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Dear Madoda Sambatha and the National Union of Mineworkers

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

Comment 1:

1. Background

NUM appreciates this opportunity to comment on this important process to review the Revised Draft Environmental Impact Report for Eskom proposed Nuclear 1 power station and associated infrastructure. NUM organises and is representative union within the Cosatu federation in Construction, Mining and Energy sectors of our economy.

"One of the main tasks that will henceforth confront the trade unions is to protect in every way the class interests of the proletariat in its struggle against capital. This task should be openly put in the forefront, and the machinery of the trade unions must be recognised, changed or supplemented accordingly" Vladimir Lenin

In this spirit and since our formation in 1982, the National Union of Mineworkers has been on the forefront of the struggle waged by the working class against the oppression of man by man and to defend the dignity and rights of workers in the workplace. In this regard we not only fought against poor working conditions in the workplace and sectors that we organise but have vigorously raised concerns against poor working conditions and unnecessary exposure of our members and their communities to health risks caused by the industries they're employed.

Our role in Energy Policy development

As a progressive union, we view our role in the energy policy context as that of ensuring that social contracts must not be at the expense of the working class – the ultimate price is paid by workers and their communities such as declining real wages, environmental impacts and degradation, and unemployment crisis.

Our engagement of the Report will also be guided by section 24 of Act 108 of 1996 – the Constitution of the Republic of South Africa which assures the citizenry of the Republic to a right: (a) to an environment that is not harmful to their health or wellbeing; and (b) to have the environment protected

for the benefit of the present and future generation through reasonable legislative and other measures that:

(i) prevent pollution and ecological degradation;
(ii) promote conservation; and
(iii) secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development

Response 1:

Your comment is noted.

Comment 2:

2. Introduction

South Africa relies on coal for its energy needs. More than 90% of electricity is generated through coal and this makes us one of the highest greenhouse gasses emitters in the world – number 12th in the world.

In its 52nd congress the African National Congress asserted that "there is now a general agreement that the world is rapidly moving towards the point where rising temperatures will result in dramatic and irreversible climate related impacts that will have dramatic effects on human society and on our natural environment. The polar ice caps are melting; changes are taking place in sea currents and sea levels. The hottest temperatures in recorded history have measured in the last decade, as have the most intensive storms, the most destructive floods and the longest lasting droughts". Furthermore, the ANC stated that "poor communities will bore the brunt of the costs resulting from climate change and direct inverse to their contribution to the phenomenon of global warming. Scientific research predicts that in all of this the African continent is likely to be the most affected parts of the world (ANC 52nd National Conference 2007)[1]".

We are witnesses to the impact and destruction that was caused by an Earthquake in New Zealand southern city – Christchurch. According to the CNN (online) of February 23, 2011 the death toll had risen to 147 in the southern part of the country – Christchurch city. At the time more than 300 people were reported missing which fuelled fears that the death toll could rise. This 7.1 magnitude tremor left a trail of destruction and dead bodies throughout the city.

We also saw the destruction that was caused by the floods in Australia. Brisbane recorded 2010 as the rainiest year in 150 years. Mining operations had to shut down – coking coal exports and many other minerals had to halt responding to transportation delays. Australia exports two thirds of its coking coal. All mines in Queensland district had to close down due to the flooding.

Here at home in January we experienced unprecedented flash floods across the country. The floods were reported to have killed 120 people, left about 20 000 people without shelter and areas in eight provinces were declared as disaster areas. The estimates were at $211 flood damage. South Africa is still plagued by disease such as HIV/AIDS, mass unemployment, poverty etc – we cannot afford the damages of unpredictable weather patterns, the onus is on the State to ensure an adequate legislation that will deter the worst effects of climate change.

All these disasters have left a trail of costly destruction which meant loss of life for some, loss of production to farmers and business owners and loss of income to workers – all of this we cannot afford. However, it is in the best interest of the working class communities not to opt for energy generation technologies that will be safe for generations to come. The radioactive which remain a

[1] ANC 52nd National Conference – Polokwane, Limpopo Province, 2007.

hazard to human life and the environment for thousands of years, the dodgy costs and financing of nuclear energy and the safety hazards which are inherent with nuclear energy are not convincing for the uptake of a large nuclear plant.

Can nuclear energy creates (sic) the necessary and much needed decent jobs for the growing number of unemployed workers? This industry is yet to convince workers that it has potential to create jobs for the South African labour market which is shedding jobs in the economy.

Response 2:

As indicated in the Revised Draft EIR, the construction phase of the proposed Nuclear-1 power station will create approximately 7,500 temporary employment opportunities and the operational phase will create approximately 1,400 permanent employment opportunities.

Koeberg power station has been operating for over three decades. The power station has continued to provide not only the permanent positions and contributed to the local economy in many ways it also provides at least 1000 temporary positions during major outages.

Comment 3:

3. Description of the project

3.1Timeframes for construction and power station life cycle

Reputable sources inform us that it is in the nature of the nuclear industry to experience construction delays. February 2011 would have been an end of a 36-year construction programme of the Bushehr nuclear reactor in Iran had the reactor builders' not experienced new technical problems during commissioning. The recent delays to this program are reported to be problems with one of the coolant pumps which have rendered the commissioning of this plant uncertain. This project began in 1974 with the Shah ordering a fleet to be built by a German electronic company, Siemens. A number of factors contributed to the failure to complete this programme including the Islamic revolution in Iran, the Iran-Iraq war – with the Iraqi aircraft striking the plants a number of times including 1985, 1986, two times in 1987 and finally in 1988.

Turkey has also attempted to build nuclear power plants since the early 1970s. Only in May 2010 did the Turkish government signed (sic) an intergovernmental agreement for Rosatom, a Russian company, to build, own, and operate the Akkuyu plant with 1200 MW AES-2006 units – a US$20 billion project. The reactors are expected to be operational in yearly intervals in the period of 2018 – 21.

In Finland, the Olkiluoto nuclear plant is another example of costs overruns and delays. After 4 years of construction, this nuclear project experienced thousands of defects and deficiencies. Originally, the project was budgeted for about US $4 billion and due to delays, has ran budget overruns of more than 50% the original price by 2009 and this continues to sky-rocket unabated as further delays due to various reasons including safety concerns continues to affect the project [2]. The construction of the plant started in May 2005 and the commercial operation envisaged in 2009 – this was not realised. It is now envisaged that the plant will be able to produce electricity in 2013, which means the project is effectively 4 years behind schedule and this has an impact on the budget.

[2] New York Times online, May 2009 – James Kanter

The French, with extensive experience in nuclear energy construction – 80% electricity generated from nuclear energy, has experienced similar problems to Finland. Their Flamnville nuclear project has experienced budget overruns and construction delays. In 20th July 2011, Reuters reported that EDF has delayed the completion of its first French next-generation EPR nuclear reactor by another two years to 2016, saying it expects the project's costs to rise to 6 billion euros ($8.52 billion). The same thing happened in July 2010, the state-controlled utility delayed the commercial start of the 1,600 megawatt nuclear reactor by two years to 2014. At the time, it had also raised its cost estimate for the project in northern France from 4 to 5 billion euros.

All these indication points out to the fact that nuclear energy is inherently dodgy when it comes to financing and predicting the completion period. South Africa has urgent energy needs – a crisis of energy reserves deficit. The country is in a energy crisis and cannot afford tempering with expensive energy generation technologies which would be of no help if they remain deep, dark holes where the country would throw in its limited resources and precious time.

It is reported that currently there's 14 countries building nuclear power plants, and most of these projects are experiencing costly and substantial delays. As of April 1, the International Atomic Energy Agency (IAEA) listed 64 reactors which are currently under construction – this makes-up a capacity of about 62.5GW. A staggering twelve of these reactors have been listed as under construction for the past 20 years including the Iranian Bushehr plant, three Russian units, two Belen units in Bulgaria, two Mochovce units in Slovakia, the Atucha-2 react in Argentina started 30 years ago including two Taiwanese units which have been under construction for the past 10 years; Thirty five projects do not have an official (IAEA) planned start-up date, including six of the 11 Russian projects, the 24 of the 27 Chinese units under construction and the two Bulgarian reactors; and Many of the units listed by the IAEA as under construction have experienced delays, most of them significant. The remaining units were started within the last five years and have not reached projected start-up dates yet and this makes it difficult to assess whether they are running on schedule[3].

Response 3:

There have indeed been programme and budget overruns on a number of nuclear power station construction projects. The Iranian example is extreme as this country is subject to international sanctions due to its nuclear armaments programme. The Iranian example therefore cannot be compared on par to nuclear power station construction projects in countries where there is a free flow of goods and services.

Delays on other nuclear projects have been primarily based on quality and regulatory issues. As Nuclear-1 is not at the beginning of the nuclear renaissance, key lessons from international examples are being integrated into the planning for Nuclear-1. This should therefore minimise any perceived delays into the future. As an example, delays on the EPR project are currently reducing as Areva is getting into the build exercise at an increased pace (Olkiluoto experienced more delays, Flammanville less and Taishan is on schedule) from a period of not building. As most credible nuclear vendors are constructing elsewhere to date, Nuclear-1 will benefit from their experience. Eskom has been responsible for building two of world's largest coal fired power stations, there have been delays with this construction and initial cost estimates were not as accurate as desired. However, it was more than 20 years after the previous coal fired power stations were built. Eskom has gained much experience from these two projects and will use these to ensure that the nuclear projects is a success.

[3] M Schneider, A frogatt, S Thomas – 2011 – World Nuclear Industry Status Report 2010 - 2011

Comment 4:

3.1 Human Resources

Nuclear 1 and associated infrastructure will comprise of up to a 4000 MW nuclear reactor and will employ in all and based on the Revised Draft Environmental Impact Assessment Report (revised DEIR), 5000 vendor construction, 2200 vendor staff, 140 Eskom project staff and 40 Eskom consultants, including to this will be 1385 Eskom operations staff which will be compromised of people with various engineering, technical and scientific skills. However, it is not clear as to first, whether these jobs will be permanent and how many, if any, of these jobs will be blue collar jobs and how permanent are these jobs.

South Africa has more than 25% unemployment rate – this is a crisis, as 70% of this is youth. In our view, the Revised DEIR fails to deal with employment -- the provision of decent jobs forms a critical element of our energy generation technology choice.

Response 4:

As indicated in Response 3 approximately 7,500 temporary jobs will be created in the construction phase and approximately 1,400 permanent jobs will be created during the operational phase. The majority of the job opportunities during the operational phase will be skilled jobs, but the majority of the jobs during the construction phase will be for unskilled and semi-skilled workers.

Professional people that will be employed during operations will cover all disciplines necessary at a power station viz. physicists, chemists, accountants, engineers, human resources practitioners, environmentalists, thus mostly people at university and technikon graduate level. Previous recruitment experience shows that these people are available in South Africa.

In addition to graduates a large percentage of staff are artisans at various trade levels viz. fitters, electricians, mechanics, welders etc. as well as semi-skilled trades like scaffolders, laggers, riggers and others.

Comment 5:

4. Need and Desirability

4.1 Balancing Electricity Supply and Demand

The problems which have led to Eskom being unable to meet the country energy demand is that the state-owned company failed to plan or convince the government of the day to provide legislative and policy measures which would assist them in planning to build more capacity. Historically, South Africa has had excess energy reserves to an extent that Eskom failed to realise that power station have a lifespan. The rash to increase electricity tarrifs (sic), the rolling black-outs and power shedding is hurting the poor more that depends on electricity to run their small business and for daily living purposes.

Nuclear energy cannot, therefore, be an easy-way out of the energy crisis. There are far too many challenges with nuclear energy than opportunities. Other possibilities such as renewable energy must be explored.

Response 5:

Nuclear energy is one of several technologies which will contribute to meeting the electricity demand in South Africa not the only one. The fact that Eskom intends to develop a nuclear power station does not imply that it opposes renewable technologies. However, the conclusion of the IRP process is that 9,600 MW of nuclear generation must, in parallel to renewable technologies, form a part of the mix generation technologies. The EIA process, which is a project-specific environmental management tool, does not have any mandate to revisit the strategic analysis of power generation alternatives that was completed in the IRP.

The environmental application for Nuclear-1 is for a single nuclear power station, as has been the case with other power stations such as the gas-fired power stations that have been constructed at Mossel Bay and Atlantis and the Medupi and Kusile coal fired power stations currently under construction. In all these previous instances, the scope of the EIA was restricted to a specific technology within a defined geographical area. It cannot reasonably be expected that each application for a power station must revisit strategic government decisions that have been taken on the mix of generation technologies that are necessary to meet South Africa's electricity needs. This is especially the case in the instance of the Nuclear-1 application, where the government has, through a consultative process (the Integrated Resource Plan – IRP) taken a decision on the mix of generation technologies required to supply South Africa's future electricity needs for the next two decades. This mix of technologies includes a balance of a number of different technologies, including a substantial portion of renewable technologies.

Comment 6:

5. Project Alternatives

This Revised DEIR does not consider clean coal technology as an appropriate source of base-load energy required to meet the increasing electricity demand. This exclusion is not explained and can only be viewed in the light of vested interest and the large amounts of resources required by the sector. There are other energy generation technologies including solar, bioenergy, geothermal and energy efficiency, which together in our view would make-up a reliable source of base-load energy required to meet the energy demand.

Despite the technical potential of renewable energy and clean-coal technology, the report fails to deal with costs of each eligible alternative technology compared to nuclear energy. However, the World Nuclear Industry Status Report asserts that atrophied skills, overstretched supply chains, sheer complexity keep nuclear capital costs soaring. Furthermore in relation to costs, the report states that renewable electricity rule the market place, providing half of the world's new generation capacity in 2008-09. The cost of nuclear energy and risks associated dissuades investors. The report states that innovation and mass production, not giant units, are making nuclear power's renewable competitors inexorably cheaper – wind turbines by one fifth since 2007, they now beat nuclear power by two to threefold; solar by half. In 2009, a standard crystallised-silicon photovoltaic (PV) module costs $4.20 per peak watt, today it is $1.70; its forward pricing is $1.35 for the end of 2011 and $1.00 for mid-2012.

In terms of investments, in 2010 all renewables excluding large hydro received $151 billion of global private investments and surpassed nuclear power's total global installed capacity. In the same year nuclear got none. The report further project that, within few years, renewable energy will exceed nuclear power total global electricity output and soon will outproduce and outcompete all 64 reactors which are listed to be under construction by the IAEA.

The investor confidence in renewable energy indicates that renewable energy is a reliable source of energy and indeed base-load energy. The exclusion of renewable energy as alternatives and the selection of wind as an unreliable source of power is rejected by NUM and we have reason to think this can only be that the nuclear industry is yet to wake-up and realise that renewables makes-up a source of energy that the nuclear fails to recognise its contribution to climate change mitigation and environmental sustainability.

Response 6:

As indicated by Response 6, a project-specific EIA for a specific power station based on specific technology does not have a mandate to question strategic decisions on the mix of power generation technologies recommended in the IRP.

Your statement that the Revised Draft EIR does not deal with the comparative costs of generation technologies is not factually correct. Chapter 5 of the revised Draft EIR refers to two studies that compare a wide number of electricity generation technologies, including coal-fired, nuclear, wind and gas. Figures 5.5 and 5.6 in the Revised Draft EIR, which were obtained from the study by the International Energy Agency (IEA) and the OECD Nuclear Energy Agency (NEA), provide levelised cost of electricity (LCOE) for nuclear, coal, gas and onshore wind power generation. The Electric Power Research Institute (EPRI) report referred to in the Revised Draft EIR provides data on renewable resource technologies (e.g. wind, solar thermal, solar photovoltaic and biomass), fossil fuel technologies and nuclear technologies.

Whilst direct comparison of costs may seem to indicate that renewable technologies are far cheaper than nuclear, it must be remembered that many renewable technologies (especially solar and wind) have a far lower capacity factor (percentage of time that full capacity can be supplied) than nuclear, which is regarded as baseload power supply. For instance, in the EPRI report (2010) quoted above, wind turbines at an unspecified coastal location are regarded to have a capacity factor of 29.1 to 40.6 %, whilst that of nuclear generation is around 80%.

There is no doubt that renewable technologies will represent larger and larger proportions of total generation capacity. However, this does not negate the need for baseload generation such as can be supplied by nuclear generation.

Comment 7:

6. Conclusions

"*…the renewable revolution already happened—yet the nuclear industry still doesn't even acknowledge renewables as a realistic competitor, claiming that wind and solar power's variability disqualify these burgeoning sources as unreliable. Just the opposite is true: they actually improve security and reliability more than nuclear power ever could*[4]*."*

Analysing the trends in developing nuclear energy throughout the world, you find-out that delays in construction, budget overruns and lack of investor appetite into the sector is inherent to the industry. The uptake of nuclear energy remains artificial, while on the other hand renewable energy continues to receive public support. Of the 64 nuclear reactors which are currently under construction in the world, more than a third of that has been in this situation for the past twenty years, another significant number for the past ten years and the rest have no official start-up date. This informs us that Nuclear Renaissance is but a myth!

We reject Nuclear 1 and appeal to Eskom's logic to re-invest its resources in clean coal, renewable energy and energy efficiency.

[4] World Nuclear Industry Status Report 2010-2011

Response 7:

Nuclear specialist to respond to claimed extended construction time frames for nuclear power stations.

As indicated in Response 6, the development of nuclear energy generation does not imply opposition to the development of nuclear generation capacity. A variety of different forms of power generation technology are required in parallel to meet South Africa's electricity needs.

Eskom is indeed investing in renewable technologies, will build clean coal if required to do so by government. Electricity efficiency and demand-side measures are regarded as a key component of the Integrated Resource Plan's recommended way forward. However, the IRP's assessment is that demand side management can contribute a saving of 3,420 MW at most.

See response 3 for further information.

Yours faithfully
for Arcus GIBB (Pty) Ltd

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Nuclear-1 EIA Team