# 1 SPECIALIST REPORTS - XHOSA

## 1.1 Yembonakalo Yomphezulu Womhlaba (Appendix E2)

Olu phononongo lwengcali lweempembelelo zokusingqongileyo lunxulumene namandla eentshukumo zendunduma malunga nesikhululo samandla senyukliya (iNyukliya-1) esicetywa ukwakhiwa nguEskom. Kukho iziza ezithathu eziqwalaselweyo: iDuynefontein, iBantamsklip neThyspunt. Iifoto zasemoyeni ukusuka kowe-1942 ukuya kowama-2007 zihlalutyiwe ukuvavanya ukwakheka kweendunduma namandla entshukumo yemimandla yeendunduma ezishenxayo nemimandla yeendunduma ezinezityalo kwiziza zozithathu. Uncwadi olufumanekayo ngesifundo lufundiwe, kuquka neengxelo ezahlukeneyo ezilungiselelwe uEskom, yaye neentlobo ngeentlobo zeengcali zokusingqongileyo kubonisenwe nazo. Amatyelelo kwisiza enziwe, kuquka amatyelelo neengcali zemigxobhozo nezebhotani (nezenzululwazi ngezityalo).

**EDuynefontein**

Iindunduma zaseDuynefontein zenza inxalenye yepaseji yommandla wendunduma waseAtlantis. Iintlobontlobo zeendunduma ezifunenweyo ziindunduma ezinqamlezayo ezishenxayo, iindunduma ezinqamlezayo zizinziswe ngokuzenzela ngezityalo zamanye amazwe ezifana neRooikrans, nelinye icala elimbhoxo elinezityalo. Amanzi omhlaba “okukhanya kwasemini” eDuynefontein kuphela kwimigongxo yexeshana omnye okanye emibini, ngako oko azikho iimpembelelo ezibalulekileyo ezinxulumene nokusebenzisana phakathi kwamanzi omhlaba namandla entshukumo yeendunduma kwisiza.

Iindlela zokufikelela neentambo zothumelo zingakhiwa ngokunqamleza iindunduma ezishenxayo ngeempembelelo zokusebenza ezisuka kweziphakathi ukuya kweziphantsi. Iindlela zokufikelela neentambo zothumelo zingakhiwa ngokunqamleza imimandla yeendunduma ezinezityalo ezineempembelelo zokusebenza ezisuka kweziphantsi ukuya kwezingabalulekanga.

Umhlaba ongaphezulu nokugcinwa kwezinto ezingafunwayo ezikwindunduma eshenxayo uya kuba neempembelelo zokusebenza eziphakathi. Umhlaba ongaphezulu nokugcinwa kwezinto ezingafunwayo ezikwimimandla yeendunduma ezinezityalo uya kuba neempembelelo zokusebenza eziphantsi.

EDuynefontein, ama-25% ohlobo olukhethekileyo lweendunduma ezishenxayo aya kulahleka ukuba isiza seNPS ecetywayo siyasetyenziswa, yaye nangona kungathandeka ukungalahlekelwa zezi ndunduma ezishenxayo, esi ayisiso isiphene esibulalayo ngokwexabiso lokulondoloza imbonakalo yomphezulu womhlaba. Iindunduma ezinezityalo zokuzenzela azinalo ixabiso lolondolozo. Ulwalamano oluncinci lweendunduma ezinecala elifanayo elimbhoxo zeLate Holocene ziya kulahleka; oku kubalukeke ngokuphantsi ngokolondolozo.

**EBantamsklip**

Imimandla yeendunduma egqithisileyo/egabadeleyo yenzeka ecaleni konxweme kummandla waseBantamsklip. Iqulethe ikakhulu iindunduma ezinqamlezayo, ezo ikakhulu zizinziswe ngezityalo zamanye amazwe ezifana neRooikrans neentlobo ezithile zelizwe lasekhaya. Azikho iindunduma ezishenxayo ngoku kwisiza ngokwaso. Kukho iindunduma ezithile ezinemigca efanayo embhoxo ezindala kakhulu ezinezityalo ezajika zalilitye ngexesha langaphambili kwelomkhenkce (kwiminyaka engama ~ 120 000 eyadlulayo). Amanzi omhlaba

akenzi “ukukhanya kwasemini” kwisiza yaye azikho iimpembelelo ezinxulumene nokusebenzisana phakathi kwamanzi omhlaba namandla entshukumo yeendunduma esizeni.

Iindlela zokufikelela neentambo zothumelo zingakhiwa ngokunqamlezayo kwiindunduma ezenziweyo zezityalo ezineempembelelo zokusebenza eziphantsi. Iindlela zokufikelela neentambo zothumelo zingakhiwa ngokunqamlezayo kwiindunduma ezinemigca efanayo embhoxo zezityalo zendalo ezineempembelelo zokusebenza eziphantsi emva kokubuyiselwa kwisimo sangaphambili ngononophelo.

Umhlaba ongaphezulu nokugcinwa kwezinto ezingafunwayo ezibekeke phezu kwemimandla yeendunduma ezityalwe ngokuzenzela okanye iindunduma ezinemigca efanayo embhoxo yezityalo ezindala zendalo ziya kuba neempembelelo zokusebenza eziphantsi.

Ixabiso lolondolozo lomphezulu womhlaba wemimandla yeendunduma zesiza saseBantamsklip liphantsi, xa kucingwa ukuba eminye imizekelo yemimandla yeendunduma yohlobo lwazo ayikaze ibe neempembelelo.

**EThyspunt**

Iintlobo zeendunduma ezifunyanwa eThyspunt yimimandla yeendunduma zohlobo lommandla weendunduma odlula kumbindi womhlaba (ummandla weendunduma waseOyster Bay), kunye neendunduma ezifana necala elimbhoxo ezitsolo okwesipeliti (hairpin). Ngaphezu koko iindonga ezisemacaleni zemimandla yeendunduma ezishenxayo zangaphambili zidala amaqaqa amade eendunduma ezinezityalo. Iinxalenye zemimandla yeendunduma ezishenxayo zizinziswe ngokwenziwa ngezityalo zamanye amazwe ezifana neRooikrans. Imimandla yeendunduma ezishenxayo inamandla amakhulu entshukumo.

EThyspunt amanzi omhlaba “okukhanya kwasemini” kwiindawo ezininzi eziphakathi kweendunduma phakathi kommandla weendunduma waseOyster Bay adala amachibi phakathi kweendawo zeendunduma (ezaziwa kananjalo njengeendunduma ezehlelayo), apho imigxobhozo idla ngokufunyanwa khona. Ukuziphatha neempawu zokumpompoza kwamanzi omhlaba namanzi omphezulu ziphandiwe ukunceda ukuqinisekisa uzinzo lokuqhubeka, ngokuphathelele kumandla entshukumo endunduma, ukwakhiwa kweentambo zothumelo nendlela yokufikelela eThyspunt ukusuka emantla, ukunqamleza ummandla weendunduma waseOyster.

Amandla entshukumo yeendunduma ezishenxayo eThyspunt aphandwe ngokunzulu. Indlela yokufikelela, iintambo zothumelo nebhanti lokuhambisa lethutyana okanye indlela yokutsala/ukuthutha ingakhiwa ukunqamleza iindunduma ezishenxayo kummandla weendunduma waseOyster Bay eThyspunt. ***Umsebenzi owongezelelweyo wokuhlola amanzi omhlaba kumanzi omphandle nokumpompoza kwamanzi omhlaba angekho nzulu njengoko kufuneka, bekuqhutywa ngexesha lokubhala le ngxelo.***

Indlela yokufikelela ingakhiwa nokuba kusetyenziswa indlela egudileyo yamandla omoya ngentshukumo ephakanyiswe kancinci ngentla komphezulu ophakathi kweendunduma ezineekholveti ezibekeka rhoqo okanye ngebrorho yamandla omoya entshukumo ewela iindunduma ezishenxayo nemigxobhozo ephakathi kweendunduma ukuvumela ukuthuthwa kwentlabathi ngaphantsi kwendlela ngaphandle kokudala ukuqokelelana kwentlabathi. Uyilo

lwebrorho eyakheke ngamandla omoya wentshukumo lunokuba nempembelelo ephantsi yokusebenza.

Iintambo zothumelo zingakhiwa ukunqamleza ummandla weendunduma ezishenxayo waseOyster Bay. Iimpembelelo zokusebenza zamaphondo agqagqelene ngezithuba ezingama-300 ukuya kuma-400 m zingasuka kweziphakathi kwimeko yeendlela zokufikelela ezisetyenziselwa ukwakha, ukuya kwezisezantsi kwiimeko zeehelikopta ezisetyenziselwa ukwakha. Ukusebenzisa amaphondo agqagqelene ngezithuba ezingama-800 m, wonke ummandla weendunduma unganqamlezwa ngaphandle kwemisebenzi okanye izakhiwo eziphakathi kweendunduma ezishenxayo, ngako oko zingabikho kwaphela naziphi iimpembelelo.

Ibhanti lexeshana lokuhambisa okanye indlela yokuthutha ingakhiwa ukunqamleza ummandla weendunduma ezishenxayo ukunqamleza iOyster Bay ngenjongo yokuthwala izinto ezingafunwayo ukuya “kumhlaba omxinwa odibana nobanzi” kumantla esiza. Iimpembelelo zokusingqongileyo zinokuba phantsi emva kokuba ibhanti lokuhambisa okanye indlela yokuthutha isusiwe yaye ukubuyisela kwimo yangaphambili kugqityiwe. Nangona kunjalo, ukubuyisela kwimo yangaphambili kungacotha.

Iindlela zokufikelela, iintambo zothumelo nebhanti lokuhambisa lethutyana okanye indlela yokuthutha zingakhiwa ukuqamleza imimandla yeendunduma enezityalo ngeempembelelo zokusebenza eziphantsi. Ukufakela iziseko zebhanti lokuhambisa kusetyenziswa izibonda zomsekelo zedayamitha ephantsi endaweni yezisekelo zekonkriti, kuya kunciphisa iimpembelelo nangakumbi. Izomelezi zomhlaba okanye iibhloko ezinjalo kufuneka zisetyenziswe ukuzinzisa amacala okusikwa nokuzalisa amacala, njengoko ukubuyisela kwisimo ngokutyala izityalo emathambekeni kuya kuba nzima yaye kucothe.

Umhlaba ongaphezulu nokugcinwa kwezinto ezingafunwayo akunakho ukubekwa kwimimandla yeendunduma ezishenxayo zaseOyster Bay eThyspunt. Umhlaba ongaphezulu nokugcinwa kwezinto ezingafunwayo ungabekwa kwimimandla enezityalo eThyspunt ngeempembelelo zokusebenza eziphakathi.

Ixabiso lolondolozo lomphezulu womhlaba wemimandla yeendunduma ezidlula kumbindi womhlaba liphezulu eThyspunt, njengoko iyiyo kuphela imimandla yeendunduma emikhulu eshiyekileyo yolu hlobo esasebenzayo eMzantsi Afrika. Imimandla yeendunduma edlula kumbindi womhlaba waseCape St. Francis iyodwa ngokomlinganiso wengingqi, wenqila yaye mhlawumbi ngokwehlabathi. Ummandla wendunduma onezityalo ukhethekile, uphantse ube ngumzekelo wamandulo weseti efanayo yendunduma yamaqaqa eHolocene nePleistocene aneentlobontlobo zeemvelaphi: iindunduma ezinamacala afanayo ambhoxo, iindunduma ezinamacala afanayo ambhoxo atsolo, nemimandla yeendunduma ezishenxayo ezineendonga zamacala ezidlula kumbindi womhlaba, kuquka imizekelo eyodwa ngokukhethekileyo yeendonga zamacala ezinjalo. Ngokubanzi, imimandla yeendunduma yaseThyspunt inexabiso eliphezulu lokuchaza nokucacisa amandla entshukumo endunduma eziselunxwemeni.

**Ukutshintsha kwemozulu**

Iziphumo ezinokubakho zokutshintsha kwemozulu kumandla entshukumo yeendunduma zezi:

Ukurhoxa kommandla waselunxwemeni ngokusabela kumphakamo ophezulu wolwandle kungashenxisa okanye kudale amanxweme amatsha entlabathi adala iindunduma zentlabathi eziphetshulwa ngumoya. Iindunduma ezishenxayo nemimandla yeendunduma ngako oko ingadalwa kwimimandla enezityalo ngoku.

Ukuncipha kwemvula nokunyuka kwamaqondo obushushu eDuynefontein naseBantamsklip ziza kuxinzelela iindunduma ezinezityalo, ngako oku kuya kuba lula ukudaleka kokuphephuka kwentlabathi. EThyspunt, akulindelwanga ukuba ukuna kwemvula kutshintshe, kodwa amaqondo obushushu aya kunyuka, ngako oko kuya kuba lula ukudaleka kokuphephuka, kodwa hayi kakhulu njengakwezinye iziza.

Ukwanda kwesantya somoya akulindelwanga ukuba kube nayo nayiphi impembelelo ebalulekileyo kokusingqongileyo.

## 1.2 Yembonakalo Yokwakheka Komhlaba (Appendix E3)

Ngokubanzi impembelelo yesiKhululo saMandla seNyukliya kwimbonakalo yokwakheka komhlaba osingqongileyo incinci xa ithelekiswa nempembelelo enokubakho yembonakalo yokwakheka komhlaba osingqongileyo ***yesiKhululo saMandla seNyukli****ya* esicetywayo. Iinkqubo zophando zembonakalo yokwakheka komhlaba zikhokelwa ziiNuclear Regulatory Code, ngokukodwa iiU.S. Nuclear Regulation, ezithathwa njengesakhelo solawulo ***esiphambili*** sezizwe, kunye neenkqubo zophando zenzululwazi yokwakheka komhlaba ezikhokelwa kukwanda kwesigqibo kwimimandla yolawulo elandelelanayo yesi-1, 8, 40 nama-320 km ukujikeleza isiza ngasinye esicetywayo.

Iimeko eziliqela ezahlukeneyo zembonakalo yokwakheka komhlaba ziyaqwalaselwa apha, eziquka:

- Intshukumo edalwa kwingingqi kukungcangcazelisa umhlaba (zii-injini zomsinga) kwisiza;
- Ukugqabhuka komphezulu;
- Ukuzinza komhlaba ongaphantsi komphezulu; kunye
- Nengozi yentaba-mlilo.

Idata (iinkcukacha) efumanekayo yembonakalo yokwakheka komhlaba kwiziza ezintathu iyaqwalaselwa ngokuphathelele kukufakela umatshini wamandla wenyukliya, eThyspunt, eBantamsklip naseDuynefontein, iphengululwe ngokuphathelele kwiimeko zengozi ezixeliweyo ngentla. Oku kubonise ukuba ingozi yembonakalo yokwakheka komhlaba malunga neemeko zengozi ezixeliweyo ngentla iphantsi kuzo zontathu iziza ezicetywayo. Nangona kunjalo, iinkqubo zophando ezongezelelweyo zeneotectonic kusafuneka zigqitywe yaye iziphumo zithunyelwe kwiNational Nuclear Regulator njengenxalenye yezingeniso zeNgxelo yoKhuseleko kwiSiza (Site Safety Report). Ezi nkqubo zophononongo, eziya kwenziwa ngokwahlukeneyo kwinkqubo yeEIA, zinokuba nempembelelo kwanalo utshintsho kwizigqibo ezifikelelweyo ukuza kuthi ga ngoku, yaye ngako oko azikho izigqibo zokugqibela ezinokwenziwa malunga nokufaneleka kwesiza.

Ngokwembonakalo yokwakheka komhlaba, azikho iindawo ezinovakalelo ekufuneka ziphetshwe kwiZiza zaseBantamsklip naseDuynefontein. Kwisiza saseThyspunt isiseko sezakhiwo ezibalulekileyo kufuneka singaweli ukudibana phakathi kweZakhiwo zaseGoudini naseSkurweberg.

Isigqibo sokungaqhubeki nesiKhululo saMandla seNyukliya asinakuba nempembelelo kwimbonakalo yokwakheka komhlaba kwiziza zaseThyspunt, eBantamsklip okanye eDuynefontein.

Ingozi encinci yokuzinza komhlaba ongaphantsi komphezulu ikhona kwisiza esicetywayo saseDuynefontein.

## 1.3 Umngcipheko Wenyikima (Appendix E4)

Jikekelele iimpembelelo zesiKhululo soMbane seNyukliya kokusingqongileyo kwe-geo-scientific azibalulekanga xa kuthelekiswa neempembelelo zokusingqongileyo kwe-geo-scientific ezinokuba khona kwisiKhululo soMbane weNyukliya esicetywayo. Amaphando e-geo-scientific kwiisayithi zenyukliya akhokelwa ziiKhowudi zoLawulo lweNyukliya, ingakumbi iMimiselo yeNyukliya yaseMelika, ethathwa njengokuba iyeyona nkqubo-sikhokeo yolawulo olubanzi lwamazwe ngamazwe, kwaye ifuna amaphando ejoloji ne-geophysical ezigqibo ezinyukayo kwi- concentric regulatory radii yama- 320, 40 ne-8 km kokujikeleze isayithi nganye ecetywayo.

UCazululo lweeNgozi zeNyikima (Seismic Hazard Analysis) (SHA) luphathelene nokuqikela amanqanaba alindelekileyo okushukuma komhlaba kwisayithi ngexesha lokwakhiwa kwendawo ezakuba sisikhululo, ngokusekelwe kwimodeli yeenyikima kwingingqi nakummandla (ubukhulu kunye neendawo zenyikima). Lonke ucazululo lweengozi zenyikima lukwafuna izimvo ezibalulekileyo ngedata; imodeli yokwenzeka kweenyikima (imodeli *yomthombo* wenyikima) kunye nemodeli yengqikelelo yokushukuma komhlaba kwindawo ethile ngokweziphumo zomzekeliso ngamnye wenyikima (imodeli yokushukuma komhlaba). Umthombo weenyikima kunye neemodeli zokushukuma komhlaba zidityanisiwe, mhlawumbi ngokunokwenzeka okanye ngokumiselweyo, ukuze kufunyanwe iintshukumo zomhlaba emazithathelwe ingqalelo kuyilo. UCazululo lweeNgozi zeeNyikima ezinoKwenzeka (Probabilistic Seismic Hazard Analysis) (PSHA) lusebenzisa iindlela zocalulo manani eziqhubele phambili ezenza kuthathelwe ingqalelo ukungaqiniseki.

I-SHA ejongene nendawo ngqo yaye yaqaliswa kwezi sayithi zintathu liBhunga le- Geoscience ( Council for Geoscience) (CGS), lisebenzisa indlela ekuthiwa yi-Parametric-Historic SHA. *Kusetyenziswa le ndlela, amaxabiso e-median PGA e-0.16 g, 0.23 g ne-0.30 g aye abalwa kwiisayithi eyase-Thyspunt, Bantamsklip neyase-Duynefontein, ngokwahlukahlukeneyo kwaye la maxabiso amisela amanqanaba eengozi zenyikima akhoyo ngoku kwezi sayithi.*

*Ezi ziphumo zaye zamkelwa nguMlawuli weNyukliya weSizwe ((National Nuclear Regulator )(NNR). I- NNR nakuba kunjalo, yaye yawisa imiqathango yokuba isimo sangoku sobugcisa be-SHA kufuneka busetyenziswe ekuhlolweni kweesayithi xa kusenziwa izicelo ezisesikweni zemvume yokwakha nokusebenza. Ukuze kuhlangatyezwane nale mfuneko, i- Eskom igqibe ekubeni ilandele imimiselo yeKomishoni yoLawulo lweNyukliya eMelika (United States Nuclear Regulatory Commission) (okanye i- US NRC), ethathwa njengokuba yeyona ineseti yemimiselo engqongqo, ecazululiweyo, ezanyiweyo kwaye yavavanywa ehlabathini, kwaye ke ngoko ichaza izenzo zamazwe ngamazwe ezigqwesileyo kwi-SHA kunye nenkqubo yemvume ecetywayo kwi-NNR. Ukongeza, iMelika, njengoMzantsi Afrika, lilizwe elililungu loMbutho wamaZwe ngamaZwe waMandla e-Atomikhi ((nternational Atomic Energy Association) (IAEA), ke ngoko ke umthetho wawo wesizwe uyangqinelana nemimiselo ye- IAEA.*

*ISahluko se-EIR sichaza imsebenzi eyenziweyo ukuza kuthi ga ngoku ngohlo lweengozi zenyikima kwiisayithi ezintathu, kwaye sinika imo yangoku ngokuphathele nokufaneleka kwazo ekubeni kwakhiwe izikhululo zombane wenyukliya kuzo.*

## 1.4 I-Geotechnical Characterisation (Appendix E5)

**I-Eskom Holdings Limited (Eskom) iceba ukwakha iziKhululo zoMbane zeNyukliya kunye nezakhiwo ezinxulumene nazo, mhlawumbi kwiphondo laseMpuma okanye eNtshona Koloni. Kuthathelwa ingqalelo iisayithi ezintathu:**

- I-Thyspunt (eMpuma Koloni – kwiNtshona yeBhayi ngase-Oyster Bay)
- I-Bantamsklip (eNtshona Koloni – kwiikhilomitha ezi-5 kumzantsi mpuma we-Pearly Beach)
- I-Duynefontein (eNtshona Koloni – kufutshane neSikhululo soMbane sase-Koeberg, eKapa)

**Indawo ekhethwayo yeesayirthi ezifanelekileyo iyakuchatshazelwa yinkqubo yoHlolo lweeMpembelelo lokusiNgqongileyo (Environmental Impact Assessment) (EIA), apho kuphandwa khona imiba emininzi ephathekayo, ye-biophysical, yeenzululwazi zaselwandle kunye neyobunjineli. Le ngxelo ithathela ingqalelo imiba ye-Geotechnical Engineering kwiisayithi.**

**Ingxelo isekelwe kumsebenzi owenziweyo wolwazi lwezembali ngokunjalo nokuqokelelwa kwedata okubanzi ngophando olunzulu kumamdla lo. Le mithombo yedata ichonge ezi mpawu zibalulekileyo zilandelayo ze-geotechnical kwiisayithi:**

**Isayithi yase-Thyspunt**

- Iprofayile yomhlaba wesayithi yohluka kakhulu ngobukhulu xa uya ngasemhlabeni, uqala kwi-0 m ubukhulu (elwandle) ukuya phantse kuma-60 m ubukhulu kummandla wengquzu yentlabathi;
- Iipropati ze-geotechnical zale mihlaba ziyafana kwindawo yonke yesayithi kwaye ziyehla iindawo eziqinileyo ezenzekayo;
- Umaleko omanzi kwilitye ukhona kwisayithi, amanzi aphantsi komhlaba ekukhanyeni kwasemini elwandle kwaye kukho iyantlukwano kububanzi kumanzi aphantsi komhlaba kummandla weengquzu zentlabathi;
- Imihlaba awunako ukudibana kwaye xa umanzi, uyakufuna iindlela zokuzinziswa kwesilowupu kuko nakuphi na ukwembiwa kwemingxuma okucetywayo;
- Indibansiwelwano ezimbini zejoloji ziyenzeka phantsi kwemihlaba, zezi yi-Skurweberg ne-Goudini formations;
- I-Skurweberg Formation yakhiwe kufutshane nolwandle ize i-Goudini yona ibe semhlabeni;
- Amatye entlabathi e-quartzitic kwi-Skurweberg afaneleke kakhulu (aqinile kwaye axhathisa kakhulu kukhukuliseko) kukho amatye entlabathi aqulethe ikhabhoni e-Goudini Formation;
- Uxinzelelo lokhukuliso lwembali oluqulethe amasuntswana lukhona kwi-Goudini kwaye lo maleko wamaseuntswana uchaphazela icala aya kulo amanzi aphantsi komhlaba kwicala loMzantsi Mpuma.

**Isayithi yase-Bantamsklip**

- Iprofayile yomhlaba wesayithi iyohluka ingaphantsi kubukhulu kunesayithi yase-Thyspunt njengoko enye ingena emhlabeni, iqala kwi-0 m ubukhulu (elwandle) ukuya phantse kuma-20 m ubukhulu kummandla wengquzu zentlabathi;
- Iipropati ze-geotechnical zale mihlaba ziyafana kuyo yonke isayithi kwaye iindawo ezinkulu eziqinileyo ziyenzeka;
- Amanzi aphantsi komhlaba angaphezulu nje kwedwala
- Imihlaba ayinako ukudibana kwaye xa ifumile, iyakufuna iindlela zokuzinzisa islowupu kulo naluphi na umbiwo lwemingxuma olucetywayo, kodwa ke ubukho bomhlaba oqinileyo buyakunika uncedo ngokuphathele noku;

- Udwala lugcwele amatye entlabathi e-quartzitic e-Peninsula Formation;
- La matye entlabathi e-quartzitic adibene kakhulu, kwaye afanelekile kwaye emele ukufaneleka okukhulu kokuncitshiswa kwamaza e-Thyspunt;

**Isayithi yase-Duynefontein**

- Iprofayile yomhlaba wesayithi yohlukile kweyase-Thyspunt neyase-Bantamsklip ngokuba yona iphantse ibe luhlobo olunye lwama-20 m ubukhulu kuyo yonke idawo kwisayithi;
- Iipropati ze-geotechnical zale mihlaba ziyafana kuyo yonke isayithi;
- Amanzi aphantsi komhlaba aphakeme kule sayithi kwaye enzeka phakathi kwe-4 ne-10 m ngaphantsi kwenqanaba lendalo lomhlaba;
- Imihlaba ayinakudibana kwaye xa ifumile, iyakufuna iindlela zozinzo kwislowupu, akukho nakuphi na ukwembiwa kwemingxuma okucetywayo;
- Iisanti ezingumthwalo omkhulu zikumatye ase-Malmesbury zine-greywacke, hornfels, mudstone, siltsone ne-shale, zonke zinokwahlukana ngokufaneleka kwazo;
- Ii-greywacke nee-hornfels zifaneleke kakhulu kune-mudstone, siltstone ne-shale, ezo ezonakala kakhulu.

**Indlela yokungaSetyenziswa (No-go)**

Ukuba ngaba kunokwenziwa isigqibo sokuba singakhiwa isikhululo sombane senyukliya akukho nanye kwezi mpembelelo zingasentla ezinxulunyaniswa nokwakhiwa kwesikhululo sombane senyukliya eyakwaziswa. Zonke iimpembelelo ezinxulumene naso ezimbi ziyakuthi ke zisuswe. Nakuba kunjalo, i-Eskom inokuzithengisa iziza zase-Thyspunt nase-Bantamsklip, kwaye xa kunokwenzeka neenxenye ezithile zesayithi yase-Duynefontein phantsi komzekeliso lo kwaye ke kunokuba khona ezinye iimpembelelo ezimbi ezingabonwanga kwangaphambili ezinokuvela kwimizekeliso yophuhliso lweepropati eyahlukileyo.

Iimpembelelo zokusingqongileyo ezinokutshintsha ukusebenza kokusingqongileyo kwendalo kwe-geotechnical environment zinxulumene:

- Nokungazinzi kwesilowuphu ematyeni nakwimihlaba ngaphambi kunye nasemva kokwakhiwa okukhokela kwimingcipheko yokhuseleko ebantwini kunye nakancinane nje kokusingqongileyo;
- Iimeko ze-Geotechnical (kwaye ingakumbi ubukhulu obugqithisileyo kunye neeprofayili zamanzi aphantsi komhlaba) okukhomba ukuba ukuphazamiseka okukhulu kweesayithi kuyakwenzeka kwimingxuma eyembiweyo (oku kuyakufuneka ukuba kulungiswe kubuyiselwe kwii-engile ezikuluhlu lwama-20º);
- Ukulahlwa kwezinto ezonakeleyo eziphuma kwimingxuma eyombiweyo.

Iimpembelelo ezinxulumene nozinzo kwislowupu zinokuba nemingcipheko kukhuseleko xa engekho amanyathelo okudanjiswa zinobukhulu obuphantsi kuzo zonke iisayithi, kuba iindlela zoyilo lozinzo kwisilowupu ziyakusetyenziswa ukuze kumelwane nale miba. Iindlela eziqhelekileyo zokuzinziswa kwesilowupu entlabathini ngokuqinisekileyo ziyakuthetha izilowupu ezembiwe imingxuma kuyakufuneka ukuba zilungiswe zibuyiselwe kwimo yangaphambili zibe zii-engile ezimcaba (zibuyiselwe kwii-engtile ezivuleke kancinane kuluhlu lwama-20º) ukunciphisa ukuba nokuba nentsilelo kwesilowuphi. Oku kukhokelela kwiimpembelelo ezingananzwayo (okukhokelela kwii-engile zesilowupi ezimcaba) zomthamo omkhulu wokufuneka kokwembiwa kwemingxuma, okukhokelela kuphazamiseko lweendawo ezinkulu ekwembiwa imingxuma kuzo kuney nemfuno yokulahlwa kwemithamo emikhulu yezinto ezonakeleyo. Iimpembelelo ezinxulunyaniswa noku ***(ngaphandle kokudanjiswa)*** zinobukhulu ***obuphakathi e-Duynefontein nase-Thyspunt zize zibe nobukhulu obusezantsi e- Bantamsklip. Xa zinokudanjiswa, oko okunemfuneko yokwemba imingxuma kufutshane nolwandle e-Bantamsklip nase-Thyspunt, ubukhulu beempembelelo ezinxulumene nazo zehliswe ziye phantsi kunye naphantsi-phakathi e-Duynefontein nase-Thyspunt ngokulandelelana. E-Bantamsklip, ubukhulu bezi mpembelelo buphantsi – busenza umthwalo ogqithisileyo omncinane kule sayithi.***

Iimaphu zobuntununtu besayithi ezibonisa ***ubukhulu bezi mpembelelo ezinxulumene nokwembiwa kwemingxuma*** zithiwe thaca kule ngxelo.

## 1.5 I-Hydrology (Appendix E6)

Le Ngxelo yeeMpembelelo zokusiNgqongileyo (Environmental Impact Report) (EIR) ithetha ngeempembelelo namanyathelo okudambisa ezinxulunyaniswa nokwakhiwa kunye nokusebenza kweSikhululo soMbane seNyukliya Nuclear Power Station (NPS) oqhelekileyo kunye nezakhiwo ezinxulumene naso kwisayithi enye eMpuma Koloni neesayithi ezimbini eNtshona Koloni. Iisayithi kuqala zaye zachongwa ngenxa yeziphumo zophando olwaqala ngoo-1980 kunye nakuPhononongo lweSikowupu se-EIA. Olu phononongo lweengcali luthetha nge-Hydrology kwaye lwaqhutywa yi-SRK Consulting.

I-Eskom iceba ukwakha i-NPS yobugcisa bohlobo lwe-Pressurised Water Reactor, enomthamo wama- ~4 000 MWe. Le NPS icetywayo iquka i-nuclear reactor, turbine complex, spent fuel, izibonelo zokugcina amafutha enyukliya, izibonelelo ezijongene nenkunkuma, idama lokungena nokuphuma kwamanzi kunye nesakhiwo seenkonzo ezahlukahlukeneyo eziza kuncedisa.

Zontathu ezi sayithi zicetywayo e-Thyspunt, Bantamsklip nase-Duynefontein zimi kunxweme.

Uphando sele luyenzile imiba yemimadla ngokusekelwe kwiindawo ezigcina amanzi ezinxulumene nemiba yonke kunye nommandla wophononongo wama-20 km ommandla. Ukusuka kuhlolo lommandla kwaye kwamiselwa ukuba akukho mithombo yamanzi okusela aphezu komhlaba afumanekayo kuyo nayiphi na kwezi sayithi. Eminye imithombo yamanzi okanye ukucocwa kwamanzi aselwandle ke ngoko kufuneka kuthathelwe ingqalelo. Ukususwa kwetyuwa kumanzi aselwandlle kuxoxiwe ngako kwingxelo yophononongo lwengcali yoNikezo lwaManzi aFreshi.

Ngepaseji emxinwa yendawo yesikhululo senyukliya esicetywayo ngoku kunye nezakhiwo ezinxulumene nayo zeesayithi kukho umngcipheko onokubakhona wokugcwala kwamanzi okumanqanaba asezantsi ngakunxweme lwepaseji emxinwa kwimeko yokuba kubekho amanqanaba aphezulu angaqhelekanga amanzi. Ingozi yokugcwala kwamanzi ngenxa yamachibi ikwakhona kuyo nganye kwezi sayithi kwisigaba sokwakha, ngenxa yemingxuma eyembiweyo evulekileyo ngenxa yeziseko zendawo yesikhululo.

Ukuba nokonyuka kwamanqanaba olwandle okungenxa yosondelelwano lomhlaba kuneempembelelo ezincinane kwi-NPS kwaye utshinstho lwemozulu nalo lukuba neziphumo ezincinane ***kwi-hydrology yamanzi aphezu komhlaba*** xa kuthathelwa ingqalelo ukungabikho kweendlela zamanzi ezingundoqo kwiisayithi.

Ngenxa yokuqina komphezulu womhlaba kwindawo yesikhululo kunye nemisebenzi encedisayo ukuhamba kwamanzi esiphango kunye neencopho kulindeleke ukuba zonyuke malunga namaxesha angama-25 ukuya kwangama-40 xa kuthelekiswa neemeko zaphambi kophuhliso. Zonke iimpembelelo, nakuba kunjalo, zinokuncitshiswa ngokuphunyezwa kwamanyathelo okudambisa.

Impawu ezingundoqo ezenza zahluke iimpembelelo kokusingqongileyo kwiisayithi ezintathu kakhulu zinxulumene nemvula, ubukho bemigxobhozo ngexesha elithile lonyaka kunye neendlela zamanzi ezingathathi unyaka wonke. E-Duynefontein iimpembelelo kwimigxobhozo ebakhona ngexesha elithile lonyaka zingaphantsi kuba imvula iphantsi apha xa kujongwa ezi sayithi zintathu. Imvula e-Bantamsklip iphezulu kunase-Duynefontein, kodwa ke akukho zimpawu zintununtunu kokusingqongileyo okanye nayiphi na imigxobhozo enobuntununu kwizinto eziphilayo nakwindawo eziphila kuyo. Iimpembelelo ezingqalileyo kuzo zontathu ezi sayithi *ziphantsi* ngobukhulu ziqala kwiziphumo *ezisezantsi.*

Ukuba ngaba akukho siKhululo soMbane seNyukliya (indlela yokungakhi) kuyo nayiphi na kwezi sayithi, i-Eskom iyakuthengisa iipropati eyase-Bantamsklip neyase-Thyspunt kunye k***wakhona*** nomhlaba ogqithisileyo ***e***-Duynefontein. Iisayithi ke ngoko zinokuphuhliselwa ezinye iinjongo kungabikho lulawulo lungqongqo kangako kunye nemimiselo olungafaniyo nolo lokuFakwa kweNyukliya. Oku kunokukhokelela ekuhambeni kwamanzi okonyukileyo okuvela kuphuhliso. Ukuba ngaba impembelelo azilawulwa kakuhle ke ngoko zinokuba neziphumo ezibi. Nakuba kunjalo, iimpembelelo kwisayithi yase-Duynefonetin zinokuba ntle.

Eyona ndlela iGqwesileyo yezenzo zoLawulo iyamkelwa ekuchongweni kwamanyathelo okudambisa amanyathelo ezakhiwo kunye nalawo ingasingawo awezakhiwo. Amanyathelo okudambsia ezakhiwo aquka:

- Iingqumba zomhlaba eziguqulayo;
- Iintlenga yomhlaba;
- Izakhiwo ezikhupha amandla; kunye
- Namadama agcina amanzi amdaka.

AManyathelo angasingawo awezakhiwo aquka:

- Iinkqubo zolondolozo ezilungiselela amanyathelo okutsalwa kwamanzi esiphango; kunye
- Nokuveliswa kweencwadana zamanyathelo olawulo lokusebenza.

Ngoko ke akukho zinto zinokubulala kuyo nayiphina kwezi sayithi ngokuphathelene neempembelelo zamanzi aphezu komhlaba.

Ulwazi olukhoyo kufuneka longezwe kule miba ilandelayo:

- Imo ecazululiweyo noyilo lommandla wesikhululo sombane kunye nemisebenzi encedisayo;
- Ukuba kwingqingqi kunye nendawo yokuhlala enokuba khona kwixa elizayo/uphuhliso lwezorhwebo; kunye
- Nokulinganiswa kobuninzi bomahluko wemvula ngenxa yotshintsho lwemozulu kwisayithi nganye.

## 1.6 I-Geohydrology (Appendix E7)

Le Ngxelo yeeMpembelelo zokusiNgqongileyo (Environmental Impact Report) (EIR) ithetha ngeempembelelo namanyathelo okudambisa ezinxulunyaniswa nokwakhiwa kunye nokusebenza kweSikhululo soMbane seNyukliya Nuclear Power Station (NPS) oqhelekileyo kunye nezakhiwo ezinxulumene naso kwiisayithi ezintathu eMpuma (1) naseNtshona (2) Koloni. Iisayithi kuqala zaye zachongwa ngenxa yeziphumo zophando olwaqala ngoo-1980 kunye nakoluPhononongo lweSikowupu se-EIA. Olu phononongo lweengcali luthetha nge-Geohydrology kwaye lwaqhutywa yi-SRK Consulting, ***ngoncedo lweZiko lwamaPhononongo aManzi aphantsi komhlaba (Institute for Groundwater Studies) e-UOFS ngemodeli yamanani.***

Olu phononongo lweempembelelo lunolwazi lwaphambi kokuqala kokwakhiwa kunye nohlolo lweempembelelo kwezi sayithi zilandelayo:

1. E-Duynefontein;
2. Bantamsklip; nase
3. Thyspunt.

Uphononongo lunika uhlolo xa lulonke lweempembelelo zesibonelelo senyukliya kwi- aquifer hydrodynamics kunye nangokuphendululekileyo. Umsebenzi ochazwayo (Terms of Reference) (ToR) kuHlolo lwee-Geohydrological kukuphanda:

- Ubukho kunye nokwakhiwa komaleko omanzi kwilitye wommandla/wengingqi kunye nezinye iiyunithi ezibandakanyekayo ze- geohydrological ezinxulumene neesayithi, umzekelo, umhlaba onyina ukuhamba kwamanzi avela phantsi komhlaba, ukuqhekeka, imida;
- Ingqwalaselo yamanzi aphantsi komhlaba kuqukwa ukwakheka kwe- hydraulic conductivity (K) / transmissivity (T), amanqanaba amanzi aphantsi komhlaba kunye nokunyuka esehla kwawo kunye noxhathiso lwesamente nomhlaba kuhlaselo yikhemikhali;
- Ukuba nokwenzeka kongcoliseko lwamanzi aphantsi komhlaba, izikhukula kunye nokususwa kwemathiriyeli ngenxa yohlaselo ngamanzi aphantsi komhlaba;
- Iziphumo zokutsalwa kwamanzi aphantsi komhlaba kwimimandla ekufutshane ngokuhamba kwamanzi aphantsi komhlaba avela kwiisayithi;
- Imodeli yengqikelelo emilinganiselo mi-3 ye-geohydrological ebonisa umaleko omanzi elityeni, amanqanaba amanzi aphantsi komhlaba, imida yomaleko omanzi elityeni, kunye namacala ekuya kuwo amanzi aphantsi komhlaba;
- Imodeli emilinganiselo mi-3 yokuhamba ngokwamanani ukuvuselela ukusabela okukhethekileyo kummandla, ingingqi nesayithi kwamanzi aphantsi komhlaba kwiimpembelelo zendalo okanye ezenziwe ngabantu, umzekelo, ixesha elithile lonyaka, ukususwa kwamanzi ngexa lokwakha, ukutsalwa kwimimandla yamaqula;
- Imodeli yothutho yesingcolisi ukuze ivuselele naziphi na izingcolisi ezenziwe kwiinkqubo zamanzi aphantsi komhlaba ekusebenzeni kwiisayithi; kunye
- Nohlolo lwemingcipheko yeempembelo zee-NPSs kokusingqongileyo okwamkelayo.

Umsebenzi obanzi nocazululiweyo uye waqhutywa kuzo zontathu iisayithi njengenxenye yale-EIR, kuqukwa i-hydrocensus, ii-geophysics ezikumphezulu, ukubhola, ukuvavanya ukumpopmpa, iimvavanyo ze-packer, uhlalutyo lwekhemikhali, ukuhamba ngobuninzi kunye nokulungiswa nokuhlolwa kwezothutho.

Iimpembelelo ezintandathu ezinokba khona zokusingqongileyo ezibandakanya amanzi aphantsi komhlaba ziye zachongwa, zezi.:

- Ukugcwala kwamanzi aphantsi komhlaba;
- Ukuguga komaleko omanzi welitye wengingqi;
- Ukuncipha kwemigxobhozo / ii-phreatophytes/ iindawo ezimanzi / imithombo;
- Ungcoliseko;
- Ukwehla kwezakhiwo; kunye
- Nongcoliseko lonxweme ***lungenelelo lwamanzi olwandle.***

Zontathu ezi sayithi zimi kwimo engqongileyo engaselunxwemeni kukho oko kuthiwa ziiPaseji ezimXinwa ze-EIA apho ii-NPS kunye nezakhiwo ezinxulumene nazo ziyakwakhiwa khona. Ke ngoko ke, kukho impawu ezingundoqo ezithile ze- geohydrological ekunokwenzeka ukuba zilawule ukwenzeka kwamanzi aphantsi komhlaba kunye nokuphatheka kwezi sayithi. Ezi zezi:

- Kubonakala ***kungenakwenzeka*** ukuba kubekho nakuphina ukusetyenziswa kwamanzi aphantsi komhlaba ahamba ngemijelo;
- Amanzi aphantsi komhlaba kwisayithi ayakuba kufutshane/ekupheleni kwendlela ahamba ngayo;
- Kuyakuba khona icandelo lokuhamba kwamanzi aphantsi komhlaba aya ngakwindawo ekuhamba kuyo amanzi (phezulu);
- Amanqanaba amanzi aphantsi komhlaba ayakuba kufutshane nomphezulu womhlaba;
- Ilitye eliqinileyo linokuba nendawo emcaba emxinwa;
- Okusingqongileyo / i-downstream receptor esabelayo kulo naluphi na ungcoliseko iya kuba yindawo eselunxwemeni/ulwandle;
- Kusenokwenzeka ukuba kubekho iinkqubo zendawo emanzi elityeni ezimbini kwisayithi, naphezulu kwamahlalutye kunye nendawo emanzi elityeni eqhekekileyo kumazantsi;

- Ezi ndawo zimbini zimanzi ematyeni kusenokwenzeka ukuba zibe kunxulumano lwe-hydraulic kodwa zinokohlulwa yindawo egugileyo kwilitye eliqinileyo mhlawumbi oko kube kumisela indawo ethintela ukuhamba kobuninzi bawo amanzi aphantsi komhlaba;
- Ukukhuphela elwandle kwengingqi kunokuchaphazela kuphela umaleko omanzi welitye ophezulu. Umaleko omanzi welitye onzulu unokhuphela ngokungapha amanzi emhlabeni, kunokwenzeka ukuba kube kwiikhilomitha ezininzi ***ukusuka*** kwisayithi nganye;
- Umgangatho wamanzi aphantsi komhlaba unokulambatha ngenxa yendibaniselwano yobude bendlela bokuhamba kwawo, ixesha lokudibana neemathiriyeli zendawo emanzi elityeni kunye nokuba kufutshane elwandle (ungenelo lwamanzi olwandle, iityuwa eziphetshethwa ngumoya);
- Amazinga okuhamba kwamanzi aphantsi komhlaba kusenokwenzeka ukuba acothe ngenxa ye-hydraulic gradients;
- Kuyakuba khona umda ofanayo phakathi kwamazi aphantsi komhlaba 'afreshi' avela emhlabeni kunye namanzi aphantsi komhlaba anetyuwa kwindawo eselunxwemeni;
- Amanzi aphantsi komhlaba anokondla imithombo/iindawo ezimanzi eziselunxwemeni ezinokuxhasa indawo ekuhlala kuyo izinto eziphilayo; kunye
- Ukuvuza kwe-radioactivity akuyi kuchaphazela ngqo abasebenzisi abasele bekhona bamanzi aphantsi komhlaba. Nakuba kunjalo, nakuphi na ukukhutshwa komoya kunokuthuthwa kuziswe emhlabeni yimimoya ekhoyo kwaye kungcolise amanzi phantsi komhlaba ngokuba afakwe ngaphantsi emhlabeni.

Ezi mpawu ziye zathathelwa ingqalelo kwindlela yokwenziwa kolu phononongo kwaye zadlala indima engundoqo kwintelekelo yeempembeleo zokusingqongileyo. Kwisayithi yase-Bantamsklip kuye kwamiselwa ukuba akukho zindawo zimanzi ematyeni kunokufikwa kuzo zikhoyo, nakuba iindawo ezimanzi ekunokufika kuzo e- Thyspunt zikhona (ezingundoqo nezinganeno) zize e-Duynefontein (zibe nganeno, zibe ngundoqo ngaphaya emhlabeni).

Ukuthelekelelwa kweempembelelo ezinokba khona kokusingqongileyo kushwankathelwa ngale ndlela ilandelayo kwizigaba zokwakha kunye nezokusebenza:

- Ukugcwala kwamanzi aphantsi komhlaba: ku***Phakathi*** kuzo zontathu iisayithi xa kudanjiswa luze lube ***Phantsi*** xa lungadanjiswa;
- Ukuphela komaleko omanzi welitye: ***uPhakathi*** e-Thyspunt uze ube ***Phantsi-Phakathi*** e-Bantamsklip nase-Duynefontein ngaphandle kokudambisa ube ***Phantsi*** kuzo zontathu iisayithi xa kudanjiswa;
- Ukuthotywa kwemigxobhozo / iindawo ezimanzi / imithombo: ***iPhakathi*** e-Thyspunt nase-Duynefontein ize ibe ***Phantsi-Phakathi*** e-Bantamsklip ngaphandle kokudambisa ize ibe ***Phantsi*** kuzo zontathu iisayithi xa kudanjiswa;
- Ungcoliseko olungelulo olwe-radioactive: lu***Phakathi*** kuzo zontathu iisayithi xa ludanjiswa luze lube ***Phantsi*** ngaphandle kokudanjiswa;
- Ukuthotywa kwezakhiwo: E-Duynefontein ukuthotywa xa kukonke kunokuba kukhulu uze umlinganiselo wokwakha ube mncinane. E-Bantamsklip ukuthotywa xa kukonke kunokuba kukhulu uze umlinganiselo wokwakha ube mncinane. E-Thyspunt ukuthotywa ngeke kube khona kodwa ke kunokuba nemilinganiselo yokwakha.
- Ungcoliseko ngemathiriyeli ye-radioactive: ***Phantsi-Phakathi*** kuzo zontathu iisayithi ngaphandle kokudambisa kwaye zibe ***Phantsi xa*** zidanjiswa;
- Indlela yokungaSetyenziswa: zi***Phantsi*** iimpembelelo e-Bantamsklip kwaye ***ziPhezulu*** e-Thyspunt nase-Duynefontein ngaphandle kokudanjiswa, kwaye zi***Phantsi*** e- Bantamsklip zize zibe ***Phakathi*** e-Thyspunt nase-Duynefontein xa zidanjiswa.

Amazinga entelekelelo asezantsi kakhulu kumsebenzi weesayithi ezakhiwe kwiindawo eziselunxwemeni apho amanzi aphantsi komhlaba akufutshane nesiphelo sendawo ahamba kuyo kunye ne-downstream receptors ezisezantsi. Ubuntununtunu bendawo buthelekelelwa ngale ndlela ilandelayo:

- I-Bantamsklip: Phantsi;

- I-Duynefontein: Phantsi ngaselunxwemeni busonyuka ngobuntununtu ngasemhlabeni;
- I-Thyspunt: Kakhulu buphantsi ukuya phakathi kwaye buphezulu kwimimandla yemigxobhozo.

Amanyathelo okudambisa ayimfuneko aquka la alandelayo:

- Ukusetyenziswa kwendawo esusa isalina kumanzi olwandle ukunika iindawo ekwakhiwa kuzo nekusetyenzwa kuzo iimfuneko zamanzi afreshi;
- Ukumisela uthungelwano lokuhlola oluyilwe ngokufanelekileyo lwamanzi aphantsi komhlaba lwamanqanaba amanzi kunye nomgangatho kuzo zonke iindawo ezimanzi kwilitye /imigxobhozo;
- Ukusebznisa izithinteli ezibiyileyo kuyo yonke imingxuma eyembiweyo ukunyina ukunaba kwamanzi ngexa lokwakha;
- Ukusetyenziswa kokukhutshelwa kwamanzi elwandle okwenziweyo ampontshwa esuswa kwimingxuma eyombiweyo ngexa lokukhutshwa kwamanzi ukugcina imigxobhozo/imithombo/iindawo ezimanzi kunye nee- phreatophytes;
- Ukwakhiwa kwe-NPS kwisayithi yePaseji emxinwa ye-EIA ukuze iimpembelo ezichongiweyo kwehliswe ubukhulu bazo, umzekelo, ukuphepha iindawo ezineziphene/eziqhekekileyo, >500 m ukusuka kwimigxobhozo, >300 m ukusuka kwiindawo ezimanzi/imigxobhozo elunxwemeni (kwenza ukuba kusebenze amanyathelo olawulo lokudambisa). Ukubeka kubuyiselwa indawo yesikhululo ukusuka elunxwemeni kuyangqinelana noyilo lwe-Eskom lokunciphisa ukonakala kwezityalo;
- Ukusetyenziswa kweziseko ezixhathisayo kumonakalo weziseko, imibhobho nezixhobo apho izakhiwo ziyakwakhiwa ngaphantsi kwendawo ehamba amanzi;
- Ukusetyenziswa koyilo lwe-nuclear reactor oluhlangabezana neemfuneko zoMlawuli weNyukliya weSizwe (National Nuclear Regulator) kwidosi yokusebenza eqhelekileyo yokhutsho kunye nongcoliseko lokhutsho ngengozi;
- Ukuphuhliswa kweprotokoli yokulungisa/ukudambisa phambi kokwakha ukuze amanyathelo anokuthathwa abhalwe phantsi kwaye alungele ukusebenza ngazo naziphi na izehlo zokungcoliseka kwisayithi okanye iimpawu ezithelekelele okutsala agqithisiweyo.

Ngokusekelwe kuhlolo lwe-geohydrological oluthiwe thaca kule ngxelo yengcali, zontathu iisayithi zamkelekile ngokokusingqongileyo, ngokwamazni aphantsi komhlaba, ekuphuhlisweni kwe-NPS.

Inqanaba lethemba lwalo lonke ulwazi oluthiwe thaca kule ngxelo yeengcali liphezulu.

## 1.7 Unikezo Lwamanzi Afreshi (Appendix E8)

Le Ngxelo yeeMpembelelo zokusiNgqongileyo (Environmental Impact Report) (EIR) ithetha ngeempembelelo namanyathelo okudambisa ezinxulunyaniswa nokwakhiwa kunye nokusebenza kweSikhululo soMbane seNyukliya Nuclear Power Station (NPS) esiqhelekileyo kunye nezakhiwo ezinxulumene naso kwiisayithi ezintathu eMpuma (1) naseNtshona (2) Koloni. Iisayithi kuqala zaye zachongwa ngenxa yeziphumo zophando olwaqala ngoo-1980 kunye nakuPhononongo lweSikowupu se-EIA. Olu phononongo lweengcali luthetha ngoNikezo lwaManzi aFreshi kwaye lwaqhutywa yi-SRK Consulting.

Iimfuneko zamanzi ze-4 000 MWe NPS zezi zilandelayo:

- Iimfuneko eziqhelekileyo : 70 L/s
- Imisebenzi yokwakha : 104 L/s
- Ukwakhiwa kwesayithi : 23 L/s

Unikezo lwamanzi luyafuneka ngeenjongo zokusela nokwakha ngexa lokwakhwa kwe- NPS kunye nokusela, ukususwa kweeminerali, kunye neenjongo zokukhusela umlilo ngexa lemisebenzi ye-NPS.

I-EIR isekelwe kuphononongo olubhalwe phantsi kunye nophando ngesayithi olubandakanya oku kulandelayo:

- Iingxelo zeSebe leMicimbi yaManzi namaHlathi (Department of Water Affairs and Forestry) (DWAF) reports;
- Ukujongwa kwakhona kwengxelo ze-Atomic Energy Corporation/Eskom kwiisayithi ezintathu ukususkela ngoo-1980 noo-1990;
- Ukujongwa kwakhona komthetho obandakanyekayo;
- Uphando olucazululiweyo ngesayithi kule EIR, kuqukwa nobalo lwabasebenzisi/imithombo esele ikhona, ukubhola kunye nokuvavanywa komngxuma wesitsala manzi, uhlalutyo lweekhemikhali kwisampuli yamanzi;
- Ulwazi olunikwe ngoogunyaziwe beengingqi abohlukeneyo.

Iindlela zonikezo manzi kuzo zontathu iisayithi zingoku kulandelayo:

- Amanzi kamasipala okanye e-DWAF avela kwizikim esele zikhona zengingqi okanye zommandla, ingakumbi amanzi avela kumphezulu womhlaba /kumadama kodwa ke kusenokwenzeka ukuba anokuvela nakumanzi aphantsi komhlaba;
- Ukuphuhliswa kwmadama amatsha yi-Eskom okanye oogunyaziwe beengingqi;
- Ukuphuhliswa kwemithombo yamanzi aphantsi komhlaba; kunye
- Nokususwa kwetyuwa emanzini aselwandle (Indlela ekhethwa yi-Eskom).

**Ezi ziphetho zilandelayo ziyathathwa kolu phononongo olweengcali:**

**Thyspunt**

- Kuko ukusetyenziswa okukhulu kwamanzi aphantsi komhlaba kwimimandla ejikelezileyo;
- Kukho imithombo eselunxwemeni kwisayithi;
- Iidolophu ezijikelezileyo zinikwa amanzi avele kumadama ase-Churchill nase-Impofu kunye namanzi aphantsi komhlaba;
- Kukho isikowupu sophuhliso olungaphaya lwemithombo yamanzi engingqi aphantsi komhlaba ukuze asetyenziswe ekwakheni kwisayithi kunye nakummandla ojikelezileyo;
- Imithombo yamanzi engingqi nawommandla angaphezu komhlaba aphantsi koxinzelelo kwaye utsalo olongezelelekileyo lwamanzi e-NPS lunokwenza mandundu esi isimo;
- Eyona ndlela ingundoqo yamanzi aphezu komhlaba apho kukho khona iimpembelelo kwingingqi kunye nakummandla iya kuba kukuthatha amanzi kwiSikim somLambo i-Orange (Orange River Scheme);
- Amanzi aphezu komhlaba kunye nakancinane amanzi aphantsi komhlaba akubonakali ngathi anokuchaphazeleka kakubi lutshintsho lwemozulu; kwaye
- Ukususwa kwetyuwa kumanzi aselwandle yeyona ndlela inokwenzeka kunikezo lwamanzi oluqinisekileyo okuneempembelelo zokusingqongileyo ezincinane kwaye akunakuchatshazelwa kukutshintsha kwemozulu. Le ndlela iyakuba nezona mpembelelo zincinane kwaye yindlela ekhethwa yi-Eskom' yonikezo lwamanzi afreshi.

**Bantamsklip**

- Akukho maleko omanzi kwilitye onokusetyenziswa kulo mmandla;
- Imithombo yamanzi aphezu komhlaba yengingqi neyommandla isetyenziswa ngokupheleleyo;

- Iidolophu ezijikelezileyo zifumana amanzi aphezu komhlaba kwiDama lase-Kraaibosch Dam kunye namanzi aphantsi komhlaba kwimithombo kunye nakwimingxuma yezitsala manzi;
- Imithombo yamanzi aphezu komhlaba yengingqi neyommandla iphantsi koxinzelelo kway utsalo olongezelelekileyo lwamanzi e-NPS luyakusenza sibe mandundu esi simo;
- Eyona ndlela ikukuphela kwayo yokufumana amanzi aphezu komhlaba kukuthatha amanzi kwisikim se-Riviersonderend-Bree;
- Amanzi aphezu komhlaba kunye nakancinane amanzi aphantsi komhlaba akubonakali ngathi anokuchaphazeleka kakubi lutshintsho lwemozulu; kwaye
- Ukususwa kwetyuwa kumanzi aselwandle yeyona ndlela inokwenzeka kunikezo lwamanzi oluqinisekileyo okuneempembeleo zokusingqongileyo ezincinane kwaye akunakuchatshazelwa kukutshintsha kwemozulu. Le ndlela iyakuba nezona mpembelelo zincinane kwaye yindlela ekhethwa yi-Eskom' yonikezo lwamanzi afreshi.

**Duynefontein**

- Kukho ukusetyenziswa okukhulu kwamanzi aphantsi komhlaba kummandla ojikelezileyo;
- I-Aquarius Wellfield ngaphambili yayiphuhliselwe ukuba inike amanzi aphantsi komhlaba iSikhululo soMbane weNyukliya sase-Koeberg (Koeberg Nuclear Power Station) (KNPS) ayisetyenziswanga kutsha nje ngenxa yemiqobo yomgangatho wamanzi. Le wellfield ifuna ubuyiselo kwimo yangaphambili olubanzi kodwa ke inokunika amanani lawo afunekayo ekwakheni nenxenye yokusebenza;
- I-KNPS idityaniswe kwisikim sonikezo manzi sikamasipala;
- Amanzi ongezelelekileyo aphezu komhlaba avela kwimithombo yoomasipala esele ikhona ngeke aqinisekiswe;
- Amanzi aphezu komhlaba kunye nakancinane amanzi aphantsi komhlaba akubonakali ngathi anokuchaphazeleka kakubi lutshintsho lwemozulu; kwaye
- Ukususwa kwetyuwa kumanzi aselwandle yeyona ndlela inokwenzeka kunikezo lwamanzi oluqinisekileyo okuneempembeleo zokusingqongileyo ezincinane kwaye akunakuchatshazelwa kukutshintsha kwemozulu. Le ndlela iyakuba nezona mpembelelo zincinane kwaye yindlela ekhethwa yi-Eskom' yonikezo lwamanzi afreshi.

**Indlela yokungaSetyenziswa (No go)**

- Kwimeko yokuba isayithi ingaphuhliselwa ii-NPSs, i-Eskom iyakuthengisa iipropati eyase-Bantamsklip neyase-Thyspunt kwaye iinxenye ezingeyomfuneko zase-Duynefontein nazo zinokuthengiswa. Kulo mzekeliso impembeleo zibonwa zinobukhulu obuphantsi, iziphumo ezingathathi cala kwaye ezinobukhulu obuphantsi kwisayithi yase-Bantamsklip (akukho maleko umanzi welitye) kodwa ubunzima buphakathi, iziphumo ezibi kwaye ezibukhulu buphezulu kwiisayithi eyase-Thyspunt neyase-Duynefontein kuba imithombo yamanzi aphantsi komhlaba engingqi anokusetyenziswa kakubi ngabanini mhlaba babucala/abakhi. Awona manyathelo okudambisa angundoqo anokusebenza kulo mzekeliso iyakuba kukunyanzelwa okungqongqo kweemeko ezisebenzayo kuko nakuphi na ukuvunywa kokuphuhliswa kweesayithi kwexa elizayo.
- Kwenziwa isincomo sokuba ukususwa kwetyuwa kumanzi aselwandle kuphunyezwe kwisayithi ekhethiweyo yonikezo lwamanzi afreshi. Amanyathelo okudambisa angundoqo afunekayo kolu nikezo lwamanzi ngala:

- Amanzi anetyuwa akhutshwe njengesiveliso senkqubo yokukhutshwa kwetyuwa emanzini aselwandle kufuneka akhutshelwe kummandla wokusefa ngexa lesigaba sokwakha (ukuya kuma-156 L/s) ukulungiselela uxubo;
- Amanzi anetyuwa akhutshwa njengesiveliso sale nkqubo yokususuwa kwetyuwa emanzini aselwandle kufuneka axutywe namanzi apholisayo akhutshwe yi-NPS ngexa lokusebenza;

- Ingcali yezinto eziphila elwandle kufuneka ihlole iindawo ekukhutshelwa kuzo ukuze ihlole iimpembeleo kwizinto eziphilayo zaselwandle.

## 1.8 Isishwankathelo soPhumezo soMmandla wesiKhukula wonyaka wesi-1 ukuya kwi-100 (Appendix E9)

Iingcali eziliqela ezisebenza kwiNyukliya-1 EIA zicelwe ukuba ziqikelele ummandla wesikhukula wonyaka we-1:100 ngenxa yesikhukula esivela elwandle. Oku kunxulumene nobubanzi bepaseji yaselunxwemeni nokubekeka kwethambeka elisisinyuko lenyukliya phakathi kwePaseji yoFakelo lweNukliya echaziweyo.

Ummandla wesikhukula wonyaka we-1:100 ngumdibaniso wemiphakamo yomphezulu edalwa ziinkqubo eziliqela zaselunxwemeni. Ngokukodwa imiphakamo ngenxa:

- Yokuzala nokurhoxa kolwande
- Yokunyuka komphakamo wolwandle (apho kufanelekileyo)
- Yokuza ngamandla kwesaqhwithi
- Yokufikelela kweliza

Inkqubo engamandla ibonwa ingowona mphakamo uphezulu ubalwayo wokufikelela kweliza. Njengoko ukufikelela kuxhomekeke ikakhulu kwithambeka lokwakheka konxweme, ukuphakama kweliza nobunzulu bamanzi, kuyafuneka ukuhlela inkcazelo yommandla ophantsi kophononongo ngamanani anikana izithuba rhoqo emifanekiso eqhelekileyo yaselunxwemeni.

Isimbuku somphakamo wesikhukula ibalwa ngokudibanisa ukuzala nokurhoxa kolwandle, ukuza ngamandla kwesaqhwithi nokufikelela kweliza zomnye nomnye wemifanekiso yaye emva koko zifakelwe kwimaphu yomphakamo yedijithali (yemivo) yenkcazo-mphandle wesiza. Ummandla wesikhukula wonyaka we-1:100 ngako kukunqumlana komphakamo obaliweyo womphezulu kunye nomphezulu wenkcazo-mphandle.

Ukwenzela ukubala ubukhulu bommandla wesikhukula wonyaka we-1:100 wama-2075 ifuthe lokutshintsha kwemozulu libalwa ngobunjani obunokubalwa bezifundo zophando elwandle nenkcazo-mphandle yengingqi.

Ummandla waselunxwemeni nawo uvelelwa lutshintsho ngokusekwe kukwanda komphakamo wolwandle. Ukhukuliseko luyenzeka ngokuqhubekayo kwimiphakamo ephezulu ukunyuka elunxwemeni. Unxweme, umfanekiso, kulindelwe ukuchazwa ngokuthe nkqo, isixa esilingana nokunyuka komphakamo wolwandle nokukhukuliseka ukuya ngaphakathi elizweni umgama onolwalamano nethambeka lonxweme lwengingqi.

Ukuze ubale ummandla waselunxwemeni wexesha elizayo, kuyafuneka ukusebenzisa iinguqu ezixeliweyo ngentla zommandla wonxweme kwinkcazo-mphandle phambi kokufakela umphakamo owandisiweyo womphezulu obaliweyo kumphezulu olungisiweyo.

Imimandla yaselunxwemeni yonyaka we-1:100 yesiza ngasinye ibaliwe yomhla wangoku nowama-2075. Ezi zinokusetyenziswa zezinye iingcali ezisebenza kwipaseji yaselunxwemeni nokubekeka kwezinyuko zenyukliya phakathi kwePaseji yoFakelo lweNukliya echaziweyo.

## 1.9 Isishwankathelo Sophumezo SoBulunga SoMoya (Appendix E10)

UEskom uceba ukwakha isikhululo samandla senyukliya eMzantsi Afrika esinamandla okuvelisa umthamo wokuya kutsho kuma-4 000 MWe. Kule EIA, iprojekthi yaziwa njengeNyukliya-1, equka uvavanyo lweziza ezithathu. Njengomboniso owandulelayo

weshedyuli, kuthathwe ngokuthi ufikelelo lwesiza nokulungisa uluhlu lwezinto ezishiyanayo ngokunyuka zeNyukliya-1 lucetyelwa uJanuwari wama-2013, yaye luya kuqhubeka ithuba leenyanga ezi-6 ukuya kwezili-12. Ukwakhiwa kwesikhululo samandla senyukliya kuya kuthatha iminyaka esi-7 ukuya kweli-9.

Iziza ezicetyelwa ezi zikhululo zamandla ziquka:

- IDuynefontein (eNtshona Koloni) ebekeke kufuphi neSikhululo saMandla saseKoeberg esikhoyo, eKapa;
- IBantamsklip (eNtshona Koloni) ebekeke kwi-10 km emzantsi-mpuma wasePearly Beach; kunye
- NeThyspunt (eMpuma Koloni) ebekeke kwintshona yaseBhayi yaye malunga ne-15 km kwintshona yaseCape St. Francis.

IsiGaba SokuKhangela ngokuPheleleyo sale nkqubo yoVavanyo lweMpembelelo yokusiNgqongileyo (EIA) sikhuthaze ukuba iziza ezibini eMntla Koloni (iBrazil neSchulpfontein) zingaqukwa kuphando olongezelelweyo ngexesha lesigaba se-EIA.

UEskom uceba ukusebenzisa chuleubuchule besiXhobo soKwenza aMandla (iReactor) saManzi aXinzelelweyo (Pressurised Water Reactor) (PWR). Nangona kunjalo, uyilo lokugqibela lomatshini womthengisi okhethekileyo akukenziwa isigqibo ngalo okwangoku. Olu vavanyo ngako oko belusekwe kwisikhululo samandla senyukliya ngokubanzi, ngokukhutshwa kolwazi lweamosferi (umoya ojikeleza umhlaba) olubonelele ngemvulophu yeentlobo ezahlukeneyo zokuyilwa kwereactor. Kuzo zonke iimeko, iimpembelelo zeyona meko imbi zivavanyiwe. Uvavanyo ngako oko luquka ukukhupha iradionuclide eyona ininzi ukuphuma kwisikhululo samandla senyukliya ngexesha lokusebenza ngokwesiqhelo ngethuba lobomi bonke baso kwakunye nokufanekisa ngemidlalo ingozi ngokusekwe kuyilo (DBA[1]) ngokusekwe kwiintlobo ezahlukeneyo zobuchule bokuyila ireactor, eqwalaselwayo nguEskom.

UAIRSHED PLANNING PROFESSIONALS (Pty) Ltd walathelwe nguARCUS GIBB (Pty) Ltd ukwenza uVavanyo lweMpembelelo yoBulunga boMoya neNzululwazi ngeMozulu ukwenzela ukwakha okucetywayo, ukusebenza nokuphelisa ugunyaziso lwesikhululo samandla senyukliya kunye nezibonelelo zokusebenza ezayamene nako.

**Indlela Yokusebenza**

Injongo engamandla yophononongo ibikukuqinisekisa iimpembelelo zokungcoliseka komoya ezinokubakho ezayanyaniswa nokwakha, ukusebenza nokuphelisa ugunyaziso lwesikhululo samandla senyukliya esicetywayo kwimekobume esingqongileyo. Ukuphumeza oku, inyathelo lokuqala ibikukuseka imiqathango yesiseko yeziza ezintathu ezicetywayo ngemilinganiselo yengingqi yenzululwazi yemozulu (meteorology). Inyathelo lesibini ibikukuqinisekisa ngawo wonke umoya okhutshwayo ekulindeleke ubekho ngexesha lezigaba ezahlukeneyo. Xa kuthathwe inkathalo enkulu ukuqikelela izinto ezikhutshwayo ezilindelwe ngexesha lesigaba sokwakha, kulindelwe ukuba izinto ezahlukileyo ezithile ezincinci zinokugqibela zikhona kwisicwangciso sokugqibela sokwakha. Impembelelo ngexesha lesigaba sokuphelisa ugunyaziso ixatyiswe ngokobulunga kusetyenziswa umzekelo owandulelayo wesicwangciso sokuphelisa ugunyaziso. Ukusasazwa emoyeni ojikeleza umhlaba wezinto ezikhutshwayo zazo zonke izingcolisi zomoya ezinokubakho ngexesha lesigaba sokusebenza kuqukiwe kuvavanyo. Ezi ziquka iinon-radionuclide nezinto ezikhutshwayo eziradioactive. Imidibaniso yomoya nezinga lokuyeka zifanekisiwe kusetyenziswa idata yenzululwazi yemozulu

[1] Ingozi ebangwa ngokungathi yeyokwenene yokuba ulungiselelo lwenyukliya kufuneka luyilwe yaye lwakhiwe ukumelana ngaphandle kwelahleko kwiinkqubo, izakhiwo, namalungu afunekayo ukuqinisekisa impilo yoluntu nokhuseleko. Isiseko soYilo seeNgozi (Basis Accidents), ezinokuquka ukugqabhuka kombhobho, ukusilela ukusebenza kwelungu, njl. kufuneka silawulwe ngamalungiselelo okhuselo ngendlela yokuba iziphumo kokusingqongileyo zigcinwa zingaphantsi kwamaxabiso abaluliweyo okucwangcisa eNNR, oko kukuthi ithamo elinesiphumo kumsebenzi okanye amalungu oluntu lingaphantsi kwama-50 mSv.

erekhodwe kwisiza[2] nokusuka kwezona zikufuphi izikhululo zenzululwazi yemozulu zeSouth African Weather Services (SAWS) ezinedata yembali eyaneleyo. Ngokuphathelele kwizinto ezikhutshwa emoyeni ezinon-radioactive, izikhokelo zobulunga bomoya orhanqileyo zisetyenzisiwe ukuthelekisa ngokuchasene nemidibaniso eqikelelweyo, esebenza ukubonelela ngokuhluza ingozi empilweni[3]. Impembelelo yeeradionuclide ivavanyiwe ngendlela efanayo neyezinto zenon-radioactive, oko kukuthi uthelekiso "kumda wethamo". Nangona kunjalo, imisebenzi eqikelelweyo yenuclide ("imidibaniso") namazinga ezinto ezilahlelwa kumphezulu ziguqulwe kuqala ukuba kwithamo elinesiphumo[4]. Uphononongo lujolise kuphela ekuphefumleleni ngaphakathi, ukutshona kwilifu nokusasazeka kwemitha ngaphakathi evela kumphezulu wemihlaba. Indlela yokuginya (amanzi nokutya) kujongwana nayo kuphononongo lwengozi empilweni ngokubanzi kusetyenziswa umdibaniso womoya nezinga leziphumo zezinto ezilahliweyo ezifunyenwe kolu phononongo.

Ngokuphathelele kwiinjongo zolu vavanyo, ummandla wophononongo ongama-40 km ngama-40 km uchaziwe ukwenzela izibalo zengingqi zokusasazeka. Akukho mmandla wophononongo okhethekileyo ochaziweyo malunga nothutho lomgama omde njengoko ezi bezisekwe kwimigama ehanjwa ngokwenene zizingcolisi kwithuba leentsuku ezintathu.

**Iingcinga Neentsilelo**

Ukusilela ukwazi umthengisi okhethekileyo wesikhululo samandla senyukliya kuthathwa kusisikhewu. Oku kubaluleke ngokukodwa ngokuphathelele kwixesha lomthombo wokukhupha iradionuclide. Nangona kunjalo, ukuze ucacise ngezinto ezinokukhutshwa zeradionuclide ukusuka kwisikhululo samandla senyukliya esicetywayo, amaxesha omthombo ukuvela kubathengisi ababini abahlolwayo aqukiwe kuvavanyo. La maxesha omthombo abonelela ngemvulophu yokuyilwa kweereactor ezahlukileyo. Ezi zinto zikhutshwayo ziquka zombini iimeko eziqhelekileyo neziphazamisekileyo. Uvavanyo ngako oko belusekwe kwezona ziphumo zilumkileyo ezivela kwaba bathengisi babini. Kufuneka kuqatshelwe ukuba ukuze kwaneliswe iimfuneko zeNNR, isikhululo samandla senyukliya esicetywayo kufuneka sihlale phakathi kwamazinga ezinto ezikhutshwayo amisiweyo kwilayisensi yaso.

Iziganeko zentlekele bezingeyiyo inxalenye yesicwangciso sophononongo lovavanyo njengoko ezi ziganeko zingaphantsi kolawulo negunya leNNR. INNR iya kuxabisa imeko yokhuseleko yesikhululo samandla senyukliya esicetywayo ukuqinisekisa ukuthobela iimfuneko eziqulethwe kwiSaziso sikaRhulumente R388 somhla wama-28 kuEpreli 2006, "iSafety Standards and Regulatory Practices". Inkqubo yeNNR ayikaqali okwangoku, kodwa iya kulandela emva kokuba umthengisi okhethekileyo wePWR ekhethiwe njengenxalenye yenkqubo yokuthenga. Ngako oko imidlalo yokufanekisa ingozi akukajongwana nayo ngokucacileyo kolu vavanyo.

[2] Idata yenzululwazi yemozulu ekwisiza eThyspunt naseBantamsklip ibifumaneka kuphela kwixesha leenyanga ezimbalwa ekuqaleni kovavanyo lwempembelelo. Kuphengululo olulandelayo lovavanyo, idata yenzululwazi yemozulu yesiza yexesha elingaphezulu konyaka ifumanekile yaye uthelekiso nedata yeSAWS ibonise izinto ezincinci ezingumahluko, ezinokuguqula izigqibo zovavanyo.

[3] Imidibaniso yomoya nezinto ezilahlwayo zezingcolisi zenon-radionuclide zithelekiswe nemida yengozi empilweni ephuhliswe ngamaziko ezizwe ngezizwe, afana neWorld Health Organisation (WHO), ukumela amazinga akhuselekileyo lawo angaphantsi kwawo kungekho ziphumo zengozi empilweni eziqwalaselweyo. Izinto ezigqitha umda zingafuna ukongezwa kwezinciphiso sezinto ezikhutshwayo.

[4] Ithamo elinesiqhamo yingqikelelo yesiphumo eso ithamo lokusasazeka kwemitha okungafaniyo linokuba naso kuluntu. (Iyunithi yethamo elinesiqhamo yiSievert (Sv)). Amanani andisayo enguqulo yethamo (Sv/(Bq/m³)) afunyenwe kwiInternational Commission on Radiological Protection (ICRP), njengoko equlethwe kwiICPR Publication 72 asetyenzisiwe. I-ICRP 72 luhlaziyo lwamvanje. La manani andisayo okuguqula ithamo avumela ubalo lwamathamo ngokuxhomekeke kubudala bamalungu oluntu ukusuka ekungeniseni ukuya ekubeni sesichengeni seeradionuclide. Amanani andisayo okuguqula ithamo ayafumaneka ukwenzela zonke iiradionuclide.

.

Nangona ixesha lonyaka omnye elifutshane ngokuthelekiswa lokurekhoda idata yenzululwazi yemozulu eThyspunt naseBantamsklip, nalo kananjalo linokuthathwa njengokusilela ekusasazeni iziphumo zomzekelo, uthelekiso lwedata kwisiza neerekhodi zexesha elide zaseCape St. Francis naseHermanus, ngokulandelelana, lubonisa ukuba ubunjani bezinto ezinokubalwa ezikhoyo zenzululwazi yemozulu (oko kukuthi isantya somoya, amacala osinga kuwo umoya, ukuna kwemvula namaqondo obushushu omoya) zinokuthelekiswa yaye zibe neziphumo zezigqibo ezifanayo. Nangona uhlolo olongezelelweyo kwisiza lunokubonelela ngezilungiso ezincinci kwiziphumo, akulindelwanga ukuba izigqibo, ezinikiwe ngezantsi, zingatshintsha nangakuphi ukubaluleka.

Izicwangciso zokuphelisa ugunyaziso lweePWR ziyafana yaye ngako oko isicwangciso sokuphelisa ugunyaziso saseKoeberg sisetyenzisiwe kolu vavanyo. Ngaphezu koko, impembelelo kungafuneka ithobele imida yethamo elibalulwe yiNational Nuclear Regulator (NNR).

Xeshikweni uphononongo luquke isiseko sokuhlola ubulunga bomoya beenon-radionuclide, uphononongo lwesiseko lwesifundo seX-reyi neminye imitha aluqukwanga. INNR ifuna ukuba iphulo lokuhlola isiseko seeradionuclide liqhutywe phambi kokwakha. Ngaphezu koko, imida yethamo ebalulwe yiNNR isebenza kwithamo elongezelekayo elibalelwe isikhululo samandla senyukliya esicetywayo. Izigqibo ngako oko azinakutshintsha, naxa umsebenzi weradio wendalo usekiwe kwiziza ezintathu.

Olu vavanyo lusebenzise imida yobulunga bomoya enikwe liSebe leMicimbi yokusiNgqongileyo (iDEA) ukwenzela izinto ezikhutshwayo zenon-radionuclide nayiNNR ukwenzela izinto ezikhutshwayo zeradionuclide, ngokulandelelana. Uvavanyo lweengozi empilweni ngako oko lucingwa lukwizinga lokuhluza. Iziphumo ezivela kolu vavanyo ziya kusetyenziswa njengegalelo kuVavanyo lweNgozi eMpilweni ukwenzela le EIA eya kuba luvavanyo lobulunga lwempembelelo yeeradionuclide empilweni yoluntu nakwizinto eziphilayo namakhaya azo endalo.

Nangona uhlalutyo oluqukayo lovakalelo lomzekelo wosasazeko belungagqitywanga, ezona mbonakalo zibalulekileyo zihloliwe, eziquka ukujongana nentsebenziswano yomhlaba nolwandle kunye nenkcazo-mphandle. Kuzo zonke iimeko, olona khetho lunobulumko lukhethiwe ukugqibezela uvavanyo. Uxabiso olunzulu nangakumbi oluqukaya lobulunga bedata nomzekelo weemvakalelo luya kuba yinxalenye yesicelo selayisensi kwiNNR.

**Iziphelo**

Iimpembelelo eziqikelelwayo ziya kufana kuzo zontathu iziza. Ngaphezu koko, ngokusekwe kwiimpembelelo eziqikelelweyo zozibini inon-radioactive neradionuclide zongcoliseko lomoya, uvavanyo lugqiba kwelobuka akukho nasinye isiza ekufuneka silahlwe ngokuphathelele kwisikhululo samandla senyukliya esicetywayo.

Unciphiso olukhethekileyo luyakhuthazwa ngexesha lesigaba sokwakha kuphela. Ngenxa yoqikelelo lwempembelelo ephantsi yezinto ezikhutshwa yiradionuclide phantsi kweemeko eziqhelekileyo zokusebenza, akukho lunciphiso longezelelweyo luya kufuneka ngokuphathele kwizinto ezikhutshwa yiradionuclide.

**IsiGaba soKwakha**

Imithombo yeempembelelo ngexesha lokwakha inokuba kukukhutshwa kothuli oludlulayo oluvela kwimisebenzi yakwakha ngokubanzi (ukucoca, ukomba, ukukrwela, imiphezulu yomhlaba, njl) nezinto ezikhutshwayo eziphuma kwizithuthi nezixhobo zokusebenza. Iimpembelelo zesigaba sokwakha ziya kuba *nokubaluleka* OKUPHEZULU ukuba amanyathelo okunciphisa asetyenziswayo akekho okanye anqongophele. Le mpembelelo ingaphungulwa ukuya *kukubaluleka* OKUPHANTSI iindlela ezngaigangathwanga zigalelwa umphezulu (oko kukuthi zifakwe itela) nokufaka entsebenzweni isicwangciso solawulo lobulunga bomoya.

**IsiGaba sokuSebenza**

Imithombo enokubakho yezinto ezikhutshwa emoyeni zenon-radioactive ngexesha lesigaba sokusebenza ziquka:

- Ikharbon, isulfure neenitrogen oxide kwimibhobho yeegesi evela kwii-injini zeejenereyitha zokuvelisa umbane wokuxhasa njengelalela;
- IFormaldehyde nekharbon monoxide ekhutshwa kukugqunywa ngerabha xa izinto zibuyela emsebenzini emva kokulungiswa; kunye
- NeAmmonia ephuma xa ubushushu bunyuka kwiijenereyitha zomphunga ngexesha lokuqalisa.

Iimpembelelo eziqikelelweyo zezi zingcolisi zenon-radiological beziqikelelwe ziphantsi kakhulu xa zithelekiswa nemilinganiso yempembelelo eyingozi empilweni yoluntu nezityalo.

Ngexesha lokusebenza okuqhelekileyo, ubuninzi beentwanantwana zezinto eziradiological ziya kukhutshelwa kokusingqongileyo. Kungahoywa indlela yokutya, ithamo elinesiqhamo eliqikelelweyo ukusuka kwezi ndlela libonisa *ukubaluleka* OKUPHANTSI. Olu balo lusebenza kuzo zontathu iziza.

Iimpembelelo eziqikelelwayo zezinto ezikhutshwayo zeradioactive ngexesha lesigaba sokusebenza eBantamsklip naseThyspunt ziboniswe *zinokubaluleka* OKUPHANTSI. Ngeli lixa, azikho izinto eziphuhliswayo zeshishini, zorhwebo okanye ezibalulekileyo zeendawo zokuhlala kule mimandla emibini.Oku kungqinwe liphulo leenyanga ezintathu lokuthatha iisampulu ngelo xesha kulinganiswa imiphakamo yemidibaniso emoyeni yesulfure dioxide nenitrogen dioxide. Impembelelo yokungcoliseka komoya okongezelekayo ngako oko kunokuba ngokuyimfuneko koko kuphela okwesikhululo samandla senyukliya esicetywayo.

Ngokuchaseneyo, iDuynefontein ibekeke kummandla apho kunokubakho amazinga ongcoliseko lomoya aphakeme kancinci ngenxa yokuba kufuphi naseKapa. Nangona kunjalo, ngokusekwe kwimilinganiselo yangasemva, impembelelo yeminye imithombo yongcoliseko lomoya[5] kubumelwane baseDuynefontein iboniswe inqongophele. Impembelelo eqikelelweyo eyongezelekayo yongcoliseko lomoya kwisiza saseDuynefontein ithathwa *ibaluleke* NGOKUPHANTSI.

Usasazo lwezifanekiso luquke inani leeDBA ezichongiweyo. Elona thamo liphezulu lomzimba wonke ngesantya sokwehla komoya umgama we-1 km ukusuka kwisikhululo samandla senyukliya ukulandela izaziso zebhaqo ezinjalo liboniswe lingaphantsi kowona mda uphezulu wamkelekileyo wama-50 mSv ngokuphathelele kwisiganeko esinye, njengoko kubalulwe yiNNR.

**IsiGaba sokuPhelisa uGunyaziso**

Ukuba sesichengeni sokusasazeka kwemitha, ngokusekwe kwisicwangciso sokuphelisa ugunyaziso esiphuhliselwe iKoeberg, kufuneka kugcinwe kuphantsi ngeyona ndlela yaye kungaphantsi kwethamo elifunekayo elibalulwe yiNational Nuclear Regulator (NNR). Njengoko le mida yethamo isekwe kumazinga akhuselekileyo okuba sesichengeni, kulindelwe ukuthi ukuba sesichengeni sosasazeko lwemitha ngexesha lokugunyazisa kuya kuba phantsi.

[5] Ayikho imithombo yongcoliseko lomoya yeshishini ekhoyo ngaphandle kweSikhululo saMandla seNyukliya saseKoeberg kummandla okufuphi kanye naseDuynefontein. Iinkqubo zoshishino zikhona eAtlantis (iSikhululo saMandla seInjini yoMsinga soMjikelo oVulekileyo weGesi, imisebenzi yokwenza izitena neminye imisebenzi emincinci yezorhwebo) malunga ne-9 km emntla-mpuma, imisebenzi yokuzalisa umhlaba eVissershok (ii-5 km emzantsi-mpuma) nomatshini wokuhluza ipetroli (malunga nama-21 km emzantsi-zantsi-mpuma). Izithuthi ecaleni kweendlela ezinkulu (umz. R27) nemimandla ekufuphi yokuhlala kananjalo zinegalelo ekusasazeni umoya, ngokukodwa iioxide zenitrogen. Ngelishwa, ayikho idata efumanekayo ngokwembali yokuhlola ubulunga bomoya eDuynefontein. Nangona kunjalo iphulo elifutshane kakhulu, leenyanga ezintathu lesulfure dioxide nenitrogen dioxide liqhutyiwe ukusuka ngoMatshi ukuya kuMeyi wama-2009. Ezi data zibonise imidibaniso ephantsi yesulfure dioxide nenitrogen dioxide.

Isicwangciso siqulethe izigaba ezintandathu. Ekupheleni kwesigaba sokugqibela (*isiGaba sesi-6*), imidibaniso yeradionuclide engaphantsi komphezulu iya kuqinisekiswa kwakhona ukwanelisa iimfuneko zokukhululwa kwesiza.

**Ukhetho lokuNgahambi ("No-Go"):**

*Isiza saseDuynefontein*

Ngaphandle kwesikhululo samandla senyukliya esicetywayo kwisiza saseDuynefontein, ukhetho "lokuNgahambi" ("no-go") lungafana nempembelelo yangoku yobulunga bomoya, ethathwa iyebokubaluleka OKUPHANTSI malunga nezihlanganisi zenon-radioactive yaye inokubaluleka OKUPHAKATHI malunga nezinto ezikhutshwa yiradionuclide.

*Iziza zaseBantamsklip naseThyspunt*

Ubulunga bomoya ngoku kwisiza saseBantamsklip buthathwa bucoceke kakhulu ngokuphathelele kwimilinganiso yezingcolisi zenon-radioactive, ezifana neeoxides zenitrogen, isulfure dioxide nekharbon monoxide. Nawaphi amaphuhliso angamanye kwisiza anokunyusa inani lezithuthi, angenise imithombo yokutshisa (iionti, iibhoyila, izifudumezi, njl.) okanye abemi abangabantu banokubanakho ukunyusa imiphakamo yemilinganiso yezi zingcolisi. Ukubaluleka kuxhomekeke kwizinto ezikhethwayo ngokutshintshisanayo, yaye zingaba nesiphumo sokubaluleka OKUPHEZULU.

Njengoko ithamo lesiseko langoku kwezi ziza ezibini lingaziwa, akwazeki ngokobuninzi ukubonelela ngempembelelo echanekileyo "yokungahambi) ngokobalo lweradioactivity. Ngokobukho bemida yethamo eliphantsi elisekwe yiNNR, ukukhutshwa okuqhelekileyo kungaba nesiphumo kumazinga ethamo phakathi kwamazinga okusasazeka kwemitha awenzeka ngokwendalo. Nangona kunjalo, kwimeko yokukhutshwa ngengozi, kulindelwe ukuba ithamo linokuba ngaphezulu kweradioactivity eyenzeka ngokwendalo kwisiza yaye ngaloo ndlela, ngaphandle xa impahla eradioactive isetyenziswa nakweyiphi eminye imisebenzi yophuhliso, impembelelo yeradio yenyukliya yokhetho "lokungahambi" ("no-go") iya kubalwa iphantsi.

**Iinkuthazo**

- Iimpembelelo eziqikelelweyo zezinto ezikhutshwayo ezingancitshiswanga ngexesha lesigaba sokwakha ziboniswe zinokubaluleka OKUPHEZULU.
  - Uluhlu olubanzi lweenkuthazo lubonelelwe kwiCandelo 5.2.1.
  - Le mpembelelo ingancitshiswa ukuya kukubaluleka OKUPHANTSI ngezicwangciso zokuphatha nolawulo lwezinto ezikhutshwayo olusemgangathweni.
  - Isicwangciso sokunciphisa izinto ezikhutshwayo sithathwa sifuneka apho kuqhutywa imisebenzi yokwakha kufuphi kakhulu neendawo zokuhlala nezinye izamkeli ezinovakalelo.
  - Owona mthombo ubalulekileyo (ophakathi kwama-80% nama- 90%) wezinto ezikhutshwayo zothuli oludlulayo uboniswe ukuba livili lokukhwelisa kuloliwe kwiindlela ezingagangathwanga. Ngako oko, kukhuthazwa ukujolisa kwasekuqaleni ekunciphiseni izinto ezikhutshwayo kumphezulu wendlela. Oku kungafikelelwa ngokumanzisa rhoqo imiphezulu engagangathwanga, kusetyenziswa iikhemikhali zokuthomalalisa uthuli, okanye ngokona kuthandekayo, ngokufaka itela kwimiphezulu yendlela.
  - Kwimimandla apho ukufaka itela kungelulo ukhetho olunokwenzeka, kufuneka isicwangciso solawulo sibe neeshedyuli zokumanzisa iindlela ezingagangathwanga, okungenani, kwakunye neminye imisebenzi enokunciphisa ngezitshizi zamanzi.
  - Ngaphezu kokulungisa umphezulu wendlela, kukhuthazwa ukusebenzisa uluhlu lokuhlola ulawulo lokunciphisa xa kusakhiwa, olunikwe kwiSihlomelo D, okanye ingxelo yalo elungiswe ngokufanelekileyo.

- Inkqubo ekhuthazwayo yokuhlola ubulunga bomoya ebonelelwe kwiCandelo 5.2.1 kufuneka ngokuthandekayo iqaliswe unyaka phambi kokwakha. Oku kungabonelela ngesiseko esaneleyo sesiqhelo somdibaniso womoya esinokufakelwa kuwo onke amaxesha onyaka. Le nkqubo kufuneka iquke yomibini imidibaniso yenon-radionuclide neyeradionuclide (njengoko kubalulwe yiNNR);
- Awekho amanyathelo okunciphisa awongezelelweyo afunwayo ezinto ezikhutshwayo zemisebenzi yesiqhelo yeeradionuclide. Nangona kunjalo, sakuba sithathiwe isigqibo sokugqibela sobuchule bereactor, kufuneka uEskom aqinisekise ukuba izinto ezikhutshwayo kubuchule obukhethiweyo zihambelana nemvulophu esetyenziswa kolu vavanyo kwanokuthi izinto ezinjalo ezikhutshwayo zingagcinwa kumjikelo wonke wobomi besikhululo samandla senyukliya. Oku kuquka uvavanyo olunzulu lokuthembeka nolondolozo lokusebenza ngobuchule obuphezulu kwezihluzi zamasuntswana emoyeni (HEPA) eziya kusetyenziswa ukulawula izinto ezikhutshwayo zomoya wemitha yeX-reyi (radiological) evela kwisikhululo samandla senyukliya;
- Ngokufanayo, umnikeli ophumeleleyo wobuchule kufuneka abonise ukuba izinto eziphuma ngokuzenzekela nangengozi zingahambelana njani neemfuneko zeNNR yaye ezi zingagcinwa njani ziPhantsi kaNgangoko kungaFikelelwa noKwamkelekileyo (As Low As Reasonably Achievable) (ALARA);
- Impembelelo ngexesha lesigaba sokuphelisa ugunyaziso ivavanywe ngokobulunga ngokusekwe ekuthatheni ukuba isicwangciso sokuphelisa ugunyaziso siya kufana neso esiphuhliselwe isikhululo samandla senyukliya saseKoeberg. Isicwangciso sokuphelisa ugunyaziso esijongene ngqo nesiza kufuneka siphuhliswe ngezona mfuneko zakutshanje ezibalulwe yiNNR.
- Kuya khuthazwa ukuqinisekisa ukuba izinto ezikhutshwayo ezivela kwiijenereitha zamandla zokuxhasa njengamalalela zisebenza ngokwezibaluli zomthengisi, ezo uvavanyo belusekwe kuzo. Nangona uhlolo oluqhubekayo lwezinto ezikhutshwayo (CEM) lunokuthandeka ngokubhekiselele kumasuntswana neeoxide zenitrogen, amaphulo okuthatha iisampulu rhoqo kwiingqumba anokwanela njengoko imo yokusebenza ineziqabu. Kukhuthazwa ukuba amaphulo amathathu okuqala okuthatha iisampulu zeisokinetic kufuneka kananjalo aquke uhlalutyo lwesulfure dioxide.
- Ukwenza umzekelo wosasazo lomoya kufuneka uphindaphindwe kusetyenziswa imimiselo yomthombo wezinto ezikhutshwayo eziqhelekileyo neziphazamisayo zomthengisi ophumeleleyo kwakunye nedata yemozulu kwisiza phambi kokwakha isikhululo samandla senyukliya. Izifanekiso kufuneka ziphindaphindwe ngokuphathelele kuzo zozibini izinto zomoya ezikhutshwayo zenon-nuclear neradionuclide. Ngaphezu koko, indlela yokusebenza yokubala ithamo kufuneka yenziwe ngokwemigangatho yakutshanje yezizwe ngezizwe kwakunye neemfuneko zeNNR.

## 1.10 Isishwankathelo soPhumezo seBhotani (seNzululwazi ngeziTyalo) (Appendix E11)

UEskom uzimisele ukwenza isicelo semvume yokwakha isikhululo samandla senyukliya kwesinye nesinye seziza ezintanthu: eDuynefontein, kuNxweme lwaseNtshona Kapa, eBantamsklip kwintshona yeAgulhas Plain empuma kwasePearly Beach, neThyspunt, entshona nje yeCape St. Francis kwiMpuma Kapa.

Njengenxalenye yenkqubo yoVavanyo lweMpembelelo yokusiNgqongileyo, amabini amaphononongo engcali, adityaniswe kule ngxelo, ngaweBhotani (inzululwazi yezityalo) nezinto eziphilayo neendawo zazo ezindundumeni.

Olu phononongo lube neenjongo ezilandelayo ezingundoqo zesiza ngasinye:

- Uhlalutyo lweesampulu ezimele umhlaba;
- Ukwenza imaphu nenkcazo yamaqela ezityalo ezikhoyo ngobuninzi;
- Uphuhliso nohlalutyo lwezintlu ezibanzi zeentlobo zezityalo;
- Uphuhliso lwezalathiso zokunqaba novakalelo kwakunye neengxaki zazo;
- Ngokuphathelele isiza ngasinye, ukuhlola iimpembelelo zesikhululo samandla senyukliya esicetywayo, iintambo zombane zangaphakathi, izitiya zevoltage enzima neendlela zokufikelela;
- Ukuphuhlisa amanyathelo okunciphisa iimpembelelo ezinokubakho;
- Ukuphuhlisa iindlela zokusebenza ezinokunciphisa iimpembelelo; kunye

Nokwenza izindululo ezo uEskom anokuba yinxalenye yemizamo ebanzi yolondolozo, kuquka ulawulo lolondolozo lomhlaba kwisiza ngasinye

**Iziza ezizezinye**

**IDuynefontein**

**Iimpawu**

Iintlobo ezimbini zezityalo (iCape Flats Dune Strandveld neCape Flats Sand Fynbos) ziyafumaneka kwisiza, yaye zombini ziseNgozini. Amaqela ezityalo alishumi elinanye achongiwe, nonxulumano ngokubanzi phakathi kweempawu zomhlaba neqela lezityalo, kodwa ngokuhlela ngamaqela amakhulu eendunduma eziqulethe ikhalsiyam kharboneithi (calcareous) namathafa entlabathi efynbos angaqulathanga ikhalsiyam kharboneithi. Ukunqaba kwendawo yokuhlala yezilwanyana nezityalo kuphakathi malunga nendawo ekhoyo ecetywayo. Izihluma zendunduma nezethafa lentlabathi ziboniswe zicacile kwisiza, kodwa zidibene ngokubanzi nezihluma zaseluNxwemeni lwaseNtshona. Kwiintlobo ezingama-380 ezifunyenweyo kwisiza, ezingama-34 zinqabile. Ukunqaba kweentlobo kuphezulu kakhulu kwithafa lentlabathi yefynbos, njengoko kusoloko kukho kwingingqi, kodwa kuphantsi kakhulu kwiindunduma eziqamlezayo yaye oku kuyaphindwa kubukho obuphantsi apho. Nangona kunjalo, ukunqaba kwekhaya lezilwanyana nezityalo nokweentlobo kunyuka nokuqaphelekayo xa kuwelwa ithafa lentlabathi yezityalo zefynbos elicwangciselwe iintambo zombane. Uvakalelo luphezulu ngenxa yobukho beendunduma zentlabathi ezishenxayo nezinokushenxa, nokuthambekela okuphezulu kwimililo ekumathafa entlabathi yefynbos. Ngokuphikisayo, ukomelela kwakhona kwezityalo kuphantsi. Inkqubo yeendunduma ezinqamlezayo yinto esoloko ikho eDuynefontein, ngolu hlobo lwenkqubo uNxweme lwaseNtshona Kapa lumelwe ngokusilelayo.

**Iimpembelelo**

Iimpembelelo ezingalunganga zijikeleza ikakhulu kulwakhiwo lwesibonelelo senyukliya esizeni yaye oku kungakhokelela ekulahlekeni kwekhaya lezilwanyana nezityalo kwakunye nobukhulu benkqubo enqabileyo yendunduma ezishenxayo ezinqamlezayo. Ukwakhiwa kweentambo zombane phezu kweendunduma ezinqamlezayo namathafa entlabathi efynbos nako ngokunjalo kungadala iilahleko kwingingqi yekhaya lezilwanyana nezityalo, kunye neentlobo ezinqabileyo.

Ukutshintsha kwemozulu kungenzeka kukhokelele ekuphakameni komphakamo wolwandle okungange-1.1 m ngowama-2075, yaye oku kunokuba neempembelelo ezingamandla kwiindunduma zesiseko nezinqamlezayo elunxwemeni.

Iimpembelelo ezongezelekayo zingadalwa nanguwuphi umsebenzi oqhekeza iinkqubo zendalo, ukubeka esichengeni ukusebenza kwenkqubo yezinto eziphilayo neendawo zazo zokuphila, kwakunye nokukhokelela kwilahleko esisigxina yendawo yokuhlala yezilwanyana nezityalo enqabileyo nenobulunga. Oku kusebenza ngokukodwa kwiindunduma ezinqamlezayo (NPS) namathafa entlabathi efynbos (iintambo zombane). Iimpembelelo ezivela kulwakhiwo olunokubakho lwesibonelelo sePBMR nazo kananjalo kufuneka zisombululwe.

**Ukunciphisa**

Ipaseji yaselunxwemeni iyakhuthazwa enokuphepha naziphi iimpembelelo ezivela kwipaseji yangoku yeEIA nesitiya seHV ngokubeka isibonelelo empuma yeendunduma ezinqamlezayo, ukuphepha le nkqubo inqabileyo nesoloko ikho. Ukulungelelanisa ngokutsha indlela yeentambo zombane nako kananjalo kungafuneka ukuphepha okanye ukunciphisa impembelelo kwiindunduma ezinqamlezayo namathafa entlabathi efynbos.

Imibhobho engenayo nephumayo kufuneka yombelwe kwiindawo eziphazamisekileyo ngaphambili emazantsi (emantla nje kwiNPS yangoku) yaye, apho kombiwe khona, umphezulu ubuyiselwe kwimo yangaphambili ngeentlobo zezityalo zendawo.

Izinto ezingafunwayo kufuneka zigalelwe kwiindawo ebeziphazanyisiwe kwixa elidlulileyo. Iindawo ezinjalo kufuneka zibuyiselwe kwimo yangaphambili ngeentlobo zezityalo zendawo zakuba izinto ezingafunwayo zisasazwe kwenye indawo.

Imisebenzi yokufuna nokuhlangula kufuneka ifudusele naziphi izityalo ezinqabileyo kunye/ okanye eziluncedo kwimimandla eya kuba nokhuseleko lwexesha elide. Zonke iindawo eziphazanyisiweyo kufuneka zibuyiselwe kwimo yangaphambili ngezityalo zendawo. Kufuneka iEMP yangoku ihlaziywe ukuquka imimandla emitsha neenjongo ezintsha ezifana nezi.

Inkqubo yokuhlola kufuneka imiselwe eya kulinganisa impumelelo okanye ngenye indlela ukubuyisela kwimo yangaphambili.

**IBantamsklip**

**Iimpawu**

Kufunyenwe iintlobo ezilithoba zezityalo kwisiza. Zikunye nemo yazo yolondolozo, zezi: iAgulhas Limestone Fynbos (Eyona iseNgozini eNcinci), iAgulhas Sand Fynbos (Enokubasengozini), iCape Lowland Freshwater Wetlands (V), iCape Seashore Vegetation (LT), iElim Ferricrete Fynbos (Esengozini), iOverberg Dune Strandveld (LT), iOverberg Sandstone Fynbos (LT), iSouthern Coastal Forest (LT) neziTyalo zoMmandla weLityeeliNkumnkum eluNxwemeni lwaseNtshona (LT). Phakathi kwezi, amaqela ezityalo ali-16 achongiwe, yaye aquka imimandla yomhlaba (umhlaba omileyo) kwakunye nomgxobhozo namakhaya endalo ezilwanyana nezityalo ngasemlanjeni. Iiphatheni zomhlaba zinxusene ngokusondeleyo nomahluko kumaqela ezityalo, yaye kukho ukwahlukana okucacileyo phakathi kwamakhaya endalo ezilwanyana nezityalo anetshokhwe (calcareous) nangenayo itshokhwe (non-calcareous). Kufunyenwe ulwalamano oluphezulu kakhulu lweeRed Data ezingama-50 kwisimbuku sezityalo ezingama-463, yaye oku kungqina into esoloko ikho kwingingqi yesiza. Kukho ukwahlukana okucacileyo kwizihluma zengingqi phakathi kwesiza, yaye oku kukhuthazwa yimo yobutshokhwe (calcareous) okanye ukungabi nabo ubutshokhwe (non-calcareous) kumgangatho ongaphantsi komnye (isiseko), yaye nokuba amaqela ngoovulamazibuko okanye incam. Umcimbi ongundoqo lulawulo lobumanzi bomhlaba, apho amakhaya endalo ezilwanyana nezityalo ngasemilanjeni nemigxobhozo zahluliwe kwezinye izihluma. Uninzi loku kunqaba lufunyanwa ukuya emantla we-R43, ngaphandle kwamatye ekalika aselunxwemeni, yaye ngokungephi kwiintlabathi zaselunxwemeni. Ukunqaba kwamakhaya endalo ezilwanyana nezityalo nako kananjalo kuninzi kumantla kunakumazantsi endlela, kwakhona, ngokungumahluko kumatye ekalika aselunxwemeni. Uvakalelo oluphezulu ngokuphathelele ukhukuliseko olunokubakho lwenzeka kwiinkqubo zendunduma ezishenxayo neziphantse zingashenxi elunxwemeni, kwakunye namathafa entlabathi nemilambo nemigxobhozo. Umlilo kananjalo ngumcimbi ongundoqo onokuthambekela okuphezulu okunxulumene nobukho befynbos kubukhulu besiza. Ngokuhambelanayo, ukomelela kwakhona okuphantsi kommandla kulawula ngokusondele kakhulu kubukho ngaphakathi kwelizwe naselunxwemeni kwamatye ekalika, umlambo neenkqubo zomgxobhozo kwakunye neendunduma ezinqamlezayo. Iinkqubo zendunduma eBantamsklip zimelwe kakuhle kwenye indawo ecaleni kwalo mmandla waselunxwemeni yaye ngako oko azinqabanga okanye azisoloko zikho.

**Iimpembelelo**

Iimpembelelo ezingalunganga zijolise ikakhulu kufuphi nokwakhiwa kwesibonelelo senyukliya, ngokukodwa ukuba amatye ekalika aselunxwemeni bekufuneka aphuhliswe yaye iindunduma zesiseko ziphenjelelwe. Impembelelo engundoqo elungileyo inokuba kukudala ulondolozo lwendalo lwenxalenye engaphuhliswanga yesiza, ngako oko kuphuculwe imo yolondolozo yeentlobo ezithile zezityalo kumathafa aselunxwemeni laseAgulhas.

Iimpembelelo ezongezelekayo zingadalwa nguwo nawuphi msebenzi oqhekeza iinkqubo zendalo, eziquka ukusebenza kwenkqubo yezinto eziphilayo neendawo zazo, kwanokukhokelela ekulahlekeni okusisigxina kwamakhaya endalo ezilwanyana nezityalo anqabileyo nanobulunga. Oku kungasebenza ngokukodwa kumatye ekalika aselunxwemeni.

**Ukunciphisa**

Ukunciphisa okungundoqo kufuneka kube kukubeka kwakhona into ekhoyo ukuphepha nawaphi amatye ekalika aselunxwemeni, nangona ngenxa yeemfuneko eziphezulu zokulondoloza okuphakathi kweendunduma ezishenxayo ezinqamlezayo, kukhuthazwa ukuba le nkqubo iphetshwe.

Imibhobho engenayo nephumayo kufuneka yombelwe yaye, apho kombiweyo, umphezulu kufuneka ubuyiselwe kwimo yangaphambili ngeentlobo zelizwe.

Izinto ezingafunwayo kufuneka zigalelwe kwiindawo ebeziphazanyisiwe kwixa elidlulileyo. Iindawo ezinjalo kufuneka zibuyiselwe kwimo yangaphambili ngeentlobo zezityalo zendawo zakuba izinto ezingafunwayo zisasazwe kwenye indawo.

Imisebenzi yokufuna nokuhlangula kufuneka ifudusele naziphi izityalo ezinqabileyo kunye/ okanye eziluncedo kwimimandla eya kuba nokhuselo lwexesha elide. Zonke iindawo eziphazanyisiweyo kufuneka zibuyiselwe kwimo yangaphambili ngezityalo zendawo. Kufuneka iEMP yangoku ihlaziywe ukuquka imimandla emitsha neenjongo ezintsha ezifana nezi.

**IThyspunt**

**Iimpawu**

Iintlobo ezinkulu ezintlanu zezityalo ziyafumaneka kwisiza (imo yolondolozo kwizibiyeli): iAlgoa Dune Strandveld (eYona iseNgozini eNcinci), iSouthern Cape Dune Fynbos (LT), iTsitisikama Sandstone Fynbos (Inokubasengozini), iCape Seashore Vegetation (LT) neCape Lowland Freshwater Wetlands (V). Oku kuxela amaqela ezityalo alithoba amakhulu neentlobo zemigxobhozo ezintandathu kunye nenkqubo yomlambo. Iintlobo zezityalo ezingama-383 zibhaliwe kwisiza, neentlobo ezinqabileyo eziphantsi kakhulu ngobalo (i-14 okanye i-3.7%), xa kuthelekiswa neminye imimandla yaselunxwemeni enokubonisa ngaphezulu kwe-5% (perrs.obs.). Uhlalutyo lwezihluma ezikwisiza kubonisa umahluko ocacileyo phakathi kwamakhaya endalo ezilwanyana nezityalo anetshokhwe (calcareous) nangenayo itshokhwe (non-calcareous), yaye nesimbuku sekharbon yomhlaba edlala indima enkulu njengoko umntu ehamba ukuya phakathi kwilizwe ukusuka elunxwemeni, egqitha kwiindunduma zesiseko, iindunduma ezizinzileyo namahlathi. Ukunqaba kweentlobo kuphantsi ngokubanzi, ngaphandle kwekhaya elinye okanye amabini endalo ezilwanyana nezityalo. Ngokufanayo ukunqaba kwamakhaya endalo ezilwanyana nezityalo kuphantsi ngokwamkelekileyo ngaphandle kweendunduma ezinqamlezayo, amatye ekalika elunxwemeni nemigxobhozo. Ubukho bento esoloko ikho nabo buphantsi, apho kufunyenwe into enye kuphela esoloko ibakho kwingingqi. Uvakalelo lukhulu kakhulu kuzo zombini iindunduma ezishenxayo nezizinzileyo, apho ubukhulu besiza bubonisa ukunyamezela okuphezulu kwembalela. Onke amaqela efynbos anokubonisa ukuthambekela okuphezu ekutsheni. Ukomelela kwakhona kwamakhaya endalo ezilwanyana nezityalo kokona kuphantsi kwiindunduma ezishenxayo, kumatye ekalika elunxwemeni nakwimigxobhozo. Inkqubo yendunduma edlula ngakumbindi

welizwe eThyspunt yinto esoloko ikho kummandla yaye yeyona inkulu elunxwemeni lwaseMzantsi Afrika.

**Iimpembelelo**

Iimpembelelo ezingalunganga kwipaseji ecetywayo yeEIA yesibonelelo senyukliya zinokuba ikakhulu kwiindunduma ezishenxayo ngokwenxalenye. Nangona kunjalo, iimpembelelo kwimigxobhozo eselunxwemeni, naseLangefontein, kungaba zezona zidala ixhala. Ukuwela kweentambo zombane phezu kweendunduma ezinqamlezayo nako kananjalo kungaba yimpembelelo enkulu, ngokufanayo nokwakha indlela edibanisa isikhululo samandla nesiTiya seHV. Zombini iindlela zokufikelela, ezivela empuma nasentshona, zinokuba nempembelelo kwiindunduma ezinqamlezayo nemigxobhozo eyayameneyo phakathi kwelizwe. IsiTiya seHV kungenzeka sibe kwindawo eyonakeleyo yelitye lentlabathi lefynbos yaye ingadala eyona mpembelelo incinane. Impembelelo engundoqo elungileyo inokuba kukudala ulondolozo lwendalo kwisiza, ngokukodwa ukuba ummandla wolondolozo ungadalwa ukhuselwe yindunduma edlula kumhlaba omkhulu weOyster Bay-Cape St. Francis. Kufuneka uEskom abe ngumthathi-nxaxheba ophambili kule nkqubo yaye kungafuneka asebenzisane nabanini-mhlaba abakufuphi. Le nkqubo ikhuselwe ngoku kuphela ngokwenxalenye yaye iphenjelelwa luphuhliso lweendawo zokuhlala ecaleni kobude bayo.

Nangona iimpembelelo zexesha elide zemibhobho engenayo nephumayo ecetywayo kunokwenzeka zibe ncinci njengoko iza kombelwa ngaphantsi komhlaba, kufuneka le mibhobho yakhelwe ngendlela eya kunciphisa iimpembelelo kumakhaya endalo ezilwanyana nezityalo neentlobo zaselunxwemeni.

Iimpembelelo ezongezelelekayo zingadalwa nanguwuphi umsebenzi oqhekeza iinkqubo zendalo, ukubeka esichengeni ukusebenza kwenkqubo yezinto eziphilayo neendawo zazo zokuphila, kwakunye nokukhokelela kwilahleko esisigxina yendawo yokuhlala yezilwanyana nezityalo enqabileyo nenobulunga. Ixhala elingundoqo kukuqhekeka okusisigxina, ukulahleka kobulunga kwamakhaya endalo ezilwanyana nezityalo nokuncipha kokusebenza kwenkqubo yezinto eziphilayo neendawo zazo zokuphila kwiindunduma ezinqamlezayo, kwakunye nemigxobhozo yaselunxwemeni naseLangefontein.

**Ukunciphisa**

Ukunciphisa okungundoqo kufuneka kube kukulungelelanisa ubukho beNPS ukuze kudale eyona mpembelelo incinci kwiinkqubo ezinqabileyo nezinovakalelo ezichongiweyo, ngokukodwa imigxobhozo yaselunxwemeni naseLangefontein. Indlela yeentambo zombane ngaphezu kweendunduma ezinqamlezayo ayixhaswa. Indlela yokufikelela ngasempuma kufuneka ilungelelaniswe ukudala eyona mpembelelo incinci kwiindunduma nemigxobhozo. Indlela yokufikelela ngasentshona iyingxaki njengoko inokuwela icala elisentshona leendunduma ezisemantla ezinqamlezayo kwakuye nemigxobhozo eliqela eyameneyo; unciphiso lungafuna ukugcina indlela yomhlaba ekhoyo ngokusondele kangangoko, nokuphepha iindunduma ezishenxayo nemigxobhozo. Indlela ewela iindunduma ezinqamlezayo ezisemantla, edibanisa iNPS nesiTiya seHV ayixhaswa njengoko unciphiso oluncinci kakhulu lungakwazi ukuquka iimpembelelo ezidalekayo kule nkqubo esoloko ikhona. IsiTiya seHV kufuneka sidale impembelelo encinci ukuba nje sakhiwe kwilitye lentlabathi lefynbos elonakele kakhulu.

Imibhobho engenayo nephumayo kufuneka yombelwe kwiindawo eziphazamisekileyo yaye, apho kombiwe khona, umphezulu ubuyiselwe kwimo yangaphambili ngeentlobo zezityalo zendawo.

Izinto ezingafunwayo kufuneka zigalelwe kwiindawo ebeziphazanyisiwe kwixa elidlulileyo. Iindawo ezinjalo kufuneka zibuyiselwe kwimo yangaphambili ngeentlobo zezityalo zendawo zakuba izinto ezingafunwayo zisasazwe kwenye indawo. Esinye isindululo sesokuba izinto ezingafunwayo zibekwe kwizityalo ezonakeleyo kwilitye lentlabathi yaye mhlwawumbi zishiywe apho. Oku kuya kufuna ingqalelo ekhethekileyo yokubuyisela kwisimo sangaphambili. Okungcono nangakumbi, intlabathi kufuneka ipontshwe njengodaka ukuya elwandle, kuphetshwe naziphi iimpembelelo emhlabeni.

Imisebenzi yokufuna nokuhlangula kufuneka ifudusele naziphi izityalo ezinqabileyo kunye/ okanye eziluncedo kwimimandla eya kuba nokhuselo lwexesha elide. Zonke iindawo eziphazanyisiweyo kufuneka zibuyiselwe kwimo yangaphambili ngezityalo zendawo. Kufuneka iEMP yangoku ihlaziywe ukuquka imimandla emitsha neenjongo ezintsha ezifana nezi.

**Amanyathelo okunciphisa ngokubanzi**

Apho ilahleko yekhaya lendalo lezilwanyana nezityalo ingenakho ukuphepheka, imisebenzi yokufuna nokuhlangula kufuneka isuse impahla yesityalo esifanelekileyo ukuyifudusela kwimimandla ekhuselekileyo; Ngaphezu koko, iintlobo ezifanelekileyo kufuneka zityalwe kwisitya sezithole kwisiza. Oku kuya kudityaniswa ngokusondeleyo nenkqubo yokubuyisela kwimo yangaphambili efuna ukujongana nemimandla ebiyonakalisiwe ngaphambili okanye ephazanyisiweyo ngexesha lenkqubo yokwakha. Amalungu angundoqo esicwangciso sokubuyisela kwimo yangaphambili kukususa nokwenza ingqumba yomhlaba ongaphezulu, ukukhetha iintlobo ezifanelekileyo, ixesha lokuhluma leminyaka emibini phambi kokutyala, ukuvelisa isigcina-kufuma emhlabeni (imulch) esithathwe kwiminga esusiweyo kwingingqi nokulondoloza okuqhubekayo kwimimandla etyaliweyo.

Ukunciphisa okubalulekileyo kokokuseka ummandla waselunxwemeni wokubuyekeza izinto eziphilayo neendawo zazo zokuphila ezikhuselekayo kunye nepaseji yaselunxwemeni yobubanzi bobuncinci bama-200 m eBantamsklip naseThyspunt. Ngenxa yobukho benkqubo yeendunduma ezivakalelwayo nezisoloko zikho, lo mgama uya kwanda ngokusondeleyo kwii-2 km ngaphakathi kwelizwe eDuynefontein.

Izinto ezikhoyo zophuhliso kufuneka zilungiswe ukuze ikhaya lendalo lezilwanyana nezityalo liphetshwe okanye kuncitshiswe ukulahleka kwekhaya lendalo lezilwanyana nezityalo. Apho kunokwenzeka, amakhaya endalo ezilwanyana nezityalo kufuneka angaqhekezwa njengoko oku kukhokelela ekunciphiseni ukuphila, ikakhulu ngenxa yokuncipha kobukhulu, nalapho isakheko sithi tyaba ngokuchasene nesingqukuva. Apho kuqhekekileyo, ukudibana kwekhaya lendalo lezilwanyana nezityalo kufuneka kananjalo kulondolozwe, yaye oku kungafezekiswa, ukwenza umzekelo, ngokubuyisela kwimo yangaphambili ngobulumko.

**Inkqubo ekhuthazwayo yokuhlola nokuxabisa**

**Ukubuyisela kwimo yangaphambili nokuhlola**

Inkqubo ebanzi yokubuyisela kwimo yangaphambili nokuhlola kufuneka iyilelwe isiza ngasinye. Inkqubo enjalo iya kukhuthaza ukuphuhliswa kwesitiya sezithole kwisiza ngasinye, yaye ingajolisa ekwandiseni iintlobo zezityalo zelizwe ezifumanekayo kwingingqi. Zonke izityalo ezifanele ukuhluma, kwakunye neentlobo ezisengozini ephakamileyo, kufuneka ziqukwe. Inxalenye engundoqo yenkqubo yokubuyisela kwimo yangaphambili kukususa iminga ehlaselayo yelinye ilizwe yaye ezi zingasetyenziselwa ukwenza izigcini-kufuma (imulch). Impumelelo okanye ngenye indlela yeentswelo zezityalo kufuneka ixatyiswe ngokusekwe kwiinyanga ezintathu yaye izityalo ezifileyo zithathelwe indawo apho kufanelekileyo.

Iintlobo kufuneka zityalwe ubuncinane iminyaka emibini phambi kokuba nakuphi ukwakha kuqalise.

**Ipaseji yaselunxwemeni nommandla wokubuyekeza**
Ipaseji yaselunxwemeni yobubanzi bobuncinane bama-200 m, ekhusela iindunduma zaselunxwemeni ezinovakalelo, amatye ekalika nemigxobhozo kufuneka iyilwe yaye ilondolozwe kwisiza ngasinye. Iindunduma ezinovakalelo, ngokukodwa iindunduma zesiseko kwakunye neendunduma ezinqamlezayo ezingenazo izityalo nezinezityalo ngokwenxalenye kufuneka zenzelwe umda we-100 m ukuze ezi nkqubo zivunyelwe ukusebenza ngendlela eqhelekileyo kangangoko. Umda kufuneka uqinisekiswe kumgxobhozo waseLangefontein.

**Imimandla Yolondolozo**

Ngaphandle kwaseDuynefontein apho sele kukho ulondolozo lwendalo, isiza ngasinye kufuneka sibhengezwe njengolondolozo lwendalo ngokusisigxina ngenjongo yokulondoloza onke amakhaya endalo ezilwanyana nezityalo neentlobo kweso siza. Kwimeko yokuphelisa ugunyaziso, kufuneka uEskom agcine ummandla njengolondolozo okanye, ukuba oko akuphumeleli, kufuneka umhlaba unikelwe kumbutho wolondolozo othembekileyo. Kwimeko yaseDuynefontein, ukuxhasa kufuneka kuqhubeke ukubonelelwa malunga neKoeberg Nature Reserve, yaye kwenziwe zonke iinzame zokwandisa ummandla wolondolozo ukuya emantla, ngokudityanelweyo neGroot Springfontein Farm. Malunga neThyspunt, kufuneka uEskom angene kumdibanelo nabanini-mhlaba abakufuphi ngenjongo yokukhusela inkqubo yeendunduma yokugqithela ngaphakathi kwelizwe phakathi kweOyster Bay neCape St. Francis.

Isiza ngasinye kufuneka sibe nomphathi wolondolozo oya kulawula eso siza yaye athembeke ekuyileni isicwangciso solawulo.

**Iziphelo**

**IDuynefontein**

Ukubekeka kwesibonelelo esicetywayo kwiindunduma ezinovakalelo ezinqamlezayo nezishenxayo akuxhaswa ngaphandle xa into ekhoyo ishenxiselwa ngaphakathi kwelizwe lale nkqubo isoloko ikho. Ukuwela ithafa lentlabathi yefynbos elinqabileyo nelinovakalelo nako kananjalo lixhala yaye oku kufuneka kuphetshwe ngokulungelelanisa iindlela zeentambo zombane okanye ukuwela eli khaya lezilwanyana nezityalo ngemigama emide.

**IBantamsklip**

Kuthathwa ukuba akukho phuhliso luya kwenzeka kummandla wendlela yaseGansbaai. Ukubekeka kwangoku kwesiza seNPS kuneempembelelo kwifynbos enqabileyo nenovakalelo yelitye lekalika eliselunxwemeni yaye kananjalo zinokuchaphazela ukusebenza kweendunduma zesiseko elunxwemeni, iindunduma ezinqamlezayo entshona, kwakunye nayo inkqubo encinci enqamlezayo empuma. Ngokwazi ukwenzeka kwazo okuqhelekileyo ecaleni kommandla waselunxwemeni, ilahleko yeendunduma ezinqamlezayo ayijongwa njengomba obalulekileyo, kodwa uphuhliso kwezi nkqubo ezishenxayo kungaba neengxaki ezinkulu zokulondoloza izakhiwo ezimisiweyo.

Inyathelo elingamandla lonciphiso lobukho beNPS ngako oko likumantla nasempuma yesiza sangoku, yaye ngokuthandekayo kufuneka sibekeke ngokupheleleyo kwikhaya lendalo lezilwanyana nezityalo elinqabe nokuba novakalelo kancinci entlabathini yaselunxwemeni lwefynbos. Ukulahleka kwekhaya lendalo lezilwanyana nezityalo kungabuyekezwa ngokudala ummandla wolondolozo kummandla oshiyekileyo wesiza.

Apho kunokwenzeka, iindlela zeentambo zombane kufuneka zingaweli isiza, njengoko ikhaya lendalo lezilwanyana nezityalo linokuba nokunqaba okuphezulu, ukusoloko likhona novakalelo. Kungafane kufunwe umhlaba okufutshane okhoyo nophazamisekileyo.

**IThyspunt**

Ukubekeka kwesibonelelo senyukliya elunxwemeni kungakhokelela ekulahlekeni kwekhaya lendalo lezilwanyana nezityalo, nto leyo engenalo unciphiso ngaphandle kokubonelela ngembuyekezo ngokungekho ngqo kwenye indawo kwisiza okanye komnye ummandla.

Ingxaki yokukhetha isiza sesibonelelo bubukho bovakalelo, kwakunye nokunqaba okugqithisileyo nemigxobhozo esoloko ikho elunxwemeni nangaphakathi kwelizwe eLangefontein. Le migxobhozo kufuneka nakanjani ingabekwa esichengeni luphuhliso olucetywayo, nokuba kukwizigaba zokwakha okanye ezokusebenza. Ukulahleka kwekhaya

lendalo lezilwanyana nezityalo kungabuyekezwa ngokudala ummandla wolondolozo kummandla oshiyekileyo wesiza.

Ukulungelelaniswa kweentambo zombane neendlela zokufikelela nawo kananjalo anokucokiswa ngenjongo yokuphepha amakhaya ezilwanyana nezityalo anovakalelo nanqabileyo. Ukuya ngasempuma ngokukodwa kufuneka kuboniswe ulungelelaniso lokuvakalelwa xa kuthathelwa ingqalelo ukubaluleka nokusoloko kukho imigxobhozo enobude engena eCape St. Francis, xeshikweni ulungelelaniso lwasentshona ludala iingxaki zolondolozo lweendawo ezisekupheleni kwasentshona kwinkqubo yendunduma ezinqamlezayo emantla, kwakunye neempembelelo zeendunduma ezishenxayo ezinomgca ofana nombhoxo (parabolic); apha unciphiso lobulumko luyafuneka ukuphepha iindunduma ezishenxayo nemigxobhozo. Indlela yofikelelo esemantla ibonwa kunzima kakhulu ukwenza unciphiso kuyo yaye kufuneka ingakhiwa.

Ukubekwa kwesiTitya seHV kwilitye lentlabathi yefynbos elonakalisiweyo kujongwa njengokwamkelekileyo, ngokuxhomekeke ekubeni into ekhoyo ilungelelanisiwe ukuhlala emhlabeni owawuyifama ngaphambili. Nangona kunjalo ingcamango yokukrozakwentambo yombane phakathi kwenxweme nesitiya seHV esilapha awuxhaswa. Umba ongundoqo kukuwelwa kweendunduma ezishenxayo neziphantse zishenxe ezinqamlezayo yintambo yombane, yaye oku kuya kufuna ukucingwa ngononophelo, yaye ngokukhethekayo kuphetshwe. Ngokulandelelana nale nkonzo yendlela edibanisa iNPS nesiTiya seHV; njengoko oku kungabeka esichengeni ukusebenza kwenkqubo yendunduma esemantla enqamlezayo, le ndlela ayixhaswa kwaphela.

**Iziza ebeziluphuhliso olucetywayo azinakho ukuncitshiswa okanye ebezinethemba eliphantsi lokunciphisa**

Malunga ne**Duynefontein,** ukwakhiwa kwenkqubo ekhoyo yendunduma enqamlezayo kufuneka kungaqukwa njengento enokwenzeka yeNPS ukuba into ekhoyo ayishenxiswa ukuya ngaphandle kweli khaya lendalo lezilwanyana nezityalo ukuya kwimpuma yale nkqubo.

Malunga ne**Bantamsklip**, ngokuxhomekeke ekubeni kukho ulungiso olungamandla kwindawo yokubekeka noyilo lwento ekhoyo ukuphepha iinkqubo zaselunxwemeni ezinovakalelo, iNPS inokwakhiwa.

Ukuba ukubeka esichengeni ukusebenza kwemigxobhozo e**Thyspunt** kunako ukuphetshwa, ngako ke oku kuthathwa njengesiphene esibulalayo, ngokukodwa njengoko ezi nkqubo zisoloko zikhona kolu nxweme yaye inkqubo yaseLangefontein “yeyohlobo olulodwa”. Ukuwela iindunduma ezinqamlezayo ukuya emantla akuxhaswa, xeshikweni ukubekeka kwendlela yofikelelo entshona kufuna unciphiso olulumkileyo.

**Ukushwankathela**

Zonke iziza zinganakho ukuphuhliswa ngokuxhomekeke ekubeni unciphiso olungqongqo luyasetyenziswa – njengoko kuchaziwe ngokunzulu kwingxelo yaye kushwankathelwe ngentla. Nangona kunjalo, ngaphandle konciphiso olungamandla, asikho nesinye isiza esithathwa sifanelekile ukwakha isibonelelo senyukliya.

## 1.11 Imigxobhozo (Appendix E12)

**Intshayelelo**

Injongo yeli candelo kukubonelela ngesishwankathelo esifutshane seengxaki ezingamandla zokuphuhliswa kweSikhululo saMandla seNyukliya (NPS) esicetywayo kwimigxobhozo yeziza ezithathu ngokutshintshatshintshana – iDuynefontein, iBantamsklip neThyspunt. Zonke iziza ngokutshintshatshintshana, ziquka kwimida yazo neendawo ezikufuphi ezizingqongileyo, iinkqubo zemigxobhozo ezibaluleke kakhulu kwizinto eziphilayo nendawo zazo zokuphila

ezingenazo iimpembelelo xa kuthelekiswa yaye ezicingelwa ukuba zinokuba ziintsalela zokugqibela (kwimeko yaseDuynefontein) zamakhaya endalo ezilwanyana nezityalo ezikhethekileyo emigxobhozweni elahlekileyo kwimimandla emikhulu okanye, kwimeko yaseBantamsklip yaye ngokukodwa eThyspunt, kucingwa ukuba ziinkqubo ezizodwa ezingakhangeleki ngathi zinokumelwa kwimo yazo yangoku nobumbaxa kuyo nayiphi enye indawo ehlabathini. Imo yolondolozo kuzo zozithathu iziza, ngokwembono yemigxobhozo, iphezulu ngokugqithisileyo yaye naziphi izothuso kwimfezeko yazo, zibonwa zingalunganga ngokuqapheleka okuphezulu.

Ingxelo esisekelwe phezu kwayo esi sishwakathelo ithathele ingqalelo iziphumo zonyaka wokuhlola nokuhlalutya okunzulu kwamanzi omhlaba namanzi angaphezu komhlaba (Visser *et al*. 2011), ezidale amazinga aphezulu entembeko anikelwe iingqikelelo zeempembelelo zemisebenzi ecetywayo eyanyaniswa nophuhliso lweNPS, kwimigxobhozo yesiza ngasinye sezithathu ezikhankanywayo. Ezinye zezigqibo zale ngxelo, ngako oko zitshintshe kakhulu kwezo bezibonisiwe kwiingxelo zangaphambili (umz. Day 2009 and 2010).

**Iimpembelelo ezayanyaniswa neNPS ecetywayo**

Iimpembelelo ezinxulumene nophuhliso olucetywayo lweNPS kwimigxobhozo zahlukahluke kakhulu phakathi kweziza ngokutshintshatshintshanayo, ngokuxhomekeke kukusondela kwesiza ngasinye kwimigxobhozo, kwakunye nokusebenzisana kwamanzi omhlaba / angaphezu komhlaba kwiziza ngokunqamlezayo. Iimpemelelo ezingamandla ezivavanyiweyo zishwankathelwe ngezantsi.

**EDuynefontein**

Iimpembelelo ezingamandla ezayanyaniswa nophuhliso lwesigaba esinye seNPS kwesi siza, ziquka ukukwazi ukuthoba okanye ukuphazamisa okuphantsi kwemigxobhozo eyenziweyo engeyiyo eyendalo kumntla-ntshona wesiza, imigxobhozo yendunduma ezehlelayo ezidlulayo zeendunduma ezishenxayo nemigxobhozo enokubakho ehlukaniswa ngamaxesha athile kufuphi nendlela ecetywayo yokungena. Ummandla wophuhliso “onconywayo” (okanye onolona vakalelo luphantsi) womatshini ocetywayo, ukude ngokwaneleyo kwimigxobhozo enolona vakalelo lukhulu kwisiza – oko kukuthi, imigxobhozo yendunduma ehlelayo ethe gongqo phantsi kwinxalenye ekumzantsi-ntshona wesiza. Umfuziselo wamanzi omhlaba unxulumana nezinga eliphantsi lokutsalelwa ezantsi kuyo yomibini, kwakunye neminye imigxobhozo kwisiza, ngenxa yokufunxeka kwamanzi.

Ngaphandle kokuzalisekisa amanyathelo okunciphisa, iingxaki zophuhliso lweNPS enye eDuynefontein zivavanywe ngokuba nokubaluleka okungalunganga okuphakathi ngokwembono yomgxobhozo.

**EBantamsklip**

Ummandla wophuhliso “onconywayo” (okanye onolona vakalelo luncinci) we-EIA ecetywayo neepaseji zeHV kwesi siza, ukumazantsi endlela iR43 ecanda phakathi kwesiza. Indlela ngokwayo isebenza njengesithintelo kwinxalenye esemantla yesiza, apho kukho umlambo obaluleke kakhulu iGroot Hagelkraal River nemitsitso yethambeka eyayanyaniswa nawo kwakunye namasebe awo omgxobhozo okumanzantsi entlambo. Inkolelo engamandla yovavanyo lwe-EIA kwesi siza yeyokuba imisebenzi eyayanyaniswa nezigaba zokwakha nezokusebenza kweNPS, iya kuphelela kummandla okumzantsi wendlela iR43. Oku kuthetha ukuba, iimpembelelo kwiinkqubo zemigxobhozo ezivela kwiprojekthi ecetywayo ziya kuphetshwa kakhulu. Imimandla engamandla exhalabisayo yelandelayo:

- Ukwanda kokusetyenziswa kwendlela iR43, okukhokelela ekuqhekekeni kweepaseji zomgxobhozo
- Ukuthotywa okunokwenzeka kwemo yomgxobhozo ngokuxhomekeke kwindawo ekwakhiwe kuyo izakhiwo zolawulo zeNPS

- Iziphumo ezingalindelekanga ezinokwenzeka zokwanda kophuhliso kummandla wePearly Beach.

Kwezi, uvavanyo lomba wokugqibela ungaphandle komda wolu phononongo. Nangona kunjalo umba ubonakala ufuna ukuqwalaselwa.

Uphononongo lokuhamba kwamanzi omhlaba (geohydrological) (Visser et al. 2011) lubonise ukuba nangona iradiyasi yokutsalela ezantsi eyanyaniswa nokufunxeka kwamanzi kwesi siza inokolulwa ukuya kufuphi neenkqubo zemilambo iGroot Hagelkraal neKoks River, nangona kunjalo akukhangeleki ngokungathi naziphi na ziya kuchaphazeleka.

Ngaphandle kokufezekisa nawaphi amanyathelo okunciphisa, iingxaki ezongezelelekayo zophuhliso lweNPS enye eBantamsklip, zivavanywe ngokuba nokubaluleka okungalunganga okuphakathi ngokwembono yomgxobhozo.

E**Thyspunt**

Uphuhliso kwesi siza, xa engekho amanyathelo okunciphisa, lungayanyaniswa nezona mpembelelo zininzi, ezinzulu nezimbaxa kwiinkqubo ezibalulekileyo zomgxobhozo. Iimpembelelo ezingamandla ezivavanyiweyo ziquka:

- Ukulahleka nokuthotywa ngokusisigxina kwemitsitso yemigxobhozo eselunxwemeni ngenxa yokufunxeka kwamanzi / ukuphambuka kwamanzi omhlaba, ukuyondelelanisa ukumpompoza kwamanzi omhlaba kwakunye neendlela ezintsha ezicetywayo;
- Ezinye iingozi zeempembelelo eLangefonteinvlei ngenxa yeziphumo zokutsaleleka ezantsi okunokwenzeka: nangona kunjalo, ukubakho kwengozi kucingelwa kuphantsi, ngokwezinto ezifunyaniswe nguVisser *et al*. (2011), ezokuba iLangefonteinvlei ihleli phezu kwetafile yamanzi omhlaba kwimida esemanzantsi nesentshona. Ngako oko, iimpembelelo zokutsaleleka ezantsi kungafuneka zinabele kwiinxalenye ezisemantla nasempuma phambi kokuba zibe neziphumo ekuhambeni kwamanzi omhlaba omgxobhozo;
- Isiphazamiso sokuqhekeka, ukuzalisa nembonakalo kwimigxobhozo yeendunduma ezehlelayo kwinkqubo yeendunduma ezishenxayo eOyster Bay nakwimigxobhozo ekufuphi nomntla wommandla weendunduma waseOyster Bay, ngenxa yeempembelelo ezayanyaniswa nezinto ezicetywayo ezifana nepaseji yeentambo zothumelo, iindlela nezinto ezinokukhethwa zokuthutha iintsalela ukunqamleza iindunduma;
- Ukuzalisa nokuqhekeka okunokwenzeka kwimigxobhozo ebalulekileyo kumazantsi entlambo ngenjongo yokuvumela ukwakhiwa kweendlela zokufikelela kwisiza kwakunye nokufaka phantsi komhlaba imibhobho yamanzi;
- Ukuthotywa kwemigxobhozo ethe gongxo emhlabeni neminye ngenxa yokuthutha izinto ezingafunwayo ezigqithisileyo phezu kweendunduma ukuya kwiplatfomu yeHVY.

Iimpembelelo ezingentla kunokwenzeka zibe neziphumo ezibonakalayo zokuthoba inkqubo ekhoyo ngoku yomhlaba ongenazo iimpembelelo nemigxobhozo elikhaya lendalo lezilwanyana nezityalo, ezinamazinga aphakamileyo othungelwano nexabiso eliphakamileyo lokwahlukahlukana kwezinto eziphilayo, zinto ezo iinkqubo zomgxobhozo ezenza igalelo elibalulekileyo kuzo. Iimpembelelo ezongezekayo zophuhliso olucetywayo lweNPS enye kwisiza saseThyspunt ngaphandle kwamanyathelo okunciphisa, zivavanywe zinokubaluleka okuphezulu okungalunganga.

**Amanyathelo onciphiso angundoqo andululwayo kwisiza ngasinye**

**EDuynefontein**

Unciphiso lokuphepha iimpembelelo kwimigxobhozo kucingwa ukuba kunokwenzeka kwesi siza. Amanyathelo onciphiso ajolise kulawulo olunesiphumo longcoliseko luthuli, amanzi

ezikhukhula neenkqubo zokwakhiwa kwendlela, nokumiswa kweNPS nezibonelelo zayo zokusebenza kwimimandla enolona vakalelo luncinci kwiindawo zophuhliso. Phakathi kweepaseji ze-EIA neHV, ukugcinwa kweendunduma ezishenxayo njengenkqubo eqhubekayo kuyanconywa, ukuqinisekisa ulondolozo lwemisebenzi yomgxobhozo phakathi nakumntla weendunduma. Imigxobhozo ekwisiza saseDuynefontein engaphandle "kommandla wophuhliso okhuthazwayo," esecaleni kwemida yaso yomhlaba neepaseji ezithungelanayo, ichongwe njengemimandla "engeyiyo yophuhliso".

**EBantamsklip**

Amanyathelo onciphiso afunekayo kwesi siza angafuna:

- Ulawulo lwesiza kumantla eR43 njengommandla wolondolozo lwendalo, ngomgaqo wolondolozo lwendalo lwexesha elide lwesiza (emva kwexesha lobukho beNPS)

Ngaphezu koko, ingxelo iqaphelise ukunqweneleka:

- Kokukhuliswa kweekholveti ezinqamleza phantsi kweR43 eGroot Hagelkraal
- Kokubambelela kwizithintelo ezithile zophuhliso ePearly Beach.

Ezi zincomo zichaphazela imimandla engaphandle kolawulo ngqo lukaEskom yaye ngako oko azinako ukuba yimiqathango yogunyaziso.

Impembelelo eyongezelekayo yeNPS kwesi siza, ngonciphiso, inokuba yimpembelelo elungileyo yokubaluleka okuphezulu, ngokusekelwe kwithuba eliqukwe kuphuhliso lokufumana ulondolozo lwendalo lwexesha elide lweenkqubo zomgxobhozo kumntla weR43.

**EThyspunt**

Amanyathelo afunekayo onciphiso kwesi siza angaquka okulandelayo:

- Ukuqonda iintlobontlobo "zeendawo okungangenwa kuzo" zemimandla yophuhliso nezinto ezibuyisela emva izinto eziphilayo neendawo zazo zokuhlala – ukuzalisekisa umba wokugqibela, kungafuna ukuba "ummandla wophuhliso onconywayo" ocetywayo kwisiza ubekwe ukuya ngasentshona, ukulungiselela umhlaba onconywayo osisidambisi eLangefonteinvlei;
- Ulawulo lwesiza sonke, ngaphandle kobukho beNPS phakathi kommandla "onconywayo" wophuhliso njengommandla osesikweni wolondolozo lwendalo;
- Ukuthenga yonke imihlaba ekunokwenzeka inqamleze indlela yokufilelela esempuma ngasempuma kwesiza saseThyspunt ukuya kuma kumda wasentshona weThe Links, nolawulo lwemimandla yeendunduma nemigxobhozo ethengiweyo ngaloo ndlela njengommandla obekelwe bucala ulondolozo lwendalo.

Unciphiso oluchasene nengozi yokutsalelwa phantsi kwamanzi okunxulumene neempembelelo eLangefonteinvlei luquka ukufakelelwa kweendonga zokuthintela, amalaphu angangenwa lula lulwelo okanye ezinye izixhobo ezifanelekileyo zokunciphisa ukufunxeka kwamanzi eziyilwe ngendlela yokuthintela ngokukuko, ukutsaleka kwamanzi kwiradiyasi yokombiwa kwesiza seNPS ngokwaso, nokuthintela nayiphi ingozi yeempembelelo zokutsaleka kwamanzi echaphazela iLangefonteinvlei.

Amanyathelo okunciphisa achasene neempembelelo zemitsitso elunxwemeni azinze ekuqukeni iindlela zokuyila ukungafunxeki kwamanzi, eziya kuvumela ukusasazwa kwakhona kwexesha elide nokuphambukisa usasazeko / ukufunxeka kwamanzi omhlaba ukuphinda kwisinyibilikisi, ukuze sigalele kwimitsitso yaselunxwemeni eyehla nomlambo, kuthathelwa ingqalelo ukwanda okuqikelelwayo kokuphakama kolwandle okunokwenzeka ngenxa yokuba netyuwa kwamanzi omhlaba ngaphezulu nje kokuphakama kolwandle kwangoku.

Amanye amanyathelo akhuthazwayo okunciphisa kwesi siza angaquka:

- Indlela yokungena esemantla kufuneka ingasetyenziswa, yaye indlela yokungena yasentshona kufuneka ilungelelaniswe ngokutsha ukuya emantla ngenjongo yokuphepha inani lemitsitso elunxwemeni;

- Iindlela zokungena kufuneka zenzelwe iibrorho zokuwela imigxobhozo ewelwa ngokungenakuphetshwa ziindlela;
- Iingcingo zothumelo kufuneka ziquke naziphi iindlela zokulondoloza / zokungena ukunqamleza iindunduma ezishenxayo, yaye kufuneka kwenziwe isibonelelo sokufikela ngehelikopta okanye (ukuba kunokwenzeka) ngesithuthuthu esinamvili amane kuphela;
- Unciphiso lweempembelelo ezayanyaniswa nothutho lwentlabathi ukunqamleza iindunduma ezishenxayo lunokwenzeka, ukuba kunokusetyenziswa inkqubo yokuhambisa, kodwa kubekwe izithintelo eziphathekayo kulwakhiwo / ulondolozo lweendlela nolawulo lwentlenga.

Nangona kunokuzalisekiswa onke amanyathelo onciphiso achaziweyo ngentla, isiphumo esongezelelekayo sisathathwa sisesokubaluleka okuphezulu okungalunganga okukhoyo, ngenxa yempembelelo yentsalela kwimigxobhozo emikhulu engachatshazelwanga yimpembelelo ngoku kunqamleza ummandla omkhulu, nokuthotywa okukhoyo nokungenakuncitshiswa kommandla omncinci wemigxobhozo yomtsitso oselunxwemeni ongachatshazelwang ziimpembelelo.

Nangona kunjalo unciphiso lokulinganisa lunokwenzeka, yaye lungaquka imimandla yolondolozo lwendalo equka imigxobhozo yeEastern Valley Bottom neyemimandla yeendunduma yaseOyster Bay ngokwayo, ukuya kummandla onempembelelo kumntla womda webala legalufa laseThe Links. Inyathelo elifunekayo lithatha ukuba kuthengwe yonke imihlaba esecaleni kwendlela yokungena yasempuma ecetywayo phambi kokuba iphuhliswe, yaye ngaloo ndlela kuthengwe umhlaba omkhulu womgxobhozo nenkqubo yeendunduma, ezo ngenye indlela ziya kuba neempembelelo zophuhliso ngokusisigxina (kodwa zingatshatyalaliswa). Oku akunciphisi ngokuchasene nelahleko yemitsitso yemigxobhozo yaselunxwemeni, kodwa kunika ithuba lolawulo olukhulu nolondolozo lweenkqubo zokuphila zomgxobhozo zizonke yaye kukholelwa ukuba zilinganisa ilahleko yeminye yale migxobhozo ebalulekileyo, xeshikweni kugcina imigxobhozo yaseLangefonteinvlei neendunduma ezehlayo zikwimeko engenayo impembelelo. Kwimeko yokuba amanyathelo onciphiso olupheleleyo nolinganiso azalisekisiwe, impembelelo eshiyekileyo kwimigxobhozo kwisiza saseThyspunt kungenza kube yeyokubaluleka okulungileyo, nomboniso okhethekayo kwenye indlela evavanyiweyo yokungabikho kophuhliso.

Xa kuthethiwe oku, nangona kunjalo, kuyavunywa ukuba ngokuthandekayo, akukho nomnye wemigxobhozo engaphakathi neyanyaniswa nendunduma yaseOyster Bay, ekufuneka ibeyinxalenye yolungiso naluphi lophuhliso. Kwimeko yokuba beyingekho enye indlela efumanekayo yophuhliso ebonelela ngamathuba enkxaso-mali aneleyo okulawula izinto ezingezizo zelizwe, yaye kungaquki ukwaphuka ngeziqendwana kommandla ukuba ngamasuntswana amancinci ophuhliso, ngako oko ukhetho olunjalo belunokuthandeka ngokucacileyo ngokwembono yezinto eziphilayo neendawo zazo zokuhlala, kulo naluphi uphuhliso lwesibonelelo samandla enyukliya kwesi siza.

## 1.12 Lezilwanyana Zelizwe (Appendix E13)

EDuynefontein, ubungakanani bomhlaba wophuhliso ofumanekayo, nongenalo uvakalelo oluphezulu kwizilo zonke zelizwe, unqongophele kodwa wanele ukuvumela iNyukliya-1. Nangona kunjalo, ukwandisa okongezelelweyo kwixa elizayo kwamalungiselelo okuvelisa amandla phakathi kwepropati yangoku kaEskom, ukuya kumantla eKNPS, kufuneka kungacingwa.

Uphuhliso lweNyukliya-1 eDuynefontein lunokuba neempembelelo ezimbi ezibalulekileyo, ikakhulu ngenxa yeempembelelo ezithe ngqo kwikhaya lendalo lezilwanyana zelizwe ezikhoyo phakathi kwemimandla. IDuynefontein ingazuza kukhetho lokungaphuhlisi ngenxa yokuba

umhlaba sele ulawulwa njengenxalenye yolondolozo lwendalo yabucala. Amathuba emilinganiso yolondolozo kwisiza anqongophele.

EBantamsklip, kwicala laselunxwemeni lwe-R43, ubungakanani bomhlaba wophuhliso ofumanekayo nongenalo uvakalelo oluphezulu kwizilo zonke zelizwe, wanele ngokugqithiseleyo ukuvumela iNyukliya-1. Inxalenye yepropati engaphakathi kwelizwe ku-R43 inovakalelo oluphezulu yaye kufuneka ingaphuhliswa kwaphela.

Uphuhliso lweNyukliya-1 eBantamsklip lunokuba neempembelelo ezimbi ezibalulekileyo, ikakhulu ngenxa yeempembelelo ezithe ngqo kwikhaya lendalo lezilwanyana zelizwe ezikhoyo phakathi kwemimandla. Nangona kunjalo, imilinganiso ebalulekileyo enokubakho inokwenzeka eBantamsklip ukuba indawo engaphuhliswanga inokubhengezwa njengendawo yolondolozo lwendalo ize ilawulwe ngokuneziphumo. Oku kungaxhomekeka ngokukodwa kukhuseleko nolawulo lwenxalenye engaphakathi kwelizwe, kwakunye nepaseji eyaneleyo yaselunxwemeni.

Ukhetho lokungaphuhlisi iBantamsklip alulunganga ngenxa yokuba kungacingelwa ukuba kuya kukhokelela kutshintsho lobunini-mhlaba yaye mhlawumbi uphuhliso elunxwemeni lweendawo zokuhlala kunye/okanye ezokuthatha ikhefu, nokwanda okunokwenzeka kobunzulu bemizamo yokusebenzela indyebo yelizwe ngezolimo kwinxalenye engaphakathi kwelizwe.

Ubungakanani bomhlaba wophuhliso ofumanekayo, yaye lowo ungenalo uvakalelo oluphezulu kwizilo zelizwe, uthinteleke kakhulu yaye awanelanga ukuvumela iNukliya-1. Nangona kunjalo, ukuba umhlaba owongezelelweyo ubunokuthengwa owayamene nomhlaba omnxinwa odibana nomhlaba obanzi kwinxalenye yepropati, oku kusilela bekungoyiswa.

Uphuhliso lweNyukliya-1 eThyspunt lunokuba neempembelelo ezimbi ezibalulekileyo, ikakhulu ngenxa (a) yeempembelelo ngqo kwindawo yokuhlala yezilwanyana zelizwe ezikhoyo phakathi kwemimandla, (b) yophuhliso lweendlela ezintathu ezinkulu ezintsha zofikelelo, kunye (c) nemfuneko yokuphuhlisa ipaseji ukucanda ummandla omkhulu weenduli ezishenxayo, ezenza esi siza sibe yingxaki enkulu ngokuphathelele izilwanyana zelizwe neendawo zazo zokuhlala. Kwelinye icala, imilinganiso ebaluleke kakhulu enokubakho inokwenzeka eThyspunt ukuba umhlaba ongaphuhliswanga ungabhengezwa njengendawo yolondolozo lwendalo uze ulawulwe ngokuneziphumo. Imilinganiso enjalo inokomelezwa kakhulu ngokuthengwa komhlaba owongezelelweyo.

Ukhetho lokungaphuhlisi iThyspunt akulunganga ngenxa yokuba kuthathwa ngokuthi kuya kukhokelela kutshintsho lobunini-mhlaba yaye mhlawumbi kuphuhliso elunxwemeni lweendawo zokuhlala kunye/ okanye ezokuthatha ikhefu, yaye mhlawumbi nokwanda kubunzulu bemizamo yokusebenzela indyebo yelizwe ngezolimo kwinxenye engaphakathi kwelizwe.

**Imeko ebalulekileyo engalunganga kukusilela kolwazi olucacileyo nokuba izicombululo zobunjineli ezaneleyo ziyafumaneka ukuphepha iimpembelelo ezimbi kakhulu ekumpompozeni kwamanzi omhlaba nemigxobhozo enovakalelo yaseThyspunt.** Kukho iimfuno ezifanayo zolwazi olongezelelweyo ngamandla eenguqu kummandla weenduli ezishenxayo, nokubhala ngcono iimaphu zamahlathi namatyholo eenduli zezityalo zamanye amazwe. Kuyafuneka ukuba amaphononongo afunekayo aqhutywe ngokungxamisekileyo ukwazisa inkqubo yeEIA.

Ngokwembono yolondolozo lwekhaya lendalo lwezilwanyana nezityalo, izigqibo eziqukayo ezilandelayo zifikelelwe:

- Ngokwemeko yangoku yokungaqiniseki malunga namanzi omhlaba nemigxobhozo kwakunye neminye imiba yezinto eziphilayo kokusingqongileyo, nokunganeli kobungakanani bomhlaba ofanelekileyo wophuhliso, isindululo sophuhliso eThyspunt sineziphene okwangoku. Kufuneka le meko iphuculwe ngokugqibezela amaphononongo achanekileyo, nokufumana umhlaba owongezelelekileyo, xa kukho imfuneko.

- Imicimbi engekenziwa eThyspunt kufuneka iconjululwe ngokwanelisayo phambi kokuba kwenziwe izigqibo zokugqibela yaye ngexesha lokuba amanyathelo okunciphisa afunekayo abalulwe ngokupheleleyo. Oku kunokuba nesiphumo sokumisela uphuhliso lwaseThyspunt elinye ixesha.
- INyukliya-1 ingaphuhliswa nokuba kuseDuynefontein okanye eBantamsklip, ngaphandle kwamaphando angezelelweyo eEIA yamakhaya endalo ezilwanyana nezityalo.

Iimpembelelo ezichongiweyo zeziza ezintathu ziyafana ngokutshintshisanayo, eDuynefontein, eBantamsklip naseThyspunt, nangona ubukhali beempembelelo bahlukile kwisiza nesiza. Nazi iimpembelelo ezichongiweyo:

i. Ukutshabalalisa amakhaya endalo ezilwanyana nezityalo nabemi bawo
***ii.*** Ukunciphisa abemi beentlobo eziseNgozini
***iii.*** Ukuqhekeka kwamakhaya endalo ezilwanyana nezityalo kunye neendlela zokuhamba kwezilwanyana
***iv.*** Ukufa ezindleleni
***v.*** Ukufa okwayanyaniswa neentambo zothumelo ezihamba phezulu kunye nezikhululo ezinganeno
***vi.*** Uphazamiso lwabemi abafuyayo abanovakalelo
***vii.*** Ungcoliseko lothuli ngaphaya kwesiza sokwakha
***viii.*** Ungcoliseko lomhlaba namanzi ngaphaya kwesiza sokwakha
***ix.*** Ungcoliseko lokukhanya ngaphaya kwesiza sokwakha
***x.*** Utshintsho lwemiphakamo nemimpompozo yamanzi omphezulu nawomhlaba, neziphumo kwimigxobhozo yengingqi
***xi.*** Ukuzingela ngaphandle kwemvume izilwanyana zasendle zengingqi
***xii.*** Ukufanekisa ngemidlalo iingxaki zezilwanyana
***xiii.*** Ukuqokelelana kweeradioisotope (ilungu leradio elahluke kwelinye ngobunzima nenukliya kodwa hayi ngeempawu zekhemistri) kokusingqongileyo nakwimizimba yezilwanyana zasendle
***xiv.*** Iimpembelelo ezongezelekayo
***xv.*** Imo ephucukileyo yolondolozo yomhlaba ongaphuhliswanga (impembelelo elungileyo).

Amanyathelo okunciphisa akhuthazwayo ayafana kwiziza ezintathu ngokutshintshisanayo, eDuynefontein, eBantamsklip naseThyspunt, nangona iinkcukacha zahlukile kwisiza nesiza.

**i. Unciphiso lokutshabalalisa amakhaya endalo ezilwanyana nezityalo nabemi bawo**

- Uphuhliso maluphelele kwindawo ekhoyo ekhuthazwayo.
- Ubukho bophuhliso mabuphelele kweyona ndawo incinci kangangoko.
- Ukulahla umonakalo elwandle
- Yila imimandla yokubekela kwiindawo ebeziphazamisekileyo ngaphambili.
- Ukusebenzisa iimbonakalo zendalo zokwakheka komhlaba njengemida.
- Ukucoca isiza ngolandelelwano olunengqiqo.
- Ukuphawula imimandla echaphazelekayo.
- Ukubuyisela kwimo yangaphambili imimandla echaphazelekileyo, apho kunokwenzeka.
- Ukwenza imbuyekezo yelahleko yamakhaya endalo ezilwanyana nezityalo. (Jonga ngezantsi.)

**ii. Unciphiso lokuphungula abemi beentlobo eziseNgozini**

- Onke amanciphiso adweliswe ngaphantsi kwe-(i) (ngentla).
- Ukulungiselela imisebenzi yokufuna nokuhlangula ngaphambi nangexesha lokucoca isiza.
- Ukulungiselela ukuqokelela izinto nolwazi lwezenzululwazi ngaphambi nangexesha lokucoca isiza.

**iii. Unciphiso lokuqhekeka kwamakhaya endalo ezilwanyana nezityalo neendlela zokuhamba kweezilwanyana**

- Uninzi lwezinciphiso ezidwelisiweyo ngaphantsi kwe-(i) (ngentla).
- Ukwenza isibonelelo seepaseji zezinto eziphilayo namakhaya azo.
- Ukwakha iinkalo zokuwela ngaphantsi nangaphezulu kweendlela.
- Ukwenza iindlela zibe kude kangangoko kwimigxobhozo.
- Ukusebenzisa iintlobo ezikhuthazwayo zokubiyela ngokhuseleko.
- Naphi apho kunokwenzeka, Ukubeka uluhlu lwemibhobho neentambo ngaphantsi komhlaba, yaye ubuyisele umhlaba kwimo yesiqhelo.
- Ukunciphisa inani leendlela neziporo yaye uzibeke ngononophelo.
- Ukwenza ukuba iindlela zingafikeleleki ngamaxesha amisiweyo yonke imihla.

**iv. Ukunciphisa ukufa ezindleleni**

- Ukunciphisa inani leendlela neziporo yaye uzibeke ngononophelo.
- Uwenza iindlela zibe kude kangangoko kwimigxobhozo.
- Ukwakha iinkalo zokuwela ngaphantsi nangaphezulu kweendlela.
- Ukuthintela isantya ezindleleni.
- Ukwenza ukuba iindlela zingafikeleleki ngamaxesha amisiweyo yonke imihla.
- Ukubeka iimpawu zokulumkisa kwiindawo ezifanelekileyo.
- Ukusebenzisa izilawuli zesantya eziyilwe ngokufanelekileyo.

**v. Ukunciphisa ukufa okuyamaniswa neentambo zothumelo ezihamba phezulu kunye nezikhululo ezinganeno**

- Ukufakela izixhobo ezisemgangathweni kuzo zonke iindlela ezintsha (umz., “iziphekuzi” okanye izibuyisi zokukhanya okanye “iibhola”).
- Ukuhlola iindlela nezifakelo.

**vi. Ukunciphisa uphazamiso lwabemi abafuyayo abanovakalelo**

- Qinisekisa indawo nobungakanani beentaka ezinovakalelo kunye neminye imimandla.
- Valela bucala iintaka ezinovakalelo kunye neminye imimandla.
- Thintela amaxesha okudubula.
- Dala imimandla yemida ebanzi.
- Thintela isiphithiphithi seenqwelomoya.
- Thintela ukuhanjiswa kwamanzi.
- Nyanzelisa zonke izithintelo.
- Misa indlela yokuhlola.

**vii. Ukunciphisa ungcoliseko lothuli ngaphaya kwesiza sokwakha**

- Sebenzisa amanyathelo okunciphisa asemgangathweni, umz., ukumanzisa ngamanzi amatsha, ukusebenzisa izibiyeli zokuthintela zelaphu okanye ezamatyholo, ukugquma iingqumba ngeeplastiki ezithe tyaba, njl.
- Musa ukusebenzisa amanzi olwandle.

**viii. Ukunciphisa ungcoliseko lomhlaba namanzi ngaphaya kwesiza sokwakha**

- Sebenzisa amanyathelo okunciphisa asemgangathweni.
- Susa kwisiza wonke umhlaba namanzi angcolisekileyo.
- Lahlela elwandle amanzi anetyuwa avela ekususeni ityuwa.
- Lahla amanzi amdaka edolophu ngendlela elondolozayo.

**ix. Ukunciphisa ungcoliseko lokukhanya ngaphaya kwesiza sokwakha**

- Nciphisa izibane zangaphandle.
- Sebenzisa izibane zobude bamaza amade kuphela.
- Sebenzisa izifakelelo zokwalatha imbombo.
- Yenza ikhuse kwizibane zangaphakathi.

**x. Ukunciphisa inguqu yemiphakamo nemimpompozo yamanzi omphezulu nawomhlaba, neziphumo ezongezelelekayo kwimigxobhozo yengingqi**

- Phepha iziza apho umonakalo omkhulu kumgxobhozo ungenakunqandwa.
- Musa ukusebenzisa imigxobhozo okanye amanzi omhlaba njengemithombo yamanzi amatsha.
- Lawula njengenjineli izisombululo zokumpompoza kwamanzi omhlaba.
- Qhuba amaphononongo awongezelelweyo eThyspunt.

**xi. Ukunciphisa ukuzingela ngaphandle kwemvume izilwanyana zasendle zengingqi**

- Fundisa abasebenzi.
- Gada ummandla.
- Lawula izinto zokusebenza.
- Lawula izixhobo zokudubula.
- Lawula ufikelelo emva kweeyure zomsebenzi.
- Lawula ufikelelo kwimimandla engeyiyo yokwakha.

**xii. Ukunciphisa iingxaki zezilwanyana ngokufanekisa ngemidlalo**

- Musa ukuvumela ukutyiswa kweezilwanyana zasendle.
- Gcina imithombo yoncedo enomtsalane apho ingenakufikelelwa.
- Sebenzisa ulawulo olungqongqo lwenkukuma etyekayo.
- Shenxisa iikati nezinja zasendle.
- Musa ukuvumela izilo-qabane kwisiza.

**xiii. Ukunciphisa ukuqokelelana kwee-radioisotope (ilungu leradio elahluke kwelinye ngobunzima nenukliya kodwa hayi ngeempawu zekhemistri) kokusingqongileyo nakwimizimba yezilwanyana zasendle.**

- Akukho zinciphiso zikhuthazwayo, ngaphaya kwezo zifunwa ngokwempilo yoluntu nemithetho yokhuseleko.

**xiv. Ukunciphisa iimpembelelo ezongezelekayo**

Izinciphiso ezikhuthazwayo eziya kuba nelona galelo likhulu zezi:

- Ukhetho lwento ekhoyo yophuhliso olufanelekileyo
- Ukubuyisela kwimo yesiqhelo imimandla eyonakalisiweyo, emva kokwakha
- Ukusebenzisa uyilo olufanelekileyo lokubiyela umda
- Ukusebenzisa ukukhanya okufanelekileyo ngaphandle
- Ukuphepha nokunciphisa iimpembelelo kumanzi omhlaba
- Ukunyanzelisa izithintelo zeziphazamiso nokuzingela ngaphandle kwemvume izilwanyana zasendle
- Ukuhlola abemi abanovakalelo ukunceda ulawulo lokusingqongileyo
- Ukuhlola ungcoliseko lweradioisotope ukunceda ulawulo lokusingqongileyo.

**xv. Ukunciphisa/ ukubuyekeza iimpembelelo ngokuphucula ulondolozo lomhlaba ongaphuhliswanga**

- Ukuphakamisa imo yezomthetho yeenxalenye ezingaphuhliswanga ukuba ziindawo zolondolozo lwendalo ngokusemthethweni
- Ukwenza ukuba izibiyeli ezingafanelekanga zocingo lomnatha zithathelwe iindawo zizibiyeli zeepali zentsimbi
- Iindleko ezandileyo zokususa izityalo zelinye ilizwe ezihlaselayo
- Ukufakela iinkalo ezimbini okanye ezintathu ezihamba ngaphantsi ezibekwe ngobuchule ukulungiselela ukuhamba kwezilwanyana ukuwela iindlela eziphithizelayo
- Ukugunyazisa amaphando anzulu amaqela ezilwanyana eziphandwe ngokusilelayo, ezi zezi., izirhubuluzi, izilwanyana eziphila emhlabeni nasemanzini nezilwanyana ezanyisayo ezincinci

Ukugunyazisa inkqubo yokuhlola abemi beentlobo ezinovakalelo

**Inkqubo ekhuthazwayo yokuhlola nokuxabisa**

Inkqubo efanelekileyo yokuhlola nokuphicotha kufuneka yenziwe ukulandela umkhondo wokusebenza ngempumelelo kwamanyathelo okunciphisa. Ubuninzi boku kuhlola kufuneka bakhelwe kwinkqubo yokuphicotha yeeEMP yezigaba zokwakha, ukusebenza nokuphelisa ugunyaziso, kodwa ufakelo ngexesha lesigaba sokuyila nako kananjalo kubalulekile ekwenzeni imida yemimandla enovakalelo. Inkqubo kufuneka iquke uhlolo olubhekiswe ngqo ngokukhethekileyo kubemi bezilo zonke zelizwe ezinovakalelo.

## 1.13 Ezingenawo Umqolo (Appendix E14)

**Imvelaphi**

Impembelelo ezinokubakho zesikhululo samandla seNyukliya-1 esicetywayo nguEskom kubahlali bezilwanyana zehlabathi ezingenamqolo kwiziza ngokutshintshanayo zaseDuynefontein, eBantamsklip naseThyspunt ziphandiwe.

Ukuxabisa uvakalelo lwabahlali bezilwanyana ezingenamqolo kwezi ziza kusekwe:

1. kuvavanyo lokuqala olunikwe kwingxelo yobungcali eveliselwe ingxelo yokukhangela ngokupheleleyo yeNyukliya-1 yeEIA (“ingxelo yokukhangela ngokupheleleyo yezilwanyana zehlabathi ezinganamqolo”),
2. kuvavanyo lwekhompyutha olongezelelweyo lwabahlali bamabhabhathane,
3. kwiimvavanyo ezimfutshane zommandla zokwahlukana kwamabhabhathane zokukhangela ngembonakalo nokubamba ngeminatha kwisiza ngasinye ekupheleni kukaAgasti/ekuqaleni kukaSeptemba ngowama-2008 kulandelwa luvavanyo olunzulu lwamabhabhathane kwiindawo zokuhlala ezinkulu zendalo kwisiza ngasinye ekupheleni kukaMatshi wama-2009,
4. kwiimvavanyo ezimfutshane zommandla weembovane ezahlukeneyo ngokuqokelela iisampulu zovavanyo olusebenzayo olubekelwe ixesha lemizuzu eli-15 engamashumi amabini kwisiza ngasinye ekupheleni kukaAgasti/ekuqaleni kukaSeptemba wama-2008,
5. kwiimvavanyo ezingenabunzulu kakhulu zommandla ekupheleni kukaAgasti/ekuqaleni kukaSeptemba ngowama-2008 malunga nezibonakalisi eziliqela zetax eziquka nezinye zazo ezixatyisiweyo kwingxelo yokukhangela ngokupheleleyo yezilwanyana zehlabathi ezingenamqolo yaye
6. Nakwiinkqubo ezinzulu zokuhlola kwisiza bezona ntlobo zithandwayo ezikhoyo (ngokusekwe kumdibaniso wezigqibo zeengcali zezinto eziphilayo) neendawo zendalo zokuhlala ezifanayo kwisiza ngasinye ngoDisemba wama-2009/ngoJanyuwari wama-2010.

**Iintsilelo zophononongo**

Olu phononongo lugunyaziswe kwibakala elisemva kakhulu ngexesha lenkqubo ye-EIA yeNyukliya-1, evumela iiveki ezintathu kuphela ngowama-2008 ukugqiba uvavanyo lommandla, ukuhlalutya, ukuvavanya impembelelo nokwenza ingxelo. Ngako oko ngeli xesha kukwazekile ukwenza kuphela uvavanyo olungekho nzulu kakhulu, kukho iintsuku ezimalunga

nezimbini ezifumanekayo zokuhlola isiza ngasinye sezithathu, ezinomhlaba odibeneyo ongama-5 885 hectares (ha). Iintsilelo ezisisiphumo sexesha elifutshane kakhulu lovavanyo lommandla zenziwa mandundu nangakumbi kukubeka ixesha elingafanelekanga (uninzi lwamatyelelo ommandla luphakathi kwama-25 kuAgasti nesi-2 kuSeptemba), njengoko uninzi lweentlobo ezingenamqolo ezikhoyo zibonisa amazinga aphantsi kakhulu entshukumo ngeli xesha lonyaka. Ixesha eligqithisileyo nezithintelo zexesha lonyaka kwiimvavanyo eziqhutywe ngowama-2008 zingenise ukungaqiniseki ekubekeni ngokoluhlu uvakalelo lwesiza yaye zathintela uqokelelo olunzulu olwaneleyo lweziza ukuvumela ukhetho, kwimbono yolondolozo lwezilwanyana zehlabathi ezingenamqolo, zeendawo ezithandwayo zophuhliso phakathi kweziza. Amaphononongo amabhabhathane angezelelweyo ngoMatshi wama-2009 ahambele phambili ekulungiseni oku, kodwa zombini iimvavanyo zokuhlela izinto eziphilayo (taxonomic) nokukhangela nokupheleleyo ngamaxesha onyaka nazo zisilele kakhulu. Ukubeka ngokweendawo uvakalelo neenkuthazo malunga neendawo ezithandwayo zezibonelelo zokusebenza kufuneka ngako oko zithathwe njengezethutyana njengoko zingathathelanga ngqalelo uninzi lwamaqela ezilwanyana ezingenamqolo ezikhoyo kwiziza. Iimvavanyo ezongezelelweyo ezinzulu zokuvumelana ngezinto ezikhoyo ezithandwayo kwimimandla ngoDisemba wama-2009 / ngoJanyuwari wama-2010 ziqhubekile ukunciphisa iintsilelo nokuvumela izigqibo eziphathekayo zenziwe ngokuphathelele kwiimpembelelo nonciphiso, kodwa azisusi imfuneko yophando olunzulu lwamakhaya endalo ezilwanyana ezingenamqolo zesiza esikhethiweyo phambi kokwakha; UEskom uzibophelele ekuqhubeni uphononongo olunjalo.

**Iziphumo zeemvavanyo zommandla**

Ambalwa kakhulu amabhabhathane aqwalaselweyo ngexesha leemvavanyo zokuqala kummandla (uhlobo olunye kwindawo nganye eDuynefontein naseBantamsklip, ezisixhenxe eThyspunt), kodwa iingqwalaselo zamakhaya endalo nezityalo zokutya zincedile ukucokisa uvavanyo lwekhompyutha zokwahlukana kweentlobo okunokubakho. Ukwahluka kweembovane bekuphantsi ngokubonakalayo kodwa kuzinzile kwiindawo zeziza zaselunxwemeni nokubakho kwazo phakathi kweNqila yeeNtyatyambo yaseKapa (Cape Floristic Region), nokona kwahluka kuphezulu kuqikelelwa eDuynefontein (ngama-27 spp.), kulandelwa ngokusondeleyo yiThyspunt (ngama-26 spp.), yaye eBantamsklip kukho umahluko oqikelelwayo ophantse ube sezantsi (ongama-21 spp.). Uvavanyo lwasehlotyeni mhlawumbi beluya kunika iingqikelelo zomahluko eziphezulu.

Ukongeza kwiisampulu zeentlobo eziliqela zamasongololo, iintlobo eziliqela zamabhungane enkawu, iintlobo ezintathu zoonomadudwane, iintlobo ezimbini zezigcawu zeemfene neegastropods zasemhlabeni eziliqela, nezilwanyana ezingenamqolo eziliqela kube zizinto zophando ezifunyenweyo ezibaluleke kakhulu yaye zarekhodwa (zabhalwa) ngexesha leemvavanyo ezahlukeneyo. Ezona zinto zibalulekileyo kweziphandiweyo zezi:

1. Uhlobo olungachazwanga mhlawumbi lwesigcawu socango oluthe tyaba sodidi lwe*Spiroctenus* eBantamsklip;
2. Uhlobo olungachazwanga mhlawumbi lwembovane (i*Leptogenys* sp.) eBantamsklip;
3. Iintlobo ezimbini ezingachazwanga zeembovane (i*Tetramorium* sp. ne*Monomorium* sp.) eDuynefontein;
4. Uhlobo olunqabileyo yaye mhlawumbi olungachazwanga lwesigcawu socango oluthe tyaba sodidi lwe*Pionothele* eDuynefontein
5. Umsundululu oyivelvethi (iOnchyophora) ofunyenwe liqela lekhaya lezilwanyana ezinomqolo eThyspunt;
6. Uhlobo lwembovane enye engachazwanga (i*Monomorium* sp.), iintlobo ezimbini zeembovane mhlawumbi ezingachazwanga (i*Tetramorium* sp. ne*Camponotus* sp.) nohlobo lwembovane ethintelweyo nenqabe kakhulu esoloko ikho endaweni ethile (i*Diplomorium longipenne*) eThyspunt.

**Uhlalutyo lovakalelo**

Izigqibo malunga novakalelo oluqhelekileyo lweziza ngokwembono yolondolozo lwezilwanyana zasemhlabeni ezingenamqolo, kwakunye nokona kubekeka kulungileyo kweNPS ecetywayo phakathi kweziza, kufuneka zithathwe njengezethutyana ngenxa yexesha

elingafanelekanga leemvavanyo zommandla kwakunye nexesha elifutshane ngokugqithiseleyo nelithintelweyo lokugqiba ukuhlela izinto eziphilayo.

Iziphumo zeemvavanyo zommandla novavanyo lwekhompyutha lwamabhabhathane zixela ukuba ngokuchasene neengqikelelo zengxelo yokukhangela ngokupheleleyo yezilwanyana zomhlaba ezingenamqolo, isiza saseThyspunt mhlawumbi sixhasa abona bahlali beentlobo ezininzi zezilwanyana ezingenamqolo. Nangona kunjalo, ngenxa yomahluko omkhulu weentlobo ezinqabileyo nezisagcine imo yazo yamandulo eziqikelelweyo kwisiza saseBantamsklip, nokubhaqwa kwabahlali beentlobo ezingachazwanga kwakunye neentlobo zeembovane ezinokuba zithintelwe kwakunye mhlawumbi neentlobo zezigcawu ezingachazwanga zocango oluthe tyaba apha, esokugqibela isiza sithathwa sisesona sinabahlali abaxabisekileyo bezilwanyana ezingenamqolo ngokwembono yolondolozo, yaye sithathwa sisesona siza sinovakalelo kwiziza ezintathu. IDuynefontein ibe nowona mahluko uphantsi wamabhabhathane, kodwa umahluko weembovane ubumkhulu kancinci kunowaseThyspunt, yaye mhlawumbi unomahluko ophakathi jikelele wezilwanyana ezingenamqolo; neentlobo ezimbalwa kakhulu ezinqabileyo okanye ezigcina imo yamandulo eziboniweyo okanye eziqikelelweyo, esi siza sithathwe sisesona sinovakalelo oluncinci.

Iinkqubo zokuhlola ezongezelelweyo zesiza eziqhutywe ngoDisemba wama-2009 / ngoJanyuwari wama-2010 ziqinisekise ukuba, kwimeko yaseBantamsklip naseThyspunt, nokuba loluphi uvakalelo lwamakhaya endalo ezilwanyana phakathi kwemimandla ekhoyo ecetywayo, kukho ukukhangela okupheleleyo okwaneleyo kokukhusela ngokwaneleyo amakhaya endalo aliqela afanayo kwenye indawo kwisiza. EDuynefontein, xa amakhaya endalo afanayo ngaphandle kommandla okhoyo ocetywayo ambalwa kakhulu, sinethemba lokuba uninzi lweentlobo zezilwanyana ezingenamqolo phakathi kwendawo ekhoyo ecetywayo ziya kumelwa ngokwaneleyo kwezinye iindawo zendalo zokuhlala ezikhoyo kwisiza. Ngokuphathelele kuzo zontathu iziza, iinkuthazo ezenziwe apha malunga neendawo ezikhoyo ezithandwayo zenziwa nangona kunjalo ngokuqonda okucacileyo ukuba iimvavanyo ezinzulu zezilwanyana ezingenamqolo kwisiza (kwiziza) ezikhethelwe ukwakhiwa kweNPS ziya kuqhutywa phambi kokuqaliswa kwemisebenzi yokwakha ukuqinisekisa ukuba akukho zintlobo zikhethekileyo okanye amaqela aya kuba sengozini.

**Ukuchongwa kwempembelelo nenkuthazo yokunciphisa**

Ezona mpembelelo **zingalunganga** ezinokubakhona kuphuhliso olucetywayo lweNPS kumaqela ezilwanyana zomhlaba ezingenamqolo kwiziza ezintathu namanyathelo okunciphisa esiseko akhuthazwayo abonisiwe kuLuhlu A.

ULuhlu A: Ezona mpembelelo zibalulekileyo ezinokuba azilunganga namanyathelo akhuthazwayo okunciphisa

| **Impembelelo** | **Amagqabantshintshi esiseko eenkuthazo zokunciphisa** |
|---|---|
| Ukutshabalalisa ngqo ikhaya lendalo lezilwanyana nezityalo | 1. Qhuba iimvavanyo ezongezelelweyo ezinzulu zezilwanyana ezingenamqolo kuzo zontathu iziza ukwenzela iinkuthazo ezivakalayo zenziwe malunga nezona nxalenye zesiza ezifanele uphuhliso;<br>2. Nciphisa uphuhliso lwendawo ekhoyo yaye uthintele yonke imisebenzi yophuhliso ukuphelela kwimimandla ekhuthazwayo; yaye<br>3. Lahla izinto ezingafunwayo ngaphandle kwesiza yaye wenze indawo yokugcina yethutyana ibe ncinci kangangoko kunokwenzeka. |
| Ukuphungula abemi beentlobo ezinqabileyo / ezisengozini / ezikhuselweyo | 1. Nciphisa uphuhliso lwendawo ekhoyo yaye uthintele yonke imisebenzi yophuhliso ukuba kwimimandla |

| | |
|---|---|
| | ekhuthazwayo;<br>2. fezekisa onke amanyathelo afunekayo ukunciphisa ukufa ezindleleni nongcoliseko lokukhanya. |
| Ungcoliseko lokukhanya | 1. Ukukhanya okubonakala ngaphandle kufuneka kugcinwe kukuncinci kangangoko yaye<br>2. naphi na apho kunokwenzeka kufuneka kusetyenziswe imithombo yokukhanya yomgama omde phakathi kweencam zamaza amabini. |
| Ukusasazeka kweentlobo zezilwanyana ezingenamqolo ezihlaselayo zelinye ilizwe | 1. Misela ulawulo olungqongqo malunga nezinto eziziswa kwisiza;<br>2. Buyisela kwimo yesiqhelo iindawo eziphazamisekileyo ngokukhawuleza kangangoko kunokwenzeka; yaye<br>3. Misela iinkqubo zokuhlola nokuphelisa ngenjongo yokukhangela nokulawula iintlobo ezihlaselayo zelinye ilizwe. |

Eyona mpembelelo ibalulekileyo enokuba **ilungile** yophuhliso olucetywayo lweNPS kumaqela ezilwanyana zomhlaba ezingenamqolo kwiziza ezintathu iya kuba kukuphucula ukhuselo nolawulo oluthambekele kulondolozo lweziza nguEskom. Ukuxabisa iimpembelelo ezingalunganga nezilungileyo zophuhliso olucetywayo kucebisa ukuba malunga neBantamsklip neThyspunt impembelelo elungileyo eyinzuzo ingafikeleleka. Kungaxoxwa nangaphezulu ukuba ukwakha iNPS enye kwesinye nesinye sezi ziza kungaba nesiphumo sempembelelo enkulu eyinzuzo elungileyo kwizinga lesizwe kunokwakha isikhululo esinye okanye ezingaphezulu kwisiza esinye kuphela.

**Iinkqubo zokuhlola ezikhuthazwayo**

Amagqabantshintshi eenkqubo zokuhlola ezikhuthazwayo malunga nokuxabisa ukusebenza ngempumelelo nokuncedisa ukufezekisa amanyathelo okunciphisa anikelwe kuLuhlu B.

ULuhlu B: Isishwankathelo seenkqubo zokuhlola ezikhuthazwayo zezilwanyana ezingenamqolo

| **Inkqubo yokuhlola** | **Ubude bexesha lokuhlola** | **Ukwenza ingxelo** | **Iinjongo zolawulo** |
|---|---|---|---|
| 1. Ukufa kwezilwanyana ezingenamqolo okubangwa kukukhanya kwangaphandle | Ubomi beprojekthi: qala phambi kokwakha ukufumana isiseko sokuqala, qhubeka kuzo zonke izigaba zokwakha nokusebenza. | Njalo ngeenyanga ezi-3 kude kube itekeni ifikelelwe, emva koko njalo ngonyaka | Ukunciphisa ukufa okubangwa kukukhanya ukuya kumazinga angenamsebenzi; kungabikho impembelelo ebalekayo yongcoliseko lokukhanya ukujikeleza abemi bezilwanyana ezingenamqolo. |
| 2. Uhlaselo ziintlobo zezilwanyana ezingenamqolo zamanye amazwe | Ubomi beprojekthi: qala phambi kokwakha ukufumana isiseko sokuqala, qhubeka kuzo zonke izigaba zokwakha nokusebenza. | Ngonyaka | Ukukhangela ukusekwa kweentlobo zelinye ilizwe ngenjongo yokuvumela ukungenelela kwangoko ngokuphelisa / ukulawulal. |
| 3. Ukwahlukahlukana nokwakheka | Qala phambi kokwakhiwa | Ngonyaka | Ukwahlukahlukana nokwakheka kweentlobo |

| | | |
|---|---|---|
| kwabahlali<br>bamaqela<br>akhethiweyo<br>esibonakalisi<br>afana<br>neembovane<br>nezinambuzane<br>ezitya amagqabi | ukufumana amaxabiso<br>esiseko yaye uqhube<br>ngalo lonke ixesha<br>lezigaba zokwakha<br>(kuquka ukubuyisela<br>kwisimo<br>sangaphambili iindawo<br>eziphazamisekileyo<br>emva kokwakhiwa)<br>nesigaba sokuphelisa<br>ugunyaziso. | zesibonakalisi<br>esikhethiweyo setax<br>yokubuyisela kumaxabiso<br>esiseko emva<br>kokubuyisela<br>ngempumelelo kwisimo<br>sangaphambili. |

**Uvavanyo lokusingqongileyo**

Uvavanyo lweempembelelo ezilindelweyo ezingancitshiswanga nezincitshisiweyo lubonise ukuba kuzo zontathu iziza intsingiselo yoninzi lweempembelelo ingaphungulwa ngokunciphisa ukuya phantsi okanye phakathi, kodwa malunga nokutshabalalisa ngqo ikhaya lendalo lezilwanyana nokuphungula amaqela anqabileyo/asengozini/iintlobo ezikhuselweyo oku bekungenakho ukwenzeka yaye imbuyekezo ibingafuneka ukuthomalalisa oku. Imbuyekezo enjalo iphawuleka ngokukhawuleza ekunciphiseni impembelelo elungileyo enokubakho echaziweyo ngentla, ukuba ulawulo oluthambekele kulondolozo luyaphuculwa, mhlawumbi ngeempawu ezongezelelweyo ezifakelwayo kwimimandla yolondolozo.

**IziGqibo neeNkuthazo**

X konke okusemandleni kwenziwe ukubonelela ngovavanyo oluphelele kangangoko, iintsilelo ezidalwe ngumgama wexesha onganelanga nokubeka ixesha elingafanelekanga leemvavanyo zezilwanyana ezingenamqolo kufuneka zibonwe njengezithintelo ezingamandla. Uvavanyo olunzulu olungathathi cala lommandla omkhulu kangaka (ama-5 885 hectares uwonke) alukwazi ukwenzeka phantsi kweemeko ezinje yaye ukuze kwandiswe intembeko ekulinganiseni ngokovakalelo, ukuchonga iimpembelelo ezithile ngokunzulu nangakumbi, nokubonelela ngegalelo elisemthethweni nangakumbi ekukhetheni imimandla enolona vakalelo luncinci phakathi kweziza, kukhuthazwa ngamandla ukuba iimvavanyo ezongezelelweyo zamakhaya endalo ezilwanyana ezingenamqolo ziqhutywe kwiziza ezithathu. Amaphononongo anjalo kufuneka aquke umgama obanzi wamaqela okuhlela izinto eziphilayo (taxonomic) ezineendima ezingafaniyo zeendawo zokuphila yaye ngokuthandekayo aqhutywe okungenani ixesha lonyaka wonke elisebenzayo, ukuvumela ukuba iimvavanyo zommandla ziqhutywe ubuncinane ngexesha lasentwasahlobo/ekuqaleni kwehlobo, phakathi/ekupheleni nokuya ekupheleni kwehlobo / ekuqaleni kokwindla, ngokuphathelele iimvavanyo zamabhabhathane ukuquka iinyanga zikaOktobha, uNovemba, noFebhruwari ubuncinane. Ezi mvavanyo kufuneka ziquke ngokukodwa ilungu elijolise ekufumaneni iisampulu zobudoda zeentlobo mhlawumbi ezeentlobo ezintsha zesigcawu socango (i*Spiroctenus* sp.) ezifunyenwe eBantamsklip ukuze ukuchongeka kwaso kuqinisekiswe, kwakunye nokumisela ukusasazeka kwaso kwisiza nakwimimandla esingqongileyo ukunceda ukukhetha iindawo ezithandekayo zophuhliso lweNPS xa kuqinisekiswa ulondolozo lweentlobo. Iimvavanyo ezipheleleyo zamakhaya endalo embovane kwisiza (kwiziza) ezikhethelwe uphuhliso kufuneka ziqhutywe phambi kokwakha ukubonelela ngesiseko sokuqala sokuhlola ukubuyisela kwimo yangaphambili (ngokukodwa iindawo zokugcina izinto ezingafunwayo) nokuhlasela okunokwenzeka kweentlobo zembovane zelinye ilizwe, kwakunye nokubonelela ngegalelo kwiimvavanyo ezinzulu zovakalelo nokuvavanya imo yolondolozo lweentlobo ezintsha ezichongiweyo kwisiza ngasinye.

Xa singaboni nasiphi seziza njengesiphene esibulalayo, sikholelwa ukuba, ngokwembono yamaqela ezilwanyana zomhlaba ezingenamqolo eziphandiweyo, uphuhliso lwesiza saseDuynefontein luya kuba neyona mpembelelo incinci ingalunganga yaye eyona inkulu eBantamsklip. Ngokuphikisayo, ngenxa yemo yangoku yolondolozo lwepropati yaseDuynefontein, esi siza naso kananjalo siya kuba neyona nzuzo incinci kwiimpembelelo ezilungileyo ngokokhuselo nolawulo lwesiza, yaye zombini iBantamsklip neThyspunt

zinethuba lokuzuza kakhulu kulawulo oluqhubekayo okanye oluphuculiweyo njengemimandla yolondolozo phantsi kobugosa bukaEskom. Nangona amaphononongo awongezelelweyo anokunika iziphumo ezandisa iimvavanyo zovakalelo kuzo zonke iziza, ngenxa yeempembelelo ezininzi ezingalunganga ezibonakalayo, angakhona amathuba okuba iimpembelelo ezilungileyo zihambe kunye ukubuyekeza iimeko ezingalunganga.

Nangona kunjalo kufuneka kuqondwe ukuba uvavanyo olungentla lusekwe kwingcinga yokuba ingozi yenyukliya enesiphumo esibonakalayo sosasazeko lwemitha lokungcoliseka kokusingqongileyo ayisoze yenzeke. Ingozi enokubakho yeempembelelo ezingalunganga eziyintlekele kumaqela ezilwanyana ezingenamqolo kummandla ojikelezileyo kungafuneka zilungelelaniswe ngokuchasene neempembelelo ezilungileyo ezichaziweyo ngentla. Nangona ukuyilwa kwereactor ethathelwe ingqalelo kufuneka ibe nakho ukuqinisekisa ukuba kukho ingozi enguziro ngokwenene (engekhoyo kwaphela) engamandla yokukhupha usasazeko lwemitha, ukuba uvavanyo lokubakho kwengozi lugqibe ekubeni isiganeko esinjalo kungezeka mhlawumbi senzeke, uvavanyo lovakalelo lweziza mhlawumbi lungatshintsha yaye ngokwembono yolondolozo lwezilwanyana ezingenamqolo iziphumo zesiganeko esinjalo kungalindelwa zibaluleke kancinci eDuynefontein yaye zibaluleke kakhulu eBantamsklip.

Sinoluvo lokuba uphuhliso lweNPS eBantamsklip mhlawumbi lungaba neyona mpembelelo incinci kumaqela ezilwanyana zomhlaba ezingenamqolo ukuba lungasemntla-mpuma kangangoko kwipaseji yeEIA, eDuynefontein ukuya ngasemzantsi kangangoko kwipaseji yeEIA (kufuphi nesiKhululo saMandla saseKoeberg esikhoyo) yaye eThyspunt sikhuthaza ukuba iNPS ngokubanzi ingakumbindi wepaseji ye-EIA.

## 1.14 Uvavanyo Lwempembelelo Yaselwandle (Appendix E15)

Olu phononongo lweengcali, lwenziwe ukuvavanya iimpembelelo ezinokwenzeka zesikhululo samandla somthamo wama-4 000 MW kwimekobume esingqongileyo yaselwandle kwiziza ezithathu ezinokwakhiwa ecaleni kwamanxweme aseMpuma naseNtshona Kapa. Uphuhliso olunjalo eDuynefontein, eBantamsklip okanye eThyspunt, luya kuba neempembelelo zeentlobo ngeentlobo ezinokwenzeka. Ezi ziquka:

- Ukuphazamisa ikhaya lendalo lezilwanyana nezityalo kummandla waselwandle. Xa kusakhiwa inkqubo eyayanyaniswa nesikhululo yokungenisa nokukhupha amanzi okupholisa, esi siphumo siya kujolisa kwisigaba sokwakha yaye siya kuba sesaloo ndawo, esexesha nokubaluleka okuphakathi. Xa sisayanyaniswa nokulahla izinto ezingafunwayo, ukuphazamiseka kwemekobume yaselwandle kubalulekile. Xa kuncitshiswa ngokulahla izinto ezingafunwayo kude nonxweme (nangokusebenzisa nje ukumpompa ngezinga eliphakathi eThyspunt), impembelelo iyancitshiswa ibe yeyesiphumo esiphakathi kwanokubaluleka okuphakathi. Izithintelo zeempembelelo zethutyana nezendawo ezayanyaniswa nokulahla izinto ezingafunwayo kwiintlanzi ze-chokka squid eThyspunt, ziya kuba nempembelelo encinane kumhlambi uwonke we-squid, xa kuthathelwa ingqalelo ummandla obanzi ezibekela kuwo amaqanda ezi ntlobo.
- Ukuhanjiswa nokufa kwezinto eziphilayo okwayanyaniswa nokungeniswa kwamanzi okupholisa. EDuynefontein naseThyspunt akulindelekanga ukuba ukuhanjiswa kube neempembelelo ezibalulekileyo kwizinto eziphilayo neendawo zazo zokuhlala. Nangona kunjalo, eBantamsklip ukuhanjiswa kwemibungu (larval) kungaba neziphumo ezibalulekileyo ezingalunganga kwimihlambi yengingqi ye-abalone *Haliotis midae*.
- Ukukhutshwa kwamanzi ashushu asetyenziswa ngeenjongo zokupholisa. Uyilo lwetonela yenkqubo yokukhupha inciphisa iimpembelelo ezingalunganga ezinokwenzeka, ngokusebenzisa iindawo ezininzi zokukhupha ngenjongo yokuncedisa ukusasaza ubushushu obugqithisileyo, ngokukhulula amanzi okupholisa ngaphezulu komphantsi wolwandle ukunciphisa iziphumo kwimekobume

yeengcongolo ezingqongileyo nangokusebenzisa izinga eliphezulu lokumpompoza kwindawo yokukhulula ukukhulisa ukuxubana namanazi apholileyo ommandla. Ukuzekelisa okuqukayo kwezifundo zolwandlekazi, kubonise ukuba iziphumo zobushushu okuphakanyisiweyo kulindelwe ukuba zijoliswe kwikhaya lendalo lezilwanyana nezityalo elisemanzini avulekileyo. Oku kuphathelele ngokukodwa kwiBantamsklip yaye ngeqondo elinganeno kwiThyspunt, njengoko kunokunceda ukunciphisa iimpembelelo kwiikhepsule zamaqanda e-abalone ne-chokka squid ngokwahlukahlukeneyo. Xa i-chokka squid kwisiza saseThyspunt kulindelwe ukuba iphephe ubushushu bamanzi obuphakanyiswe ngaphezulu kwezinga lazo lokunyamezela ubushushu, ummandla okuqikelelwa ukuba uza kuchaphazeleka umele ubukhulu obunganeno kwepesenti enye yommandla waselunxwemeni wokubekela amaqanda. Kukhuthazwa ngamandla ukuba eBantamsklip kusetyenziswe itonela elahla kude nonxweme, yokukhulula amanzi ashushu ngenzame yokunciphisa iimpembelelo kwi-abalone. Ngokubalulekileyo inkqubo yokukhulula kufuphi nonxweme kwesi siza kucingwa ukuba ivelisa ingozi engamkelekiyo kwimihlambi yee-abalone.

- Ukukhulula amanzi amdaka asuswe ityuwa. Ngexesha lokwakha imithamo embalwa yamanzi amdaka aneetyuwa eninzi kakhulu, aya kukhululwa ngqo ukungena kummandla wamaza angaselunxwemeni, apho intshukumo ephakamileyo yamandla amanzi iya kuba nesiphumo esaneleyo sokuwaxuba namanzi ommandla wamanzi olwandle, ukuqinisekisa impembelelo encinane kwimekobume yaselwandle. Ngexesha lesigaba sokusebenza amanzi amdaka asuswe ityuwa aya kukhululwa ngaxeshanye namanzi apholisayo. Njengoko umxube wamanzi netyuwa uya kuxubeka ukuya kumazinga angaqaphelekiyo phambi kokukhululwa akukho mpembelelo iqikelelwayo kwimekobume yaselwandle evela kula manzi amdaka ngexesha lesi sigaba sophuhliso.
- Ukukhululwa ngokungeyonjongo kwezinto ezikhutshwa kukusasazeka kwemitha. Uyilo lobuchwepheshe lwenkqubo yokupholisa luyinciphisile le ngozi, kangangokuba le mpembelelo ibekwe kwizinga lesiphumo esiphantsi nokubaluleka okuphantsi.
- Ukhuselo olongezelelweyo lwezinto eziphilayo zaselwandle ekuxhatshazweni ngenxa yothintelo kummandla wokhuseleko. Isiza esingazuza kummandla onjalo wothintelo singaba yiBantamsklip kuphela, njengoko oku kungaba luncedo olukhulu kwimeko yangoku yokuvuna ngokungekho mthethweni kwemihlambi yee-abalone. Nangona kunjalo, ukuze inzuzo enjalo izaliseke unyanzeliso olwaneleyo lommandla wothintelo kufuneka lubonelelwe.
- Ukukhutshwa kwamanzi amdaka edolophu anyangiweyo. La manzi amdaka kufuneka amelane nemigangatho ebekwe liSebe leMicimbi yaManzi naMahlathi yaye, ngaloo ndlela, ayikho impembelelo ebalulekileyo elindelweyo kwimekobume yaselwandle.
- Ungcoliseko lwemekobume yaselwandle kukukhutshwa kwamanzi omhlaba angcoliswe ziimbumba zezinto ezibolayo, iibhaktheriya okanye ikhaboni yamanzi. Njengoko le mpembelelo kungalindelwanga ukuba yenzeke yaye iya kuthintelwa ngokwendawo nethutyana, kucingwa ukuba inesiphumo nokubaluleka okuphantsi.

Ngaphandle kweempembelelo zophuhliso olucetywayo kumakhaya endalo ezilwanyana nezityalo zaselwandle, izinto eziphilayo kwimekobume yaselwandle nazo kananjalo zinempembelelo kuphuhliso. Oku kungenzeka ngendlela yokungcoliswa kwemibhobho yamanzi okupholisa. Le mpembelelo kulindelwe ukuba ibaluleke kakhulu eDuynefontein, ngenxa yendawo ekuyo ecaleni konxweme lwasentshona, apho iintyatyambo ze-jellyfish zibonakala zisanda ngokwenzeka rhoqo.

## 1.15 Iinzululwazi Zaselwandle (Oceanography) (Appendix E16)

EMzantsi Afrika ukukhula kwezoqoqosho kunye neemfuno zasekuhlaleni zikhokelela kwimfuno enkulu yombane ukuba ihlangabezane nemfuneko zonikezo lombane. I- Eskom ke ngoko iceba ukwakha isiKhululo samaNdla e-Nuclear (Nuclear Power Station) (NPS) esenza umthamo wamandla ombane ayokuma kwi-4000 MW kusetyenziswa ubuchwepheshe be-Pressurised Water Reactor (PWR).

Le ngxelo iphonononga iimpembelelo zokusingqongileyo kwaselwandle okuphathekayo okwenziwe kukwakhiwa nokusebenza kwe-NPS kwiindawo ezintathu ezinokusebenza, ezizezi; Duynefontein, Bantamsklip ne-Thyspunt. Ukongeza kwiimpembelelo ze-NPS kokusingqongileyo kwaselwandle okuphathekayo, iimpembelelo zezehlo zeziphango, ukutshintsha kwezimo zezulu neentlekele zendalo ezifana neetsunami ezichaphazela ukusebenza kunye nokhuseleko lwee-NPS zaye zathathelwa ingqalelo.

Iimpembelelo zeNzululwazi zaseLwandle ezinxulumene nesigaba sokwakha zithathwa ngokuba azibalulekanga kakhulu kwaye ziyafana kwindawo nganye yezi zintathu ekunokwakhiwa kuzo.

Ububanzi be-thermal plume kwindawo nganye buguquka kakhulu kwaye buxhomekeke kwiimeko zomoya kunye namaza ngalo naliphi na ixesha elithile. Ucazululo lokukhutshwa kwe-thermal plume kwindawo nganye kukhombisa ukuba kwenzeka ukhutsho olungeluhlanga e-Thyspunt, apho i-plume ibonwa kakhulu elunxwemeni ize ingabinzulu ngakwimimandla eselunxwemeni. Olona khutsho lukhulu lwe-thermal plume lubonwa e-Duynefontein.

Iimpembelelo kwi-NPS ezibangwa kokusingqongileyo kwaselwandle okuphathekayo kuya kuvela kwizikhukula ezivela elwandle kunye nokuphazanyiswa kwamanzi okupholisa. Ukuphazanyiswa kwamanzi okupholisa kwathathwa njengokungabalulekanga kakhulu kwindawo eyiyenye nganye ngenxa yobunzulu bendawo ekungena kuyo amanzi kunye namanyathelo okudambisa afakwe kuyilo lwenkqubo yokupholisa amanzi kwindawo angena kuyo.

Kungenzeka ukuba amanqanaba amanzi ayodlule indawo ekucetywe ukuba iphakanyiswe iyokuma kuyo i-NPS kuzo zontathu iindawo ukuba nje itsunami inokwenzeka ngexesha elinye neemeko zemozulu ezigqithisileyo (isehlo se-meteo-tsunami). Ukwenzeka kwetsunami, nakuba kunjalo, akunakufane kwenzeke ngenxa yengozi esezantsi exeliweyo yemisebenzi yeenyikima kulwandlekazi olujikelezileyo. I-Thyspunt yeyona ndawo ekukuphela kwayo enamanqanaba amanzi aphezulu ngokugqithisileyo avela kwimiba yezemozulu ekuthelekelelwa ukuba yodlula i- + 10 m MSL ngexa lexesha lonke lokufakwa kwayo. Ngako oko, amanqanaba athelekelelwayo amanzi e-Thyspunt ngexa le-meteo-tsunami angaphezulu kakhulu kunawase-Bantamsklip nase-Duynefontein.

Kwenziwa isincomo samanyathelo okudambisa ngokufanelekileyo kuwo ngamnye kule miba ibalulekileyo yeenzululwazi zaselwandle ichongiweyo.

## 1.16 Soqoqosho (Appendix E17)

UEskom uceba ukwakha isikhululo samandla senyukliya esivelisa amandla omthamo ofikelela kuma-4,000 MW kwisiza ngasinye kwezintathu, oko kukuthi iThyspunt eMpuma Koloni, iBantamsklip eNtshona Koloni neDuynefontein eNtshona Koloni. Injongo yophononongo kukuhlalutya ukusebenza ngexabiso elihle ngokwezoqoqosho kweziza ezithathu kubahlali abalindelekileyo ngokubanzi. Oku kuquka inkunzi (imali yesiseko) neendleko zokusebenza zomboneleli weenkonzo kwakunye neendleko kubahlali, kuthathelwa ingqalelo izinto ezilungileyo nezingalunganga zangaphandle kuqoqosho nokusingqongileyo. Uphononongo kananjalo lucinga ngempembelelo yoqoqosho olukhulu ngokubanzi lweziza ezithathu kuqoqosho lwamaphondo azo asemxholweni.

Indlela yophononongo yakhiwe ngomdibaniso wophando lwekhompyutha, udliwano-ndlebe kummandla nokusetyenziswa kwenkcazelo eqokelelwe ukwenza umzekelo woqoqosho olukhulu.

Isiza saseDuynefontein sikummandla ophuhliswe kakhulu nophucukileyo kuneziza ezibini (iBantamsklip neThyspunt). Uqoqosho olumbaxa lwaseKapa luya kufumana kulula kakhulu ukwamkela nokukhonza isikhululo samandla senyukliya nabasebenzi baso kunoko bekunokwenzeka eThyspunt okanye eBantamsklip.

Iimbono ngokuphathelele isikhululo samandla senyukliya zidla ngokuselwa ekusileleni kolwazi lwenzululwazi malunga neempembelelo ezibonwayo. Amadliwanondlebe ethu kummandla abonise ukuba umphakamo wexhala labantu liphantsi kummandla ongqonge iDuynefontein ngenxa yamava abo aseKoeberg; ngokuchaseneyo, kukho inkcaso ebonakalayo kwisikhululo samandla senyukliya kwiziza ezinye ezibini. Ngokubanzi, amacandelo eshishini kuzo zontathu iziza abona amathuba avelayo ekusekweni kwesikhululo samandla senyukliya, ngokwahlukileyo kukubaluleka kokuzinzisa uphakelo lombane.

Awona mashishini mabini anovakalelo ngokweembono zawo malunga neempembelelo zeNyukliya-1 kwimisebenzi yawo lelokuloba iintlanzi nelokhenketho. Nangona kunjalo, uhlalutyo lubonisa ukuba naziphi iimpembelelo ezingalunganga kunokwenzeka zibe ncinci kwanokuthi ezinyanisweni kunokubakho iimpembelelo ezilungileyo ngokubanzi kukhenketho.

Uhlalutyo lwempembelelo kuqoqosho olukhulu lunika iziphumo ezixubeneyo zezigaba zokwakha nezokusebenza kwiziza ezithathu. Izalathisi zoqoqosho olukhulu zithanda iziza zaseNtshona Koloni kodwa izalathisi zamakhaya nezentlalo zithanda iThyspunt. Uhlalutyo lokusebenza kakuhle kwexabiso lubonisa ukuba iThyspunt inomda omncinci kakhulu ngaphezu kweDuynefontein nomda omkhudlwana ngaphezu kweBantamsklip. ***Umahluko phakathi kweThyspunt neBantamsklip ngama-R6.388 eebhiliyoni, yaye xa uxelwa ngepesenti umahluko sisi-5.93% ngokulungele iThyspunt. Phakathi kweThyspunt neDuynefontein umahluko ngama-R570 ezigidi, okanye i-0.53% ngokulungele iThyspunt.*** Ngako oko, ulandelelwano lokuthandeka (ukusuka kwesona sithandwa kakhulu ukuya kwesona sithandwa kancinci) yiThyspunt, iDuynefontein neBantamsklip. Nangona kunjalo, umahluko mncinci, yaye zonke iziza zinokuba neempembelelo ezinkulu ezilungileyo zoqoqosho kummandla wengingqi nowephondo ezikulo.

Amanyathelo okunciphisa acetywayo anxulumene nokusebenza nokulondoloza (ngokukodwa imiba yezakhono), iimbono namaxhala oluntu, kunye nembuyekezo.

## 1.17 Lwempembelelo Kwezentlalo (Appendix E18)

**Imvelaphi**

IOctagonal Development cc (Alewijn Dippenaar) yalathelwe ukuqhuba uVavanyo lweMpembelelo kwezeNtlalo (iSIA) yokwakhiwa okucetywayo kwesikhululo samandla senyukliya kunye nezibonelelo zokusebenza ezayamene naso, kwiziza ezithathu apho esinye sikwiPhondo laseMpuma Koloni nezinye ezibini kwiPhondo laseNtshona Koloni. Iziza ezithathu ezichongwe ngokutshintshisanayo kubhekiswa kuzo njengezi:

- iThyspunt;
- iBantamsklip kunye
- neDuynefontein.

Ingxelo enxulumene neSIA yahlulwe yazizahluko ezine, ezizezi:

- Icandelo loku-1: Intshayelelo;
- Icandelo lesi-2: Inkcazo yokusingqongileyo okuchaphazelekayo;
- Icandelo lesi-3: Ukuchongwa kwempembelelo, uvavanyo namanyathelo okunciphisa/okwandisa; kunye
- Necandelo lesi-4: Izigqibo neenkuthazo / izincomo

**Iprojekthi (IsiKhululo saMandla seNyukliya*)***

UEskom uceba ukwakha isiKhululo saMandla seNyukliya ekubhekiswa kuso njengeNyukliya-1 esivelisa amandla omthamo oya kufika kuma-4 000 MW, sisebenzisa ubuchwepheshe

beReactor yaManzi aXinzelelweyo (Pressurised Water Reactor) (PWR). Ngeendlela ezininzi isakhiwo somatshini wenyukliya sifana nesomatshini oqhelekileyo wamandla omsinga womoya oshushu (thermal). Umahluko phakathi koomatshini bamandla benyukliya nabaqhelekileyo ababaselwa ngefosili (oko kukuthi ngamalahle) ngumthombo wezibaso nendlela obuveliswa ngayo ubushushu. Kumatshini wefosili kubaswa ioli, igesi okanye amalahle kwibhoyila, nto leyo ethetha ukuthi amandla ekhemikhali yezibaso ajikwa ukuba bubushushu. Kwisikhululo samandla senyukliya umthombo wezibaso uphuculwa ngeyuraniyum yaye kusetyenziswa amandla avela ekusabeleni kokucandeka kwetyathanga lenyukliya.

Inkqubo yokwenene yokwakha iNyukliya-1 ingathatha malunga neminyaka eli-9 ukuba igqitywe yaye iquka imiba ephathelele ukusekwa kwesiza, ukomba ngemilinganiso emikhulu, imisebenzi yoburhulumente, iindlela zokufikelela nokwakhiwa kwereactor.

Ulwazi olubonelelwe nguEskom (ngoSeptemba, 2008) lunika iinkcukacha zendawo efunekayo yokuhlalisa isikhululo samandla senyukliya yeNyukliya-1 esicetywayo. Kufuneka kugxiniswe ukuba iinkcukacha zeemfuneko zokuhlalisa nokudibanisa kwiindawo zabahlali needolophu ezikhoyo kusafuna kuthethathethwane noomasipala ngokwahlukahlukeneyo nabanye abathathi nxaxheba apho kufanelekileyo. Ukubekeka ngqo komzi onokubakho wokwakha kusafuna ukuqinisekiswa emva kokuba isiza esithandwayo sichongiwe.

Imimandla yomhlaba iya kugqitywa ngokwemimiselo yokuxinana kweendawo zokuhlala emiselweyo sisiCwangciso soPhuhliso lwesiThuba neNdawo (Spatial Development Plan) malunga neepropati ezifumanekayo. UEskom kufuneka abonelele ngomhlaba owahlulwe ngokutsha ukwenzela umThengisi akhe uMzi woKwakha wabasebenzi abakude namakhaya (amagoduka). Yimfanelo kaEskom ukulungiselela inkqubo yeEIA.

Ngaphezu koko, uEskom angabonelela ngeziza zokuhlala ezifakelwe iinkonzo ukwenzela umThengisi akhe iindawo zokuhlala zesitafu (uMzi weSitafu). Iindawo zokuhlala ziya kugqityezelwa akuba umThengisi enyuliwe, yaye uphuhliso lomhlaba luya kufakelwa kubuchule bokudibanisa abahlali ngokubanzi ukwenzela uphuhliso lweendawo zokuhlala zakwaEskom.

**Injongo yengxelo**

Injongo yale ngxelo kukubonelela ngeziphumo zophando zeSIA, ngokukodwa njengoko zinxulumene neziza ezithathu, oko kukuthi iThyspunt, iBantamsklip neDuynefontein. Imele uvavanyo olunzulu lweempembelelo zentlalo ezinokubakho, iquka ukulinganiswa kweempembelelo njengoko kufunwa yimiThetho yeEIA, ukubaluleka koko nemilinganiso yokunciphisa nokuphucula iimpembelelo ezilungileyo nokunciphisa iimpembelelo ezingalunganga.

**Iingcinga/izigqibo zokuzenzela neeNtsilelo**

Izigqibo zokuzenzela ezilandelayo zithathelwe ingqalelo kule ngxelo:

- Urhulumente woMzantsi Afrika uza kuqhubeka ngenjongo yakhe yokulandela ngenkuthalo amandla enyukliya kwithuba leminyaka ezayo elishumi ephindwe kabini njengoko kubonisiwe kwiThe Nuclear Energy Policy and Strategy for the Republic of South Africa (DME, 2007);
- Abantu abahlukileyo badla ngokubona iinyaniso zobomi ngokwahlukeneyo yaye ngako oko impembelelo enokubonwa ingalunganga ngumtu okanye umzi othile, inokubonwa iyeyona ilungileyo neyona mpembelelo ilungileyo ngumntu olandelayo;
- Ukubonisana nabantu, ngenjongo yokufumana ukuqonda imiba, kunemida/iintsilelo, ikakhulu ngenxa yenyaniso yokuba abantu/amaqela abazimiseli ngamaxa onke ukuza nokuthatha inxaxheba kwiingxoxo neeseshoni zokubonisana. Ngamaxa amaninzi abantu bayathandabuza ukunika igalelo ngokuphandle kwiindibano zeqela yaye ukuqhuba iindibano zodliwano-ndlebe akwenzeki ngamaxa onke okanye akwamkeleki;

- Nangona iStatistics SA ibonelela ngeenkcukacha-manani ezithile ezihlaziyiweyo rhoqo, zibakho izithuba kwidata esemthethweni efunyanwa kweli ziko. Nangona le ntsilelo yedata yakutshanje yommandla othile inomba wentsilelo, ezi ntsilelo azibanganakho ukungoyiswa, ukuba azichanekanga kangako, uqikelelo lungafunyanwa ngokuthelekisa idata efumanekayo neenkqubo ezihlaziyiweyo zePhondo nezeSizwe;
- Xeshikweni yonke imizamo yenziwe yokunikela ngethuba kuwo onke amaqela achaphazelekayo nanomdla ukuthatha inxaxheba kolu phononongo, iziphumo zophononongo azinakho ukusebenza jikelele kubo bonke abemi bophando. Ngako oko, xa kuhlalutywa iziphumo, kuthathwa izigqibo ngokuphathelele iimpawu neembono zaloo maqela anomdla nachaphazelekayo (iiI neeAP) athathe inxaxheba kuphononongo;
- Izintlu zovavanyo lwempembelelo zidala intsilelo yeempembelelo zentlalo ngengqiqo yokuba izintlu azivumeli uthelekiso phakathi kweempembelelo ezinobunzima obuqhotyoshelweyo nezo zingenabo. Ayizizo zonke iimpembelelo ezinexabiso elifanayo yaye asiyiyo inxalenye yezintlu zempembelelo ukuvavanya ixabiso elayamene nempembelelo nganye ngokusingisa kwisazobe sesalathiso.

**Indlela yokusebenza neNkqubo yoPhononongo**

Indlela yokusebenza eqondwayo, yokusebenza ngoonxantathu, isetyenzisiwe ukuqokelela nokuhlalutya idata ngexesha lolu phononongo, njengobuchule obamkelekileyo bovavanyo lwempembelelo.

Indlela yokusebenza esetyenziselwe iSIA ihambelana neInternational Association for Impact Assessment (IAIA) nezikhokelo ezibalulwe kwiWestern Cape Department of Environmental Affairs and Development Planning's Guidelines malunga nokubandakanyeka kweeNgcali zeNtlalo kwiEIA.

Indlela yokusebenza yokuxuba ubuninzi nobulunga iyasetyenziswa yaye, ihambelana nale ndlela yokusebenza.

Malunga nesigaba ngasinye sezigaba ezibini zesiseko zeprojekthi, oko kukuthi, esokwakha nesokusebenza, iimpembelelo neenzuzo zangoku nezexesha elizayo ezinokubakho, ezayamene kuphela nophuhliso olucetywayo, zichaziwe zavavanywa, zozibini ngaphambi nasemva kokunciphisa/ukwandisa ngokwemilinganiso emiselweyo yokuvavanya.

**Ukuchonga nokuvavanya impembelelo: yesigaba sokwakha nesokusebenza**

Iimpembelelo ezilandelayo zentlalo zichongiwe zaza zavavanywa:
- Iindawo zokuhlalisa isitafu nabasebenzi bokwakha;
- Ukungena ngamandla kwabafuni bomsebenzi;
- Ukwanda kwenani leendawo zokuhlala ezingekho mthethweni (amatyotyombe);
- Ukudala amathuba engqesho;
- Amathuba okushishina;
- Impembelelo kwimisebenzi yolwaphulo-mthetho;
- Iingozi zeeSTD, zeHIV neAIDS;
- Iinkonzo zikamasipala;
- Iimpembelelo zezihamba-ndlela;
- Impembelelo yengxolo nothuli;
- Ukulahleka kwengqesho emva kokwakha;
- Iimpembelelo zembonakalo;
- Impembelelo kwizibonelelo zokusebenza zentlalo kunye namancedo;
- Impembelelo kuvakalelo lwendawo;
- Isicwangciso sokusebenzisa umhlaba kwixesha elizayo;
- Iingozi ezibonwayo eziyamana neziganeko zenyukliya;
- Uvavanyo lokhetho lokungaphuhlisi.

Uvavanyo belusekelwe kuphengululo:

- Lwemiba echongiweyo ngexesha leNkqubo yokuKhangela ngokuPheleleyo;
- Lwamaxwebhu okucwangcisa nomgaqo-nkqubo ophathelele kummandla;
- Lweenkqubo zodliwano-ndlebe namaqela angundoqo anomdla nachaphazelekayo;
- Lwemiba yezentlalo eyamene neenkqubo zophuhliso ezifanayo; kunye
- Namava ombhali kummandla weeSIA.

Ngoku kuxoxwa ngokufutshane ngempembelelo nganye.

**Indawo zokuhlala zesitafu nabasebenzi bokwakha**

Amanani aphezulu abasebenzi aya kubeka uxinzelelo olungamandla ekuboneleleni ngeendawo zokuhlala zethutyana nezisisigxina. UmThengisi nesitafu sikaEskom baquka ukungena ngamandla kwabasebenzi abaqikelelwa kuma-3 837 (ngexesha elisencochoyini) kunye neentsapho zabo kummandla weprojekthi yesikhululo samandla senyukliya. Ukungena kwabemi bebonke kuqikelelwa abantu abangama-10 500, bokuhlaliswa kummandla omalunga ne-167.2 ha.

Kuya kufuneka uMzi woKwakha uhlalise abantu abamalunga nama-3 750. Ukubekeka koMzi woKwakha kusafuna ukuqinisekiswa, yaye yimeko enovakalelo enamathuba neenzuzo ezixabisekileyo, kodwa kananjalo zakubakho iimpembelelo ezingalunganga kwintlalo-ntle yabantu.

Amanyathelo okunciphisa ukubonelela ngeendawo zokuhlala ezaneleyo kufuneka azalisekiswe.

**Ukungena ngamandla kwabafuni bomsebenzi**

Le mpembelelo ijongene nokungena ngamandla kwabafuni bomsebenzi kwisiza ngexesha lesigaba sokwakha. Aba bafuni bomsebenzi, kuquka abo abavela kwimimandla engaphandle “kwengingqi” bangena kummandla ngethemba lokufumana ingqesho. Xa beyifumene ingqesho, ithuba linokubakho lokuba baya kuba negalelo kwingxaki ekhoyo yeendawo zokuhlala ezingekho sikweni (amatyotyombe), uxinzelelo kwimithombo yamancedo ekhoyo, iinkonzo nezibonelelo zokusebenza. Ithuba likho ngaphezu koko lokuba banokuba negalelo malunga nolwaphulo-mthetho nezinye iingxaki zentlalo ezifana, nokusebenzisa utywala (ialkoholi) ngobugwenxa nokuthengisa ngemizimba.

Amanyathelo okunciphisa anenjongo yokunciphisa inani labafuni bomsebenzi abahlala kummandla.

**Uphuhliso oluNgekho sikweni kwakunye neeNdawo zokuhlala (amatyotyombe)**

Ukwanda kophuhliso olungacwangciswanga neendawo zokuhlala ezingekho sikweni ukujikeleza isiza sesikhululo samandla senyukliya kwayanyaniswa namathuba ezoqoqosho abonwayo. Ukuba akulawulwa ngononophelo, olu hlobo lophuhliso olungalawulwayo nalo kananjalo lunokuba nesiphumo sokwanda koluhlu lwezifo zentlalo ezifana nolwaphulomthetho, ukuthengisa ngemizimba nokusebenzisa ngobugwenxa ialkoholi neziyobisi.

Amanyathelo okunciphisa anenjongo yokulawula isoyikiso sokwanda kophuhliso olungacwangciswanga nokwanda kweendawo zokuhlala ezingekho sikweni (amatyotyombe).

**UkuDala amaThuba eNgqesho**

Isikhululo samandla senyukliya sinika ithuba kubantu abangekho engqeshweni ukufumana ingqesho enentsingiselo ngexesha lesigaba sokwakha. Kuqikelelwa ukuba isigaba sokwakha singathatha ukuya kwiminyaka eli-9 ukusuka ekuqaleni kokwakha ukuya ekugunyaziseni. Ngethuba leli xesha kuqikelelwa ukuba malunga nesitafu esingama-8 737, kuquka abasebenzi

bokwakha, baya kuqeshwa kwisiza. Kulindelwe ukuba ubuncinane abangama-25% babasebenzi bokwakha baya kuthathwa kubasebenzi bengingqi.

Amanyathelo okwandisa anenjongo yokuphucula amancedo okudala ingqesho.

**Amathuba okuShishina**

Inani eliphathekayo lamathuba okushishina aya kudalelwa iinkampani zengingqi/ababoneleli beenkonzo neeSMME.

Ukusebenzisa abaxhobisi bengingqi nabanikeli beenkonzo kufuneka kukhuthazwe ngokuthenga kwingingqi neenkqubo zokwalatha kwangaphambili ngokusebenzisa iinkqubo zeziniki-maxabiso (iithenda) ezivulekileyo neziselubala malunga nayo yonke imisebenzi enxulumene nokwakha.

**Impembelelo kwiMisebenzi yoLwaphulo-mthetho**

Isiphumo sokungena ngamandla kwabantu abaninzi kummandla njengabaqeshwa okanye ukufuna umsebenzi, kungaba nesiphumo sokwandisa imisebenzi yolwaphulo-mthetho. Kananjalo kunokwenzeka ukuba ngexesha lesigaba sokwakha seprojekthi, amalungu olwaphulo-mthetho ajonga amathuba angasebenzisa ukwanda kwemisebenzi kwimimandla ethile ukujikeleza kwiziza zokwakha.

Amanyathelo okunciphisa anenjongo yokunciphisa ingozi yolwaphulo-mthetho.

**Iingozi zeeSTD, iHIV neAIDS**

Le mpembelelo ibhekisa ekwandeni kwengozi yeeSTD neHIV neAIDS. Kuxeliwe ngokubanzi ukuba ukwanda kwengozi yeeSTD, iHIV neAIDS kwayanyaniswa nokungena ngamandla kwabasebenzi, ngokukodwa abasebenzi abangamagoduka (migrant workers), kunye/okanye nakuphi ukwanda kweelori zezihamba-ndlela ukungena okanye ukuphuma kummandla.

Amanyathelo okunciphisa anenjongo yokulawula iingozi eziyamaniswa neeSTD, iHIV neAIDS.

**Iinkonzo zikaMasipala**

Le mpembelelo ijongene nokulindeleka kokwenzeka kokuba isikhululo samandla senyukliya mhlawumbi sinzimele iinkonzo zikamasipala ezifana namanzi, ezococeko, iindlela, inkunkuma nokulahlwa kwenkunkuma.

Amanyathelo okunciphisa anenjongo yokubonelela ngeenkonzo ezifunekayo.

**Iindlela nezoThutho**

Inkxalabo ngumthamo weendlela nezibonelelo zokusebenza zothutho ezifunekayo ngexesha lokwakha nokusebenza kwesikhululo samandla senyukliya.

Amanyathelo okunciphisa anenjongo yokucwangcisa, ukuxhasa ngemali nezibonelelo zokusebenza zokwakha nokusebenza kwesikhululo samandla senyukliya, ngaphezu koko, neendlela nezibonelelo zokusebenza zothutho zeendawo zokuhlala ekufuneka ziphuhliselwe ukuhlala kwesitafu nabasebenzi bokwakha.

**Ukususwa kweNkunkuma nokuNgcola**

Oku kuphathelele kwiZiza zoMhlaba wokuDiba nokuThuthwa kweNkunkuma ezifunekayo ukwenzela ukwakha nokusebenza kwesikhululo samandla senyukliya, kwakunye neenkonzo nezibonelelo zokusebenza kwiindawo zokuhlala ekufuneka ziphuhliselwe ukuhlala kwesitafu nabasebenzi bokwakha.

Amanyathelo okunciphisa anenjongo yokubonelela ngokwaneleyo ngeZiza zoMhlaba wokuDiba nezoThutho lweNkunkuma ukwenzela ukwakha nokusebenza kwesikhululo samandla senyukliya kwakunye neenkonzo zokususa inkunkuma kwiindawo zokuhlala ekufuneka ziphuhliselwe isitafu nabasebenzi bokwakha.

**Iimpembelo zeziHamba-ndlela**

Ukwanda kokuhamba kwezithuthi ngexesha lesigaba sokwakha kunokuba nefuthe kwimpilo yemihla ngemihla neepateni zokuhamba kwamalungu abahlali kwiilali ezingqonge isiza.

Amanyathelo okunciphisa anenjongo yokwandisa ukuhamba kwezithuthi ngexesha lesigaba sokwakha ukunciphisa iingxaki zengxinano yezihamba-ndlela kummandla, nto leyo eya kuba nefuthe kwimpilo yemihla ngemihla neephatheni zokuhamba zamalungu abahlali abasebenzisa ezi ndlela kwiilali ezingqonge isiza.

**Iimpembelelo zeNgxolo noThuli**

Ukwanda kwamazinga engxolo nothuli kungadala impembelelo engalunganga kubulunga bempilo yabantu abahlala kufuphi nesiza sesikhululo samandla senyukliya esicetywayo.

Amanyathelo okunciphisa anenjongo yokuthintela ukuphazamiseka neziphumo zengxolo engqondweni nokungcoliseka luthuli.

**Ukulahleka kweNgqesho emva koKwakha**

Imisebenzi eliqela iya kulahleka sakuba isikhululo samandla senyukliya sigqityiwe ukwakhiwa. Amanyathelo okunciphisa anenjongo yokunciphisa ubuninzi bemisebenzi elahlekayo emva kokwakhiwa.

**Iimpembelelo zembonakalo**

Isikhululo samandla senyukliya siya kutshintsha iimpawu nobulunga bembonakalo yesimo sendawo ngokuya ngokoPhononongo lweNgcali lweMbonakalo (Visual Specialist Study) (ngoSeptemba wama-2009).

Amanyathelo okunciphisa anenjongo yokuthintela iziphumo ezingalunganga nokuphazamiseka kovakalelo lwendawo okunokwenziwa sisikhululo samandla senyukliya. Isisombululo sinokuba kukufezekisa amanyathelo okunciphisa acetyiswe kuphononongo lwempembelelo yembonakalo.

**Impembelelo kwiSibonelelo sokusebenza sezeNtlalo / amancedo ezeNtlalo**

Le mpembelelo ibhekisa kwimo yokungathi isikhululo samandla senyukliya esicetywayo sibeka ubunzima kwizibonelelo zokusebenza ezikhoyo ezifana namancedo ezonyango, amapolisa, izikolo namancedo ezemidlalo.

Amanyathelo onkunciphisa anenjongo yokwenza izibonelelo ezaneleyo zezibonelelo zokusebenza zentlalo namancedo malunga nokukhula kwenani labantu.

**Impembelelo kuvakalelo lwendawo**

Isikhululo samandla senyukliya esicetywayo kunokwenzeka sibenesiphumo esitshintsha uvakalelo lwendawo yengingqi.

Le nkxalabo inxulumene nokuthi kunokwenzeka ukuba isikhululo samandla senyukliya singaba negalelo elingalunganga kwiimpawu zangoku, okanye uluvo / imbono abantu abakholelwa kuyo. Abahlali banamava okuba indawo yabo ikhethekile yaye inophawu olulodwa.

Amanyathelo okunciphisa anenjongo yokuthintela iziphumo ezingalunganga nokuphazamiseka kovakalelo lwendawo, elo iprojekthi inokuba nalo kokusingqongileyo.

**Ukusetyenziswa koMhlaba kwiXesha elizayo (Ukucwangcisa)**

Isikhululo samandla senyukliya esicetywayo siya kuba nempembelelo ekusebenziseni umhlaba kwixesha elizayo nokucwangcisa kummandla.
Amanyathelo okunciphisa anenjongo yokunciphisa impembelelo yesikhululo samandla senyukliya ekusetyenzisweni komhlaba nokucwangcisa kwixesha elizayo.

**Iingozi eziBonwayo ziYamene neziGaneko zeNyukliya**

Ngexesha lenkqubo yokubonisana noluntu, kuxeliwe ngokucacileyo ngabathathinxaxheba abahlukahlukeneyo ukuba bayayoyika impembelelo yeengozi ezinokubakhona ezinxulumene neziganeko zenyukliya. Ezi ngozi zinxulumene nezinto ezilandelayo:

- Ukhuselelo loyilo;
- Iingozi zenyukliya;
- Izenzo zobugrogrisi ezinokwenzeka;
- Isakhono nobuchule babantu abaqhuba isikhululo samandla senyukliya;
- Iintshukumo zoqhankqalazo noqhushululu lwabasebenzi oluchaphazela ulawulo lwemihla ngemihla; kunye
- Nokuthembeka konikezelwano loqhagamshelwano ngokubhekiselele kwimbono yeengozi ezinokubakhona neempembelelo ezingalunganga kwimpilontle yabantu.

Amanyathelo okunciphisa anenjongo yokuqinisekisa ukuba abahlali bafumana ulwazi oluchanekileyo noluthembekileyo malunga neengozi zokwenene nezibonwayo zamandla enyukliya.

## 1.18 Sokubonwayo (Appendix E19)

UEskom uzimisele ukwakha izikhululo zamandla zenyukliya kwiziza zonke ezithathu. Isiza esinye siselunxwemeni kumhlaba ophakamileyo othe thu elwandle owaziwa njengeThyspunt phakathi kweOyster Bay neCape St. Francis, malunga nama-70 km kumzantsi-mpuma wePort Elizabeth (eBhayi). Isiza sesibini sikufuphi neBantamsklip phakathi kwePearly Beach neQuoin Point kumzantsi-ntshona wonxweme lwaseKapa empuma kwiGansbaai yaye esesithathu yiDuynefontein esikumntla wesiKhululo saMandla seNyukliya saseKoeberg (NPS), kwintshona Dolophu yeAtlantis kuNxweme lwaseNtshona Koloni.

Le ngxelo ixabisa impembelelo enokubakho yembonakalo yesiKhululo saMandla seNyukliya kwindalo engqongileyo nemekobume esingqongileyo eguqulwe ngabantu kwisiza ngasinye.

Iimbangi zengozi yembonakalo kuzo zonke iziza ezithathu zinxulumene ikakhulu nokwanda kokuzinyakathisa kwesiKhululo saMandla seNyukliya njengeziko yaye ngokudibeneyo namalungu ancedisayo afana nokwakhiwa kweeofisi, izitora, iindlela zokufikelela, amabala okutshintsha, iintambo zothumelo, iimasti (iipali ezinde) neendawo zokulahla inkunkuma yezinto ezingafunwayo. Kwisiza saseDuynefontein iimbangi zengozi yembonakalo zinxulumene ikakhulu nokuzinyakathisa ngokudibeneyo nesiKhululo saMandla seNyukliya saseKoeberg kufuphi nomda okumazantsi esiza nomatshini ocetywayo wePebble Bed Modular Reactor Demonstration Power Plant kufuphi necala elikumazantsi eKoeberg. Iingozi ezongezelelweyo zesiza ngasinye zichongwe njengokubekwa komthamo omkhulu wezinto ezombiweyo, ukuguqulwa kwemimandla ejikeleze isiza ngexesha lokwakha neendlela ezintsha zokufikelela ngokukodwa kwisiza saseThyspunt.

Isiza ngasinye kuxoxiwe ngaso saza salinganiswa ngokwemigaqo-siseko yembonakalo yokubonakala ezindleleni kwakunye nembonakalo yomhlaba ojikelezileyo ngokubanzi, ukuzinyakathisa okunokubakho kwimbonakalo kuphawu lwembonakalo yomhlaba novakalelo lwendawo nokwayamanisa imbonakalo neentambo zothumelo. Impembelelo yembonakalo yeentambo zothumelo ngumba weEIA ehlukileyo; oko kukuthi iEIA yoThumelo.

Isiza ngasinye sivavanyiwe ngokweseti yemigaqo-siseko yokulinganisa impembelelo yembonakalo yokunyakathisa nokubonakala. Isiphumo sophando sesokuba iNPS yaseThyspunt, iNPS yaseBantamsklip neNPS yaseDuynefontein zinobunzulu bembonakalo yokunyakathisa elinganiswa njengebalulekileyo, ngokukodwa umbono wasebusuku.

Ngokusebenzisa iseti yemigaqo-siseko impembelelo yembonakalo yesinye nesinye seziza zeNPS iyavavanywa.

Isigqibo esifikelelwe sesokuba isiKhululo saMandla seNyukliya saseThyspunt, isiKhululo saMandla seNyukliya saseBantamsklip nesiKhululo saMandla seNyukliya saseDuynefontein ziya kunyanzela impembelelo yembonakalo ebalulekileyo kwimeko yembonakalo ekhoyo nophawu lwesimo sendawo sengingqi kumgama wommandla we-5 km. Iimasti (iipali) zemozulu nerediyo ziya kubonakala ngokucacileyo ngosuku olungenawo amafu ukusuka kubude be-10 km ubuncinane. Isibane esibomvu phezu kwemasti yemozulu eli-120m ukuphakama siya kubonakala ebusuku ngaphaya kwe-10 km. Iimeko zemozulu ziya kuba nefuthe ekubonakaleni kweemasti njengoko iimeko zobukho bamafu okanye inkungu zingawasitha ngokupheleleyo la malungu. Imiba ekhethekileyo yembonakalo enxulumene nesiza yelandelayo:

**EThyspunt**

Imbonakalo iqulethwe ecaleni kwenxweme lasempuma-ntshona kwimimandla yeendunduma. Oku kuthintela ukuba sesichengeni kwembonakalo yeNPS yaseThyspunt kwiidolophu zeOyster Bay neCape St. Francis.

Umba ongamandla okhokelele kwisigqibo esingentla bubukho bembonakalo engamandla yeNPS yaseThyspunt kwakunye neentambo zothumelo nezakhiwo ezayamene naso, apho zonke zibonakala ngokushiyana ukusuka kummandla we-10 km wesiza, kodwa ikakhulu ecaleni komphetho wonxweme. Oku kungenxa yokwakheka komhlaba oquka iindunduma ezinezityalo nezishenxayo ezisinga empuma-ntshona, eziphantse zifane nommandla waselunxwemeni kwakunye nokukhanya okwandisiweyo ebusuku ngenxa yokukhanyiswa okungamandla kweso siza. Nangona kunjalo umbono okhoyo ebusuku waselunxwemeni ngokubanzi uphazanyiswa zizibane ezibukhali ezikhanyayo kumaphenyane ‘echokka’ njengoko eloba izilwanyana zasemanzini ezifana nengwane kufuphi nonxweme. Ubunzulu bokukhanya buyahlukahluka ngokwexesha lonyaka lokuloba ngeechokka. Ukuzinyakathisa kwembonakalo kuphawu lwembonakalo yomhlaba kuya kwandiswa liBala leHV, iintambo zothumelo nendlela yofikelelo ecetywayo kumantla yaye zonke zibonakala ngokuphandle kumhlaba omxinwa odibana nobanzi kwipropati ekumantla endunduma ephakamileyo yentlabathi.

**EBantamsklip**

Umba ongamandla okhokelele kwisigqibo esingentla bubukho bembonakalo engamandla yeNPS yaseBantamsklip kwakunye neentambo zothumelo nezakhiwo ezayamene naso, apho zonke zibonakala ngokushiyana ukusuka kummandla we-10 km wesiza. Oku kungenxa yokwakheka komhlaba olithambeka ukuya kummandla waselunxwemeni kwakunye nendawo ephumileyo eya ngaselwandle kwisiza kwithambeka lezinyuso laselunxwemeni. Oko kubonakala kuya kwandiswa ebusuku kukukhanyiswa komatshini.

**EDuynefontein**

Isiphumo sophando sesokuba iNPS yaseDuynefontein inobunzulu bembonakalo yonyakathiso olulinganiswa njengolubalulekileyo, ngokukodwa ebusuku. Oku kungokwayamaniswa

nobungakanani bokuba kufutshane kweNPS yaseKoeberg yaye umatshini onokubakho kwixesha elizayo wePebble Bed Modular Reactor Demonstration Power Plant (PBMR DPP) uya kwandisa njengeqela impembelelo ekhoyo yembonakalo yeNPS yaseKoeberg kwimbonakalo yomhlaba nabahlali abayingqongileyo.

Imbonakalo engamandla yeNPS yaseDuynefontein nesibonelelo sokusebenza esayamene nayo ziya kubonakala ngokushiyana ukusuka kumgama wesiza we-10 km. Oku kungenxa yokwakheka komhlaba othambekele ngaselunxwemeni yaye ukukhanya kwandiswa ebusuku kukukhanya kweso siza.

Impembelelo yembonakalo eyongezelekayo yamalungiselelo amathathu amakhulu okuvelisa amandla kumgama we-3 km ukusuka elunxwemeni inokuzinyakathisa okuphezulu kwimbonakalo yeembono, uphawu lwembonakalo nobulunga bembonakalo.

Isikhululo esitsha seOpened Cycle Gas Turbine Power Station sigqityiwe eAtlantis, malunga ne-10 km ngaphakathi kwelizwe ukusuka kwisiza esicetywayo. Oku kongeza esinye isakhiwo somlinganiso omkhulu kwimbonakalo yomhlaba wenqila.

Izakhiwo ezincedisayo neempawu nazo zivavanyiwe malunga nefuthe lazo kwimbonakalo yovakalelo lwendawo nokuzinyakathisa kwembonakalo yazo. La malungu ziimasti (iipali) zemozulu (120m) neemasti zerediyo (95m), iintambo zothumelo phakathi kwepaseji ye-EIA, iindawo zokulahla inkunkuma yezinto ezingafunwayo namadwala neendlela zokufikelela kwisiza ukusuka kwindlela yephondo.

**Iziphumo zophando zezi**

- iimasti ziza kubonakala ukusuka kumgama omde kuneNPS, ngokukodwa ebusuku, ngenxa yesibane esibomvu esidanyazayo kumphezulu. Imasti iya kucutheka, nto leyo eya kunciphisa ukuzinyakathisa kwayo kwimbonakalo;
- iintambo zothumelo phakathi kwepaseji ye-EIA ziya kongeza ukuzinyakathisa kwimbonakalo yeprojekthi ngokuphakama nenani lazo;
- iindlela zokufikelela zaseBantamsklip naseDuynefontein ziya kuba nokuzinyakathisa kwimbonakalo yovakalelo lwendawo ngokungenamsebenzi;
- iindlela zaseThyspunt ziya kuba neyona mpembelelo ingalunganga kuvakalelo lwendawo, apho indlela esemantla ichongwe njengeyona inempembelelo encinci engalunganga ngenxa yembonakalo edibene neentambo zothumelo ezibonakala kakhulu, iintambo ezi-2 x 400kV eziphumayo nentambo e-1 x 132kV engenayo, kwakunye neBala leHV;
- iindawo zokulahla inkunkuma yezinto ezingafunwayo zinkulu kakhulu yaye kucingwa ukuba zibekwe phakathi kwepaseji yeEIA. Le ndawo iya kwenza ukuba iindawo zenkunkuma zibonakale ngamandla phakathi kommandla yaye zingasebenza njengezikhuselo ezikhulu zeembonakalo zeNPS ukusuka kwiindlela zephondo.

Kucetywa amanyathelo alandelayo esiQhelo sokuNciphisa ngenjongo yokuphungula impembelelo yembonakalo yeNPS.

**Kucetywa amanyathelo alandelayo esiQhelo sokuNciphisa ngenjongo yokuphungula impembelelo yembonakalo yeNPS.**

**Umbala**

Kukhuthazwa ukuba kusetyenziswe umbala wobublowu obungwevu obukhanyayo kwizakhiwo ezikhulu (oko kukuthi iSakhiwo seTurbine-Generator), netshimini enobungwevu obukhanya kakhulu. INPS sisakhiwo sekonkriti, eya kuba nobungwevu obukhanyayo. Ibhanti elintsundu ukujikeleza izakhiwo ezinkulu liya kunciphisa umlinganiso wazo othe nkqo. Iimasti kufuneka zibe nombala ongwevu oya kuba sisiphumo sokupeyintwa kwazo. Nangona kunjalo oku kunokuchasana neemfuneko zolawulo zokuba zibe namabhanti abomvu namhlophe.

**Izikhuselo**

Izikhuselo zethutyana zemo yelaphu kwiindawo zokubiyela ukujikeleza isiza sokwakha, iindawo zokusebenza neendawo zokuseka kufuneka zisetyenziswe ukuthintela iimbono zamalungu amaninzi okwakha kumphakamo wokubiya.

Iindledlana zomhlaba zobukhulu obubonakalayo kufuneka ziyilwe ecaleni komda wesiza owona ukufutshane nomhlaba wemisebenzi enovakalelo, umz. iindawo zokuhlala neendlela, ukukhusela iinxalenye ezithile zezakhiwo. Nangona kunjalo, kufuneka kuthathelwe ingqalelo iimpembelelo ezayamene nazo ezidalwayo ngexesha lokwakhiwa nokuzinziswa kwazo, ezifana nothuli, nengxolo, ukubuyisela kwimo yesiqhelo nokutshabalalisa izihluma ezikhoyo zaselunxwemeni. Uvavanyo olunzulu kufuneka luqhutywe kwisiza phambi kokuba kuthathwe nasiphi isigqibo malunga nesikhuselo sendledlana. Oku kuyimfuneko ngokomxholo wokusetyenziswa okunokubakho komhlaba weendawo zokuhlala kummandla waselunxwemeni okwimpuma yesiza seNPS yaseThyspunt nasentshona yeCape St. Francis, kwakunye nasempuma yeNPS yaseBantamsklip, enokuba sisiphumo sokwandiswa kweR43 ukuyidibanisa neBredasdorp.

**Ukukhanya**

Ukukhanya kwezakhiwo neendawo ezingaphakathi kwesiza seNPS kufuneka kuyilwe ngumntu onamava afanelekileyo ngenjongo yokunciphisa “ukuphalala kokukhanya”. Imiba ekufuneka ifakelelwe kukukhanyisa phantsi, umbala wokukhanyisa, umgama ofunekayo wokukhanyiswa, izifakelelo zezibane ezilawula ukukhanya nokunciphisa intsusa yokukhanya okubonakalayo.

**Iindawo zokulahla inkunkuma yezinto ezingafunwayo**

Iindawo ezinkulu zokulahla inkunkuma yezinto ezingafunwayo kufuneka zidityaniswe nemo yendawo ekhethiweyo ngokutshintsha imo yazo namathambeka asemacaleni ukulingana umlinganiso weentlobo zomhlaba ezikhoyo. Ngaphezu koko ukutyalwa kwakhona kweentlobo zezityalo zelizwe ngokwenene zokwakheka komhlaba ongqongileyo kuyimfuneko ukuyila imbonakalo ehambelana namalungu endawo yokulahla inkunkuma nophawu olukhoyo lokwakheka komhlaba.

IGcisa lezakhiwo Lokwakheka komhlaba kufuneka lalathelwe kwiqela lokuyila ngenjongo yokucebisa ngokudibanisa imbonakalo yeprojekthi kwizinga elinzulu ngexesha lezigaba zokuyila nokwakha nokusebenza.

Ingxaki yokubeka isibonelelo esitsha somlinganiso omkhulu kummandla ongekaphazanyiswa kangako nosemaphandleni okanye kufuphi neendawo ezakhiweyo yokunciphisa ubunzulu bokuzinyakathisa kwimbonakalo isekhona. Umbuzo ngowokuba kwandiswe, kodwa kuqukwe impembelelo yembonakalo kwingingqi okanye kwenziwe impembelelo yembonakalo kwenye indawo (esele inempembelelo), kodwa hayi ngomgangatho ofanayo.

Isigqibo sesokuba iNPS kuso nasiphi seziza ezintathu iya kuba nempembelelo yembonakalo ephezulu kuphawu novakalelo lwendawo lwemo yendawo ekhoyo. Nangona kunjalo, ngengqalelo kwimiba enzulu yamanyathelo okunciphisa acetywayo, iimpembelelo zembonakalo zingaphungulwa. Ukufikelela oku, umzamo omkhulu kuya kufuneka usetyenziwe kulo mba ngexesha lokuyila isiza nebakala lokwakha leprojekthi.

## 1.19 Samafa Esizwe (Appendix E20)

IOfisi yeeKontraki yeNzululwazi ngezaKudala yeYunivesithi yaseKapa (Archaeology Contracts Office of the University of Cape Town) yalathelwe nguArcus Gibb (Pty) Ltd, egameni leEskom

Holdings yenze uvavanyo lwempembelelo yokusingqongileyo lwecandelo lamafa esizwe, lweziza ezithathu ezicetyelwe isikhululo samandla senyukliya sama-4000 MW, nezibonelelo zokusebenza eziyamene naso. Ugunyaziso luyafunwa kuzo zozithathu iziza. Iziza zifutshane nesikhululo samandla senyukliya esiseDuynefontein (eNtshona Koloni), esesibini siseBantamsklip phakathi kwePearly Beach neDie Dam (eNtshona Koloni) nesesithathu eThyspunt phakathi kweCape St. Francis neOyster Bay eMpuma Koloni. Olu phononongo, olubandakanya imvelaphi ebanzi, nophando lwesiseko olulandelwa luvavanyo kummandla, luchonge iimvakalelo zamafa esizwe kuzo zozithathu iziza.

Zozithathu ezi ziza ziqulethe imithombo ebalulekileyo yamafa esizwe, ekwiindawo ezaziwayo zinovakalelo lwenzululwazi yezakudala nenzululwazi yezidalwa zamandulo, kwimimandla enembonakalo yelizwe eneempawu ezingamandla yasentlango. Ezi zinto ziphandiweyo zophononongo, zishwanakathelwa ngale ndlela:

**EDuynefontein**:

- Iimpembelelo zexeshana zamafa esizwe eMinyaka yaMva yaMatye (Late Stone Age) ziya kuba ncinci.
- IDuynefontein inovakalelo oluphezulu ngokwezidalwa zamandulo. Unciphiso olubanzi luya kufuneka apho, ukuba lwenziwe ngokufanelekileyo, luya kunceda uphando ngezidalwa zamandulo.
- Ngokwembonakalo-mhlaba yenkcubeko, ubukho beshishini lenyukliya sebusekiwe yaye bamkelwe njengebhakana luninzi lwabahlali baseKapa. Naziphi na izinto ezongeziweyo koku, ziya kongezwa kwiziko elisele lisekiwe.

**EBantamsklip**

- Ngokwemigangatho yaseNtshona Koloni, ulondolozo nomthamo weziza zezinto zakudala ubalasele. Unciphiso olubanzi luya kufuneka.
- Iimbonakalo-mhlaba zendawo zamafa esizwe endalo zibalasele yaye zenza igalelo kuvakalelo lwendawo kwinqila. Zikunye nezinto zezifundo zakudala zimele imbonakalo-mhlaba elungileyo ngokubanzi yamaxesha aphambi kokusekwa kwamathanga (precolonial). Ukuthatha ubunzima nobuninzi bomsebenzi ocetywayo, zilindelwe iimpembelelo zembonakalo-mhlaba zenkcubeko azingeke zincitshiswe.

**EThyspunt**

- Amafa esizwe ezinto zakudala nezidalwa zamandulo, aziintlobo ngeentlobo yaye anda kakhulu. Unciphiso ngaphandle kweempembelelo ezigqithisileyo, luya kufikelelwa nzima ngokobuchwepheshe, ngenxa yesimo sesiza neengxaki ngokuphathelele ukukufikeleleka, nangona kunjalo ukubekeka kokugqibela kwesibonelelo esicetywayo, kuya kudlala indima kwiqondo lempembelelo elindelweyo.
- Iimpawu zokuba sentlango kwale nxalenye yaselunxwemeni ***ngokwayamene namafa esizwe ezinto zakudala,*** zibalasele yaye zenza igalelo eliphathekayo kuphawu lwenqila. Ukuthatha ubunzima nobuninzi bomsebenzi ocetywayo, zilindelwe iimpembelelo zembonakalo-mhlaba zenkcubeko ezingenakuncitshiswa.

## 1.20 Uvavanyo Lwempembelelo Yezolimo (Appendix E21)

Uphando oluqhutywe kumgama weradiyasi ye-16km yazo zozithathu iziza lubonise ukuba ulimo kummandla weThyspunt lusekelwe kwimveliso yobisi; ifynbos ixhaphake kakhulu kummandla waseBantamsklip nangona zikhona iideri ezithile kwakunye neefama zeenkomo zenyama, zeegusha nezezilwanyana ezizingelwayo; xa ummandla waseDuynefontein usekelwe kubufama obuxubileyo.

Ngokuya ngolwazi oluqokelelweyo kuphononongo lwezolimo, kuqikelelwe ukuba ixabiso langoku lonyaka lwemveliso yeefama ngowama-2008 belingange-R150 yezigidi kummandla waseThyspunt, lingama-R29 ezigidi eBantamsklip yaye lingama-R75 ezigidi eDuynefontein.

Iimpembelelo ezingamandla zesikhululo samandla senyukliya kulimo bezinokuba kukuveliswa kothuli ngexesha lesigaba sokwakha, ukunqongophala kwabasebenzi nokwenyuka kwemivuzo, neziphumo zemalike. Impembelelo eqikelelweyo kwiimalike zemveliso ibonise ukuba ixabiso lilonke lemveliso kummandla waseBantamsklip ***belingaba nako*** ukunyuka nge-5% yaye kummandla waseThyspunt nge-10 ukuya kwi-15%, xa kungekho nguqu ilindelweyo kummandla waseDuynefontein.

Ngokwembono yemveliso yezolimo iDuynefontein sisiza esikhulileyo ngenxa yokuba imveliso yomdiliya nengqolowa ziqhubile ecaleni kwezigaba zokwakha nezokusebenza zesikhululo saMandla seNyukliya esiseKoeberg. Uthuli ngexesha lokwakha umatshini omtsha luya kuba nesiphumo esincinci kwimihlaba yeefama ngenxa yokuba imimoya ezingisayo ngexesha leenyanga ezomileyo zasehlotyeni ihamba ecaleni komcu waselunxwemeni.

Ukushwankathela, iimpembelelo kulimo kwiziza ezithathu zingendlela elandelayo:

**EDuynefontein**

- Ayikho impembelelo ebalulekileyo kwezolimo ngexesha lokwakha nelemisebenzi eqhelekileyo. Akukho ukwanda kwemveliso yezolimo ngexesha lokusebenza.

**EThyspunt**

- ***ngexesha elifutshane*** impembelelo engalunganga kwezolimo ingabakho ngenxa yothuli ngexesha lesigaba sokwakha. Nangona kunjalo likho ithuba lempembelelo elungileyo kummandla kwimveliso ngokwandisa ubukhulu bemalike yengingqi ngenxa yokungena ngamandla kwabemi (Abaqeshwa kwiNyukliya-1 neentsapho zabo kwakunye nabasebenzi bokwakha).

**EBantamsklip**

- ***ixesha elifutshane*** impembelelo engalunganga kwimveliso yezolimo iphathelele kuthuli ngexesha lesigaba sokwakha. Kukho ithuba eliqikelelwayo lokukhula okunganeno kwe-5% kwimalike yengingqi yemveliso yezolimo ngenxa yezithintelo zamanzi ezithintela ukwanda.

Ngokwempembelelo kwezolimo azikho iziphene ezibulalayo ngokuphathelele nasiphi nakwiziza ezithathu, yaye zonke zingafaneleka ukuhlalisa iNyukliya-1.

## 1.21 Sokhenketho (Appendix E22)

Olu phononongo luxabisa ishishini lokhenketho kwesinye nesinye seziza ezintathu ezichazwe kwinkqubo kaEskom yeNyukliya-1, oko kukuthi, iThyspunt, iBantamsklip neDuynefontein. Imalike yokhenketho kwisiza ngasinye ichaziwe yavavanywa kwimimiselo elandelayo:

- Inkcazo yemeko yeli xesha (status quo) ngokweshishini lokhenketho ngoku namagqabantshintshi ophuhliso olucetywayo kummandla ngamnye
- Inkcazelo nexabiso lenguqu kwimpahla yokhenketho enokwenzeka ngenxa yokwakha nokusebenza kwesikhululo samandla senyukliya kummandla ngamnye
- Ukuchonga nokukhuthaza amanyathelo okunciphisa ngenjongo yokuphungula okanye ukubuyekeza iimpembelelo ezingalunganga ezibonwayo kwimpahla yokhenketho

Isiza ngasinye siphandiwe ngophononongo lwekhompyutha olunzulu olulandelwe lutyelelo lommandla. Iintlobo ngeentlobo zabantu abachaphazelekayo neziphatha-mandla eziphambili kukhenketho bachongiwe, kwaqhagamshelwana nabo yaye kwaqhutywa udliwano-ndlebe nabo. Ukuba mbaxa kweshishini lokhenketho lilonke nefuthe elitshintshayo lembono nomfanekiso ekuthengiseni ukhenketho, ukubalula indawo ekusingwa kuyo nokwenza izigqibo, kwenza kube nzima ukuxabisa umndilili wokhenketho. Ngako oko kuthathwe isigqibo sokuba eyona ndlela ilungileyo yokubonisa ukusebenza kokhenketho neyona ndlela ilungileyo yokuthelekisa ixabiso lerandi kummandla ngamnye inokuba lixabiso leendawo zokulala ezicithwe apho. Oku kubalelwa ummandla ngamnye wophando ngokubala inani elisondeleyo leebhedi liphindaphindwe ngomndilili wokuhlalwa ngonyaka kuphindaphindwa ngomndilili wexabiso ngobusuku.

Impahla yokhenketho kummandla ngamnye yachazwa ngokwengqwalaselo yengcali neembono zabantu abachaphazelekayo ekubonisenwe nabo. Emva kophengululo lwedata yommandla yingcali, kubunjwe isikali esinemilinganiso yeempembelelo zokhenketho namaxabiso onyaka abonisa iimpembelelo kukhenketho abalwa kusetyenziswa izibalo zebhedi ngobusuku. Isishwankathelo sibonisiwe kuluhlu olungezantsi.

| | | IsiGaba soKwakha (iminyaka 1-6) | | IsiGaba sokuSebenza (iminyaka 7-20) | |
|---|---|---|---|---|---|
| | Ixabiso loKhenketho Ngoku (iiRandi) | Impembelelo ngoNyaka (iiRandi) | Impembelelo (%) | Impembelelo ngoNyaka (iiRandi) | Impembelelo (%) |
| EDuynefontein | 497,827,951 | 0 | 0.00% | 7,111,828 | 1.43% |
| EBantamsklip | 62,247,100 | 3,112,355 | 5.00% | 5,335,466 | 8.57% |
| EThyspunt | 77,745,000 | -6,108,536 | -7.86% | 0 | 0.00% |

Abahlali baseThyspunt naseBantamsklip bavakalise eyona nkcaso ingagungqiyo kwisikhululo samandla senyukliya. IThyspunt iqaqambise ngokucacileyo imo ephambili yendawo ephambili eselunxwemeni yokuchitha ikhefu, ukanti iBantamsklip igxininise imo entsha nenkenenkene yophuhliso lwemveliso yokhenketho nokuthembela kwengingqi kuyo. Umahluko kubukhulu nohlobo lokhenketho kwezi ziza ezibini kuchaza ukuba kutheni impembelelo yexesha elifutshane eThyspunt ibonwa ingalunganga; ilahleko ethile yemalike yangoku yeeholide

kunokwenzeka ingabuyekezwa ngokupheleleyo luhlumo lweshishini lokhenketho eThyspunt, ukanti ishishini lokhenketho kunokwenzeka landise ubukhulu bemalike encinci yaseBantamsklip. Xa abanye abantu baseDuynefontein abachaphazekelayo kukhenketho beneenkcaso zobuqu ekwakhiweni nokusebenza kwesikhululo samandla senyukliya esinye, bayaliqonda ithuba lokwanda kweshishini yaye bakhuthaza ngokubanzi imbonakalo elungileyo yokhenketho.

Inyathelo elingamandla lonciphiso liphulo elihlaselayo elisekwe kunxibelelwano oluqukayo loluntu lokujongana neenkolelo eziqhelekileyo eziphosakeleyo, ngokukodwa iimpembelelo zokuvelisa amandla ngenyukliya kwimekobume esingqongileyo yolwandle nekufuphi. Umdibaniso ochaziweyo nobanzi weearhente ezifanelekileyo zokhenketho nemibutho kwiinjongo nemisebenzi kaEskom yenyukliya kwisiza ngasinye, uya kulungiselela kwangexesha iinguqu zokuthengisa indawo yotyelelo nokubalula imizamo yokhenketho, yaye ngako oko ikhawulezise ukuqhelisa iimveliso zokhenketho zesiza ngasinye nomfanekiso wendawo ukusingisa kwimekobume entsha enokubakho yenyukliya; njengoko kugxininisiwe lungenelelo lorhwebo nenkxaso yabachaphazelekayo efunyanelwe iNPS yaseKoeberg.

Ukushwankathela, iimpembelelo kukhenketho kwiziza ezithathu zezilandelayo:

- EDuynefontein – zamkelwe lula kakhulu kuqoqosho lwengingqi; ayikho impembelelo yexesha elifutshane ebonakalayo kukhenketho; kumgangatho omncinci, impembelelo elungileyo yexesha elide ebonakalayo kukhenketho;
- EBantamsklip – umgangatho omncinci, impembelelo elungileyo yexesha elifutshane nelide ebonakalayo kukhenketho;
- EThyspunt – umgangatho omncinci, ixesha elifutshane, impembelelo engalunganga ebonakalayo kukhenketho; ayikho impembelelo equkayo yexesha elide ebonakalayo kukhenketho.

Ngokwempembelelo kukhenketho, akukho ziphene zibulalayo ngokuphathelele nasiphi seziza ezithathu, zonke zingalungela ukwamkela iNyukliya-1.

## 1.22 Sengxolo (Appendix E23)

Iingcali ziye zaphonononga impembelelo enokubakho yengxolo ebangelwa kukusekwa okucetywayo kweSikhululo saMandla seNyukliya (iNyukliya-1), ngokuvelisa umbane womthamo wobona bukhulu bungama-4 000 MW, kwiindawo ezintathu ezahlukeneyo. Iindawo ezintathu ziseKoeberg (iDuynefontein) isiza esisemantla ngqo kwiSikhululo saMandla seNyukliya saseKoeberg (KNPS), eNtshona Koloni; iBantamsklip malunga ne-5 khilomitha empuma kwePearly Beach, eNtshona Koloni; naseThyspunt, empuma kweOyster Bay, eMpuma Koloni.

Ibingekho inkcazelo (iinkcukacha) efumanekayo yobungakanani bengxolo ekhutshwa ngoomatshini nezixhobo zokusebenza eziza kufakelwa kwisiza. Le nkcazelo, ekhutshwawa ngabenzi boomatshini/izixhobo ngokwahlukahlukana kwazo, idla ngokufumaneka kuphela kwisiniki-maxabiso (tender) nakwinqanaba loyilo olunzulu bakuba abenzi noomatshini/izixhobo bekhethiwe.

Amandla ombane awona mthamo mkhulu ungama-4 000 MW weNyukliya-1 uya kuba mkhulu ngokuphindwe ka-2,2 kulowo oli-1 800 MW weSikhululo saMandla seNyukliya saseKoeberg esikhoyo (KNPS). Kucacisiwe kule ngxelo ukuthi, ukuba bekunokubakho ukwanda kwamandla esandi esikhutshwayo (ngeewatt) esiyameneyo esiphindwa ka-2,2, esi sandi besingenakuvakala ebantwini. Umahluko onjalo ugqalwa ungabalulekanga kwimigangatho yesizwe neyezizwe ngezizwe enxulumene nokuvavanya ingxolo kokusingqongileyo. Ngako oko, kuye kwamkelwa ukusebenzisa iziphumo zemilinganiselo enzulu yesandi eqhutywe kwiKNPS ukubala ubungakanani bamazinga engxolo kumhlaba ojikeleze iNyukliya-1 ecetywayo kwiziza ezithathu ngokutshintshanayo. Oku kubonelele ngeyona nkcazelo

ilungileyo ifumanekayo yokuqikelela impembelelo yengxolo enokubakho evela kwisikhululo samandla esicetywayo seNyukliya-1.

Iziphumo zophononongo zibonise ukuba ayinakubakho impembelelo yengxolo kumhlaba ojikeleze nayiphi na kwiipropati ezintathu ngexesha lokwakha nokusebenza kwesikhululo samandla senyukliya esicetywayo. Ngako oko azikho iinkqubo zokunciphisa ingxolo eziya kufuneka. Ingxolo ngexesha lesigaba sokusebenza ayinakuba nonxulumano kukhetho lwesiza nasiphi kwiziza ezithathu ezitshintshanayo.

Ayikho impembelelo yengxolo elindelweyo eyayanyaniswa nokwakhiwa kweendlela ezintsha ukuya kwiziza ezitshintshanayo, ngaphandle kwendlela yokufikelela yasentshona kwesiza saseThyspunt eya kudlula kwisithuba sama-230 m selokishi Umzamowethu. Kumzekelo wokugqibela kwenziwa kukhuthazwe oku kulandelayo:

- Kusetyenziswa iinkqubo zokwakha noomatshini/izixhobo zokusebenza ezikhupha awona mazinga aphantsi engxolo afumanekayo;
- Inkqubo ecwangciswe neququzelelwe kakuhle “yokukhawulezisa” iyaphunyezwa ukugqiba iyonke inkqubo yokwakha ngelona xesha lifutshane linokuthathwa; yaye
- Umsebenzi wokwakha kufuphi neendawo zokuhlala wenziwa kuphela ngamaxesha aqhelekileyo asemini omsebenzi.

Impembelelo yengxolo eyayanyaniswa nokuthuthwa kweempahla nezixhobo zokusebenza ukuya kwisiza inokuba nempembelelo ephantsi kwezona zindlu zokuhlala zikufutshane nendlela u-R27 eya kwisiza saseDuynefontein. Impembelelo yengxolo kwezona zindlu zokuhlala zikufutshane ecaleni kwendlela u-R43 eya kwisiza saseBantamsklip inokuba phakathi. Impembelelo yengxolo kwinani elincinci lezindlu zokuhlala kweyona ndawo ikufutshane yeendawo zokuhlala ezingekho sikweni ecaleni kwendlela u-R330 kulwandle iVista kufuphi nesiza saseThyspunt inokuba phakathi. Kuyo yonke imizekelo, alukho unciphiso lwengxolo oluya kufuneka ngokweMimiselo yoLawulo lweNgxolo/Noise Control Regulations (NCR).

Ukuthuthwa koomatshini abanzima kwizithuthi zobunzima obugqithisileyo ezicothayo kwiindlela ezikumgama we-1000 m wezindlu zokuhlala, kungenzeka kube nesiphumo sempembelelo yengxolo yobunzulu obuphakathi kodwa okwexesha elifutshane kakhulu. Kuncinci okunokwenziwa ukunciphisa amazinga engxolo akhutshwa zizithuthi zobunzima obugqithisileyo. Ngenjongo yokunciphisa impembelelo yengxolo kubahlali abachaphazelekayo, kukhuthazwa ukuba baziswe kwangaphambili kokuthuthwa nakuphi okwenzekayo.

## 1.23 Isishwankathelo soPhumezo soVavanyo lweNgozi eMpilweniyaBantu (Appendix E24)

Iprojekthi yeNyukliya-1 yakwaEskom ibandakanya ukufumana ilayisensi yeziza ezithathu ezihlolwayo ecaleni kwamanxweme asentshona nasemazantsi oMzantsi Afrika ukwenzela ukuseka izikhululo zamandla zenyukliya. Iziza zezi:

- Isiza saseThyspunt, esikwiPhondo laseMpuma Koloni kwinqila esentshona yeBhayi phakathi kweCape St Francis neOyster Bay;
- Isiza saseBantamsklip, esikwiNtshona Koloni kummandla ophakathi kweDanger Point neQuoin Point;
- Isiza saseDuynefontein, esikuNxweme lwaseKapa oluseNtshona (iCape West Coast), malunga nama-30 ekhilomitha kumantla eKapa, kufuphi neSikhululo saMandla seNyukliya sangoku saseKoeberg.

Ukusekwa kwesikhululo samandla senyukliya kuquka imisebenzi eliqela, efuna ugunyaziso ngokwemiThetho yoVavanyo lweMpembelelo yokusiNgqongileyo (EIA) ebhengezwe phantsi

komThetho weSizwe woLawulo lokusiNgqongileyo (No. 107 we-1998) (National Environmental Management Act) (No. 107 of 1998), njengoko ulungisiwe. Inkqubo yeEIA ilawulwa liSebe leMicimbi yokusiNgqongileyo (DEA). Nangona kunjalo, ukulandela isigqibo somanyano phakathi kweDEA noMlawuli weSizwe weNyukliya (National Nuclear Regulator) (NNR), kuvunyelenwe ukuba iNNR iya kuba nemfanelo yegunya malunga novavanyo lwemicimbi yonke enxulumene neempembelelo zokuphucula ubulunga bokusasaza imitha (ionising radiation) empilweni yabantu. Le ngxelo yempembelelo yokusingqongileyo kuvavanyo lweengozi zempilo ezinokubakho ezayamaniswa nezikhululo zamandla zenyukliya kwiziza ezihlolwayo ngako oko iya kuthunyelwa kwiNNR ukufumana imvume. Ingxelo iqulunqwe nguINFOTOX (Pty) Ltd ngokusebenzisana noSRK Consulting.

Ukhuseleko lokusasazeka kwemitha ngezinga lethamo eliphantsi lujongene ikakhulu nokhuseleko ngokuchasene nomhlaza obangwa kukusasazeka kwemitha nesifo esifunyanwa ngokofuzo. Ezi ziphumo zichazwe njengosasazeko olungahlelwanga lwezinto ezinokwenzeka (stochastic), ezingenaso isiqalo, yaye zanda ngokwenzeka rhoqo ngokwalamana nethamo losasazeko lwemitha. Ukuba sesichengeni sokusasazeka kwemitha kuboniswe kusandisa ingozi kwezinye izifo, kubantu abasesichengeni samathamo aphezulu okusasazeka kwemitha, njengakunyango ngosasazeko lwemitha (radiotherapy) yaye kananjalo kubantu abasinde kwibhombu yamandla eeatom (atomic-bomb) abathe baba sesichengeni samathamo aphezulu okusasazeka kwemitha. Nangona kunjalo, akukho bungqina obuthe ngqo bokwanda kwengozi yezifo ezingezizo ezomhlaza kumathamo anokuba ngaphantsi kwe-100 millisieverts (mSv). Lo mphakamo wethamo yimilinganiso emibini yobukhulu engaphezulu kunomda wethamo weNNR wokuba sesichengeni koluntu. Ukhuseleko ngokuchasene nokufumana umhlaza oveliswa kukusasazeka kwemitha kuthathwa kwanele ukukhusela kwiziphumo zofuzo kwakunye naziphi ezinye izifo ezayamaniswa nokusasazeka kwemitha.

Yonke imihla abantu basesichengeni semvelaphi yendalo yokusasazeka kwemitha evela kumhlaba wokusingqongileyo, izixhobo zokwakha, umoya, ukutya, imitha yendalo yonke, ukanti nakumalungu osasazeko lwemitha phakathi komzimba womntu. Alukho uphawu ngokubanzi olwenza iziphumo zosasazeko lwemitha olwenziwa ngabantu lwahluke kwezo zenzo zokusasazeka kwemitha okwenzeka ngokwendalo.

KwiSaziso sikaRhulumente No. R. 388, iSebe leziMbiwa naMandla licacisa umda wethamo lonyaka elisebenzayo le-1 mSv kumalungu oluntu elivela kuyo yonke imisebenzi egunyazisiweyo. Umda wethamo uxela “ixabiso lethamo elisebenzayo okanye ithamo elilinganayo kubantu kwimisebenzi egunyazisiweyo yilayisensi yokufakela inyukliya, ilayisensi yenqanawa yenyukliya okanye isatifiketi sobhaliso, ekufuneka ungagqithwa”. Ngaphezu koko, iNNR ibalula isithintelo sethamo se-0.25 mSv ngokungqamene nesenzo esigunyazisiweyo, ukuqinisekisa ukuba isibalo samathamo esifunyenweyo lilungu eliqhelekileyo leqela elibalulekileyo ukuvela kuyo yonke imithombo elawulwayo sinokuba sincinci kunomda wethamo. Isithintelo sethamo “sisithintelo esinokubakho nesinxulumene nomthombo kwithamo lomntu eluvela kumsebenzi oqikelelweyo wesenzo esigunyazisiweyo esikhonza ngokukodwa njengomda wolona khuselo lokusasazeka kwemitha okanye ukhuseleko lwenyukliya”.

INNR ifuna ukuba nakuphi ukuba sesichengeni okungaphezulu kwemvelaphi yosasazeko lwemitha lwendalo kufuneka kugcinwe kuphantsi kangangoko kunokwenzeka ngokwamkelekileyo (umgaqo siseko weALARA). Imida yethamo nezithintelo zethamo kufuneka ngamaxa onke zichazwe njengemida ephezulu ngokuhambelana nomgaqo siseko weALARA, nto leyo ethelekelela ukuba ukuba sesichengeni okuvela kwimisebenzi yesiqhelo kuya kuba nganeno kwemida yethamo nezithintelo zethamo.

Ubuchwepheshe besixhobo sokwenza amandla ngeeathom (ireactor) abukhethelwanga iprojekthi yeNukliya-1 ngeli lixa yaye uvavanyo lwangoku lusekwe kwingqiqo yemvulophu yobuchwepheshe (technology envelope) (TE), emisela umda ophezulu wezinto ezikhutshwa lusasazo lwemitha, olufuna ukuba amathamo osasazeko lwemitha kwilungu eliqhelekileyo

leqela elibalilekileyo nakwesiphi isiza esiphantsi koqwalaselo angagqithi iimfuneko zolawulo zeNNR. Ngokuphathelele amandla akhethiweyo okuvelisa umthamo kwisiza, imidibaniso yezixhobo zokwenza amandla ngeeathom ingaqwalaselwa, ukuba nje izinto ezikhutshwa lusasazeko lwemitha alugqithi iTE. Uvavanyo lwempembelelo empilweni olunikelwe kule ngxelo lusekwe kwisindululo sesiseko sengxelo sokuba iNNR iya kukhupha ilayisensi yesiza kuphela ukuba zonke iimfuneko zolawulo ziboniswe zithotyelwe ngokupheleleyo. Oku kungathathela ingqalelo kungekuphela nje uvavanyo lwethamo lokusasazeka kwemitha kokusebenza okuqhelekileyo kwesikhululo samandla enyukliya, okuya kuthunyelwa kwiNNR ngemo yengxelo yokhuseleko lwesiza (SSR), kodwa onke amanye amaphononongo afunelwa uvavanyo lwemeko yonke yokhuseleko.

Le ngxelo yempembelelo yokusingqongileyo igqabaza ngeendlela zokulinganisa ubuninzi bokuba sesichengeni kusasazeko lwemitha yaye ibeka iimfuneko zolawulo zeNNR emxholweni ngeengozi ezinokubakho empilweni yabantu. Indlela yokusebenza iqwalasela imidlalo eyilwa ngezinto ezingqamene nesiza ukwenza iindlela ezininzi zokuba sesichengeni. Amathamo alinganisiweyo okusasazeka kwemitha amiselwe yiSSR aya kuvavanywa ngokweemfuneko zolawulo zeNNR. Iimvavanyo zeziza ezihlolwayo kufuneka zingabonisi kuphela ukuthobela imida yethamo nezithintelo zethamo zeNNR, kodwa kananjalo kufuneka ziqwalasele imigaqo-siseko yeALARA. Ukuba ithamo elibaliweyo liphakathi kweemfuneko ezamkelekileyo zeNNR, kungafikelelwa isigqibo sokuba ingozi yomhlaza ingaba ngaphakathi *kwelona thamo liphantsi* lengozi ebomini, olumele umphakamo wengozi yempilo othathwa njengongabalulekanga okanye ongenamsebenzi. Ukhuseleko ngokuchasene nokuvela komhlaza obangwa kukusasazeka kwemitha luqwalaselwa lwanele ukukhusela ngokuchasene neziphumo zofuzo nezinye izifo ezayamaniswa nokusasazeka kwemitha.

Uvavanyo lwempembelelo luqaqambise ukuba kukho unciphiso olubanzi olwakhelwe kuyilo lwesixhobo sokwenza amandla ngeeathom kwanokuthi kukho amakhuselo amaninzi ngokuchasene neziphumo zokusilela kwizinto zokusebenza nezixhobo neempazamo zobuntu.

Ukwenzela iinjongo zeEIA, kuyavunywa ukuba iNNR iya kukhupha ilayisensi yokusekwa kwesikhululo samandla senyukliya nakwesiphi isiza esikhethekileyo kuphela ukuba ukuthobela okupheleleyo kwemida nezithintelo zethamo lokusasazeka kwemitha kubonisiwe, kuthathelwa ingqalelo imigaqo-siseko yeALARA nayo yonke eminye imicimbi enxulumene nemeko yokhuseleko lulonke. Ngokuqwalasela iindlela zokuvavanya ithamo ezinikiweyo kule ngxelo, kukhuthazwa ukuba indlela yamkelwe njengekhusela ngokwaneleyo ngokuchasene neziphumo ezibi empilweni kumalungu abahlali.

## 1.24 Uthutho (Appendix E25)

UArcus GIBB (Pty) Ltd (Arcus GIBB) walathelwe nguEskom Holdings Limited (Eskom) ukwenza uVavanyo lweMpembelelo yokusiNgqongileyo (EIA) kunye nesiCwangciso soLawulo lokusiNgqongileyo (EMP) ukwenzela ulwakhiwo lwesikhululo samandla senyukliya kwakunye nezibonelelo zokusebenza ezayanyaniswa naso kwesinye sezikhululo ezithathu ezikhethiweyo ezikwiPhondo laseMpuma-Koloni nelaseNtshona-Koloni, ezibizwa:

- IThyspunt – eMpuma-Koloni ;
- IBantamsklip – eNtshona-Koloni;
- IDuynefontein (Isiza esikhoyo eKoeberg) – eNtshona-Koloni.

Ezinye iziza ezibini eMntla-Koloni, ezibizwa iBrazil neSchulpfontein, aziqukwanga kuphononongo olongezelelweyo lwesiGaba sokuKhangela ngokuPheleleyo senkqubo yeEIA.

Le ngxelo icacisa uPhononongo lweNgcali yezoThutho yesiGaba soVavanyo lweMpembelelo yeNyukliya-1.

Injongo yesi siGaba soVavanyo loPhononongo lweNgcali yezoThutho kukuqinisekisa ngempembelelo yezothutho kuthungelwano lwezothutho olusele lukho ngexesha lazo zonke izigaba zophuhliso, oko kukuthi esokwakha, esokusebenza nesokuphelisa ugunyaziso lwesikhululo esicetywayo samandla enyukliya.

Isiza sase**Duynefontein** asifuni iinkqubo zokuphucula ezibalulekileyo ngexesha lezigaba zokwakha nokusebenza kweNyukliya-1 ngokuphathelele ukuphuculwa kwendlela ezinqumlanayo neendlela zokuthutha imithwalo enzima. Nangona kunjalo, iDuynefontein iswela inani eliphakamileyo lezithuthi ezingamalalela zokuqinisekisa ukufudusa ngokhuselekileyo abasebenzi bokwakha ukuba kunokwenzeka ingozi kwisiKhululo saMandla seNyukliya saseKoeberg esikufuphi ngexesha lokwakha. Ezi zithuthi zingasetyenziswa ukuthutha abasebenzi bokwakha ukuya nokubuya kwisiza ngamaxesha engxinano ephezulu KUSASA naseMalanga.

**IBantamsklip** inempembelelo ebalulekileyo kuthungelwano lwezothutho, nemfuneko yokuphucula inkqubo yezothutho yoluntu, nokuphucula iindlela zemithwalo enzima neendlela zengxakeko ezifunekayo ngeenjongo zokufudusa xa kuhlangulwa. Ngenxa yokuba isiza saseBantamsklip simi sodwa, ukuthuthwa kwemithwalo enzima ngendlela kuya kufuna ukuphakanyiswa okubalulekileyo kweendlela yaye nenye indlela yothutho ngolwandle kuya kufuneka iqwalaselwe. Kufuneka kuchongwe isiza esifanelekileyo elunxwemeni kufuphi neBantamsklip yaye kufuneka kwakhiwe nendawo yokumisa enamalungiselo okulayisha / ukwehlisa imithwalo.

**IThyspunt** ifuna ukuphuculwa okungamandla kothutho ngobhekisele kuthutho nokufikelela koluntu ngamaxesha ezigaba zokwakha. Indlela iR330 ekucetywa ukuba isetyenziselwe ukuthutha imithwalo enzima nayo ingafuna ukuphuculwa ngokuthi kwakhiwe iindledlana ezisemacaleni ukuze ikwazi ukumelana nokwanda kwemithwalo enzima. Indlela yaseOyster Bay kucetywa ukuba iphuculwe ibe yindlela egalelwe umphezulu yaye isetyenziswe ngexesha lesigaba sokwakha nokusebenza ukulungiselela abasebenzi bommandla, izithuthi zokwakha naxa ifuneka njengendlela yokufudusa kwingxakeko kwimimandla efana neOyster Bay.

## 1.25 Isishwankathelo soPhumezo sokuSabela kwiNgxakeko (Appendix E26)

Le Ngxelo yeMpembelelo yokusiNgqongileyo (EIR) iquka izigqibo namanyathelo okunciphisa awayamaniswa nokwakha nokusebenza kweSikhululo saMandla seNyukliya esiqhelekilyeo (NPS) yaye esiyamaniswa nesibonelelo sokusebenza kwiziza ezithathu eMpuma Koloni (1) naseNtshona Koloni (2). Ekuqaleni iziza bezichongwe ngenxa yophando lwesiza olwenziwa ukususka kwiminyaka yee-1980 nakuPhononongo lokuKhangela ngokuPheleleyo lweEIA. Olu phononongo lobungcali luquka ukuSabela kwiNgxakeko yaye lwaqhutywa nguMogwera Khoathane/SRK Consulting.

Injongo yolu vavanyo kukubonisa ukuba nakho kwesicwangciso sengxakeko (esinxulumene nenyukliya) phakathi kommandla wophononongo. IiMvavanyo zesiCwangciso seNgxakeko zibonelela abenzi bezigqibo ngolwazi oluya kukhokela isigqibo sabo ngokhetho lokugqibela lwesiza.

Ukulungela ingxakeko kumxholo weNPS kungachazwa njengamanyathelo awenza umntu ozimeleyo nemibutho bakwazi ukwenza ukusabela okukhawulezileyo nokunesiqhamo kwingxakeko kumxholo weengxakeko zenyukliya. Izenzo ezikhuselayo ziquka amanyathelo okuthintela ukuba sesichengeni koluntu kungcoliseko lweradioactive ngokuba sesichengeni ngokuphandle, ukuphefumla nokuginya. Iinjongo zezi zenzo kukuthintela iziphumo eziqinisekisayo (ukufa kwangoko) nokunciphisa iziphumo zokumisela ngokungahlelwanga (ikakhulu kumhlaza).

**Ngokuphathelele kwiingxakeko zenyukliya, iiseti ezimbini zeemfuneko kufuneka ziphunyezwe.**

Iimfuneko zokusebenza (ukusabela); kunye
Neemfuneko zesibonelelo sokusebenza (ukulungela)

Iimfuneko zokusabela okusebenzayo zibhekisa “kwisakhono” sokwenza umsebenzi. “Isakhono” siquka ukuba nazo izibonelelo zokusebenza ezifana negunya nemfanelo, umbutho, amagosa, iinkqubo, amalungiselelo, izixhobo zokusebenza noqeqesho lokwenza umsebenzi ngempumelelo okanye umsebenzi xa kufuneka ngexesha lengxakeko.

“Isakhono” siquka ukuba nalo igunya neemfanelo ezifunekayo, umbutho, amagosa, iinkqubo, amalungiselelo, izixhobo zokusebenza noqeqesho lokwenza umsebenzi ngempumelelo okanye umsebenzi xa kufuneka ngexesha lengxakeko. Kulo mxholo, isibonelelo sokusebenza sixela ezothutho nothungelwano loqhagamshelwano, imisebenzi yezeshishini kunye, ngokubanzi, nantoni enokuba nefuthe lokukhawulezisa intshukumo ekhululekileyo yabantu nezithuthi kwinqila yesiza.

Ekuboniseni ukuba nakho ukwenzeka kwesicwangciso sengxakeko, imiba emininzi enxulumene nesiza kufuneka ithathelwe ingqalelo. Eyona miba ibalulekileyo yile:

Ukuxinana nokusasazeka kwabemi, imigama ukusuka kwimibindi yabemi, amaqela abemi ekunzima ukuwanika ukhuselo okanye ukuwafudusa kwimeko yengxakeko;
Imbonakalo ezikhethekileyo zejografi, ezifana neziqithi, imimandla yeentaba, imilambo, izakhono zezithuthi zengingqi nothungelwano loqhagamshelwano;
Imisebenzi yezolimo enovakalelo kwizinto ezinokukhutshwa zeeradionuclide, kunye

Neziganeko zentlekele zangaphandle okanye iziganeko zendalo ezinokubonwa kwangaphambili.

Iziphumo neenkuthazo ezingundoqo zolu phononongo lokuSabela kwiNgxakeko zinokushwankathelwa ngokulandelayo:

**Iingcamango ngeziBonelelo zokuSebenza**

ISiza saseDuynefontein siquka isiKhululo esikhoyo saMandla seNyukliya saseKoeberg, ngako oko isibonelelo sokusebenza sokusabela kwingxakeko neenkqubo zikhona. Nangona kunjalo, iziphumo zoHlalutyo loKhuseleko, olwenziwe phambi kokugunyaziswa njengenxalenye yeNgxelo yoHlalutyo loKhuseleko ziya kuqinisekisa ukuba izibonelelo zokusebenza zangoku zinokwanela ukujongana neemfuno zesiKhululo saMandla seNyukliya-1 esongezelelweyo esicetywayo.
Iziza zaseBantamsklip naseThyspunt ziya kufuna ukuphuculwa kwezibonelelo zokusebenza njengoko zikwimimandla esemaphandleni njengoko kubonisiwe ngamaphononongo okusetyenziswa komhlaba awenziwe nguEskom.

**Usasazeko lwaBemi**

Inkqubo yokumisela yeNPS ngokubanzi iquka uphononongo nophando lommandla omkhulu wokukhetha isiza sokuhlolwa esinye okanye ezingaphezulu (jonga IsiKhokelo soKhuseleko seIAEA 50-SG-S9 kuPhando lweSiza) lulandelwe luxabiso olunzulu lwezo ziza.

**Imiba engundoqo ethathelwa ingqalelo yile:**

- Isiphumo senqila yesiza kumatshini;
- Isiphumo somatshini kwinqila;
- Abemi.

Ngethuba lesigaba "sokhetho", apho ngelo xesha kusenziwa uhlalutyo lwenqila, iziza kwimimandla eneyona ngxinano iphezulu yabemi iya kushenxiswa kwiziza ezifunwayo; ngokwesiphumo kwamkelekile, xa zonke izinto zithathelwa ingqalelo, ukukhetha imimandla

enabemi abambalwa kunaloo mimandla enobudolophu obuphezulu. Iziza zaseThyspunt naseBantamsklip ziyanelisa ngokuphathelele koku.

Iziza zaseThyspunt naseBantamsklip zamkelekile ngokubhekisele kwiingcamango zesicwangciso sengxakeko njengoko indlela entsha eyamkelweyo yeEUR eyamkelwe nguEskom yesicwangciso sengxakeko ikhuthaza ukuba iNPS ingakhiwa eMzantsi Afrika ngaphandle kwemfuneko yamancedo engxakeko angaphandle kwesiza awexesha elifutshane afana nekhusi, ukufudusa okanye i-iodine prophylaxis (oko kukuthi akukho manyathelo okuthintela angxamisekileyo). Iimfuneko zeEUR zimisela ukuba izitishi zamandla zenyukliya zakule mihla kufuneka zingabinazo okanye zibe nezona zimbalwa iimfuneko zamancedo engxakeko (umz. ukufudusa) ngaphaya kwama-800m ukusuka kwireactor, yaye zibonelela ngeseti yemigqaliselo ekufuneka ireactor iyanelise ukuze ibonise ukuba ingakhiwa ngaphandle kweemfuneko zesicwangciso sengxakeko.

## 1.26 Isishwankathelo SoPhumezo SoLawulo LweSiza (Appendix E27)

Le ngxelo iphanda iimpembelelo namanyathelo okunciphisa afunekayo awayamaniswa nolwakhiwo nokusebenza kweSikhululo SaMandla SeNukliya Esiqhelekileyo (NPS) kwakunye nezibonelelo zokusebenza ezayamaniswa kwisiza esinye eMpuma Koloni neziza ezibini eNtshona Koloni. Iziza zichongiwe ngokusekelwe kuphando olwenziweyo kwisiza ukusuka kwiminyaka yee-1980. Le EIR iquka uLawulo Lwesiza yaye beluqhutywa nguSRK Consulting.

IEskom iceba ukwakha iNPS yohlobo lobuchwepheshe lweSixhobo Sokwenza Amandla Samanzi Axinzelelweyo (Pressurised Water Reactor), ngomthamo wama- ~ 4 000 MWe. INPS ecetywayo iya kuquka isixhobo senyukliya sokwenza amandla ngeeathom, indawo yeinjini yomsinga, isibasi esisetyenzisiweyo, amalungiselelo okugcina isibasi senyukliya, amalungiselelo okujongana nenkunkuma, ukungenisa nokukhupha izakhiwo kwakunye nezibonelelo zokusebenza zeentlobontlobo zeenkonzo ezincedisayo. Umatshini uya kuba nobomi bezoshishino beminyaka engama ~60.

Zontathu iziza ezicetywayo, eThyspunt (eMpuma Koloni), eBantamsklip naseDuynefontein (eNtshona Koloni), ziselunxwemeni. Ezibini zokuqala ziziza ezingazange zakhiwe uphuhliso ngaphambili xeshikweni iSikhululo Samandla Senyukliya saseKoeberg esikhoyo sikwisiza sokugqibela.

Inkcazelo Yomgama Wophando (Terms of Reference) (ToR) yophononongo lwengcali yoLawulo lweSiza kukuvavanya iintlobo ngeentlobo zemiba ngokuphathelele ulawulo lwesiza, kuquka okulandelayo:

- Ukhuseleko lweSiza;
- Ulawulo lokufikelela (ukungena nokuphuma, kuwo omabini amabakala okwakha nokusebenza); kunye
- Nemimandla elawulwa ngabanini-ndawo.

Indlela elandelwayo yeEIR yoLawulo lweSiza iquke uphononongo ngekhompyutha nokuhlola isiza ngokusekwe:

- Kumacandelo achanileyo eeNkcukacha zoBuchwepheshe zikaEskom Zophando Lweziza Zenyukliya (Eskom 2006, 2009);
- Umthetho ochanileyo/osemxholweni;
- Izahluko ezichanileyo Zengxelo Yokhuseleko Lwesiza saseKoeberg (Eskom 2006, 2009);
- Amanyathelo olawulo lwesiza eKNPS (Eskom 2006);
- Uphando Lwesiza; kunye
- Nomatshini Wamandla Wokubonisa iSixhobo sokwenza aMandla soMaleko oSetyenziswa njalo Wohlalutye (kwisiza saseDuynefontein). Uphononongo lweNgcali

loVavanyo lweMpembelelo yokusiNgqongileyo: uKhuseleko lweSiza (Malepa Holdings 2007).

Ngokusekelwe kulwazi olungentla novavanyo lwempembelelo, kungafikelelwa kwizigqibo ezilandelayo:

**lDuynefontein:**

- Isiza sele siphuhlisiwe njengeNPS enofikelelo olupheleleyo nolawulo lwesiza, ebesisebenza ukusuka kugunyaziso ngowe-1979 naphambi kolu lwakhiwo;
- Inamalungiselelo apheleleyo abatyeleli kunye neZiko laBatyeleli;
- Ulondolozo lweNdawo lwaseKoeberg luphuhliswe kwisiza;
- Kukho iindlela ezityhutyhayo zokuhamba ngeenyawo nokukhwela iibhayisekile zentaba;
- Ufikelelo luya kungena ngofikelelo olutsha ngeendawo zolawulo kunye neendlela ezikhoyo eziphuculweyo ezikhokelela kwindlela engu-R27;
- Ziya kuba mbalwa iimpembelelo ezongezwayo okanye ezongezelelekayo ngophuhliso lweNyukliya-1; yaye
- Ukuxabisa impembelelo *bubunzulu obuphantsi*, *isiphumo* kunye *nokubaluleka*, ikakhulu *kumphakamo ophezulu wentembeko* yaye ayinakubakho impembelelo yemithombo engenavuselelwa. Azikho iziphene ezibulalayo.

**lThyspunt:**

- Sisiza esinako ukuphuhliswa;
- Izinto eziphilayo neendawo zazo zokuphila zemigxobhozo ezinovakalelo kunye neembonakalo zamafa esizwe ezikhoyo ziya kulondolozwa ngokuphumeza amanyathelo olawulo lwesiza;
- Ukufikelela kwisiza ngoku kunyiniwe yaye kulawulwa ngokubiyelwa nangamasango e-elektroniki/atshixwayo;
- Indawo entsha yofikelelo yolawulo iya kuphuhliswa kumda wolawulo ngumnini-ndawo entshona okanye empuma nakucingo lokhuseleko olungaphandle nolungaphakathi; yaye
- Ukuxabisa impembelelo *bubunzulu obuphantsi, isiphumo* kunye *nokubaluleka*, ikakhulu *kumphakamo ophezulu wentembeko* yaye ayinakubakho impembelelo yemithombo engenavuselelwa.. Azikho iziphene ezibulalayo.

**lBantamsklip:**

- Sisiza esinako ukuphuhliswa;
- Ukufikelela kwisiza ngoku kunyiniwe yaye kulawulwa ngokubiyelwa nangamasango; Nangona kunjalo, indlela yetha u-R43 igqitha phakathi kwesiza;
- Ufikelelo luya kungena ngendawo/ iindlela zolawulo ukusuka kwindlela u-R43 yaye iindawo zolawulo lokufikelela zikucingo lokhuseleko olungaphandle nolungaphakathi; yaye
- Ukuxabisa impembelelo *bubunzulu obuphantsi, isiphumo* kunye *nokubaluleka*, ikakhulu *kumphakamo ophezulu wentembeko* yaye ayinakubakhona impembelelo yemithombo engeke ivuselelwe. Azikho iziphene ezibulalayo.

**Ukhetho lokuNgahambi:**

- UEskom uya kuthengisa iziza zaseThyspunt naseBantamsklip;
- Ukuxabisa impembelelo *bubunzulu obuphantsi* kunye *nesiphumo esiphakathi* kunye *nokubaluleka okuphantsi* malunga neDuynefontein kunye *nobunzulu obuphantsi*, *isiphumo esibi* kunye *nokubaluleka okuphezulu* malunga neziza zeThyspunt neBantamsklip.

Ukutshintsha kwemozulu nomatshini wokususa ityuwa azinakuba naliphi ifuthe kuvavanyo lwempembelelo kuLawulo lwesi Siza.

**Amanyathelo okuNciphisa**

Amanyathelo alandelayo okunciphisa ayandululwa:

- Yenza uqhagamshelwano olucacileyo lomgaqo-nkqubo wofikelelo kwiipropati kuluntu, usebenzisa iibhodi zezaziso kumasango ofikelelo nangokuqhagamshelana ngqo nabahlali abakufuphi;
- Cinga ngokubonelela ngeemvume zokuvumela ufikelelo lwemisebenzi yokuloba iintlanzi nokubukela iminenga nakuwuphi ummandla waselunxwemeni wokubekela bucala;
- Gcina ufikelelo loluntu kwindlela u-R43 apho icanda isiza saseBantamsklip;
- Phumeza amanyathelo okunciphisa akhuthazwayo kwingxelo yovavanyo lwempembelelo yembonakalo;
- Seka ulondolozo lwendalo phakathi kommandla olawulwa ngabanini-ndawo yaye ubonelele ngofikelelo ngeenjongo zophando lwezenzululwazi;
- Londoloza yaye utyale ngokutsha izityalo zeli lizwe;
- Gcina yaye ulondoloze iimbonakalo zokusingqongileyo kwiziza ezifana nemigxobhozo;
- Londoloza iimbonakalo zamafa obuzwe;
- Lungiselela uphengululo lwemiba yolawulo lwesiza eziphakanyiswa kule EIR ngaManqaku eSizwe anguNdoqo ngokusebenza ngoMphathiswa waMapolisa;
- Qinisekisa ukufumaneka kwenkxaso nayiphi efunekayo yolawulo lwesiza evela kwiiarhente ezichanileyo zolawulo ezifana nezamapolisa, ezomkhosi, ezamajoni aselwandle nezaselunxwemeni;
- Dibanisa amanyathelo olawulo akhethekileyo esiza namanyathelo okhuseleko akhoyo engingqi nawenqila;
- Phuhlisa isiCwangciso soLawulo lokusiNgqongileyo phambi kokwakha. Chaza amanyathelo okunciphisa, ukubeka iso izinto ezinokubalwa, itekeni 'iinjongo' kunye neemfanelo kwiEMP; yaye
- Qesha iGosa loLawulo lokusiNgqongileyo.

IsiCwangciso soLawulo lokusiNgqongileyo kufuneka siyilwe phambi kokwakha ngokucebisana noEskom. Iimfanelo, amanyathelo okunciphisa nokubeka iso ukusebenza kwazo ngempumelelo kufuneka kuchazwe ngokucacileyo.

## 1.27 Isishwankathelo soPhumezo sokuCwangcisa iGrid (Appendix E28)

UEskom ucinga ukwakha iqela elitsha lezikhululo zamandla zenukliya ukwanelisa imfuno yeziswe yombane nokuphambukisa umthombo womthwalo wesiseko wemveliso ukusuka kwimveliso ebaselwa ikakhulu ngamalahle. Isigaba sokuqala sale nkqubo yenukliya sibizwa iNukliya 1 eya kuqulatha nokuba ziiyunithi ezintathu ze-1100MW okanye iiyunithi ezimbini ze-1600MW, ezinika itotali ephakathi kwama-3200MW ukuya kuma-3300MW. UEskom sele echonge iziza ezinokubakhona ezintlanu elunxwemeni lwaseKapa yaye uphononongo loVavanyo lweMpembelelo yokusiNgqongileyo (EIA) lwenziwe ukumisela impembelelo enokubakhona kwisikhululo samandla senukliya sama-3300MW kwiziza ezintlanu.

Ukunika imbono jikelele yemitshintshelo yamandla eya kwenzeka njengoko ukuveliswa kwenukliya kudityaniswa kuthungelwano lothumelo lwaseKapa kunokwenziwa lula ngeenani leepaseji zothumelo olungundoqo lwamandla. Oku kubonakalisiwe kwisazobe soku-1 esibonisa iipaseji zamandla ezingundoqo zaseKapa (ezileyibhiliwe ngoA, B, C1, C2 noC3) yaye neziza zenukliya ezicetywayo (ezileyibhilwe ngoB, D, T, S noZ). Iipaseji zeC1, C2 neC3

zibonisa iipaseji zothumelo ezikhoyo xeshikweni uA noB zibonisa iipaseji zothumelo ezintsha ekuya kufuneka zisekwe.

Iimfuneko zomdibaniso wothumelo kwiziza ezintlanu zezilandelayo:

**EThyspunt**
Esi sisiza esizimele sodwa yaye sibonelela ngomthwalo wesiseko wokungenisa imveliso kwiGrid eseMazantsi (eMpuma Koloni) equka ngokungamandla imithwalo yeCoega, yeBhayi neyeMonti. Umdibaniso uya kudityaniswa kwiipaseji zamandla ezikhoyo zeKapa zeC3 neC1.

Isigaba sokuqala seNukliya 1 eThyspunt siya kufuna umdibaniso wothumelo olandelayo ukwanelisa imigqaliselo yokucwangcisa:

- Iintambo ezi-2x eThyspunt-Dedisa 400kV
- Intambo e-1x eThyspunt-Grassridge 400kV
- Isikhululo esinganeno esitsha eBhayi (PE S/S) 400/132kV
- Iintambo ezi-2x eThyspunt - kwiPE S/S eNtsha 400kV
- Intambo e-1x kwiPE S/S eNtsha - Dedisa 400kV
- Intambo e-1x kwiPE S/S eNtsha - Grassridge 400kV

**Iziza uB noK – eBantamsklip naseDuynefontein (eKoeberg)**
Ezi ziza ezibini ziya kungenisa kummandla weGreater Cape Peninsula weGrid yaseNtshona (eNtshona Koloni) eya kuquka imithwalo evela eSaldahna, eKapa nokuya ngqo ezantsi eMossel Bay. Ngokwembono yokulingana koThumelo lweMfuno yeMW zinokuthathwa zikummandla ofanayo. Umdibaniso wezi ziza ezibini uya kudityaniswa kwiipaseji zamandla zaseKapa ezikhoyo zeC2 neC1.

Isiza saseBantamsklip sikude ngokwenene kulo naliphi iziko elingamandla lomthwalo yaye uthungelwano olunamandla lwama-765kV lonxibelelwano nothungelwano lukaEskom kuya kufuneka lwakhiwe. Phantse onke amandla aya kuthuthelwa kuthungelwano lwama-765kV ngokujikela kwisikhululo esinganeno esitsha saseKappa sama-765/400kV esikufuphi neWolseley ukwenzela usasazo olongezelelweyo.

Isigaba sokuqala seNukliya 1 eBantamsklip siya kufuna izinto ezilandelayo:

- Iintambo ezi-3x 765kV eBantamsklip-Kappa 765kV
- Iintambo ezi-2x eBantamsklip – Bacchus 400kV (endaweni yentambo enye eya eProteus ngokwengxelo yokuqala)

Isiza esicetywayo saseDuynefontein sikumantla nje esikhululo samandla esikhoyo saseKoeberg. Isikhululo esinganeno esitsha saseOmega 765/400kV MTS siya kusekwa kufuphi neKoeberg njengenxalenye yeeprojekthi zoKomeleza iKapa. Amanye amandla eNukliya 1 aya kudityaniswa ngqo kuthungelwano lweCape Peninsula 400kV ukuthumela kumthwalo okhulayo yaye amandla ayintsalela aya kuthuthelwa kuthungelwano olungundoqo kwaEskom ngokujikela eOmega ukwenzela usasazo olongezelelweyo okanye ukuthunyelwa emantla.

Isigaba sokuqala seNukliya 1 eDuynefontein siya kufuna izinto ezilandelayo:

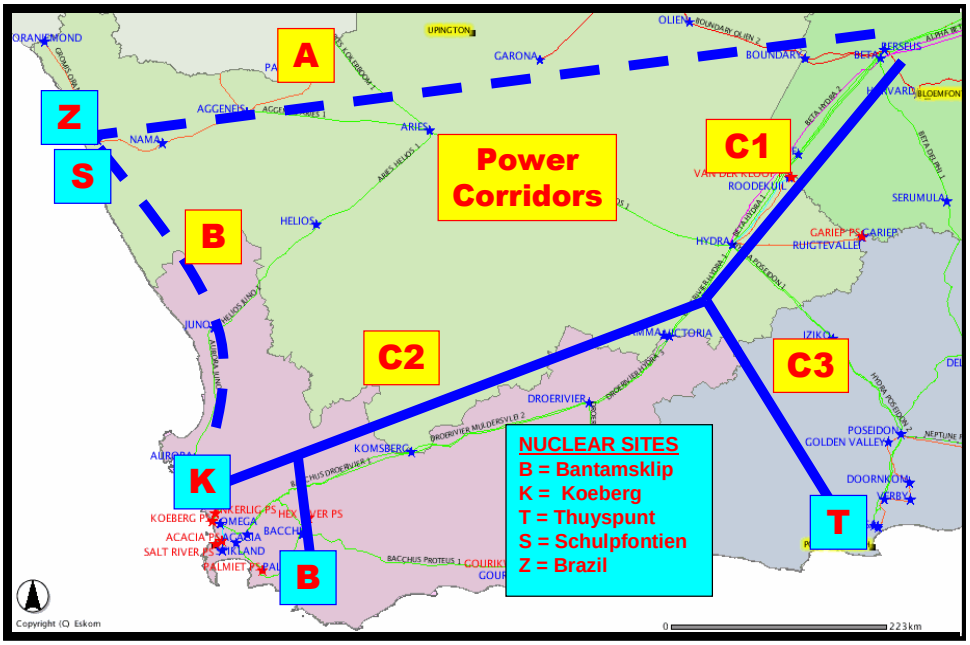
- Iintambo ezi-3x eDuynefontein - Omega 400kV
- Iintambo ezi-2x eDuynefontein - Stikland 400kV
- Intambo yokurhintyela iAcacia-Muldersvlie 400kV ukuya eOmega naseDuynefontein

Inkqubo yeEIA ibonisa ukuba intambo ecetywe ekuqaleni yeDuynefontein-Philippi 400kV ibingenakho ukubakhona yaye ngenxa yoko isicwangciso somdibaniso sitshintshelwe kwintambo yokuya eStikland yaye endaweni yoko nentambo yerhintyela ekhoyo eAcacia-Muldersvlei.

**Iziza uS noZ – eSchulpfontein naseBrazil**
Iziza zaseSchulpfontien naseBrazil zikummandla waseKleinsee yaye zigqagqelene ngama-40km kuphela, ngako oko zinokuthathwa ngokombane zikwindawo efanayo. Mncinci kakhulu umthwalo wengingqi yaye zikude kakhulu kuthungelwalo lothumelo olungundoqo

lakwaEskom. Esona sikhululo singaneno sikufutshane sothumelo olukhulu sisikhululo esinganeno saseAggeneis 400kV, phakathi kweSpringbok nePoffadder, eyinxalenye ebuthathaka yonxibelelwano.

Ukuze kudityaniswe iNukliya 1 kwezi ziza kuya kufuneka kusekwe iipaseji ezimbini ezintsha zothumelo lwamandla. Imigca eyenziwe amaqhagamshela (- - -) ephawulwe njengoA noB imele iiPaseji zaMandla ezintsha ekuya kufuneka zisekwe. Le iya kuba yipaseji “esuka kuNxweme lwaseNtshona ukuya eGauteng” (iPaseji A) kunye nePaseji “esuka kuNxweme lwaseNtshona ukuya kwiPeninsula” (iPaseji B). Okungenani iintambo ezimbini zama-400kV ziya kufuneka kwiPaseji uB yaye iPaseji uA iya kuqulatha nokuba ziintambo ezingu-UHV 765kV okanye iintambo ezingu-HVDC 600kV. Le ndleko ephathekayo nempembelelo yexesha zithathelwe ingqalelo xa kuthelekiswa iindleko zokhetho lomphakamo ophezulu wothumelo ngokuchasene nezinye iziza ezintathu. Ngenxa yeso sizathu ezi ziza ezimbini azithathwa zinokulungela ukusekwa kweNukliya 1 yaye zishiyiwe.




**ISAZOBE 1:** Imaphu yeeNdawo zeSiza zeNukliya esiCetywayo neePaseji zaMandla eziNgundoqo zaseKapa

| | |
|---|---|
| ***Power Corridors*** | ***iiPaseji zaMandla*** |
| ***NUCLEAR SITES*** | ***IZIZA ZENUKLIYA*** |
| ***Bantamsklip*** | ***iBantamsklip*** |
| ***Koeberg*** | ***iKoeberg*** |
| ***Thuyspunt*** | ***iThuyspunt*** |
| ***Schulpfontein*** | ***iSchulpfontein*** |
| ***Brazil*** | ***iBrazil*** |

## 1.28 Senkunkuma Yenyukliya (Appendix E29)

Inkqubo yoVavanyo lweMpembelelo yokusiNgqongileyo (iEIA) yesiKhululo saMandla seNyukliya yeNyukliya-1 esicetywayo ingahlukaniswa ngokwesiGaba sokuKhangela ngokuPheleleyo kunye nesiGaba soVavanyo lweMpembelelo. Ngexesha lesiGaba soKhangela ngokuPheleleyo, imiba eliqela ichongelwe ukuqwalaselwa kwisiGaba soVavanyo lweMpembelelo.

Injongo yolu phononongo kukujongana nemiba echongiweyo ngexesha lesiGaba sokuKhangela ngokuPheleleyo enxulumene nolawulo lwenkunkuma yokusasazeka ngemitha (radioactive) eya kuveliswa ngexesha lokusebenza nelokuphelisa ugunyaziso lwesiKhululo saMandla seNyukliya yeNyukliya-1. AmaGunya okuSebenza ophononongo afuna inkcazo yezinto ezilandelayo:

- Imithombo, ubuninzi nezinga lokusasazeka ngemitha layo yonke inkunkuma yokusasazeka ngemitha (elulwelo, eyigesi, neqinikeyo) eqikelelwa ukuba iyakuveliswa sisiKhululo esicetywayo saMandla seNyukliya yeNyukliya-1.
- Indlela inkunkuma yonke yokusasazeka ngemitha yesiKhululo saMandla seNyukliya yeNyukliya-1 iya kulawulwa ngayo ngokusekwe kumgaqo-siseko wokusuka esizalweni ukuya engcwabeni.
- Indlela inkunkuma yokusasazeka ngemitha iya kulungiswa ngayo nokubanakho ukulungisa inkunkuma yokusasazekwa ngemitha eveliswa sisiKhululo saMandla seNyukliya yeNyukliya-1.
- Uqikelelo lwesixa sezinga eliphantsi neliphakathi lenkunkuma yokusasazeka ngemitha esinokuveliswa sisiKhululo saMandla seNyukliya yeNyukliya-1 nomthombo wale nkunkuma (iimpahla, njl.).
- Indlela leyo inkunkuma yokusasazeka kwemitha yezinga eliphantsi neliphakathi ithuthwa ngayo ngoku ukuya eVaalputs ukusuka kwisiza sesiKhululo saMandla seNyukliya saseKoeberg.
- Indlela leyo inkunkuma esasazeka ngemitha yezinga eliphantsi neliphakathi (iLILW) evela kwisiKhululo saMandla seNyukliya yeNyukliya-1 ekumiselwe ukuba iza kuthuthwa ngayo ukuya eVaalputs.
- Amandla afumanekayo okulahla inkunkuma yeLILW eVaalputs.
- Indlela elahlwa ngayo inkunkuma yeLILW eVaalputs.
- Iinkqubo nemigaqo-nkqubo yezizwe yokulahla inkunkuma yezinga eliphezulu lokusasazeka ngemitha (iHLW);
- Umgaqo-nkqubo nobuchule baseMzantsi Afrika malunga nenkunkuma yeHLW nendlela le nkqubo ithelekiseka ngayo nemigaqo-nkqubo yezizwe.
- Indlela inkunkuma yeHLW elawuleka ngayo kwisiza sesiKhululo saMandla seNyukliya esikhoyo eKoeberg, kwakunye
- Nendlela ecetywayo eya kulawulwa ngayo inkunkuma yeHLW evela kwisiza sesiKhululo saMandla seNyukliya yeNyukliya-1.

Ukufikelela iinjongo zophononongo nokuphumeza amaGunya okuSebenza, ingxelo yakhiwe ngendlela elandelayo:

- Section 2 linikela ngenkcazelo jikelele yesakhelo solawulo lwenyukliya esilawula ukuphathwa kwenkunkuma yokusasazeka ngemitha eMzantsi Afrika, njengoko kuchaziwe kwiNational Policy and Strategy for Radioactive Waste Management, kwakunye nenkcazelo jikelele yemithetho esebenzayo malunga nemigangatho yokhuseleko neenkqubo zolawulo.
- Icandelo Section 3 linikela ngamalungu eNkqubo yoLawulo lokuSasazeka ngemitha (Radioactive Waste Management Programme), njengesakhelo solawulo lwenkunkuma esasazeka ngemitha kwisikhululo samandla senyukliya. Ingxoxo yeyesiqhelo yaye isekwe ikakhulu kwizikhokelo ze IAEA ezinikelwe kwiIAEA (2002b).

- Icandelo Section 4 linikela ngenkcazelo jikelele yeempawu zenkunkuma yokusasazeka ngemitha ekulindelwe ukuba iveliswe sisikhululo samandla senyukliya soveliso lwesithathu lokwenene lwamanzi axinzelelweyo. Ingxoxo yahlulwe ngokwenkunkuma yegesi, yokusasazeka ngemitha, yenkunkuma elulwelo yokusasazeka ngemitha, inkunkuma eqinileyo yokusasazeka ngemitha. Ingxoxo iquka umthombo (intsusa) wenkunkuma yokusasazeka ngemitha, ubungakanani (umthamo) benkunkuma nezinga lokusasazeka ngemitha eliyamene nohlobo lwenkunkuma, kangangoko kunokwenzeka.
- Icandelo Section 5 libonelela ngenkcazelo jikelele yeenkqubo zolawulo lwenkunkuma esasazeka ngemitha ethathwa iyinxalenye yeNkqubo yoLawulo lweNkunkuma yokuSasazeka ngeMitha yesiKhululo saMandla seNyukliya yeNyukliya-1, ukususka ekuvelisweni ukuya ekulahlweni. Ingxoxo iquka ulawulo lwenkunkuma yegesi nenkunkuma yolwelo kwisiKhululo saMandla seNyukliya yeNyukliya-1, kwakunye nenkcazelo jikelele yeenkqubo zolawulo (umz. ukugcina nokulahla) ezicingelwa iLILW neHLW. Apho kufanelekileyo, ingxoxo iquka ukulungisa (unyango olwandulelayo, unyango okanye ukulungiselela) inkunkuma yokusasazeka ngemitha.
- Icandelo Section 1 libonelela ngesiseko sezizwe solawulo lwenkunkuma yeHLW. Le nkcazelo jikelele isebenza njengesiseko sokuthelekisa umGaqo-nkqubo noBuchule boLawulo lweNkunkuma yokuSasazeka ngemitha eMzantsi Afrika, neenkqubo nemigaqonkqubo yezizwe. Ingxoxo iquka inkcazelo jikelele yemigaqo esebenzayo equlethwe kwiJoint Convention on the Safety of Spent Fuel Management kunye neSafety of Radioactive Waste Management (IAEA, 2006a), kwakunye neengqiqo zesiseko zolawulo lweHLW ukuphuma kuncwadi lwezizwe.
- Icandelo Section 7 libonelela ngenkcazelo jikelele yendlela leyo isibaso senyukliya sithuthwa ngayo ngoku ukuya kwisiKhululo saMandla seNyukliya saseKoeberg, nendlela leyo isibaso senyukliya kunokwenzeka sithuthwe ngayo ukuya kwisiKhululo saMandla seNyukliya yeNyukliya-1 esicetywayo.
- Icandelo Section 8 linikela ngokuchongeka nexabiso lazo zonke iimpembelelo zokusingqongileyo ezibalulekileyo ezinokuvela ngenxa yenkunkuma yokusasazeka ngemitha nesibaso esisebenzileyo kwisiKhululo saMandla seNyukliya yeNyukliya-1 esicetywayo.
- Icandelo Section 9 lishwankathela izigqibo ezingamandla zengxelo.

Izigqibo ezingamandla ezifunyenwe kuphononongo zezi:

- IsiKhululo saMandla seNyukliya yeNyukliya-1 sivelisa inkunkuma elulwelo, eyigesi nezinto eziqinileyo zokusasazeka ngemitha njengeziveliso ezilisolotya (by-products) zeemeko zokusebenza nemisebenzi yokuphelisa ugunyaziso. Inkunkuma eqinileyo yokusasazeka ngemitha yahlulwe ngokongezelelweyo ukuba yinkunkuma enokubumbana, inkunkuma engenakho ukubumbana, inkunkuma engaqhelekanga nesibaso esisebenzileyo. Enye inkunkuma ngaphandle kwenkunkuma yokusasazeka ngemitha eya kuveliswa ingahlulwa ukuba yinkunkuma eqhelekileyo nenkunkuma eyingozi.
- Iinkqubo zolawulo lwenkunkuma yokusasazeka ngemitha ecingelwayo kwisiKhululo saMandla seNyukliya yeNyukliya-1 zihambelana nezikhokelo zeIAEA malunga neNkqubo yoLawulo lweNkunkuma yokuSasazeka ngeMitha yezikhululo zamandla zenyukliya ukususka ekuvelisweni ukuya ekulahlweni.
- IsiKhululo saMandla seNyukliya yeNyukliya-1 sizama ukunciphisa ukuvelisa yonke inkunkuma eqinileyo, elulwelo neyigesi yokusasazeka ngemitha ngokomthamo kwakunye nomsebenzi wesiqulatho, njengoko kufunwa kwizimo ezintsha zereactor. Oku kwenziwa ngeenkqubo ezifanelekileyo zokulungisa, ukulungiselelela imeko, ukuphatha nokugcina. Ngaphezu koko, ukuveliswa kwenkunkuma yokusasazeka ngemitha kuncitshiswe ngokusebenzisa iinkqubo ezilungileyo zosasazeko ngemitha, ngokwahlula ngokwemimandla, ukubonelela ngenkqubo esebenzayo yokuhambisa amanzi amdaka nokungenisa nokukhupha umoya, iziphetho ezifanelekileyo nokusebenzisa ezona nkqubo zilungileyo zangoku zokuphatha inkunkuma eqinileyo yokusasazeka ngemitha. Apho kunokwenzeka, isiKhululo saMandla seNyukliya yeNyukliya-1 sisebenzisa izinto kwakhona okanye silungiselele usetyenziso lwezinto kwakhona.

- Injongo yokulungisa inkunkuma yegesi neyolwelo kukunciphisa amazinga okusebenza kwisakhiwo sereactor kunye namanzi negesi emdaka yeemeko zokusebenza. Kananjalo iqinisekisa ukuba amathamo okusasazeka ngemitha kumalungu oluntu ngenxa yezinto ezikhutshwayo kokusingqongileyo (oko kukuthi, ulawulo lwezinto ezikhutshwayo) akagqithi iqhezu lomda wethamo loluntu (umda wethamo). Ngenxa yale njongo, ubuNgakanani obuGunyazisiweyo bezinto eziKhutshwayo (Authorised Discharge Quantities) (AADQ) buchaziwe malunga nale miphunga yenkunkuma. Uhlolo lokuthobela luya kuqhutywa emthonjeni nakokusingqongileyo. Ukulungisa inkunkuma eqinileyo kujolise ekunciphiseni umthamo wenkunkuma (umz., ukubumbana), ukuqulatha umsebenzi onokusasazeka (umz. ukungashenxiseki), okanye ukunciphisa umsebenzi wenkunkuma engaqhelekanga (umz. ukuphelisa ungcoliseko). Umsebenzi ocetywayo wokulungisa nokulungiselela imeko yenkunkuma eqinileyo kuhambelana nogcino olukhuselekileyo nokuvumelana nemilinganiso eyamekelekileyo yenkunkuma eVaalputs.
- Iinkqubo ziyilelwe ukugcina inkunkuma eqinileyo elungisiweyo yokusasazeka ngemitha ixesha lokuya kwiminyaka emithathu kwisibonelelo. Iziqulathi zokugcina zihambelana neemfuneko zokulahla inkunkuma eqinileyo kwisibonelelo sokulahla inkunkuma yokusasazeka ngemitha eVaalputs. Inkunkuma engafanelekanga ukulahlwa eVaalputs iya kugcinwa kwisiza kude kube isibonelo esifanelekileyo siyafumaneka.
- Ukudlulisa nothutho oluyameneyo lwenkunkuma ukuya eVaalputs kuya kuhambelana nokuthuthwa kwenkunkuma ukusuka kwisiKhululo saMandla seNyukliya saseKoeberg. Oku kuya kwenzeka ngokwezibonelelo ezifanelekileyo zemiThetho yoKhuseleko loThutho lweMpahla yokuSasazeka ngeMitha yeIAEA, ngokulawulwa yindlela yokuhlela. Injongo yemiThetho kukukhusela abantu, ipropati nokusingqongileyo kwiziphumo zokusasazeka ngemitha ngexesha lokuthutha izinto ezisasazeka ngemitha. NgokwemiThetho, inkqubo yothutho ixhomekeke kukhuselo lokusasazeka ngemitha, ukusabela kwingxakeko, ukuqinisekisa ubulunga, nokuthobela iinkqubo zokuqinisekisa.
- Ingqiqo yokulahla inkunkuma eqinileyo eVaalputs iqulethe imijelo ekufuphi nomphezulu kusetyenziswa kweziqulathi zentsimbi ukwenzela inkunkuma enezinga eliphantsi neziqulathi zekonkriti ukwenzela inkunkuma yezinga eliphakathi. Ukhuselo lwexesha elide lwesibonelelo, oluthobela ezona nkqqubo zilungileyo zezizwe zokulahla inkunkuma yezinga eliphantsi neliphakathi, lubonisiwe ukwenzela uluhlu lwesizwe lwenkunkuma yokusasazeka ngemitha. Uluhlu olwenzelwe le njongo luquka inkunkuma yesiKhululo saMandla seNyukliya yeNyukliya-1 esicetywayo. Ngako oko iVaalputs inomthamo ongaphaya kokwanelisa wokulahla inkunkuma eqinileyo ekuqikelelwa ukuba iya kuveliswa sisiKhululo saMandla seNyukliya yeNyukliya-1.
- Inkqubo yokuPhatha nokuGcina iziBaso (Fuel Handling and Storage System) ecetywayo yokulawula nokugcina izibaso ezisetyenzisiweyo zesiKhululo saMandla seNyukliya yeNyukliya-1 ziya kuba nomthamo owaneleyo wokugcina nokhuseleko lwazo zonke izibaso ezisetyenzisiweyo eziveliswe ngalo lonke ixesha lokusebenza koomatshini nokugcina izibaso ezisebenzileyo neminye iminyaka eli-10 emva kokuphelisa ugunyaziso xa kukho imfuneko. Ngako oko kusemva kweminyaka engama-70 kuphela apho isibonelelo sokugcina kwisiza (okanye kwenye indawo) kuya kufuneka siphuculelwe ukugcina nokulawula izibaso ezisetyenzisiweyo. Oku kuya kubonelela ngexesha elaneleyo lokuchaza nokuphuhlisa ubuchule bolawulo bexesha elide malunga nezibaso ezisebenzileyo zesiKhululo saMandla seNyukliya yeNyukliya-1, umz. isibonelelo sokulahla esikhulu sembonakalo yokwakheka komhlaba okanye enye indlela.
- Xa ukulungisa kwakhona izibaso ezisetyenzisiweyo kungabekelwanga bucala njengokhetho lolawulo lwezibaso ezisebenzileyo, ayikho injongo yokulungisa kwakhona izibaso ezisebenzileyo zesiKhululo saMandla seNyukliya yeNyukliya-1 ngoku. Isizathu esingamandla isesexabiso eliphezulu elayamene nokulungisa kwakhona izibaso ezisetyenzisiweyo.
- Iinkqubo nemigaqo-nkqubo yezizwe ngokuphathelele kwizibaso ezisetyenzisiweyo nolawulo lwenkunkuma yezinga eliphezulu zisekwe kwimigaqo yeJoint Convention on the Safety of Spent Fuel Management kunye neSafety of Radioactive Waste Management. Ngokwezizwe, le nkunkuma ngoku iyagcinwa (ngokwesiqhelo

ngaphezu komhlaba), kulindwe uphuhliso lweendawo zokulahla kwimbonakalo yokwakheka komhlaba. Xa amalungiselelo okugcina ebonise ukwanelisa yaye eqhutyiwe ngaphandle kweengxaki, kuvunyelwene ngokubanzi ukuba la malungiselelo ngawethutyana yaye akamelanga isisombululo sokugqibela.

- Imingeni emibini yesiseko yokuphucula inkqubo yokwahlukanisa inkunkuma yokusasazeka ngemitha kukukhetha isithintelo esifanelekileyo sokwakheka komhlaba (into engumamkeli) nokuyila isithintelo esenziwe ngobunjineli obunesiqhamo. Kwiilebhu zophando lwangaphantsi komhlaba kwenziwe igalelo elilunge kakhulu kuphando lokwahlukanisa inkunkuma xeshikweni ulwamkelo loluntu lweeprojekthi zokwahlukanisa inkunkuma yokusasazeka ngemitha kuseyeminye yemingeni emikhulu.
- UmGaqo-nkqubo weSizwe woBuchule woLawulo lweNkunkuma yokuSasazeka ngeMitha (National Radioactive Waste Management Policy and Strategy) uhambelana nenkqubo yezizwe yolawulo lweHLW. Nangona kunjalo, imithetho eyongezelelweyo enzulu nangakumbi iyafuneka kwimiba ekhethekileyo enxulumene nolawulo lwexesha elide nokwakheka komhlaba wokulahla iHLW. Isishwankathelo seemfuneko ezamkelekileyo zezizwe zokulahla ngokwakheka komhla zisekiwe kutshanje. (IAEA, 2006d). Ezi mfuneko kufuneka zihlonyelwe ukuvela kumava eenkqubo zesizwe eziliqela ezenzeka kwithuba leminyaka elishumi yokusebenza kwendawo yokulahla yeHLW ngokwakheka komhlaba nezibaso ezisebenzileyo, ngokuqaphelekayo eFinland, eSweden, naseMelika.
- Iimpembelelo ezinokubakho kokusingqongileyo ezichongiweyo zavavanywa ziquka zonke iintlobo ezinokwenzeka zeenkunkuma zokusasazeka ngemitha ekulindelwe ukuba ziveliswe sisiKhululo saMandla seNyukliya yeNyukliya-1 esicetywayo. Iziphumo zovavanyo zibonisa ukuba ngokusebenzisa onke amanyathelo okunciphisa afanelekileyo zonke iimpembelelo ezinokubakho ziphantsi.

## 1.29 Sokutshebeleza Kobutyobo Bembonakalo Yomphezulu Womhlaba (Appendix E30)

Olu phononongo lwengcali, luphanda ngemitshebelezo yobutyobo exelwayo neentlenga zokutshebeleza kobutyobo kuMlambo iSand, imigxobhozo yentlabathi nokunyibilika kwentlabathi, isikhukula sangoNovemba wama-2007 esonakalisa indlela u-R330 eSt Francis Bay Village nethuba lokwenzeka komonakalo wesikhukula apho i-R330 iwela uMlambo iSand. Le miba, iphakanyisiwe ngabanomdla abaphambili kwindibano yokusebenza eyayibanjelwe eSt. Francis Bay, ngomhla wama-25 Meyi 2010 njengenxalenye yeEIA yesikhululo samandla senyukliya ('iNyukliya-1'),uEskom aceba ukusakha.

Izoyikiso ezinokwenzeka zokuba iziganeko ezinjalo zingenzeka kwisikhululo samandla senyukliya nezibonelelo zokusebenza ezayanyaniswa naso kwisiza saseThyspunt ziyavavanywa. Iziphumo zinikelwe kwesi Sihlomelo seNgxelo ngeMbonakalo yoMphezulu weNdunduma (Dune Geomorphology Report).

Uncwadi olufumanekayo ngesifundo zifundiwe, kuquka iingxelo ezahlukeneyo ezilungiselelwe uEskom. Iintlobo ngeentlobo zabahlali bengingqi neengcali zokusingqongileyo kubonisenwe nazo. Iimaphu ezinzulu zoyilo neefoto zasemoyeni ukusuka kowe-1942 ukuya kowama-2007 zihlalutyiwe, ukuphanda ukuziphatha koMlambo iSand neendlela zokutshebeleza kwamanzi ezikhukula.

**Imitshebelezo yobutyobo neentlenga zokutshebeleza kobutyobo**

Ayikho imitshebelezo yobutyobo okanye iintlenga zomtshebelezo wobutyobo kuMlambo iSand. Azikho ezinye iimeko zokusingqongileyo kummandla waseCape St. Francis, ezikhokelela ekudalekeni kwemitshebeletso yobutyobo. Ngako oko imitshebelezo yobutyobo, ayinako ukuba sisoyikiso kwisikhululo samandla senyukliya esinokubakho, kwakuye nesibonelelo sokusebenza esayanyaniswa naso kwisiza saseThyspunt.

**Imigxobhozo yentlabathi nokunyibilika kwentlabathi**

Imigxobhozo yentlabathi, idla ngokwenzeka kummandla wendunduma waseOyster Bay. Idla ngokwenzeka xa intlabathi edityaniswe ngokukhululekileyo izaliswa ngamanzi. Izithuthi azinakugutyungelwa yimigxobhozo yentlabathi kummandla wendunduma waseOyster Bay, ngaphandle kokuba zihamba kwimisele yoMlambo iSand okanye kumachibi aphakathi kweendunduma. Izithuthi ezihamba ku-R330, azikho nakweyiphi ingozi yokugutyungelwa yimigxobhozo yentlabathi.

“Indlela yofikelelo yasempuma” ecetywayo eya kuwela kwiindunduma ezinezityalo nemigxobhozo, iya kwakhiwa ngezibaluli ezichanekileyo zobunjineli ukulungiselela naziphi iimeko zesiseko esisilelayo ukuze izithuthi zisebenzise indlela ngokukhuselekileyo. Isikhululo samandla senyukliya esinokubakho singasekwa kwidwala eliqinileyo yaye ngako oko imigxobhozo yentlabathi okanye ukunyibilika kwentlabathi akunakuba neziphumo kuyo.

**Isikhukula sangoNovemba wama-2007**

NgoNovemba wama-2007 isikhukula esonakalisa i-R330 siqikelelwa ukuba sisiganeko sonyaka sesi-1:200. Umonakalo omkhulu wokhukuliseko, wawusisiphumo sokukhukuliseka kweentlenga ngamanzi esikhukula atshebeleza, ukwehla kumjelo ongu-V omqengqelezi ecaleni kwe-R330. Umonakalo wadalwa kananjalo kukulahlwa kwentlenga kummandla we-R330 ecaleni kwe-Lyme Road ukungena kwindawo ekufutshane neSt. Francis Bay Golf Course. Intlenga ngumhlaba wentili, kungekhona intlenga yobutyobo.

UNinham Shand wenze isindululo sokuphucula umsele wamanzi esaqhwithi, okuya kunciphisa kanobom amathuba okwenzeka komonakalo onjalo kwakhona. Ezinye zezi ndlela zokuphucula zenziwe.

**Ithuba lokwenzeka komonakalo wesikhukula kwindawo u-R330 awela kuyo uMlambo iSand**

I-R330 iwela uMlambo iSand ngendlela yekholveti eyibhokisi eyakhiwa xa indlela yayisakhiwa ukuba kulo mgangatho ekuwo ngowe-1989/1990. Owona monakalo mkhulu kwi-R330 ukususela ngoko, waba sisikhukula sangoNovemba we-1996, xa iindonga ezikwicala ngalinye lekholveti zoonakala yaye kwabakho ukhukuliseko oluthile lomphezulu ofakwe itela wonakaliswa ngamanzi ahamba phezu kwendlela. Indlela yayisebanzi ngokwaneleyo, ukwamkela isiphithiphithi ukuhamba ukuya kumacala amabini. Ezinye izikhukula zadala umonakalo onganeno okanye awabikho umonakalo.

Ngako oko i-R330 yonakaliswe zizikhukula eziliqela zoMlambo iSand kodwa umonakalo ube mncinci kuba, ukufikelela kwezithuthi akuzange kuphazamiseke. Kukhuthazwa ukuba ikholveti yomelezwe xa kukho imfuneko, ilondolozwe kakuhle, ihlolwe rhoqo ukujonga ukuba akukho ntlabathi ivingcileyo; yaye nabuphi ubutyobo obubambeke ngokuxwesileyo ngexesha lezikhukula bususwe.