



GIBB
ENGINEERING & SCIENCE

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Our Ref: J27035
Your Ref: Email received 08 August 2011

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Dear Delia Marshall

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

Comment 1:

EIA COMMENTS

I have several concerns regarding the EIA for Nuclear-1:

Unscientific ranking system used in the EIA

The ranking system used to demonstrate the preferred site for Nuclear-1 is amateurish and poorly substantiated. Such vague, unscientific reasoning would not be accepted in an undergraduate report!

Decisions about if and where to site a nuclear power station ought to be made on a thorough, scientifically rigorous basis, not on the basis of an amateurish and opaque ranking system.

Response 1:

Your comment is noted. Every discipline has different methods and approaches to evaluating data and information. In the field of environmental management, the assessment and evaluation of environmental impacts has developed over the last three decades and includes a number of criteria that are applied almost universally in EIAs by professional practitioners. These criteria typically include nature (is the impact negative or positive?), extent (or scale), duration, intensity (degree of change), consequence (seriousness), reversibility, probability (how certain is it that the impact will occur?) and significance (overall importance of the potential impact).

Although there is general agreement about the nature of the criteria for assessment and there are local and international guidelines on this, there is no single agreed method. It is up to the discretion of the environmental assessment practitioner (EAP) to apply his or her mind to determine the most appropriate combination of criteria, as well as any requirements that the environmental authority might have regarding the criteria. In the case of the Nuclear-1 EIA the EAP sought assistance from other senior EAPs, namely Mr. Neal Carter and Mr. Reuben Heydenrych, as well as an advisor on EIA process, Mr. Sean O'Beirne.

Furthermore, based on comments received from the DEA during the review of the RDEIR Version 1, The National Department of Environmental Affairs requested the EAP to review the impact assessment methodology used in the Revised Draft Environmental Impact Report (Version 1), so as to



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simplify the criteria for assessment of significance and identification of a preferred site. In response, an approach has been developed that identifies and describes key decision-making issues contained in the individual specialist studies. This updated assessment no longer utilises the ranking / scoring system for the sites, but rather considers the residual risks associated with the proposed Nuclear power station at the proposed sites. These decision-making issues apply to both the acceptability of the proposed Nuclear Power Station as well as to the preferred site. Please refer to Chapter 10 for the updated assessment approach.

Comment 2:

Spent fuel disposal

It is envisaged that the spent fuel in Nuclear-1 will be stored in the nuclear power station, as currently the case at Koeberg. However, one of the lessons learnt from Fukushima is that waste on site is not optimal. Currently no other options exist in South Africa.

In addition, the construction of high level waste facilities is extremely costly, as demonstrated in the USA, among other countries (see Economic impact, below)

Response 2:

The design of the Fukushima Daiichi nuclear power station dates from the late 1960s and does not incorporate the substantial lessons in nuclear power station design that have been learnt in the decades since its construction.

One of the major differences between the design of the Fukushima Daiichi power station and later power stations in terms of spent fuel storage is that the Fukushima Daiichi design includes the spent fuel pool outside the containment structure, housed in a steel structure whereas in later designs (e.g. at Koeberg Nuclear Power Station - KNPS), the spent fuel pool is within the steel enforced containment structure and contamination in the containment structure does not impact access to, and operation of, spent fuel cooling systems. Please see Appendix E32 and E33 of the Revised Draft EIR (Version 2) for a more detailed discussion.

The spent fuel pool storage is provided as part of the overall plant supply and is not differentiated. The decommissioning costs are inclusive of used fuel/spent fuel management/storage.

Comment 3:

Economic impact on South Africa

What is perhaps most concerning about this Nuclear-1 proposal is the potentially *adverse economic impact on the country*.

The assumption is made in the EIA is that nuclear energy remains a cost-effective mode of energy production for South Africa, but this is not adequately substantiated in the documentation. The comparative figures in the EIA are in fact different from those in the IRP2, which points to sloppiness in the EIA report-writing process.

I am concerned that the projected costs for nuclear energy seem to be based on outdated figures. In addition, the EIA doesn't adequately take into account decommissioning costs, nor the high costs of building permanent high-level waste facilities, nor the legislated insurance requirements.

All these costs need to be factored in *now* – they cannot be left for future generations to deal with.

An additional concern is that the actual end-of-project costs for Nuclear-1 are likely to be significantly higher than the projected costs. This is an international trend. For example, the newest EPR reactor being built in Finland is currently costing double the projected price.

Response 3:

The costs for nuclear generation are based on the costs in the IRP 2010. The projected costs in the Revised Draft EIR are based on 2008 figures. Inflationary increases would need to be applied to these costs to account for current construction costs.

There have indeed been significant cost overruns with regard to the construction of nuclear power stations. However, it must be borne in mind that the Finland site (Olkiluoto) was the first site where the new EPR unit was constructed. The French site (Flamanville) was the second and a considerable number of lessons learned at Finland site were implemented at Flamanville – hence much reduced delays were experienced. The Chinese plants used these lessons and are on time and within cost. Eskom never intended to build a first of a kind plant type, which obviously will reduce the risk of overruns in both construction time and cost.

With regard to cost, we refer you to the EPRI report carried out on behalf of the DOE to inform the Draft Integrated Resource Plan. Coal will be subject to carbon taxes and increasing fuel cost in the future, which will influence cost comparisons of nuclear, coal and renewable technologies.

Comment 4:

Argument based on increased base-load requirements

The EIA refers to a 4% average demand growth in electricity over the past few years. However, this is contested by researchers in energy studies, who argue that this value is inflated (eg. Winckler, 2009). The EIA refers to Eskom's projection of over 40 000 MW of new generating capacity required over the next 20 years, but this is not referenced or substantiated.

Should South Africa remain stuck in out-moded views of economic growth linked to heavy industry (including smelters), rather than to more sustainable models of growth? If the extra base-load requirement is in fact not required urgently, it seems unwise to invest so heavily in nuclear energy at this stage.

Furthermore, there is no analysis in the EIA of ways to meet energy demand in other ways (eg demand side management options). The 'no go' option is poorly motivated.

Response 4:

With regards to the motivation for the need for additional electricity generation capacity, please refer to Chapter 4 of the Revised Draft EIR, which is based (amongst other sources) on several Eskom annual reports showing the increase in electricity demand, as well as sources like the Department of Energy and the International Energy Agency and the Accelerated and Shared Growth Initiative for South Africa (AsgiSA). In addition, you are referred to the National Planning Commission, which states in the National Development Plan that one of the key objectives with respect to Economic Infrastructure is that *"The country would need an additional 29 000MW of electricity by 2030. About 10,900 MW of existing capacity is to be retired, implying new build of more than 40,000 MW"*.

It is not within the mandate of an EIA process to make recommendations regarding the economic growth model for South Africa and whether the economy continues to rely on large-scale energy-intensive industries.

It is pointed out in the Revised Draft EIR that Eskom is not pursuing nuclear electricity generation exclusively and to the detriment of renewable electricity generation. A range of different generation alternatives need to be pursued in parallel in order to meet South Africa's electricity generation challenges. It is not within the mandate of a project-specific REIA process such as that for Nuclear-1 to question the strategic decisions that have been taken in the Integrated Resource Plan for the proportions that different generation technologies should contribute to South Africa's electricity generation mix. The IRP has examined these technologies and come to the conclusion that renewable energy sources must make up around 17,800 MW of future power supply and that demand-side management can achieve a maximum saving of around 3,420 MW by 2017.

Comment 5:

Safety standards

The EIA fails to consider the perceptions of the safety culture that exists in the South African nuclear industry. It is well-known that the safety culture at Koeberg has been a concern. With heightened public awareness of safety issues in the wake Fukushima (as well as 'near misses' like the Forsmark Swedish nuclear power station incident in 2006), it would be imperative to address this issue.

Response 5:

Your comments regarding the perception of safety culture in the South African nuclear industry are noted and it is agreed that a culture strict safety with regards to nuclear technology is an absolute necessity. It is also to be noted that the Koeberg Nuclear Power Station's radiation emissions have been consistently far below legal limits set by the National Nuclear Regulator (as reported publicly in the National Nuclear Regulator's annual reports) in all the years of this power station's operation.

The Fukushima Daiichi incident has indeed focused attention on issues of nuclear safety. An analysis of this incident and the implications it holds for the design and operation of nuclear power stations will be included in a revision of the Nuclear-1 EIR, which will be made available for public comment. It is to be noted, as indicated in Response 2, that nuclear power station design has advanced considerably since the late 1960s Fukushima designs and that current Generation III designs are inherently much safer than the Fukushima Daiichi design.

RESPONSE FROM THE INDEPENDENT NUCLEAR SPECIALIST

The adoption and demonstration of a "nuclear safety culture" is a fundamental tenet of modern nuclear safety management systems - the effective on-going demonstration of which would be expected to be a key part of the NNR licensing conditions

Yours faithfully
for GIBB (Pty) Ltd



The Nuclear-1 EIA Team