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18. NUCLEAR TECHNOLOGY		
Dr Anton Bok Home Owner-Rebebries,Thysbaie	▪ Most appropriate technology e.g. why not Pebble – Bed Reactor?	It is Eskom's stance that ALL of the primary energy resources including solar, wind, wave, ocean current, tidal energy, biomass, hydro, as well as gas, coal and nuclear need to be harnessed using the appropriate technology to provide the electricity that South Africa requires to support its economic growth and development. This EIA is for a proposed nuclear power station based on the Pressurized Water Reactor technology. The pebble bed modular reactor (PBMR) technology is being developed by the PBMR (PTY) Ltd company. Eskom has submitted applications for an environmental authorisation and for a nuclear installation licence for a PBMR demonstration power plant to be constructed on the Koeberg site. The EIA for the PBMR Demonstration Power Plant is in progress. Pending the successful operation of the Demonstration Plant, Eskom will purchase PBMR power stations, subject to normal commercial conditions and regulatory requirements (authorisations, licences, permits etc) being met.
Mr Dave Brook Milnerton Residents Association	▪ Possible impact that a national gas pipeline might have in distributing natural gas particularly from the West Coast and Kudu gas fields. ▪ I asked for clarity as to the status of the existing approvals granted in the 1970/1980's for Koeberg and as to whether they were only for 2 existing reactors or for the ultimate 6 that could be built on the site. ▪ I am concerned at the answers given by Eskom as to what size power plant is planned should Koeberg be the selected site. It was stated that over the next 20 years	The EIA will identify the possible impacts that other activities may have on the proposed power station. The authorisations that are in place for Koeberg are for the existing power station, comprised of two reactors and the infrastructure, as it currently exists. This information will become available during the course of the EIA, and will be reported in the Environmental Impact Report.

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	some 20 000MW (or 10 times the size of the present Koeberg) would be needed and that this could be spread over several sites or be concentrated on one site. Can we have a definitive answer as to what the maximum size of power plant would be if Koeberg is the chosen site?	
Mr Ryan Donnelley Founder and chairperson of F.A.C.T. (For A Clean Tomorrow)	▪ What kind of "Electro Magnetic Field" will be created with 4000MW of electricity?	The phenomenon of electromagnetic fields (EMF) is related mainly to transmission lines and infrastructure and will be assessed in the transmission line EIA.
Mr Johan Du Plessis Saldanhabaai Municipality	▪ Uninterrupted / continuous power supply for the west cost.	Comment noted
Mr Peter Johnston University of Cape Town	▪ The life and sustainability of the plant as well as decommissioning	The power plant will have a design life of 60 years.
Mr Mike Kantey Watercourse cc	Issues to be addressed by Scoping Report: ▪ Inventory of Proven Uranium Reserves and Rate of Extraction for 30-Year Lifetime of All Fully Operational Plants.	Every 1000 MW of nuclear power capacity needs approximately 200 tonnes of natural uranium per annum. Thus, 4 000 MW of nuclear power operating for a 60 year period would require about 48 000 tonnes of natural uranium. South Africa's Reasonable Assured Resources (RAR) of uranium is estimated to be 521 000 tonnes, with a further 211 000 tonnes as inferred resources. [Reference: IAEA/NEA "Uranium 2005: Resources Production and Demand" – the "Red Book"]. Thus, South Africa has enough uranium resources to support a bigger than 20 000 MW nuclear programme for the envisaged 60 year lifetime of the modern nuclear power plants.
Mr Julius Koen Department of Tourism Environment and Conservation	▪ How will the electricity feed into national grid?	A separate EIA is being undertaken to investigate the integration of the proposed power station to the transmission network.
Mr Gerrie Mostert University of Pretoria	▪ Why not pebble bed technology?	It is Eskom's stance that ALL of the primary energy resources including solar, wind, wave, ocean current,

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		tidal energy, biomass, hydro, as well as gas, coal and nuclear need to be harnessed using the appropriate technology to provide the electricity that South Africa requires to support its economic growth and development. This EIA is for a proposed nuclear power station based on the Pressurized Water Reactor technology. The pebble bed modular reactor (PBMR) technology is being developed by the PBMR (PTY) Ltd company. Eskom has submitted applications for an environmental authorisation and for a nuclear installation licence for a PBMR demonstration power plant to be constructed on the Koeberg site. The EIA for the PBMR Demonstration Power Plant is in progress. Pending the successful operation of the Demonstration Plant, Eskom will purchase PBMR power stations, subject to normal commercial conditions and regulatory requirements (authorisations, licences, permits etc) being met.
Mrs Avril Nunn Kogelberg Branch of the Botanical Society	▪ Which radioactive elements are formed in the reaction? ▪ What is the half life of each of them?	There are many radioactive isotopes formed during the nuclear fission process. A textbook on nuclear fission, or a search on the internet (e.g. Google) for "fission products" would provide a list. It is not only the half life that is important, but also the amount of each radioactive element that is produced as well as the type and intensity of the radiation that is emitted by each radioactive element.
Mr M Phalane Earthlife Africa	▪ Type of nuclear power. ▪ Associated infrastructure.	For the proposed nuclear power station Eskom is considering the latest design of Pressurized Water Reactor (PWR) technology Infrastructure will include, inter alia ▪ Intake infrastructure (uses sea water for cooling), administration buildings, transmission yard, engineering building, turbine hall, which consists of a turbine and generator, mechanical workshops ▪ Main security fence.

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		▪ Restricted area, which require permits to access. ▪ The conservation area, which would be open to the public.
Dr Laurine Platzky Premier – Western Cape	▪ South Africa's nuclear energy policy?	The 1998 White Paper on Energy Policy for South Africa states (Section 7.2.4) "Whilst it is unlikely that additional nuclear capacity will be required for a number of years, it would not be prudent to exclude nuclear power as a supply option. Decisions on the role of nuclear power, as with any other supply option, need to be taken within the context of an integrated resource planning process." In August 2007 Government published for public comment a draft "Nuclear Energy Policy and Strategy for the Republic of South Africa". These documents are available for download from the Department of Minerals and Energy website www.dme.gov.za
Mr KK Ravishanker Umbilo Secondary School	▪ Technical future evaluation – mechanisms.	The nuclear safety and the risk of a nuclear accident at the proposed power station will be independently assessed by the National Nuclear Regulator. The NNR will only issue a nuclear installation licence for the proposed power station if it is satisfied that the risk of an accident is acceptable low. In addition the power station will undergo regular international peer reviews to ensure that it is been operated in accordance to international technical and safety requirements

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Ms Maya Aberman	The following constitute the comments of Earthlife Africa Cape Town to the Background Document for the Eskom Nuclear Power Station and Associated Infrastructure and the Comment Sheet 1: Scoping Phase. ▪ Nuclear power projects have a variety of negative systemic impacts, including: the need for inefficient large grid systems; the need for expensive state regulatory and disaster management institutions and infrastructure; blocking of innovation in the supply and demand sectors, as well as in the development of efficient small-scale plants.[1] ▪ Nuclear power projects require highly specialised international expertise and technology and thus always involve net job loss in energy provision.[2] ▪ Further, this background document would have the South African public believe that nuclear energy "produces virtually no greenhouse gases" and offers the potential to make a "significant contribution to reducing South Africa's greenhouse gas emissions." Carbon dioxide is produced by every step in the nuclear fuel cycle except the actual fission in the reactor. Fossil fuels are involved in the mining, milling and enrichment of the ore, in the fuel can preparation, in the construction of the station and in its decommissioning, in the handling of the spent waste and its re-processing and in digging the hole in the rock for its deposition.[3] Uranium enrichment or beneficiation, in particular, is incredibly energy intensive. If nuclear energy generation is to expand, demand for uranium will increase and lower and lower grades of this ore will be used. This will result in an increase in carbon emissions. In comparison to renewable energy, nuclear power releases	All comments are noted and will be addressed as part of the EIA. As a partial response to issues raised please note the following The public process for South Africa nuclear power generation policy is being undertaken as a separate exercise by the Government. This process will have a broader, country-wide focus. It is clearly stated in the Background Information Document that: "Nuclear power produces virtually no sulphur dioxide, particulates, nitrogen oxides, volatile organic compounds (VOCs) or greenhouse gases (GHGs). Over the full life cycle – from mining of the uranium, iron ore and other minerals, manufacture of the components and construction of the power station, operation and maintenance of the power station through to decommissioning of the station and the management and disposal of waste – nuclear power emits less than 11 grams of carbon equivalent per kilowatt-hour (gC /kWh) (ref: Greenhouse gas emissions from energy systems: Comparison and overview (Dones, et al., 2003)). This is the same order of magnitude as wind and solar power including

1 Pretenders & Providers: Why Nuclear Power doesn't make Climate Sense, R. Sherman & R. Worthington, 2001

2 Pretenders & Providers: Why Nuclear Power doesn't make Climate Sense, R. Sherman & R. Worthington, 2001

3 Nuclear Power not the answer to Climate Change, John Busby

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	3-4 times more CO2 per unit of energy produced taking account of the whole fuel cycle.[4] ▪ Even if nuclear energy were an emissions free energy source, nuclear energy still wouldn't offer any hope. This is because electricity is just one of the human activities that produce carbon emissions. Others include transport, agriculture and deforestation. The CO2 released worldwide through electricity production accounts for just 9% of total annual human greenhouse gas emissions.[5] ▪ Further, the background document fails to consider some of the realities which are emerging about the folly of investing such vast sums of money and time in an energy technology which is fuelled by uranium, a resource which is finite and fast approaching its peak. ▪ Current supplies of uranium ore are insufficient to fuel ***current demand*** for nuclear energy. The excess demand, of approximately 37%, is met by stockpiles accumulated before 1980. These stockpiles are derived in part from the conversion of old nuclear weapons. Within ten years these stockpiles will be exhausted. According to information presented in Parliament by Professor Eugene Cairncrosse of the Cape Peninsula University of technology, if ***current demand*** (assuming no significant increase in nuclear power capacity) is to be met, new production will have to be increased by about 50%. ▪ Eleven uranium-producing countries have exhausted their uranium reserves. Only Canada remains with uranium ore deposits that have uranium content of more than one per cent. The ore located in many other countries contains only 0.1 per cent uranium. More than two thirds of all ore deposits have less than 0.06 per cent of the nuclear fuel. The energy demand for uranium mining is almost directly inversely proportional to the ore grade. Thus the energy demand for mining ore of 0.05% grade is 23 times greater than for mining a 1% ore. At an ore grade of 0.01 – 0.02%	construction and component manufacturing, and two orders of magnitude below (i.e. one hundredth of) the average for coal, oil, and natural gas." In terms the energy balance of nuclear power (and related potential carbon emissions if the input energy comes from fossil fuel sources) studies (after ERDA 76/1, Appendix B, with current data where available - http://www.world-nuclear.org/info/inf11.html) show that with centrifuge enrichment the energy input to a nuclear reactor cycle is 1.7% of its output. Any CO2 attributed to the nuclear output would be a function of the source of the energy to drive the fuel cycle and far below that of a conventional fossil fuelled power station. Every 1000 MW of nuclear power capacity needs approximately 200 tonnes of natural uranium per annum. Thus, 4 000 MW of nuclear power operating for a 60 year period would require about 48 000 tonnes of natural uranium. South Africa's Reasonable Assured Resources (RAR) of uranium is estimated to be 521 000 tonnes, with a further 211 000 tonnes as inferred resources. [Reference: IAEA/NEA "Uranium 2005: Resources Production and Demand" – the "Red Book"]. Thus, South Africa has enough uranium resources to support a bigger than 20 000 MW nuclear programme for the envisaged 60 year lifetime of the modern nuclear power plants.

4 Special Briefing, Nuclear Power and Climate Change, Friends of the Earth International, November 2000

5 Nuclear energy as a solution for climate change?, WISE Nuclear Monitor, February 2005

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	as much energy is used to produce the uranium as would be produced by converting it to electrical power. ▪ As more and more marginal deposits or uranium ore are exploited, it is not simply the energy demand of mining that climbs, but also the energy demand for fuel fabrication, including uranium enrichment, which increases. This reality casts further aspersions on the false claim by the nuclear lobby that it offers us a climate change saviour. In fact carbon dioxide is produced by every step in the nuclear fuel cycle except the actual fission in the reactor. Fossil fuels are involved in the mining, milling and enrichment of the ore, in the fuel can preparation, in the construction of the station and in its decommissioning, in the handling of the spent waste and its re-processing and in digging the hole in the rock for its deposition. Uranium enrichment, in particular, is incredibly energy intensive. If nuclear energy generation is to expand, demand for uranium will increase and lower and lower grades of this ore will be used. This will result in an increase in carbon emissions.	
Ms Melissa Krige	There are other factors that will need to be addressed during the EIA - hopefully these are already on the researchers agenda: ▪ Has global warming and the predicted raised sea levels been taken into consideration in terms of the positioning of the reactors? How exactly will this as yet unquantifiable factor be accommodated into the building design, and most importantly, exactly how will the radio-active waste components be protected from potential tidal wave destruction given that disaster tends to strike without prior warning? What security measures are being planned for this eventuality? ▪ Taking into consideration that Danger Point is one of the most treacherous stretches of our coast line (as numerous ship wrecks are testimony to), what will the effects be of an oil spillage on the reactors? What occurs if oil gets into the reactors?	All comments are noted with thanks and will be included in the relevant specialist studies as part of the EIA

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Mrs Sara Stevenson	▪ Proven record of type of reactor to be erected.	This EIA is for a proposed nuclear power station based on the Pressurized Water Reactor (PWR) technology. The two designs that are under consideration evolved from previous designs (e.g, the Koeberg design). The majority of nuclear power stations operating in the world today are of the PWR design, and together have many years of safe operational experience.
Conservation International Sarah Frazee Steven Davids Siphokazi Mnyani Chandra Fick Philip Briel Nuchey van Neel Marjory Wildschutt Morne Farmer	▪ The sustainability of Long-term Nuclear technology is in question yet Eskom considers it, why? Please refer to attached document on comment. (**For ease of reference ACER has provided this document separately).**	Eskom is of the opinion that nuclear power is sustainable in the long term. There are adequate supplies of uranium to provide fuel for the proposed nuclear reactors. Every 1000 MW of nuclear power capacity needs approximately 200 tonnes of natural uranium per annum. Thus, 4 000 MW of nuclear power operating for a 60 year period would require about 48 000 tonnes of natural uranium. South Africa's Reasonable Assured Resources (RAR) of uranium is estimated to be 521 000 tonnes, with a further 211 000 tonnes as inferred resources. [Reference: IAEA/NEA "Uranium 2005: Resources Production and Demand" – the "Red Book"]. Thus, South Africa has enough uranium resources to support a bigger than 20 000 MW nuclear programme for the envisaged 60 year lifetime of the modern nuclear power plants.
Lianda Beyers Cronje Bantamsklip Anti-Nuclear Group (BANG)	▪ Which model reactor are we supposed to be getting? Apparently the tender process closed in December last year with the result that Eskom should be knowing by now.	This information is incorrect. Eskom has conducted pre-feasibility studies on different nuclear power plant technologies that are available in the world today. The result of these studies is that Eskom has decided to concentrate further investigations on advanced Pressurised Water Reactor (PWR) technology. Koeberg utilizes PWR technology and hence Eskom, the National Nuclear Regulator and local suppliers of services are familiar with this kind of technology. The formal negotiations with vendors of this technology, specifically Westinghouse in the USA and Areva in France, will commence later in 2007.

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Dr Hendrik de Waal Interested Party	Issues to be addressed by scoping process ▪ When considering aspects to be included in an impact assessment in preparation of the construction and commissioning of a nuclear reactor, there are two main dimensions to be considered. o The second (and to my mind the most relevant) are the aspects influencing the long-term acceptability of the nuclear industry in its broadest sense. o With aspects such as global warming (partly caused by the burning of fossil fuels), the fast rate of industrial development and the "race" after the dwindling natural resources (fossil fuels), seen in perspective with the "unpracticality" of most of the other alternatives, the "nuclear option" will be the solution essential for the future. o Ironically, there was a time when nuclear power was accepted and popular. Incidents and events whoever caused a change and a decline in its popularity, to such an extent that the industry felt it necessary to commission a series of studies in an effort to identify the causes for this growing negativity. (Chalmers, J. Pijawka, D. and others 1982. Socio-economic impact of nuclear generating stations. The same authors published another report a year later on the impacts of nuclear generating plants on local areas in the Economic Geography vol.59 (1): 66-80. These studies were done at a number of utility/sites. The most important conclusions were: 1) There were some communities that were definitely more negatively orientated towards the nuclear utilities in their areas than others. 2) These "negative" ones registered anxiety, fear and general negativity before construction started. o It is interesting to note that The "Three mile island" utility was included in the study and that a survey after the incident showed that 50% of the surrounding community wanted the utility to be restarted. o In planning the "PR" program before construction it is	Thank you for these comments. These issues, where applicable will be taken into account in the impact assessment phase of the EIA.

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	thus necessary to ensure that the "community" around a nuclear facility has accepted it and are fully identified with it, a detailed profile of attitudes, expectations, fears and perceptions regarding the construction and commission of such facility must be compiled before construction. The information obtained is to be used in the planning of a public relations program off interaction (and where necessary trade offs) between the utility and the community/s. o Structured interviews or detailed questionnaires should be conducted amongst a representative sample of communities.	
Mr and Mrs Michael/ Susanne Fuchs Klein Paradijs County House	▪ Where will the transmission lines and masts be placed? How will this affect our quality of life (noise, electromagnetic fields) and the appearance of the landscape?	Transmission lines are required between the proposed power station and the existing national transmission network to enable the electricity generated by the proposed power station to be fed into the national transmission network. Separate EIAs will be undertaken for the proposed transmission lines. The EIAs for the proposed transmission lines will be co-ordinated to align as close as possible to the EIA for the proposed nuclear power station.
Patricia Honey	▪ What type of Nuclear power plant is Eskom planning to put up at Thyspunt? Originally it was thought that it was a Pebble-Bed Reactor and now the word on the street is that it is a PWR. Could you also tell us what size these plants are.	For the proposed nuclear power station, Eskom has conducted pre-feasibility studies on different nuclear power plant technologies that are available in the world today. The result of these studies is that, Eskom has decided to concentrate further investigations on

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Mr Renaldo Nell DWAF	▪ The final choice for the type of nuclear power plant (e.g. pressurised water reactor versus pebble bed reactor)	advanced Pressurised Water Reactor (PWR) technology. Koeberg utilizes PWR technology and hence Eskom, the National Nuclear Regulator and local suppliers of services are familiar with this kind of technology. Note that the pebble bed modular reactor (PBMR) technology is being developed by the PBMR (PTY) Ltd company. Eskom has submitted applications for an environmental authorisation and for a nuclear installation licence for a PBMR demonstration power plant to be constructed on the Koeberg site. The EIA for the PBMR Demonstration Power Plant is in progress. If successful then Eskom will purchase PBMR power stations, subject to normal commercial and regulatory conditions being met.
Mrs Carmen Janet Perrott	▪ What is the span of life of the reactor? ▪ Who covers the cost of decommissioning? ▪ Have you checked what France is doing with their Generation IV Reactors? They produce 78% of electricity needs from nuclear and are one of the most energy secure nations in the Europe i.e. they don't rely on importing energy.	The lifespan of the proposed power station would be the order of 60 years, always subject to maintaining a high safety level and hence retaining its licence, and its financial viability. Eskom makes financial provision for the decommissioning of all its power stations. Since Koeberg began operating it has contributed on a monthly basis to the decommissioning provision This financial provision now stands in excess of R 2 billion. All new nuclear power stations will make such financial contributions. The financial provision is reflected in Eskom's Annual Financial Statements, and is independently audited. The provision will be used for decommissioning of the station as well as the management and final disposal of the spent fuel. The French are currently operating 58 PWR (Gen II) and are building a new reactor of the EPR type (Gen III). There are studies into Gen IV designs in France but

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		they will not be commercially available before ~2030. The French nuclear supplier, Areva, is one of the vendors with who Eskom will enter into negotiations later in 2007.
James (Jim) Michael Pattison	▪ The 'proven and tested' track record of the technology envisaged for the power station, and the cost risks.	This EIA is for a proposed nuclear power station based on the Pressurized Water Reactor (PWR) technology. The two designs that are under consideration evolved from previous designs (e.g, the Koeberg design). The majority of nuclear power stations operating in the world today are of the PWR design, and together have many years of safe operational experience.
Ingela Richardson	▪ According to research by Storm van Leeuwen, Phillip Smith and Helen Caldicott - CO2 emissions are far greater from nuclear reactors than even from coal stations. This worsens global warming and is of great concern to South Africans.	Thank you for these comments. A climatology specialist study will be undertaken as part of the Impact Assessment Phase (Section 10.6.5 of the Scoping Report) As stated in the Background Information Document: "Nuclear power produces virtually no sulphur dioxide, particulates, nitrogen oxides, volatile organic compounds (VOCs) or greenhouse gases (GHGs). Over the full life cycle – from mining of the uranium, iron ore and other minerals, manufacture of the components and construction of the power station, operation and maintenance of the power station through to decommissioning of the station and the management and disposal of waste – nuclear power emits less than 11 grams of carbon equivalent per kilowatt-hour (gC /kWh) (ref: Greenhouse gas emissions from energy systems: Comparison and overview (Dones, et al., 2003)). This is the same order of magnitude as wind and solar power including construction and component manufacturing, and two orders of magnitude below (i.e. one hundredth of) the average for coal, oil, and natural gas."

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		In terms the energy balance of nuclear power (and related potential carbon emissions if the input energy comes from fossil fuel sources) studies (after ERDA 76/1, Appendix B, with current data where available - http://www.world-nuclear.org/info/inf11.html) show that with centrifuge enrichment the energy input to a nuclear reactor cycle is 1.7% of its output. Any CO2 attributed to the nuclear output would be a function of the source of the energy to drive the fuel cycle and far below that of a conventional fossil fuelled power station.
Mr and Mrs Diana Catherine / Louis Richard Serrurier	▪ Alternative water for cooling systems.	The impact on water resources will be studied in the impact assessment phase of the EIA. Sea water will be used for cooling of the steam in the turbne condensers.
Mrs Shirly Ann Simpson	▪ Impact on water sources.	
Mrs Jacqueline Le Roux Cape St Francis Community Association.	▪ SA does not have enough knowledgeable people to manage such a power station.	Eskom expects to contract for this power station on the same basis as Koeberg (i.e. a "turnkey project"). Koeberg's schedule was similar to that proposed for the new nuclear power station. Similar to Koeberg, the contract will include provision for the training of South Africans. The provision of appropriate skills for all of Eskom's new power stations is being addressed through Eskom's recruitment and training and development processes.
Ms Annelise le Roux Succulent Karoo Information Centre	Lifespan of the power station and the transmission lines.	The lifespan of the proposed power station would be the order of 60 years, always subject to maintaining a high safety level and hence retaining its licence, and its financial viability. Transmission lines will always be required to take the electricity from the power station to the national transmission network, for as long as the power station is in operation.

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Mr Michael Duerr	This is my initial comment for the Eskom's Nuclear EIA process 12/12/20/944. Sorry for putting forward my comments at the last date, but I waited to no avail for the promised minutes of the meetings on the official Eskom/eia/nuclear1 site. It is worrying that promised facts and minutes are made not available for timely comments. This leads to possible later additions, depending on the delivered information from the EIA consultant and Eskom. Maybe you have to ask your lawyers to extend the comment period again until the relevant information is made public. Now to my initial points, comments and questions for the initial EIA process: All points in the following "ABC of the Nuclear Mirage in South Africa" have to be dealt with in the draft scoping report to the fullest extent to facilitate deeper discussion for the final scoping report and the following draft version of the EIR. ABC of the Nuclear Mirage in South Africa **A**lternatives of nuclear power, authorisation, accidents, Areva, Atomic Energy Commission **B**aseload of nuclear plant, BID document, business model, billions, breeder, BANG, BANG **C**osts of nuclear life, change lifestyle, conservation, construction, conversion, CO2, COEGA **D**emand of nuclear fuel, disposal, downblending, depleted uranium, decommissioning, dream **E**conomics of nuclear fission, exploration, enrichment, efficiency, EIA, EPR, EAR, Eskom **F**inancials of nuclear abyss, financing, fuel cycle, fuel fabrication, full-power years, France **G**rid of nuclear monoculture, green field, global what? Guideline for involving economists **H**igh-tech of nuclear systems? Hard (old) path of meeting energy demand, health risks **I**nput/Output analysis of nuclear life, infrastructure, IAP, impact, incurred debts, insurance	Thank you for your comments. These issues, where applicable, will be addressed in the impact assessment phase of the EIA.

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	JFK: "The great enemy of the truth is very often not the lie – deliberate, contrived, and dishonest – but the myth – persistent, persuasive, and unrealistic." **K**nowledge on nuclear leads people from apathy to activism, KANG, KANG, KANG **L**ife-cycle analysis of nuclear cycle, liability, lifetime, licensing, labour, local community **M**ining of nuclear basis, milling, mine operations, mining benefaction, more Hoggenheimer **N**o-Go of nuclear option, nuclear investment, NIMBY, net-energy production, NIRP, NEMA **O**re grade of nuclear getting leaner or who guarantees necessary fuel for the nuclear lifespan **P**roven nuclear technology, PBMR, PWR, peak demand, proliferation, Price-Anderson Act **Q**uack of nuclear scientists, quack of Eskom, quack of DPE, quack of DME, quack, quack **R**enewables of nuclear age, radioactivity, reprocessing, restoring, radon, releases, RAR, risks **S**ustainability of nuclear, supply, sequestering, stakeholder, soft path, scoping, skills, strategy **T**ailings of nuclear processing, tails, transmission lines, thorium, transport, taxpayer, trillion **U**-235: nuclear potential as temporary stop-gap until breeder take over, UF6, UO2, utopia **V**ery large uncertainties regarding the completion of a nuclear project like Nuclear 1, 2, 3 **W**aste of nuclear production, posing immeasurable risk to society, Westinghouse, water **X**-tremly long nuclear commitments of 100 to 150 years, x-tremly inconsistent information **Y**ellowcake (U3O8) by Presidency, Cabinet and Money Power, not by majority and society **Z**ealot of nuclear pipe-dreams - quote from David Lilienthal as first chairperson of AEC:	

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	"Why does the ordinary citizen need to know anything at all about nuclear? The answer is because atomic experts are no more infallible than any other experts – which is to subjected to the checks and balances of cross-examination and inquiry that are at the heart of the democratic process in an open society." Furthermore there has to be a detailed input/output analysis for the whole uranium cycle, from cradle to grave, containing all stages of mining, milling, enrichment, radiation, electricity generation to decommissioning and green field. Is there any capacity like John William Gofman available for the South African project team? Sadly we cannot recruit him from our side, but he was of impeccable reputation and Professor Emeritus of Molecular and Cell Biology in the University of California at Berkeley, and Lecturer at the Department of Medicine, University of California School of Medicine at San Francisco. He was the author of several books and more than a hundred scientific papers in peer-review journals in the fields of nuclear / physical chemistry, coronary heart disease, ultracentrifugal analysis of the serum lipoproteins, the relationship of human chromosomes to cancer, and the biological effects of radiation, with especial reference to causation of cancer and hereditary injury. While a graduate student at Berkeley, Gofman co-discovered protactinium-232, uranium-232, protactinium-233, and uranium-233, and proved the slow and fast neutron fissionability of uranium-233. Post-doctorally, he continued work related to the chemistry of plutonium and the atomic bomb development. At that early period, less than a quarter of a milligram of plutonium-239 existed, but a half-milligram was urgently needed for physical measurements in the Manhattan Project. At the request of J. Robert Oppenheimer, Gofman and Robert Connick irradiated a ton of uranyl nitrate by placing it around the Berkeley cyclotron (to capture neutrons), for a total exposure period of six weeks, with operation night and day. In 110 Gilman Hall, they scaled up Gofman's previous test-tube-sized sodium uranyl acetate process for the plutonium's chemical extraction. Dissolving 10-pound batches of the "hot" ton in big Pyrex jars, and working around the clock with the help of eight or ten others, they reduced the ton to a half cc of liquid containing 1.2 milligrams of plutonium (twice as much as expected).	

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	After the plutonium work, Gofman completed medical school. In 1947, he began his research on coronary heart disease and, by developing special flotation ultracentrifugal techniques, he and his colleagues demonstrated the existence of diverse low-density lipoproteins (LDL) and high-density lipoproteins (HDL). Their work on lipoprotein chemistry and health consequences included the first prospective studies demonstrating that high LDL levels represent a risk-factor for coronary heart disease and that low HDL levels represent a risk-factor for coronary heart disease. His principal book on the heart disease research is *Coronary Heart Disease* (1959, Charles C. Thomas, Publisher). In the early 1960s, the Atomic Energy Commission (AEC) asked him if he would establish a Biomedical Research Division at the Lawrence Livermore National Laboratory, for the purpose of evaluating the health effects of all types of nuclear activities. From 1963-1965, he served as the division's first director, concurrently with service as an Associate Director of the entire Laboratory, for Biomedicine. Later he stepped down from these administrative activities in order to have more time for his own laboratory research in cancer, chromosomes, and radiation, as well as his analytical work on the data from the Japanese atomic-bomb survivors and other irradiated human populations. In 1965, Dr. Ian MacKenzie published an elegant report entitled " Breast Cancer Following Multiple Fluoroscopies" (*British J. of Cancer* 19: 1-8) and in 1968, Wanebo and co-workers, stimulated by MacKenzie's work, reported on "Breast Cancer after Exposure to the Atomic Bombings of Hiroshima and Nagasaki " (*New England J. of Medicine* 279:667-671), but few were willing to concede that breast-cancer could be induced by low-LET radiation. Gofman and his colleague, Dr. Arthur Tamplin, quantified the breast-cancer risk (1970, *The Lancet* 1:297), looked at the other available evidence, and concluded overall that human exposure to ionizing radiation was much more serious than previously recognized (Gofman 1969; Gofman 1971). Because of this finding, Gofman and Tamplin spoke out publicly in favour of re-examining two programs which they had previously accepted. One was the AEC's "Project Plowshare," a program to use hundreds or thousands of nuclear explosions to liberate natural gas in the Rocky	

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	Mountains and to excavate harbours and canals. Experimental shots had already been done, for example, in Colorado and Nevada. The second program was the AEC's plan to license about 1,000 nuclear power plants as quickly as possible and to build a "plutonium economy" based on breeder reactors. In 1970, Gofman and Tamplin proposed a five-year moratorium on licensing of commercial nuclear power plants. For Gofman and Tamplin, the public health was the issue of prime importance. The Atomic Energy Commission was not pleased. In 1973, Gofman returned to full-time teaching at the University of California at Berkeley, until choosing an early and active "retirement" --- a retirement to full-time research on radiation health-effects. This research led to publication of four scientific books, and to the current work, *Preventing Breast Cancer.* The previous books are: 1. *Radiation And Human Health*, 908 pages (1981). 2. *X-Rays: Health Effects of Common Exams* (with Egan O'Connor), 439 pages (1985). 3. *Radiation-Induced Cancer >From Low-Dose Exposure: A Independent Analysis*, 480 pages (1990). 4. *Chernobyl Accident: Radiation Consequences for This and Future Generations*, 574 pages (1994). It is in the Russian language. An English-language edition will be published in the future. Who is the expert on low- and medium radiation concerns in South Africa? David Fleming with "Nuclear Power cannot be Major Energy Source" from April 2006 has to be consulted and distributed for as wide an information as possible too. Please attach the PDF-document: http://www.cane.org.za/documents/whynuclearcannotbeamajorenergysource.pdf to the DSR to make the information available to all I&APs. Lean (Duerr) Energy consists of: - energy conservation and efficiency - structural change to build local energy systems - renewable energy - within a framework to achieve deep reductions in energy demand.	

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	How does the EIA process deal with those positive changes to society? What is the overall climate impact of the nuclear industry, including its use of halogenated compounds with a global warming potential many times that of carbon dioxide? What are the alternative systems of nuclear fission, such as fast-breeders and thorium reactors? What is the stage of depletion of uranium and how long are reliable high-ore grade uranium resources available to power the existing nuclear network? Is there any other reliable source next to the ground-breaking work of Jan Willem Storm van Leeuwen and Philip Smith? Will this work be replicated for the South African needs? say they are very fallible indeed – and they need to be Who is the financial expert / team to analyse the feasibility of Nuclear1? When do you appoint economists to calculate the impacts on the economy as a whole and the interest rates in detail? At what stage is the financial case made public, to discuss waste of public money and reputational risk for the country as a whole? What are the scoping out criteria for the whole Nuclear1 process? Is this possible by the EIA mandate? As written before, the detailed discussion of the comments in the public hearings and the minutes thereof can only be addressed once the EIA consultant / Eskom made public the promised and so far held back information. More comments to follow from this side once you make minutes available. Hope this adds to the thought process and involves more specialists, to give all interested and affected parties a fair chance to contribute to the well-being of South Africa and its people.	

Table 1: Estimate on annual earnings (crew and factory based) paid out; industry turnover and factory processing turnover paid over from squid catches. Ms Karen Humby South African Squid Management Industrial Association (SASMIA)

	Total for all squid catches (P Alfred to Plettenberg Bay)				Total for catches extending from Oyster Bay to Jeffrey's Bay				
Year	Catches (tons)	Crew Earnings	Industry Turnover	Approx. Factory turnover	Catches (tones)	% of total catch	Crew Earnings*	Industry Turnover	Approx. Factory turnover
1999	6,943	R54 million	R153 million	R5, 387 000	2,544	36.65%	R20 million	R56 million	R1, 971 000
2000	5,564	R47 million	R145 million	R4, 387 000	1,613	28.99%	R14 million	R42 million	R1, 288 000
2001	3,247	R28 million	R91 million	R2, 800 000	924	28.46%	R8 million	R26 million	R 800 000
2002	7,406	R85 million	R319 million	R8, 395 000	2,327	31.42%	R27 million	R100 million	R2, 632 000
2003	8,681	R81 million	R252 million	R6, 146 000	2,752	31.70%	R 26 million	R80 million	R1, 951 000
2004	9,639	R85 million	R260 million	R7, 283 000	3,412	35.39%	R29 million	R92 million	R2, 577 000
2005	6,990	R58 million	R175 million	R5, 147 000	2,516	36.00%	R21 million	R63 million	R1, 843 000
*incorp. fishermen, officers, shore staff									