



**ESKOM NUCLEAR POWER STATION AND ASSOCIATED
INFRASTRUCTURE ("NUCLEAR-1")
(DEA Reference no 12/12/20/994)**

COMMENTS ON REVISED DRAFT EIAR

Submitted on behalf of:

The Thyspunt Alliance and its members

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GLOSSARY OF ABBREVIATIONS AND ACRONYMS

DEA	Department of Environment
DEIAR	Draft Environmental Impact Assessment Report
DSR	Draft Scoping Report
EAP	Environmental Assessment Practitioner (i.e. Arcus Gibb)
EIA	Environmental Impact Assessment
EIA Regulations	The NEMA Environmental Impact Assessment regulations, 2006 (GNR.385 of 21 April 2006)
EPZ	Emergency Planning Zone
Eskom	Eskom Holdings Limited (the Applicant for the environmental authorisation)
EUR	European Utility Requirements
HLW	High-Level (Radioactive) Waste
I&APs	Interested and Affected Parties
IRP2	Integrated Resource Plan 2
NEMA	National Environmental Management Act, 107 of 1998
NNR	National Nuclear Regulator
NNRA	National Nuclear Regulator Act 47 of 1999
NPP	Nuclear Power Plant
NSIP	Nuclear Site Investigation Program
Nuclear-1	The proposed nuclear power plant of up to 4000MW (megawatts)
PAZ	Pro-active Action Zone
PGA	Peak Ground Acceleration
PoS	Plan of Study for EIA
PWR	Pressurised Water Reactor
SECCP	Sustainable Energy and Climate Change Project of Earthlife Africa
SSHAC	Senior Seismic Hazard Advisory Committee
Thyspunt Response Executive Summary	Executive Summary of the Thyspunt Alliance Response to the Nuclear-1 Draft EIAR
UPZ	Urgent Protective Zone



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Annex A: Comments on revised DEIAR prepared by members of the Thyspunt Alliance



1. INTRODUCTION

1. We represent the Thyspunt Alliance and its member organisations ("our client"). The comments submitted in this memorandum are in respect of the Revised Draft Environmental Impact Assessment Report ("revised DEIAR") and are submitted on behalf of the Thyspunt Alliance as a whole (and each of its members), each of which are interested and affected parties ("I&APs") in the environmental impact assessment ("EIA") process.
2. The comments in this memorandum must be read with:
 - 2.1. the more detailed comments on the revised DEIAR prepared by members of the Thyspunt Alliance which are attached as **Annex A**;
 - 2.2. the comments submitted on behalf of the Thyspunt Alliance and its members in respect of the draft Environmental Impact Assessment Report ("DEIAR") on 30 June 2010 which are still applicable; and
 - 2.3. the comments on the revised DEIAR submitted by Earthlife Africa and Greenpeace in response to the revised DEIAR, which are endorsed by the Thyspunt Alliance and its member organisations.
3. In preparing this response to the revised DEIAR we have taken account of the letter dated 20 March 2011 from Arcus Gibb, the environmental impact assessment practitioner in this matter ("EAP") to us which responds to the comments which we submitted on behalf of our client in respect of the first DEIAR. We have not responded in this document to each of the EAP's responses in that letter, but the absence of a response to any points made by the EAP should not be interpreted as a concession on our part that we accept the correctness of the response. On the contrary, unless otherwise indicated, the absence of a specific response to the EAP's comments indicates that we are of the opinion that our original arguments are still valid despite the response from the EAP.
4. This memorandum focuses on discussing new information and additional issues that were not delete with in our previous comments on the first DEIAR. Additional studies undertaken on behalf of our client in respect of the proposed nuclear power station and associated infrastructure are attached to this memorandum. For ease of reference we have adopted the same format in this document as in our previous comments of 30 June 2010.

2. OVERVIEW OF COMMENTS ON REVISED DEIAR

5. The EAP has responded to the comments which we submitted in respect of the first DEIAR in a letter to us dated 30 June 2010 and by making minor revisions made to the original DEIAR. As appears from the more detailed comments set out below, neither we nor our client consider that the EAP has responded adequately to our previous comments. In our view, it would be unlawful for the Department of Environmental Affairs ("DEA") as the competent authority to grant an authorisation for the



construction of a nuclear power plant ("NPP") on the Thyspunt site on the basis of the revised DEIAR.

6. The revised DEAIR continues to suffer from a number of defects, including:
 - 6.1. material gaps in the information required by decision-maker to make a properly informed decision;
 - 6.2. a failure to comply adequately or at all with mandatory legal requirements, including the requirements to assess the "no-go" option; to identify and assess feasible alternatives, and to identify and assess the potential environmental and socio-economic impacts of each alternative; and
 - 6.3. the application of inaccurate and misleading methods of evaluating the significance of the impacts identified and of comparing the relative methods of the three possible sites which produces the absurd result that the Thyspunt site has been identified as the preferred option despite the fact that the expert reports clearly indicate that it is the least suitable site from both an environmental and a heritage perspective.

3. MANDATES

3.1 Standard of care and precautionary approach

7. In our comments submitted in respect of the DEIAR (paragraphs 18-22), we indicated that the DEA must apply a high standard of care and adopt a strong precautionary approach when awarding environmental authorisations for NPPs. We asserted that this high standard has not been achieved in this EIA process. In its response letter to us dated 30 June 2010 the EAP stated that this conclusion was unfounded and unsubstantiated.
8. On the contrary, the comments which we submitted in respect of the DEIAR clearly substantiate that conclusion, for example by pointing to the gaps in information, the errors and inadequacies in various expert reports, the shortcomings in the public participation process etc.

3.2 Mandate of National Nuclear regulator

9. .In its response letter to us dated 30 June 2010 the EAP responded to our comments submitted in respect of the DEIAR in relation to the relative mandates of the DEA and National Nuclear Regulator ("NNR") (see paragraphs 23 to 25 of our comments) by stating that the consideration of radiological issues will be assessed when Eskom applies for a licence from the NNR and that this application process could not be commenced until such a time as the design of the plant is confirmed.
10. We reiterate our view that the NEMA and the regulations made under it require that the environmental and socio-economic impacts of the radioactive emission, both operational and in emergencies, must be assessed as part of the EIA process.



11. The above statement by the EAP supports our view that information about the design of the NPP and the site layout is necessary in order to assess the potential environmental and socio-economic impacts of radioactive emissions. The fact that that information is not currently available merely indicates that the EIA process was commenced prematurely.
12. In our opinion the EAP's statement that it believes that the revised DEIAR provides information of the possible impacts in respect of the storage and handling of radioactive waste, emergency incidents and seismic reports in sufficient detail for the decision-maker to decide the matter lawfully [insert reference] is a statement of misplaced optimism rather than of fact.

4. LEGAL REQUIREMENTS FOR EIA PROCESS

13. We reiterate our comments submitted in respect of the original DEIAR (paragraphs 26 to 28).
14. The EAP is required to conduct an EIA process that results in an EIAR for submission to the competent authority which contains the information required by law and which the competent authority requires to make a properly informed decision as to whether or not to authorise some or all of the listed activities for which an environmental authorisation is required, and if so, to select the alternative which the competent authority considers to be the best practicable environmental option ("BPEO") the terms and conditions which the environmental authorisation must be subject to. In making these decisions the competent authority must consider each of the alternatives and their impacts with reference to section 24 of the Constitution, the principles set out in section 2 of the National Environmental Management Act 107 of 1998 ("the NEMA"), the general objectives of integrated environmental management in section 23 of the NEMA, and the factors set out in section 240 of the NEMA.
15. The EAP stated in its letter to us dated 30 June 2010 that "one of the functions of the EIA process is to balance the rights and responsibilities of different parties." (paragraphs 8-17).
16. This is incorrect and the EAP's misunderstanding of the purpose of the EIA process has coloured the revised DEIAR. In attempting to strike a balance between the rights and responsibilities of different stakeholders in the process (e.g. between the interests of electricity consumers throughout South Africa versus the rights and interests of our clients) the EAP is usurping the role of the competent authority. It is not for the EAP to determine the balances to be struck - the EAP is required to present the facts objectively and independently so that the competent authority is able to make the decision that it is required by law to do. In fact even the competent authority is not required to balance the rights and responsibilities of different parties – it is required to consider the comments of the different parties and then to make the decision on the environmental and related socio-economic grounds as outlined above.



5. PREMATURE COMMENCEMENT OF EIA PROCESS

5.1 Decision-making sequence

17. In comments submitted in respect of the DEIAR, it is pointed out that the commencing of the EIA process prematurely distorts the decision-making process, potentially resulting in poor decision-making (see paragraphs 29-32 of comments in respect of the DEIAR). We confirm our position and assert that the EAP has not adequately addressed our comments in the revised DEIAR.

5.2 Failure to Identify Proposed Nuclear Technology and the design of the proposed development prior to Commencement of EIA

18. The revised DEIAR does not contain any specific information regarding the nature or design of the PWR that the applicant proposes to build and this glaring omission is justified in the executive summary of the revised DEIAR by the statement that:

“A nuclear power station of standard Generation III design is favoured by Eskom due to its operational simplicity and rugged design, availability, reduced possibility of core melting accidents, minimal effect on the environment, optimal fuel use and minimal waste output. Detailed descriptions of the proposed nuclear plant are not available, as the preferred supplier has not been selected.”

19. The EAP reiterates [in the revised DEIAR] that “the envelope of criteria is used which is based on the specifications of all possible PWR III Generation vendors or represents a conservative set of criteria that provides “the worst case scenario” in terms of the footprint of the proposed site”.

20. In this regard we refer to the comments submitted by Greenpeace at 5.2. which highlight the fact that: there is no such thing as a standard Generation III design for a NPP.

5.3 The “envelope approach”

21. As previously discussed, Eskom is applying for an environmental authorisation for an “envelope” which will enable it to build any NPP that has biophysical impacts that fall within the ranges used to define the “envelope”. In our view, this process is not authorised by law. Indeed the adoption by Eskom and its EAP of the “envelope approach” is an attempt to circumvent the legal requirement to consider alternatives, including technological alternatives.

22. As indicated in our comments in relation to the first DEIAR, the applicant (i.e. Eskom) must identify the technology which it wishes to use and provide sufficient information about it and about the proposed design of the NPP to enable a proper identification and assessment of the risks to be made. If Eskom wishes to consider several alternative forms of technology, it should propose each of these as an alternative and identify and assess the impacts of each.

23. The absence of information about the nature, design and layout of the proposed NPP prevents the assessment of specific impacts and means that both the impacts and the



corresponding mitigation measures cannot be identified with any degree of certainty or precision as is reflected by the vague and general nature of the impact assessments in the DEIAR. Unless this information is known before the EIA is conducted it is not possible to determine:

- the specific risks posed to human health and the environment;
- the emergency response measures which would be required to be put in place and the potential impacts of an emergency event, for example involving the release of radiation;
- the amount of insurance that would be required to cover the risk;
- the potential liability of Eskom and of the State (which should be insured against); and
- the socio-economic implications of the risk through enhanced insurance costs to be borne by Eskom and also by residents in the area (household insurance invariably excludes radiation risk).

24. An EIA process is designed to identify and assess the environmental, heritage and socio-economic impacts of various alternatives and to put the necessary information before the competent authority to enable it to make an informed decision, firstly about whether or not the project should be allowed to proceed at all (which involves an evaluation of the project against the "no-go" option) and secondly, if the project is to be authorised, to select and authorise the alternative that the competent authority considers to be the best practicable environmental option. The "envelope" approach means that the competent authority is prevented from exercising its statutory mandate to identify the best alternative since no technological, design or layout alternatives have been identified and assessed. In other words, the DEA is faced with the choice of either approving or rejecting a single "envelope".

25. The effect of this is that a wide range of considerations which are material to the decision to be made by the competent authority cannot be taken into account in making its decision. Information that is material to identifying and assessing the environmental, heritage and socio-economic impacts of the proposed NPP, such as the precise nature of the PWR technology to be adopted, the design of the plant and ancillary structures, and the plant layout, is not in the revised DEIAR. This means that if the competent authority were to grant an environmental authorisation for an "envelope" it could well be authorising the construction of an NPP which it would not have authorised had it known the full facts. The absence of such crucial information will also prevent the competent authority from identifying the BPEO which is determined by an holistic determination of the interaction of many factors, including technology, plant design, and layout, in the context of a specific site. Consequently if this information is not placed before the competent authority, it will not be in a position to make a properly informed decision and must refuse the application.

26. Authorising an "envelope" without knowing the details of the actual design, layout, etc. of the range of NPPs that are notionally contained within that envelope, would in our view be unlawful. In colloquial terms authorising an envelope would amount to "buying a pig in a poke" (i.e. purchasing something which you have not yet seen). This adage reminds us of the foolishness of such a course of action.



6. SOCIO-ECONOMIC IMPACT AND ELECTRICITY PRICES

27. Our client has submitted a response to the Social Impact Assessment Report as part of the revised DEIAR. The response is attached to these submissions as part of **Annex A**.
28. Comments submitted in respect of the first DEIAR highlighted the need to adequately address the socio-economic impacts of the proposed development, as the costs of financing the development of Nuclear-1 will be recovered via electricity prices.¹ The Social Impact Assessment did not consider any possible future non-nuclear developments taking place at any of the sites. Therefore no comparative analysis is available.
29. The Social Impact Report only considers the social impacts at the construction and operational phase. Little or no consideration is given to the possible socio-economic impacts of a NPP in relation to electricity prices in the revised DEIAR. We refer to our comments in respect of the DEIAR (paragraphs 50-53) in this regard.

7. DECISION-MAKING BY NNR

30. We refer to our comments in respect of the DEIAR (paragraphs 53 to 63) in this regard. We further refer to the response to our comments from the EAP. It is indicated that the "neither the EIA process or the NNR process will dictate the specific technology or plant." This is contrary the purpose of the EIA process, as the technology or design of an NPP may have different environmental and socio-economic impacts that must be assessed in the EIA process. We refer to our comments in 6.2 above.

8. CONSIDERATION OF ALTERNATIVES

8.1 Dismissal of renewable energy alternatives

31. As highlighted in the comments submitted on behalf of Earthlife Africa, regulation 31(g) of the EIA Regulations requires an assessment to be conducted in respect of alternatives to the proposed activity and "alternatives" may include alternatives to "the type of activity being undertaken." Further, section 24(4) of NEMA reiterates the obligation to consider alternatives and a "no-go option" to the proposed activity.² In response to the comments submitted in respect the DEIAR and the question of alternatives, the EAP responded by stating that "the application for environmental

¹ See Annex A page 13 at paragraphs 50 to 53.

² Section 24(4)(b) - Procedures for the investigation, assessment and communication of the potential consequences or impacts of activities on the environment must include, with respect to every application for an environmental authorisation and where applicable— (i) investigation of the potential consequences or impacts of the alternatives to the activity on the environment and assessment of the significance of those potential consequences or impacts, including the option of not implementing the activity.



authorisation relates specifically to a Nuclear Power Station on three specific sites... it does not aim to establish the energy mix to be implemented in South Africa... as it falls within the ambit of the...IRP and IRP 2010 processes."

32. This assertion does not adequately reflect the obligation set out in section 24(4) of NEMA or Regulation 31(g). Further, regulation 31(f) provides that the need and desirability of the proposed activity must be considered. The need and desirability of building a nuclear power station cannot be adequately evaluated if an assessment of alternative technologies (particularly renewable energy sources) is not undertaken. As highlighted in paragraph 25 of the comments to the DEIAR, the identification of the best practicable environmental option, including the no-go option, may only be assessed if alternative technologies are adequately considered and proper studies are undertaken to determine an appropriate energy mix for South Africa.

33. Since we submitted comments on the first DEIAR the Integrated Resource Plan for Electricity 2010 ("IRP II") has been adopted. The IRP II examines a range of scenarios for meeting South Africa's energy requirements and considers various policy options. It indicates that the Department of Energy has adopted the policy option of committing to "a full nuclear fleet of 9600 MW" (paragraph 4.4) but also states that:

"The scenarios indicated that the future capacity requirement could, in theory, be met without nuclear, but that this would increase the risk to security of supply (from a dispatch point of view and being subject to future fuel uncertainty)."

34. The fact that the IRP II contains a scenario in which no new nuclear power stations are constructed (i.e. that it would be viable to meet South Africa's energy needs without using nuclear power) confirms the validity of our previous comments that renewable energy generation should have been evaluated as an alternative to constructing Nuclear 1. As highlighted in our comments on the first DEIAR in paragraph 73, studies have shown that renewable energy technologies may provide a credible alternative to nuclear power in respect of base-load capabilities and should be investigated. This is reiterated in the comments submitted by Greenpeace in respect of the revised DEIAR (see page 11 of Greenpeace submission).

35. The revised DEIAR states that:

"South Africa does not have sufficient quantities of indigenous natural gas and does not have the large rivers required for base load hydro-electric power stations".³

"Only certain electricity generation technologies are presently commercially available, although not necessarily financially viable in South Africa, based largely on the availability of resources (fuel) and geographical constraints."⁴

36. Renewable energy is dismissed on the basis that it does not provide guaranteed base load capacity. However it is misleading to say that "base load technologies" are required where in fact there are many ways of meeting base load demand, including by using renewable energy sources.

³ Chapter 4 at 4.2.2

⁴ Chapter 5 at page 8.



37. The revised DEIAR has addressed comments received in respect of the DEIAR indicating a lack of consideration of wind-generated power as an alternative to nuclear-generated power. The revised DEIAR considers the potential environmental impacts of the infrastructure and associated infrastructure for the operation of wind turbines.
38. We reiterate our comment submitted in respect of the DEIAR at paragraph 73. Alternative energy options, particularly renewable energy technologies, are viable and credible and discounting alternative technologies without adequate evaluation is contrary to the obligations set out in NEMA and the EIA Regulations.

8.2 Comparative costs of technologies

39. The comparative costs of power generation alternatives have been considered in the revised DEIAR. The comparison is however limited to coal-powered plants and nuclear energy plants, with the conclusion that:

“the study suggests that no single electricity generating technology can be expected to be the cheapest in all situations. The preferred generating technology will depend on a number of key parameters and the specific circumstances of each project.”

40. The comparative costs are inadequately addressed in the report. As highlighted in the comments submitted by the LRC on behalf of Earthlife Africa, “the EIR simply lists some energy sources in a table, without any analysis of their impacts or the significance of those impacts”. The IRP II provides for cost effective scenarios which exclude nuclear power with the assertion that security supply can be guaranteed without nuclear power.
41. The revised DEIAR fails to consider the promotion of energy efficiency programmes, which is a cost effective and viable measure to provide electricity security.

8.3 Dismissal of the “no-go” option

42. The revised DEIAR does not assess the no-go option but simply dismisses it as being illogical and unfeasible. Simply stating that the no-go option is “not feasible” amounts to a statement rather than an adequate reason for not considering it. In any event, the no-go option is not required to be feasible, it must be assessed so that the competent authority has the necessary information about what is likely to occur if the application for an environmental authorisation is refused. This has not been done.
43. In response to the “no-nuclear” option, the revised DEIAR states that if the proposed development of an NPP in South Africa is not approved, that Eskom would in all likelihood apply to develop more coal-fired power stations. In our view this statement is misleading, particularly in light of the need to achieve carbon emission reductions (which means that coal-fired power stations are unlikely to be authorised as the BPEO), the fact that the government is providing incentives to renewable energy generators (e.g. through the REFIT programme) and that the IRP II has recognised that it would be viable to meet South Africa’s energy needs without using nuclear power. In other words, if the proposed Nuclear 1 power station were not built at



Thyspunt or the other two sites proposed, the most “no-go option” is that the additional electricity generation capacity would be fulfilled by independent renewable energy power producers.

9. DEFICIENCIES IN PUBLIC PARTICIPATION PROCESS

44. We refer to our comments in respect of the DEIAR (paragraphs 74 and 75).

45. One of the new studies in the revised DEIAR is a Heritage Mitigation study. In the introduction to the study the following statement is made:

“We have however conducted significant amount of consultation with respect to mitigation of archaeological sites.”

46. Our client finds it unacceptable that none of the specialist or affected parties in the Eastern Cape was invited to this discussion and therefore contest the significance of the consultation.

10. FAILURE TO ASSESS NUCLEAR SAFETY ISSUES AND RISK OF SEVERE ACCIDENTS

47. We refer to our comments submitted with regard to the DEIAR in this respect (paragraphs 76-77). In response to comments submitted in respect of the DEIAR, the EAP refers to an agreement between the DEA and the NNR indicating that the DEA would not decide on the acceptability of radiological safety issues (“severe accidents”) and that this issue is within the ambit of the NNR licensing application.⁵ Radiological safety issues and the risk of severe accidents affect the environment as well as humans and have not been adequately assessed.

10.1 Emergency and disaster management planning

48. According to the revised DEIAR, the final and detailed emergency plan for each site will be approved by the NNR based on detailed plant-specific safety assessments that must provide final justification for the technical basis of a site’s emergency plan.

49. The EIA has been conducted on the assumption that Generation III technology will be used and that the European Utility Requirements (the “EUR”) for light water reactors (“LWR”) nuclear power plants are appropriate. The revised DEIAR states that:

“it is assumed that the NNR will accept Eskom’s proposal, adopted from the European Utility Requirements (EUR) for new reactor designs, for emergency planning zones (EPZs) of 800 m and 3 km for the Proactive Action Zone (PAZ) and the Urgent Protective Zone (UPZ), respectively. Should this not be the case, a re-assessment of the impacts in relevant specialist studies and in the EIR may need to be undertaken. The proposed **PAZ** of 800 m

⁵ See Annex B at page 25 “Response (76-77)”.



around the proposed power station places limitations on the degree to which the power station footprint can be moved around on the site to adapt to the site's environmental sensitivities. The power station may not be any closer than 800 m from a public road.”

50. The revised DEIAR states that Eskom has developed a document demonstrating that the proposed nuclear power stations can be built without the need for off-site short – term emergency interventions in line with the EUR requirement.⁶ These interventions include sheltering, evacuation or iodine prophylaxis. The EUR provides there is no or minimal need for these emergency interventions beyond 800 meters from the reactor and that any delayed action such as the temporary transfer of people will not be required beyond 3 kilometres from the reactor. Further, the document indicates that no long-term action involving permanent (i.e. longer than one year) resettlement of the public will be required at any distance beyond 800 meters from the reactor.

51. The revised DEIAR concludes that:

“All three sites are acceptable for emergency planning considerations because of the EUR approach to emergency planning followed by Eskom.”⁷”

52. In our view the EUR are an unacceptable basis on which to base the EIA, particularly given the legal requirement to adopt a precautionary approach. The EUR requirements are the product of a joint exercise by 12 companies or organisations in Europe all of which are involved in nuclear power generation. These requirements are completely inadequate and have not been endorsed by the International Atomic Energy Agency or by any government nuclear regulator. The EUR are much less onerous than the requirements usually imposed by government regulators. For example the equivalent zones applied:

52.1. by the NNR in relation to Koeberg, are 5 kilometres from the reactor for the PAZ and a 16 kilometres for the UPZ; and

52.2. by United States Nuclear Regulatory Commission are 10 miles and 50 miles (instead of 800 metres and 3 kms).

53. Furthermore, the fact that there is only one Generation III nuclear reactor operating means that there is no generally accepted international good practice in relation to safety precautions for Generation III nuclear reactors.

54. .As a result of the nuclear incident in Fukushima, villages 45km from the site were found to be highly contaminated which resulted in these villages being evacuated at a later stage.⁸ With the potentially severe environmental impact a nuclear incident can have on the environment, an adequate emergency plan indicating what tools will be adopted to mitigate the potentially severe environmental harm; the true impact of the development cannot be assessed. The NEMA requires the adoption of a precautionary approach to decision-making. Where the potential environmental harm resulting from an emergency incident may be significant, a detailed emergency plan indicating how

⁶ Chapter 9 at 9.23.2.

⁷ Chapter 9 at 9.23.3.

⁸ Greenpeace Africa submission on Nuclear-1 Revised Draft EIA Report – August 2011 at 6.2 page 21.



this harm to the environment and human health will be mitigated is essential to the decision-making process.

55. The Emergency Response Impact Assessment in the revised DEIAR merely sets out a high level description of the emergency plan. The report indicates that a Safety Analysis Report (SAR) will be developed by Eskom prior to a licence being issued by the NNR.
56. The Emergency Response Impact Assessment highlights the two requirements for nuclear emergencies. These include infrastructure considerations and functional (response) considerations. An emergency response plan may well require the construction of additional site-specific infrastructure (e.g. new roads to be used for evacuation purposes may be required at Thyspunt but not at other sites). Without an adequate assessment of the emergency response procedures to be adopted, the potential environmental impact of additional roads and infrastructure cannot be assessed and considered. These considerations are particularly significant in considering the cumulative impacts of a development. The additional costs associated with the safety measures that must be put in place have also not been considered in the revised DEIAR.
57. The revised DEIAR should have contained the following information to enable a proper identification and assessment of the socio-economic and environmental impacts of responding to emergencies at each site:
 - 57.1. a site-specific emergency plan which identifies the additional infrastructure that will be required for emergency responses purposes and an assessment of the consequential environment and socio-economic impacts (these will be different for each site and consequently may affect the selection of the BPEO); and
 - 57.2. the mitigation measures to be adopted in emergency situations at each site.
58. The failure to assess the implications of emergencies (e.g. major disasters) amounts to a failure to comply with the legislative requirement to assess each identified and potentially significant impact. The socio-economic impacts as well as the environmental impacts of any significant emergency incident (e.g. release of radioactive materials) would be very significant indeed.

11. FAILURE TO IDENTIFY AND ASSESS ALTERNATIVES FOR HANDLING, STORAGE AND DISPOSAL OF HIGH-LEVEL RADIOACTIVE MATERIALS

59. The revised DEIAR states that:

“The potential environmental impacts identified and assessed include all potential types of radioactive wastes expected to be generated by the proposed Nuclear-1 Nuclear Power Station. The assessment results indicate that with the implementation of appropriate mitigation measures all potential impacts are low.”



60. The specialist report on Waste Assessment states that radioactive waste management:

“comprises all the administrative and operational activities involved in the handling, pre-treatment, treatment, conditioning, transport, storage and disposal of radioactive waste. Conditioning of waste typically includes immobilisation and packaging of waste, treatment includes volume reduction and activity removal, while pre-treatment refers to activities such as collection, segregation, chemical adjustment and decontamination.”

61. However the Waste Assessment fails to highlight the cost implications of radioactive waste management or, as highlighted by the LRC, the cost of research and development for finding alternative solutions for storing radioactive waste, to which a solution needs to be found.

62. At present, South Africa does not have an authorised facility for the disposal of high-level radioactive waste. Thus, the only current and feasible alternative is for Eskom to store high-level radioactive waste in spent fuel pools on the Nuclear-1 nuclear island, as is the case at Koeberg. The Fukushima incident in Japan has drawn attention to the danger of keeping spent nuclear fuel rods in pools on the site (as is proposed in this case) and of the inherent risks of nuclear power. For example in Fukushima the event which precipitated the emergency incidents lay beyond the parameters of the risk assessment assumptions which had considered a tsunami wave of approximately 5 meters high but had not considered the possibility of a tsunami wave of approximately 14 meters (which is what occurred). This means that the proposed Nuclear-1 facility must be designed in such a way that such long-term storage within the nuclear island building is possible.

63. The potential impacts and hazards associated with the transportation of low and intermediate radioactive waste have not been adequately considered in the Waste Assessment. It is apparent that low and intermediate radioactive waste will be transported to and disposed of at the Vaalputs Waste Disposal Site. The future power station will be required to obtain a written authorization in accordance with the NNR Regulations for the transportation of the waste, which will be done at a future point in time. It is clear that a route for the transportation of the waste has not been established. The potential impacts of the transportation of this waste have not been adequately considered in the EIA process, particularly as the risks associated with transportation will be difficult to contain and, depending on the route along which the waste is transported, the socio-economic and environmental impacts must be assessed.

64. In this EIA, inadequate attention has been given to the potential impacts of emergency incidents on the basis that this will be dealt with by the NNR during the process of deciding whether or not to grant a nuclear licence for the operation of the site. However, this ignores the fact that an EIAR must identify and evaluate all potential risks, including emergency incidents.

65. The DEIAR must indicate how the long-term storage of nuclear waste will be dealt with in order to assess the ecological, financial and socio-economic impacts of proposed NPP. As will be appreciated, the enormous cost of storing radioactive waste indefinitely will have a major impact on the cost of the project and will impose a burden on future generations.



66. In our comments submitted in respect of the DEIAR, we indicated that a "precautionary approach" should be applied by the DEA when considering the storage, transportation and handling of hazardous waste (see paragraphs 78 and 79), particularly in light of the fact that the Waste Assessment highlights the lack of an authorized facility for the disposal of high level waste in South Africa.⁹ In response to these comments, the EAP stated that the impacts of handling and storage of radioactive waste falls firmly in the ambit of the NNR, based on a co-operative governance agreement between the (then) DEAT and the NNR signed in 2007. We refer to comments in our submission in respect of the DEIAR (paragraphs 59-62) that the mandates of the DEA and the NNR are clear and by agreeing to allow material impacts to be considered by the NNR, the DEA has abdicated its responsibility to consider material impacts (as legally required) in the EIA process.
67. The revised DEIAR includes numerous assumptions in respect of the study, including an assumption that "in terms of the Constitution...and the NEMA, it is assumed that the DEA is responsible for assessing the potential impacts of the power station on the environment. It is further assumed that in recognition of the dual but distinct responsibility with respect to the assessment of radiation hazards, the DEA, is the lead authority on environmental matters and the NNR is the decision-making authority with respect to radiological issues." The potential environmental and socio-economic impacts of radiation hazards are both evident and of critical concern in the EIA process. Actual and potential environmental impacts must be considered in the EIA process, including cumulative impacts. Regulation 31(1)(l) requires "an assessment of each identified potentially significant impact" which includes "cumulative impacts."¹⁰ A "significant impact" includes "an impact that by its magnitude, duration, intensity or probability of occurrence may have a notable effect on one or more aspects of the environment."¹¹ The potential and actual radiation hazards are significant and will affect the assessment of cumulative impacts at each of the proposed sites, and will affect the assessment of the no-go option.
68. Further, we draw attention to aspects of procedural fairness, where the public participation processes under the NNRA are narrower than those prescribed in NEMA and the EIA Regulations for the EIA process. The potential impacts associated with transporting, handling and storing radioactive waste (and in particular high level waste) are critical, particularly in light of nuclear and radioactive safety and are of great public concern (see paragraphs 60 and 63.2 of the Draft EIA comments).

12. INCOMPLETE INFORMATION

69. Numerous uncertainties in the DEIAR have not been addressed in the revised version and significant important information has still not be provided. This includes information in relation to:

¹⁰ Regulation 31(l)(i).

¹¹ Regulation 1.



- 69.1. detailed designs, cross sections or layouts of new planned access roads, sea tunnels, pumping tunnels, the open Cycle Gas Turbine, and desalination plants or waste water works;
- 69.2. whether or not mixed oxide fuels will be used (the use of mixed oxide fuels changes the safety parameters and accordingly the potential risk of harm and extent of the impact);
- 69.3. possible "source terms" (i.e. how long the fuel will remain in the reactor which affects how radioactive it becomes) which is relevant to assessing the potential risks and impacts of operating the reactor.

13. RELIANCE IS PLACED ON INCORRECT, UNVERIFIED AND IRRELEVANT INFORMATION

70. In this regard we reiterate our comments in respect of the first DEIAR and to the comments in **Annex A** and reiterate our view that information in the revised DEIAR is insufficient to justify the selection of the Thyspunt site as the BPEO.

14. SPECIALIST STUDIES INADEQUATE

- 71. In this regard we reiterate our comments in respect of the first DEIAR (paragraphs 83 and 84) and to the comments in **Annex A**.
- 72. In responding to those comments the EAP rejected our client's assertion that potential debris flows at the site posed a risk and stated " after detailed investigations, it was found that no evidence of this having occurred at or close to the site, of the conditions that would enable debris flow to take place (p 27).
- 73. A specialist report of Ellery and Elkington which are attached to these comments indicating the EAP and its specialists are incorrect.

15. FLAWED METHODOLOGY

15.1 Methodology for the assessment of impacts.

74. Our client has made detailed comments in relation to the methodology adopted for the assessment of impacts. These are attached as part of **Annex A** to these submissions.

15.2 Charactering the NPP as beneficial to conservation and heritage.

75. In their letter response to us the EAP argue that Eskom is already engaged in active conservation at all of the sites but simultaneously argues that if the NPP is not built at



Thyspunt, the site will continue to deteriorate due to the spread of alien invasive plants. The short point is that Eskom must comply with its legal obligations to eradicate alien invasive plants regardless of whether or not a power station is built.

76. The logic of the specialists appears to be that the only viable way of conserving areas of flora and fauna is to allow a major industrial installation to be built within them and then to exclude people from the remainder. In considering the impacts on terrestrial vertebrate fauna the revised DEIAR states that.

"highly significant potential conservation offsets are possible at Thyspunt if the undeveloped land is declared a nature reserve and managed as such."¹²

In considering the impacts on terrestrial invertebrate fauna it is stated that;

"Thyspunt...would benefit substantially from getting formal protected status. Thus the proposed project would have a potential net positive impact on invertebrate communities at...Thyspunt."¹³

77. A similar conclusion is drawn in the Heritage Assessment report. This is a reductionist approach which fails to take account of the impact of large industrial undertakings on the landscape and in this case the significant risk which the NPP poses not only to human safety but also to other aspects of the environment.
78. The logic of this approach suggests that the most effective conservation strategy would be to promote the establishment of large industrial facilities which pose such a significant and inherent risk that exclusion zones must be maintained around them, in the most ecological sensitive and conservation worthy areas of the country. This is clearly absurd. The construction of an NPP in an area of very high biodiversity and heritage significance is unwise, unjustifiable and detrimental to the cultural and natural heritage of South Africa. To argue the contrary, as the revised DEIAR does, is irrational and misleading.

15.3 Methodology use to compare the three sites

79. The weighting system adopted for assessing the impacts of the NPS at the three sites has been altered in the revised DEIAR however remains inaccurate and its application unclear.
80. The methodology used by the EAP to compare the three sites is self-evidently defective because it results in the conclusion that the Thyspunt site is the best alternative (i.e. the BPEO) despite the fact that:
- 80.1. the environmental impacts of constructing an NPP there will be significantly more severe than at the other two sites; and
 - 80.2. the potential impacts on cultural heritage at the Thyspunt site are inmitigable resulting in a fatal flaw.

¹² Executive Summary at page 13.

¹³ Executive Summary at page 13.



81. Numerous conclusions throughout the revised DEIAR indicate the potentially severe environmental harm at the Thyspunt site and numerous specialist reports indicate that the environmental impacts at the Thyspunt site will be significant, even with the adoption of mitigation measures. The executive summary of the revised DEIAR highlights the following points, among others.

81.1. The potential impact of the development on flora at the Thyspunt site is significant and "Thyspunt has by far the greatest diversity of vegetation communities, including extensive and highly sensitive wetlands... Thyspunt will experience the highest level of impacts.¹⁴" The above impacts are likely to result in profound degradation of a system that presently exists as a relatively unimpacted mosaic of terrestrial and wetland habitats, with high levels of interconnectivity and high overall biodiversity value, to which the wetland systems make a significant contribution. The potential cumulative impacts of the proposed development of a single nuclear power station at the Thyspunt site without implementation of mitigation measures has been assessed to be of high negative significance.

81.2. The impact of the development on wetlands is deemed the most significant at the Thyspunt site. The executive summary states:

"without mitigation, the development could result in profound degradation of relatively unimpacted wetlands systems....The onus is on Eskom to ensure that mitigation measures are put in place to meet the requirements to protect the wetlands and extend the conserved area of wetlands...."

81.3. "Thyspunt has in all probability the highest butterfly diversity and conservation value of the alternative sites. This together with a high ant diversity and the *Onchyophoran* species indicate that Thyspunt has significant conservation value. Thyspunt is therefore considered to be more sensitive to development than Duynfontein, and only marginally lower than Bantamsklip. If development is pursued at Thyspunt, further monitoring of faunal communities and mapping of vegetation habitats would be required.¹⁵"

81.4. The Geo-hydrology assessment indicates that the overall sensitivity at Thyspunt is low to medium, but in Wetland areas the sensitivity is high, unlike the two alternative sites where the sensitivity is low.¹⁶

82. The revised DEIAR indicates that the Thyspunt site is the preferred site on the basis of environmental and technical factors, a statement which is contradicted by the statement that the Thyspunt site is more sensitive from a biophysical and heritage perspective than the other two proposed sites.¹⁷

¹⁴ Executive Summary at page 12.

¹⁵ Executive Summary at page 13.

¹⁶ Executive Summary at page 10.

¹⁷ Executive summary at page 6.



15.4 Process review of Draft EIA

83. The EAP responded to criticisms of the EIA process by appointing two other EAPs to undertake a review of the EIA process (this did not involve reviewing the specialist reports).
84. While we agree with certain conclusions of the reviewers, in our opinion the reasoning used to support the main conclusions is irrational, for the reasons set out below.
85. The reviewers state that if the potential impacts of undertaking the proposed activities at a particular site are found to be intolerable, the site should be regarded as being fatally flawed and should in fact be disqualified from any further consideration as a possible site for the power station. (pages 18 and 19). The reviewers also stated:
- “there is no provision in the impact ranking for an impact greater than “high” – hence “high” must include the most unacceptable case. In these terms, and given the multiple impacts identified as being of high significance for all 3 sites (see table 2) it would not be unreasonable to expect that all three sites would be disqualified. Contrary to this, all the specialists agreed that there were no fatal flaws in any of the three sites. This again suggests that the impact significance has been exaggerated in the EIA.”
86. The ranking of impacts as “high” is based on the specialist reports which the reviewers did not review. It is clear from many of the specialist reports (some of which, in our client’s view, understate the impacts) that there are sound reasons for ranking many of the impacts at Thyspunt as “high”. Therefore logically, unless it can be established that the specialists were incorrect (which the reviewers do not do) the fact that the impacts on the environment and on cultural heritage at Thyspunt are high and cannot be significantly mitigated should mean that the Thyspunt site has fatal flaws and should be excluded from consideration. (This follows the argument advanced by the reviewers which is referred to above.)
87. The heritage studies and specialist studies as well as the additional studies undertaken on behalf of our client, confirm that not only are the impacts of building an NPP there high, but in some cases they have been underestimated in the specialist reports contained in the revised DEIR. In fact the Thyspunt site is a classic example of a site that should be excluded from consideration as the site of any major industrial development, let alone an NPP. The South African Heritage Resources Agency (“SAHRA”) has indicated no development should take place there; it been identified as a critical biodiversity area, and constructing an NPP there would have severe environmental impacts on both terrestrial and marine ecosystems (which are currently poorly understood).
88. However instead of reaching the logical conclusion that the Thyspunt site should be excluded from further consideration, the reviewers start with the conclusion in the DEIR that none of the sites have fatal flaws and work backwards to conclude that the only way in which such a conclusion could be valid despite the number of high impacts identified, is if the impacts were exaggerated. Without demonstrating any flaws in the specialist reports (which they did not review) the reviewers conclude that there has been a general exaggeration of the significance of the impacts (the factual basis for this conclusion is not apparent).



89. The reviews compound this error by reasoning that if all of the sites are potentially suitable from an environmental perspective because the DEIAR says that none of them suffer from fatal flaws, then it is legitimate to identify the preferred option primarily on the basis of the relative ease and cost of connecting the proposed NPP to the grid.
90. The relative ease and cost of connectivity to the grid is primarily relevant to determining whether or not it is feasible to develop an NPP on the site. The applicant (Eskom) has indicated that it is reasonable and feasible to build an NPP at any of the 3 sites. Once that determination has been made the relative ease and cost of connectivity to the grid should only have a marginal and indirect impact on the decision-making process (i.e. they are only relevant insofar as they affect the environmental and socio-economic impacts of the proposed listed activities). These so-called "technical" issues cannot be used as a basis for overruling environmental considerations. Any weighting system which allocates a preferred site based on a disproportionately high weighting to ease of connectivity to the grid and the supposed benefits to the Eastern Cape economy where the site has also been identified as having the greatest environmental and heritage impacts, is clearly fatally flawed and misleading.
91. Furthermore, it is doubtful whether the competent authority is entitled to take account of issues such as ease of connectivity to the grid and the cost of constructing the NPP except to the extent to which these factors are shown to have socio-economic or environmental impacts. In this case these factors are given such a high weighting that they become decisive in selecting Thyspunt as the preferred option and therefore the BPEO.
92. The specialist reports and the stance adopted by SAHRA make it clear that the Thyspunt site should be excluded from further consideration. The fact that the scoring system is weighted in a manner that transforms a site that should have fallen out of consideration completely, into the preferred option, is an indication of the deficiencies in the weighting system.
93. Furthermore, the fact that the revised DEIAR rates a site that is clearly unsuitable from environmental, heritage and geomorphological reasons as the preferred option creates a strong perception of bias (as recognised by the reviewers). The reviewers suggested that this perception be corrected by including a credible explanation for this in the revised DEIAR. This has not been done and accordingly the perception of bias remains.
94. In our view, it would be unlawful for a competent authority to authorise the selection of the Thyspunt site as the best practicable environmental option because the facts simply cannot sustain such a conclusion and consequently any such decision based on the revised DEIAR could be set aside by a court as being irrational.



16. HERITAGE RESOURCES AT THE THYSPUNT SITE

95. The Heritage Assessment report included in the revised DEIAR as well as the revised DEIAR indicate that the impacts of a NPP on human cultural heritage and landscape will be the most significant at the Thyspunt site where archaeological and palaeontological heritage is diverse and prolific. The Thyspunt site is therefore deemed the least preferred site from a heritage perspective, however this is ignored in the revised DEIAR, as the Thyspunt site remains Eskom's preferred site. Indications are clear that mitigation is going to be technically difficult to achieve due to the character of the site, difficulties with respect to accessibility¹⁸ and will be extremely lengthy and costly.¹⁹ The Heritage Assessment considers the no-go alternative and its impacts on the various sites from a heritage perspective. The specialist takes the view that the *status quo* would be maintained until such a time as alternative land uses are adopted. The specialist states that:

"Eskom has indicated that land will be sold if it cannot be used for power station development. Should any of the sites be used for property development, it is likely that heritage impacts in terms of archaeology and landscape will be severe. While the development of a nuclear power station on any of the proposed sites will result in substantive impacts, the conservation of landscapes within of the owner-controlled zone as well as possible biodiversity offsets will be advantageous for heritage conservation in the long term."

96. These conclusions are absurd in respect of the current EIA process. Even if Eskom were to sell the site any future property development would not be authorised without an EIA and heritage assessment and in view of the extraordinary value of the area as a cultural landscape, there is no reason to believe that developments that have a severe impact on archaeology or the landscape would be permitted. The potential impact of property development in the long term (as a potential future land use) cannot be used to justify the destruction of the heritage value of the land in the short term as a result of the construction of a NPP.

97. A Heritage Mitigation Study has been compiled as part of the revised DEIAR even though the South African Heritage Resources Agency (the "SAHRA") has indicated that it does not support the development of a NPP at Thyspunt due to the significant heritage value of the site.²⁰ In addition, the heritage impact of the proposed NPP at the Thyspunt site cannot be accurately determined for the following reasons:

- the design parameters of the NPP will have a significant effect on the severity of the impacts on heritage sites at Thyspunt;²¹
- the true cultural value of the site can only be determined once trial excavations at the site are undertaken;²² and
- without a clear understanding of the potential and actual impacts on heritage sites, mitigation criteria and a mitigation strategy cannot be established or determined.²³

¹⁸

¹⁹ Heritage Assessment at 4.3.

²⁰ Heritage Mitigation Study at 1.

²¹ Heritage Mitigation Study at 3.1.

²² Heritage Mitigation Study at 3.1.



98. The SAHRA do not support mitigation through excavation as has been proposed in the revised DEIAR, as this approach is unfeasible and not in the interest of overall heritage conservation. Section 35(4) of the National Heritage Resources Act, 25 of 1999 (the "NHRA") declares that no person may damage, destroy or excavate any archaeological or paleontological site without a permit issued from the competent heritage authority. Therefore excavation work at the Thyspunt site cannot be undertaken without the necessary approval. When exercising any power or performing any function in terms of the NHRA, including granting a permit for excavation, the competent heritage authority must consider the following principle:

"Heritage resources have lasting value in their own right and provide evidence of the origins of South African society and as they are valuable, finite, non-renewable and irreplaceable they must be carefully managed to ensure their survival."²⁴

99. The Heritage Assessment Report indicates that wilderness qualities of the Thyspunt site are exceptional and substantially contribute to the "character of the region and the contiguity of the strong cultural landscape qualities of the place."²⁵

100. Based on the above, the competent heritage authority cannot grant a permit for the excavation of the Thyspunt heritage sites without failing to comply with the general obligations and principles set out the NHRA. In doing to the competent heritage authority would be acting unlawfully.

101. The Mitigation Study indicates that the SAHRA has the option of declaring the Thyspunt cultural landscape a National Heritage Site, resulting in the SAHRA having the power to dictate the future of proposed activity in the area.

17. APPREHENSION OF BIAS

102. The socio-economic impact report has only considered the benefits of remunerating workers at the NPP but still fails to address the potential impact on consumers and taxpayers associated with funding the construction and decommissioning of the NPP.

103. In the response to our Draft IEAR submissions, it was indicated that the recommendation of Thyspunt as the preferred site "is based on a number of factors, including technical factors, a number of social and biophysical factors, and cost." Although factors such as technical specifications and cost are relevant in the EIA process, section 2 of the NEMA requires that environmental management must pursue the best practicable environmental option which is the option that "provides the most benefit or causes the least damage to the environment as a whole, at a cost acceptable to society in the long term as well as in the short term."²⁶

²³ Heritage Mitigation Study at 3.1.

²⁴ National Heritage Resources Act, 25 of 1999 at section 5(1)(a).

²⁵ Heritage Assessment Report at 6 (page 78)

²⁶ NEMA definitions section 1



104. It is clear from the specialist reports, firstly that the Thyspunt site is wholly unsuitable for a major industrial development and should have been excluded from consideration because of the existence of high impacts that cannot satisfactorily be mitigated. Secondly, even if Thyspunt were not excluded from consideration, the fact that the environmental and heritage impacts of constructing an NPP at Thyspunt are substantially more severe than at either of the other two sites means that it cannot possibly be the best practicable environmental option. The fact that Thyspunt is Eskom's preferred site and the methodology applied by the EAP to compare the three sites results in Thyspunt being recommended as the BPEO creates the suspicion that the EAP is not fully independent and we reconfirm our comments submitted in respect of the DEIAR (paragraphs 90 and 91).

105. In this regard it is worth noting that in the recent case of *S v Frylinck and another* an environmental assessment practitioner (EAP) was convicted in terms of regulation 81(1)(a) of the Environmental Impact Assessment Regulations, 2006, for providing incorrect and misleading information in a basic assessment report. A failure to place all relevant information before a decision maker may result in an EAP being convicted of a crime in his or her personal capacity.

18. CONCLUSIONS

106. The EAP has dismissed and failed to address substantively almost all the comments which we submitted in relation to the first DEAIR and accordingly the revised DEIAR is also defective and in our view, could not form the basis for a decision to authorise the construction of an NPP at Thyspunt.

107. The defects in the revised DEIAR include:

107.1. material gaps in the information required by decision-maker to make a properly informed decision;

107.2. a failure to comply adequately or at all with mandatory legal requirements, including the requirements to assess the "no-go" option; to identify and assess reasonable and feasible alternatives, and to identify and assess the potential environmental and socio-economic impacts of each alternative; and

107.3. the application of inaccurate and misleading methods of evaluating the significance of the impacts identified and of comparing the relative methods of the three possible sites which produces the absurd result that the Thyspunt site has been identified as the preferred option despite the fact that the expert reports clearly indicate that it is the least suitable site from both an environmental and a heritage perspective.
