

## SITE SELECTION

Thermal power stations, whether coal-fired, gas, oil or nuclear, require large quantities of water for cooling purposes. However, South Africa is a water stressed country, which poses challenges for the supply of water. For example, Eskom's coal-fired power stations are located near to the coal fields, which are situated inland, in order to minimise the transportation of the coal.

Large nuclear power stations, such as the Koeberg type, which do not need to be close to the source of their fuel (uranium) are, therefore, ideally located at the coast to use sea water for cooling. Such stations do, however, require specific geological conditions for safety reasons and, similarly, licensing authorities require population and infrastructure management measures to be in place for effective emergency planning.

Accordingly, in the early 1980's, Eskom considered it prudent to commission extensive (desktop) and intensive (field) pre-feasibility studies in order to identify sites in South Africa that would be suitable for possible future nuclear power generation. Subsequently, the Eskom Nuclear Site Investigation project, lead by a team of independent consultants, investigated sites along the South African coastline. Based on various social, economic and environmental criteria, the following potential sites were identified:

- Thyspunt (Eastern Cape located west of Port Elizabeth near Cape St Francis)
- Bantamsklip (Western Cape located 10 km south-east of Pearly Beach)
- Duynfontein existing Koeberg Power Station (Western Cape located adjacent to the existing Koeberg Power Station, Cape Town)
- Brazil (Northern Cape located in Kleinsee/Port Nolloth area)
- Schulpfontein (Northern Cape located in Hondeklipbaai/Kleinsee area)

The potential generating carrying capacity varies for each site. Subsequently, the maximum generating capacity that is considered practical for each individual site will be evaluated as part of this Environmental Impact Assessment (EIA).

## TERREIN SELEKSIE

Termiese kragentrales, hetsy steenkool, gas, olie, of kern gedrewe, benodig groot hoeveelhede water vir verkoeling. Suid-Afrika is egter arm aan water en dit stel uitdagings vir water voorsiening aan byvoorbeeld Eskom se steenkool gedrewe kragentrales wat naby aan die steenkoolvelde geleë is om vervoerkoste te verminder.

Groot kernkragentrales, soos byvoorbeeld Koeberg, wat nie naby die bron van hul brandstof (uraan) hoef te wees nie, kan dus ideaal naby die kus geplaas word om sodoende seewater vir verkoeling te gebruik. Vir veiligheidsredes benodig sulke kragentrales spesifieke geologiese toestande. Soortgelyk, vereis die lisensieerings-owerhede dat bevolking- en infrastruktuur beheer maatreëls in plek moet wees vir effektiewe noodgeval beplanning.

Gevolgtrek het Eskom gedurende die vroeë 1980's dit belangrik geag om 'n omvattende en intensiewe pre-lewensvatbaarheidsstudies te doen, ten einde terreine in Suid-Afrika te identifiseer wat geskik is vir moontlike toekomstige kernkrag opwekking. Gevolgtrek, is die Eskom Kernkragondersoek projek van stapel gestuur en het onder leiding van 'n span onafhanklike konsultante, terreine langs die Suid-Afrikaanse kuslyn ondersoek. Gebaseer op verskeie sosiale-, ekonomiese- en omgewingskriteria is die volgende potensiele terreine geïdentifiseer:

- Thyspunt (Oos-Kaap, wes van Port Elizabeth naby Kaap St Francis)
- Bantamsklip (Wes-Kaap, 10 km suidwes van Pearly Beach)
- Duynfontein (Wes-Kaap, langs die bestaande Koeberg Kragentrale, Kaapstad)
- Brazil (Noord-Kaap in die Kleinsee/Port Nolloth area)
- Schulpfontein (Noord-Kaap in die Hondeklipbaai/Kleinsee area)

Die potensiele opwekkingskapasiteit verskil van terrein tot terrein. Gevolgtrek sal die maksimum opwekkingsvermoë wat as prakties vir die onderskeie terreine geag word, deel vorm van hierdie OIS.

## UKUKHETHWAKWESIZA

Isitishi samandla obushushu, nokuba ngamalahle atshiswayo, igesi, loyile okanye inyukliya, sidinga amanzi amaninzi athi asetyenziselwe ukupholisa. Kanti, uMzantsi Afrika lilizwe elingqingqwa kwicala lokusetyenziswa kwamanzi, nto leyo ithi ibe nemiceli-mngeni ekuhanjisiweni kwamanzi. Umzekelo, izitishi zamandla ombane ezitshisa amalahlwe zibekwe kufutshane neendawo zamalahle, nesisemhlabeni, ukuze kuncitshiswe ukuthuthwa kwawo.

Izitishi ezukhulu zenyukliya, ezifana nohlobo lweKoeberg, ekungadingeki ukuba zibe kufutshane nendawo ekuvela kuyo amafutha azo (iyureniyam) zibekwe elunxwemeni ukuze zisebenzise amanzi olwandle ukuzipholisa. Nangona kunjalo, ezo zitishi ziyazifuna iimeko ezizodwa zolwakheko lomhlaba ngezizathu zokhuselo, kwanamagunya afanayo okukhutshwa kweelayisenisi afuna kube kho imithetho yolawulo lwabemi nezakhiwo ukucwangcisa ixesha likaxakeka.

Ngokunjalo, ebutsheni boo-1980, uEskom uyibone ibubulumko ukuqhuba uphando lokunokwenzeka olubanzi (oluqhutywa ngokusebenzisa iincwadi neekhompyutha) nolunzulu (oluqhutywa kulo ndawo ubuqu) ukuze achonge iziza eMzantsi Afrika ezinokufanela imveliso yamandla enyukliya enokuba khona kwixa elizayo. Okulandelayo, iprojekthi yoPhando ngeSiza seNyukliya sikaEskom, ikhokhelwa liqela labacebisi abazimeleyo, iye yaphanda iziza ezikwunxweme loMzantsi Afrika. Ngezizathu ezahlukeneyo zeendlela ezisetyenziswayo zezentlalo, ezoqoqosho nezokusingqongileyo, kuye kwachongwa ezi ziza zilandelayo njengeziza ezinokufumaneka ze zisetyenziswe:

- I-Thyspunt (eMpuma Koloni, imi kwiNtshona yeBhayi ngaseCape St Francis)
- I-Bantamsklip (eNtshona Koloni, imi kwiikhilomitha ezili-10 kuMzantsi-mpuma wePearly Beach)
- I-Duynfontein (eNtshona Koloni imi ijongene neSithishi saMandla oMbane saseKoeberg, eKapa)
- I-Brazil (ekuMntla Koloni imi kummandla weKleinsee nePort Nolloth)
- I-Schulpfontein (ekuMntla Koloni imi kummandla weHondeklipbaai neKleinsee)

Umthamo wokuvelisa umbane onokuba khona uyohluka ngokwesiza ngasinye. Okulandelayo, awona mandla maninzi okuvelisa umbane abonwa njengawona anokuba khona kwisiza ngasinye aza kuvavanywa njengexalenye yoHlobo lweeMpembelelo zokusiNgqongileyo (iEIA ngamafutshane kwisiNgesi).

## PROJECT DESCRIPTION

Eskom proposes to construct a nuclear power station of the Pressurised Water Reactor type technology. In many ways the structure of the nuclear plant resembles that of a conventional thermal power plant. The difference between such plants is in the manner in which heat is produced. In a fossil plant, oil, gas or coal is fired in the boiler, which means that the chemical energy of the fuel is converted into heat. In a nuclear power plant, however, energy from the fission chain reaction is utilized. Cooling water for the nuclear power station will be utilised directly from the sea.

Although detail design still needs to be completed, it is estimated that the entire development will require of the order of 31 ha, including all auxiliary infrastructure. The proposed nuclear power station will include a nuclear reactor, turbine complex, spent fuel nuclear fuel storage facilities, waste handling facilities, intake and outfall basin, and various auxiliary service infrastructure.

Should the proposed project be authorised, it is estimated that the construction of the nuclear power station could commence in 2009/10 with the first unit being commissioned in 2016.

## NUCLEAR LICENSING PROCESS

In addition to the EIA process, which serves to identify, assess and mitigate potential environmental impacts that may be associated with the proposed nuclear power plant, authorisation from the National Nuclear Regulator (NNR) is required to provide for the protection of persons, property and the environment against nuclear damage, and to exercise regulatory control related to safety. The NNR establishes standards, based on international practice, limiting radiation exposure and risk to the public and workforce.

### National Nuclear Regulator (NNR) Legislation

In terms of Section 20 of the National Nuclear Regulator Act (NNRA), 1999 (Act No 47 of 1999), no person may site, construct, operate, decontaminate or decommission a nuclear installation, except under the authority of a nuclear installation licence. Section 21 of the Act makes provision for a person wishing to engage in any of these activities to apply to the Chief Executive Officer of the NNR for such a licence.

## PROJEK BESKRYWING

Drukvasse Water Reaktor tipe tegnologie gaan gebruik word vir die voorgename kernkrag sentrale wat deur Eskom opgerig gaan word. Die struktuur van hierdie kernkrag sentrale stem ooreen op vele maniere met dié van 'n konvensionele termiese krag sentrale. Die verskil tussen sulke aanlegte is die wyse waarop hitte gegenereer word. In 'n fossielbrandstof-aanleg word olie, gas of steenkool gebruik om die stoomketels te stook. Dit beteken dat die chemiese energie van die brandstof in hitte omgeskakel word. In 'n kern-aanleg daarenteen, word energie van die klowings-kettingreaksie gebruik. Verkoelingswater vir die kernkrag sentrale kan direk vanuit die see onttrek word.

Alhoewel 'n detail ontwerp nog gedoen moet word, word daar na raming ongeveer 31 ha vir die hele ontwikkeling asook verwante infrastruktuur benodig. Die voorgestelde kernkrag sentrale sal 'n kernreaktor, turbine kompleks, uitgeputte kernbrandstof bergingsfasiliteite, afval hanteringsfasiliteite; inlaat- en uitlaatkom en verskillende verwante infrastrukture insluit.

Daar word geraam dat die konstruksie van die voorgestelde kernkrag sentrale teen 2009/2010 kan begin met die ingebruikneming van die eerste eenheid teen 2016.

## KERNLISENSIEERINGS PROSES

Tesame met die OIS-proses wat potensiële omgewingsimpakte wat met die voorgestelde kernkrag sentrale gepaard gaan identifiseer, bestudeer en versag, word goedkeuring van die Nasionale Kern Regulering (NKR) benodig ten einde beskerming te verleen aan persone, eiendom en die omgewing teen kernskade. Die NKR vestig en stel standarde gebaseer op internasionale praktyke, wat blootstelling aan bestraling en risiko's vir die publiek en personeel verminder.

### Nasionale Kernreguleerder Wetgewing

In terme van Afdeling 20 van die Wet op die Nasionale Kern Regulering, Wet Nr. 47 van 1999, mag geen persoon 'n kern-installasie bou, bedryf, ontsmet of buite diens stel sonder die magtiging van 'n kern-installasie lisensie nie. Afdeling 21 van die Wet maak voorsiening vir 'n persoon wat sulke aktiwiteite wil onderneem om by die Hoof Uitvoerende Beampte van die NKR aansoek te doen vir 'n lisensie.

## INGCACISO YEPROJEKTHI

UEskom uceba ukwakha isitishi samandla enyukliya sobugcisa bohlobo lwe-Pressurised Water Reactor (isxhobo sokwenza amandla ngee-atom sisebenzisa amanzi). Ubume balo mzimveliso wenyukliya bufana ngeendlela ezininzi nobo bomzimveliso womsinga wamandla oshushu onyukayo noqhelekileyo. Umahluko phakathi kwale mizimveliso ukwindlela ekuveliswa ngayo ubushushu. Kumzimveliso ongasesebenziyo, ioyile, igesi okanye amalahle zitshiswa kwibhoyila, nto leyo ithetha ukuba amandla eekhemikhali zamafutha aguqulwa abe bubushushu. Kanti, kumzimveliso wamandla enyukliya, kusetyenziswa amandla enziwe ngokucandeka kwee-atom. Amanzi okupholisa kwisitishi samandla enyukliya aza kusetyenziswa evela ngqo elwandle.

Nangona uyilo olupheleleyo lusafuna ukuqunjelwa, kuqikeleleka ukuba uphuhliso lunonke luza kufuna malunga nama-31 eehektare, kuquka zonke izakhiwo ezixhasayo. Isitishi samandla enyukliya esicetywayo siza kubandakanya isixhobo sokwenza amandla ngee-atom, indawo enezakhiwo zenjini ejikeleziswa ngumsinga wamanzi, womphunga oshushu, izixhobo zokugcina amafutha asele esetyenzisiwe enyukliya, izixhobo zokujongana nenkunkuma, isikhongozelo sokwamkela nokukhupha, kwanezakhiwo ezixhasayo nezahlukeneyo.

Ukuba le projekthi icetywayo ithe yaphunyezwa, kuqikelelwa ukuba ulwakhiwo lwesitishi samandla enyukliya lungaqala ngo-2009 okanye u-2010, ngeli xa icandelo lokuqala liza kuyilwa ngo-2016.

## INKQUBO YOKUNIKEZELWA KWEELAYISENISI ZENYUKLIYA

Ukongeza kwinkqubo ye-EIA, nemsebenzi wayo ikukuchonga, ukuhlola nokudambisa iimpembelelo zokusingqongileyo ezinokuba kho, nezinokwayanyaniswa nomzimveliso wamandla enyukliya ocetywayo, ugunyaziso oluvela kuLawulo lweNyukliya lweSizwe (iNNR ngamafutshane kwisiNgesi) luyafuneka ukukhusela abantu, izakhiwo kunye nokusingqongileyo ekonakalisweni yinyukliya, kwanokuphumeza ulawulo olunxulumene nokhuselo. I-NNR ithi iseke imigangatho, esekelezwe kwimisebenzi kaZwelonke, ithi iseke imida ukunqanda ukungakhuseleki ekusasazweni kwemitha kwanobungozi kuluntu nabasebenzi.

### UWiso-Mthetho loLawulo lweNyukliya lweSiwe (iNNR ngamafutshane kwisiNgesi)

NgokweCandelo 20 loMthetho woLawulo lweNyukliya lweSizwe (iNNRA ngamafutshane kwisiNgesi), ka-1999, (uMthetho ongunombolo 47 ka-1999), akukho mntu unokumisela, akhe, asebenzise, asuse ukungcoliseka okanye ajike ugunyaziso lokufakelwa kwenyukliya, ngaphandle kwaphantsi kogunyaziso lwelayisenisi yokufakelwa kwenyukliya. ICandelo 21 lalo Mthetho liyababonelela abantu abanqwenela ukuzibandakanya nawo nawuphi na umsebenzi ukuba bafake izicelo kwiGosa eliyiNtloko yoLawulo leNNR ukuzuzisa loo layisenisi.

## The Licensing Process

The licensing process entails the evaluation of the design, construction, manufacture of component parts, operation and maintenance to ensure compliance with regulatory standards. The applicants for nuclear installation licences must carry out a comprehensive safety assessment and submit this to the NNR for evaluation. Should the safety assessment demonstrate that the installation will comply with the laid down standards, conditions are then set down in the licence which will ensure that the installation is properly constructed, commissioned, operated and eventually decommissioned. The NNR then conducts extensive compliance assurance activities including extensive inspections and review of operating data to ensure that the licensee complies with the conditions of the licence.

Similar to the EIA process, the NNR process makes allowance for public participation. The NNR public participation process makes allowance for the discussion of nuclear safety matters. These public participation processes will be conducted separately.

## ENVIRONMENTAL AUTHORISATION REQUIREMENTS

In terms of the National Environmental Management Act, Act No. 107 of 1998 (NEMA) and its EIA regulations published in April 2006, listed activities require environmental authorisation before they can proceed. For this proposed project, these proposed activities are:

- (1a) The construction of facilities or infrastructure, including associated structures or infrastructure, for the generation of electricity where the energy generation is greater than 20 Megawatts and the facility exceeds an area of one hectare;
- (1b) The construction of facilities or infrastructure, including associated structures or infrastructure, for nuclear reaction including the production, enrichment, processing, reprocessing storage or disposal of nuclear fuels, radioactive products and waste

## Lisensieeringsproses

Die lisensieeringsproses behels die evaluering van die ontwerp, konstruksie, vervaardiging van onderdele, bedryf en onderhoud, ten einde te verseker dat daar aan die regulasies voldoen word. Aansoeke vir kern-installasie lisensies moet gepaard gaan met 'n omvattende veiligheidsstudie en moet vir evaluering aan die NKR voorgelê word. Indien die veiligheidsstudie toon dat die installasie aan die vasgestelde standarde voldoen, word voorwaardes in die lisensie gestel wat sal verseker dat die installasie deeglik gebou, in gebruik geneem, bedryf en uiteindelik buite diens gestel sal word. Die NKR pas omvattende beheermaatreëls toe om te verseker dat daar aan die standarde en voorwaardes voldoen word. Dit word gedoen deur middel van deeglike inspeksies en hersiening van bedryfsdata ten einde te verseker dat die gelisensieerde aan die voorwaardes van die lisensie voldoen.

Soortgelyk aan die OIS se proses, maak die NKR se proses voorsiening vir publieke deelname met betrekking tot kernveiligheid kwessies.

## OMGEWINGSMAGTINGSVEREISTES

In terme van die Wet op Nasionale Omgewingsbestuur, Wet Nr. 107 van 1998 en die OIS regulasies wat gedurende April 2006 gepubliseer is, word daar vir sekere gelyste aktiwiteite omgewingsmagtigting vereis, alvorens daar met hulle voortgegaan kan word. Hierdie aktiwiteite is soos volg:

- (1a) Die konstruksie van fasiliteite of infrastruktuur, insluitend gepaardgaande strukture en infrastruktuur, vir die opwekking van elektrisiteit, waar die elektrisiteitsopwekking meer as 20 Megawatt is en die fasiliteit 'n area groter as een hektaar beslaan;
- (1b) Die konstruksie van fasiliteite of infrastruktuur insluitend gepaardgaande strukture en infrastruktuur vir kernreaksies, insluitend die produksie, verryking, verwerking, her-verwerkingstoring of weggooi van kernbrandstof, radio-aktiewe produkte of afval.

## INkqubo yokunikezelwa kwamaphepha-mvume

Inkqubo yokufumana iphephamvume iquka ukuvavanywa koyilo, ulwakhiwo, ukwakheka kwezinto ezibandaknywayo kulo, ukusetyenziswa nokugcinwa isebenza ukuqinisekisa ukuthobela kwayo imigangatho yolawulo. Abafaki-zicelo zamaphephamvume okufakelwa kwenyukliya kufuneka benze uhlolo olubanzi lokhuselo, ze balunikezele kwi-NNR ukuze luvavanywe. Ukuba uhlolo uhlolo lokhuselo lubonisa ukuba ukufakelwa luza kuhambelana nemigangatho ebekiweyo, kuye kubekwe imiqathango kwiphephamvume eza kuqinisekisa ukuba ufakelo luqhutywa ngendlela eyiyo, lugunyazisiwe, lwasetyenzwa ze ekugqibeleni lwapheliswa. I-NNR ke ngoko ithi iqhube imisebenzi ebanzi yokuyokuthobela kuquka uhlolo olubanzi kwanokuvavanywa ngokutsha kolwazi lokusebenzisa ukuqinisekisa ukuba umnini-phephamvume uyayithobela imiqathango yephephamvume elo.

Ngokunjalo nakwinkqubo ye-EIA, inkqubo yeNNR iyaluvumela uluntu ukuba luthabathe inxaxheba. INkqubo yeNxaxheba yoLuntu yeNNR ivumela iingxoxo zemiba yezokhuselo lwenyukliya. Ezi nkqubo zenxaxheba yoluntu ziza kuqhutywa ngokwahlukeny.

## IIMFUNeko ZOLAWULO LOKUSINGQONGILEYO

NgokoMthetho woLawulo lokusiNgqongileyo weSizwe, uMthetho ongunombolo 107 ka-1998 (iNEMA ngamafutshane kwisiNgesi) nezigunyaziso zawo zeEIA ezipapashwe ngoEpreli ka-2006, imisebenzi efakwe kuluhlu ifuna ugunyaziso lokusingqongileyo phambi kokuba iqhubekele phambili. Ukwenzela le projekthi icetywayo, kukho imisebenzi le misebenzi ilandelayo icetywayo:

- (1a) Ulwakhiwo lwezixhobo okanye izakhiwo, kuquka nobume obuhambelana nalo okanye izakhiwo, ukuze kuveliswe umbane apho kuveliswa ngaphezulu kwama-20 eMegawatts sibe isixhobo singaphezulu kommandla oyihektatre enye;
- (1b) Ulwakhiwo lwesixhobo okanye isakhiwo, kuquka nobume obuhambelana nalo okanye izakhiwo, zezixhobo zokwenza amandla enyukliya ngeeatom kuquka imveliso, ukuphuculwa, ukusetyenzwa kwakhona kwendawo yokugcina okanye ukulahlwa kwamafutha enyukliya, iimveliso ezinemitha ebangwa kukuqhekeka kwee-atom nenkunkuma.