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Attention: Mrs Jooste-Coetsee

Johannesburg

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Dear Madam

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

Your correspondence to Ms. Bongji Shinga of ACER (Africa) refers.

Arcus GIBB (Pty) Ltd (GIBB) acknowledges receipt of the above-mentioned letter. We thank you for your valuable comments and your participation in the Eskom Nuclear Power Station (Nuclear-1) 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)

I do feel that the residents of Humansdorp township and the greater Humansdorp local community have not been informed enough and that it is not up to the local municipality to be consulted on such a small scale without involving the whole community properly, especially any and all areas that will be affected by the heavy traffic flow. This includes the fact that they are not going to receive electricity at a cheaper cost as they are probably lead to believe as well as the fact that they possibility of employment is probably not going to benefit them to a large degree as well as all below:

- During the whole assessment have all the locals at Umzawowethu Township been informed in any way of the increase of the large trucks that will pass by the township, increasing the risk of their farm animals being run over, with a smaller percentage but possible risk of pedestrians being involved?
 - Have they been informed of the high noise level, especially the low lying shacks and houses?
 - The added air pollution of truck fumes and the consequences there of – during and after construction?
 - The fact that once the plant is up and running passed with radioactive materials and the consequences there of should an accident occur with one of those trucks and let's say a herd of cattle or goats that frequently roam those streets.
 - These possibilities, although may seem rare, have the potential to be catastrophic for all the residents living along that road or any other road leading up to the waste storage unit.

Response (1)

Interested and Affected Parties (I&APs) such as the residents of Humansdorp and Umzamowethu, as well as key stakeholders and members of the public, have been included in the public participation process through registration on the I&AP database, site notices, advertisements in local and regional newspapers, letters to registered I&APs and public meetings. Umzamowethu and Humansdorp residents have attended the public meetings organised during each phase of the EIA (refer to Appendix D6 of the Environmental Impact Report [EIR] for the attendance registers of the public meetings held).

Noise levels at Umzamowethu: Section 3.6.1 of the Noise Impact Assessment (Appendix E23 of the Draft EIR) states that the western route to the Thyspunt site would pass within 230 m of the Umzamowethu township. In view of this distance, for continuous operation during 8 hours the noise levels would be between 53 dBA and 56 dBA at the township boundary. The estimated maximum noise impact on the township for the duration of the construction of the road in the vicinity of the township would be **Medium**.

Vehicle emissions and truck fumes: Vehicle emissions were not identified as a potentially significant impact. Dust emissions from dirt roads were assessed, as it was identified as a potentially significant impact. However, it is the intention that the current dirt road to Oyster Bay will be tarred prior to construction. Dust emissions should, therefore, only be an issue for a short period during initial road construction.

Traffic safety: Traffic safety has been identified as a potentially significant issue, especially for populations that are not accustomed to high traffic volumes. Mitigations to ensure pedestrian safety are described in the Traffic Assessment (Appendix E25 of the Draft EIR). Radioactive materials will be transported under safe and controlled conditions. Please refer to the Radioactive Waste Management Report (to be appended to the Revised Draft EIR) for a description of the safety precautions employed for radioactive waste and an assessment of the impacts associated with potential spillage of such waste from a vehicle. This assessment has found that, even in the event of an accident involving the transport of low or intermediate level nuclear waste, the impacts will be of low significance, due to the precautions that are taken in the packaging of the waste. The transport of waste from a nuclear power station to the nuclear waste site at Vaalputs is under the regulatory authority of the National Nuclear Regulator (NNR). The power station manager would be required to apply to the NNR under the nuclear licence before that waste is transported.

The residents of this community have in no way been made to believe by either GIBB or Eskom that electricity will be supplied to them at a cheaper cost. .

In terms of job creation the construction and operation of infrastructure associated with the Nuclear Power Station, such as the staff village will contribute positively towards development in the area and the possibility of attracting other developments and investment in the area that can benefit the adjacent communities. The building and maintenance of above infrastructure during construction and operation will also potentially provide a number of job and business opportunities. Running of these facilities, as well as provision of services in the local area will also provide a number of new job opportunities. Please refer to the Social and Economic Impact Assessments in Appendix E of the EIR. The Noise Impact Assessment (Appendix E of the EIR) records noise impacts associated with the construction of new structures related to the western access road to the Thyspunt site, as the proposed route would pass within 230 m of Umzamowethu. In this instance the following recommendations are made:

- o Construction processes and machinery/ vehicles with the lowest noise emission levels available are utilised;

- A well planned and co-ordinated “fast track” procedure is implemented to complete the total construction process in the shortest possible time; and
- Construction near residences only takes place during normal daytime working hours. No construction activities are to be permitted during weekday evenings and night-time, on Saturdays after midday and the entire day on Sundays.

The Social Impact Assessment (Appendix E of the EIR) also reports that the western access road may have an impact on Umzamuwethu due to its proximity to the proposed road and the fact that a large number of residents do not make use of motorised transport. Safety mitigation measures recommended in the Traffic Impact Assessment (Appendix E of the EIR) should ensure safety of people crossing the road.

Eskom has further indicated the utilities’ willingness to engage in discussions with the community regarding the construction of overpasses at strategic points in order to ensure the safety of affected residents.

Comment (2)

- From what I have read I have not seen enough of an environmental impact study done on the sea and marine life. There are completed studies that have been done by various independent groups internationally that state the negative affect it will have on our prestine oceans. Our sea is a complex and interwoven ecosystem.
- Eutrophication or ocean dumping can destroy entire habitats and ecosystems when excess sediment builds up and toxins are released. Even the slightest changes in the ph of the sea will lead to eutrophication, which is a biological process where dissolved nutrients cause oxygen depleting bacteria and plants to proliferate. This will occur with the release of the warmed cooling water that is released into the sea as well as the spoil and sediment in the sea. This alters the chemistry of our oceans which causes acidification. As soon as the sea water is extracted from the sea and then altered and then returned in any other state other than its natural, there will be long term consequences, which cannot be so blatantly overlooked.
- To also add that: to say that only the area off the coast where the pipes are situated will be affected is totally not true as the sea is constantly moved around by strong ocean currents so with each flush the negative effects are going to actually travel far and wide by the currents, which is going to have wide spread consequences. Each biotic and a-biotic factors influence every other component directly or indirectly
- When one habitat disappears, the organisms relying on that niche can no longer survive and slowly from there we will see vast changes in our whole ocean system. This includes everything from the plankton to the sea grass, and from there sea turtles, various fish, shrimps, squid, crabs as the sea is an interlaced ecosystem. With the loss of one species we could end up seeing another soar in numbers, which would end up in there being an imbalance. The loss of this biodiversity in the oceans is critical and has the power to affect human survival in the long run.
- Sea sponges hold the power to fight cancer but as they also absorb all the pollutants this will be lost.
- Over 12 000 beaches in the U.S. are becoming unsafe due to contamination and pollutants. Many bays and estuaries now have dead zones from pollution run-offs – these cause everything from birth defects, cancer, to neurological problems.

Response (2)

- The Marine Impact Assessment is a comprehensive document prepared by individuals who are experienced and qualified specialists in their field (refer to Appendix E for the relevant specialist CVs). The Marine specialists have further had additional input from other specialists studies prepared in terms of the Nuclear Power Station, such as the Oceanography and Economic specialists, so that the impact assessment in terms of the marine environment is robust and comprehensive.
- The release of warm water used for cooling purposes: A tunnelled design of the release system mitigates potential negative impacts, through multiple points of release to aid dissipation of excess heat, by releasing cooling water above the sea bottom to minimise effects on the benthic environment and by utilising a very high flow rate at the point of release to maximise mixing with cool surrounding water. Comprehensive oceanographic modelling has demonstrated that the effects of elevated temperature are expected to be focused on the open water habitat. This would help to mitigate impacts on chokka squid egg capsules. While chokka squid at the Thyspunt site are expected to avoid water temperatures elevated above their thermal tolerance range, the area predicted to be affected represents less than one percent of the coastal spawning ground. Disruption of surrounding marine habitats: When associated with the construction of the cooling water intake and outfall system, this effect will be focused within the construction phase and will be localised, of medium duration and high significance. When associated with the discarding of spoil, disruption to the marine environment is significant and of a high consequence. When mitigated by disposing spoil offshore (and by using only a medium pumping rate at Thyspunt), the impact is reduced to one of medium consequence, although the significance remains high. The temporal and spatial limitations of the impacts associated with the disposal of spoil on chokka squid at Thyspunt will have limited impact on the overall squid stock, when taken within the context of the extensive area over which this species spawns. Also please note that at Thyspunt entrainment it is not anticipated to have important ecological impacts.
- Your comments in terms of sea sponges are noted.
- Your comments regarding the beaches in the United States are noted.

Your comment (3)

This brings me to the human factor after all is said and done and also seems to be very low on the agenda is that although what seems to be a minor concern is still a concern. I object to the very fact that I as a local will in some way be exposed to anything that may affect my health or the health of my family short or long term.

- Some scientific studies around the world at various nuclear power plants have proven that although low, the long term exposure to low levels of radiation that is released into the environment can have detrimental effects on human health, such as an increased risk of cancer, while other studies suggest that the probability is there of possible DNA restructuring causing generational birth defects as well as various other ailments such as an increase of asthma as radiation affects the lungs as well as other vital organs of the body. All of this also depends on how sensitive each individual is to these toxins that are released even at low levels into the environment.

- It is my human right as a South African to be able to breathe in good clean air and it is also my right to demand good clean renewable energy that South Africa has the perfect climate for.
- Oyster Bay being the perfect place to try out all 3 energy resources, all reliable grid based energy sources – we have the wind factor, the sun for solar as well as the possibility of Hydro energy if we could try out a system whereby we harness the power of the waves.

Response (3)

Impact on Health

The Health Impact Assessment conducted by Infotex (Pty) Ltd (Appendix E 24) states that according to the NNR (2005 and 2006), various gaseous and liquid effluents are produced during the routine operation of a Nuclear Power Station. However, such substances are treated prior to it entering the environment through dedicated clean up systems. These clean up systems reduce the amount of radioactivity in the substances too well within the specified limits. The risk of public exposure from that portion of radiation released to the environment is controlled through the implementation of a radiological effluent management programme. This ensures that the risk that such effluent poses to the public is not significant.

The Human Health Risk Assessment further states that the National Nuclear Regulator (NNR) will issue a license for the establishment of a Nuclear Power Station at any particular site only if full compliance with the radiological dose limits and dose constraints is demonstrated. It reports that the most thoroughly documented cases of radiation-induced cancer in humans are the survivors of the Hiroshima and Nagasaki atomic bombs. Cancer cases above the general population cancer rates were observed at doses of about 40 to 1 600 times the average annual background exposures (NRC 2006). The types of cancer caused by radiation are not different from those that occur due to other causes. Therefore, there is not any specific cancer that can be unequivocally attributed to ionising radiation.

Lastly it states that the likelihood of adverse health impacts associated with radiological exposure due to a Nuclear Power Station is regarded as remote. A key focus of accident prevention has long been the use of multiple precautionary defences against the consequences of failures. This approach of 'defence in depth' is aimed at preventing equipment failures and human errors and mitigating their consequences, should any of these happen. Comprehensive assessment methodologies are applied in the design phase of nuclear installations by applying such methods as failure-mode and effects analysis, cause-consequence analysis and fault tree analysis, to select components and materials that have an extremely low probability of failing during operation. Furthermore, should components or materials fail, or should human errors lead to consequences that may have adverse effects on human health and the environment, several layers of backup systems and other controls are automatically introduced to stop the propagation of the IE or to mitigate its consequences.

Wind farms as an alternative

The draft Integrated Resource Plan (IRP) 2010 has recommended a mix of power generation technologies for South Africa over the next 20 years. This includes coal-fired, nuclear and various renewable generation alternatives such as solar and wind-powered generation. Renewable generation alternatives such as wind need to be included in South Africa's strategy to meet its future energy demands. However, wind power is not an alternative to base-load power such as nuclear and needs to be pursued in parallel to base-load power generation.

A high level analysis of the implications of a wind farm as an alternative to nuclear generation has been included in Chapter 5 of the Draft EIR. This analysis indicates that a spacing of 8 turbine rotor diameters downwind and 4 turbine diameters across wind can be applied to determine the space requirements for wind farms. If there is a prevailing wind direction where the wind originates from for the majority of the time, wind turbines can be placed 4 diameters apart (cross wind). However, if the

wind direction varies more (as is the case with most coastal areas with pressure driven wind systems), then the turbines need to be placed 8 rotor diameters apart down wind and cross wind. Areas with a unidirectional or bi-directional wind are generally thermally driven systems typically found in regions such as at Sutherland or on escarpments.

Turbine rotor diameters vary from 80m to 120 m. In this instance, a 90m diameter has been used as an example and capacity of 2 MW per turbine has been assumed. If a spacing between turbines of 8 rotor diameters by 8 rotor diameters is assumed, then an area of 345 600 ha will be required for 13 333 MW of installed capacity. Due to the fact that wind is not available at all times, a capacity factor of 30% is assumed and the effective power produced will be 4 000 MW. If a rotor diameter of 80m is assumed, the space requirement would be 273 000 ha. The actual space that will be used will inevitably be greater than this due to not all pieces of land being suitable for turbine placement.

Your comment (4)

Unless South Africa starts to look at better solutions that are more sustainable to the environment without buying into the world nuclear program we will go down the same devastating polluted path as so many other countries are going down. This brings me to the point that by saying that Nuclear is the only sustainable grid system is something that through extensive research have found to be a complete fallacy and that in fact there are other sustainable renewable sources of energy of which we have the perfect climate for.

These include solar, wind and hydro power all which have a fully sustainable grid system and when interchanged with other forms of renewable power for base load and off peak times can be perfectly sustainable throughout the country and not just for Thyspunt. The cost of all three renewable energy resources will be way more sustainable therefore more profitable long term for Eskom as the input cost versus the output costs are weighed up and the long term consideration is taken into account. Once everything from construction, to running to the decommissioning costs, that are rising horrendously all the time of a nuclear power plant is taken into consideration it is going to cost us the consumer and the country as well as Eskom way too much – as a consumer I also have a right to decide where my money is going considering that I as a consumer at the end of it all are going to be covering the costs when paying for my electricity.

Response (4)

In terms of alternatives to meeting the present energy demand, given the state of present technology, renewable energy sources are not yet in a position to replace base-load power stations. Thus, as far as power generation technologies are concerned, nuclear generation and coal-fired power generation are the only proven base-load technologies.

Apart from these factors, the IRP 2010 process assessed the energy mix for South Africa in terms of climate change considerations. South Africa must make increasing use of nuclear power generation in future to reduce its greenhouse gas emissions in order to comply with its commitments made at the Copenhagen Climate Change Summit in December 2009. The life cycle contributions of nuclear electricity generation to greenhouse gas emissions is small compared to coal-fired electricity generation. Nuclear power is thus a relatively clean source if compared to other base-load alternatives.

Please see our comment regarding wind farms in response 3.

Your comment (5)

I also have huge concerns over:

Disposal that remains dangerous for over 240 000 years and the possibility of any accident occurring at the dump site, besides the fact that none of us are going to be around for the next 240 000 years and that waste is going to be left for the future generations to look after and what happens as the containers slowly degrade over time. Is Eskom really willing to put all the future generations at risk of countless illnesses and birth defects as well as the well being of the Earth as a whole.

Response (5)

The impacts of handling and storage of radioactive waste is a matter that is within the ambit of the National Nuclear Regulator (NNR) and the newly established National Radioactive Waste Disposal Institute. The disposal of low and intermediate level radioactive waste will be undertaken at a facility that is licensed for this purpose (Vaalputs waste disposal site) and the impacts of disposal are therefore adequately managed within legally accepted criteria. This disposal site is audited on a regular basis against legal requirements.

Your comment (6)

There is concern over the safety during transport of the waste that is to be transported.

Response (6)

Eskom adheres to the Regulations for the Safe Transport of Radioactive Material administered by the NNR, when transporting waste to Vaalputs. The packages that are used for transportation of radioactive waste are approved by the NNR. The accidental spillage of radioactive waste during transport has been assessed in a specialist report entitled: Management of Radioactive Waste, which has been prepared by Aquisim consulting (Appendix E). This report will be made available for public comment and review as part of the Revised Draft EIR.

Your comment (7)

There is a concern over the possibility that the sealed containers at some point in their life span will be compromised and leak radiation.

All these factors it seems to me while not being overlooked completely are conveniently being ignored and yet all could have catastrophic consequences if left unnoticed.

Response (7)

The packages that are used for transportation of radioactive waste are approved by the NNR. As previously mentioned the impacts of handling and storage of radioactive waste is a matter that is firmly within the ambit of the NNR and the newly established National Radioactive Waste Disposal Institute. The disposal of low and intermediate level radioactive waste will be undertaken at a facility that is licensed for this purpose (Vaalputs waste disposal site) and the impacts of disposal are therefore adequately managed within legally accepted criteria. This disposal site is audited on a regular basis against legal requirements.

Your comment (8)

My final objection is the costs involved in putting up a nuclear power plant and I do feel that as a paying citizen of South Africa I have the right to decide where my money is being spent. Nuclear power is the most expensive plant to put up and then later to decommission and I feel that since I will

have to pay Eskom every month for my electricity I have a right to decide where my money is being spent.

Response (8)

Your comment is noted. Data on the operational costs of nuclear generated electricity vs. other forms of electricity indicates that nuclear generation's costs are comparable with other forms of generation. The costs of technologies are also compared in the Integrated Resource Plan published by the Department of Energy. There is the potential for carbon tax being implemented in the future which would significantly increase the cost of coal fired electricity. Renewable technologies are also very costly.

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

A handwritten signature in black ink that reads "JMBall". The signature is written in a cursive, flowing style.

Jaana-Maria Ball
Nuclear-1 EIA Manager