.

Response 1:

Please refer to Appendix E37 of the Revised Draft EIR Version 2 for the Peer Review reports on the Specialist studies conducted. The Peer Reviews found the specialist studies to be objective and adequate for this EIA

Comment 2:

1 Biased treatment of matters related to radioactivity

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What we asked for:
The entire report including specialist reports needs to be rewritten in a fair, objective and neutral manner. Issues relating to radiation need to be dealt with consistently and in appropriate detail.

What we got:
There is little change and no significant improvement to the amount of bias in most of the specialist reports. We still have the situation where potential radioactive leaks have been cherry picked and included in the study only when the results are considered acceptable and excluded where they would be unfavourable to the development.

For example:

1. The air quality reports still excludes abnormal accident scenarios with the excuse that they are beyond the scope of the project.

2. The marine ecology also still excludes abnormal accident scenarios using the excuse that major radiation leaks are just too improbable to consider further because Koeberg has never had a significant radiation leak.

3. The consequences of an accident occurring during the highly dangerous and unavoidable exercise of transporting spent fuel is still just ignored, with the excuse that this issue is not site-specific and somehow that is considered reason enough to exclude it from the EIA.

4. The groundwater report remains the only report to consider a major radiation leak, and we submit that reason why this case is included is because they show that the result of the leak is insignificant, however their result is erroneous.

The faulty groundwater modeling is dealt with later, in section 4. The other three excuses need to be dealt with in some detail as they are used, with slight variations, repeatedly throughout the report and in the responses to comments from the public.

Excuse number 1: Catastrophic incidents need not be included in the EIA.

The excuse that catastrophic accident scenarios are beyond the scope of this project is no longer valid, despite the agreement between the DEA and the NNR.

Radiological issues and catastrophic events have been discussed at formal public meetings, in the IRRs and in some of the specialist reports and in the EIR. Much of the information presented has been biased and incorrect. The only acceptable way forward now is for the EIA to include a thorough assessment of the consequences and possibilities of various incidents leading to radiation emissions in a consistent, objective and neutral manner, taking into account the recent experiences in Japan.

Excuse number 2: If it hasn't happened at Koeberg it can't happen anywhere.

It seems a bit trite to point it out but it needs to be done: just because we have not seen a major radiation incident at Koeberg does not mean it's impossible for major radiation leaks to occur at Koeberg in the future. Koeberg provides a sample size of one, and also has not reached the end of its life time.

Excuse number 3: Only site specific factors are relevant.

The excuse that non-site-specific issues can be excluded from the EIA is flawed. If a radiation leak occurs, the site and surrounds will be affected. So of course such incidents should be covered in an environmental impact assessment.

On the whole, looking at the bias in favour of the development, the EIR is now even worse than it was before.

Although Eskom has claimed that a Fukushima type accident cannot occur at Koeberg, we note that the reactors designs are both from the 1960's/1970s and originate from the same design i.e. Fessenhein. It is not scientifically defensible to state that a large scale accident could not occur, and to use this as a reason for not investigating the possible impacts of such an accident.

The original reports have not been fixed. They remain as biased as before. Some of the new reports are clearly biased. E26 Emergency Response is particularly bad.

In this report we are told:

The Duynefontein Site includes the existing Koeberg Nuclear Power Station, therefore the emergency response infrastructure and systems are in place.

They might be in place and they might even be adequate but we cannot make this assessment if we don't have access to the Koeberg emergency plan. We have attempted to obtain the relevant documentation from Eskom, even reverting to a formal PAIA which was refused (ref. PAIA 10125).

A little further there is another attempt to avoid doing an emergency preparedness analysis:

The outcomes of the Safety Analyses, done prior to commissioning as part of the Safety Analysis Report has to confirm that the current infrastructure would be adequate to cope with the demands of the additional and proposed Nuclear-1 Power Station.

Whatever tasks may be required as part of some other process does not diminish the responsibility of Eskom or Gibb to fulfill the requirements of the EIA. The analysis of the readiness for dealing with emergencies cannot be classified as a nuclear radiation issue covered by the agreement between the NNR and the DEA.

A major part of the emergency response assessment must be to consider the infrastructure available to assist in the case of an emergency. Just one example: In Japan's recent disaster 104 massive fire-engines with powerful pumps and hoses on long extension booms of the type used for putting out fires in skyscrapers were sent out from Tokyo to assist in cooling the damaged reactors. What capacity do we have here for that type of task?

There is some confusion between probability and consequence in the EIR. Enhanced safety can only affect the probability of a nuclear disaster, not the consequences.

It might be unlikely, but it is not impossible that Nuclear-1 could experience a total loss of cooling and suffer a meltdown and a breach of the reactor vessel and a major explosion and then release into the air and spill onto the ground vast quantities of radioactive matter. Possible scenarios that could cause this included an earthquake, a Tsunami, repeated shelling from an artillery gun, a commando style raid by terrorists, a series of operator errors compounded by a series of equipment failures and other scenarios that nobody has thought of yet. Regardless of how unlikely, it is possible.

The purpose of an emergency response assessment is to assess how prepared we are for a nuclear disaster.
It appears to us that this document was authored with the intention of enabling Eskom to minimise its responsibility to prepare for emergencies.

It is totally unacceptable that sheltering, evacuation and iodine prophylaxis are to be excluded from the emergency plans.

If a disaster occurs it no longer matters how enhanced the safety features of the damaged plant was thought to be. What would matter most would be to get people away from danger. And the distance that they would have to be evacuated to would depend on where the radioactive matter is and not on where it used to be or how safely it was contained when it was contained.

The EUR requirements amount to no more than an attempt by NPS suppliers and operators to reduce their costs and avoid their responsibilities via a proposal for reduced safety standards. No democracy

would accept these industries proposed 'standards' and they do not form part of the national regulations in any European country. Referring to them as European and as a 'standard' as though they are accepted by the governments and people of Western Europe is simply misleading, and an indication of bias in favour of the applicant.

FEMA in the USA requires that evacuation plans be made for a 50 mile (80 km) radius around nuclear plants. During the recent nuclear disaster in the Japan the American government advised its citizens to get at least 50 miles away from Fukushima. We see no reason why South Africans should accept a lesser standard. We are all more or less equally susceptible to getting cancer from radiation.

One of the most serious problems with this revision of the EIR is in the responses to questions and comments from the public, the IRR's. On reading these documents it is clear that they have been written by someone who is highly motivated to defend the development.

Status: Worse – additional evidence of bias

Response 2:

Air quality report:
Emergency planning is outside the scope of the EIA process and forms part of the NNR's nuclear licensing process.

Marine ecology report:
Emergency planning is outside the scope of the EIA process and forms part of the NNR's nuclear licensing process.

Transfer of spent fuel:
The proposed project does not involve transfer of spent fuel, since it is proposed that spent fuel will be stored on site until such time as a long-term repository for spent fuel is developed in South Africa.

Groundwater report: Radiation leak:
Your claim that the finding of insignificant impact is erroneous is unsubstantiated and can therefore not be considered.

A major radiation leak was not considered in the groundwater (Geohydrology) report. The two scenarios related to contamination that were considered were 1) incorporation of tritium into the groundwater from air dispersion releases related to normal reactor operations and 2) on-site (reactor footprint area) contamination by an unspecified liquid contaminant. These scenarios were run regardless of the outcomes and not because they show that the result of the leak is insignificant (a claim that is bordering on slanderous). The result may seem erroneous to the reader if the scenario modeled is not understood, as would seem to be the case here.

Groundwater modelling
Your claim of "faulty" groundwater modelling is responded to below.

Probability and consequence of potential impacts:
Your statement of confusion between probability and consequence in the EIR refers. It is incorrect to state that mitigation can only affect the probability but not the consequence of an impact. While there are mitigations measures that are geared towards minimising the consequence after an event has occurred without reducing the probability of occurrence of an event, other mitigation measures are designed to address the probability of occurrence of and event. Thus, if the probability of an event occurring is reduced, there is a chance that the consequence may also be reduced but it does not follow that reducing probability will lead to reduction in consequence.

Your assumption that all nuclear emergency situations necessarily have the same consequence is not reasonable. A small scale release of radioactivity that exceeds legal limits, but which holds no risk to health or to food chains cannot be regarded to have the same consequence as a large-scale release that potentially affects the health of a large number of people. Thus to suggest that all unplanned releases of radioactivity necessarily have the same consequence is simplistic.

Emergency response (Appendix E26 of the Revised Draft EIR Version 1):

Access to Koeberg Emergency Plan and consideration of infrastructure required

EUR requirements:
The basis for adopting the EUR by Eskom is that the EUR aims at ensuring that the design that is adopted has minimal impact on the man and environment. This has been developed by utilities who will, in any case, have their designs studied and endorsed by the relevant regulatory bodies. If the final design does not conform to the assertions made, the design will not be accepted and might have to be modified accordingly until it conforms to these requirements. Thus, the key emphasis of this requirement is to minimise the impact on man and the environment. Eskom has chosen the EUR as this specification is sound and robust. It also allows for alignment with the international nuclear community. The Emergency Plan boundaries allow for minimal restrictions around the site, while also providing for safer designs.

Application of EUR and comparable FEMA Emergency Planning Zones
Nuclear specialist to respond

"Catastrophic incidents need not be included in the EIA"
Your statement that the agreement between the DEA and the NNR is no longer classified as a radiological issue and that catastrophic scenarios are therefore required to be included in the EIA is note substantiated. The DEA / NNR agreement clearly spells out the roles of each of the respective authorisation processes and furthermore states that issues of a radiological nature that cannot be resolved within the EIA process must be referred to the NNR for consideration. GIBB, as the Environmental Assessment Practitioner, cannot ignore the requirements of this agreement as it constitutes a valid co-operative governance agreement in terms of the National Environmental Management Act, 1998.

"If it hasn't happened at Koeberg it can't happen anywhere"
Your comment is noted and as with any other form of power generation project or indeed any form of development, lack of an incident in the past does not guarantee that an incident would never occur. Hence as result of the aftermath of the Fukushima nuclear accident Eskom established an External Event Review Team (EERT) at Koeberg (located in its Duynefontein site) with the view of analyzing and understanding what happened in Japan and to come up with improvements that can be made at its Koeberg Nuclear Power Stations to mitigate against a Fukushima type criticality event.

"Only site specific factors are relevant"
Inasmuch as the KNPS uses Pressurised Water Reactor (PWR) technology, it is instructive to refer to the environmental impacts that have been experienced at Koeberg, and it is indeed required by the DEA to refer to the KNPS environmental experience in order to predict the potential environmental impacts of Nuclear-1. However, your comment is focused on the potential for a disaster occurring at Koeberg, which is beyond the scope of the Nuclear-1 EIA, since this EIA process focuses on the proposed Nuclear-1 power station.

Nevertheless, some response is required with regards to your comparison of the KNPS and Fukushima Daiichi. It is not factually correct to state that the designs of the Fukushima Daiichi plant and the KNPS are directly comparable. The KNPS has a Pressurised Water Reactor (PWR) design and the Fukushima Daiichi plant has Boiling Water Reactor (BWR) design.
The primary reason for the Fukushima Daiichi accident was that the pumps that operated the cooling system, as well as power supply to these pumps (offsite power and backup generators that provided power to the pumps) were incapacitated or destroyed by the tsunami. Resultantly, cooling water could no longer be pumped into the reactor.

The following measures are in place at the KNPS to prevent an occurrence similar to Fukushima, even though no tsunami has ever been recorded on the Western Cape coastline:

- The original design of Koeberg provided protection against earthquakes and tsunamis and loss of off-site power supplies.

- The two nuclear reactors at the KNPS are constructed on an “aseismic” raft, and all the components and plant systems that are important to nuclear safety have been designed to these seismic specifications so that they will be able to perform their expected functions during and after an earthquake.
- A 4 m tsunami (as a result of an earthquake in the South Atlantic) was considered in determining the Koeberg terrace height. This was considered to coincide with a maximum spring tide and a major storm surge and maximum wave set-up and run up, leading to a water level of 7 m above mean sea level. The Koeberg terrace height is at the 8 m level above mean sea level.
- During normal operation, each unit at Koeberg is supplied from two 400 kV lines connected to the national grid. The station also has supply from a 132 kV line connected to the national grid.
- If there is a problem with the normal 400 kV and 132 kV supply, the Acacia open cycle gas turbine power station (far inland) supplies electricity to Koeberg through a dedicated 132 kV line.
- Koeberg has two emergency diesel generators of 5MW each for each unit respectively to provide backup power supply. A fifth emergency diesel generator that can be switched between either of the two units is also installed. These five diesel generators are all located on the Koeberg terrace at 8 m above mean sea level.
- Two smaller (1 MW) diesel generators are installed, one for each unit, and are independent of the emergency diesel generators and physically located in a different place (at a higher elevation [14 m] above mean sea level). They will provide power to the batteries and hence the instrumentation & control systems, and will ensure the integrity of the reactor coolant pump seals – thus enabling the fuel to be cooled through natural convection if all other systems fail.
- There are a further two portable generators on site that could also provide emergency power supplies.

None of these additional measures were available at Fukushima Daiichi to provide power to the power station’s cooling system. The emergency diesel generators at Fukushima Daiichi were based on an assumption of only a 5 m tsunami, which is inappropriate for a country characterised by frequent earthquakes.

Comment 3:

Confusion about time-scales

What we asked for:

Several impacts were incorrectly classified as "short term", when in fact they should have been classified as "medium" and "long term".

What we got:

The time periods have been redefined. The minimum category is now 9 years or less rather than 3 years or less.

This fixes one class of problem: A few impacts that will endure for more than three years but less than nine years that were previously incorrectly rated as short term can now correctly remain in the minimum duration category.

However it has introduced two new fatal errors into the project.

The first fatal consequence of this changing of the time intervals has, like so many aspects of this report, been done incompletely. In table 7-16 the old definitions remain. So now the time intervals are ambiguously defined, and hence many of the rating scores are invalid.

The second fatal consequence is that this causes a watering down of the significance rating of impacts. Serious impacts that last between four and nine years will now ALL be downgraded from medium to low and from high to medium. Processes and ratings methods accepted during the

scoping phase have thus been manipulated to favour the development. This moving of the goal-posts in a way which favours the applicant is one example of a widespread bias in this EIR.

It is now almost impossible to for anything to be rated as significant in this scoring system and almost any activity would be acceptable.

An outrageous hypothetical example:

We demonstrate this by sketching an extreme scenario. The first atom bombs were only expected to have 40 to 50 percent chance of working. Would the DEA allow a trial detonation of one of these atomic bombs in the Kruger National Park? Obviously not, yet according to the rules used for this EIA they would have to allow it to proceed.

We will now proceed to do a detailed analysis of using the Kruger National Park as a test site for atomic bombs using the rules of this EIA. What are the impacts? We consider the following two hypothetical impacts:

Impact A)
At the central blast zone in a crater of about half a kilometre across, all life would be obliterated and the ground so thoroughly contaminated by radiation that it would, like Chernobyl, remain un-inhabitable for about a thousand years.

Impact B)
The radiation over much of the rest of the Kruger Park within 10 km radius would be so severe that nobody would be allowed to enter the area for 15 years.

Now let's do the scoring.

Impact A - 45% Possibility of a total permanent nuclear obliteration of a 500m wide crater in Kruger Park

Criteria	**Rating**	**Reason**
Nature	Negative	
Intensity	High	Natural process will permanently cease. Definition in Table 7-16
Extent	Low	Affects only the development footprint. Definition in Table 7-16
Duration	High	1000 years
Impact on irreplaceable resources	Low	It's only a few hectares of bushveld, which is considerably less than the coastal fynbos.
Consequence	Medium	This particular combination (High Intensity, Low Extent, High Duration, Low Impact) is not specified in Chapter 7, but we can work out the scoring by looking at other impacts that have the same combination, for example in Table4-7 of the Geohydrological report.
Probability	Low	Less than 50 % likely that an impact will occur. Definition in Table 7-16.
Significance	Low to medium	Medium consequence and low probability. Definition in Table 7-16

We repeat this exercise with Impact B.

Impact B - 45% Possibility of 15 years of dangerous radiation over 30 000 ha of Kruger Park Criteria Rating Reason

Criteria	Rating	Reason
Nature	Negative	
Intensity	Medium	Using the definition and terminology from Table 7-16 we note that the environment will be affected as individual animals will die. Tourists will still be able to visit the rest of the park, and so cultural and social processes will continue albeit in a modified way.
Extent	Medium	From Table 7-16. Local Extent (limited to the site and its immediate surroundings, including the surrounding towns and settlements within a 10 km radius)
Duration	Medium	15 years is now considered medium term. (Page 7-34) Impact on irreplaceable resources
impact on irreplaceable resources	Low	The wildlife that dies can readily be replaced.
Consequence	Medium	Intensity is medium and at least two of the other criteria are rated medium
Probability	Low	Less than 50 % likely that an impact will occur. Definition in Table 7-16
Significance	Low to medium	Medium consequence and low probability. Definition in Table 7-16

On page 7-35 this significance rating is defined as below the level required to influence the decision to proceed with the proposed project. How remarkable! This new scoring system is clearly unacceptable.

What these examples show is that just a couple of low scores can completely outbalance very, very serious issues.

In all rating categories the severity of impacts that score high-impact are extreme. For example the impact has to reach beyond 10 km before it can score high in the extent category and so an impact that covers 30 thousand hectares will only get rated as medium-impact. For the scoring to be balanced then impacts that score low-impact should be almost trivial, but this is not the case. In the probability category, for example, an up to 50% chance of an event occurring is rated as low-impact. A 49% chance of something bad happening cannot be considered a low risk in anyone's mind. .

How long is long term?

Why is there an upper limit to what is considered long term? Is it there so the EIA can avoid complying with the requirements with respect to the long term storage of spent fuel?

The conditional acceptance of the Scoping report from the DEAT of 2008 contains:
"2.11 The long term storage of high level nuclear waste must be addressed in the EIR"

During the Milnerton meeting it was asked what the meaning of long term in this sentence was. The consultant initially replied that the question should be addressed to DEAT (who were not present).

Under pressure from the public, the question was answered again that the consultants understood long term meant the life time of the plant plus 10 years, which may come to about 50 to 70 years.

In the field of nuclear waste handling long term is generally considered to mean thousands of years. The consultants appear to have not been diligent in engaging with specialists familiar with the field of long term nuclear waste and hence have failed to authoritatively address point 2.11

Status: Still fatally flawed – in addition the consultants appear insufficiently informed to fulfil the TOR

Response 3:

Time scales

Your comments regarding the definition of impact assessment criteria are noted. Your summary of the assessment criteria for duration is incorrect. As stated in Table 7-16 of the Revised Draft EIR Version 1, duration has the following categories, compared to the initial categories in the Draft EIR of 2010:

Revised Draft EIR Version 1		**Draft EIR**	
Low	0-3 years	Short-term	0-5 years
Medium	4-8 years	Medium-term	6-10 years
High	Longer than 9 years	Long-term	More than 10 years
		Permanent	Permanent

As with all the other criteria, the number of categories per criterion was reduced to three to make the method easier to apply by the specialists and therefore more consistent. A change in the Revised Draft EIR Version 1 is that the duration of the categories has been made shorter. Thus, the category of highest duration now includes any impact of nine years or longer and effectively any impact that commenced at the start of construction and extends into the operational phase of the power station (based on a construction phase of nine years) is regarded to have a high duration.

Your following statement refers: “Serious impacts that last between four and nine years will now ALL be downgraded from medium to low and from high to medium”. This is not correct, since impacts lasting between 4 and 9 years will be considered to have a medium duration. Any impact lasting nine years or longer is considered to have a high (long-term) duration.

Your example of the detonation of an atomic bomb over the Kruger National Park is inappropriate and GIBB will not enter into a detailed debate on the merits of assessing such a hypothetical impact. Your application of the impact criteria is not consistent with how these were applied in the Nuclear-1 Revised Draft EIR Version 1. Your application of probability is incorrect.

There is no upper limit to what is considered long-term. As indicated above, there is only a lower limit of 9 years. All impacts lasting longer than 9 years are considered to be long-term.

With regarding to the long-term storage of radioactive waste, that is the function of the National Radioactive Waste Disposal Institute that has been established by Parliament under Act 53 of 2008. It is the policy of the DoE to establish a central interim spent fuel store (under the NRWDI) for South Africa by 2025. Therefore spent fuel would be shipped to this store from the power station on its closure.

Comment 4:

3 Undetermined risk of earthquakes

What we asked for:

We found several problems in the seismic risk analysis and noted that it was far from complete.

What we got:

Your responses to our comments do not resolve any of our concerns.

Your Response (8)

Reference to " experience in the seismic hazard assessment and seismic design of other nuclear reactor sites in regions characterised by levels of seismicity, and thus expected levels of seismic hazard, comparable to or higher than those encountered in South Africa, such as California and Japan" do not fill one with confidence at all. If anything, the tragic recent experience of Japan, and especially of Fukushima, proves that international regulatory benchmarks, even those of countries with the greatest experienced in relation to earthquake and tsunami risks, are entirely inadequate to guarantee fail-safe reactor design.

The fact that "the investigators acknowledge the limitations inherent to the data and methodology employed so far and the Seismic and Geological Hazard Impact Assessment reports are quite clear about the fact that not all the questions regarding the geological environment have been resolved" amounts to an admission that the job required has not been done satisfactorily. The precautionary principle would suggest that such an admission of an insufficient understanding of the long-term seismic hazards and risks, especially but not only at the Duynefontein site, disqualifies the sites from being suitable for the construction of NPSs, especially in a post-Fukushima world. The repeated assurance that "there is therefore a need for additional work to reduce remaining uncertainties" is entirely unacceptable – either the necessary work has been done and can be considered as part of the EIA, or it has not been done (as is the case here) and is therefore irrelevant to the current EIA.

A postponement of necessary research "due to financial constraints" is not an acceptable excuse for cutting short a comprehensive seismic risk assessment which is crucial in determining the long-term safety of the proposed NPS. Promises of proper studies to be completed or "redone using a different methodology" at some time in the future are simply not good enough. No "informed conclusions" can be drawn from an incomplete study. As it stands, the incomplete and flawed nature of the seismic risk assessment are grounds to disqualify the proposed site as suitable at least until such time as the necessary new and additional research has been completed. It is simply not true that "informed preliminary conclusions" of any real value can be drawn "regarding the suitability of the sites for the development of a NPS" in the absence of a complete set of data.

Your Response (9)

Admission is made that "no new Seismological Risk Assessment was completed since 2007" and again reference is made to "financial restraints" necessitating a postponement of necessary studies. This should not be an excuse for something as important as seismic risk assessment. An EIA for a proposed NPS that does not include state-of-the-art seismic risk assessment is simply not acceptable after Fukushima.

On a more fundamental level, the assumption, made repeatedly in the responses, that "design and appropriate engineering mitigation" will necessarily result in a NPS that is able to withstand any earthquake risks provided good seismic data is available has quite demonstrably been proven fatally misguided and erroneous in the case of recent events in Japan.

Your Response (10)

Once again reference is made to data that is not internationally acceptable and work still to be done ("the future PSHA for Duynefontein…"). Until such work has been concluded, no valid conclusions can be drawn. Referring to studies to be completed or carried out at some stage in the future are not acceptable for consideration in an EIA. Similar references to expected future work are made in most of the other responses.

Your Response (12)

The reference to "successful operation of nuclear power reactors in regions with generally higher levels of seismicity and thus higher seismic hazard levels, such as California and Japan" is unfortunate, ironic and rather tragic in the light of the recent disaster experienced in Japan – a tragedy that has led the country to re-assess its involvement with nuclear power and has prompted its Prime Minister to call for the technology to be phased out in Japan.

Your Response (18)

You state that “the Seismic and Geological Hazard Impact Assessment reports are quite clear about the fact that not all the questions have been resolved and that there is a need for additional work before the green light can be given for the development of a NPS at any of these sites”. Yet the draft EIA report itself states that “based on current knowledge, the three localities under review are considered suitable locations for standard export NPS’s”. These are two blatantly inconsistent statements. The draft EIA report clearly draws a conclusion that is the direct opposite of what the

Seismic and Geological Hazard Impact Assessment reports are “quite clear” about.

Grade:

Status: Specialist report still fatally flawed

Response 4:

Please note that the seismic assessment (Appendix E4) conducted concluded that all three sites were seismically suitable to construct a nuclear power station. Furthermore, please note that a detailed site safety case will have to be presented to the NNR as part of the nuclear license application.

Comment 5:

4 Faulty groundwater modelling

What we asked for:

Geophysical surveys. The team of experts needs to be extended. Geophysicists should be brought in to perform field surveys to locate fractures and more accurately determine the boundaries of the various geological layers.

What we got:

Although we have been assured that a geophysics survey was performed to locate the boundaries of the aquifers no Geophysics report has been made available. It still appears that there may exist underground fractures that could dramatically influence the pattern of underground water movement.

Status: Specialist report still incomplete

Geophysical surveys can be important aids to determining aquifer boundaries. However, they are indirect methods, eg resistivity, electromagnetic and magnetic, and ground-truthing in the form of drilling is needed to calibrate geophysical results. Many boreholes have been drilled at the Duynefontein site over the years, for the KNPS, PBMR and Nuclear-1. It is the author’s position that there is sufficient information on the site to adequately portray and conceptualised aquifers. Geophysics is not going to pick up each and every fracture anyway and underground water movement is towards the coast. There is no existing groundwater abstraction from the fractured aquifer that could change this; all current abstraction is from the primary Atlantis Aquifer, which is one of the most intensely studied aquifers in the country. Additional geophysical work will not significantly improve or change the geohydrology EIR.

What we asked for:

Better determination of aquifer properties.

What we got:
The geo-hydrologist claim that they cannot get better accuracy of these parameters, that it is normal in their work for data input values to vary by an order of magnitude, and that the numerical modelling results are to be seen as no more than a rough qualitative guide and not a quantitative assessment.
Had it been stated in the report that the parameters derived were 100% accurate this could also have been criticized, and rightly so, for being too optimistc given the fact that most geohydrological parameters are derived via indirect methods. This uncertainty is not a flaw in the study/report; it is an inherent issue with groundwater studies worldwide.

This explanation appears to be in direct conflict with their statement that they have a high degree of confidence in their results. But then, as we have pointed out elsewhere, the confidence rating of high medium and low has not been properly defined. So the high confidence doesn't mean anything.
I confirm the high confidence level in the results documented in terms of the broad conclusions reached, eg aquifer definition, groundwater flow directions, groundwater level fluctuations, dewatering, fate of contaminants. However, I have a low confidence in being able to state, for example, that the transmissivity of an aquifer is 12 m^2/day as against 20 m^2/day, or 150 m^2/day as against 200 m^2/day; that its storage is 0.001 as against 0.0001 or that recharge is 15% of MAP as against 20%. These are all uncertainties that any competent geohydrologist will acknowledge. The degree of convergence of modeled groundwater levels with measured groundwater levels gives the geohydrologist confidence in his /her estimations of hydraulic parameters. The calibration of 98% achieved with the Duynefontein flow model is thus an indication that it is highly unlikely that the hydraulic parameters calculated/used in this EIR are erroneous.
The implication of this is that there cannot be any hard statements regarding groundwater flow. All we are left with is a qualitative and subjective opinion of an expert who appears to be biassed in favour of the development.
It is possible to make a “hard statement” that groundwater flow direction is towards the sea and I reiterate that here.

What we certainly do not have is a guarantee that crucially important aquifers will not be irredeemably contaminated in the event of a radiation leak.
A radiation leak from the reactor footprint in the form of say radioactive liquids would not contaminate important aquifers such as the Atlantis Aquifer. However, I do not think it is the duty of the EIA specialists to provide guarantees.
This must be seen as a fatal impact that should terminate the project. Over the next 100 years while nuclear contaminated water will be stored on the site, South Africa will become critically short of water. All accessible aquifers will become crucial irreplaceable resources, even if they are considered to be poor quality by current standards. Even quite brackish water is likely to be used in future as it is much easier and cheaper to filter salts out of poor quality borehole water than it is to desalinate sea water.
However, seawater is a constant source and not subject to limitations related to environmental constraints and seawater desalination is the only viable long-term sustainable option for future large-scale water supply to end-users such as the City of Cape Town.

Status: Specialist report still incomplete

What we asked for:

The use of better software.

What we got:

The response was an argument that MODFLOW is popular and has been used on American nuclear projects.

MODFLOW is popular mainly because it is old, cheap and open source. Correct for older versions but not for up-to-date versions with latest features. For example, SRK has recently purchased the PMWIN8 version of MODFLOW for US$1 190.

MODFLOW has also been used in many academic radionuclide contamination studies, but the reason for this is that the source code is readily available for researchers to modify and extend in order to test pioneering mathematical algorithms. In particular this relates to studies of the very complicated retardation processes that radionuclides are subject to once released into the groundwater systems.
For each of the three sites there was as an attempt to simulate the potential nuclear contamination resulting from a hypothetical incident in which the entire is initially 100 % contaminated right down to the bedrock, (the Scenario 6 numerical models).Yes but the hypothetical contaminant was not specified as being a radionuclide or radioactive. On p50 it is clearly stated that ”contamination type is not specified for this hypothetical scenario” This is a reasonable modelling scenario that would demonstrate some of the consequences of catastrophic incidents that are well beyond design base incidents, such as what might arise from a rapid leak of the water from the spent fuel cooling pond or the escape of supplementary cooling water used in attempts to contain a partial meltdown.

While we accept that MODFLOW is adequate for some of the uses to which it has been put in this study, such as to obtain a qualitative idea about the likely consequences of dewatering during construction, it is in regard to the nuclear contamination scenarios the modeling study is truly appalling and is quite simply wrong. We did **not** model nuclear contamination apart from air dispersion of tritium (a conservative radionuclide that does not react once it is incorporated into groundwater) emissions from normal plant operation. It is clearly stated that air emissions and fracture flow scenarios for contamination are excluded. The respondent has misread the report.

It is just not adequate to use a simple mass transport model to estimate the flow of radioactive contaminants where nuclear reactions with substrate material, adsorbtion into the substrate, radioactive decay and thermal effects also have to be modeled in order to get reasonable results. For this type of problem it is possible, but not easy, to obtain numerical results of determinable accuracy. See for example the work of Ewing, Yuan and Li in the SIAM Journal on Numerical Analysis. As per the previous response, it is not stated in the report that we had modeled a radioactive contaminant.

In response to our previous comments we have been told that the geohydrologists were simply attempting to obtain a qualitative rather than quantitative result. However their quantitative numerical results are too far out to be usable for any kind of interpretation. Simple qualitative comparison with other major nuclear contamination incidents is proof enough of the inaccuracy of their results. The contamination of the groundwater at Fukushima and Chernobyl are several orders of magnitude bigger than this prediction. Any attempt to simulate a Chernobyl-type scenario, (which was in any case less severe that a 100% footprint contamination down to the bedrock) should yield a Chernobyl-type result, where a huge contaminated wedge is gradually moving towards Kiev, 130 km away, where it is expected to linger for 300 years. A Chernobyl-type scenario is different to what was modelled in the EIR and the Chernobyl site is an inland site whereas the Duynefontein site is on the coast. The latter gives rise to a totally different flow path situation and receptor. At a site such as Duynefontein (and Thyspunt and Bantamsklip), the only possible receptor from an on-site reactor (assuming the footprint is located where depicted in the EIR) leakage, e.g. of radioactive water as described by the respondent above, is the coast/ocean because the site is situated at the end of the groundwater flow path. It is not possible to get a “Chernobyl-type result”. It is also not clear from the information provided above if the “huge contaminated wedge” is purely the result of on-site contamination or includes air dispersion of radionuclides and subsequent incorporation into the groundwater. However, it can be deduced that the red line shown on the map below must include air dispersion. If it was the same scenario as depicted in the EIR, there would be preferential migration of the contamination along the groundwater flow path instead of the semi-equidistant development of the contamination zone around the site, with expansion in the direction(s) of the prevailing winds.

The red line in the diagram below marks the dangerously contaminated zone around Chernobyl. The white rectangle superimposed near the bottom left corner is page 52 of the Geohydrological Assessment, reproduced so the map is at the same scale as the main image.

The small red dot in that rectangle is the predicted contamination zone.

(http://www.facebook.com/photo.php?fbid=410162273652&set=o.405140235598&type=1&theater)

This illustration shows that major radiation leaks can be considerably more serious than what is presented in the geo-hydrology report. Agreed, for inland sites and with a Chernobyl-type accident. The Chernobyl contamination zone and the Duynefontein contamination zone are for two different types of sites and occurrences and just because the former is much larger does not make the predicted smaller area for the latter incorrect.

We note further that the report states that "specific contamination type unspecified at this stage". The NNR requirements call for a full source term analysis. So apart from being incorrect by several orders of magnitude, this study is also very far from being complete.

Status: Specialist report incomplete

What we asked for:

Numerical expertise.

The numerical modelling must be redone from scratch, and it must be performed and reviewed by appropriately skilled mathematicians.

What we got:
The team are still includes many earth scientists and no mathematical scientists. Incorrect; Dr Ingrid Dennis, who carried out the numerical modeling, has a BSc in Mathematics and Applied Mathematics. This was pointed out in the previous submission.

Even though some of them have spend many years using simple finite difference programs to assist in interpreting groundwater flow that does not mean that they have sufficient knowledge of the mathematical theory that is required for the nuclear contamination scenarios.

But even the simpler modelling of basic the groundwater flow problem has not been done properly. Apart from all the spacial and time discretisation checks and parameter sensitivity checks that were apparently performed, but not included in the report, there is still something fundamentally wrong with the basic model.

Consider the scenarios concerning the impact of the increase in sea water level on the groundwater system. While the actual consequences of a rise in sea level might not present any significant threat to a power station, the modeling of this scenario is clearly wrong, which indicates that there is something wrong with the modelling in general.

The modeling results are that the effect of an 80cm rise in sea level will cause a 50cm maximum rise in the water table. But this must be wrong. If the sea level rises then the height of the land surface above see level will be reduced. The average gradient of the water moving through the ground from where it lands as rain to where it eventually flows into the sea is therefore less. If the gradient is less, so the groundwater must flow more slowly. If the same amount of water flows more slowly (the rainfall is the same), it takes longer to get to the sea and hence at any given time there is more water moving through the ground in the zone between ground surface level and see level. This means that the water table must rise by more than the rise in sea level, but they've got it as less. Intuitively the effect of a sea level change will be diminished further inland and far enough away from the coast the effect should be negligible. But close to the coast the water table must rise by more than the rise in sea level, and this is not seen anywhere in the results of the modeling.

Status: Specialist report still fatally flawed

Response 5:

This is not a fatal flaw. The increase in sea level was input into GIS and a “new’ coastline derived at the site. This was then input as the new 0 m level western boundary of the model. The resulting groundwater level was simulated and gave an average 0.55 m rise across the site. This was used to provide an indicative increase in groundwater levels and the effect this might have on inflows/dewatering for the reactor excavation. As stated earlier in the EIR, modeling is not an exact science. However, a calibration level of 98% was achieved which indicates that the model is reproducing actual measured groundwater levels to a very high degree of accuracy, which gives assurance and a high level of confidence for the predictions derived for the various scenarios.

Comment 6:

5 Incomplete economic risk assessment

What we asked for:

The economic impact assessment must be repeated. All of the costs that will occur over the entire duration of the project must be included. In the cases of uncertain events a probability of occurrence and associated costs must be estimated. The report must be objective and neutral.

What we got:

Although the economic impact assessment has had a few minor changes it remains just as incomplete and biased as before. Costs associated with uncertain events are still ignored and instead we have been told that it is impossible to quantify the economic costs of such events. But you cannot just ignore something because it is uncertain. Few environmental impacts are ever 100% certain. Estimating unknown costs for events that may never happen is an everyday practice in the insurance industry.

The main purpose of the EIA is to provide information to the DEA to enable them to make a decision on whether or not they should allow the project to proceed at all. The choice between the three sites is a secondary issue. Their decision boils down to a cost versus benefit analysis, and for them to be able to do this they need all costs to be considered, including the uncertain costs of uncertain events. Uncertain events need to be analysed in terms of their cost consequences and probability of occurrence.

We have been told that all of the costs that we identified as missing from the report are included in the costs of the NPS. But the EPRI report that the data is based upon does not included all external costs. In the recent revision of the IRP the cost of nuclear power has been increased by 40% above the EPRI values. The Fukushima incident and the subsequent collapse of the Nuclear Renaissance mean that this cost needs to be increased yet further still.

The economic impact assessment report remains biased.

It still includes a pro-nuclear argument by quoting from a British government white paper (a fairly old report produced for a previous British government). Just about every democratic country now intends to cut back on nuclear power. In the next revision of the economic impact assessment report must be updated with a new quote that is more representative of international opinion on the costs, benefits and risks of nuclear power.

There is a section on the chances of a Chernobyl-type incident occurring that is more propaganda than fact.

It claims that Nuclear-1 would have a containment structure that would be able to "keep the radiation inside the plant in the event of such an accident." That's complete nonsense. No containment structure would be able to to keep theradiation inside the plant in the event of a hydrogen explosion of the type that occurred at Chernobyl. Typically containment domes can withstand a maximum internal pressure of less than 10 bar (145psi). (see http://en.wikipedia.org/wiki/Containment_building)

Bicycle pumps can produce more pressure than that.
(http://en.wikipedia.org/wiki/Bicycle_pump)

The photo below shows the damaged Chernobyl power station a few days after the explosions.
(http://en.wikipedia.org/wiki/File:Chernobyl_Disaster.jpg)

Do our economic's specialist really believe that this kind of damage was caused by an explosion that generated less pressure than a bicycle pump?

The report correctly identifies operator error as one of the primary causes of the Chernobyl accident, but then states that in South Africa safety measures are strictly adhered to and operator errors won't occur. But this is not necessarily true.

For example, a radiation alarm at Koeberg was once ignored for two days.

The report that is inappropriately dismissive of the concerns of the people in Jeffreys Bay who oppose the development.

The section on the results of a Nuclear Disaster gives no estimates of the actual costs of serious incidents, but instead repeatedly emphasises that such events are unlikely.

What is required is an ordinary hazard analysis written in plain language. The report must simply define scenarios corresponding to events ranging from 1 to 7 on the INES scale and estimate the range of probabilities of incidents occurring and estimate the associated costs. Without this, we are not able to participate in an informed and meaningful way with the EIA process.

Status: Specialist report still incomplete

Response 6:

Your comments are note. Please find a response from the Economic Specialist below:

The author of the document criticises the specialist for using a report produced for a previous British Government. Our work was undertaken at a time when the British report represented the most comprehensive independent report available. The fact that it was produced for a previous British Government is not relevant.

It is necessary to take into consideration the exact purpose (scope of work) of the economic evaluation. We were asked to evaluate and compare the three sites (Thyspunt, Koeberg and Bantamsklip), in terms of economic suitability and possible impacts. We were never asked to compare nuclear electricity generation with other forms of electricity generation. The Economic Study is part of an Environmental Impact Assessment for the proposed Nuclear Power Station.

That is what we set out to accomplish: compare the three sites in terms of economic parameters, which includes a risk assessment. The approach was, however, aimed at identifying risk factors that differentiate the three sites from one another. If a too-low risk evaluation technique was used, it would make very little difference to the final outcome as this was applied at each of the three sites. We have confidence in our approach and techniques. To state that the economic evaluation is pro-nuclear or biased is just not true as we have already stated that we were not comparing different electricity generation options, but three different proposed sites.

With regard to Fukushima: it is true that some governments have abandoned their nuclear power programmes but equally true that others are proceeding with expansion. In our opinion, there was an irrational response worldwide to the Fukushima incident. While a recent commission has found that the Japanese regulatory system was weak and that it needs to be improved, the fact remains that the incident was caused by a tsunami. Japan built nuclear power stations on a fault line and a coast susceptible to tsunamis. South Africa will not build its nuclear power stations on fault lines or on coasts susceptible to tsunamis, and it has already reviewed its regulatory system. Moreover, after a longish period since the Fukushima incident no proof has been presented of anybody dying of radiation contamination, while thousands of people died because of the natural disaster.

We stand by our assessment that serious incidents in South Africa are unlikely, and we would reiterate that the architecture and technology of nuclear power stations have changed significantly since the Soviets built Chernobyl and that the safety factors incorporated in new nuclear power stations render the occurrence of a Chernobyl-type disaster extremely unlikely to say the least. Thus, the improbability of such incidents occurring in South Africa makes a scale assessment purely academic and not worthwhile.

Comment 7:

6 Inadequate Agriculture Specialist Report

We note some changes in the executive summary of this report. The phrase 'short term' has been prefixed to the phrase 'negative impact' both times it occurs. This is indicative of bias, and an attempt to de-emphasise the negative impacts. It is also questionable to categorise the construction phase as short term, since this is defined as < 9 years. From experiences at other nuclear plants, time and cost overruns are likely (c.f. the IRP 2010 adding 40% to the quoted cost of nuclear power to cater for overruns). This means that the construction phase may well last more than 10 years, and hence categorising these impacts as short term is not only misleading but also inaccurate.

What we asked for: (33)

Section 5.1 be modified to address the TOR w.r.t. the operational phase.

What we got:

You responded:

"*The operational impacts of a accidental reactor incident on crop production and livestock are accordingly discussed in section 3.3 and 3.4 of the report respectively. All the impacts in Table 5-1 are related to the operational phase.*"

Table 5-1 appeared to us to deal with dust pollution, which relates to the construction phase. We are therefore further confused by your response.

Section 3.3 and 3.4 only deal with an accidental large scale release.
We note that the issue of releases during normal operation, such as releases of tritiated steam and condensate, and the possibility of accumulation in terrain features or bio-accumulation and the resulting effect on agriculture (e.g. dairy farming) is not dealt with, except for the single sentence that has been added in the second draft, which reads: "*Under normal operating conditions there is no effect on livestock or other agricultural produce.*" No justification or reference is provided for this statement, which is unacceptable in a scientific report.

What we asked for: (34)
That the economic impacts of the need for measures such as "the stock would need to be slaughtered or moved outside the danger area." be quantified.

What we got:

You replied:

"*given that the probability of an incident happening is very low, the discussion, assessment and "carry through" of impacts must be seen in this context.*"

This appears to be saying that there is no need to evaluate the impact of such a procedure. In order for us to participate in an informed manner, we once again demand that the possible measures described in this report are evaluated for their economic impact.

What we asked for: (34)

That Chapter 9 fairly presents the possible negative impacts

What we got:

The table 9-51 in Chapter 9 of the EIR still contains only three categories: dust pollution, labour and market conditions.

As before this ignores the possible agricultural impacts (such as loss of export markets) in the case of an incident resulting in a radiation leak. The recent experiences in Japan should be used as the basis for a study, particularly the economic impact on the dairy and beef industries with respect to export markets. It is indicative of bias on the part of the consultants to accept the applicants word that the selected design will be 'inherently safe' without investigation, and hence avoid analysis of the possible impacts of a large scale accident.

What we asked for:

That the agricultural report be redone by someone with expertise in amongst other things, the long term effects of the release of radionuclides on agriculture.

What we got:

This specialist report has not been redone. The fact that Wikipedia is quoted as a source for this report further indicates that it still lacks scientific rigour.

Status: Specialist report still biased and incomplete.

Response 7:

Your comments are noted.

The phrase short term is used as the negative impacts identified it can be mitigated against (e.g. tarring of road) and does not relate to the length of the construction phase.

33: "Under normal operating conditions there is no effect on livestock or other agricultural produce."

Under normal operating conditions and given the release specifications we understand there to be no negative impact to agriculture. Obviously if there is an accidental release then this is no longer valid. However we confirm that emergency planning falls outside the scope of the EIA process and forms part of the NNR's nuclear licensing process.

The DEA / NNR agreement clearly spells out the roles of each of the respective authorisation processes and furthermore states that issues of a radiological nature that cannot be resolved within the EIA process must be referred to the NNR for consideration. GIBB, as the Environmental Assessment Practitioner, cannot ignore the requirements of this agreement as it constitutes a valid co-operative governance agreement in terms of the National Environmental Management Act, 1998.

34: Evaluation of Possible Measures for their Economic Impact

We are referring to the 3km emergency zone only

34: Analysis of Impacts of Large Scale Incident

Please refer to our response under "33" above

34: The Use of Wikipedia as an Information Source

We are not sure where the reference to Wikipedia is found but agree that this should not be used as a reference unless it is referencing a credible source

Comment 8:

7 Flawed marine biology assessment.

What we asked for:

A more complete analysis of the impacts of this project on the maritime environment must be performed.

What we got:

The report still excludes any analysis of radiation emissions. This is concerning when compared to the agricultural specialist report, which states in section 3.5

"*All the sites are located on the coast in close proximity to the sea. Therefore in the event that there is a contaminated spillage and a subsequent seepage into the ground water, this will not affect the ground water used by farmers as they are inland of the sites.*" which seems to imply that such contaminated groundwater would move towards the sea.

The conclusion that unintentional release of radiation emissions are of low consequence and low significance because of the design of the cooling system is not valid. To prove that our argument is correct we need only note that there are actual cases where unintentional release of radiation emissions into the ocean has occurred.

The report recently made available to us titled "The Provision of Groundwater Monitoring Boreholes (Construction Groundwater Monitoring) for the PBMR Demonstration Power Plant Project" shows that radiation has indeed leaked from Koeberg NPS.

This is a list of nuclear plants in the USA where radiation has leaked into the groundwater:

- Braidwood, Byron, Dresden and Quad Cities in Illinois;
- Indian Point and Fitzpatrick in New York;
- Yankee Rowe and Pilgrim in Massachusetts;
- Three Mile Island and Peach Bottom in Pennsylvania;
- Callaway in Missouri
- Catawba in South Carolina
- Oyster Creek in New Jersey
- Hatch in Georgia
- Palo Verde In Arizona
- Perry in Ohio
- Page 14
- Palisades in Michigan
- Point Beach in Wisconsin
- Salem in Delaware
- San Onofre in California
- Seabrook in New Hampshire
- Shearon Harris in North Carolina
- Watts Bar in Tennessee
- Wolf Creek in Kansas
- Connecticut Yankee in Connecticut
- Vermont Yankee in Vermont

Just like Koeberg and Nuclear-1, these facilities also all have cooling systems designed to minimise the risk of unintentional release of radiation emissions. In some of these cases the amounts have been small, but it still serves to remind us that leaks still do occur, despite the fact that cooling systems are designed to prevent this possibility. And of course much bigger leaks have occurred at Chernobyl and Fukushima.

Spent fuel pools, which don't even have cooling water systems, have also been the origin of unintentional release of radiation emissions into the oceans.

In addition to ignoring radiation, the Marine Biology report contains many other areas of concern.

We draw your attention to the following:

- The envisaged 'once-through' reactor resign would affect a very large volume of sea water annually.
- The high importance of marine based eco-tourism in the environs of Bantamsklip and Thyspunt.
- The fact that whales were specifically mentioned in the conditional acceptance of the Scoping Report of 19/11/2008 [clause 2.34.1].

In our opinion there is clear evidence that the marine specialist employed by Arcus Gibb to do the marine ecology study:

- does not have expertise in the field of whales or other marine mammals and
- has failed to fulfil the terms of reference

- overreaches his field of expertise and
- is biased towards a positive result for the applicant.
- In addition, the report has not undergone a professional peer review, and we have not found a review either attached to the specialist report, or elsewhere on the website.

The evidence is as follows (drawn from the specialist report unless otherwise indicated):

1. The author states "We acknowledge that we are not specialists in the field of marine mammals" on page 7 of his response to the Dyer Island Conservation Trust (DICT) submission. On page 16, The "Southern right whales" are given the name "*Balaena glacialis*". This appears to be a mixture of the genus name *Balena* (the bowhead whale) and the species name of the Northern Right Whale, *glacialis*. The author appears to be unaware of the species name of the Right Whales found along our coast which is *Eubalaema australis.*

2. The author frequently references his own work which was done as consulting work for the applicant.

3. On page 32, the terms accident, incident and event are used in a way which clearly indicates the author and the reviewer(s) are not familiar with the INES definition of terms relating to nuclear power stations.

4. The well known alternative to once-through seawater of using cooling towers is neither evaluated nor mentioned.

5. The author in their response to the DICT submission states that monitoring of toxicity of marine organisms is not considered useful, and gives the reason as "the great expense and time commitment required to determine toxicity levels" is not justified. This is not only unscientific, but also appears to indicate the specialist is considering the financial interests of the applicant above impacts on the environment.

We refer you to section 81(1) of the EIA Regulations, which, since inaccuracies have been identified for you, will apply should this specialist report be submitted to the competent authority in its present form. In addition, we submit that this author is in violation of the code of ethics for Environmental Assessment Practitioners (clause 6.2.11) and as such should be excluded from submitting a specialist report for this EIR, and a formal complaint lodged.

Status: Specialist report fatally flawed due to lack of expertise and rigor.

Response 8:

Your comments are noted. Please find the response from the Marine Specialist below:

Radiation

The report has not ignored radiation, but referred that to the appropriate experts. As stated on page 25 of the report "In South Africa the National Nuclear Regulator (NNR) controls radiation emissions released into the environment. As such the proposed plant will be legally required to meet the NNR's dose limits prior to approval." All radiation issues fall under the jurisdiction of the NNR and as such it is not appropriate for the issue to be considered further in our report.

About the Marine Specialists Employed by GIBB

Note that our mandate is to report in Marine Ecological impacts – not specifically those on whales or any other specific taxonomic group. We have a combined experience of 45 years in the field of marine biology (indeed Prof Griffiths has been professor and director of one of the country's leading marine research institutes for over 25 years!). This, plus the fact that we are the only researchers in the country who have hands-on experience in monitoring the marine impacts of an operational nuclear power plant; places us in a an ideal position to appropriately comment on and review the literature regarding such impacts. We have thus certainly not overreached our field of expertise, indeed we are

probably the best placed researchers in the country to do this study (and were first choice candidates to be invited to do so). In an effort to ensure that our assessment is correct the Dr Simon Elwen, a prominent marine mammal expert, has been asked to contribute to the sections of the report dealing with marine mammals. There is no evidence that we have not fulfilled our terms of reference. We are also in no way biased to the applicant, as detailed further below.

Peer Review of Marine Report

This report was reviewed by Emeritus Professor George Branch. If this review has not been made available to the public it is through no fault of ours. In addition, input has been provided by other specialist researchers (for example extensive input by the Squid Working Group) to strengthen those sections of the report, the section dealing with marine mammals will be further reviewed by Dr Simon Elwen.

Southern Right Whale

The species name Balaena glacialis is a synonym to the name Eubalaena australis (note not Eubalaema australis as stated above). This name has been used in South Africa until quite recently. The use of the name on page 16 was a formating error for which we apologise. Please note the correct name is used throughout the rest of the report. Note also that no consutant reporting on an entire discipline (marine biology, botany, freshwater biology, terrestrial fauna, etc) could ever claim to be an expert on each and every of the thousands of species within those systems. Our role is rather to collate and report on such information, as gathered and published by a host of other experts.

Referencing of Work

The work referred to (i.e. the marine monitoring at Koeberg Nuclear Power Station) is very important as it offers vital information from the only comparable development on our coast. We would be severely negligent not to include it.

INES Requirements

There is no requirement that we use the definitions of the INES.

Use of Cooling Towers

This is a design issue and not one relating to marine ecological impact.

Monitoring Toxicity of Marine Organisms

In the reply to the DICT we said: “A monitoring programme considering toxicity in marine organisms during the construction phase is not considered a useful exercise. This is due to the fact that that toxicity levels for chemicals which might be co-released with the brine have not been determined in South Africa (or in many cases they have not been determined at all). Without this basic information monitoring would only be able track levels of chemicals within chosen organisms and attempt to correlate this to changes in the density of these species (without showing causality). The large natural variability known to occur within sandy and rocky shore communities would further complicate interpretation of any such results. Considering the very limited area which is predicted to be affected by the brine and the temporary nature of the impact, the great expense and time commitment required to determine toxicity levels prior to monitoring does not appear to be justified.”

We are by no means partial to the applicant. We have offered our scientific opinion with regards to the value of monitoring toxicity levels. Note also that this highly selective criticism seems to ignore that a whole last section of our report is dedicated to recommended additional monitoring and evaluations programmes that we suggest are done (including those on marine mammals). This clearly demonstrates that we have recommended extensive follow up where it is needed, only not where it is not useful.

Section 81 (1)

It is ridiculous to claim we are in violation of section 81(1) of the EIA regulations or any ethical code. Prof Griffiths is a leading academic in the field of marine biology, has been the Director of the Marine Biology Research Centre at the University of Cape Town for more than 25 years, and is probably South Africa's leading expert on marine biodiversity (and how this is impacted by human activities); while Dr Robinson has seven years post-doctoral experience in the field, specifically including the monitoring of marine impacts of a nuclear power station. We have applied all this knowledge, and that of other contributing experts, in producing the most accurate report possible. The fact that the report has been reviewed and supported by internationally recognised marine biologist Emeritus Professor George Branch reaffirms that our report is an appropriate assessment of the proposed development. In an effort to further ensure that our assessment of potential impacts on marine mammals is enhanced, Dr Simon Elwen has been asked to contribute to the sections of the report dealing with marine mammals.

Comment 9:

8 Sabotage and terrorism trivialised

What we asked for:

We pointed out that on 11 April 2010 a gathering of 47 world leaders including President Zuma attested that they believe that terrorist gaining access to nuclear material is "the single biggest threat" that the world faces right now. Various sabotage and terrorism scenarios must be detailed and all of the associated impacts must be analysed.

What we got:

The response that we received is not relevant to our comment.

In the EIA report potential terrorist acts are still considered to be only "perceived risks" and not "real risks". And because terrorism is seen as only "perceived" and not "real" they suggest as a "mitigation measure" that Eskom undertakes a propaganda exercise, what they call a "reliable flow of relevant and correct information" in the form of "an aggressive community-oriented and comprehensive public information campaign." It is not adequate to address terrorism by claiming that it is not a valid concern and by launching a marketing campaign with the message that terrorism is not a real risk. The recent event in Norway and the completely unexpected act of terrorism there reinforces the fact that we need to consider these risks as real. Therefore, this EIR must examine the possible impacts of these possible worst case scenarios which must be accepted as real possibilities by the consultants.

We still insist that various sabotage and terrorism scenarios must be detailed and all of the associated impacts must be analysed.

Status: As before, EIR fails to deal with these scenarios.

Response 9:

Your comment is noted. GIBB stands by its previous response in this regard.

As part of the requirements planning for the proposed nuclear power station, a complete safety analysis, which includes the possibility of events such as terrorist attacks, must be undertaken by the National Intelligence Agency in terms of the National Key Point Act 1980 (Act No. 102 of 1980), since all power stations are regarded as National Key Points. An EIA process will not duplicate a safety assessment that will in any event be undertaken through another avenue.

Furthermore, the purpose of an EIA process is to predict the potential impact of the development on the environment and not vice versa i.e. the potential impact of possible terrorist attacks on the proposed development.

Comment 10:

9 Dodging the health regulations

What we asked for:

The Human Health Risk Assessment deliberately misquotes the NNR regulations in an attempt to provide a less complete analysis than what the law requires. Misrepresenting the requirements is fraud and evidence of bias. We called for the consultants to be replaced. We pointed out that the analysis must include due consideration of a full and representative range of postulated risk events, including low probability catastrophic incidents, whether of natural origin or human induced. And in order to perform the required calculations on potential impacts on human health, more input data will be required from other specialist studies than what is currently in the reports.

What we got:

In your response to our observation that in the Human Health Risk Assessment there was a misrepresentation of the legal requirements you claim that "The amended paragraph referred to provides a more complete description of operational states". This is not true. The effect of amendments is to imply that nothing beyond design base accidents needs to be considered. In fact the legal requirements are that all potential incidents must be considered.

We believe that this was a deliberate attempt by the authors to distort the requirement of the EIA process and we submit that they did this because they are biassed in favour of the development. We insist that those individuals should be removed from the project and replaced with a new team of neutral unbiased medical experts.

You state further that "One must keep in mind that the study deals with an assessment of the suitability of a site to accommodate a nuclear power station, not the assessment of the inherent safety of a nuclear reactor." This warrants some unpacking.

Your use of the phrase 'inherent safety of a nuclear reactor' indicates a strong personal bias in this matter. The safety of the NPS is disputed. But even if we ignored the fact that the stated probabilities associated with various incidents are disputed and if instead we all agreed on the same set of number to describe the probabilities of various incidents occurring, it still remains a subjective opinion on what qualifies as 'inherently safe'. There is not a number associated with 'inherently'. We also note the consultants were employed by Eskom to do an EIA for the PBMR (Pebble Bed), and in that documentation there is reference to the PBMR design as 'inherently safe', presumably as compared to other designs at the time such as PWR reactors. For this EIR, the consultants now refer to a PWR design as 'inherently safe'. This is contradictory, and also shows a bias on the part of the consultants, who apparently accept the applicants word that any design they put forward is 'inherently safe'.

A better, more neutral, expression of your statement above could be:

"One must keep in mind that an EIA deals with the suitability of a site to accommodate a development and not of the safety issues relating to the development"

In this form we can understand what you are trying to say, but the opinion expressed is still not correct. You seem to imply that the study must answer the question "How will the development be affected by the characteristics of the site" rather than "How would the environment be effected by the development". However it is more important for the EIA to answer the second question. The EIA must therefore include an analysis of all potential health risks associated with the development.

Later you state that
"The report is based on a qualitative interpretation of regulatory requirements ",

and further

"These ... satisfy the requirements of a qualitative interpretation of regulatory requirements ".

We question this "qualitative interpretation" of the law. The law must be complied with fully, and in this context it quite simply means that ALL possible hazards are within scope.

A full analysis must be performed. Several other reports will have to be extended to provide the required information regarding the dispersal of radionuclides through the groundwater, the air and the ocean.

Status: Incomplete - health issues still not addressed.

Response 10:

We have responded to these issues in a previous review. There appears to be a misunderstanding about the purpose of the EIA and what is required by the NNR.

The assessment of radiological dose in the EIA report was conducted as a qualitative assessment, considering that the Site Safety Report will present all the detail that is required by the NNR. This decision was reached on the basis of deliberations and agreement between regulatory authorities. The EIA report cannot produce more than what has been presented. There is nothing that can be added to this.

The study deals with the suitability of the sites for nuclear power stations and the studies are thus site-specific. Aspects that may influence the suitability of a site may be the meteorological conditions, proximity of sensitive receptors, seismic issues, etc.

The issue of “abnormal accident scenarios” is dealt with in design specifications of a reactor, including for example various levels of precaution (defence-in-depth), safety interlocks etc. Complex and thorough procedures of analysis of the entire safety case are followed. These considerations are not site-specific and do not belong in the assessment of the suitability of a site, which is what the EIA report is about.

It is untrue that there is even the slightest possibility that the siting of a nuclear power station will not fully comply with all the acts and regulations of South Africa. Such unfounded accusations do not contribute to constructive debate.

Comment 11:

10 Wishy-washy methodology

What we asked for:

Better definitions of the rating categories.

What we got:

In the response from Gibb states that the assessment criteria "adheres to acceptable international and national guidelines and practices" and anyway had been approved by the DEA. Please provide a reference to what guidelines or in fact any other reputable study where the word 'probable' is used to mean LESS than 50% probability.

We note that only three categories is not enough, especially not for something like a nuclear project where some impacts have very extreme ratings, since this obfuscates the issue by placing incidents of very different probabilities into the same category.

There still remains a problem that the confidence category is undefined, and hence meaningless. Even qualitative estimates of probability need to be based on a numerical definition.

We also note the lack of any validation process of the weighting system used to combine the impacts. This weighting system was concocted by the consultants while they had some data already in hand.

This is a clear weakness in terms of objectivity, and should have made the need for an objective validation of the weighting system clear.

Status: Fatally flawed methodology

Response 11:

Numerical definition / quantification is still based on judgement. Even if numerical values are assigned, it still remains up to the judgement of the applicable specialist or the Environmental Assessment Practitioner to assign a particular value. It is therefore questioned what additional value a quantified approach would provide, as it is in effect no different to the current rating system, which is also based on professional judgement.

The rating system in the Draft EIR, which preceded the Revised Draft EIR Version 1 Version 1, had more than three categories and it was found that this resulted in the specialist team not understanding the rating system and applying it incorrectly. This was indicated by the independent peer review of the EIA process as an issue that needed to be addressed and accordingly, the rating categories were simplified and made more consistent.

Your opinion regarding the "validation" of the rating system is noted. There is no process for validation of impact assessment methodologies. Every discipline has different method and approaches to evaluating data and information. In the field of environmental management, the assessment and evaluation of environmental impacts includes a number of criteria that are applied almost universally in EIAs. These criteria typically include nature, extent, duration, intensity, consequence (seriousness), reversibility, probability and significance.

Although there is general agreement about type of criteria to be included in assessment and there are local and international guidelines on this, there is no single method that is applied universally. It is up to the discretion of the environmental assessment practitioner (EAP) to apply his or her mind to determine the most appropriate combination of criteria for the project under consideration, bearing in mind any requirements that the environmental authority might in this regard. Some EAPs apply only some of the above criteria, others apply all or even more than the ones mentioned above, and in different combinations. Some EIA practitioners apply quantified rating systems, some apply only qualitative assessments and some use a combination of the two. The criteria applied for the Nuclear-1 EIA are a result of GIBB's experience with EIAs over a number of years and have been developed based on this experience.

Comment 12:

11 Wishful thinking on NPS design and safety

What we asked for:

A choice of the actual NPS and full particulars of its design must be fully defined before the current stage of the EIA process, including the public participation process, can be completed. If more than one design is still being considered then all candidate NPS designs must be fully specified.

Crudely specifying a generic class of PWR is far too imprecise to allow the EIA process to proceed further.

What we got:

The same technology envelope and the same flawed argument remains with the same incorrect analogy to American examples, that as we pointed out last time actually support our position that the actual choice of NPS must be made at this stage of the approval process.

Grade: No change

What we asked for:
Catastrophic incidents cannot be considered to be too improbably to occur and must be included in ALL sections of the EIA that deal with potential impacts of the development on the biophysical, social and economic environments.

What we got:

Much of the EIA is a pointless exercise. You start by assuming the NPS will always adhere to some safe standard with only minimal amounts of radiation being released. Then you analyse the impacts, and obviously the impacts turn out to be minimal because the safe standard was designed to be safe with minimal radiation being released. But there is a basic fundamental logic flaw here. You cannot be 100% sure that the NPS will always adhere to the chosen standard and only release minimal amounts of radiation. Even enhanced safety processes with multiple levels of redundancy and passive gravity driven shut down and cooling mechanisms can still be damaged or bypassed or they can simply fail.

You must consider all types of incidents from 1 to 7 on the INES scale.

Status: Fatal flaw – missing design of the reactor and associated infrastructure.

Response 12:

Your opinion in this regard is noted. Our previous response remains valid.

Comment 13:

12 Unacceptable risks to unique ecosystems

What we asked for:

All three sites are too valuable to be developed. This is clearly the impression of the vast majority of natural scientists who are familiar with these areas. The EIA must be rewritten to reflect their views more accurately.

What we got:

No significant change.

Status: EIR does not reflect opinion of the majority of scientists with experience around the sites.

Response 13:

Thank you for your comment. Local knowledge is invaluable to EIA processes. Please rest assured that all comments raised and information submitted has been considered within this EIA.

Comment 14:

13 Inadequate consideration of alternative options

What we asked for:

Throughout this EIA the all of the existing descriptions of alternative options to how the land could be used and to how the equivalent power could be generated must be replaced with more thorough, objective and factually accurate analyses.

What we got:

The consideration of alternatives in the EIR is still incorrect and incomplete.

Nuclear costs

The EPRI estimated prices shown for nuclear power in the EIR and in the first IRP in 2010 are way too low. They were increased by 40% for the updated IRP, and that was assuming a learning cost reduction based on a global roll-out of several hundred new reactors. The Fukushima meltdowns and subsequent collapse of the Nuclear Renaissance means that steady upward price trend of nuclear power over the past few decades is certain to continue to rise at the same rate or an even higher rate for the next few decades. Nuclear fuel price must be based on actual data from Koeberg. Load factor estimates could be based on actual data from Koeberg (about 69%) or derived from more sophisticated modeling. It is certainly not correct to use the 93% value provided by EPRI. Apart from scheduled and unscheduled downtime for maintenance there will be times when power supply will exceed demand and the NPS will run at reduced output because its maximum capacity is not required and not because it cannot produce maximum power. Wind and solar will be part of any future energy mix. Because they use no fuel they will always be dispatched before any fuel based power source. And because their output is variable the shortfall to be provided by fuel based power stations will be more variable in the future than what it is now. Load factor should be between 60% and 70%

Lifetimes

The postulated 60 year lifetime of a new NPS is disputed. Although it may be possible it is probably only likely with significant refurbishment and considerable expense in the last few decades. A detailed analysis of historical data from similar projects should be performed to obtain an estimate of likely lifetime and refurbishment costs. A reasonable result would be something like 40 years of trouble-free operation followed by an additional expense of about 20% of the initial cost to extend the life to the full 60 years.

The EIR states that the lifetime for solar power (and its not clear if this means photovoltaic or CSP) is only 30 years, and for wind 20 years. For CSP that has been accurate for existing pilot projects. Commercial CSP power stations are likely to have a very similar lifetime to any other thermal power station, including nuclear. In the case of wind and photovoltaic systems the manufactures guarantee period is generally 20 to 30 years. Thereafter photovoltaic panels might produce up to 20 percent less power than when they were new but they will not need to be replaced. Likewise wind turbines will probably need some significant refurbishment after 2 or 3 decades but one can expect that they could be put back into service for another few decades.

Photovoltaic

In section 4.5.2 Technological Alternatives of the Economic Impact Assessment report a reference is made to a 125MW 9 hours storage system. Nothing like this exists, and so this calls into question the expertise of the specialist who wrote this report.

Photovoltaic solar power is going through one of the most extraordinary technological revolutions of our time. Computer memory is the only technology to experience the same phenomenal rate of growth, increase in performance, decrease in price and dramatic future trend projections. Photovoltaic is going to be the most dramatic game changer in the energy field, and yet the Gibb appointed expert cannot even spell the word properly ('Photo Voltaic') and does not differentiate it from Concentrated Solar Power. This section must be repeated by an engineer with qualifications and up to date experience in renewable energy.

The cost estimates of photovoltaic systems used in the EIR is out by orders of magnitude. The given price per watt for a 125 MW solar farm is 5 to 10 times the hardware store retail prices of domestic portable 100 watt panels. See www.solarbuzz.com for photovoltaic costs. They provide a consulting service and they should be able to provide pricing data for large systems based on real world experience and independent analysis of price trends.

In a “historic crossover,” the costs of solar photovoltaic systems cheaper a cheaper option than Nuclear power in 2010.

Source: Prof J Blackburn, Economics Dept, Duke University, USA.

http://www.ncwarn.org/wp-content/uploads/2010/07/NCW-SolarReport_final1.pdf

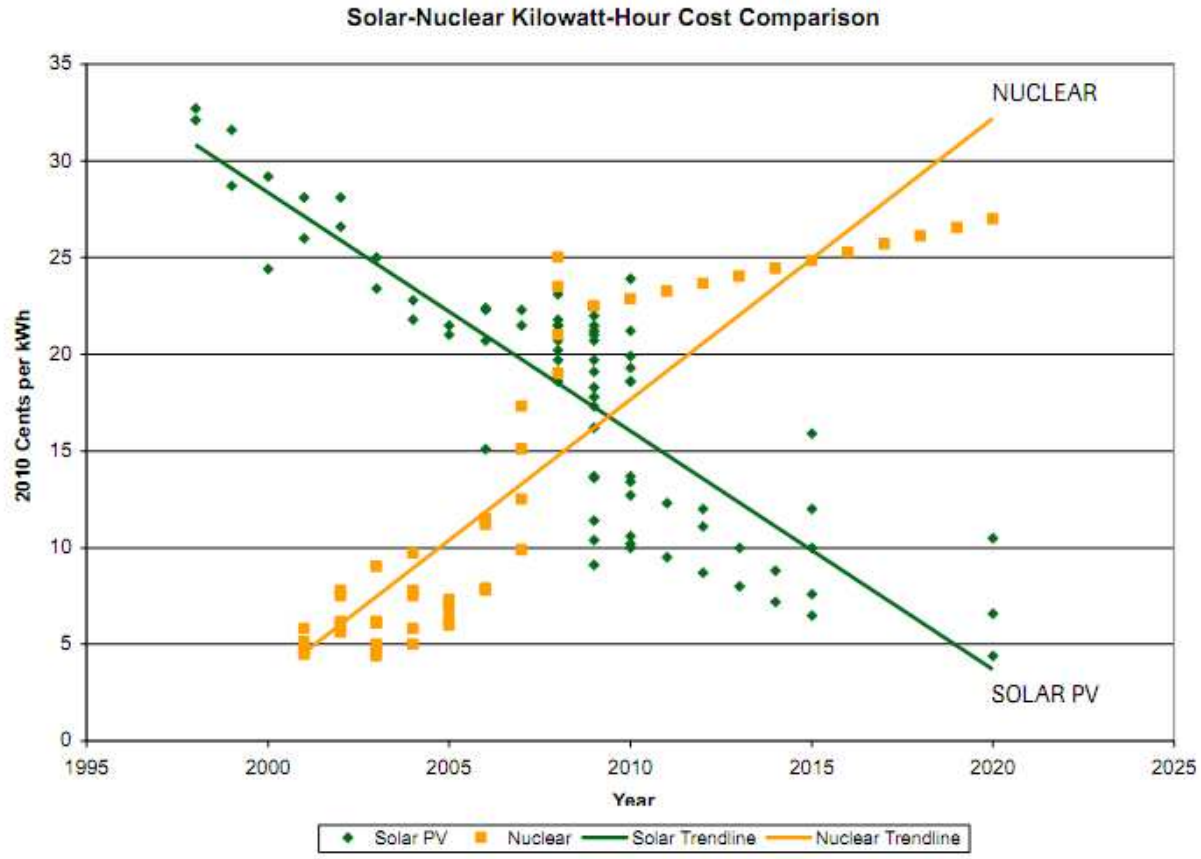


Figure 1: The Historic Crossover – Solar photovoltaic costs are falling as new nuclear costs are rising.[1]

There are a number of other special considerations regarding PV. They will largely be privately owned, thereby removing the funding problem from Eskom and the state. They use no water. They do need inverters which can add to the expense. They will often be producing power close to where it is being consumed and hence reduce transmission infrastructure costs. There will have to be some planning for load balancing on cloudy days, but only a small fraction of the country is covered by clouds at any one time. The details for all of these issues are probably beyond the scope of this project. They should be acknowledged as issues that need to be taken into account, but they do not change the basic fact that PV is going to play a big role.

How solar power can displace base load

Currently, heavy users of electricity are encouraged to use energy dring the low demand period at night. The same mechanisms could be used to encourage energy use during sunlight hours, when solar PV plants would be producing electricity. Concentrated Solar plants would collect energy and have sufficient storage to provide for the early evening peak. This would have the effect of reducing the need for power stations which run 24x7, such as nuclear power plants. This alternative approach must be investigated and presented in this EIR, as per 2.14 of the conditional acceptance of the scoping report.

Concentrated Solar Power

A first CSP project in South Africa is likely to be expensive, about 168% more expensive than coal according to reports from within Eskom. The same report predicts that CSP will be comparable to coal within 20 years.

http://www.engineeringnews.co.za/article/eskoms-concentrated-solar-power-ambition-2010-06-18

The A.T. Kearney global management consulting firm predicts that it will be a profitable business within 10 years. So if CSP is not already cheaper than nuclear, it almost certainly will be within the time frame that it would take to build a new nuclear plant.

http://www.estelasolar.eu/fileadmin/ESTELAdocs/documents/Cost_Roadmap/2010-06-29_-_Press_Release_ATKESTELA_-_ENG.pdf

Although there are several sites around the world where CSP has been implemented and operated successfully, it cannot yet be considered a stable or mature technology. There does still remain a risk of cost and construction overruns. Given the record of recent NPS projects the two technologies are probably about equal in this regard. CSP with fairly modest amounts of storage is a good solution to meeting the evening peak. Heat gathered during 8 hours of sunshine can be used to generate power for 4 hours in the evening. The same steam turbine and generator can be driven by fossil fuel to provide peaking power to cope with the early morning demand. Plants built now using this approach will be cost effective at current prices for meeting this requirement, but more than that, later when the technology matures and becomes cheaper they can be extended with more heat gathering and more storage to provide longer dispatchable power source. They would then be able to provide a backup for the variability of wind turbines and hence enable more renewable energy to displace coal and nuclear base load generators.

Wind

Wind power is discussed in the EIR, but mostly in the form of little anti-wind anecdotes, such as how Spain once had power shortages, all the negative impacts on birds and bats, and some vastly exaggerated nonsense about how much space is required and how impacts on transport networks will be substantial and so on. Nothing positive is said about wind at all. The EIR should provide accurate objective information for decision makers, and hence not just repeat one sided views supplied by the applicant.

The EIA states that technologies for wind energy have not developed beyond the level of small-scale plants. This is patently false and yet another example of the bias of the economics specialists. In the last few years more wind power was installed than any other power source.

Several countries produce more than 20% of their power from wind. Germany gets more power from wind than what Japan gets from nuclear.

We have pointed this error out in our previous submission and yet it has remained in the report.

Gibb must consult wind energy experts to provide information on the wind potential of South Africa.

The South African Wind Energy Association (SAWEA) has proposed that we should aim to have 20% of South Africa's electrical energy generated by wind by 2025. They estimate that this would require turbines capable of producing a maximum of 30GW and they predict that these could be distributed so that at any time they would produce at least 7GW. This is all backed with engineering data and calculations. Moreover, private funding is available and contractors are ready.

The bottom line is that when the calculations are done correctly and accurately and without bias, wind comes out cheaper than nuclear power.

The official US government data confirms this: http://www.eia.gov/oiaf/aeo/electricity_generation.html as does the finding of the revised IRP 2010.

Since the consultants compare nuclear power to coal power in the EIR, it appears that they share our view that comparison to alternate form of power generation should be included in the EIR. It is therefore unacceptable that this comparison is limited to coal vs nuclear, and there is an international trend of both of these technologies being replaced by renewable sources of energy.

Distributed power

Climate data shows that the major sites suitable for wind turbines stretch along a band parallel to the entire South African coast from Namibia to Mozambique, and another band runs along the escarpment from Lesotho to Swaziland. This covers a range of climate zones.

If wind turbines are distributed throughout this area the variability of the combined total wind power output will be much less than if fewer wind turbines are concentrated in a few places. More importantly the output and the variability in the output can be estimated and predicted with statistically determinable accuracy.

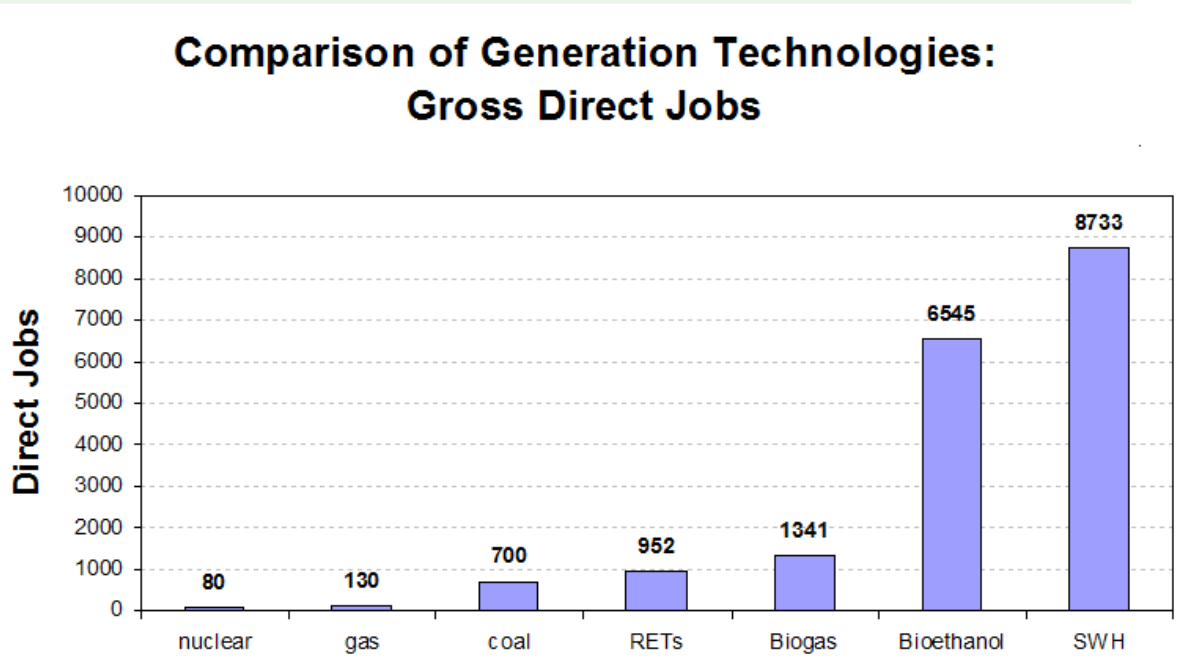
Scenarios like what happened in Spain in September 2010 can be effectively designed out.

You are correct in your statement that the option to use wind power to provide stable, dependable base load supply to the grid is challenging and that wind power does need to be supplemented by more dependable generating sources. However it can be done. The challenge is one of planning and design. And the solution will turn out to be cheaper than pursuing nuclear power. And if it was not biassed the EIA would show this.

It is only the variability of wind power that needs to be backed up with another source, not the entire capacity. Let's suppose that we follow the SAWEA plan and install 30GW nameplate capacity of wind power distributed so that the average output is 7.5GW and the 95% range in output is predicted to be from 7GW to 8GW then the backup power required is 1GW and not 30GW. Because we could predict several days in advance what the actual output is likely to be the backup source could be an existing older base load coal power station, being slowly and continuously being ramped up and down and producing an average of 500MW and a maximum of 1GW. By the time these older coal power stations need to be retired, either because they are too old or because because of CO2 concerns, they can be replaced with purpose build CSP generators which will by then be cost effective.

Jobs

In South Africa job creation is one of our nation's most important goals. Renewable energy technologies will create many more jobs than nuclear. As shown in the graph below, investment in SWH (Solar, Wind and Hydro) will create more than one hundred times as many jobs as the same investment in Nuclear power.



Source: "Employment potential of renewable energy in South Africa", SECCP 2003, Agma Energy 2003

Imports
If South Africa were to embark on a nuclear path then vast sum of money would leave the country, probably to France or America. It would be much better for our society to the develop the local renewable energy industry by spending the money here. The EIR must be extended to include references such as the above, and either refute or confirm this information.

Carbon trading
You have not responded to our request to include a consideration of the potential for capital inflows from carbon trading schemes.

Scope
It is not clear to us what Gibb of the DEA consider to be included within the scope of this EIR regarding the extent to which alternative sources of power need to be considered.

The quotes below seem to imply that alternative power sources do need to be considered.

DEAT approval of Final Scoping Report
2.37.1 This study must address the cost implications of the proposed NPS in relation to other electricity generating activities.

2.14 Power generation alternatives
2.14.1 The SR is deficient in presenting the suite of policies which led government, the National Energy Regulator and Eskom to submit an application for a proposed conventional pressurized water reactor (PWR). The screening of alternative to arrive at the conclusion that PWR is the preferred option is poorly motivated and hence undermines the well communicated need and desirability of the proposed project. This must be addressed in the EIR.

Gibb response to DEAT PoS.

Power generation and technology alternatives were discussed in the Scoping Report, where relevant these technologies will be discussed further in the EIR.

The Gibb response to our previous comment asking that the EIR be corrected regarding alternatives had this to say:

The revised Economic Impact Assessment, included in the Revised Draft EIR, includes a brief assessment of the relative financial costs of other generation options. However, this is given for information purposes, since the intention of this project-specific EIA process is not to assess different generation options. This EIA is specifically for nuclear power station providing base load. Please refer to a more detailed assessment in the Draft Integrated Resource Plan recently released for public comment by the Department of Energy.

Whatever the Department of Energy does or does not do has no legal consequences to Eskom's obligations to perform a full EIA for its proposed projects.

In general terms it is a requirement for EIA's to consider alternatives, both alternative uses of the land and alternative means to achieving the same functional or economic goal. Eskom cannot choose to consider only a "nuclear power station providing base load" without including in the EIA a proper consideration of alternative schemes that would meet the same need as a "nuclear power station providing base load".

What is indisputable is that wind and solar have been discussed in the EIR, in the specialist reports, at the public meetings and in the responses to comments from the public. The law requires that the EIA must be objective and factually correct. Yet much of the information given about alternative power generating options has been incorrect and biased. The EIR must be updated to correct these shortcomings.

The correct and unbiased conclusions regarding alternative power generating options that should be included in the EIA is that all of the electrical energy demand that would be fulfilled by developing nuclear power plants can be satisfied by an alternative solution based almost entirely on renewable energy, and this alternative solution would be:

- Cheaper
- create more jobs
- keep more capital within the country

Status: Fatal flaw – coal is the only only alternative discussed in any detail

Response 14:

Your opinion regarding the ecological value of the sites is noted. This opinion contrasts with the documented assessments of the specialists, all of whom agreed that there are no fatal flaws at any of alternative sites and that the sites can be developed, provided that the recommended mitigation measures are adhered to, particularly with regards to the positioning of the proposed power station on the site. The sites contain sensitive areas, but these areas can be avoided by judicious placement of the power stations on the sites.

The Revised Draft EIR Version 1 accurately reflects the opinions of the specialists. The specialists' assessments of the impacts are reflected verbatim in the Revised Draft EIR Version 1, although they have been condenses in the EIR to reflect their key findings.

Comment 15:

Issues regarding non-compliant process

It is the duty of the consultants to take minutes of the public meetings, to provide an accurate record, and to provide information in response to reasonable requests.

Slow and inefficient response to requests for information

1. During the Milnerton public meeting on 25 May 2011, Peter Becker quoted the response from the consultants to the KAAs previous submission, which reads in reference to Koeberg "Local groundwater close to the reactors shows somewhat elevated tritium levels..."

2. The request was made that the source of this information was made available as part of the EIR documents. This was agreed to by the consultants

3. The minutes were produced which misquoted the question as relating to strontium (instead of tritium). The response was therefore not relevant to the question.

4. After further contact with the consultants a report was sent to us which purportedly contained the requested information on 6 July 2011. It was not searchable (it was scanned) and so it was necessary to read the entire report to discover that it did not mention tritium

5. After further discussion with the consultants, a document was sent to us on 21 July 2011, which contained the requested information

6. 8 weeks is a significant portion of the submission period, and so waiting this long for information, as well as the time required to engage in this drawn out process, impacts on our ability to engage in an informed and meaningful way

7. The web site containing all the EIR documentation was rearranged in July 2011, and the specialist reports are no longer accessible via existing bookmarks, links, and also not accessible from the main Arcus Gibb Home page. This obstructed the process of obtaining information w.r.t. the second draft of the EIR.

Lack of diligence on the part of the consultants

1. As of 2 August 2011, the minutes of the Milnerton meeting were still not available on the Arcus Gibb website, with the deadline for submissions 5 days away. In some cases, the responses to questions raised at this meeting would influence or inform our submissions, and we therefore found the time between this information being made available and the deadline for our submissions, hampered our ability to engage in informed and meaningful participation in this process

2. Those from the Southern Suburbs and elsewhere who were not able to be physically present at Milnerton, have thus not (as of 2 August) been able to peruse the minutes and engage in the process

3. The microphone used for the public at the Milnerton meeting was faulty and there was not a backup on hand.

4. The process of transcribing the minutes was not done with due diligence, leading to long delays (see above) in providing information to IAPs.

Refusal to hold public meeting

1. After the release of the first draft of the EIR, three meetings were held near Cape Town. By far the most attended the Southern Suburbs meeting. Possibly due to concerns about the possible effects of a radiation leaks which would the winter North Wester would spread over the Southern Suburbs, there was a large turnout by a well informed public. There were many hard questions put to the consultants and vigorous debate. [cf the minutes].

2. As a result of the public participation process, many specialist reports were substantively changed, and in some cases new reports were written. After the release of the second draft, the Southern Suburbs was omitted from the schedule of public meetings. Many individuals and organisations requested that a meeting was arranged there, but this was refused by the consultants.

3. Milnerton is some distance from the Southern Suburbs, and the meeting was arranged for 6pm, which is when that route is clogged with rush hour traffic, which resulted in many interested parties not having the opportunity to engage with the consultants and applicant re issues arising from the second draft.

4. The consultant explained this by saying since Thuyspunt was the preferred site, that people in Cape Town are less affected than after the first draft, hence on meeting instead of three was appropriate. Since Milnerton was closest to the Koeberg site (where the new plant was not going to be built), it was most appropriate to have a single public meeting closest to that site. Apart from not making sense, this has the effect of reassuring Cape Townians that Koeberg will not be the selected site, and that the site decision has been made, whereas this is a decision for the competent authority.

5. By refusing to arrange a public meeting in the area that was previously most successful in terms of public engagement and participation, the consultants have not been diligent in pursuing meaningful and informed public participation.

In short, there is evidence that the consultants are biased towards the applicant, and in some cases have employed specialists who are similarly biased and also not competent in the fields they attempt to cover.

<u>Conclusion</u>
None of the issues that we have previously highlighted have been addressed adequately. In addition, while analyzing the second draft of some of the specialists' reports, we have identified further fatal flaws in the EIA process and this second draft of the EIR.

The EIR is still incomplete, biased and erroneous and it needs to be reworked, and once again submitted to a public participation process. If it is submitted in its current form to the competent authority, this in our view will be an offence in terms of section 81(1) of the EIA Regulations.

Contributors to this submission include:
Robert Isted M.Sc. Eng (Cape Town)
Peter Becker B.Sc (Cape Town), B.Sc. Hons (UNISA)
Andreas Spath M.Sc. (Cape Town), PhD Geology (Cape Town)

Response 15:

The Revised Draft EIR Version 1 makes no claims regarding the life spans of alternative forms of power generation technology. Should you be able to provide a reference to the section in the Revised Draft EIR Version 1 where such claims are made, GIBB can consider this comment.

All the alternative technologies mentioned in Section 4.5.2 of the Economic Impact Assessment (Appendix E17 of the Revised Draft EIR Version 1) are based on reference EPRI report[1], which was commissioned for the Integrated Resource Plan IRP). The specific technology referred to is parabolic trough with a central receiver. Please refer to the EPRI report, which available on the IRP website, in this regard.

Your comments regarding the merits of other forms of renewable power generation are noted. It is acknowledged that other forms of power generation have merit, but it is not the intention of this EIA process to assess the relative merits of these technologies vs. nuclear generation.

EIA is, by its very nature, a project-specific process. We thus reiterate our response that the environmental application for Nuclear-1 is for a nuclear power station, as has been the case with other power stations such as the gas-fired power stations that have been constructed at Mossel Bay and Atlantis and the Medupi and Kusile coal fired power stations currently under construction. In all these previous instances, the scope of the EIA was restricted to a specific power station on a specific site or sites within a defined geographical area. It cannot reasonably be expected that each application for a power station must revisit strategic government decisions that have been taken on the mix of generation technologies that are necessary to meet South Africa's electricity needs. This is especially the case in the instance of the Nuclear-1 application, where the government has, through a consultative process, already taken a decision on the mix of generation technologies required to supply South Africa's future electricity needs for the next two decades.

Yours faithfully
for GIBB (Pty) Ltd

Nuclear-1 EIA Manager

[1] EPRI. 2010. *Power Generation Technology Data for Integrated Resource Plan of South Africa.* EPRI, Palo Alto, California. 23p.