Our Ref: J27035

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Attention: Mr. R. Gurzynski

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Dear Sir

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

Your correspondence to Ms. Bongi Shinga of Acer (Africa) entitled "Environmental Impact Assessment for the Proposed Nuclear Power Station ("Nuclear-1): A comment on the Economic Impact Assessment Report." 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)

My response is focused on the Economic Impact Assessment Report, a specialist study by Conningarth Economists, that informs the Nuclear-1 Environmental Impact Report. In the scope of study, the consultants confine the scope of the EIA to a 20km radius of the 3 sites, but in the body of the report they also take on a role of negating the viability of renewable energy, without any substantiation. They are wrong and the report is biased. By doing this they avoid having to make any comparison with viable alternatives. They also do not do a full life cycle cost analysis of the nuclear plant itself and they avoid any of the serious problems of the nuclear life cycle by confining the scope of the study to the 3 sites for 30 years. Nuclear power is not a self-contained technology that can be confined to a site or 30 year time period. The consultants ignore this but see the problem in terms of "perceptions" on the part of the public. This is biased.

Response (1)

The approach to this EIA process is to assess a proposed nuclear power station, but not to assess the pros and cons of a number of different generation alternatives against each other. It is acknowledged that other forms of electricity generation, besides nuclear generation, all have a role to play in the mix of generation alternatives that need to be applied in South Africa. Other forms of generation are not rejected, but cannot be assessed within the scope of this EIA process, as EIA is a project-specific tool. The final mix of and proportion of generation alternatives will be determined by the IRP 2010 process, a draft report was released during October 2010.

The scope of this study did not include a full life cycle analysis of nuclear power generation. However, well-researched, peer reviewed publications comparing the life cycle environmental impacts of different forms of generation alternatives have been referred to in the Draft EIR. These sources indicate that, on a life cycle basis, nuclear electricity generation causes impacts on par with some renewable energy alternatives.

Your comment (2)

My comments follow the quotations taken from the EIA report rendered in italics.

Executive summary
"Perceptions regarding a NPS are frequently based on a lack of scientific information about perceived impacts... Mitigation measures proposed relate to operation and maintenance (particularly the skills issues) as well as to public perceptions and concerns."

Perceptions regarding a NPS can also be based on scientific information. The role of the EIR consultants is to present the scientific information, not to preface their comments with their perception of public perception. Operation, maintenance and level of skills are a precondition and not a question of "mitigation". Public perceptions and concerns are entirely valid and the use of the word "mitigated" implies the entire issue is merely a matter of "perceptions".

Response (2)

Your comments are noted. Unfortunately, the very word “nuclear” automatically creates perceptions of nuclear explosions and radioactive damage, irrespective of the nature, level of sophistication, fail safe mechanisms or purpose of the technology proposed to be used. It is often automatically assumed for instance, even by well educated people that a nuclear power station can “blow up” like a nuclear bomb. This is not the case and is in fact physically impossible. It is also a common fallacy that there is no such thing as naturally occurring radiation and that all forms of radioactivity are necessarily produced by human activity and specifically by nuclear power stations or the nuclear weapons industry. The fact that the average human ingests a certain small amount of naturally occurring radioactivity on a daily basis, or that many people who live on areas of granitic bedrock will probably receive more radiation from this source than they will ever receive from a nuclear power station, is not well understood. Thus, there are some perceptions that are not based in fact, and it is important that such incorrect perceptions are addressed by providing correct and factually based information.

Your comment (3)

1.1. Project Background
"Identified renewable forms of energy, for example, solar, cannot supply base-load power stations."

This statement is unsubstantiated and untrue. Concentrated solar thermal plants with hot salt storage (with or without natural gas back-up) can deliver base load e.g.: "Phase 1 of the CSP [Eskom's concentrated solar power plant near Upington] ... will be a baseload plant"[1] and wind farms can deliver base load where there are sufficiently varied sites with wind availability >30%. This can be proven or disproven by wind mapping.

Response (3)

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 by providing the same capacity as coal-fired or nuclear power stations. It is also not always well understood by all stakeholders what the implications would be of replacing a coal fired or nuclear base load power

[1] Engineering News. 22 April 2010. http://www.engineeringnews.co.za/article/eskom-aims-to-secure-balance-of-funding-for-wind-solar-projects-this-year-2010-04-22

station with an alternative form of renewable generation such as wind-powered generation. The construction of a wind farm, for instance, capable of producing 4 000 MW of power, would require an area of approximately 345 600 ha for 13 333 MW of installed capacity, assuming that this entire area would be suitable for the placement of wind turbines. In reality, not all areas would be suitable, for technical or environmental reasons, and a larger area would in fact be required. Owing to wind not being available at all times, a capacity factor (percentage of time that that installation can produce at full output) of 30% is assumed and the effective power output for the 13 333 MW of installed capacity will then be 4 000 MW. Solar thermal technology which can provide higher load factors through the use of storage is not yet commercially proven and is still being researched and demonstrated. There are several small pilot plants not exceeding 20MW built in Spain and the USA and the technology is advancing but is still some time off from being proven as a base load and dispatchable option.

Thus, as far as power generation technologies are concerned, nuclear generation and coal-fired power generation are the only proven base-load technologies. Of these two, coal-fired generation is not viable in the coastal regions of the Western Cape and Eastern Cape. Apart from these factors, South Africa must make increasing use of nuclear power generation in future to reduce its greenhouse gas emissions. The life cycle contributions of nuclear electricity generation to greenhouse gas emissions is small compared to coal-fired electricity generation. This points to Nuclear generated electricity being a necessary part of South Africa's strategy to generate an additional 40 000 MW of electricity by 2025.

Your comment (4)

1.3 Scope of this Study

"The primary objective of this study was to measure the nature and magnitude of the economic and socio-economic impacts of the NPS at each of the three sites. The economic impacts consists of...a construction and a production (operation) phase."

Nuclear power is a technology with impacts that go beyond construction and production at a site. The impacts should include post-operational life, security, decommissioning and also long-term spent fuel management, since unless a solution can be found, spent fuel may have to remain on site indefinitely.

Response (4)

Decommissioning is discussed in the EIR. Further, decommissioning will be dealt with in the NNR process**.** The National Nuclear Regulator (NNR) has legislates the need for the establishment of a decommissioning plan for nuclear power stations. The decommissioning plan must be submitted before the nuclear authorisation is granted**.** Spent fuel will be stored on site until a national policy surrounding the disposal of nuclear waste is finalised.

Your comment (5)

2.1. Thyspunt
2.1.4 Fishing
"...the fear of negative market perceptions [relating to radioactive contamination of squid] appears to be mitigable. The production and distribution of scientific evidence should be sufficient to dispel such perceptions"

It is not that perceptions need to be dispelled, rather that evidence is required and is outstanding. Relevant studies could be made of marine life in the sea outfall of the Koeberg nuclear plant, for example.

Response (5)

Sea life at Koeberg has been monitored annually since before Koeberg was constructed in order to determine background levels of radiation, as well as to determine how much radioactivity is released

by Koeberg and how this affects marine life. No perceptible impact on marine life has been found. The monitoring results can be made available on request.

Your comment (6)

2.3. Duynefontein
2.3.3. Industry
"The business sector is interested in securing a stable supply of power and is not concerned about a second NPS at Duynefontein provided that safety measures are in place...it believes that the technology will be more advanced than at Koeberg...and therefore the risk will be managed"

It is not mentioned who "the business sector" refers to. The opinions are hearsay. It is unscientific to state that "...[the business sector] believes that the technology will be more advanced...and therefore risk will be managed." Risk analysis should be done by risk specialists e.g. insurance companies. They should be given details of the new advanced technology (not included in this EIR) and see if they will include nuclear incidents in their insurance policies (at present not insured).

Response (6)

The statements that were made in this regard were based on anecdotal evidence provided by stakeholders that the economic specialists consulted. .

Your comment (7)

2.3.4 Tourism
"Estate agents believe that the direction of the city expansion will be to the north"

It is not mentioned who the "estate agents" are, but in any case the question should rather have been put to the Cape Town City's urban planning department, who could explain the parameters and the future growth of the city much better. It is not a matter of tourism. What is important, and what is not mentioned in the EIR, is the impact of low density restrictions imposed by the NPS emergency evacuation zone on the city's urban densification policy. It should be possible to put a financial cost to this in terms of opportunity cost and the cost of servicing the resulting "leapfrog" development that the EIR refers to. Although Koeberg is presently responsible for this, Koeberg's operational life is only another 10 or so years, after which the emergency evacuation zone would fall away. This omission must surely be a fatal flaw in the EIR.

Response (7)

Your comment is noted. Although the impact on the City's urban densification policy does not fall within the Scope of the Economic Assessment, city planning informs the study. The emergency planning zones (EPZs) are expected to be much smaller than those for the current Koeberg Nuclear Power Station (as indicated in Chapter 3 of the Draft EIR) and hence they should have no impact on urban and spatial planning over and above the current impact of the EPZs for Koeberg Nuclear Power Station. Also although Koeberg's operational life is only another approximately 10 years the site has been earmarked for future Nuclear Power Stations.

Your comment (8)

3.2 Cost-effectiveness Comparison of the Three Sites
Future values have been discounted back to present values using a real discount rate of 8%...All costs resulting from the existence of Nuclear-1 but which are ultimately passed on to end-users or absorbed by other users are taken into account..."

The purpose of a discount rate is to find the present value of future money to the investor/operator. It is not ethical to discount future costs that are "absorbed by other users" or in another word externalised. The discount rate can only be used where the individual or entity remains legally bound to pay for these costs he/it has incurred. Hence, "costs absorbed by other users" are **not** taken into

account in this method. The only way to internalise the external costs is to invest a corresponding amount at a realistic safe rate of return e.g. government bond rate, and not at 8% real rate of return above inflation, which is a speculative (i.e risky) rate.

"Removal of nuclear waste" is mentioned as a cost that is discounted. So long as the operator does not have to pay for the full and final cost of waste management, i.e. externalises them, these costs should not be discounted.

Response (8)

The cost effectiveness comparison is based on the prescriptions in "A Manual for Cost Benefit Analysis in South Africa" as published by the WRC (Report No TT 305/ 07). As far as the discount rate for environmental purposes is concerned, the Manual prescribes as follows:

The discount rate has received renewed attention as part of a revived debate on discounting, stimulated in recent years by the issue of how to handle long-term environmental effects. According to Kirkpatrick and Weiss: "….it seems counter-intuitive if what everyone can agree are serious long-run environmental effects are discounted to insignificance by the application of conventional rates of 10 % to 12 %".

Weitzman (2001)2 proposed a new theoretical approach to resolving the dilemma of a discount rate for resources that are not replaceable by the proceeds of economic growth. According to him "……society should be using effective discount rates that decline from a mean value of, say, around 4 percent per annum for the immediate future, down to around zero for the far-distant future".

'In view of contrasting views by economists that the same discount rate should be used for environmental projects than for other social and industrial projects, it is proposed that environmental projects in South Africa should be discounted at the official discount rate of 8% and further tested against rates that are much lower. The results shall be disclosed to the policy maker'.

Your comment (9)

3.2.1.2.2 Reactor Standard Cost
...The non-variable element of the capital amount, payable to the vendor, has been brought into the study as the"Reactor Standard Cost" [R150 275m]. The co-called "Correction Value" refers to costs identified and calculated other than vendor costs [R150 275m + 19 725 m = R170 000 000 000].

It is misleading to imply there is a reactor standard cost. What reactor is being costed? From the very limited practical experience with "Generation III" there will be no fixed turnkey price to a nuclear reactor. Costs vary with the cost of capital including exchange rate movements and the time period of construction with delays. The initial cost of the still unfinished reactor at Olkiluoto has doubled and Flamanville 3 is 20% over budget. The latest estimate for a nuclear power plant is in the range of $5000 -7000/MW (Moodys) which would place the cost of Nuclear-1 (4000MW) in the cost range R160 - 220bn. This is in today's money. Nuclear construction costs have been consistently escalating in real terms: 15% annually between 2003-2008[3] so the construction cost by 2020 could be substantially more.

Response (9)

Escalations of price are a reality for almost all large scale construction projects. The purpose of the economic assessment was not to determine the absolute price for the construction, but to provide a relative comparison of construction at the alternative sites.

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2 Weitzman, ML. 2001.

3 M.I.T. Centre for Energy and Environmental Policy Research. Update on the cost of nuclear power. May 2009. Pg17. http://web.mit.edu/ceepr/www/publications/workingpapers/2009-004.pdf

Your comment (10)

3.2.1.2.14 Value of Unskilled Job Creation
"...it is clear that all three sites would have a very positive impact on unskilled job creation"

It is obvious that such a huge construction investment would impact on unskilled jobs creation. It would be more useful to compare job creation potential with a viable alternative. The number of jobs created, both unskilled and up-skilled, by installing say 10 000 MW of wind turbines across varying locations in the region would be more instructive.

Response (10)

As indicated above, an EIA is a project-specific environmental management tool and is not designed to assess high-level strategic alternatives such as alternative forms of power generation. In addition to nuclear power stations, Eskom is planning the implementation of a range of other generation technologies, including demand side management and renewable technologies such as wind and solar, in order to meet its goal of improving security of power supply by 2025, therefore job creation in the electricity industry will not be limited to this nuclear power station.

Your comment (11)

3.2.1.3.1 Power Balancing

This section implies that **only** a NPS can provide power balancing. This is not true. For example, 10 000 MW of wind turbines in varying locations with high wind availability (+30%) could provide 2 000 MW of firm capacity and 1 000 MW of variable energy supply, a total of 3 000 MW. "Nuclear-1" could provide 3 000 MW if run at 75% capacity, but not all the time - there would be some down time when the plant generates much less or nil.

Response (11)

The issue with grid management is the matching of supply and demand on a continuous basis. While the load factor of a plant indicates the annual energy from such a plant, but not the degree to which it can be "dispatched" on request to meet the current need.

With nuclear power station the shut downs for refueling (every 18 months currently at Koeberg) can be planned around other known grid issues (annual load variation, other power plants or power lines in maintenance). Then the contingency planning is around unplanned shut downs of the nuclear units. The world average for this is forced loss rate is 1.0% of the time for the 422 nuclear units reporting to WANO for the 2008 year, while the average number of unplanned reactor shutdowns per unit (scams) was 0.5 per year. Therefore nuclear plants are extremely well suited to provide stable and predicable support to meet the demand of the customers.

In the case of wind turbines the output is clearly a direct function of the local wind speed, and cannot be dispatched on request. This results in a requirement to have alternative means to supply the demand when there is too little or too much wind.

A recent example of this was in September 2010 in Spain where the national wind turbines, the world's fourth-biggest producer, dropped to below 3,000 MW on Thursday from 4,600 MW on Wednesday, which compared with peaks of more than 10,000 MW on Tuesday. This swing of 8,000 MW was equal to 20% of the national demand and is very difficult to sensibly manage without investing in base load options such as coal and nuclear and installing additional wind turbines for contingencies.

Another example is in Texas in Feb 2008 when Electric Reliability Council of Texas (ERCOT) said a decline in wind energy production in west Texas occurred at the same time evening electric demand was building as colder temperatures moved into the state. System operators curtailed power to interruptible customers to shave 1,100 megawatts of demand within 10 minutes. ERCOT said the grid's frequency dropped suddenly when wind production fell from more than 1,700 megawatts, before

the event, to 300 MW when the emergency was declared. Texas has the largest wind farm capacity of any US state.

In light of this the option to use wind power to provide stable, dependable base load supply to the grid is extremely challenging.

Your comment (12)

3.2.1.3.2 Power Supply Delays
"Site preparation and construction delays at the different sites could cause a relative delay in the commencement of electricity supply"

The maximum of 4 months delays allowed for in the study are wholly unrealistic. Delays in the latest Generation III power plants are Olkiluoto: 4 years and Flamanville: 20%. Delays of years, not months need to be considered, and costed. Since Eskom and the consultants are not familiar with the potential for wind power to provide for firm capacity, they must cost on the basis of OCGT using diesel fuel to provide the shortfall. It is also not adequate to compare merely the cost differences of the 3 sites.

Response (12)

As stated in the Report in terms of the commencement of electricity supply, the time estimation of starting Nuclear-1, the cost calculation is based on the consultant's own assumptions. The comments made could be valid; however although no specific information is available in this regard, the contribution of such costs is negligible in terms of the assessment.

The delays on other nuclear projects have been primarily based on quality and regulatory issues. As Nuclear-1 is not at the beginning of nuclear renaissance, key lessons are currently being integrated into the planning. This should therefore minimise any perceived delays into the future. As an example, delays on the EPR project are currently reducing as Areva is getting into the build exercise at an increased pace (Olkiluoto experienced more delays, Flammanville less and Taishan is on schedule).from a period of not building. As most credible nuclear vendors are constructing elsewhere to date, Nuclear-1 will benefit from their experience. "

Your comment (13)

3.2.1.3.5 Transport Cost- Radioactive Waste Removal

The impact assessment limits its terms of reference to what is not critical. Only the impacts of construction and operation are considered, and only with reference to the 3 sites. Hence "radioactive waste removal" cost is reduced to the transport cost of low and medium-level waste based on the comparative distance to Vaalputs. The assessment ignores the high level waste problem, the cost of on-site storage and of very long-term management and isolation for an unknown period. The cost of security on and off-site including the cost of protecting the transport of highly radioactive materials is also not considered.

Response (13)

The costs of high level waste storage on site are built into the operational costs of the power station. Eskom sets aside a percentage of the operational income for the power station for the storage of high level waste and for decommissioning.

Your comment (14)

3.2.1.3.8 Agriculture Impact

The impact assessment concludes that there is no impact, except at Thyspunt where there is a negative impact. The question that ought to be answered is: what is the impact on agriculture in the

event of radioactive contamination of the ground a) from the normal course of operation and b) from an incident of enhanced release? Studies around Koeberg should be made of the radio-active isotopes that may or may not have made their way into the soil at various times and from there into plants and into milk. A food chain concentrates the particles so analysis of the milk from surrounding farms should be a good indicator. Unless this is done, and it is not even mentioned in the assessment, it is not possible to make conclusions about agricultural impact.

Response (14)

The agricultural impact assessment in fact comes to the conclusion that, (especially during construction, but also during operation), the expansion of the market for agricultural produce would most likely result in an increase in agricultural production i.e. a positive impact on agriculture at Thyspunt and Bantamsklip. The agricultural assessment also does investigate the potential impacts from contamination of foodstuffs in the event of a nuclear accident where abnormally high levels of radioactivity were to be released.

Your comment (15)

3.2.3 Sensitivity Analysis
3.2.3.1 Discount rates
"To test the confidence levels of the results, a sensitivity analysis has been performed with various real discount rates i.e. 5%, 8% and 10%. The 5% is used as it is often the accepted discount rate for projects affecting the environment..."

The use of a discount rate to derive present value is used to determine the relative profitability of an investment to the investor. The use of any discount rate for costs not obligated back to the investor/operator for example costs affecting the environment are inherently wrong. The only future cost you can discount is the cost you yourself pay. As a thought experiment, consider the cost of a serious incident 40 years after commissioning of the reactor. The original investment would have long been paid off, at whatever interest rate was chosen and the cost of the event reduced to near-zero. Whether at the high-risk rate of 10% or the low "environmental" rate of 5%, discounting would have the same effect of reducing the apparent seriousness of the incident in present value. One way to manage future environmental costs in present value terms is to set up a fund at the beginning invested in government bonds at probably not more than 1 or 2% over inflation. Over a very long period, even this strategy is inadequate. This assessment ignores this problem by avoiding considering any long-term environmental liabilities.

Response (15)

See response number 8 above.

Your comment (16)

3.3 Macroeconomic Impact Analysis
The NPS is such a large investment that the economic effects will go beyond its direct boundaries...The total period of 30 years was considered as any longer period becomes statistically insignificant...Thus, although a NPS will operate for 60 years, it becomes meaningless to estimate the remaining 37 years of operation."

1. The report recognises that the effect of so large an investment "goes beyond the direct boundaries" but as a result of its own terms of reference, (a comparison of a NPS at the 3 sites), the impacts given in the report are without comparison with any viable alternative. So there is no basis to evaluate the results other than that they are what is presented.

2. There is no basis for the statement that the NPS will operate for 60 years. The vendor may offer this in the sales-talk, but there is no experience in the world of reactors operating this long, the average age being 25 years. There are very few reactors anywhere reaching 40 years. The older reactors are

the more brittle they get and so the possibility of a serious incident rises.[4] This is statistically **significant**, not insignificant or meaningless.

Response (16)

Conningarth Economists used a period of 30 years for the lifespan of the proposed NPS. As stated, any period longer than 30 years becomes statistically insignificant due to the 8% discounting applicable. The consultants do not want to elaborate further on the practical lifespan of the installation due to the fact that it does not make an impact on the economic results.

The plants available in the market have declared 60 year life-span. The current Koeberg Power Station has a planned life of approximately 40 years,, similar plants have applied successfully for life extension to 50 and 60 years. Thus, the 60 year plant life declared by the vendors is credible from an engineering perspective

Your comment (17)

3.3.3.4 Decomissioning

1. As the time period of the assessment is limited to 30 years in the EIA, the future costs of post-operational life, of guarding the power station and of decommissioning and of long-term spent fuel management are effectively ignored. Certainly, decommissioning is a burden on future generations since, although it appears to add to GDP figures, there is no addition to wealth, and a diversion of human resources to unproductive work.

"Further scientific development over the lifetime of the plant can also mean that the plant can be revitalised and the lifetime extended".

2. Do they mean extended life past the 60 years they have already assumed? What "scientific development" are they referring to? This is nothing but pro-nuclear propaganda.

Response (17)

1. Your comments are noted.

2. Yes, the implication in that scientific development over the operational life of the power station is likely to produce new technological developments that would allow the extension of the life span of the power station beyond the initially anticipated 60 years. The Safety Case document justifying the request for plant extension would be developed and sent to the Nuclear Regulator for authorisation. This document would be accompanied by engineering/technical analyses of plant systems, structures and components indicating the current state as well as the projected end-state (i.e. to the end of the extension period in question).

Your comment (18)

3.5 Climate Change

The report concludes that there are financial cost implications associated with sea level rise, especially at Duynefontein, and yet these costs are not quantified as such and are not included in the reactor cost "correction value". The variable costs for the 3 sites differ, (Table 3.25) but it is not clear whether the additional cost relating to sea-level rise has been included.

Response (18)

According to the view of the consultants, none of three possible sites is likely to be affected by climate changes related to variations in the sea levels. However from the three, Dynefontein is relatively the

[4] Union of Concerned Scientists. Nuclear Power in a Warming World. Pg 24 et al.

more prone to climate change. Accordingly, no financial provision has been made in this regard in Table 3.25.

Your comment (19)

4.3 Risk Assessment
4.3.1.1.The Odds of a Serious Event Occurring
"The nuclear industry throughout the world has rigid safety standards...Eskom will be obliged to prove to NNR that proposed plant can and will meet these...safety standards"

Eskom is not the manufacturer or vendor of the reactor so it cannot prove anything about the plant's inherent safety standards. Eskom can and must prove to the NNR that it can safely run the reactor. But first we need to know what reactor this is and then we need to know how the NNR is going to evaluate the design. If the reactor is to be one of the Generation III type as sold by Areva, it would appears that the enhanced safety features they say are incorporated are required by the higher burn-up:

"Generation III reactor fuel is to stay in the reactor core longer where it is to be irradiated or 'spent' to a much greater extent – compared to the equivalent Generation II reactors, [such as the Koeberg reactor], it is significantly more radioactive, its radionuclide content is more complex, actinide laden and longer lived, it is more heat generating and will remain so for decades longer....all of this uncertainty about the fuel abnormal event performance places much more emphasis of the surety of the reactor island containment" [5]

Proof of safety must include all stages: design, construction, operation, post-operation, decommissioning and long-term waste management. The burden of evaluating such information falls on the NNR and their ability to perform this task depends on the resources and expertise that they have.

Response (19)

The National Nuclear Regulator places the responsibility on the license applicant (Eskom in this case) to ensure that design, construction, operation and decommissioning of the intended plant meets specific requirements. Eskom would work with the chosen/selected designer to ensure that all the design requirements stipulated are complied with, as a minimum. Eskom would also perform independent technical analyses to ensure that the design input information, the analyses, and the output conform to the requirements.

Your comment (20)

"Since the NNR's regulations conform to the highest international standards, it seems justifiable to say that, under normal operating conditions, it is extremely unlikely that an incident with any significant adverse effect on the economy would occur....Nuclear-1 would use state of the art technology and maintenance as well as safety standards..."

This is an opinion and a disclaimer: "under normal operating conditions". But it is precisely when the operating conditions are not normal that a serious event may occur. Regulations by themselves are then not enough. "State of the art technology and maintenance" does not reduce the chance of a serious incident to the level "academic". The report fails to make any assessment of what the "odds" are. In the USA, the Union of Concerned Scientists has stated: "serious safety problems continue to arise at US nuclear power plants because the Nuclear Regulatory Commission is not adequately

[5] John H Large. Justifying UK New Build Nuclear' Call for Independent Inquiry. Technical omissions in the justification process. 11 March 2010. http://www.largeassociates.com/3187%20Justification/S1387-A1.pdf

enforcing the existing standards."[6] It is these regulators who are advise (sic) our NNR. The Nuclear-1 EIR treats this question far too dismissively.

Response (20)

Your comments are noted. It is beyond the Terms of Reference of this EIA process to comment on the competence of the NNR to effectively implement its mandate.

Your comment (21)

4.3.2 Skills requirements
"The possibility of a nuclear disaster is...connected to the issues of skills...There are two serious concerns: The first relates to the ability of the South African educational system to produce the skills...Nuclear skills are a scare resource worldwide.. Eskom cannot expect to find it easy to recruit such skills outside the country. The ability to retain skills is a second concern"

The consultants have finally identified a problem. The level of skills has an impact on the likelihood of a serious event occurring.

Response (21)

Your comments are noted.

Your comment (22)

4.3.3. Radioactive waste disposal
"...We were made aware of concerns on the part of the local communities regarding the safety factor surrounding the issue of nuclear waste disposal...a National Radioactive Waste Management Agency will be established and will exert tight control over the disposal of radioactive waste...At present South Africa does not have an authorised facility for the disposal of used fuel and high level radioactive wastes. "

The safety of nuclear waste is phrased here as if a "concern" of local communities, rather than a safety issue in its own right. This displays the bias in the report. The assessment is full of contradictions, i.e. "will exert tight control" but "does not have a facility" for spent fuel. The use of the word "disposal" is also incorrect: there can not be "disposal" of spent fuel, when it has to be protected from leaking into the environment for tens of thousands of years. On any rational basis, this would be enough to reveal a fatal flaw in the nuclear power plan, but nuclear power does not appear to operate on a rational basis. Similarly, no account or estimate of the costs of long-term spent fuel management is made in the report.

Response (21)

Your comments are noted. The “disposal” of any form of waste, including general waste, is in fact more correctly referred to as long term storage. This is no different for nuclear waste or for general, domestic waste.

Your comment (23)

"The transportation of radioactive material around the country is highly regulated"

Regulation on its own is not adequate. It would require active policing and protection in varying situations, against the possibility of a worst-case scenario which is a terrorist attack on a spent fuel

[6] Union of Concerned Scientists. Nuclear Power in a Warming World. Assessing the Risks, Addressing the Challenges. Dec 2007.
http://www.ucsusa.org/assets/documents/nuclear_power/nuclear-power-in-a-warming-world.pdf

transporter. No calculation of the chances of this possibility has been made, or the cost of protecting the transporter or the liability insurance for a serious event.

Response (23)

Your comments are noted. Radioactive waste truck drivers are trained, on a structured emergency plan in case of an accident to prevent exposing personnel and environment to the ionising effects of radiation. Eskom adhere to the Regulations for the Safe Transport of Radioactive Material, when transporting waste to Vaalputs

Low and intermediate level nuclear waste is transported in secure storage containers that effectively prevent any discharge of radioactivity in the event of a vehicle accident or any other eventuality that would result in the containers being released from the vehicle. The packages that are used for transportation of radioactive waste are approved by the NNR. Low level waste is stored in sealed drums, and intermediate level waste is encased in concrete inside a secure drum. Details of these storage methods are provided in Chapter 3 of the Revised Draft Environmental Impact Report.

There are currently no plans for the transport of spent fuel, since all spent fuel will be stored on site indefinitely. Should transport of spent fuel to a long-term disposal site become an option in future, appropriate security will be provided.

Your comment (24)

4.5 Consideration of alternatives
4.5.2 Technological Alternatives.
"Identified renewable forms of energy, for example wind and solar, have inadequately developed technology to provide large-scale power generation...that can supply a reliable base load...[wind] output will oscillate widely... "

All of these statements are opinions which display bias. Wind technology is highly developed and can indeed provide large-scale power generation if the wind conditions are suitable. This can be proven or disproven by meteorological data. Concentrated solar thermal technology is also well developed, although not yet at the scale of wind. South Africa has some of the best solar resources in the world in the northern Cape.Power generation from wave and ocean current is still experimental but promising. In the southern Cape, the best resource at present is wind. Mainstream Renewable Energy is confident of the viability of 30 000 MW of wind capacity in the W and E Cape, supplying 6 000 MW of firm or "base" load and 3 000 MW of variable energy, a total of 9 000 MW at a long-term fixed cost i.e. there is no variable fuel cost. Nuclear-1 at 75% capacity (better than Koeberg) would supply 3000 MW and to generate a similar amount of energy from wind would require 10 000 MW of wind turbines installed in various locations with a capacity of 30% - 35%. This would provide 2 000 MW of firm or base load during the day, when the load is required, and 1 000 MW of more variable energy at fixed cost. Independent power producers and investors are confident enough to commit their own money to this. Already there are at least 3 500MW of wind farms in the EIA or planning stages, especially around PE and Coega. It is not acceptable for the EIR consultants to deny the reliability of renewable energy without any scientific evidence e.g. wind maps and thereby promote nuclear power on the basis of "no alternative".

Response (24)

Please refer to our response to your comment 3.

Your comment (25)

"The cost of electricity generated by wind power will be almost three times that of Eskom's current installed capacity"

The consultants have fallen into a trap which they as economists should not fall into. The cost of any new generation capacity will always be more than Eskom's current installed capacity, which is 95%

from coal and where the capital costs have long been written off. The cost or price of electricity from wind is currently set by NERSA REFIT to encourage new investment where there has hardly been any investment in the past. This set price may come down in future, and should be compared to the cost of new generation capacity from any other new sources, and not to existing installed capacity.

Response (25)

Your comments are noted.

Your comment (26)

"It is pertinent to refer to a government White Paper in the UK (2008) which stated that all evidence pointed to the costs of nuclear power being lower than that of coal and gas"

Presumably this "White Paper" refers to the UK Government White Paper on Nuclear Power, in which case it says no such thing, except where there is a high carbon tax on coal. In the White Paper on Nuclear Power (2008) the chapter on the Economics of Nuclear Power concludes : " It is for investors to determine whether the financing... of nuclear power provides sufficiently attractive returns...".

Private investors (not state-owned, like Areva) have determined that it does not. The costs of building new nuclear power plants are in reality much higher than the figures used in the UK White Paper and the risks to private investors are much higher than the government realised. A recent study by Citi Bank (2008) identifies three major risks: construction, power price and operational. It concludes: "We see little if any prospect that new nuclear stations will be built in the UK by the private sector unless developers can lay off substantial elements of the three risks. Financing guarantees, minimum power prices and/or government backed power off-take agreements may all be needed if stations are to be built."[7]

Response (26)

Your comments are noted.

Your comment (27)

5. Mitigation measures
"An examination of international experience with regard to NPS's shows that, in the main, people have problems with nuclear power only where accidents are concerned"

The comment is hearsay and displays bias. People have many problems with nuclear power, obviously including accidents, not least the new real threat of terrorism but also including the daily discharges. Other problems, less noticeable on the surface, are the problems of uranium mining and the exposure of mineworkers to radiation and chemical toxicity, the problem of acid mine drainage and radioactive contamination of groundwater (as is now occurring in the Witwatersrand), and the back end problems of waste management for unthinkable amounts of time and the burden of decommissioning passed on to future generations and the threat of nuclear proliferation, which always accompanies the nuclear industry and worsens as it expands. The study only highlights the critical factor of skills and the reliance of nuclear power upon the highest level of risk-management. These are the real problems that need to be addressed, not the perceptions.

Response (27)

Your comments are noted.

Your comment (28)

5.2. Public Perceptions and Concerns

[7] CitiGroup. New Nuclear - The Economics says No. 9 November 2009.

"There is a widespread...lack of information on the part of the public regarding the impact of a NPS. Proposed mitigation measures [includes]...an aggressive public relations campaign directed at the local community."

This last statement speaks for itself. The EIR consultant/s show themselves to be far from independent, in fact they clearly promote the nuclear power industry. The main problem they see is "perceptions" on the part of an ignorant public so that an "aggressive" PR campaign needs to be directed **at** communities presumably in order to squash any resistance. Whereas instead, an open public debate about the entire nuclear industrial life cycle needs to be brought into the public domain.

Response (28)

Your comments are noted. Please refer to the response to item 2 above.

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