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Dear Mr de Villiers

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

Comment 1:

I wish to raise a number of concerns with the DEIR:

The DEIR fails to consider the economic impacts that the construction of the NPS will have on broader South Africa (rather than the economic impacts on the local communities that was submitted by the EAP).

It remains a concern that government and Eskom continues on a path of propagating nuclear without proper public debate about this dangerous and seriously compromised technology;

Response 1:

Your comment is noted. Although the Environmental Impact Assessment for the Nuclear-1 Power Station is a site specific assessment tool, the Economic Report (Appendix E17 of the Revised Draft EIR Version 1 – Section 3.3) prepared by Conningarth Economists and Imani Development (SA) (Pty) Ltd nevertheless conducts a macroeconomic equilibrium analysis in order to quantify the macroeconomic impact associated with the possible construction and operation of the Nuclear-1 Power Station.

The report acknowledges that, as the nuclear power station is such a large capital investment (equivalent to that of six times the capital investment in Gautrain), the economic ripple effects will go far beyond its direct boundaries. We refer the author to section 3.3 of the report for an expanded discussion.

In terms of public debate the government has, through a consultative process, already taken a decision on the mix of generation technologies required to supply South Africa's future electricity needs for the next two decades. The environmental application for Nuclear-1 is for a single nuclear power station, as has been the case with other power stations such as the gas-fired power stations that have been constructed at Mossel Bay and Atlantis and the Medupi and Kusile coal fired power stations currently under construction. In all these previous instances, the scope of the EIA was



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restricted to a specific power station on a specific site or sites within a defined geographical area. It cannot reasonably be expected that each application for a power station must revisit strategic government decisions that have been taken on the mix of generation technologies that are necessary to meet South Africa's electricity needs. The EIA process, which is a project-specific environmental management tool, does not have any mandate to revisit the strategic analysis of power generation alternatives that was completed in the Integrated Resource Plan 2010.

Comment 2:

The DEIR fails to assess worst-case scenario impacts, a particularly important point in light of what recently happened at Fukushima.

Response 2:

It is acknowledged that the incident at Fukushima as a result of this natural disaster has highlighted many important safety factors in terms of the future of nuclear energy and is indeed a stark reminder of the unpredictability of the natural environment. However it is also well known that South Africa is located on a vastly more stable tectonic environment than that of Japan which is situated close to a major subduction zone within the Pacific Ocean.

South African legislation mandates nuclear and radiological safety considerations to the National Nuclear Regulator and environmental considerations to the relevant Environmental Authorities. There is some overlap in responsibilities and hence the NNR and the Environmental Authorities signed a cooperative agreement to govern their respective responsibilities with regard to radiological impacts on the environment. The exclusion of the detailed assessment of nuclear safety aspects from the EIA is thus in keeping with South African legislation. The final decision for South Africa to proceed with a nuclear power station will not only have to obtain approval from the NNR from a safety perspective but would also require approval from the National Electricity Regulator of South Africa who is compelled to consider the economic and socio-economic aspects of such a project. Both the NNR and NERSA process require public hearings and provide an opportunity for the country to consider all relevant aspects.

ADDITIONAL COMMENTS FROM INDEPENDENT NUCLEAR SPECIALIST

In terms of each of the above; TMI whilst causing some reactor core damage had only minor actual radiological consequences. However significant lessons have been learned from the event. Similarly Chernobyl whilst having significant off site impact occurred due to a unique combination of reactor design (of a type no longer considered for commercial application) and a particular combination of operational circumstances underpinned by a poor safety culture. Apart from the proposed technology for any reactors in South Africa being not capable of exhibiting the sort of reactor kinetic behaviour, displayed at Chernobyl, the industry as a whole has learned significant lessons from the event - particularly in terms of Safety Culture which has since become an embedded characteristic of nuclear operators worldwide. With respect to Fukushima this was due to a unique combination of external events and a reactor design neither of which would specifically feature in the South African context - notwithstanding this industry has undertaken stress tests of all facilities against the type of challenges a Fukushima type event would pose and where necessary and as far as reasonably practicable implemented necessary changes. Over and above this reactor operators are required to make appropriate provisions in terms of mitigating beyond design base events and to provide the necessary

decision making tools to assist even in the remote event of such occurrences in the form of for example severe accident management guides.

Comment 3:

It does not consider the impacts and costs of waste and its disposal, and critically, there is still no long term solution for the high level waste.

Response 3:

Your comment is noted. The nature and impacts of construction waste is discussed and assessed in Chapters 3, 5, 9 and 10 of the Revised Draft EIR Version 1 and in its associated Specialist Studies (Appendix E). The nature and impact of radiological waste is described and assessed in Chapters 3, 9 and 10 of the Revised Draft EIR Version 1 and in the Radiological Waste Assessment (Appendix E29)

It is acknowledged that the issues of radioactive waste management are important and integral to debate around nuclear energy and as stated the only alternative currently available in South Africa is long-term storage of the spent fuel in the nuclear power station. However please note that the radioactive waste management practices envisaged for Nuclear-1 are consistent with the IAEA guidelines for a Radioactive Waste Management Programme for nuclear power stations, from generation to disposal. Nuclear Power Station strives to minimise production of all solid, liquid and gaseous radioactive waste, both in terms of volume and activity content, as required for new reactor designs. This is being done through appropriate processing, conditioning, handling and storage systems. In addition, production of radioactive waste is minimised by applying latest technology and best practices for radiological zoning, provision of active drainage and ventilation, appropriate finishes and handling of solid radioactive waste. Where possible, the Nuclear-1 power station will reuse or recycle materials.

All forms of radioactive wastes are strictly controlled and numerous specialised systems and management practices are in place to prevent uncontrolled contact with these substances. These controls and practices differ for the different forms of radioactive waste. South Africa still has to formally release a strategy for the long-term management of HLW, including spent fuel. Until such time, all spent fuel is stored temporarily either in spent fuel pools (wet storage), or in dry cask storage facilities (dry storage). This allows the shorter-lived isotopes to decay before further handling, a management strategy that is acceptable from a safety perspective. It must be noted however that as per the Department of Energy's Media Statement on Nuclear Procurement Process Update as released on 14 July 2015 strategies are complete to develop an approach for South Africa to deal with Spent Fuel/High Level Waste disposal.

Disposal of radioactive waste at an authorised facility is being done according to an approved disposal concept, defined and developed with due consideration of the nature of the waste to be disposed of and the natural environmental system, collectively referred to as the disposal system. The disposal system developed for this purpose makes provision for the containment of radionuclides until such time that any releases from the waste no longer pose radiological risks to human health and the environment. The safety assessment process used as basis for this purpose considers both intentional (as part of the design criteria) and unintentional (natural or human induced conditions) releases of radionuclides. Unintentional releases include consideration of unintentional human or animal intrusion conditions, which might lead to direct access and external exposure to radiation.

Once released into the environment, radionuclides might migrate through the environmental system along three principle pathways: atmospheric, groundwater and surface water. Due to the physical nature of L&ILW and HLW disposal concepts, migration along the atmospheric pathway is highly unlikely. The principle environmental pathway of concern is thus the groundwater pathway, with the surface water pathway of secondary concern as an extension of the groundwater pathway. Disposal systems are designed so that releases to groundwater or surface water are highly unlikely as further explained in Chapter 10 of this EIR.

ADDITIONAL COMMENTS FROM INDEPENDNT NUCLEAR SPECIALIST

In addition to the given response it must be noted that IAEA requirements are informed by an extensive Body of Knowledge and where necessary derived from extensive scientific discourse and expert opinion from a variety of sources a range of complementary scientific publications and international Standards, Requirements and Best Practices which are evolutionary in nature and informed by international experience. It is therefore natural to expect standards to evolve over time - and it is unwise to be absolutist in these matters however any practices at any particular time must be based on the prevailing standards noting that the fundamental safety objective of the IAEA enshrines a common purpose that any designer operator or regulator is ultimately bound by and where necessary and guided by principles such as ALARP additional measures are considered for adoption.

Comment 4:

It fails to adequately assess project alternatives (such as renewable energy) and a no-go option.

Response 4:

It is indeed a legal requirement in terms of the National Environmental Management Act to assess feasible alternatives, which is defined to mean *different means of meeting the general purpose and requirements of the activity* – in the case of this EIA, the activity is the construction and operation of a Nuclear Power Station at either the Dufnefontein, Bantamsklip or Thyspunt sites. As such Chapters 5, 9 and 10 of the Revised Draft EIR Version 1 discusses alternatives which include:

- Location of the power station;
- Nuclear plant types;
- Layout of the nuclear plant;
- Fresh water supply and utilisation of abstracted groundwater;
- Management of brine;
- Intake of sea water;
- Outlet of water and chemical effluent;
- Management of spoil material;
- Access to the proposed sites; and
- The no-development alternative.

The choice of technologies, described in Chapter 5 of the Revised Draft EIR Version 1 and the weighting to be given to each in terms of addressing South Africa's energy requirements is provided for information but does not fall within the ambit of this Environmental Impact Assessment (EIA). It falls within the ambit of strategic government initiatives such as the Integrated Resources Plan 2010. Further, the affordability to South Africa is assessed through the National Energy Regulator of South

Africa tariff process. Both the IRP and NERSA tariff process are subject to an extensive public participation process. Carrying out such a debate during the EIA process would be duplication.

This EIA and Application for Environmental Authorisation is therefore not a strategic assessment of South Africa's energy requirements and the future energy mix proposed to address these requirements or an investigation into the pros and cons of the use of Nuclear Power versus Renewable/Alternative Energy. It is a tool used to assess the possible positive or negative impact which the proposed project may have on a specific receiving environment, which in this case are the Duynefontein, Bantamsklip and Thyspunt sites.

Comment 5:

There is no final project design, making any assessment of the actual impacts impossible.

Response 5:

Your comment is noted. We assume that you are referring to design detail in terms of the reactor type/manufacturer to be used as you have not defined the lack of design detail in your statement above.

It is common practice in EIA processes, especially for installation of industrial plants, to consider the performance of the systems and type of technology proposed to be installed, without referring to specific suppliers or manufacturers of this technology, of which there may be a range available in the market. As long as the inputs and outputs of the proposed technology are known and the environmental impacts can be predicted or deduced from these inputs and outputs with reasonable certainty, it is not necessary to know the brand name of the technology and makes the assessment of impacts very possible.

As has been done in other issues and response reports, it may be appropriate to explain the envelope of criteria in colloquial terms, as has been done in public meetings during the Nuclear-1 EIA process. If the envelope of criteria is compared to the specifications for buying a vehicle, this envelope may contain requirements with respect to top speed, fuel type, fuel efficiency, catalytic convertor performance, type of tyres and wheels, fuel tank size, effective range, CO2 emission limits, cruise control, numbers and positions of airbags and a number of other safety systems such as ABS and EBD. The only thing that isn't specified is the brand of vehicle. Providing such a list of criteria would ensure that only a luxury vehicle with certain characteristics could qualify, but that a base model (entry-level vehicle) would not qualify. Similarly, if a vendor proposes a power station design that fails to comply with the criteria established in the Consistent Dataset, that design will not qualify for consideration.

Assuming that an authorisation is granted by the DEA, a power station design that deviates significantly from that specified in the Consistent Dataset in the Nuclear-1 EIR (Appendix C of the Revised Draft EIR) would render the design incapable of meeting the requirements of the EIR and the authorisation. Hence such a non-confirming design could not be considered for construction.

Comment 6:

In light of these concerns, I suggest that these revisions be added to the report so that decision-makers have all the relevant information to make their decision.

Response 6:

Your comments have been noted and revisions to the report will be made available where deemed necessary. Your comments will however be added to the Revised Draft EIR Version 2 and Final EIR which will be placed before the Competent Authority for decision making.

Yours faithfully
for GIBB (Pty) Ltd

A handwritten signature in black ink, appearing to be a stylized 'S' or 'G' followed by a flourish.

The Nuclear-1 EIA Team