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Attention: Mr. R. M. Longden-Thurgood

Dear Sir

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

Your correspondence to Ms. Bongi Shinga of ACER (Africa) entitled *"Comment on the Nuclear-1 Draft EIR – Part 2 Main Report and Appendices up to Appendix 18"* refers.

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

Responses to your comments / questions are as follows:

Your comment (1)

CHAPTER 1 INTRODUCTION – no comments

Response (1)

Your comment is noted.

Your comment (2)

CHAPTER 2 APPLICANT DETAILS - no comments

Response (2)

Your comment is noted.

Your comment (3)

Section 3.2 Principles of nuclear electricity generation - this title is misleading in that, in nuclear physics terms, conventional PWR nuclear reactors do not use any form of direct conversion technology to generate electricity. This is achieved through using the heat generated by a nuclear reactor to heat up water in a primary coolant circuit which is used in turn to produce steam in a secondary water circuit which is used to power the turbogenerators. I would suggest rewording this section to something like "Principles of producing nuclear heat for electricity generation"

Ditto, 2nd paragraph on p.3-2, quoting – "This process is controlled within the reactor and the energy released is used to heat water and produce steam, which drives a turbine"

This is not an accurate description of what actually happens. I suggest minimally rewording this sentence as follows: “This process is controlled within the reactor and the energy released heats up water successively in primary and secondary water coolant heat exchange circuits and pro-duce steam, which drives a turbine”

Ditto, 3rd paragraph, quoting – “The main plutonium isotope is also fissile - - -”

It would be more meaningful if this phrase was to be changed to: “The main plutonium isotope, Pu-239, is also fissile - - - ”

Ditto, 3rd paragraph, last sentence - the data given in this sentence would be far more readily comparable if they were to be presented in tabular format

Response (3)

Your comments on the rewording of certain sentences in Section 3.2 are noted.

Your comment (4)

Section 3.3, quoting the last dotted point –.“Conventional Nuclear: A term used by Eskom only, to distinguish other nuclear options from the Pebble Bed Modular Reactor (PBMR)”

This is confusing because “other nuclear options” could mean fast breeder reactors, whereas Eskom is only looking at PWR options. Therefore I would suggest rewording this clause as follows in order to eliminate the confusion on reactor types: “Conventional Nuclear: A term used by Eskom only, to distinguish PWR nuclear design options from the Pebble Bed Modular Reactor (PBMR)”

Response (4)

Your comments on the rewording of certain sentences in Section 3.3 are noted.

Your comment (5)

Section 3.4 History of Nuclear Power Plants - in the first dotted clause I would suggest that it should include a comment “of which xxx are PWRs”, whatever the number xxx might be

In order to provide a balance, it might be useful to include another dotted clause to mention how many of the older PWRs in the world have been decommissioned. This number, and the numbers of currently operating PWRs, should be available in some WNA report. Such information could be useful from the point of view of mollifying the nuclear objectors, in that this fact clearly indicates that experience in decommissioning PWRs is being continuously accumulated. Decommissioning is going to be discussed somewhere in this draft EIR. The objectors might just as well get the message early on in this DEIR!

Ditto, p.3-3 the 1st dotted point in the second section, quoting - .“Generation I reactors were developed in the 1950-60s. The only ones of this generation still in operation are found in the United Kingdom”

Although this is basically correct, the reactor type should be mentioned, namely advanced gas cooled reactors - AGRs.

Ditto, p.3-3 the 2nd dotted point, quoting –.“Generation II reactors are typified by the present United States fleet and are in operation in most countries. Koeberg NPS is classified as a Generation II reactor”

"Koeberg NPS" – Koeberg Nuclear Power Station - is not a reactor type of any sort. This clause needs to be reworded as follows: "Generation II reactors are typified by the present United States fleet of PWRs, and are in operation in most countries. The two PWRs at the Koeberg NPS are classified as Generation II reactors".

Ditto, p.3-3, 3rd dotted point, quoting – "*It is this generation of NPS that is proposed to be installed for the Nuclear-1 project*"

Again, may I point out that NPS – nuclear power station - is not a reactor type. NPP could be used, of course – nuclear power plant – but specifying the type of reactor obviously has its advantages for clarification. I am not certain whether PWRs are the only type of reactor currently being upgraded to Gen.III types. The Japanese fast breeder reactor developments are Gen.IV type. Any ambiguities in the above clause would be totally eradicated if it was to be reworded thus: "*It is this generation of PWRs that is proposed to be installed for the Nuclear-1 project.*"

Response (5)

Your comments on the rewording of certain sentences, the inclusion of additional information on the decommissioning of other PWRs worldwide and the inclusion of the reactor type in p.3-3 of in Section 3.4 are noted.

Your comment (6)

Section 3.6.7 Condenser – this section mentions the cooling water being obtained from the Atlantic Ocean, which will certainly be the case for the South African nuclear reactors because of the lack of adequate inland fresh water supplies. (Indeed, Eskom's new coal fired power station currently under construction will be dry cooled). However, in a lot of countries across the world where water is more abundant, eg the USA, France, and China, many nuclear power stations are located inland, using *freshwater* for cooling. Perhaps this fact could be given a brief mention to prevent misunderstandings that only *seawater* can be used for this purpose.

Response (6)

Your comment is noted.

Your comment (7)

Section 3.9.2 Meteorological Station, quoting – "A meteorological station will be constructed to a height of approximately 120 m"

No, I don't think so! Make it "A meteorological mast will be constructed - - - ", and everyone will be happy!

Response (7)

Your comments on the rewording of certain sentences in Section 3.9.2 are noted.

Your comment (8)

Section 3.9.4 Visitors Centre – please make sure that this isn't located on the top of a sand dune with a steep access path accessible only with difficulty by the elderly whose age may have compromised their steadiness. The access path up to the Koeberg Visitors Centre is most definitely not the way to go about providing an acceptable means of access.

Response (8)

Thank you for your valuable comments on the visitors centre. Attention will be paid in the design of the centre in terms of the ease of accessibly of the centre whilst ensuring that the centre is optimally located in terms of the sensitivities on site and the logistical layout requirements.

Your comment (9)

Table 3.4 Reservoirs required on site - will these be open reservoirs or totally enclosed tanks constructed into the round? If the former then evaporation could reach unacceptably high levels, especially in hot summer windy weather, typical for this part of the Western Cape Province. Also the proximity of lots of loose sand will ensure that it gets blown into them. Over a period of 60 years and more, they will require cleaning out, possibly as frequently as at 5-yearly intervals.

Response (9)

The designs for Koeberg Power Station Demineralisation, Potable and Fire Water storage tanks are for closed tanks. This is due to the need to preserve the stored water to specified standards. The final designs for Nuclear 1 are still to be finalised. Your recommendations are valid, such considerations will be taken into account.

Your comment (10)

Section 3.9.8 Desalination plant, 3rd paragraph - this should either start: "The desalination plant's three units - - - " or it could be better worded "The three units of the desalination plant - - - ".

Would it not be helpful to mention that the output from these desalination units is the feedstock for the demineralisation plant? Will these portable desalination units remain in use for the life-time of the nuclear power station, or will a permanent desalination plant be constructed?

Response (10)

Your comments on the rewording of Section 3.9.8 are noted.
If portable desalination units are deployed for use, they will only be a temporary means of supplying water to the construction site. A permanent desalination plant is intended as the primary means of generating water for the plant (demineralisation plant and potable system).

Your comment (11)

Section 3.9.9 Demineralisation plant – this starts "During operational, - - - ". Surely this should read "During the operational lifetime of the nuclear power station, - - - " ?

Response (11)

Your comments on the rewording of Section 3.9.9 are noted..

Your comment (12)

Section 3.9.10 Chlorination plant, quoting – "The chlorination plant will serve to protect the cooling systems against the growth of biofilm and biological fouling - - - "

This refers to "cooling systems", but surely it should refer specifically to the seawater cooling system? The temperature in the primary and secondary coolant systems is far too high for any organisms to exist in them. Maybe it should be reworded as follows: "The chlorination plant will serve to protect the

seawater cooling system against the growth of biofilm and biological fouling - - - ". This comment will also apply to the first line in the 2nd paragraph.

Response (12)

Your comments on Section 3.9.10 are noted.

Your comment (13)

Section 3.10 Marine works, quoting - "During operation the power station will require significant volumes of water to cool the *process*." *[My italics]*

To cool what process? Surely the seawater coolant will be used only for the secondary coolant system condensers. This section does refer to "marine works", not to the treated fresh water which is used for primary and secondary water makeup, nor to the treated emergency supplies for the primary system.

Response (13)

The seawater from the intake basin will be used in the condenser to condense steam, and in the nuclear island for the nuclear island heat exchangers used for cooling some nuclear components..

Your comment (14)

Section 3.10.1 Intake tunnels - I assume that there will be one intake tunnel to provide the flow requirements for three nuclear reactors. But what could be the situation if, as I have read elsewhere, it is decided to extend the capacity on one site to 10 000 MW(e), which will require more reactors, giving a total of 6 or 7, depending on which reactor type Eskom selects? Is it envisaged that the seawater intake basin and flow pipework will accommodate the requirements for a 10 000 MW(e) nuclear power station, or just to accommodate the immediate requirements for the ~4 000 MW(e) nuclear power station?

But, additionally, what about the land: will its actual area as is available now at any of the five sites be adequate to accommodate 6 or 7 nuclear reactors?

Response (14)

The planned infrastructure at the sites are designed in such a manner as to accommodate a 4 000 MW nuclear power station. Based on the studies carried out there may be some space for additional units. However a new EIA process will be required to confirm this if Eskom is required to build more nuclear.

Your comment (15)

Section 3.10.2 Outfall tunnels – I note that the diameters of these tunnels will 3 to 4 metres. Will one set of tunnels, however many it is intended to have constructed per set, serve for the warm seawater flow from all the reactors, or will there be separate systems for each reactor?

Response (15)

The system of tunnels referred to in the document is intended for Nuclear 1 in its entirety. This means, therefore, that the tunnels will service the power station.

Your comment (16)

Table 3-5 – why is terminology being used which hasn't been explained: eg, what is meant by "terrace" in the context of a nuclear reactor? I have never previously heard this word used for NPS construction. Is it meant to refer to the *nuclear island*? If so, then this term must be used.

Are the quantities of concrete given intended to include that used for the containment building, which would be constructed on the nuclear island? And for the quantities of materials listed, do these apply to a single nuclear reactor, or to all three? If the latter, on what basis has that number of reactors for the site been decided before Eskom has itself decided what reactor type it's going to choose, either the Westinghouse AP1000, with an output of 1 250 MW(e), or the EPR, with outputs either of 1 000 MW(e) or 1 600 MW(e)? Without proper clarification how can sensible comments to be made, especially by those I&APs who may not be familiar with nuclear terminology? Do the quantities cover all aspects of the site construction works?

Response (16)

A terrace is defined as the impacted area/footprint during the construction phase. A plant foot is generally referred to as the area occupied by the plant, excluding the previously impacted zones during construction.

Table 3.5 column 4 indicates that the concrete figures are quoted per unit. Without the knowledge of a specific design, estimates have been based on the worst case (tons of concrete per MWe) of the plants that have been analysed or assessed.

Your comment (17)

Section 3.12.1 Duynefontein – concerning this study which was carried out in 2005, have there been any changes in the situation since then? Even though this transport study was completed about 5 years ago, presumably it is still relevant for this current EIA process. Has the study been included in this EIR documentation? Do not under any circumstances make the mistake of including it with the final EIR when the latter is submitted to the DEA, without I&APs first having been given the opportunity to read it, even if there are no comments. I am sure that I don't have to remind anyone about the fiasco with the first EIA process for the PBMR, when a number of documents were indeed submitted with the final EIR which had never been presented for I&AP review. This EIA process came to an abrupt halt when Earthlife Africa *et al* challenged in court the validity of adding these unchecked documents, even if some of them contained sensitive commercial information.

For the other sites, the transport reports will presumably be included elsewhere in this draft EIR.

Response (17)

The information contained with the abovementioned study is still relevant. The study has not been included in the EIR documentation. A Transportation Assessment has however been conducted and is attached to the Draft and Revised Draft Environmental Impact Report as Appendix E26. The public has had a chance to review the assessment in the Draft EIR and will also be given the opportunity to review the assessment in the Revised Draft EIR.

Your comment (18)

Table 3-6 – I don't understand what is meant by *Coolant water*. For example, the first item under the heading Input / Output is referred to as "Total cooling water flow (Reactor Coolant Flow Rate)", with an amount of ~2.4 *billion* cubic metres per year. That's *two cubic kilometres* of water a year - incredible! But *reactor coolant flow rate* surely refers to the flow of the processed freshwater water that is *recirculated* through the reactor core – in other words the primary coolant.

So what exactly is *Coolant water* intended to mean: is it the amount of *seawater* throughput per year for the secondary coolant condensers, or what? It could have been clarified in the Comments column, of course but, as the matter stands, its meaning remains unclear.

It is unfortunate for a report of this nature that an explanation of the background has been omitted. If *I* am asking these questions – and I worked in the nuclear field for 33 years – what questions are those staff in the DEA going to ask who have the task of reviewing the final EIR? And it's the DEA who will be making the decision wrt the environmental concerns on the go-ahead for the project.

Ditto, Fuel – although the enrichment for uranium fuel is given, elsewhere the alternate mixed oxide - MOX - fuel has been mentioned, but for which no information has been provided. Some comment about this fuel needs to be added to the table.

Response (18)

The total water flow-rates defined in the table, as extracted from the consistency data set, incorporates the sea-water used for cooling (nuclear and conventional islands) and that used for processes in the station. This is not the water in the closed processes.

Your comment (19)

Table 3-8 Maximum inhalation and effective doses, etc - it is these accumulated effective yearly doses which appear to have so strongly exercised Mr and Mrs Garbett, who insist on wanting to know the actual amounts of these radionuclides that it is predicted will be emitted into the atmosphere per year. The calculations would necessarily have needed to have an estimate of the actual masses of the radionuclides likely to be emitted, converted to radioactivities, in order for the effective predicted doses per year to have been calculated. However, it should be noted that if Nuclear-1 is located alongside the existing Koeberg NPS, these effective doses will be *in addition* to what is estimated to arise from the Koeberg NPS. And at any site where the generating output is eventually increased to 10 000 MW(e), that would also give rise to an increase in the accumulated effective yearly doses.

However, for the current derived figures, if they are for a new NPS then some assumption will necessarily have had to be made on the anticipated number of reactors to be constructed on the site. This should be mentioned, as well as the comparison of the derived effective accumulative doses per year with the maximum authorised limit – I assume for the general population? – of 1 000 µSievert per year. (Is there a reason why this figure wasn't expressed as 1 mSv/y?)

Response (19)

The point is correct as each unit added on site has an increased effect on the overall discharged amounts. NNR regulates the maximum allowable annual discharges. The cumulative impacts are considered for each additional unit added onto a site. For this EIA the cumulative impact of Koeberg and the additional 4000 MW's were considered.

Your comment (20)

Section 3.16.1 Non-radioactive effluent, quoting - "According to Areva and Electricité de France (2007) - - - "

Surely one can be more definite about the information that Areva, and especially the reactor operating organisation, Electricité de France (or EdF as they are now known), have provided, and in which they presumably have confidence? Thus the wording "according to" gives an impression of doubt - "that's what they told us, but we are not really convinced it's accurate". To be more positive about the information which was provided by EdF I suggest rewording the phrase to read: "Information provided by Areva and EdF (2007) - - - ".

Response (20)

Your comments on the rewording of Section 3.16.1 are noted.

Your comment (21)

Table 3.15.3, quoting from the 5th line immediately below this table – "- - - levels of LLW, ILW, and spent fuel".

Although it is mentioned later, it would help to clarify the situation for I&APs if HLW was indicated for spent fuel elements, thus: "- - - levels of LLW, ILW, and HLW, eg spent fuel". If plant and equipment associated with the primary coolant circuit and RPV are ever changed, the replaced units being scrapped, some of this could also be HLW.

Response (21)

Your comments on the rewording of Section 3.16.1 are noted.

Your comment (22)

Section 3-17, quoting the last two dotted items –
" · The geological formation on this site does not allow the rainwater to penetrate below approximately 0.5 m; and
· The water table is below the bottom of the trenches"

These two clauses appear to be mutually contradictory. Thus although rainwater apparently can't penetrate below ~0.5 metre through the surface layers of soil, yet there's still a water table, although it lies at some unspecified distance below the trenches. "Geological formation" is mentioned as the reason, not that there's so little rain that ~0.5 metres is the limit of its penetration. Is it a matter that the water table can't penetrate to the surface because of some geological feature of the ground, the water which is there having flowed in from some considerable distance away?

The reasons given in the dotted clauses aren't synonymous. So, is there some aspect which prevents water penetration to a greater depth than ~0.5 metre, or is it merely the fact of there being so little rain?

Some further explanation and clarification is required to eliminate the apparent contradictory nature of the above two statements. Although the drums at Vaalputs are covered with clay, there's no mention of whether the upper layers of soil in the surrounding countryside is also clay.

Response (22)

Your comments are noted. We are however having difficulty to locate the exact sections you are referring to in the document. Please confirm the sections given above.

Your comment (23)

Section 3.18.3 High-Level radioactive waste, quoting from the 2nd paragraph - "Other materials, however, remain radioactive for several thousands of years"

Although what the situation on how spent fuel elements will be normally dealt with in 30 to 60 years time cannot yet be accurately predicted, now, until then there is still the possibility of unprocessed spent fuel elements with their Pu-239 content being put into repository storage. Pu-239 has a half life of ~24 000 years, and it would need to be stored for at least 10 half lives for its activity to fall to a low concentration. Therefore the above sentence should be modified to read: "Other materials, however, remain radioactive for several thousands to some hundreds of thou-sands of years "

Ditto, quoting from the last paragraph on p.3-25 to the top of p.3-26 – "When the spent fuel is removed from the reactor, it is highly radioactive and hot, and must therefore undergo cooling - - - ".

Although newly removed spent fuel elements will certainly be very hot if not cooled, this is by reason of their high radioactivity content releasing a great deal of heat, a fact about which not everyone will be familiar. Therefore I suggest rewording thus: "When the spent fuel is removed from the reactor it is highly radioactive, which causes a great deal of heat to be produced, and they must, therefore, undergo cooling"

Ditto, p.3-26, quoting from the 2nd paragraph – "In South Africa, where spent reactor fuel is currently not reprocessed, all the highly radioactive isotopes remain in the assembly. As a result, the whole fuel assembly is treated as high-level waste"

The syntax of these two sentences in juxtaposition is wrong. I suggest rewording to read: "In South Africa, where spent reactor fuel is currently not reprocessed, all the highly radioactive isotopes remain in the fuel assemblies which are, therefore, treated as high-level waste"

Ditto, p.3.26 quoting the 3rd paragraph – "The amount of spent nuclear fuel estimated from the NPS over its life cycle is estimated at 1 880 tons"

I think that I might have missed a point here. This sentence says "from the NPS", ie a nuclear power station which I assume will have three nuclear reactors. However, 1 880 tonnes of spent fuel elements from *three reactors over 60 operating years* appears to me to be somewhat low, considering that each fuel element assembly weighs in at just over 0.78 tonnes.

Assuming fuel changes at 18 monthly intervals; 3 nuclear reactors each with a fuel loading of ~241 fuel assemblies; and each fuel assembly weighing 0.78 te, the calculation for the total weight of spent fuel from the NPS after 60 years is given by: (60 / 1.5) x 3 x 241 x 0.78 = 22 560 te. And even more if there are occasions when refuelling outages occur at less than 18 monthly intervals.

Response (23)

Your comments on the rewording of Section 3.18.3 are noted.

The data in terms of the dataset included in Chapter 3 of the Draft EIR and in terms of the generation of waste are for a single reactor of 1350 MW and when assessing the impacts of a 4000MW power station, appropriate increases in the volumes of releases therefore need to be applied. Concentrations would however remain the same.

Your comment (24)

Section 3.21 Decommissioning of the proposed NPS, quoting from the 1st paragraph – "operating regulations has changed significantly" should, of course, read "operating regulations have changed significantly"

Ditto, 2nd paragraph, quoting – "For nuclear facilities, decommissioning is the final phase in its lifecycle after siting, design, construction, commissioning and operation"

Not quite: the last phases for any NPS site will be removing the RPV and the steam generators, and other heavy plant which could have become contaminated with radioactivity; removing all the most recently unloaded spent fuel elements, to be dealt with in whatever way is considered to be most appropriate in 60+ years time; breaking down such major items as the empty fuel storage ponds and the reactor containment building, and the final task of returning the site to its original "greenfields" status. Decommissioning is the *penultimate* stage, *not the final* stage. See next comments.

Response (24)

Your comments on the rewording of Section 3.21 are noted.

Your comment (25)

Section 3.21.3 Preparation of a decommissioning plan for Nuclear-1 - decommissioning of the Nuclear-1 PWRs won't arise for a minimum of 60 years after they first go critical and become operational. Many of the decommissioning activities won't change very substantially over that period from what is current practice, for example dismantling of non-radioactively contaminated ancillary plant and equipment, defueling and storing the spent fuel elements in the on-site cool-ing / storage ponds, etc.

However, when such items as the RPV, primary coolant system pipework and the steam generators, pressurizer, etc, can be dismantled will depend largely on their radioactivity arising from the activation products in steel alloy components and leaked fission product contamination which has become deposited on the internal surfaces throughout the primary cooling system.

Additionally, a most important point is how the spent fuel elements will be dealt with in 60+ years time. This cannot be predicted in any detail at the present time, but it is very likely that the uranium and transuranics (including the Pu-239, of course) will be separated and processed into fuel elements for use in fast breeder reactors. This would be a far better way to fully utilise the potential of these nuclear fuel resources, which have already been obtained from vast mining and ore purification operations. It becomes even more important as these natural resources are all used, with the alternative sometimes suggested of extracting the few ppm of uranium that is present in seawater.

However, whether this use of the uranium and transuranics recovered from spent fuel elements will occur may largely depend on whether thermonuclear power has been successfully "harnesssed" for electricity generation by that time.

At this point I want to digress for a moment on what, at first sight, may not appear to be relevant to this EIA process – motor vehicle propulsion. It cannot be accurately predicted at the present time how motor vehicle propulsion systems will evolve, but hydrogen fuel cell electrically driven vehicles are the most likely type to be developed in the long term, especially from the point of view of minimising CO2 emissions into the atmosphere. One important reason for this hydrogen fuel cell and propulsion technology is that the weight and volume of the energy producing and driving components are unlikely to exceed that of the present i/c and diesel engines. Batteries sufficient to allow a motor vehicle to be driven more than a few 100 km are very heavy.

Hydrogen produced electrolytically requires about five times more energy to produce it than the energy which is produced by highly efficient fuel cells. The only way that hydrogen can be produced energy-economically is by a high temperature chemical process which works most efficiently at around 1 000 deg.C, which happens to be the temperature of the helium coolant from the core of a PBMR. Whether thermonuclear power could be used for this purpose is not technology which is going to be looked at until this source of power is proven to be a reality. At the moment it still seems to be a long way into the future.

The relevance of all this to the Nuclear-1 EIA process rests entirely with how the spent fuel elements will eventually be dealt with. What would be a great mistake would be to put them into permanent underground repository storage if the design of such facilities is such that access after storage was to be difficult. This factor has to be considered very carefully where such long term storage is concerned. In 60 years time I would fully expect that Gen. IV high temperature nuclear reactors will be a common sight across the world. Over that period there will be great developments in many technological aspects of nuclear power, and the possibilities for the use of the uranium and transuranics from the spent nuclear fuel form all the new PWRs cannot be ignored.

I suggest that these aspects need some brief mention in this chapter.

Because of the unpredictable developments in nuclear power and decommissioning management over the next 60+ years, it would be a great mistake not to invoke a policy of flexibility. At the very least, in satisfying inflexible I&APs who are unable to envisage developments in nuclear technology occurring over the next 60 years, the mechanisms currently proposed to deal with all the decommissioning activities *in 60+ years time* or more should be qualified by comments to the effect that technological developments over that period could definitely see a different route being followed than is envisaged at the present time. The worst possible scenario, with no foresight being applied, would be for spent fuel elements to be placed in a repository from which they can't be recovered.

Response (25)

Your comments on section 3.21.3 are noted. However please note that whilst different strategies may be used in future to deal with the aspect of spent fuel elements, the methods currently foreseen have been included in the EIR for decision making purposes. The Nuclear Waste Specialist Report also reports that the Fuel Handling and Storage System proposed for management and storage of Nuclear-1 Nuclear Power Station spent fuel will have sufficient capacity to safely store all the spent fuel produced throughout the life of the plant and to store the spent fuel for a further 10 years after decommissioning if needed. It is thus only after 70 years that the storage facility on site (or elsewhere) will have to be upgraded to store and manage spent fuel. This should provide sufficient time to define and develop a long-term management strategy for the Nuclear-1 Nuclear Power Station spent fuel, e.g. a central geological disposal facility or an alternative.

Your comment (26)

Section 4.1 Introduction - this mentions the limited extent to which the Atlantis OCGT plants (being converted to CCGT) can be used to supplement the shortfall of power supplies in the Western Cape by about 1 300 MW(e), its output in fully converted CCGT format. This figure needs to be mentioned so that the comment about making up the shortfall is properly understood. The high cost of its diesel fuel has been mentioned.

General comment – where OCGT plants are mentioned this should be OCGT / CCGT, because the latter provide more electrical output for the same energy consumption. For example, the Atlantis OCGT plant has by now probably been fully converted to a CCGT plant.

Response (26)

Your comments on the rewording of Section 4.1 are noted. The OCGT's in Atlantis, named Ankerlig Power Station have not yet been converted to CCGT. Studies are continuing for an appropriate fuel source prior to the conversion taking place.

Your comment (27)

Section 5.1 Introduction, quoting from the last paragraph – "The alternatives that have been considered are only presented in this Chapter"

This is bad syntax because it gives the wrong meaning as alternatives are given further discussion in Chapter 9. It needs to be changed to: "Only those alternatives that have been considered are mentioned in this Chapter."

Response (27)

Your comments on the syntax of the last paragraph of Section 5.1 are noted.

Your comment (28)

P.5-3, quoting the 4th dotted comment – "Lengthy time delays associated with the authorisation and construction of the new power corridors applicable to the Northern Cape sites, which will prevent Eskom from providing power within the required timeframes"

There would appear to be a possible time conflict which could arise if it's not looked at very critically. Thus the Brazil and Skulpfontein sites are not being considered in this Nuclear-1 EIA process, one of the reasons being the timescale to proceed through the EIA processes for the power corridors. But it is intended to proceed with the next EIA process a short time after this one has been completed and, presumably with a positive outcome. Is it anticipated that, which-ever one of the three sites is finally decided for this current EIA process, that the following EIA processes will look at the other two sites, still leaving the Brazil and Skulpfontein sites for future consideration?

Another issue is that one of the two remaining sites could be considered for an extension to accommodate sufficient nuclear reactors to provide 10 000 MW(e). But just suppose that one or other of the Thyspunt and Bantamsklip sites was to be declared unsuitable for the development of an NPS, what then? Eskom would be left either with the two approved sites being further approved for more nuclear reactors to provide up to 10 000 MW(e) each, or the Brazil and Skulpfontein sites may have to be considered. But a major reason against these last two sites from being considered, now, is the timescale for EIA processes and approvals for the power corridors and the high cost of constructing the towers and power lines over the necessarily long distances.

There are obviously a number of conflicting issues in all these aspects. But just suppose another complication was to arise, namely that if one or other of the Thyspunt or Bantamsklip sites was to be rejected for any NPS development, and of the two remaining sites, including Koeberg, one is also rejected for the construction of *additional* nuclear reactors up to 10 000 MW(e) capacity, what will the situation be then, if no action has been taken iro EIA processes for the power line corridors from Brazil and/or Skulpfontein to the south?

However, because the Brazil and Skulpfontein site are relatively close to one another, I assume that, from the more southerly site, Brazil, the same power corridor would be used, so presumably from that point to the south, the only additional EIA process(es) would be for that length down from Skulpfontein to Brazil. But consideration of these two sites is further complicated, now, by the high costs of site construction at either of them in view of the fact that there's absolutely no commercial or industrial infrastructure up there, plus the absence of power line corridors.

Bearing all these aspects in mind with all the possibilities, there's a clear potential for a conflict of priorities, which needs to be given a lot of thought, now, so that alternate procedures for progressing can be worked out well in advance in order to prevent any hiatus on what to do if any of the concerns I have mentioned above were to arise. The all-too-easy way out, of course, is to say that "we'll cross that bridge when it arises". But for this specific situation, ie where getting the additional power supplies on stream without unnecessary delay is going to be vitally important for the economic growth of South Africa, an inactive wait and see philosophy could be a big mistake. And that very fact itself needs a lot of in-depth thought.

Such a subject may not be appropriate to be dealt with in this EIA process, of course, but the undeniable fact is that it's been this very process which has initiated all the potential possibilities that could rise and cause serious logistics problems in the future, which could result in unnecessary delays in later nuclear EIA processes.

Response (28)

Your questions and concerns are very relevant. Should the Integrated Resource Plan determine that a nuclear fleet is required Eskom would need to identify additional sites suitable for a nuclear power station. This process would not be limited to the 5 sites evaluated in this process. In each EIA that is completed feasible alternatives will be considered. Apart from the environmental and technical criteria

for site selection the national grid and demand centres will influence the timing and implementation of future sites.

Your comment (29)

Section 5.2.4 (a) Duynefontein site, 1st dotted point – note that the two Koeberg PWRs each have an output of 918 MW(e), giving a total output of 1 836 MW(e) for the NPS. If, however, it is insisted that 900 and 1 800 MW(e) are used, then I suggest putting a "~" in front of the approximated outputs.

Response (29)

Thank you your comment is noted.

Your comment (30)

Table 5.2 on p.5.10 – is there some particular reason for omitting the origin of these five reactor types listed? I know the origins of the AP1000, EPR and CANDU, but not the other two. For example, indicating one as "RSA1000" could be thoroughly misleading. The other factor is which ones are untried designs, although no doubt all of them have been based on modifications to existing well known reactor types, earlier versions of which have been operating for many years in their countries of origin. Also, in the case of new designs which aren't yet anywhere near to their construction and operational stages, their efficiencies can only be estimated - this hasn't been indicated in the table.

Response (30)

The proposed reactor designs have established history from the early models. They have evolved to incorporate some features, which do not in anyway alter the fundamental design bases of the plant and have been licensed, constructed and mostly near operation in countries of origin, and elsewhere. The designs are ideally compliant to established nuclear design standards and will be licensed through the rigorous processes of the local nuclear regulator, the NNR. Since, PWRs the fundamental basis of the designs is generally considered not to have drastically changed from the Koeberg Nuclear Power Station version, which is currently operating well in the country.

Your comment (31)

Table 5.3 on p.5.10 – the eletrical and thermal characteristics given in this table relate to the EPR only. This needs to be clearly stated in the table. Why have these data only been given for one of the five reactor types? A reactor design won't be looked at these days without assessing in advance what is required to be achieved.

Ditto, p.5.12 Gas Turbines – these are indicated to be constructed only at Thyspunt. Does that mean that for both the Bantamsklip and Duynefontein sites, the CCGT units at Atlantis will be used to provide standby supplies for both sites? Is it intended that the turbines at Thyspunt will be the more efficient CCGT or OCGT type?

Ditto, Nuclear fuel – again, to what reactor are these data applicable? If they are for the EPR, this fact should surely be mentioned in the title to the table? There can be no justification for assuming that these data will be applicable to all five reactor designs.

Ditto, p.5.13 Nuclear waste transport – the comments would appear to indicate that the existing vehicle at Koeberg will be used. Has this single vehicle demonstrated 100% reliability during the period that it as been in use? How often is the tug replaced? Will it remain satisfactory to have only the one vehicle available on site if it is decided that the Nuclear-1 reactors will be construted on a site adjoining the Koeberg NPS?

Ditto, Sewer – will as many *8 000* workers *really* be required to construct the sewer system?

Response (31)

The reactor designs considered for the installation in the Eskom nuclear project are all Pressurised Water Reactors (PWRs). These have undergone some evolution to incorporate modern safety features. The intrinsic electrical and thermal characteristics are essentially similar with variations in output magnitude (i.e. 1000 – 1600 MWe).

Preliminary desktop evaluation of Alternative Electrical Supplies (AES) highlighted that the existing RSA electrical grid might not be adequately reliable to the vendor specifications levels. Thus, Gas Turbines are considered to be an ideal option to provide the alternative supply for the safe shutdown of the plant, in the vent of a complete loss of supply.

It is unlikely that the Koeberg transport vehicle will be used for either of the sites. New vehicles similar to what had been purchased/manufactured for Koeberg will be bought for each of the new sites. The transport contractor could be an Eskom subsidiary, as for Koeberg.

In context, the comment on the site sewage system capacity can be clarified by stating that the sewer shall be designed to cater for a peak population of 8000 people, during construction and operations (including outages). The facility will be equipped with load balancing mechanism to peak-shave loads in excess of 8000 people.

Your comment (32)

P.5.14, 2nd line in the footnote – change “there” to “their”

Response (32)

Your comment is noted.

Your comment (33)

Figure 6.2 Capacity expansion programme - in this table the OCGT output of the Ankerlig turbine power station at Atlantis is given as 580 MW(e) in 2007, and with an *additional* 740 MW(e) after the installation of the turbines removed from Acacia Park, giving a total output of 1 329 MW(e) in 2009. Does this total include the *additional* output following the conversion of the original turbines from OCGT to CCGT configuration?

Response (33)

The present capacity of the installed plant (all still OCGT) at Ankerlig is 1350 MWe.The upgrade to CCGT is not in the present Eskom plan. The move of Acacia will be taking place in the next year or so.

Your comment (34)

Table 6.3 Activities requiring Scoping and EIA – I am not sure whether this EIA process was actually started during the time when the DEAT was still the relevant government department dealing with their approvals, or whether it is relevant to relate it to the now DEA, with any new regulations becoming applicable? If the former then I understand that the process continues under the EIA regulations relevant at that time. I ask this question because the DEAT is mentioned in the last column of this table. Or should it be the DEA?

Response (34)

The (now) Department if Environmental Affairs (DEA), previously the Department of Environment and Tourism is still the competent authority in terms of the application for environmental authorisation. An attempt has been made to change all references to DEAT to DEA but this may have been missed in places. Please view the DEAT and DEA as one and the same department.

Your comment (35)

CHAPTER 7 METHODOLOGY – no comments

Response (35)

Your comment is noted.

Your comment (36)

Section 8.1.2 Seismological risk – seismology is a highly technical subject with terminology which definitely won't be familiar to most people, including those staff in the DEA who have to make decisions on the EIA process. Although there is a need to know if there are seismological risks, the important aspect is for the level of risk to be properly understood by the reader, whereas this report would appear to be an abbreviated version of a somewhat larger report.

However, I can't make out whether this section is the actual report as prepared by the seismological expert, or an extract from it. It doesn't have the actual specialist author's name attached to it, and because there isn't a separate appendix containing the seismologists report (or at least I haven't traced it), I have to assume that this section on the subject is all that will be found in this draft EIR. As an example, the technical term "Parametric-Historic SHA methodology" is only going to be understood by a seismologist without any explanation of its meaning being provided.

Please note that this is not a criticism of the professional knowledge that has been applied by the specialist seismologist in the preparation of the report but that, for an EIA process, a rather different approach when writing reports for the process has to be applied in view of the fact that all documents are statutorily required to be made available for perusal and comment by I&APs, and are also presented at public meetings.

Obviously the knowledge of any risk to a nuclear installation by potential seismological events – earthquakes - is a vital aspect of their siting. Its importance cannot be overemphasized.

Response (36)

The section in Chapter 8 of the Draft EIR has been taken form the Seismological Risk Assessment which is attached as Appendix E4 to the Draft EIR.

Your comment (37)

Figure 8.58 - The circle and arrow indicting north is very faint. I don't know whether it's like this on the original, but it doesn't even come out clearly at 200% magnification. I would suggest that making it a little more prominent for the final EIR would be an advantage.

Response (37)

Your comment is noted.

Your comment (38)

Section 8.7.7. Noise - Because building structures are referred to in the two distance dimensions given in the text, which are given in metres, it is suggested that, for this public participation document, the respective distances in km be given in brackets after the metre distances. Similarly for the distance data given on the photograph. Many people drive motor cars and they are pretty familiar with kilometres, but not when expressed in 1 000s of metres.

Response (38)

Your comment is noted.

Your comment (39)

Figure 8.71 – the legend details don't come out legibly, even at 200% magnification. Can this be improved?

Response (39)

Your comment is noted.

Your comment (40)

Figure 8.72 – the centre of the red circle, presumably located where the NPS would be situated, needs to be better highlighted.

Response (40)

Your comment is noted.

Your comment (41)

CHAPTER 9 IMPACT ANALYSIS

The figures for the high sensitivity features at the Duynefontein and Thyspunt sites – comparing the areas in the white boundaries with the diagonal white lines on a deep maroon background in these two figures, which isn't indicated in the Legend, I see that for the comparable area in the Bantamsklip map the background is black, which *is* in the Legend. Either the Legends need to be altered for the last two maps to suit the maroon background, or that background is changed to black, so that all three figures are the same. (Or *vice versa*, of course, just changing the one map for Bantamsklip).

On the map for the Thyspunt site - I am rather curious about the deep red diagonal line which, as far as I can glean from the Legend, is a "No-go" zone of seismic hazard which goes right across the "EIA corridor". The black coloured line for another seismic hazard is very difficult to discern, but it would appear to be just off-centre at the top of the photo. Can the general back-ground of the photo be lightened so that these features can be more readily identified? However, my main point is: what is the significance of the red seismic zone in relation to any future seismic events? (Note: this may be discussed later in this chapter which I am reading through systematically, including the specialist's report in Appendix E – when I get to it).

Response (41)

Your comment is noted regarding the background appearance of the sensitivity maps. The red seismic zone relates to the Goudini/Cedeberg Formation Transition. Results of the Siesmic Risk

Assessment indicate that, at this stage of the geo-scientific investigations, the seismic hazard does not preclude a standard export Nuclear Power Station at the proposed Thyspunt site. The most important geologic structure to consider is the offshore Plettenberg Bay Fault, and perhaps an onshore extension of the Cape St. Francis fault. The final layout of the Nuclear Power Station and associated infrastructure will furthermore be designed in terms of the sensitive and no-go areas identified on site.

Your comment (42)

Section 9.2.1 Limitations, 5th dotted comment – in theory, I suppose the public road alignment for the Bantamsklip site could be altered to allow a more convenient siting of the nuclear island to accommodate the 800 metre emergency planning zone. Obviously additional costs would be involved – and no doubt the ire of the local inhabitants!

Response (42)

Your comment is noted however the road alignments are proposed in such a manner as to take all sensitive and no-go areas on site into consideration.

Your comment (43)

Section 9.3.1 Duynefontein, quoting the 4th dotted comment – "The soils have no cohesion and *[sic]* when saturated, and will require innovative slope stabilisation techniques for any proposed excavations"

"*Innovative slope stabilisation*" can mean many things, but an obvious solution is to freeze the soil, providing it is adequately wet.

Response (43)

Your comment is noted.

Your comment (44)

Section 9.34. Conclusion, quoting from the final paragraph – "The potential impacts related to slope stability imposing safety risks without mitigation measures have low significance and consequences at all of the sites, as slope stability design techniques will be employed to deal with these issues. Standard slope stabilisation techniques in sands will almost certainly mean that excavated slopes will need to be battered back to flat angles (i.e. cut back to acute angles in the range of 20º) to limit the potential for slope failure"

Whilst the objective of sloping as a means of achieving soil stabilisation is fully appreciated, the surface layers will always be subject to being disturbed by the wind. Or will they be covered with thick plastic sheeting? But why hasn't the alternative of soil freezing been considered? However, even with freezing no doubt the surface layers of friable soils – eg sand - would still require to be covered.

Response (44)

Various techniques exist for ensuring slope stability, of which ground freezing is one possibility, and the particular technique to be used will be selected during the detail design. Irrespective of the technique selected, a design will be provided that can safely withstand all design load effects and considerations. Since it is his responsibility, the particular technique to be used for slope stability will ultimately be selected by the Vendor.

It is noted that ground freezing can be prohibitively expensive and is not commonly used in the above application in countries in the Southern hemisphere.

As for the case of slope stability, various techniques exist to prevent / control wind erosion of surface layers, and the specific technique to be used will be selected during the detail design by the Vendor.

Your comment (45)

Section 9.4 Seismic stability of the sites, 1st paragraph, quoting - " - - - seismic design of a nuclear power stations, - - - "

Either delete the "a", or the "s" from "station(s)".

Response (45)

Your comment is noted.

Your comment (46)

Section 9.4.1 Objectives, 2nd paragraph, quoting – " - - - standard export nuclear power station - - - "

What is the significance of bringing in the word "export"? South Africa isn't exporting any PWR designs anywhere – it hasn't got any. It might be considered to be *importing* the design for a PWR from elsewhere in the world, but it would appear to be unnecessary to introduce the word at all. What is it intended to signify?

Response (46)

Your comment is noted. The word "export" has no significant implication in terms of the description of thre PWR apart from the fact that the PWR designs do not originate in South Africa.

Your comment (47)

Section 9.4.2 Methodology, 3rd paragraph, quoting – "Eskom has adopted RG 1.208 as the standard for the recalculation of the seismic hazard at the three sites under consideration for Nuclear-1, with the intent of undertaking SSHAC Level 3 studies on each of the sites"

Adopting this US standard for the seismic hazards assessment is obviously the appropriate course to follow. However, did Eskom reach agreement with the NNR when adopting it? If not, then hopefully the NNR have also accepted it, unless they have a better revised seismic assessment technique up their sleeve. In which case - - - . Does a brief review of what RG 1.208 says need to be added as an appendix?

Ditto, 6th paragraph, quoting – "To date no seismic hazard disqualifiers have been identified on any of the sites". So where does the "'No-go' zone of seismic hazard" for the Thyspunt site fit into this picture?

Response (47)

The use of RG 1.208 as the standard for the recalculation of the seismic hazard at the three sites under consideration for Nuclear-1 is current international advice best practise. It is also considered as the state-of-the-art in this regard. The NNR is aware of this approach proposed by Eskom.

Your comment (48)

Section 9.4.3 (a) Vibratory ground motion (for Duynefontein), 2nd paragraph, quoting – "Since nuclear power stations are designed to stringent seismic requirements (which consider an earthquake having a probability of exceedance in the order of $1x10^{-4}$ per annum as the design basis), developed in according with a site specific Seismic Hazard Assessment, the structural design of the buildings and equipment is performed on a very conservative basis"

One very important factor invariably associated with seismic events is how strong it is defined on the Richter scale. In the next paragraph it mentions that the Koeberg PWRs were designed for a 0.3g event for these mysterious "export" reactors, but there's no mention of the much more familiar term "Richter scale". Information should be provided comparing "g" ranges with the corresponding ranges on the Richter scale. This should ensure that these data are more meaningful to I&APs.

Response (48)

Your comment is noted.

Information regarding the relationship between the PGA of an earthquake and its magnitude on the Richter Scale at the sites under consideration can be obtained from the Council for Geosciences (this relationship is probably site specific).

Your comment (49)

Section 9.6.4 (b), 2nd dotted clause – I wonder how many I&APs will realise what "mamsl" stands for? (*Metres above mean sea level*). A table of abbreviations and acronyms would be helpful, especially for anyone accessing this document electronically.

Response (49)

A table of abbreviations and acronymns are included in both the printed and electronic versions of the Draft EIR.

Your comment (50)

P.9.28 – what is the mystery Section 9.7.4 intended to deal with?

Response (51)

Your comment is noted and the error in terms of numbering will be rectified.

Your comment (52)

Section 9.8.4 Conclusion, 5th paragraph, quoting – "Of the three alternative sites, Bantamsklip and Thyspunt will potentially benefit the most from the establishment of a protected area (provided it is handed over to conservation authorities after decommissioning), as neither of these sites currently has formal protected status"

The phrase "provided it is handed over to conservation authorities after decommissioning" needs to be considered with some circumspection because, as with the Koeberg site, the area needs to be defined as a protected site for proper conservation management purposes long before the time for decommissioning occurs, which won't arise for at least a minimum of 60 years after commissioning.

Response (52)

Your comment is noted. Once an area is registered as a protected area the owner of the land remains accountable to ensure that the requirements and management of a protected area are adhered to. Eskom would have to continue with this accountability unless a formal agreement was reached with the relevant conservation bodies to take it over.

Your comment (53)

Section 9.13.2 Operational Impacts, (b) Radioactive emissions, Table 9.27 – if the same reactor types are assumed for the three sites and for the same power output, why is the derived dose rate from the Thyspunt site more than 2.5 times the limit derived for the other two sites?

Response (53)

With the existing footprint and potential to purchase more land at Thyspunt, there is possibility for more than one power station to be located on the same site. Thus, the radioactive releases limits from such stations would most likely increase and the dose rate would be different, assuming the same type of power plant design installation on every proposed site

Your comment (54)

Section 9.17 Noise impacts, 1st paragraph, quoting – "No audible noise emanates from the nuclear reactor itself"

Although this comment cannot be faulted in so far as "*the reactor itself*" strictly refers to the RPV and its contents, none-the-less there will be a lot of noise from a variety of sources *inside the containment building* when the reactor is operating, eg arising from various electrical motors, especially those for the primary coolant pumps. All this noise is suppressed by the massively thick structure of the containment building, of course. Perhaps the syntax could be improved by expanding the phrase to: "No audible noise emanates from the nuclear reactor itself outside the containment building"

Response (54)

Your comment is noted.

Your comment (55)

Table 9.54 Site cost differences – I am somewhat puzzled by the use of the signature n/a when it can either mean "not applicable" or "not available", neither of which are defined, and nor are either of them relevant for the purposes of this table. Surely the site against which the relative difference is being made needs to be normalised to a definite figure and not be indicated merely with the meaningless "n/a" in this particular context?

And how does it come about that, when the figures for the two other sites are compared with Thyspunt, the comment "n/a" is made for Thyspunt, but when the comparison is made against Duynefontein, surprise, surprise, that for Thyspunt is still "n/a" *together with that for Duynefontein*? These inconsistencies need to be eliminated from this table.

Additionally, there is nothing to indicate whether the cost differences are positive or negative. It should not happen that one has to read the text to see which way it is. There's not even any explanatory footnotes. Again, this point needs to be indicated in the table, and although the data in it might have been quite clear to whoever prepared it, they must be capable of being sensibly interpreted by all other readers.

Response (55)

Thank you for your comment. The table will be revised in order to eliminate any inconsistencies.

Your comment (56)

Section 9.20.2 Macro-economic Analysis, 9(a) Methodology - is the Gautrain really the most appropriate construction enterprise with which to make a sensible comparison? I would have thought that one of the new coal fired power stations under construction would have been more appropriate. But why does any comparison need to be brought into the picture at all – exactly what does it achieve? The Gautrain is very nice to have - I am sure that few people who will be using it would dispute that fact - and it will impact on the cities which it will serve. But electricity supplies are quite a different matter because they impact on the economy of the whole of the country.

Response (56)

The project is not compared against the Gautrain project – reference is made to the Gautrain project merely to provide context to the scale of capital investment for the Nuclear-1 project.

Your comment (57)

Table 9.55 Comparison with site construction costs - this table has *all* the figures in it, including negative ones when appropriate. Compare with my comments for Table 9.54 above.

Ditto, figures for the value of job creation – how does it come about that the values for job creation at Bantamsklip and Thyspunt are well below that for Duynefontein? Is this anything to do with industry local to Duynefontein (eg in Atlantis) having an input to all three sites, which-ever one is finally selected? Or is there a larger manpower pool available from, say, Atlantis, with nothing comparable at the other two sites? Is this perceived anomaly explained elsewhere in this report?

Response (57)

Thank you for your comment. The table will be revised in order to eliminate any anonalies.

Your comment (58)

P-9-189 5th paragraph, quoting – "The public's level of concern is lower in the area around Duynefontein because of their experience with Koeberg. Public concern is also relatively low at Bantamsklip but is highest in the area around Thyspunt."

I have got an impression in recent months reading the Cape Argus that active groups had become more apparent in their opposition to development at the Bantamsklip site. Has the situation, in fact, changed since this comment was prepared? However, how does the low level of public concern at Bantamsklip relate to the population in the surrounding area, but with outsider active groups now having become involved?

Response (58)

Thank you for your comment. Support and opposition to the Nuclear-1 project is constantly changing not only with respect to the project as a whole but also with respect to the sites in comparison to each other.

Your comment (59)

P.9-22.7 Item (d) Emergency evacuation, quoting - "The transport network road capacity currently available (2005) to accommodate the planned evacuation is approximately 4500 vehicles"

Although this statement refers to evacuation of the staff from the new power station site, I think that the situation indicated, particularly the date 2005, needs to be reviewed regarding the evacuation of the populations. I know for a fact that the NNR approached the City of Cape Town some years ago to inform them that if additional roads weren't constructed to permit an effective evacuation of the northern suburbs' populations, the city would not be permitted to allow any further housing developments to proceed in those suburbs. I also know that a number of additional roads have indeed been constructed over the past three years, but not necessarily up as far as the Duynefontein / Melkbosstrand area, but certainly around Bothasig, Richwood and Table View. Presumably evacuation routes near to the Koeberg power station are considered to be satisfactory. This comment, therefore, needs to be updated to properly reflect the situation wrt emergency evacuation of the population as at 2010. In any case, reference to the situation in 2005 is too long ago to be appropriate for this draft EIR.

Certain road upgrades are mentioned as a requirement for construction vehicles, and presumeably these upgrades will be looked at to see that they will also facilitate emergency evacuation.

Response (59)

Your comment is noted.

Your comment (60)

P.9-229 Section 9.24.3 Bantamsklip – this heading must be changed to *Thyspunt* !

Response (61)

Your comment is noted.

Your comment (62)

P.9-23.6 Section 9.25.3 Decommissioning - a reasonable approach needs to be adopted to the decommissioning strategy because this won't even arise for a minimum for 60 years, by which time the philosophy for this process may have been drastically revised. I note it is mentioned that the strategy will need to be revised (at intervals) during the operational lifetime of the power station.

Response (62)

The strategy and time **schedules for** decommissioning are largely driven by the need for re-use of a site. This is very likely in the South African scenario. The use of international experience will be the main input into the final decommissioning plan for any RSA plant. The plan for Koeberg was recently updated with more detail following feedback from EDF on the decommissioning of Chooz A.

Your comment (63)

P9.240 Section 9.26.5 (a), 4th paragraph, quoting – "The total area of the property is 10 000ha (Beyleveldt, pers. comm. 2010)"

It would be more meaningful for I&APs if the area in sq.km – ie 100 sq.km – was added in brackets.

What is the significance of the (a) for this clause, when there's no other sub-clauses?

Ditto, quoting from the 5th paragraph – "The concept for the disposal of solid waste at Vaalputs consists of near-surface trenches using metal containers for low-level waste, and concrete"

Do any liquid wastes arise which cannot be diluted and discharged into the sea at very low concentration? Are the concrete drums made to a special composition to make them impervious to water penetration, either in or out?

Ditto, Clause 9.26.6 (b) – what is the significance of the (b) when there are no other sub-clauses?

Response (63)

Your comment is noted. Any formatting errors which may cause confusion to readers will be rectified. Liquid waste to be discharged is generally diluted to the required concentrations.

Your comment (64)

P.9-241, 1st paragraph, quoting – "Alternatives to on-site storage of HLW will depend on the legislative provisions that are put in place to manage HLW. The South African Cabinet has approved a National Radioactive Management Policy and Strategy in 2005".

No doubt the long term storage criteria for HLW will be modified from time to time in order to match international best practice as it evolves, and as will be promulgated through the publica-tions of the IAEA.

Ditto, the text of the brief article from the url given in the 2nd paragraph –

By: Esmarie Swanepoel From Creamer Media's Engineering News, 25th March 2009
South Africa's sole nuclear waste management site, Vaalputs, in the Northern Cape, was likely to house high-level waste within the next ten years, the Nuclear Energy Corporation of South Africa Necsa) said on Wednesday.

Speaking at Vaalputs, CEO Rob Adams said that the site currently only dealt with low and Intermediate level waste from the Koeberg nuclear power station, near Cape Town. However, South Africa would need a fully operational high-level waste management site by 2070 to deal with spent fuel accumulated at Pelindaba and Koeberg. The high-level waste was currently being stored in underground facilities at Pelindaba and Koeberg. The negotiations with the National Nuclear Regulator to identify a high-level waste disposal site would be likely to start within the next five years.

Adams noted that three possible disposal sites would have to be identified, and three individual environmental impact assessment studies would have to be conducted. Necsa would then argue the case of the most suitable site. Since Vaalputs has been in operation since 1986, it would be the most likely choice.

In January, President Kgalema Motlanthe signed into law an Act, which will shift control of all nuclear waste disposal sites to the National Radioactive Waste Management Institute by no later than December 2010. The institute will be responsible for the management of Vaalputs, as well as any other possible waste disposal sites.

Meanwhile, Adams added that negotiations to transport Pelindaba's low and intermediate-level waste to Vaalputs by rail, was under way. The corporation expects a decision from the regulator by the end of this month.

Currently, about 6% of Vaalputs' capacity is taken up by low-level waste, with a further 4% by intermediate level waste.

Ditto, Section 9.26.8 Conclusion - whatever legislative provisions the government puts in place, now, as are advised by the NNR, over the next 60 years there will undoubtedly be relatively dra-matic changes in the concept of how HLW - and spent fuel elements in particular – will be dealt with. Not the least of the reasons being the need to use the residual uranium and actinides, including the Pu-239 content, as the fuel for PBMRs and fast breeder reactors. Such use will also provide the mechanism

whereby this nuclear fuel is not only used to its maximum extent to provide energy, but it will also be virtually eliminated, especially the highly sensitive issue of the Pu-239, leaving mainly fission product activity to be put into long term storage.

Response (64)

Your comment as well as the attached article is noted.

Your comment (65)

P.9-24.4, Table 9.71 Factors relating to system reliability – I don't know anything about the OCGT system in East London, but it needs to be checked if it has been upgraded to the more efficient CCGT plant, as that one at Ankerlig, Atlantis, has been.

Ditto, footnote 16 – is it really a case of isolating the stable part of the system merely in order to maintain its stability, or isolating it per se from the unstable part of the system so that the latter can remain generating electricity? Or is there a possibility of a feedback problem from the failed system to that one which is continuing to work satisfactorily, causing that one also to fail? Presumably the isolation of the stable part of the system is not going to have any influence on its stability once it's been isolated.

Response (65)

Every well designed power system is equipped with isolating devices and operates on the principle of sustained network stability. Should a fault or network behaviour, with possible negative effects on the national grid, occur anywhere in the power system - the affected part of the system should be isolated. This is to maintain the power system integrity and inhibit damage to system components.

The East London OCGT which was constructed some years ago has not been upgraded to a CCGT.

Your comment (66)

Table 9.72 Transmission integration factors – the penultimate Factor in this table indicates that, for all three sites, specific Gamma 765 kV lines will be indefinitely deferred. Whilst shorter transmission distances may be the possible reason for their deferment, with its attendant cost savings, will this necessarily apply in the long term on the basis that power demand is going to continually increase?

Response (66)

The reason for the deferment of the additional 765kV transmission lines to Gamma is as a result of the nuclear generation meeting the local load requirements. No new long 765kV lines are required to increase the transfer power capacity to the Cape until the Cape load has increased beyond the output capacity of the nuclear power generation plus the safe power transfer capacity of the existing 765kV and 400kV backbone transmission system to the Cape. This is beyond the normal transmission planning period of 10 years and will be deferred even further as additional generation is added to the system in the Cape near the load centres. Without the Nuclear 1 base load generation new 765kV HVDC or even 800kV HVDC transmission lines will be required around 2020 to increase the power transfer capacity to the Cape to meet the growing demand.

Your comment (67)

P.9-244, final paragraph, quoting – "From a technical point of view, therefore, the most preferred site alternative is Thyspunt. Strengthening of the Western Cape network is still required, but technically Eskom will be able to delay this until after the construction of a power station in the Eastern Cape"

This statement as it stands gives the misleading impression that the whole deciding factor for the site of this first new nuclear power station is the matter of electricity transmission lines, but not the costs

thereof. Surely the former is merely one of a spectrum of deciding factors? Therefore is there justification for placing undue emphasis on transmission lines? I suggest rewording the clause to read: "Purely from technical considerations for power transmission lines, therefore, the most preferred nuclear power station site alternative is Thyspunt. - - - "

If, however, relative costs are also a criterion, then this needs to be mentioned, giving the relative costs figures for the additional transmission lines. This costs difference should be compared with the cost of the nuclear power station so that a sensible judgement on a comparison of the costs can be made by I&APs.

Response (67)

The recommended site, Thyspunt, is based on the operation and stability of the Eskom transmission network as a whole and not on the shortest transmission lines. The Eastern Cape is the weakest part of the transmission grid in relation to the size of the load to be supplied. If there is no base load generation in the Eastern Cape the grid in this region becomes a high risk to voltage instability under contingency conditions as the load increases, which is against the South African Grid Code. The only way to counter this, besides local base load generation, is to construct additional transmission lines into the area from the generation source to reinforce the stability transfer limits. Establishing Nuclear 1 at Thyspunt then uses the by then existing 765kV and 400kV infrastructure to supply the local load centres and export the excess generation, rather than constructing new lines to keep supplying the Eastern Cape safely. So in effect it does reduce the overall length of the transmission lines required in the long run, but is not the deciding factor.

The clause could then rather be worded as follows: "Purely from technical considerations regarding security of supply and network stability of the whole Cape grid, the most preferred nuclear power station alternative is ….."

Your comment (68)

P.9-246 Section 9.28.1 Selection of the preferred site, second set of dotted points - I find it to be somewhat curious that, in making the comparisons, purely technical considerations appear to have been dealt with in arriving at a choice for a preferred site. Isn't the subject of the relative costs involved for construction works; new roads and road improvements; and transmission lines, also an integral part of the analytical considerations for a preferred site? I am assuming that only a single supplier for (presumably) the PWRs will be selected, with all reactor installations effectively costing much the same sum.

Response (68)

As is stated in Chapter 9 of the Draft EIR, the preferred site was evaluated in terms of:

- Technical factors (geological and geotechnical suitability and seismological risk);
- Water-related factors (fresh water supply, geo-hydrology and surface water hydrology);
- Social factors (traffic and transportation, noise, social impacts, economic impact, agriculture, tourism, human health risk, emergency response and site control, and safety and visual impact); and
- Biophysical factors (heritage and / archaeology, air quality, freshwater ecology, vertebrate fauna, invertebrate fauna, oceanography, marine biology, botanical and dune geomorphology).

In terms of the supplier for the PWRs: The RSA government are referring to a nuclear fleet in discussions of the nuclear plants for the future. This implies that at the beginning there may be a single PWR plant designer. This does in no way imply that this would be the sole design for the 20 GWe being envisaged. For a single design, costs may be of the same magnitude; however,

environmental factors may call for improvements in the standard design. This is likely to increase the cost of one unit at a different site.

Your comment (69)

P.9-254 – here again is the mention of an OCGT plant. Checks must be made if they would all be CCGT, as they now are at Ankerlig, Atlantis. This may make them more noisy, but more efficient.

Response (69)

See a previous comment on same.Your comment is noted.

Your comment (70)

P.9-255, comment in the 2nd column of the table under *Selection of key decision factors for ranking of site alternatives* for Duynefontein, quoting – "Suitable but not ideal as there is already significant generation capacity in the Western Cape"

Although this is correct *per se*, none-the-less problems of supply shortages do arise when both Koeberg reactors are shut down, although this is an infrequent occurrence, usually arising from an unplanned occurrence coincident with one reactor going through its planned refuelling out-age.

Response (70)

Your comment is noted.

Your comment (71)

P.9-272 Section 9.28.10 Management of spoil material, Subsections (a) & (b) – these two sub-sections refer to disposal of the spoil material to the sea and on land, respectively. Each sub- section is worded as though each one is the intended method of disposal of this spoil material, which I assume to consist mostly of friable sols. But both methods cannot be regarded as having equal status: one is presumably preferred over the other. "Can be" and "will be" do not fit into a sensible picture for differentiating the suitability of the two alternatives. I suggest that the word-ing of these two sub-clauses needs to be revisited to make them more mutually meaningful.

I note that the proposal on how best to deal with this spoil is dealt with in Sub-section (g).

Ditto, Sub-section (a), quoting – " - - - since movement patterns in the sea would allow for sufficient *dilution* of the spoil" *[My italics]*

"Spoil" as used in the context of this sub-section refers to friable solid particulate soils. Solids of this nature would not *dissolve* in seawater: they will be *dispersed* by wave action. Therefore the word "dilution" needs to be changed to "dispersion".

Response (71)

Your comments are noted and will be forwarded to the authors of the report.

Your comment (72)

P.9-273 Section 9.28.11 Nuclear plant types, quoting – "Pressurised Water Reactors are the most commonly used nuclear reactors both nationally and globally. The existing Koeberg uses PWR technology and it is therefore a tested form of power generation - - - "

South Africa only has the PWR type of power reactor, the two of them being located at Koeberg. It is hardly appropriate to suggest that they are in *common use* in South Africa. I suggest rewording these sentences as follows, which will also improve the syntax: "Pressurised Water Reactors are the most commonly used type of nuclear reactors, internationally. The existing Koeberg nuclear power station uses PWR technology which is, therefore, a well tested form of power generation in the country - - - ".

Response (72)

Your comments are noted and will be forwarded to the authors of the report.

Your comment (73)

P.9-274, 2nd paragraph, quoting – "The sale of the properties will be to a willing buyer at the market-related price, *which would probably result in an alternative form of land use that may be more damaging than a nuclear power station*" *[My italics]*

This document is the draft EIR for a statutory environmental impact process. It is intended to indicate the situation as it is applied to the specific project, in this case Eskom's Nuclear-1 project. In my opinion, it is quite improper, unacceptable, and possibly even legally challengeable, to include any speculative and inappropriate remarks concerning some alternate more damaging development. It is, indeed, tantamount to an attempt to define for Eskom under what conditions they should consider disposing the land. I don't know when the sites were purchased, but presumably between 25 and 35 years ago.

Perhaps it escaped the attention of the individual who included the remark that, whatever party or organisation might be interested in purchasing the land for other, possibly highly lucrative, development purposes, then unless Eskom wishes to make as much money as possible out of such land sales without any consideration for the conservation, ecological and heritage value of the site for South Africa, presumably Eskom has the facility to have the area formally declared as a site of special interest, and *donate* it to the relevant heritage, conservation or other organis-ation whose objects are to maintain its pristine natural state.

The other aspect which appears to have been overlooked is that any development by another party or organisation would necessarily be subject to an EIA process, although it would be the WC Provincial Administration's DEADP who would deal with applicants.

Please ensure that either the sentence I have quoted above is either removed *in toto* for the final EIR, or delete the phrase I have indicated in italics.

Response (73)

Your comments are noted and will be forwarded to the authors of the report.

Your comment (74)

CHAPTER 10 CONCLUSIONS AND RECOMMENDATIONS (ENVIRONMENTAL IMPACT STATEMENT)

Section 10.2 Key technical considerations, 1st paragraph, quoting – "All these alternative sites were found to be technically feasible for the construction, operation and decommissioning of a conventional nuclear power station"

Once again I express my concern that the full stages for a nuclear power station haven't been fully listed. Repeating what I have mentioned earlier, they are as follows:construction; commissioning; operating; decommissioning; dismantling

The process of *decommissioning* means putting a plant, whatever it may be, into a safe mode of permanent shutdown; making it inaccessible to unauthorised persons; and removing mainly small items of plant and equipment so that no one can restart the plant. It does *not* mean the final process of dismantling and demolitions, with the reversion of the site to "greenfields" status.

Response (74)

Your comment is noted however dismantling is considered to eb part of the decommissioning process.

Your comment (75)

Ditto, comment on the 2nd paragraph on page 10-1 – this is suggesting that to locate the Nuclear-1 project at Duynefontein would be concentrating generating capacity in this area of the Western Cape at the expense of that in one of the other areas. This would, in fact, mean constructing Nuclear-1 at Thyspunt because Bantamsklip has been removed from consideration for this specific EIA process.

However, it has been stated elsewhere that any one or more sites could be considered for a generating capacity up to 10 000 MW(e), which would result in a power generation concentration somewhere else other than at Duynefontein, with the accompanying complex system of overhead transmission lines. *This is merely throwing the ball back into another court without in any way altering the situation, only transferring it*.

I would suggest that more in-depth thought needs to be given to this alleged undesirability of concentrating the generating capacity because, as currently composed, this paragraph lends itself to considerable criticism. And no doubt other people will pick up the same conflict in the reasoning that has been proffered for not siting the Nuclear-1 reactors at Duynefontein. In view of a site maximum output of 10 000 MW(e) which could be considered, this particular argument which has been invoked against the selection of Duynefontein is, therefore, inadmissible.

I am not suggesting that this first one of the new nuclear power stations needs to be sited at Duynefontein, but that more cogent reasoning must be invoked to demonstrate why Thyspunt would be a better site for this Nuclear-1 project than Duynefontein. For example, the extra cost of stronger foundations, etc, to withstand the slightly higher seismic sensitivity at Duynefontein is one reason, not that the necessary strengthening can't be achieved, but because of the consider-able additional cost.

Response (75)

Your comments are noted and the section will be revised to eliminate any inconsistencies. However please note that generation capacity and transmission integration are not the only factors used in determining the preferred site for Nuclear-1. Other factors contributing to determining the preferred site are discussed in Chapters 9 & 10 of the Revised Draft EIR.

Your comment (76)

Section 10.3.2 Seismological risk, 2nd paragraph – this indicates that there are no "seismic disqualifiers" for any of the sites, at least in so far as the report being prepared by the Senior Seismic Hazard Advisory Committee (SSHAC) doesn't indicate otherwise. Although it is understood that the work of this committee should be completed within the next two years, the question needs to be asked when was this committee established, considering the concern about the urgency of what seemingly needs to be known in more detail about the seismic sensitivity of the various sites?

Response (76)

The SSHAC panel was formed in 2008. However, prior to the formation of this group of international specialists, the AEC (Geosciences Branch) and the CGS were appointed in 1985 and 1995, respectively to undertake studies of the geology and potential seismic sources in the regions around the three Nuclear sites. This information is used by the SSHAC panel to determine what additional

investigations need to be done at each of the sites to qualify and validate the current preliminary results and before they would be able to make any scientific conclusions on the capability of the geologic features at each site. The additional investigations recommended by the SSHAC panel make use of the CGS personnel previously involved to ensure continuity of the knowledge base.

Only once the investigations required by the SSHAC panel have been completed can the seismic source zones be characterised and the seismo-tectonic models developed for the PSHA process.

Your comment (77)

P.10-5 Section 10.3.13 Economic impacts – I note that Bantamsklip is mentioned in this section. I presume that no conflict is intended wrt the fact that, elsewhere, it is mentioned that this site has been removed from consideration for this Nuclear-1 project. Or has some doubt subsequently crept in about the validity of excluding Bantamsklip from this Nuclear-1 process?

Response (77)

Bantamsklip was considered for Nuclear 1 but is not the preferred site for Nuclear 1.

Your comment (77)

P.10-8 Section 10.5 (a) Location of the proposed power station – I am very curious about the inclusion of Bantamsklip in this section. Here are my reasons for making this comment.

In Chapter 9 Section 9.28 *Evaluation of alternatives*, Sub-section 9.28.1 *Selection of the preferred site*, Sub-sub-section (b) *Selection of key factors for ranking of site alternatives*, this is what is written in the last paragraph on page 9-257, which continues at the top of the next page, quoting:

"Apart from cost, if the cumulative environmental impacts of the transmission
n corridors are con-sidered, the potential impacts of construction of a nuclear power station at Bantamsklip would likely be much more significant than the other two site alternatives, considering the length of the transmission lines and the difficult mountainous terrain through which the Bantamsklip trans-mission lines would have to pass. This would, however, need to be confirmed by the EIAs being undertaken for the transmission lines from the three alternative sites. Furthermore, potential impacts on invertebrate fauna are of significantly higher significance at Bantamsklip than at either of the other site alternatives, due to the confirmed presence of two undescribed species at Bantamsklip. These aspects are not considered fatal flaws and do not disqualify Bantamsklip as an alternative site for a nuclear power station in the future. Thus, in spite of the potential positive impacts that would be realised by the effective conservation of the Bantamsklip site by the development of Nuclear-1*, bearing the above mentioned factors in mind, the Bantamsklip site can be regarded as the least preferred site alternative and is removed from further consideration [Ref.28]. This leaves Thyspunt and Duynefontein for further comparison*" *[My italics]*

This specific EIA process is dealing with the Nuclear-1 project, for which purpose - as is clearly stated in this quotation from Chapter 9 - the Bantamsklip site has been *removed from further consideration* for it. This wording is absolutely unequivocal. Therefore, why has Bantamsklip been included in these conclusions in an *inclusive* context, when it has already been *excluded*? In fact the above conclusion from Chapter 9 in relation to the Bantamsklip site doesn't receive any mention, even in a footnote! This unfortunate lapse obviously needs to be rectified – was it overlooked?

Response (77)

Your comments are noted and your suggestions will be forwarded to the authors of the report. The sections will be reviewed for any inconsistencies and which will be rectified where needed.

Your comment (78)

Appendices A; B; C; D – no comments

Response (78)

Your comment is noted.

Your comment (79)

Appendix E4 Seismic Hazard Environmental Impact Report, Executive summary, 4th paragraph, quoting – "Parametric-Historic PSHA.". Although the anagram PSHA is included in the *List of abbreviations*, no information is provided in the *Glossary of terms* what "parametric-historic" means.

Section 1.1.1 General – this refers to Eskom favouring the US NRC Standard Review Plan, NUREG-0800, including its references to seismology ("geo-scientific information"), together with a number of other US regulatory documents and codes (*vide* Sections 1.2.1 and 1.2.4 in this seismology report). Although I certainly don't question the acceptance of this US standard, etc, in any way, has the NNR been approached for their agreement?

Although it could be argued that the NNR must retain its independence, it would clearly be un-fortunate if Eskom was to use these particular US.NRC standards and regulations when the NNR might decide to use others. However, I can't see any conflict if the NNR stated in advance which regulations it will be working to when the time comes for its assessment of the project with a view to issuing a nuclear operating license. This would be normal practice. For example, the US.NRC publish its own standards, regulations and codes which are required to be adhered to, and they are also responsible for issuing the nuclear operating licenses. Therefore there's no conflict wrt independence

Response (79)

The NNR ascribes to international acceptable standards, without being prescriptive, hence the approach that Eskom has followed. The Glossary of terms will be rectified.

Your comment (80)

Appendix E5 – no comments

Response (80)

Your comment is noted.

Your comment (81)

Appendix E6 Geotechnical Suitability Assessment, Section 4.1 Environmental Assessment, a) Slope failure, etc, 1st paragraph, quoting – "Without due care taken in the design of excavations, dewatering systems and lateral support systems, cut slopes will carry a high risk of failure in an environment where groundwater is encountered [1]"

Obviously ground water is going to cause considerable problems with ground stability in excavations. Quoting from Section 5.2.1 Slope stability, Mitigation measures, the dotted point for Duynefontein: "• Duynefontein: to explore the feasibility of lateral support systems to retain approximately 20 m of overburden and minimise excavation volumes, *all within an effectively de-watered site*" *[My italics].* Now, I most certainly am not a construction engineer, so I can only comment on this recommended mitigation procedure in a very general way.

The first paragraph in this section refers to enhanced "dewatering prior to excavation". I presume that the dewatering process is intended to achieve slope stability during the excavation work. But dewatering presumably has to be continued throughout the period of working in the excavations to ensure that the sloping sand isn't liquefied by the continuous inflow of the ground water from the surrounding area.

But what would happen if there was a cloudburst, which isn't unknown in this part of the Western Cape Province, although such events are rare. Or suppose that a period of three or more days of continuous relatively heavy rain occurs, again another phenomenon which certainly can't be discounted. These events could overwhelm any mitigation measures to maintain the dewatering régime, possibly leading to a disastrous (from the point of view of construction timescales) flow of liquefied sand and water into the excavations.

I note that the mechanism to be adopted for the dewatering technique I explained in more detail in Appendix E7 Geohydrological Assessment, Section 5 Dewatering to prevent flooding by groundwater.

Other than possibly being an expensive alternative – about which I have no knowledge – are there any specific technical reasons why ground freezing cannot be carried out instead of dewatering? In principle, would not this technique save a lot of potential worries? Thus if there was to be a cloudburst, the only water that would get into the foundation / excavation area would be what rained directly on to that area, which would presumably be a much easier problem to deal with than the submergence of the excavations and construction work by liquefied sand? I have to assume that the excavated soils would be piled around the excavation to prevent surface floods from entering the excavation.

Presumably because the excavations would have a finite size, this wouldn't affect the flow of the surrounding ground water to the seashore, ie there wouldn't be groundwater flooding.

Obviously pumps would need to be ready on site to be started up within a minute or so as soon as the signs of potential flooding became obvious. The main point of ground freezing would be the knowledge that the surrounding ground water would be permanently prevented from leaking into the excavations, and the edge slopes round the excavation could, therefore, be steeper. There would, of course, be a need to assess the possible impact of the frozen ice slightly expanding the sandy soil, with the possible requirement to recompact the sand once the site was returned to its normal status.

Response (81)

Your comment is noted.

Ground freezing is a technique that is normally applied to construction features such as shafts and tunnels rather than mass freezing that would be required for a Nuclear-1 type excavation. It should be noted that the dewatering/groundwater control methods mentioned in the EIR are only illustrative and not for design specifications. There will be further more detailed work carried out on these aspects and ground freezing could be considered at this stage and once more detailed site information is gathered. Some reasons why it has not been considered and mentioned in the EIR are:

- It requires a 100% cut-off of groundwater to be effective; any seepage or leakage through the freeze could be catastrophic
- The size and type of the excavation
- Excavation of frozen soil is more expensive than that of loose, drained soil

Concerns about flooding of an excavation from a cloudburst or continuous heavy rain are largely unfounded as:

- The dewatering system will be designed to have surplus capacity to deal with such events
- Extreme rainfall events monitored on site to date, eg August 2008, have shown that groundwater level response in the upper Algoa Aquifer is minimal, which is attributed to the high porosity of the dune sands; overflow of water into the wetlands and rapid drainage from the system via the underlying cobble layer

Various techniques exist for constructing excavations, of which dewatering and ground freezing are both possibilities. However, the particular technique to be used will be selected during the detail design. Irrespective of the technique selected, a design will be provided that can safely withstand all design load effects and considerations, and these include the effects of potential excessive precipitation described in Comment (81). Since it is his responsibility, the particular technique to be used for constructing the excavations will ultimately be selected by the Vendor.

It is noted that ground freezing can be prohibitively expensive and is not commonly used in the above application in countries in the Southern hemisphere.

Your comment is noted.

Your comment (82)

Appendices E7; E8; E9; E10; E11; E12; E13; E14; E15; E16; E17 – no comments

Response (84)

Your comment is noted.

Your comment (85)

Appendix E18 Social Assessment, p.5 Creation of Employment Opportunities, quoting - " - - - at least 25% of the construction workers will be sourced from the local labour force". This 25% criterion may apply for the Thyspunt and Bantamsklip sites because of the relatively low populations in the surrounding areas, and many of those in the vicinity may already be employed on the land. But this could not be claimed for Duynefontein largely because of the close proximity of Atlantis, which is primarily an industrial town where there remains a relatively large pool of unemployed. Although the wording "at least 25%" implies a minimum, not a maximum, none-the-less I would suggest that a higher % should be recommended if the Duynefontein site is selected for the project, otherwise there is likely to be a lot of dissatisfaction, especially in Atlantis, a major labour source because of its relatively large population and run-down industries.

There would be every social advantage to be gained if the % was increased to, say, between 45 and 50%, or even higher. It has been commented elsewhere in this DEIR that there is obviously the greatest familiarity with nuclear power in Atlantis because of the proximity of the Koeberg Nuclear Power Station, and it would be very unwise to prejudice that favourable attitude towards nuclear by the population in Atlantis by not taking advantage for the nearby labour force for em-ployment during the construction phase. Indeed, the more workers who could be recruited locally so would there be a correspondingly reduced requirement to provide accommodation. There would also be obvious opportunities for non-operating staff to be employed by Eskom from local communities and trainee operating staff.

The following paragraph in this same section recognises this point: "Optimisation measures are aimed at enhancing the benefits of employment creation". Also on p.8 in the section "Loss of Employment after Construction", this situation is again acknowledged: "Mitigation measures are aimed at minimising the extent of jobs lost after construction".

Presumably these aspects for job opportunities are is dealt with in more detail later in this specialist's report.

P.27, figures given in R billions – I don't think that the cost surely is going to run into R100s of *thousands* of billions of Rands, but R100s of billions. For the three figures given on this page, therefore, the decimal point needs to go after the first 100, eg R100.538 bn, rounding off.

P.59 Table 2.20 Schools between 20 km and 80 km radii from Duynefontein (2009) - I don't understand this table at all. Going back to Table 2.19, which lists schools up to 20 km radius from Duynefontein, there's one school listed for Milnerton, which name I don't recognise. In fact it's in Dunoon. There's also another one in Dunoon, Inkwenkwezi Primary.

In Table 2.20 Milnerton isn't mentioned at all, where there's the following long established schools: Seamount primary; Milnerton Primary; Zonnekus Primary (its name has in fact lately changed; and Milnerton High. (Abbots College has moved along Bosmansdam Road, out of Milnerton, and the Damelin is a college precinct, not a school *per se*).

There are two schools in Tyjgerhof, on the other side of Koeberg Road across from Milnerton, and four in Bothasig. Then there are two primary schools in Phoenix, also across Koeberg Road from Milnerton. And what about the schools in Brooklyn? If all these schools have been missed out, then just how many other schools have been missed from this list? An excellent map to check all the schools in the 80 km radius area from Duynefontein is the Map Studio one for Cape Town, 14th edition (2007) or later.

How on earth can the source of the information be claimed to have been the Department of Education, Western Cape? I cannot believe that they are so incompetent not to know all the schools for which they are responsible.

P.60 Hospitals within 35 km from Duynefontein – the large Panorama Medi-Clinic hospital complex along Plattekloof Road at the junction with Rothschild Boulevard isn't all that much further from Duynefontein. It's very little further, in fact, than the Milnerton Medi-Clinic. It's clearly marked on the Map Studio map for Cape Town.

P.63 There are only 2 police stations indicated to be within a 20 km radius from Duynefontein (*vide* Table 2.26), and yet there are no less than 4 within a 16 km radius (*vide* Table 2.27). This inconsistency in numbers wrt distance needs to be eliminated.

General comment: having read so far with this report and had to raise issues of data accuracy, I would suggest that the data which have been presented in the tables on schools, police stations and hospitals in this report need to be revisited in order to ensure that absolute accuracy has been achieved. Information on hospitals and police stations are a case in point, where they will be vital iro emergency planning. I have also mentioned school numbers, and although at face value they may not appear to be of emergency significance, they may well be required to tempor-arily accommodate people who have had to move from their homes to escape from possible air-borne radioactive contamination. This comment could also apply to the information provided for the Bantamsklip and Thyspunt sites, of course, with which I am not unfamiliar.

The facilities as I have mentioned above will be of considerable interest to the NNR iro emergency planning.

Response (85)

Your comment regarding data accuracy is noted and will be forward to the specialist in order to revise the report.

Your comment (86)

Figure 2.09 Land use map: Duynefontein *(2009)* - the wording in the legend of this map, even at 125% magnification, remains illegible. Can this be improved for the final EIR?

Response (86)

Your request is noted.

Your comment (87)

I haven't come across any reference to the fact that the NNR placed a restraint on the building of any more housing accommodation at Duynefontein a long time ago? As far as I am aware, this restraint remains permanently in force.

Response (87)

Your comment is noted.

Your comment (88)

P.66 Overview of the Economy: Duynefontein, 4th paragraph, quoting – "Killarney and Montague Gardens are two of the City's most important industrial areas".

This would be more meaningful if it was reworded "Killarney and Montague Gardens are two of the City's most important industrial areas within a 20 km radius of Duynefontein".

Ditto, *Industry* - although it has been considerably run down over the past 15 years, there remains a large industrial area at Atlantis. With the expansion of Eskom's nuclear powered stations this could possibly become the nucleus for the development of various nuclear industrial enter-prises to support what will become Eskom's very significant nuclear programme.

Response (88)

Your comments are noted.

Your comment (89)

P.71 Modal split, quoting - "The proposed West Coast Integrated Rapid Transit (IRT) system, which will connect the West Coast areas of Blaauwberg and Table View to Cape Town's CBD, *is currently in the planning stage for implementation*" *[My italics]*

This statement is a long, long way out of date. The irt system is well under construction from Table View into town, and is scheduled to be officially opened this November. I suggest rewording something like: "The proposed West Coast Integrated Rapid Transit (IRT) system, which will connect the West Coast areas of Blaauwberg and Table View to Cape Town's CBD, is currently under construction, and should be ready for its official opening in November, 2010". This opening date has been reported in the city's press.

Response (89)

Your comment regarding data accuracy is noted and will be forward to the specialist in order to revise the report.

Your comment (90)

P.72 Section 2.2.9 Duynefontein - the comment I referred to above should be reiterated here, namely that further residential house building at Duynefontein has been permanently prohibited by the NNR. Or at least I am not aware that any relaxation has been.

Response (90)

Your comment is noted.

Your comment (91)

P.73 3rd paragraph, 2nd line – change PBNR to PBMR

Response (91)

Your comment is noted.

Your comment (92)

General comment – due to my unfamiliarity with local knowledge, I am not offering any comments wrt the Bantamsklip and Thyspunt sites. However, I suggest that the data may need to be revisited in order to ensure accuracy and consistency

General comment – I note that the words in the Legend for Figure 2.16 are perfectly legible, so presumably there should be no reason why this measure of legibility can't be achieved in Figure 2.09 for Duynefontein.

P.125, Table 2.79 – it would appear to be an unusual feature, where there are no facilities, to indicate this as NA – not applicable - rather than as a zero – 0. Commenting with a total lack of familiarity with the area, how can one be so certain that, if the local communities were questioned, they would be totally disinterested rather than comment that they would prefer it if crêche and/or police station / satellite facilities were available. Are these not important social issues for early education and safety, respectively? Some of the communities, of course, may be very small, with no justification for just the two services I have mentioned being available, locally. But that doesn't mean, because the facilities aren't there, that they aren't considered by the local communities to be applicable and highly relevant.

P.127, Figure 2.23 – this is another figure for which the words in the legend can't be read properly, even at 150% magnification.

P.131 *Industry* – would it not be more appropriate to refer to this section as *Industry and Commerce*? The retail sector is commerce, not manufacturing industry, but both are mentioned under this heading.

P.139 Table 3.02 Population estimations, footnote - change House Hold to Household

Response (92)

Your comments are noted.

Your comment (93)

P.143, 1st dotted point, quoting – " • The Construction Village (including all the facilities) should be located in such a manner that the buildings and facilities can be utilised by the surrounding community after the construction period, in order to ensure sustainability of such infrastructure"

Is it to be assumed from this statement that temporary accommodation facilities are not being considered at all for any of the three sites? In which case there will obviously be a need for the quality of the building construction to be continually checked throughout the construction period by the relevant municipality building inspectors to ensure that satisfactory materials and work-manship have been assured for longevity, in respect of the future use of the buildings.

Response (93)

All buildings on the construction village will be permanent. There might be temporary offices, stores that will be removed once the construction is complete. Different "permanent" building materials can be used to construct a facility. All buildings and activities will conform, to amongst other, the regulations of the local authority including inspection schedules and holding points of works.

Your comment (94)

P.144 Unplanned influx - this paragraph, a communication received from the St Francis Bay Residents Association and Francis Kromme Trust, and its continuation at the top of the next page, would have its syntax considerably improved if the source of the quotation was placed at the *head* of the paragraph, not at its *end*. Exactly the same argument can be said about the preceding paragraph on p.144, which is a quotation from CANE.

Response (94)

Your comments are noted.

Your comment (95)

P.151 Table 3.08 – from the point of view of job opportunities, when contractors are brought in from large distances, they might possibly have their own pool of permanent workers at the lower grades whom they would obviously wish to bring to the site. This wouldn't be expected to apply in cases where the workers are temporary staff recruited through employment agencies. How is it envisaged that the former situation will be dealt with to the satisfaction of the local communities, who are going to expect to be given employment preference, especially as this point is empha-sised in this specialist's report for the final EIR? Trade union executives are going to be only too well aware of this fact.

Employers, therefore, are going to have to be informed about the job opportunity procedure for local inhabitants well in advance of their arriving on the construction site. The point should be made abundantly clear in the tender invitation documents.

Similarly, in the case of the influx of people from outside the area hoping to obtain employment, how is it envisaged that they will be properly identifiable from the local communities, so that the latter aren't disadvantaged iro job opportunities?

Response (95)

Your comments are noted. Eskom will need to work with the local government and community organisation to determine the area that will be given preference and considered local. There will also have to be clear criteria and documentation to confirm that a person is in fact from the area. This can be achieved by using the voters role.

The vendors will bring along some specialised skills from "outside" the region. This will include mostly artisans and special staff. General construction workers will be from the "local" areas and will be trained by the project to master a specific skill / skills on site.

These issues will be dealt with in a project Labour Agreement (PLO) that will be in place before negotiating contracts with vendors. The PLO will be an agreement between the most pertinent trade unions in the construction industry, SEIFSA and Eskom (for the project). All vendors (including Eskom, trade unions and employees) will have to abide by this agreement.

The project can not prescribe to South African citizen's weather they can live in a town or not. It is everybody's free choice. The employment policy needs to be well communicated outside the "local" area to inform people of their chances of employment on the project.

Your comment (96)

P.152 Construction phase with optimisation measures, quoting – "The fact that jobs will stretch over a period of up to 10 years is unlikely to result in the impact changing significantly"

First, does "impact" relate to job opportunities *per se* or to job skills, as the work situation changes from site excavations to building construction to plant installation?

But will "unlikely to result in the impact changing significantly" necessarily be the case? For example, one of the major tasks will be the construction of the reinforced concrete reactor containment buildings, of no mean size; the fresh and spent fuel element pools; and various ancilary buildings. Work on these constructions will be unlikely to last the whole 10-year period because there's lots of plant and equipment waiting to be installed in the completed buildings. And workers with other skills will be required for these installation tasks, not those employed on the building construction tasks. Won't this change in skills' priorities create significant employment impacts as one aspect of work is completed and other work commences?

Response (96)

Your comments are noted.

General workers will be trained by the project to fullfill certain construction requirements. Some specific jobs (like security, catering, cleaners, etc) will continue throughout the lifecycle of the project. These jobs are minimal compared to the total number of workers during the peak of construction. Correctly noted, the level of skills requirement by the project will increase as the activities near the end of construction. Some general workers will be cross trained (or re-trained) to do another task on site as we move through the construction cycle. The numbers will also not be a majority of the percentage of peak general construction workers. More skilled workers will be required once installation of components take place (with the help of unskilled helpers. Finally, some construction workers will have the opportunity to work at the power station during the operational phase.

Units will be commissioned in sequence with a period of between 9 and 14 months between each unit depending on the choice of vendor. Workers completing the activities on one unit will move across with the same skill to the next unit.

Your comment (97)

P.167 Penultimate paragraph, quoting – "*The heavy transport will include occasional loads of up to 750 tons, but a continuous stream of building materials, concrete mixers, steel etc 24 hours a day, seven days a week for ten years*"

This is the sort of agitated and exaggerated commentary which one has to get used to. A nuclear power station isn't like a huge bridge or a huge dam. Most of the major construction works have to be completed relatively early on in the nuclear construction programme ready for the installation of the plant and equipment. However, for a site with three reactors, such work will obviously be carried on for a longer period than if only a single reactor was going to be built. However, at this stage it isn't known how the construction phasing will be carried out for each reactor. Much will depend on whether it is intended that each reactor will successively start generating, or whether it is intended that the whole nuclear power station should be started up at the same time.

Ditto, last paragraph, quoting – "- - - *it will virtually render properties along the route unfit for human habitation*". This is a typical phrase for which the implications need to be looked at very critically. What does it imply: that the vibrations from the continuous heavy road usage will cause problems with building foundations, with cracks appearing in walls?; that so much dust will be stirred up that houses will become uninhabitable?; that access by residents in their cars to and from their homes to shopping centres, etc, will become impossible?; that noise levels from the enhanced heavy vehicular traffic will be intolerably high?; roads with inadequate foun-dations breaking up? The specialist reports should clarify each situation.

General comment: what is commented on in this section for Thyspunt could equally well apply to the other two sites. It all depends on community perceptions and the questions which they consider it relevant to ask.

P.183 Duynefontein, hospitals – the Panorama Medi-Clinic hospital has been overlooked, just 2 or 3 km further by road than the Milnerton Medi-Clinic hospital.

Response (96)

Your comments are noted and will be forwarded to the specialist for consideration.

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

Yours faithfully
For Arcus GIBB (Pty) Ltd

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Jaana-Maria Ball
Nuclear-1 EIA Manager