5 August 2015

Our Ref: J27035 / J31314
Your Ref: Email received 03 August 2011

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Dear Mr Murphy

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

Comment 1:

I'm writing in response to the Revised Draft EIR for the proposed Nuclear-1 Power Station (NPS).

There are a number of concerns with the DEIR listed below. The EIAR 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).

Response 1:

Your comments are noted. The Environmental Impact Assessment and Application for Environmental Authorisation for the proposed Nuclear-1 Power Station is not a strategic assessment of the energy requirements of South Africa 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 Energy or indeed a site selection process. 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 is the Duynefontein, Bantamsklip and Thyspunt sites. Despite the site specific nature of the EIA process 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) that the economic ripple effects will go far beyond its direct boundaries. For this purpose the Eastern Cape was used as the economic service and support area for Thyspunt, and the Western Cape for the proposed nuclear facilities of Bantamsklip and Duynefontein. Macroeconomic impacts have been measured in terms of the following standard macroeconomic performance criteria:

- GDP (in order to assess the contribution to economic growth);
- capital formation (as an indicator of the demand for scarce production resources);
- employment creation (as an indicator of the impact on income distribution);
- low-income household income (as an indicator of the impact on poverty relief; and

- a series of social indicators.

We refer the author to section 3.3 of the report for an expanded discussion.

Comment 2:

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

Response 2:

It is acknowledged that the incident at Fukushima as a result of this unpredicted 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.

Nevertheless please note that addressing site safety and issues are integral to the success of the proposed development and one of the important issues which will be placed in front of both the Department of Environmental Affairs (DEA) and the National Nuclear Regulator (NNR) for their consideration. Site safety issues are therefore discussed in the Emergency Response and Site Control Reports (Appendix E26 and E27 of the Revised Draft EIR) and will also be dealt with during the NNR process.

ADDITIONAL COMMENTS FROM INDEPENDNT 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 - not withstanding 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 additionally, there is no long term solution for the waste.

Response 3:

Thank you. Your comments are noted. It is acknowledged that the issues of radioactive waste management is important and integral to debate surrounding 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 evelove 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 does not adequately assess project alternatives (such as renewable energy) and a no-go option.

Response 4:

Your comments are noted. Please refer to our Response 1 in terms of the of the role of the EIA as a project specific tool for assessing the impacts of the proposed Nuclear-1 Power Station on the Duynefontein, Bantamsklip and Thyspunt sites and not a tool to investigate the future energy mix for South Africa or the viability of Nuclear Energy versus Renewable Energy. The use of Renewable Energy is therefore not considered to be a project alternative in the context of this EIA. The author is referred to Chapter 5 of the Revised Draft EIR Version 1 for the complete discussion on alternatives.

Comment 5:

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

Response 5:

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.

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, CO_2 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:

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 are noted. Your submission will be included in the Revised Draft EIR Version 2 and Final EIR reports which will be submitted to the Competent Authority for its review.

Yours faithfully
for GIBB (Pty) Ltd

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The Nuclear-1 EIA Team