

## ESKOM HOLDINGS LIMITED

### ENVIRONMENTAL IMPACT ASSESSMENT (EIA) FOR A PROPOSED NUCLEAR POWER STATION AND ASSOCIATED INFRASTRUCTURE DEA REF. No.:12/12/20/944


**EIA Phase Public Meeting:  
Review of Draft Environmental Impact Report**

March / April 2010



## PROPOSED AGENDA


1. Sign attendance register, tea and coffee: 17:00 – 17:50
2. Welcome and introductions: 18:00 – 18:10
3. Presentation of EIA and EMP findings: 18:10 – 19:00
4. Discussion: 19h00 – 19:50
5. Way forward and closure: 19:50 – 20:00



## MEETING CONDUCT

- Please wait for the discussion session to ask questions
- Introduce yourselves prior to asking a question and indicate your specific interest
- You are welcome to ask the question in your mother tongue. Presentations will be in English
- One person at a time
- Work through the facilitator
- Show respect
- Focus on the issue not the person
- Be constructive
- Agree to disagree

**Please switch off all cell phones!**



## MEETING OBJECTIVES

- The focus of the meeting is to provide an opportunity for Interested and Affected Parties (I&APs) to comment on the findings of the EIA and the Draft Environmental Impact Assessment Report (EIR). The Draft EIR makes recommendations with regards to the authorisation and siting of Nuclear-1
- Provide an opportunity for I&APs to seek further clarity on the proposed project, the EIA phase and the Draft EIR
- Provide I&APs with an opportunity for interaction with the EIA team
- Recording of issues - the proceedings will be recorded and used to compile meeting minutes. Comments will be included in the Issues and Response Report (IRR) and changes will be made to the Final EIR, where necessary



## KEY ISSUES

- People are opposed to a nuclear power station at Bantamsklip
- Grave concerns about the impacts of nuclear power station on human health, in particular children and future generations
- Serious concerns about safety during operation – the Chernobyl failure and far reaching impacts were quoted by many
- Hazardous waste that will be generated and storage were raised as serious concerns for which there are not acceptable solutions yet



## KEY ISSUES

- People of the Overberg District share a deep-felt connection to the area and have a strong “sense of place.” Most put forward their plight for preservation and conservation of pristine coast line.
- Flora, fauna and ecosystems attract local and international tourists and a nuclear power station at Bantamsklip will have severe, irreversible and adverse impacts on ecosystems



## KEY ISSUES

- Marine life could be adversely affected by altered sea temperature and turbulence caused by in flow and output of sea water to the plant
- Commercial and recreational fishing will be negatively impacted
- Light pollution
- Hermanus will loose its economic income if tourism stops as a result of whales retiring from this coast line due to warmer ocean temperatures



## KEY ISSUES

- Nuclear power stations are expensive to build
- Generating nuclear power is a threat to people’s security, because if anything should go wrong, the consequences are catastrophic
- Some people expressed a lack of trust in the trustworthiness of the EIA



## KEY ISSUES

- A nuclear power station will be unsightly and cause visual pollution
- Concerns about drop in property values
- Some support for nuclear power stations, but not in this area
- Many favour green ways to generate power, e.g., wind, solar and/or tidal power generation
- Concern that many 1<sup>st</sup> world countries seem to be moving away from nuclear power – why does Eskom pursue nuclear power generation



## PROPOSED ACTIVITY

- Eskom proposes the construction, operation and decommissioning of a conventional nuclear power station and associated infrastructure either in the Eastern or Western Cape
- A nuclear power station of the Pressurised Water Reactor (PWR) type technology e.g. Koeberg Power Station
- The transmission power lines are subject to separate environmental authorisation processes



## TRANSMISSION (TX) LINE EIAs

- Bantamsklip – Scoping phase has been extended to include Multi-stakeholder Workshops and additional public consultation. Revised Draft Scoping Report will be made available for public comment
- Thyspunt – Scoping Report accepted by Authorities and EIA phase has commenced
- Duynefontein – Scoping Report accepted by Authorities and EIA phase has commenced



## PROJECT BACKGROUND

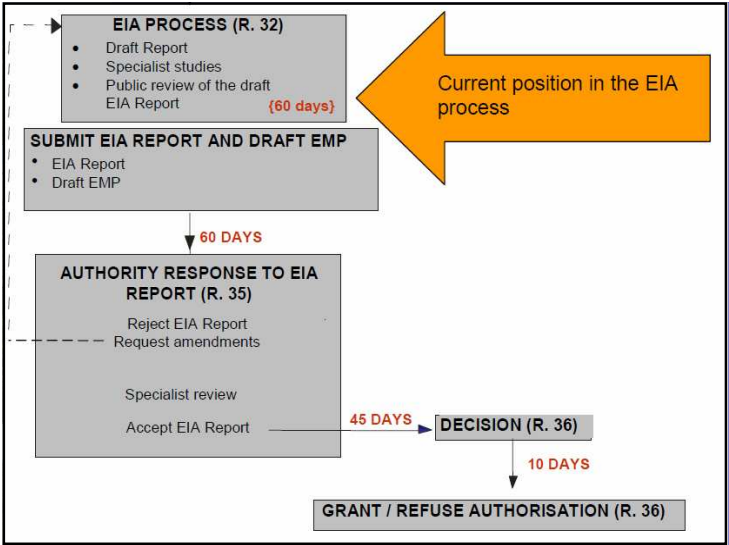
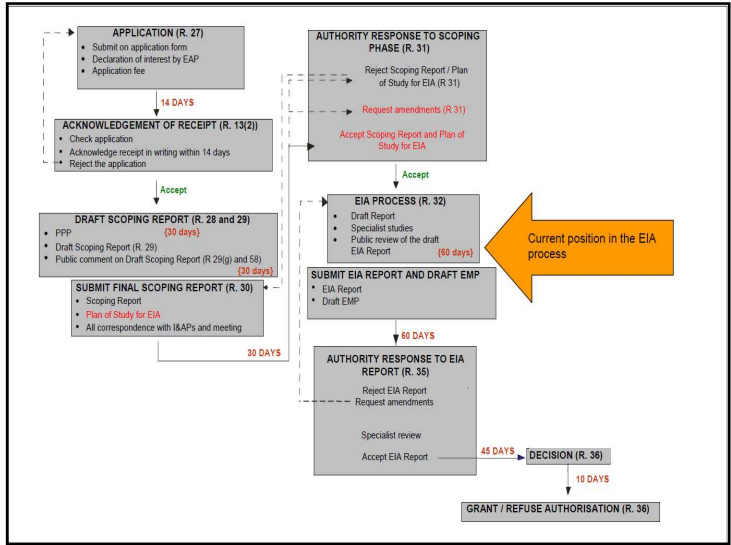
- The power station and directly associated infrastructure will require approximately 31 ha. The footprint assessed makes provision for the potential future expansion of a power station, to 10 000 MW or the maximum carrying capacity, should this be technically feasible
- The proposed nuclear power station will include nuclear reactor, turbine complex, spent fuel, nuclear fuel storage facilities, waste handling facilities, intake and outfall pipelines, desalination plant and auxiliary service infrastructure
- Should the proposed project be authorised, it is anticipated that construction of the station could commence in 2011 with the first unit being commissioned in 2018

## PROJECT MOTIVATION

- Increasing demand for electricity (> 4% growth per annum)
- Projected requirement for more than 40 000 MW of new electricity generating capacity over the next 20 years
- Need to consider aspects such as cost, lead time for construction, potential environmental impacts and operating characteristics relative to peaking and base load power generation
- In SA only coal and nuclear power are used for base load generation, while gas turbines, hydroelectric power stations and pumped storage schemes are used for peaking and emergency electricity generation

## ENVELOPE OF CRITERIA

- Detailed description of proposed nuclear plant is not available, as preferred supplier has not been selected
- Approach used has been to specify enveloping environmental and other relevant requirements, to which the power station design and placement on site must comply
- Enveloping criteria represent the most conservative parameters associated with the various plant alternatives within the available PWR technology





## SCOPING PHASE

EIA process comprises the Scoping and EIA phases

- **Approval of the Scoping Report**
  - Application was submitted to the Department of Environmental Affairs (DEA) in May 2007 and amended in July 2008 for a single nuclear power station of up to 4 000 MW
  - DEA approved the Scoping Report - November 2008
  - In mid 2009, after publication of the amended EIA Regulations, Eskom announced that it was considering amending its application to include more than one nuclear power station. Eskom subsequently decided not to pursue the amendment of the application



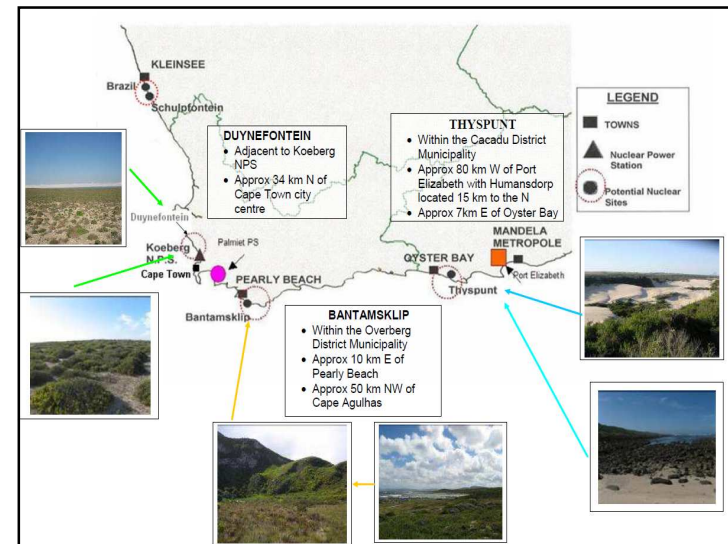
## SCOPING PHASE

- In line with Eskom's intention to investigate the potential development of up to 20 000 MW of nuclear power generating capacity an application for the second nuclear power station may be submitted soon after the submission of the Final EIR for Nuclear-1
- **Approval of the Plan of Study for EIA**
  - The Plan of Study (PoS) for EIA was made available for two rounds of public comment
  - DEA approved Final PoS for EIA - January 2010
  - The Scoping phase of the EIA process is complete



## SITE SELECTION


- Five alternative sites were assessed during the Scoping phase: Brazil, Schulpfontein, Duynfontein, Bantamsklip and Thyspunt
- Approval of the Scoping Report by the DEA included the recommendation that two of the alternative sites assessed (Brazil and Schulpfontein), be excluded from further consideration in the EIA
- Exclusion was based on the fact that the sites would not constitute reasonable and / or feasible site alternatives for Nuclear-1 based on limited local demand and the lack of existing electricity transmission corridors





## SPECIALIST STUDIES

- **Potential impacts (negative and positive) were assessed by various independent specialists**
- **The potential impacts assessed were based on:**
  - Issues identified by I&APs during the public participation process (PPP)
  - Issues identified by specialists through research
  - Experience of relevant specialists with projects of a similar nature or in a similar environment
  - Consultation with local specialists
  - Environmental resources and conditions identified by specialists during site surveys



## SPECIALIST STUDIES

- **Physical Impacts**
  - Geology and geological risk
  - Seismological risk
  - Geo-hydrology
  - Geotechnical characteristics
- **Biophysical Impacts**
  - Dune geomorphology
  - Flora
  - Fauna
  - Hydrology
  - Freshwater ecosystems
  - Oceanographic conditions
  - Marine biology
  - Air quality
  - Assessment of the 1:100 year floodline




## SPECIALIST STUDIES

- **Socio-economic Impacts**
  - Social
  - Economic
  - Noise
  - Visual
  - Heritage and cultural resources
  - Waste
  - Tourism



## SPECIALIST STUDIES

- **The impacts of high and medium significance after mitigation were considered important for decision-making**
- **The key factors for decision-making:**
  - Transmission integration factors
  - Seismic suitability
  - Impacts on dune geomorphology
  - Impacts on wetlands
  - Impacts on vertebrate fauna
  - Impacts on invertebrate fauna
  - Economic impacts




**SELECTED SPECIALIST STUDY RESULTS**

- **Seismological Risk**

Seismic studies indicate that the design basis for the respective sites in terms of peak ground acceleration values (PGA) are as follows:


- Duynefontein – PGA ~0.30 g
- Bantamsklip - PGA ~0.23 g
- Thyspunt - PGA ~0.16 g



**SELECTED SPECIALIST STUDY RESULTS**

- **Seismological Risk**


- Thyspunt demonstrates considerably lower risk with respect to any future variations arising from additional studies
- Depending on the outcomes of the process, possible subsequent deviations from a standard nuclear power station design, which is more likely to be the case for Bantamsklip and Duynefontein, will result in potentially significant cost and time delays to Nuclear-1 should it be authorised



**SELECTED SPECIALIST STUDY RESULTS**

- **Impacts on Dune Geomorphology**


- Groundwater does not 'daylight' at the Duynefontein or Bantamsklip sites. There are no potential impacts related to the interaction between groundwater and dune dynamics at these sites
- Access roads and transmission lines can be built across the mobile dunes at the Duynefontein and Bantamsklip, with potential negative operational impacts ranging from medium to low significance



**SELECTED SPECIALIST STUDY RESULTS**


- **Impacts on Dune Geomorphology**

- Access roads and transmission lines at Duynefontein can be built across the artificially vegetated and vegetated parabolic dunefields with low potential operational impacts after rehabilitation. In both cases, mobile dunes in the vicinity of infrastructure would need to be artificially stabilised
- The interaction between dune systems and wetlands is complex at Thyspunt, since groundwater 'daylights' in many inter-dune areas. The dune dynamics interacts with wetlands, groundwater and surface water. Disturbance of the Oyster Bay dunefield may cause significant secondary negative potential impacts on wetlands without mitigation




### SELECTED SPECIALIST STUDY RESULTS

- **Impacts on Dune Geomorphology**
  - As a result of the location of the proposed construction of transmission lines, haul roads and conveyor belts between the nuclear power station in the south and the HV yard in the north, the negative potential impacts on dune geomorphology at Thyspunt are more extensive than at the other two sites



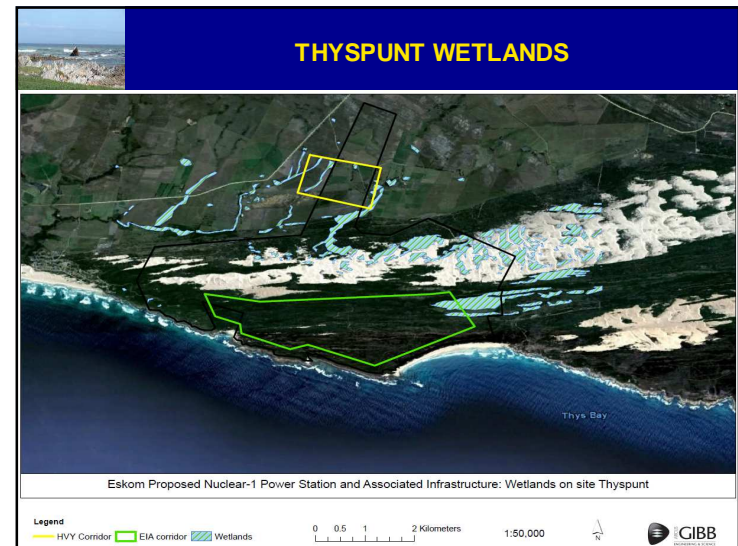
### SELECTED SPECIALIST STUDY RESULTS

- **Impact on Flora**
  - Bantamsklip will experience the least potential negative impact on plant communities and species, as the ecosystems on this site are fairly common along this section of coastline, provided that the power station is situated on the eastern half of the EIA corridor, away from the limestone fynbos
  - Thyspunt has by far the greatest diversity of vegetation communities, including extensive and highly sensitive wetlands




### SELECTED SPECIALIST STUDY RESULTS

- **Impacts on Wetlands**
  - The development of a nuclear power station at Duynfontein is unlikely to result in any unmitigable, highly significant negative impacts on wetlands
  - Development of the proposed nuclear power station at Bantamsklip would not be associated with any unmitigable impacts to wetland systems
  - The Thyspunt wetland systems are complex and potential negative impacts could occur without appropriate mitigation









**SELECTED SPECIALIST STUDY RESULTS**

- **Impacts on Terrestrial Vertebrates**
  - The amount of land that is not of high faunal sensitivity at Duynefontein is more than sufficient for the nuclear power station
  - At Bantamsklip the nuclear power station would have significant negative potential impacts, without mitigation, because of the impacts on faunal habitats within the footprint
  - At Thyspunt a nuclear power station would have significant potential negative impacts, without mitigation, because of the direct impacts on faunal habitats within the footprint, the development of two major new access roads, and the need for a development corridor across a large mobile dunefield




**SELECTED SPECIALIST STUDY RESULTS**

- **Impacts on Terrestrial Invertebrates**
  - The potential impacts of the nuclear power station on the terrestrial invertebrate communities are very similar for all alternative sites, but there are site-specific differences
  - None of the butterflies occurring in the Cape Flats Dune Fynbos area around Duynefontein are endangered or endemic
  - Non-vegetated and partially vegetated portions of the site are of very low and low sensitivity, respectively.
  - The new species of ant found at Duynefontein is regarded as a generalist and is likely to be found on other areas of the site



**SELECTED SPECIALIST STUDY RESULTS**

- **Impacts on Terrestrial Invertebrates**
  - Thyspunt has the highest butterfly diversity and conservation value of the alternative sites. Thyspunt is identified as higher sensitivity than Duynefontein, and only marginally lower than Bantamsklip
  - From the viewpoint of potential positive impacts of the nuclear power station, Duynefontein already positively benefits under the management of Eskom, which means that it would experience the least improvement in conservation status
  - Bantamsklip and Thyspunt would benefit substantially from formal protection status. The project would have a potential net positive impact on invertebrate communities at Bantamsklip or Thyspunt



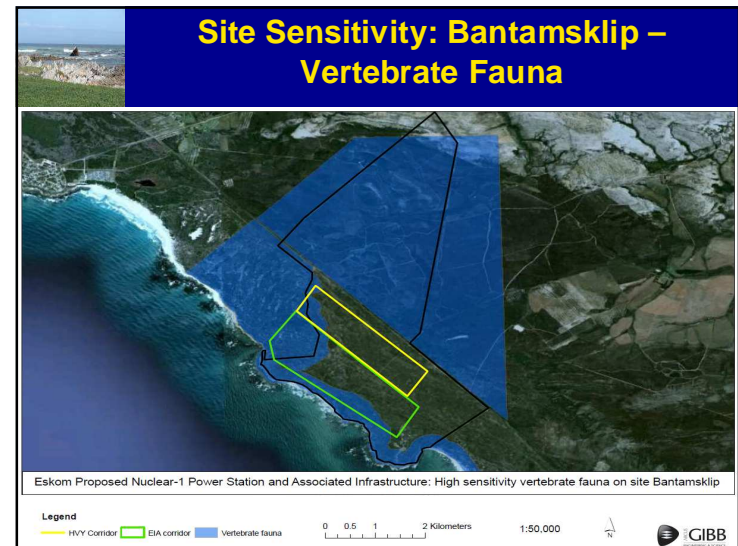
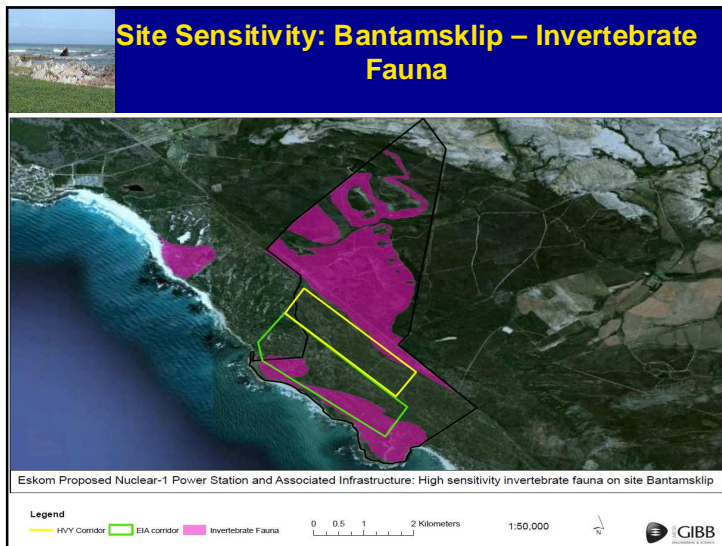
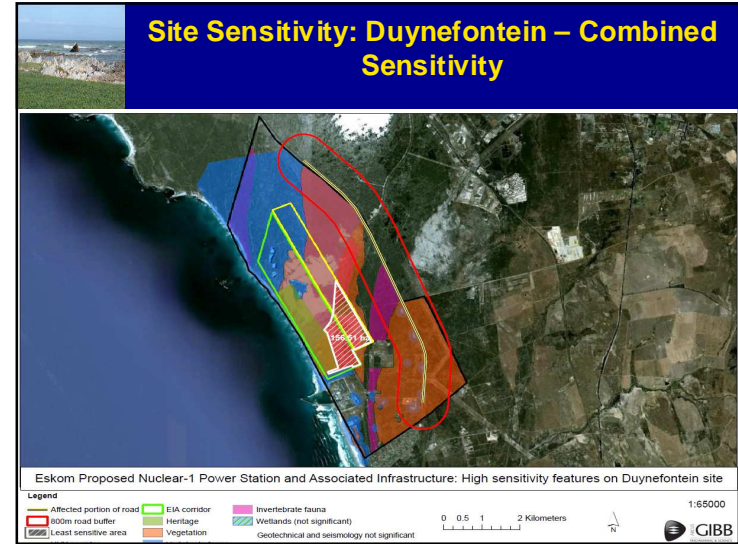
**SELECTED SPECIALIST STUDY RESULTS**

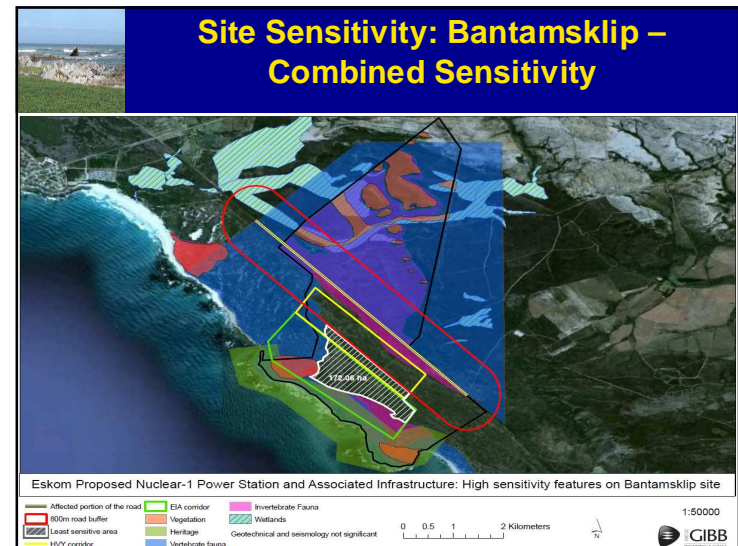
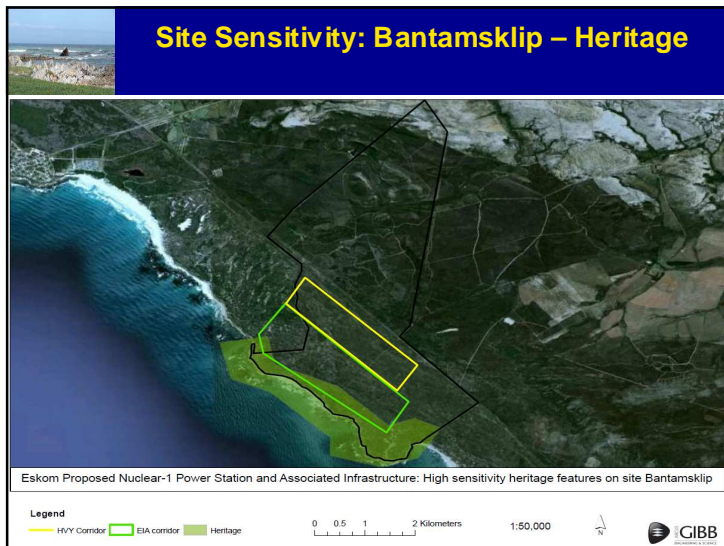
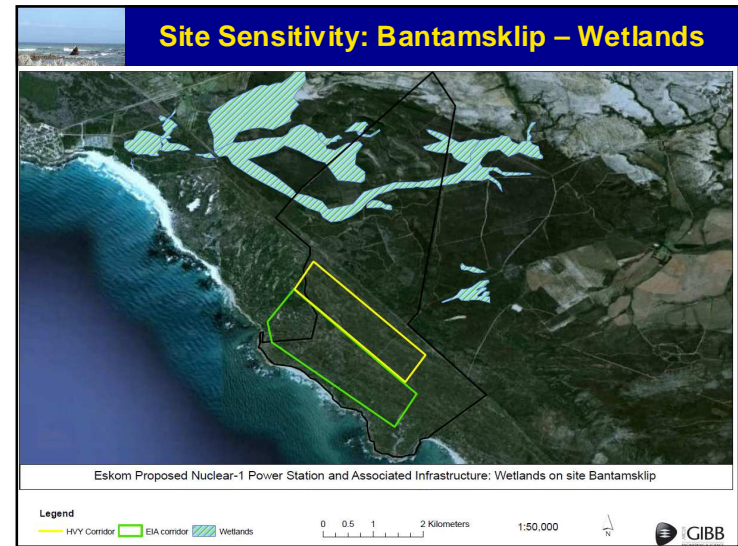
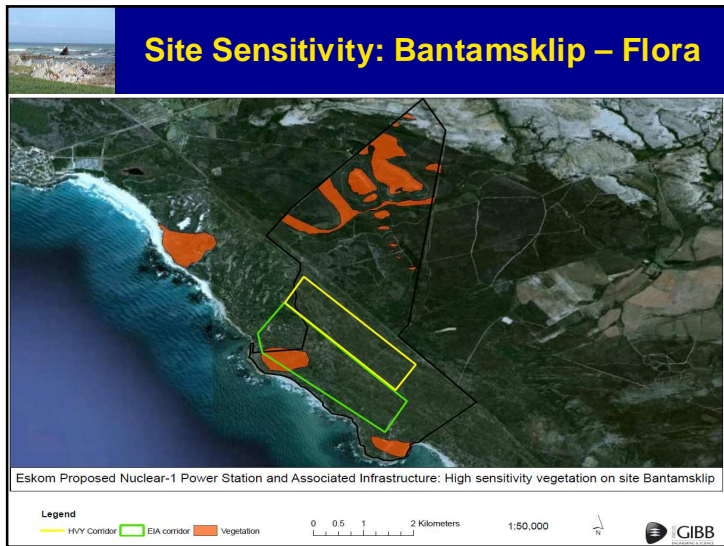
- **Economic Impacts**
  - The overall positive macro-economic impacts will be greatest at Bantamsklip and Duynefontein, and less at Thyspunt, as the sites are situated in a province with a larger, more diversified economy. Nuclear-1 would result in less dislocation of economic activities if located at Duynefontein than at either of the other two sites
  - Macroeconomic indicators favour Duynefontein and Bantamsklip
  - The cost-effectiveness analysis indicates that Thyspunt has a very slight edge over Duynefontein and a somewhat larger edge over Bantamsklip. The differences between the alternative sites are slight, and all the sites would have large positive economic impacts both on the local area and the province in which they are situated
  - The economic impact assessment gives greater weight to the cost-effectiveness analysis

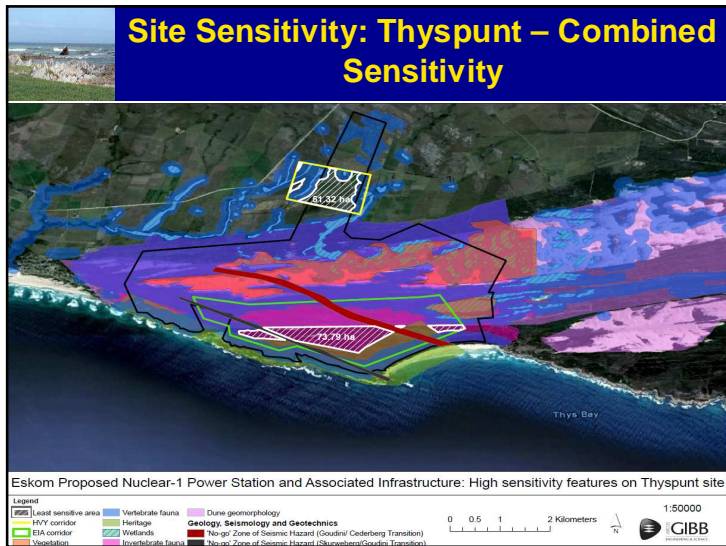


### SELECTED SPECIALIST STUDY RESULTS

- Heritage Impacts**
  - All alternative sites contain significant heritage resources. The amount of Late Stone Age heritage that will be potentially impacted at Duynefontein will be substantially less than that of Bantamsklip and Thyspunt
  - Duynefontein is palaeontologically highly sensitive. Bantamsklip is almost as sensitive as Thyspunt in terms of its heritage richness







## TRANSMISSION INTEGRATION

- Electricity generated needs to be transmitted from the high voltage yard at the power station through a complex network of high voltage transmission lines and then through a series of distribution lines of ever decreasing voltage, until it reaches the end user
- The ease with which electricity produced at the power station can be 'integrated' with the rest of the transmission system is dependent on a number of technical factors

## TRANSMISSION INTEGRATION

Eskom transmission system design philosophy is to connect new base load generation to the closest load, where possible

Transmission integration requirements are:

- System reliability and quality of supply
- Integration considerations
- Future potential for generation in each of the provinces

## PROJECT ALTERNATIVES

- Forms of power generation
- Nuclear plant types
- Layout of the nuclear plant
- Fresh water supply and utilisation of abstracted groundwater
- Management of brine
- Intake of sea water
- Outlet of water
- Management of spoil material
- Access to Thyspunt
- Waste
- The no-development alternative (i.e. 'No-Go')
- Location of the power station



## FORMS OF POWER GENERATION

- Nuclear generation and coal-fired power generation are the only proven base-load technologies
- Coal-fired generation is not viable in the coastal regions of the Western and Eastern Cape
- The life cycle contributions of nuclear electricity generation to greenhouse gas emissions is small compared to coal-fired electricity generation
- Renewable energy sources such as solar and wind energy do not provide the guaranteed base-load generation capacity that is required



## NUCLEAR PLANT TYPES

- Pressurised Water Reactors (PWRs) are internationally the most commonly used nuclear reactors
- The existing Koeberg nuclear power station uses PWR technology, making it a tested form of power generation that has been operating safely for the past 24 years
- Eskom is familiar with the technology from a health, safety and an operational perspective



## NUCLEAR PLANT LAYOUT

- Sensitivity maps of all specialist studies were integrated and composite maps were produced to indicate areas of high environmental suitability for each alternative site
- Finalisation of the site layout plans will require detailed investigations, in conjunction with the relevant qualified and experienced specialists



## FRESH WATER SUPPLY AND UTILISATION OF ABSTRACTED GROUNDWATER

- At all sites desalination provides a guaranteed source of fresh water supply for the lifespan of the proposed nuclear power station without jeopardising the availability of fresh water to other users
- A desalination plant is therefore the preferred alternative for the provision of fresh water at all sites



## MANAGEMENT OF BRINE

- The disposal of brine into the sea and the co-disposal of brine and cooling water into the sea is environmentally acceptable
- Disposal of brine directly into the sea should be utilised only during construction
- Brine should be mixed with cooling water that is discharged into the sea during the operational phase



## INTAKE OF SEA WATER

- The installation of intake and outlet tunnels that obtain water from the ocean and feed cooling water into a storage area located adjacent to the cooling water pump houses is the only feasible alternative for all sites



## OUTLET OF WATER

- Outlet structures for cooling water and chemical effluent must be offshore
- All releases need to occur at the distances prescribed by the relevant specialists
- Provided that the specific mitigation measures identified in the marine biology report are adhered to, offshore effluent release is the recommended alternative



## MANAGEMENT OF SPOIL MATERIAL

- Fine spoil must be disposed of in the marine environment at all sites
- Spoil material that cannot be pumped to sea, must be disposed of on land and used for activities like levelling of the HV yard and to minimise the footprint on the terrestrial environment
- Spoil dumps on land must be placed and shaped so that they fulfil a visual screening role and must be designed to minimise their visual impact
- Transport of spoil to the panhandle at Thyspunt via conveyor belt is not recommended due to the sensitive and unique Oyster Bay mobile dune system across which such transport would have to take place



## ACCESS TO THE THYSPUNT SITE

- The Eastern Access Route is required by Eskom for heavy loads and there is no alternative to this route
- The Western Access Route is favoured over the Northern Access Route, with respect to the potential impacts on agriculture, flora, wetlands, dune geomorphology and heritage resources
- The Northern Access Route is favoured only in terms of visual impacts
- Taking all potential impacts into account, the Western Access Road is the preferred access road for the Thyspunt site



## WASTE

- The only feasible alternative for the disposal of Low-Level and Intermediate-Level radioactive waste is disposal at the Vaalputs nuclear waste disposal site,
- Vaalputs is the only authorised facility for this form of waste in SA. Vaalputs has sufficient capacity for the waste that will be generated by Nuclear-1
- With regards to High-Level Waste (spent fuel), the only alternative currently available in SA is long-term storage of the spent fuel in the nuclear power station
- Vaalputs is being considered as a disposal site for High-Level Waste, but the required authorisation processes for this will take several years, so currently the disposal of spent fuel at this facility is not a feasible alternative



## NO-DEVELOPMENT ALTERNATIVE

- Given the urgent power demand in South Africa, the No-Go alternative is not considered to be an alternative, as Eskom's mandate is to provide power for the country
- Eskom would likely apply to develop more coal-fired power stations if the current application is declined as coal-fired generation is the only feasible base load alternative
- The life-cycle environmental impacts of coal-fired power generation are much greater than nuclear-fuelled power generation



## NO-DEVELOPMENT ALTERNATIVE

- The No-Go alternative would imply that potential benefits that emanate from the proposed project would not be realised
- If Eskom does not utilise Bantamsklip and Thyspunt for nuclear development, it is likely to sell the properties
- The sale of the properties will be to a willing buyer at the market-related price, which would result in an alternative form of land use that will in all probability be more damaging than a nuclear power station and may not involve managing the majority of the properties as nature reserves



## LOCATION OF THE POWER STATION

- Evaluation of alternatives was based on specialist assessments and the results of the specialist integration workshop
- Ranking of the sites was based on:
  - Results of the specialist studies: specialists indicated the significance of potential impacts, with mitigation, at each of the sites
  - An integration workshop, involving all specialists, where ranking of the sites was discussed
  - Cost
  - Transmission integration requirements



## IMPACT IDENTIFICATION AND ASSESSMENT

- The table that follows indicates the weighting assigned to the potential impacts of high and medium significance (after mitigation). These impacts should have the greatest influence on decision making
- Impacts that have the same significance at all the sites were filtered out, as they provide no basis for choice
- Both to reduce the number of decision factors to a manageable number and to ensure that responsible trade-offs can be made between impact categories that give contrasting recommendations regarding the preferred site, the categories of potential impacts were weighted in order to select a recommended site



## IMPACT IDENTIFICATION AND ASSESSMENT

Key decision-factors for selection of the preferred site alternative:

Specialist discipline	Weighted value
Transmission integration factors	4
Geo-hydrology	1
Seismic suitability	4
Impacts on flora	1
Impacts on dune geomorphology	3
Impacts on wetlands	3
Vertebrate fauna	2
Invertebrate fauna	3
Marine ecology	1
Heritage impact	1
Noise impacts	1
Tourism impact	1
Agricultural impact	1
Social impact	1
Economic impact	3



## IMPACT IDENTIFICATION AND ASSESSMENT

A number of factors indicate that Bantamsklip cannot be regarded as a preferred alternative when compared with the other two alternative sites:

- Substantially higher construction costs due to its remote location (requirements for upgrading of roads and bridges and lengthy transmission lines)
- Cumulative environmental impacts of the transmission corridors
- Potential impacts on invertebrate fauna

Bantamsklip is regarded as the least preferred site alternative





## IMPACT IDENTIFICATION AND ASSESSMENT

- The most important argument in favour of Thyspunt in terms of biophysical impacts is the conservation benefits realised through access control and active management of the site if a nuclear power station is constructed there
- This benefit would not be realised at Duynfontein, as the Koeberg Private Nature Reserve already includes Duynfontein
- Thyspunt has a considerably lower seismic risk profile and is favourably located in terms of Eskom's requirements for integration with the transmission system
- Thyspunt is therefore recommended for authorisation in terms of this application
- It is acknowledged that the Thyspunt site would experience environmental impacts of higher significance (particularly biophysical impacts) than Duynfontein. However, the conservation of the remainder of the site through access control and responsible long-term conservation management are significant positive impacts associated with this site



## KEY MITIGATION MEASURES

- The findings of the technical specialist studies undertaken provide an assessment of both the benefits and negative impacts anticipated as a result of the proposed project
- Although Thyspunt is recommended as the preferred site for authorisation, there remain a number of key negative impacts of potentially high significance at this site
- In order for the negative impacts to be mitigated, it is imperative that the recommendations for mitigation contain in the EIR, the specialist studies and the Environmental Management Plan (EMP) be implemented



## MITIGATION MEASURES FOR THYSPUNT

- Mitigation measures for botanical impacts, vertebrate and invertebrate fauna, wetlands and heritage resources are particularly important
- Mitigation of heritage impacts will require the work of a site-specific team dedicated to excavations over a period of several years prior to construction



## MITIGATION MEASURES FOR THYSPUNT

- Qualified and experienced botanical, wetland, vertebrate and invertebrate fauna, dune geomorphology and heritage specialists will need to find an acceptable final access route alignment
- Additional groundwater studies are necessary to better understand the interaction between groundwater and wetlands



## CONCLUSIONS AND RECOMMENDATIONS

An assessment of key criteria indicates that Thyspunt is preferred (with a score of 76 as opposed to Duynefontein's score of 57) due to:

- Lower seismic risk
- Benefits in terms of transmission integration
- Site's locality relative to the Port Elizabeth load centre
- Potential overall positive conservation benefits of the majority of the site, as well as additional land, being managed for conservation purposes



## WAY FORWARD

- Comment Period – 6 March to 10 May (66 days)
- Public meetings and key stakeholder workshops will be held around the sites assessed from 23 March to 21 May. Minutes of meetings will be sent to attendees
- Comments received will be addressed in the Issues and Response Report in the Final EIR
- Final EIR will be submitted to the DEA for consideration and decision-making
- Final decision regarding EIA will be communicated to registered I&APs
- Construction of Nuclear-1 is subject to other approvals e.g. the NNR site safety decision and transmission lines EIA authorisations



## WAY FORWARD

Written comments can be submitted by:

- Post: Public Participation Office, Nuclear 1 EIA, PO Box 503, Mtunzini, 3867, SA
- Fax: +27 (0) 35 340 2232
- Email: [nuclear1@acerafrica.co.za](mailto:nuclear1@acerafrica.co.za)



## THANK YOU