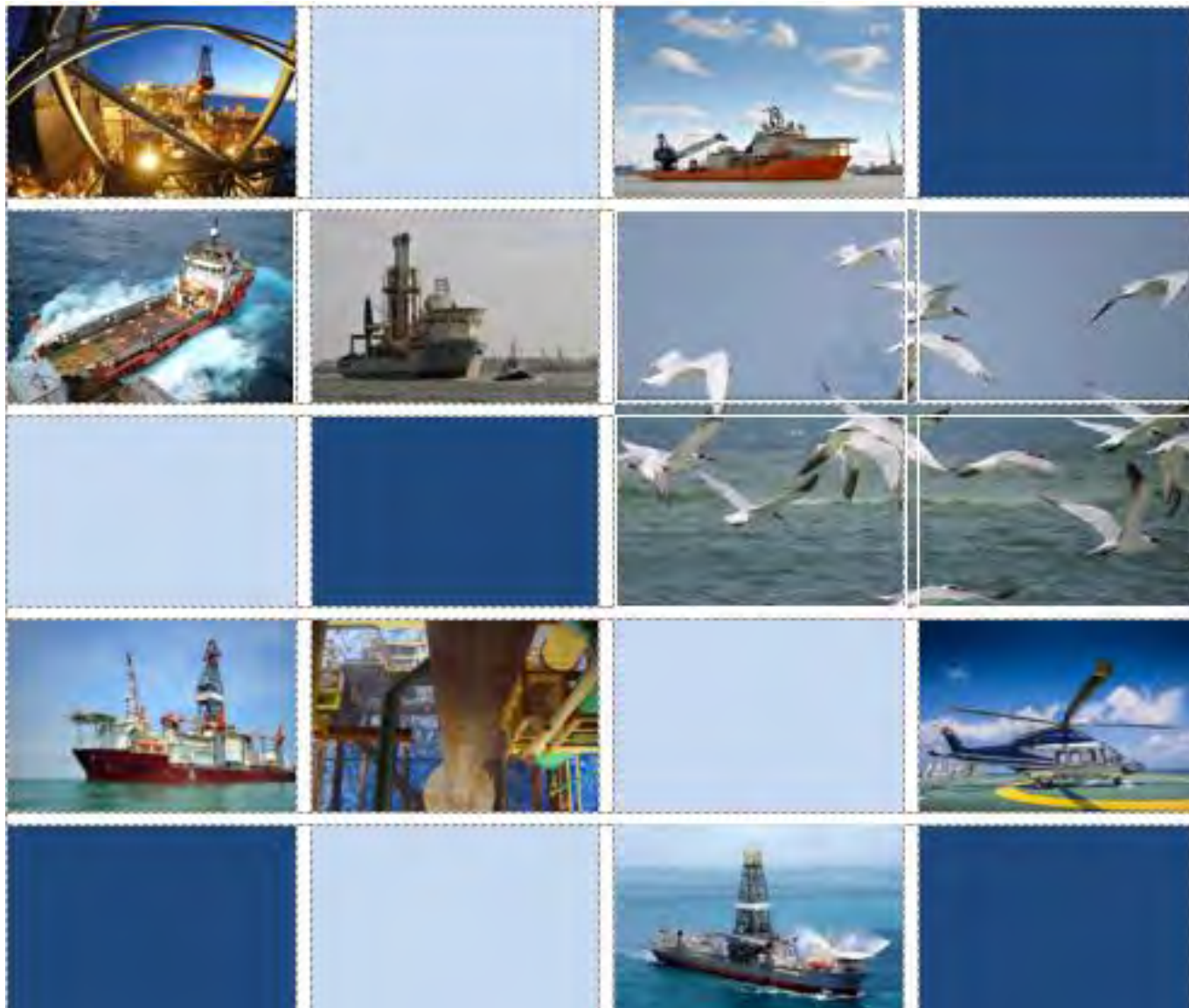




Ukuhlola ukumbiwa ngaphakathi kwa Block ER236 ukusuka e-Mpuma Yogu eNingizimu Afrika

Umbiko wokuHlola wokuPhumela komthelela
wezemvelo

Version 1

Septemba 2018

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**Ukumba Okuhloselwe Ukuhlola
Amaminerali Olwandle Olungasogwini
LwaseNingizimu Afrika, endaweni
okuthiwa yi-Block ER236**

I-Eni

Umbiko Wokuhlola Ukuchaphazeleka Kwemvelo

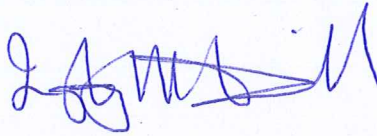
Septemba 2018

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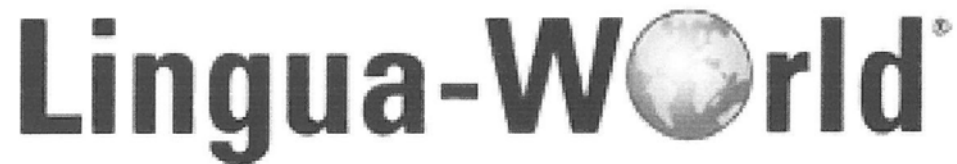
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TRANSLATION DECLARATION

I hereby declare and certify that I am fluent in English and Zulu and that I have, to the best of my knowledge and belief, made a true and complete translation from English to Zulu Documents, on behalf of Lingua-world (Pty) Ltd.

SIGNED: PRadebe DATE: 17/10/2018

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Abbreviations – Lokhu kuyefana nasesiNgisini (Left as is in English)

°C	Celsius Degrees
°F	Fahrenheit Degrees
ADGE	<i>Aeropuertos De Guinea Ecuatorial</i>
ADI	Areas of Direct Influence
AEL	Atmospheric Emission Licence
AIDS	Acquired Immune Deficiency Syndrome
AII	Areas of Indirect Influence
ALARP	As low as reasonably practicable
AOI	Area of Influence
BAR	Basic Assessment Report
bbl	Barrel
BID	Background Information Document
BOP	Blowout Preventer
CA	Competent Authority
CaCl ₂	Calcium Chloride
Ca(OH) ₂	Calcium Hydroxide
CBD	Convention on Biological Diversity
CCAPS	Climate Change and African Political Stability
CH ₄	Methane
CITES	Convention on International Trade in Endangered Species
cm	centimetres
CMS	Convention on Migratory Species
CO	Carbon monoxide
CO ₂	Carbon dioxide
COLREGS	Convention on the International Regulations for Preventing Collisions at Sea
CPUE	Catch per Unit Effort
CRR	Comment and Responses Report
CSIR	Council for Scientific and Industrial Research
CV	Curriculum Vitae
CWDP	Coastal Waters Discharge Permit
DAFF	Department of Agriculture, Forestry and Fishery
DAH	Dissolved-phase Aromatic Hydrocarbons
dB	Decibel
DEA	Department of Environmental Affairs
DEAT	Department of Environmental Affairs and Tourism
DMR	National Department of Mineral Resources
DP	Dynamic Positioning
DPS	Dynamic Positioning System
DSR	Demand Side Response
DWAF	Department of Water Affairs and Forestry
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
ECC	Emergency Control Centre
ECCAS	Economic Community of Central African States
EEPEG	ExxonMobil Exploration and Production Equatorial Guinea
EEZ	Exclusive Economic Zone
EHP	Environmental Health practitioner
EKZNW	Ezemvelo KZN Wildlife
EIA	Environmental Impact Assessment
EIR	Environmental Implementation Review
EMBF	Enhanced Mineral Oil Based Fluid
EMEPSAL	ExxonMobil Exploration and Production South Africa Limited
EMP	Environmental Management Plan
EMPr	Environmental Management Programme
EOC	Emergency Operations Centre

EPAs	Estuary Protected Areas
ESG	Emergency Support Group
FAO	Food and Agricultural Organization
FMP	Fisheries Management Plan
FPSO	Floating Production Storage and Offloading Vessel
GCLME	Guinea Current Large Marine Ecosystem
GDP	Gross Domestic Product
GHG	Greenhouse Gases
GPS	Global Positioning System
GWP	Global Warming Potential
GRT	Gross Registered Tonnage
GSLWP	Greater St Lucia Wetland Park
ha	Hectares
HCFC	Halons and hard chlorofluorocarbons
HIV	Human Immunodeficiency Virus
HQ	Head Quarter
HSE	Health Safety & Environment
HSEQ	Health Safety Environment & Quality
HSSE	Health Safety Security & Environment
HydroSAN	South African Navy Hydrographic Office
Hz	Hertz
I&APs	Interested and Affected Parties
IA	Impact Assessment
IAEA	International Atomic Energy Agency
IBAs	Important Bird Areas
ICCAT	International Commission for the Conservation of Atlantic Tunas
ICRC	International Commission on Radiological Protection
IDP	Integrated Development Plan
IDZ	Industrial Development Zone
IEP	Integrated Energy Plan
IFC	International Finance Corporation
IMO	International Maritime Organization
in ³	Cubic Inch
IOGP	International Association of Oil & Gas Producers
IOPP	International Oil Pollution Prevention
IOTC	Indian Ocean Tuna Commission
IPCC	Intergovernmental Panel on Climate Change
IPIECA	International Petroleum Industry Environmental Conservation
ITOPF	International Tanker Owners Pollution Federation
ITCZ	Intertropical Convergence Zone
IUCN	International Union for Conservation of Nature
IWCF	International Well Control Forum
JNCC	Joint Nature Conservation Committee
KCDM	King Cetshwayo District Municipality
KCl	Potassium Chloride
km	Kilometer
km ²	Square kilometer
kt	kilotonnes
KZN	KwaZulu-Natal
LC ₅₀	Lethal Concentration 50%
LM	Local Municipalities
LNG	Liquefied Natural Gas
LTMBF	Low Toxicity Mineral Oil Based Fluids
LWD	Logging while Drilling
m	Meter
m ³	Cubic Meter
MARPOL	International Convention for the Prevention of Pollution by Ships

MEDAVAC	Medical Evacuation
MEGI	Mobil Equatorial Guinea Inc.
MES	Minimum Emission Standards
MGO	Marine Gas Oil
MIG	Municipal Infrastructure Grant
MLRA	Marine Living Resources Act
mm	Millimeter
MM	Metropolitan Municipality
MMH	Ministry of Mines and Hydrocarbons
MMO	Marine Mammal Observer
MPAs	Marine Protected Areas
MPRDA	Mineral and Petroleum Resources Development Amendment
MPRDAA	Mineral and Petroleum Resources Development Amendment Act
MSD	Marine Sanitation Device
NABF	Non Aqueous Base Fluid
NaCl	Sodium Chloride
NADF	Non-aqueous drilling fluid
NAPA	National Action Plan for Adaptation to Climate Change
NARRT	North America Regional Response Team
Navtext	Navigational Telex
NE	North-east
NEMA	National Environmental Management Act
NEMAA	National Environmental Management Amendment Act
NEMAQA	National Environmental Management: Air Quality Act
NEMICMA	National Environmental Management: Integrated Coastal Management Act
NEMWA	National Environmental Management: Waste Act
NOx	Oxides of Nitrogen
NTS	Non-Technical Summary
N ₂ O	Nitrous oxide
OGP	Oil & Gas Producers
OIM	Offshore Installation Manager
OIMS	Operations Integrity Management System
OPRC	Oil Pollution Preparedness, Response and Co-operation
OSCP	Oil Spill Contingency Plan
OSRL	Oil Spill Response Limited
OSRP	Oil Spill Response Plan
PAH	Polycyclic Aromatic Hydrocarbons
PAM	Passive Acoustic Monitoring
PASA	Petroleum Agency South Africa
POB	Personnel on Board
PM _{2.5}	Particulate Matter < 2.5 µm
PM ₁₀	Particulate Matter < 10 µm
PPE	Personal Protective Equipment
ppm	Parts Per Million
PPP	Public Participation Process
PS	Performance Standard
PSC	Production Sharing Contract
PSV	Platform Supply Vessel
RBIDZ	Richards Bay Industrial Development Zone
RDP	Reconstruction and Development Programme
RO	Reverse Osmosis
ROV	Remote Operated Vehicle
s	Second
SA	South Africa
SAHRA	South African Heritage Resource Agency
SAMSA	South African Maritime Safety Authority
SANBI	South African National Biodiversity Institute

SBF	Synthetic Based Fluids
SDCEA	South Durban Community Environmental Alliance
SDF	Spatial Development Framework
S&EIR	Scoping and Environmental Impact Report
SEGESA	<i>Sociedad de Electricidad de Guinea Ecuatorial</i>
SEZ	Special Economic Zones
SO ₂	Sulphur dioxide
SO _x	Sulphur oxide
SOLAS	International Convention for the Safety of Life at Sea
SOPEP	Shipboard Oil Pollution Emergency Plan
SMP	Stakeholder Management Plan
SNC	Second National Communication
SSB	Single Side Band
SSHE	Security Safety Health and Environment
TAE	Total Applied Effort
TB	Tuberculosis
TSS	Total Suspended Solids
UNCLOS	United Nations Convention on Law of the Sea
UNEP	United Nation Environment Programme
UNFCCC	UN Framework Convention on Climate Change
USAID	United States Agency for International Development
UTM	Universal Transverse Mercator
VHF	Very High Frequency
VOC	Volatile Organic Compound
VOS	Voluntary Observing Ship
VSP	Vertical Seismic Profile
WBF	Water Based Fluid
WBM	Water Based Mud
WCCP	Well Control Contingency Plan
WCMC	World Conservation Monitoring Centre
WESSA	Wildlife and Environment Society of South Africa
WGS84	World Geodetic System 1984
WIOFish	Western Indian Ocean Fisheries
WML	Waste Management Licence
WMP	Waste Management Plan
WWC	World Water Council

1.1

UMSUKA WOMSEBENZI

Izinkampani ezimbili okuyi-Eni South Africa BV (Eni), kanye neSasol Africa Limited (Sasol) zineLungelo Lokuhlola Ukutholakala Kokumbiwa Phansi olwandle olugudle Ugu Olusempumalanga yeNingizimu Afrika. Izinkampani i-Eni neSasol zicabangela amathuba okuthi kungenzeka yini ukwenza uhlelo lokumba ngenjongo yokuhlola okumbiwa phansi olwandle endaweni ebizwa ngokuthi yi-ER236 (12/3/236) ukuze kuhlolwe ukuthi imithombo kawoyela negesi imumethe umthamo owanele yini ukwenza ibhizinisi lokumba lichume esikhathini esizayo.

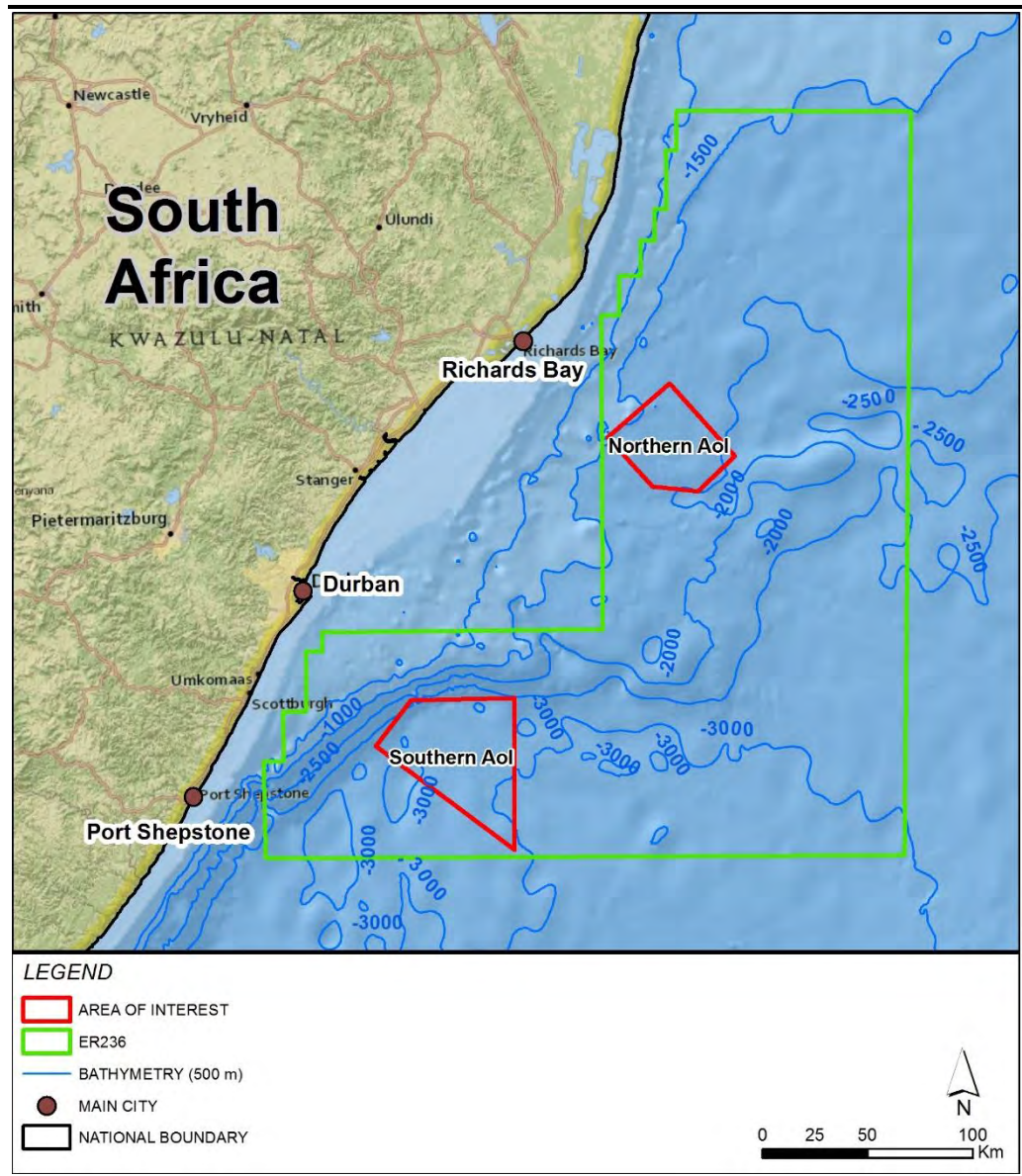
I-Eni ihlose ukumba imigodi efinyelela kweyisithupha phakathi olwandle endaweni ephawulwe ngokuthi yi-Block ER236, imigodi emine ebangeni elingama-1,717.50 km² enyakatho yendawo ehlongozwayo, emanzini ajule ngebanga eliphakathi kwama-1,500 m kuya kuma-2,100 m kanye neminye imigodi emibili ebangeni elingama-2,905 km² eningizimu yendawo ehlongozwayo (*Isithombe 1.1*), ekujuleni kwamanzi okuphakathi kwama-2,600 m kanye no-3,000 m. Inani eliqondile nemigodi ezombiwa kanye nezindawo ezombiwa kuzo kuzoncika ezintweni ezihlukahlukene ezinomthelela, kuhlenganise ukuhlolwa okwengeziwe kolwazi oluphathelele nendawo, indawo ehloselwe ukumbiwa (indawo enowoyela negesi okuzombiwa kuyo le migodi yokudonsa lezi zinto), kanye nokuthi zikhona yini izithiyo phansi phakathi olwandle. Ngaphezu kwalokho, ukuphumelela (uma kukhona uwoyela noma igesi eningi ngokwanele) komgodi wokuqala endaweni ngayinye yikona okuzonquma ukuthi eminye imigodi elandelayo iyambiwa yini. Ukumbiwa kwezindawo ezihlongozwayo esenyakatho neseningizimu kuzokwenziwa emikhankasweni emibili ehlukene, kungase kuqalwe endaweni esenyakatho noma eseningizimu kulezi ezihlosiwe.

Ukumbiwa komgodi wokuqala wokuhlola okumbiwa phansi kuhlelelwe isikhathi esiphakathi kukaNovemba 2019 noMashi 2020, kuye ngokuthi umkhumbi wokumba uyatholakala yini, okungenye yezinto eziyimfuneko ekuhloleni lo msebenzi. Ibanga elizombiwa kulindeleke ukuba libe cishe ama-3,800 m kuya kuma-4,100 m ukujula uma ubala usuka phezu kwamanzi, uyongena emhlabathini phansi olwandle, endaweni esenyakatho, kanti ukujula kuzolinganiselwa kuma-5,100 m endaweni eseningizimu. Ukumba umgodi owodwa kulindeleke ukuba kuthathe izinyanga ezimbili ukuba kuphothulwe.

Kuye ngempumelelo ebe khona emgodini wokuqala osendaweni esenyakatho, kungase kumbiwe eminye imigodi emithathu yokuhlola endaweni yesibili kanye nomunye futhi umgodi wokwenezela wokuhlola eduze kwendawo ngayinye enemigodi, ukuze kubonakale inani nokuthi kungadonswa ngezinga elingakanani okukhona lapho okumbiwa phansi, kungaba uwoyela noma igesi.

Isikhathi sokumba le migodi yokwenezela sizoncika emphumeleni womgodi wokuqala wokuhlola, futhi ngeke imbiwe ngokushesha nje ngemva kokumbiwa komgodi wokuqala. Endaweni ehlongozwayo eseningizimu, kungase kumbiwe umgodi owodwa wokuhlola kanye nomunye umgodi wokwelelela ekuhloleni kuye ngokuthi kutholakaleni emgodini wokuqala. Ukuhlolwa kwemigodi kungase kwenziwe kule migodi yokwelelela ekuhloleni uma kubonakala sengathi akhona amaathemba okuba kutholakale umthamo ongachumisa ibhizinisi lokumbiwa phansi.

Isithombe 1.1 Ibalazwe Lendawo



1.2 INHLOSO YALO MBIKO

I-ERM iqokwe yi-Eni ukuba yenze inqubo egcwele yokuHlola Ukuchaphazeleka Kwemvelo (EIA) ngokuvumelana neZiqondiso Zomthetho Kazwelonke Wokuphathwa Kwemvelo (NEMA) (Umthetho No. 107 ka-1998),

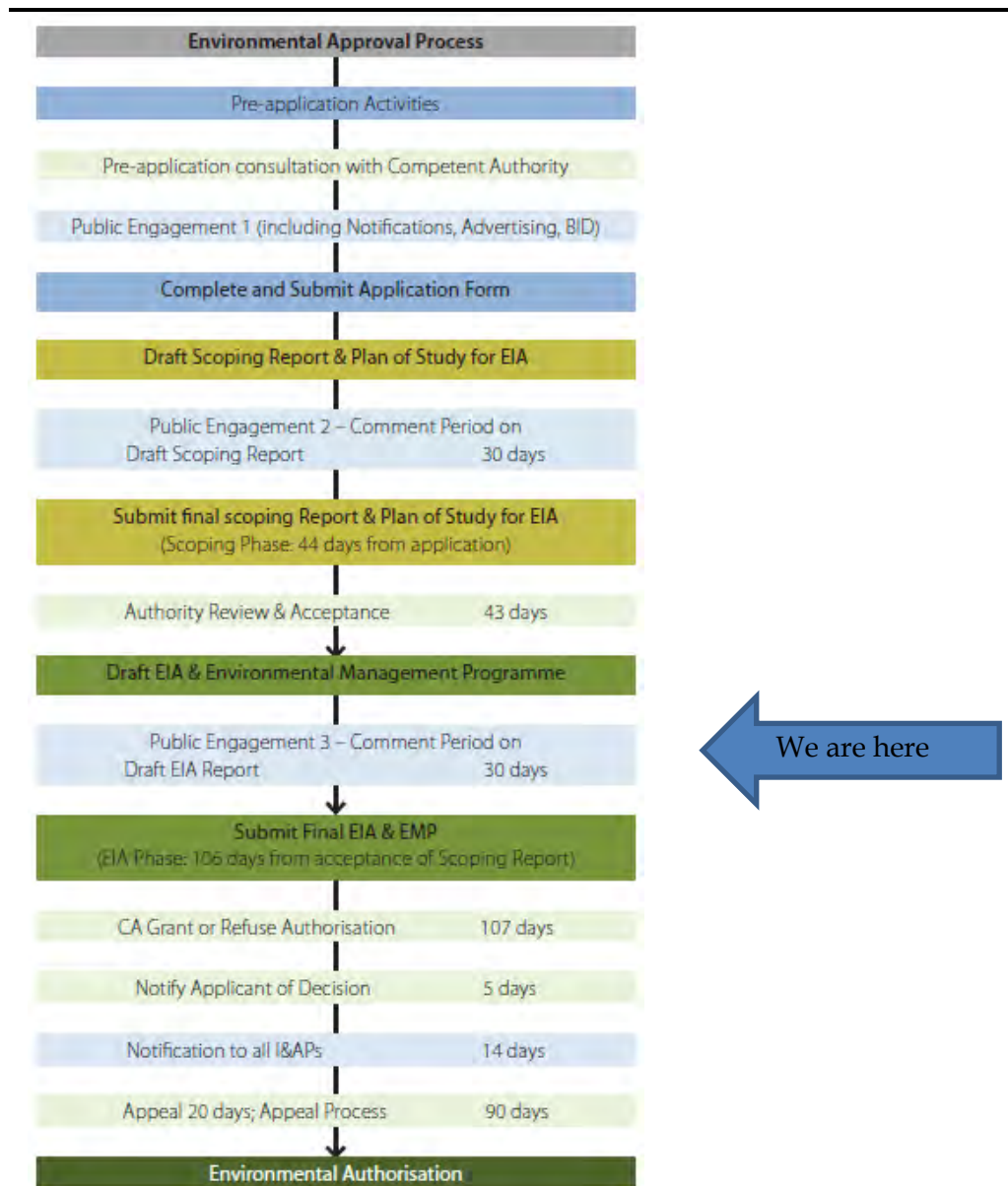
2014 (owachibiyelwa ngo-2017). Lo msebenzi udinga Ukugunyazwa Okungokwezemvelo (EA) okuvela eMnyango Kazwelonke Wezokumbiwa Phansi (DMR), kusetshenziswa uPhiko lwe-Petroleum Agency South Africa (PASA). Ukugunyazwa kuzoba ngaphansi kwe-NEMA. Ngenxa yokuthi lo msebenzi kawoyela negesi wenziwa phakathi olwandle, iDMR iyisiphathimandla esifanele, okusho ukuthi inamandla okugunyaza lo msebenzi noma ukuwuchitha.

Lo Mbiko we-EIA owuhlelo lokuqala ufingqa inqubo ye-EIA esifeziwe kuze kube manje, futhi uhlinzeka ngesithombe salokho okuhilelekile kulo msebenzi ohlongozwayo, imvelo ethintekayo kanye nokutholwe ucwaningo lochwepheshe.

Uhlola nobungako bamagalelo omsebenzi ohlongozwayo bese uveza izinyathelo ezingathathwa ukuze kulawulwe futhi kuncishiswe lawo magalelo.

1.3 Ukufingqwa Kwenqubo Ye-EIA

Inqubo ye-EIA eNingizimu Afrika ilawulwa iZiqondiso Zokuhlolwa Kwezemvelo zeNEMA (GNR R982/2014). Isiyonke inqubo yokwenza uPhenyo nokuHlola Amagalelo iboniswe *eError! Not a valid bookmark self-reference..*



Umthombo: ERM, 2017

1.3.1

Ukuhlanganyela Komphakathi Kwangaphambi Kokuhlola (Ukwazisa Umphakathi Okokuqala)

Inqubo ye-EIA iqala ngeNqubo Yokubamba Iqhaza Komphakathi kwangaphambi kokuhlola [Public Participation Process (PPP)]. Le nqubo yangaphambi kokuhlola ayisona isibopho ngokweziqondiso ze-EIA (2014) kodwa iyasiza ekutholeni Abanesithakaselo Nabathintekayo (I&APs). Njengengxenywe yale nqubo, izikhangiso ezimemezela lo msebenzi zakhishwa emaphephandabeni amane; okuyilawa: iMercury (elesingisi), Isolezwe (isiZulu), Ilanga (isiZulu) kanye neZululand Observer (elesingisi). Lezi zikhangiso zashicilelwa ngeviki lika-18 September 2017.

1.3.2

Ukufaka Isicelo

Ngomhlaka-22 Januwari 2018, kwathunyelwa iFomu Lesicelo Sokugunyazwa Kwezemvelo kanye noMbiko Wokwenziwa Kophenyo owuhlelo lokuqala kwaPASA.

I-PASA iyona enegunya lokuhlola iSicelo Sokugunyazwa Ngokwezemvelo salo msebenzi. Ngemva kwalokho kube sekulindeleka ukuba iPASA ixoxisane nofake isicelo (Eni) bese yenza iziphakamiso kuNgqongqoshe Wezokumbiwa Phansi (Umphathiswa Onegunya) zokuthi isicelo siyamukeleka yini.

1.3.3

Ukwenza uphenyo

Umgomo oyinhloko weSigaba Sokwenza Uphenyo ukuphawula izinselele ezihamba phambili kwezemvelo, ezenhlalo nezempilo kanye nemisebenzi enamathuba okuba negalelo noma okubangela, ukuchaphazeleka kwemvelo nezenhlalo.

ESigabeni Sokwenza Uphenyo, kuphawula izinkinga ezivelele (kuhlanganise nokuphawula okuvela kubabambiqhaza) futhi ziqondwe ngokwezinga elithile, okusiza okuchazeni iPulani Locwaningo eMbikweni we-EIA.

Izindaba ezingahlobene nalokhu zikhishelwa eceleni. Lokhu kusiza ekuqinisekeni ukuthi amandla okwenza inqubo ye-EIA agxiliswe ekuqoqeni ulwazi oludingekayo nasekutholeni amagelelo aphawulekayo lapho kwenziwa ucwaningo lobuchwepheshe kanye nokuxoxisana nababambiqhaza ngendlela ephumelelayo nehamba ngokushela.

Ngokuthe ngqo, imigomo yeSigaba Sokwenza Uphenyo yilena:

- Ukuqonda okushiwo ezomthetho kanye nokuthola incazelo yezimo ezivamile ezingachaphazelwe yilutho;
- Ukuthola ezinye izindlela zokwenza umsebenzi nezinto ezingcono ezingakhethwa kulo msebenzi ohlongozwayo;
- Ukuthola ababambiqhaza kanye nokuhlela noma ukuqala izingxoxo nabo ukuze kutholakale izinto ezibakhathazayo;
- Ukuthola amachaphazelo aphawulekayo angaba khona; kanye
- Nokusungula uHlelo Locwaningo oludingwa uMbiko we-EIA obeka indlela ehlongozwayo yenqubo ye-EIA, amagelelo angase abe khona okufanele ahlolwe kanye nezinqubo ezizosetshanziswa.

Kuye kwathathwa izinyathelo ezilandelayo njengengxenye yeSigaba Sokwenza Uphenyo, futhi zichazwe lapha ngezansi:

- Ukuxhumana ngokubhalelana nePASA ngaphambi kokuthumela isicelo;
- Ukuhlola ulwazi olutholakalayo kukhompyutha;
- Ukuhlela uMbiko Wokwenziwa Kophenyo wokuqala;
- Ukuthumela ifomu lesicelo;
- Ukuthumela uMbiko Wokwenziwa Kophenyo wokuqala emphakathini ukuze uveze uvo lwawo; kanye
- Nokuphothula uMbiko Wokwenziwa Kophenyo ozothunyelwa kwaPASA.

UMbiko Wokwenziwa Kophenyo wokuqala wanikezwa ababambiqhaza kusukela ngomhlaka-22 Januwari 2018¹ isikhathi esiyizinsuku ezingama-30, kusetshenziswa iwebusayithi yalo msebenzi, imitapo yezincwadi ethile kanye nangento ezinyathelisiwe (ezazinikezwa abazicelayo). Izikhangiso zashicilelwa ngomhlaka-22 Januwari 2018 emaphephandabeni amane; iMercury (yesiNgisi), Isolezwe (lesiZulu), The Zululand Observer kanye neLanga (lesiZulu) ukuze kubikwe ngokukhishwa koMbiko Wokwenziwa Kophenyo wokuqala nokuba umphakathi uthole ithuba lokuveza uvo lwawo.

Phakathi nezinsuku ezingama-30 zokuveza uvo (ezaphela ngomhlaka-5 Mashi), kwaba namahlandla amathathu okubandakanywa komphakathi kusukela ngo-7 kuya ku-9 Febhuwari 2018 eRichards Bay, eThekwini nasePort Shepstone.

Ngenxa yesicelo esenziwa ababambiqhaza, kwaba nomhlangano wokwenezela (wesine) owalandela owaba ngomhlaka-28 Febhuwari 2018 eHhlo Lomphakathi lase-Austerville. Kulo mhlango kwakukhona umhumushi owayehumushela olimini lwesiZulu. Amazwi okuphawula ababambiqhaza kanye nezimpendulo kufakiwe eMbikweni Wokuphawula Nezimpendulo (CRR), owadidiyelwa wabe ukufakwa esenezelweni soMbiko Wokwenziwa Kophenyo wokugcina [final Scoping Report (FSR)]. Umgomo wokubandakanya ababambiqhaza kwakuwukwethula umsebenzi ohlongozwayo nokwenza inqubo ye-EIA kanye nokuthola izinkinga ezihlobene nalo msebenzi, izikhalazo kanye namathuba. Imininingwane eyengeziwe mayelana nokuxhumana nababambiqhaza kanye nokuxoxisana ifakiwe kuyiSahluko 5.

UMbiko Wokwenziwa Kophenyo wokugcina (kanye noHlelo Locwaningo) kwathunyelwa kwaPASA ngomhlaka-8 Mashi 2018 ukuze kuhlolwe. Incwadi Yokugunyaza evela kwaPASA yoMbiko Wokwenziwa Kophenyo wokugcina yakhishwa ngomhlaka-16 Ephreli 2018.

¹ *Kufanele kuphawulwe ukuthi uhlelo lokuqala loMbiko Wokwenziwa Kophenyo lwakhululwa ukuze kuphawulwe ngalo ngomhlaka-27 Oktoba 2017. Ngenxa yoshintsho ebukhulwini bomsebenzi kwakhishwa isaziso ngezi-7 Novemba 2017 ukuze kwaziswe ababambiqhaza ukuthi umbiko uzophinde ukhishwe ukuze kuvezwe uvo izinsuku ezingama-30 ezigcwele ekuqaleni kuka-2018.

Lo Mbiko we-EIA wokuqala uhlinzeka ngencazelo yokuma kwendawo, izinto eziphilayo nesimo sezomnotho nezenhlalo okuzoqhathaniswa nako amachaphazelo alo msebenzi ohlongozwayo. Isimo esivamile sihlanganisa ulwazi oluphathelele nokuchaphazelekayo kanye nemithombo ayaphawulwa phakathi nokuHlola njengokunethuba lokuchaphazeleka ngenxa yalo msebenzi ohlongozwayo. Incazelo yesimo esivamile inale migomo eyinhloko elandelayo:

- Ukuze kutholakale imithombo nezimo zokwakheka kwendawo, izinto eziphilayo nesimo sezomnotho nezenhlalo ezindaweni ezingase zithintwe yilo msebenzi;
- Ukuze kuchazwe, futhi lapho kungenzeka kulinganiswe, incazelo yokwakheka (isibonelo, ukwakheka, isimo, izinga nobubanzi);
- Ukuhlinzeka ngolwazi ukuze lusize ekuqageleni nasekulinganiseni amagalelo angase abe khona;
- Ukuhlinzeka ulwazi oludingekayo ekunqumeni ukubaluleka, inani nokuba bucayi noma ukuba sengcupheni kwezinto ezidingekayo kanye nokuchaphazelekayo; kanye
- Nokusebenza njengento okungabhekiselwa kuyo ekuhloleni amagalelo omsebenzi ngomuso.

Ngokuqondene nalo msebenzi wamanje, imininingwane yesimo esivamile yatholakala emithonjeni ekhona manje ehlanganisa imisebenzi yisikhathi esidlule eyenziwa ezindaweni ezakhelele nalena, emabhukwini kamasipala nakumawebusayithi ezenhlalo aboniswe ekugcineni kwalo mqulu. Ukwenezela kulokhu, kwenziwa ukuhlola kwezinto eziphila olwandle, ukudoba nanye namagugu esizwe ukuze kutholakale isimo esivamile seNdawo Yomsebenzi. Indawo Yomsebenzi isolwandle olungasogwini lwaKwaZulu-Natali (KZN), phakathi kweSt Lucia ne-East London futhi ihlanganisa yonke indawo ewu-Block ER236.

I-ERM yabhekana nokubambeleleka okungalindelekile ekuphuthuleni ucwaningo lwezobuchwepheshe mayelana nokumba kokuhlola okumbiwa phansi endaweni ewu-Block ER236, okuholele ekubambelelekeni kokubhalwa kwezinye zezakhuko zoMbiko we-EIA. Ngenxa yalokho, i-ERM ayikwazanga ukuphuthula nokukhulula umbiko wokuqala ukuze kuphawulwe ngawo nokugcina umbandela wezinsuku eziyi-106 zokuthumela uMbiko we-EIA wokugcina engakedluli umhlaka-3 Agasti 2018, njengoba kubhaliwe eSigabeni 23(1)(a) seZiqondiso zeNEMA EIA. Ngakho, ukufaka isicelo samanje se-EIA akuphumelelanga ngomhlaka-3 Agasti 2018.

UMbiko Wokwenziwa Kophenyo wokugcina wathunyelwa kwaPASA ngomhlaka-8 Mashi futhi wagunyazwa ngomhlaka-16 Ephreli 2018. I-ERM iyaqiniseka ukuthi izimo ezivamile zendawo nezenhlalo ezichazwe eMbikweni Wokwenziwa Kophenyo azishintshile kusukela umbiko wadidiyelwa. Ngokuvumelana neSigaba 21(2)(a) kanye no-(b) weZiqondiso zeNEMA EIA, i-Eni iqalise inqubo entsha ye-EIA ngokuthumela ifomu lesicelo elichibiyelwe nangokukhulula uMbiko we-EIA owuhlelo lokuqala ukuze kuphawulwe ngawo. I-PASA yaqinisekisa ngomhlaka-29 Agasti 2018 ukuthi le ndlela yokwenza iyamukeleka.

1.3.6 *Ukuhlola Ukuchaphazeleka*

Ukuhlola ukuchaphazeleka nokusungula izinyathelo zokukunciphisa kuyinqubo ephindaphindwayo eqala eSigabeni Sokwenziwa Kophenyo iqhubeka nayo yonke inqubo ye-EIA. Imigomo eyisihluthulelo yale nqubo yilena elandelayo:

- Ukuhlaziya ukuthi umsebenzi ithintana kanjani nezimo ezivamile zendawo ukuze kuchazwe, kugaqelwe futhi kulinganiswe izinga negalelo elingase libe khona lokuchaphazeleka kwezemvelo, ezenhlalo nezempilo okubangelwa yilo msebenzi.
- Ukwakha nokuchaza izinyathelo zokudambisa umonakalo ezamukelekayo nezingabmi eqolo ukuze kugwenywe, kuncishiswe, kulawulwe, kuhlengwe noma kunxeshezwe amagalelo kanye nokuba kuthuthukiswe izinto eziyinzuzo.
- Ukuba kulinganiswe amagalelo ayimiphumela acatshangelwayo amahle namabi alo msebenzi.
- Ukuba kwakhiwe uhlelo lapho izinyathelo zokunqanda umonakalo zizohlenganiswa khona nomsebenzi futhi kuqhutshekelwe phambili nazo njengento eyisibopho.
- Lokhu kuyofezwa ngokusungulwa koHlelo Lokulawula Ezemvelo, olutholakala kuSahluko 9.

Imigomo yenqubo yokuhlola amagalelo omsebenzi echazwe ngenhla ingase ifingqwe ngokubhekisela kulezi zinyathelo ezine eziyinhloko ezilandelayo:

- Ukuhlawumbisela lokho okungase kube umphumela wokwenziwa komsebenzi;
- Ukulinganisa ukubaluleka nokuphawuleka kwegalelo lo msebenzi;
- Ukusungula izinyathelo zokunciphisa umonakalo ukuze kulawulwe amachaphazelo lapho kungenzeka khona; kanye

- Nokulinganisa ubungakho bamagalelo awumphumela.

Lapho kunezinsalela eziphawulekayo ngemva kokuba izinyathelo zokunciphisa umonakalo sezithathiwe, kuzocatshangelwa ezinye izindlela zokudambisa umonakalo futhi kuhlaziye kabusha amagalelo omsebenzi kuze kube yilapho esencishiswe aba phansi ngezinga okungenzeka ngalo (ALARP).

Le nqubo ibandakanya nokucabangela ukufinyeleleka kwezinyathelo zokunciphisa umonakalo ngokwezimali nangokwezinto ezingasetshanziswa. Inqubo esetshenziswe ekuhloleni ubungako bamagalelo omsebenzi ohlelwayo ichazwe kabanzi ku*Sahluko 6* salo mbiko.

Ukwenezela emagalelweni acatshangelwayo azobangelwa imisebenzi ehleliwe, *eSahlukweni 8* kukhulunywa nangamagalelo angaba umphumelo wengozi noma izigameko ezingeyona into yasikhathi sonke. Kulezi zimo kuxoxwa ngamathuba okuba leso sigameko senzeke (ukuthi angakanani). Amagalelo ezigameko ezingeyona into yisikhathi sonke ahlolwa ngokobungozi, kucatshangelwa umphumela wesigameko namathuba okuba senzeke isigameko esinjalao.

1.3.7 *Ukuhlelwa Kokuqondiswa Komsebenzi*

Zonke izinyathelo zokunciphisa amagalelo angemahle aphawuliwe phakathi nenqubo ye-EIA zihlanganisiwe esahlukweni seNcazelo Yomsebenzi Nokuhlolwa Kwegalelo lawo esikuwo lo mbiko. Lokhu kuhlanganiswe oHlelweni Lokuphathwa Kwezemvelo (EMPr) lwalo msebenzi (*iSahluko 9*).

I-EMPr inezinyathelo ezihlanganisa ukuphatha, ukunciphisa umonakalo nokuqapha okufanele zithathwe phakathi nokuqala kokwenziwa komsebenzi, ukuze kunqandwe imiphumelo engemihle kwezemvelo, ezenhlalo nezomnotho, ukuze ikhishelwe isinxephezelo, noma incishiswe ngezinga elamukelekayo. Lolu hlelo lunemininingwane echaza izinyathelo eziqondile ezidingekayo ukuze kusebenze izinyathelo zokulawula nokudambisa umonakalo okuvunyelwene ngazo enqubeni ye-EIA, kuhlanganise nemininigwane ephathelene nokuhlola ngokuqhubekayo, izinhloka ezineqhaza, ukubhala phansi okwenzekayo kanye nokubika.

1.3.8 *Ukubika Nokudalula*

Lo Mbiko we-EIA wokuqala wakhululwa ngomhlaka-25 Septemba 2018 isikhathi esiyizinsuku ezingama-30. Incwadi yesaziso yathunyelwa kuwo wonke ama-I&APs abhalisiwe atholakala ohlwini lwababambiqhaza ukuze abikelwe ngenqubo entsha ye-EIA eqaliwe nokuthi uMbiko we-EIA wokuqala usuyatholakala kulabo abafisa ukuveza uvo lwabo. Lo mbiko uyatholakala kuyi-inthanethi ekhasini lo msebenzi elithi (www.erm.com/eni-exploration-eia) nakulezi zindawo ezilandelayo:

- EDurban Central Lending Public Library

- EPort Shepstone Library
- ERichards Bay Library
- E-East London Central Library
- ENelson Mandela Bay Municipality – Linton Grange Library

Kuye ngokuphawula okutholakele eMbikweni we-EIA wokuqala, umbiko uyobukezwa bese uthunyelwa kwaPASA ukuze bawuhlole. Kuyobe sekuthunyelwa incwadi yokubikeal wonke ama-I&APs abhalisiwe atholakala ohlwini oluphathelene nalo msebenzi bese umbiko wenziwa utholakale kuyi-inthanethi kuleli khasi (www.erm.com/eni-exploration-eia) kanye nasezindaweni zomphakathi eziboniswe ngenhla.

1.4 ABASEKELI BOMSEBENZI

Imininingwane yokuxhumana yofake isicelo yilena elandelayo ngezansi:

Ibhokisi 1.1 Imininingwane yokuxhumana Yofake Isicelo Somsebenzi / Umsekelo

Eni South Africa BV
1st Floor, Icon Building c/o Cube WS
Cnr Lower Long St. & Hans Strijdom Rd.
Foreshore, 8001, Cape Town, South Africa
Eyomsebenzi: +27 21 412 1582
Xhumana no-: Nicole Lomborg, HSE & Sustainability Coordinator.

1.5 ITHIMBA LE-EIA

I-ERM inhlango yomhlaba wonke yabaluleki bezemvelo enabasebenzi abangochwepheshe abangaphezu kwezi-5,000 enamahhovisi angaphezu kuka-150 emazweni angaphezu kwama-40. ENingizimu Afrika, i-ERM Southern Africa iqashe abaluleki bezemvelo abangaphezu kuka-150 abasebenzela eGoli, eThekwini naseKapa.

1.5.1 Isimemezelo Sokuzimela Geqe

Imfuneko yokuba abaluleki bezemvelo bazimele futhi babe nemigomo kudala ikhona emthethweni waseNingizimu Afrika nakwamanye amazwe. Imithetho ye-EIA (GN R.982, echibiyelwe), isho ngokucacile ukuthi i-EAP (umuntu osebenza ekuhloleni kwezemvelo) (kumelwe angabi) nabhizinisi, izinzuzo zezimali, ezobuqu noma ezinye azithola emsebenzini asuke ewuhlola, esicelweni noma esikhalweni leyo EAP esuke imiswe ukuba ikusingathe ngokuvumelana nale Mithetho ngaphandle kweholo ezolithola ngokwenza umsebenzi wayo kuleyo ndawo; noma ukuthi akukho zimo ezingase zenze leyo EAP ishalazele izinto ezithile emigomweni yayo lapho yenza umsebenzi wayo.

I-ERM iyinkampani ezimele engekho ngaphansi kukahulumeni ebhalisiwe eNingizimu Afrika. I-ERM ayinabudlelwano bezezimali, futhi ayilona uphiko

Iwe-Eni, kwezomthetho noma kwezezimali. Inkokhelo yomsebenzi ofezwa Abasekeli ngokuqondene nalo mbiko ayixhumene nokugunyazwa abanegunya ekwenziweni kwezinqumo. Ngaphezu kwalokho, i-ERM ayinamihlomulo eyitholayo ewumxhantela ngenxa yalo msebenzi manje nasesikhathini esizayo.

Indima yabeluleki bezemvelo ukuhlinzeka ngolwazi oluthembekile, olungachemile nolufinyelelekayo kuhulumeni nakwezinye izinhlobo, ukuze kwenziwe isinqumo esisekelwe olwazini olwanele mayelana nokuthi lo msebenzi kufanele uqhubeke yini noma cha.

Ithimba lwakwa-ERM elikhethelwe lo msebenzi linolwazi lobuchwepheshe oludingekayo futhi lakhiwa omakadebona kulo mkhakha ukuze benze inqubo ye-EIA. Ngakho, i-ERM isayinde isimemezelo zokuzimela geqe esidingwa umthetho ukuze isebenze njengabaMeleli Bokuhlaziywa Kwezemvelo abangachemi namuntu [Environmental Assessment Practitioner (EAP)]. I-CV kanye nesimemezelo sokuzimela okuvela kubaMeleli Bokuhlaziywa Kwezemvelo siyatholakala kuyiSenezelo A.

Imininingwane yokuxhumana ye-EAP efake isicelo iseBox 1.2

Box 1.2 Imininingwane Yokuxhumana ye-EAP

Environmental Resources Management Southern Africa (Pty) Ltd. Postnet Suite 90 Private Bag X12 Tokai 7966 Vicky Stevens 1st Floor Great Westerford 240 Main Road Rondebosch 7700 Cape Town South Africa T +27 21 681 5400 F +27 21 686 0736 E eni.exploration.eia@erm.com	
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Amalunga ethimba e-EIA nochwepheshe abahileleke kulo Mbiko we-EIA basohlwini olukuIThebula 1.1.

IThebula 1.1 Ithimba le-EIA

Igama	Inhlangano	Indima	Iziqu, Isikhathi Enza Lo Msebenzi
Ingeborg McNicoll	ERM	Umqondisi Womsebenzi	BSc (Hons) Marine Biology. Iminyaka engama-35 kulo mkhakha
Vicky Stevens	ERM	Umphathi Womsebenzi kanye ne-EAP	MSc (oceanography), iminyaka eyi-12 ekulo mkhakha
Lindsey Bungartz	ERM	Oxhumana Nomphakathi Nezinhlobo	BSocSc (Hons), iminyaka eyi-10 ekulo mkhakha

Igama	Inhlango	Indima	Iziqu, Isikhathi Enza Lo Msebenzi
Dkt. Andrea Pulfrich	Pisces Environmental Services (Pty) Ltd	Uchwepheshe Wezinto Eziphila olwandle	PhD (Fisheries Biology), iminyaka engama-20 ekulo mkhakha
Dkt David Japp	Capricorn Marine Environmental (Pty) Ltd (CapMarine)	Uchwepheshe Wezokudoba	MSc (Ichthyology and Fisheries Science), iminyaka engama-30 ekulo mkhakha
Sarah Wilkinson			BSc (Hons) Oceanography and Botany, University of Cape Town, iminyaka ayi-14 ekulo mkhakha
Dkt John Gribble	ACO Associates CC	Uchwepheshe weMaritime Heritage	BA (Hons), MA Archaeology, iminyaka engama-20 ekulo mkhakha
Michael J. Fichera	ERM	Uchwepheshe Wokuchitheka Kowoyela Nokumba	B.S. in Civil Engineering and an M.E. in Environmental Engineering, iminyaka angama-25 ekulo mkhakha
Mnu Stephen Luger	PRDW	Umhloli Wemifanekiso Yendawo (Modelling Peer Reviewer)	MSc Engineering, iminyaka engama-24 ekulo mkhakha

1.6

UMSEBENZI WE-EAP

INgxenye 16 (1) (b) (iv), iSithasiselo 1 iNgxenye 3 (1) (r), iSithasiselo 2 iNgxenye 2 (1)(i) kanye(j) neSithasiselo 3 iNgxenye 3 (s) yoMthetho Olawula Ukuhlolwa Kokuchaphazeleka Kwemvelo (EIA), ka-2014 (okwamanyezelwa ngokweNEMA), kudinga ukuba kwenziwe isifungo noma kuqinisekiswa isiSebenzi Sokuhlolwa Kwezemvelo [Environmental Assessment Practitioner (EAP)] ngokuphathelele nalokhu:

- Ukuba yiqiniso kwemininingwane ebhalwe embikweni;
- Ukufakwa kwezimvo nokuphawula kwezinhloko nababambiqhaza nabathintekayo;
- Noma yimiphi imininingwane ehlinzekwe yi-EAP kubantu abathintekayo bakubabambiqhaza kanye nanoma yiziphi izimpendulo ze-EAP ekuphawuleni nasezimvweni zabathintekayo; kanye
- Izinga lesivumelwano phakathi kwe-EAP kanye nabathintekayo nabanesithakaselo kulolu Hlelo Locwaningo lokuhlola ukuchaphazeleka kwezemvelo.

Ngalokho i-ERM nochwepheshe abaphethe lo msebenzi bayaqinisekisa lokhu:

- Ngokolwazi lwethu ulwazi olunikezwe kulo Mbiko olwamuvu oluvela kubasekeli nakochwepheshe olutholakalayo okwamanje.

- Ukuphawula kanye nezimpendulo ezihambisana nakho kufakiswe *eSenezelweni B* futhi kwafingqwa embikweni wezimvo nezimpendulo (CRR).
- Ulwazi olunikezwe izinhloko nokuxhumana nazo kufakiswe *Esezezelweni B*.

1.7

IZIMFUNeko ZOMBIKO ZE-EIA NGOKUVUMELANA NEMITHETHO YE-EIA GNR 982/2014

IThebula 1.2 libonisa uMbiko we-EIA ophasisiwe.

IThebula 1.2 UMbiko We-EIA Ophasisiwe (GNR 982/2014) kanye neziNgxenywe Ezihambisana nawo kulo Mbiko

Okuphasisiwe - iSithasiselo 3 iNgxenywe 3	iNgxenywe ekulo Mbiko
(a) imininigwane ye -	
(i) i-EAP edidiyele lo mbiko	ISahluko 1 neSenezelo A
(ii) umkhakha wobuchwepheshe we-EAP, kuhlenganise ne-CV yayo	ISahluko 1 neSenezelo A
(b) indawo yomsebenzi	ISahluko 3
(i) ikhodi enezinombolo ezingu-21 yeSurveyor General yaleso naleso siqephu sezwe;	
(ii) ikheli lomgwaqo negama lepulazi, uma kukhona;	
(iii) lapho imininigwane edingeka ku-(i) no-(ii) ingatholakali, ama-coordinates omngcele wendawo noma wezindawo;	
(c) ipulani elikhomba umsebenzi noma imisebenzi ehlongozwayo efakelwe isicelo kanye nezakhiwo nezingqalasizinda zezinga elifanele, noma uma kunjalo -	ISahluko 3
(i) ukuqhubeka komsebenzi, incazelo kanye nama-coordinates indawo umsebenzi ohlongozwayo ozokwenzelwa kuyo; noma	
(ii) ezweni lapho indawo eqondile ingakaziwa, ama-coordinates alapho umsebenzi uzokwenziwa khona;	
(d) incazelo yawo wonke umsebenzi ozokwenziwa, kuhlenganise	
(i) yonke imisebenzi esohlwini nechaziwe ezodingeka futhi efakelwa isicelo; kanye	ISahluko 2
(ii) incazelo yezakhiwo kanye nezingqalasizinda ezihlobene nomsebenzi ozokwenziwa;	ISahluko 3
(e) incazelo yenqubomgomo nesishayamthetho endaweni lapho umsebenzi uzoba khona kanye nencazelo ngokuthi umsebenzi ohlongozwayo uhambisana kanjani futhi usabela kanjani kusishayamthetho nasengubweni mgomo;	ISahluko 2
(f) incwadi ekhuthazayo ngesidingo nokufiseleka komsebenzi ohlongozwayo, kuhlenganise nesidingo nokufiseleka kokuba lo msebenzi wenziwe kule ndawo ehlongozwayo;	ISahluko 3
(g) amazwi akhuthazayo endlela yokwenza efana nayo ekhethwe kwezigunyaziwe;	ISahluko 3
(h) incazelo ephelele yenqubo elandelwe ukuze kufinyelelwe indlela yokwenza ehlongozwayo yendawo egunyaziwe, kuhlenganise:	
(i) imininigwane yazo zonke izinqubo zokwenza umsebenzi ezihlukile ezicatshangiwe;	ISahluko 3

Okuphasisiwe - iSithasiselo 3 iNgxenywe 3	iNgxenywe ekulo Mbiko
(ii) imininingwane yenqubo yokubamba iqhaza komphakathi ngokuvumelana nesiqondiso 41 Somthetho, kanye namakhophi amaphepha asekelayo kanye nezimvo;	ISahluko 5 neSenezelo B
(iii) umbiko ofingqiwe wezinto ezikhathaza abantu bendawo nabanye abathintekayo, indlela ebonisa ukuthi lezo zikhali ziye zacatshangelwa ngayo lapho kwenziwa izinhlelo, noma izizathu zokuba zingacatshangelwa nhlobo;	ISahluko 8 neSenezelo B
(iv) izimo zezemvelo ezihlobene nezindlela zokwenza ezihlukile ezingasetshenziswa ezixile ekumeni kwendawo, ukwakhekha kwayo, izinto eziphila kuyo, ezenhlalo, ezomnotho, amagugu esizwe kanye namasiko;	ISahluko 4
(v) amachaphazelo kanye nezingozi eziphawulekile kuhlenganise uhlobo, ubungako, umphumela, izinga, ubude besikhathi kanye namathuba okuba lokhu kwenzeke ngempela, kuhlenganise nezinga la machaphazelo - (aa) angalungiswa ngalo; (bb) angabangela ngayo umonakalo ongalungiseki; kanye (cc) nendlela angagwenywa ngayo, alawulwe noma ancishiswe.	Izahluko 7 no-8
(vi) inqubo esetshenzisiwe ekunqumeni nakusebekeni ngokwezinga uhlobo, ukuphawuleka, imiphumela, izinga, ubude besikhathi namathuba okuba imvelo ichaphazeleke kuhlenganise nezingozi ezihlobene nezindlela ezihlukile ezingasetshenziswa	ISahluko 6
(vii) amagalelo amahle namabi umsebenzi ohlongozwayo kanye nezindlela eihlukile zokuwenza ozoba nawo emvelweni nasemphakathini ongase uthintekile uma sigxila ekumeni kwendawo, ukwakhekha kwayo, izinto eziphilayo, ezenhlalo, ezomnotho, amagugu esizwe namasiko	Izahluko 7 no-8
(viii) izinyathelo zokunciphisa umonakalo ezingase zithathwe kanye nezinga lengozi yezinto ezizoba yinsalela	Izahluko 7, 8 and 9
(ix) uma zingekho ezinye izindawo ezihloliwe okungenziwa kuzo umsebenzi ofanayo uma lena ingaphumeleli, nika isizathu esigculisayo sokuthi kungani zingafunwanga; kanye	N/A
(x) namazwi okuphetha abonisa indawo ehlukile okungakhethwa ukuba umsebenzi wenziwe kuyo uma eyokuqala ingaphumeleli kuyo indawo egunyaziwe;	Izahluko 3 and 7
(i) incazelo ephilele yenqubo ethathiwe ukuze kutholakale, kuhlolwe futhi kubekwe ngokwesigaba umthelela umsebenzi kanye nezakhiwo nezingqalasisinda okuzoba nawo endaweni ekhethiwe phakathi nesikhathi sokwenziwa komsebenzi, kuhlenganise-	Izahluko 3 and 7
(i) incazelo yazo zonke izinkinga zezemvelo nezingozi ezabonakala phakathi nenqubo yokuhlola ukuchaphazeleka; kanye	Izahluko 7 no-8
(ii) nokuhlolwa kobungako benkinga ngayinye kanye nengozi kanye nencazelo ngezinga inkinga engagwemeka ngalo noma isingathwe ngokuthatha izinyathelo zokunciphisa umonakalo;	Izahluko 7 no-8
(j) ukuhlolwa komthelela ngamunye obonakele nezingozi, kuhlenganise, -	Izahluko 7 no-8
(i) imithelela eyelekayo;	Izahluko 7 no-8
(ii) uhlobo, ubungako kanye nemiphumela yalowo mthelela nezingozi;	Izahluko 7 no-8
(iii) ububanzi nobude besikhathi somthelela nezingozi;	Izahluko 7 no-8
(iv) amathuba okuba lowo mthelela ube khona nawokwenzeka kwengozi ecatshangwayo;	Izahluko 7 no-8
(v) izinga amachaphazelo nokulimala okungalungiseka ngalo;	Izahluko 7 no-8
(vi) idinga amachaphazelo nobungozi lobo okungabangela ngayo umonakalo ongalungiseki; kanye	Izahluko 7 no-8
(vii) nezinga amachaphazelo kanye nobungozi lobo obungancishiswa ngayo;	Izahluko 7 no-8

Okuphasisiwe - iSithasiselo 3 iNgxenywe 3	iNgxenywe ekulo Mbiko
(k) lapho lokhu kusebenza khona, umbiko ofingqiwe wokutholwe omunye uchwepheshe nezincomo zakhe okuvumelana neSithasiselo 6 sale Mithetho nezinkomba zokuthi lokho okutholakele nezincomo kufakwe kanjani kulo mbiko wokuhlola;	Izahluko 7 no-8
(l) isitatimende sokuchaphazeleka kwemvelo esiqukethe -	
(i) umbiko ofingqiwe wezinto eziyisihluthulelo ezitholwe ekuhlolweni kokuchaphazeleka kwezemvelo;	Izahluko 7 no-8
(ii) ibalazwe elisezingeni elifanele elibonisa umsebenzi ozokwenziwa nazo zonke izakhiwo nezingqalasizinda zakhona okubonisa nesimo esibucayi sezemvelo endaweni okuhlongozwa ukwenziwa komsebenzi kuyo, kufanele liveze nezindawo okufanele zigwenywe, kuhlangukise nezinto zokuvikela; kanye	ISahluko 3
(iii) nombiko ofingqiwe wokuchaphazeleka okuhle nokubi okuzobangelwa umsebenzi ohlongozwayo kanye nezindlela ezingase zisetshenziswe ezihlukile;	ISahluko 10
(m) ngokusekelwe ekuhlolweni okwenziwe, nalapho lokhu kusebenza khona, iziphakamiso ezivela embikweni kachwepheshe, okuphathelene nemigomo yokulawulwa kwemithelela okuqoshiwe, nemiphumela yamagalelo yokwakha ukuze kuhlangukise kuyi-EMPr kanye nokuba kuhlangukise njengombandela wokugunyazwa;	ISahluko 9
(n) izindlela ezisikiselwe zokugcina zokwenza ngendlela ehlukile ezingatha izinyathelo zokulawulwa komonakalo ongase udaleke, ukuwugwema, noma ukuthatha izinyathelo zokuwunciphisa ezitholakale phakathi nokuhlola;	Izahluko 3 no-7
(o) noma yiziphi izinto ezaziyimibandela yalokho okwatholakala ekuhlolweni kungaba okwenziwa yi-EAP noma uchwepheshe okufanele kuhlangukise emibandeleni yokugunyaza;	ISahluko 9
(p) incazelo nganoma yikuphi okucatshangelwayo, ukungaqiniseki kanye nokungabi nalo ulwazi ezintweni ezithile okuhlobene nokuhlola kanye nezinyathelo zokunciphisa amathuba omonakalo ezisikiselwe;	Izahluko 7 no-8
(q) umbono onezizathu ezizwakalayo mayelana nokuthi umsebenzi ohlongozwayo kufanele yini noma akufanele ugunyazwe, futhi uma umbono kuwukuthi kufanele ugunyazwe, veza noma yimiphi imibandela okufanele ibekwe lapho ugunyazwa;	ISahluko 10
(r) lapho umsebenzi ohlongozwayo ungahileli izinto eziphathelene nokusebenza okuqhubekayo, isikhathi imvume okufanele iqhubekwe ikhona ngaso kanye nosuku umsebenzi ozophothulwa ngalo kanye nezimfuno zokuhlolwa kwangemva kokwakha eziphothuliwe;	N/A
(s) amazwi esifungo noma isiqinisekiso esivela kuyi-EAP ngokuphathelene: (i) nobuqiniso bemininingwane efakwe embikweni; (ii) ukufakwa kokuphawula nezimvo zezinhloka ezihlukahlukene kanye nama-I&APs; (iii) ukufakwa kwezimvo kanye nezincomo ezithathwe embikweni yochwepheshe uma kukhona; kanye (iv) noma yiluphi ulwazi i-EAP elunikeze labo abanesithakaselo nabathintekayo kanye nanoma yiziphi izimpendulo i-EAP ezinikezile ekuphawuleni nasemibonweni evezwe yilabo bantu;	Isenezelo A
(t) lapho lokhu kusebenza, imininingwane yanoma yimaphi amalungiselelo ezezimali okuhlumelelisa, ukuvalwa kanye nokuvuselelwa kwangemva kokuyekwa komsebenzi ekuchaphazelekeni kwezemvelo okungekuhle okwenzekile;	Isenezelo E

Okuphasisiwe - iSithasiselo 3 iNgxenywe 3	iNgxenywe ekulo Mbiko
(u) izimpawu zanoma yikuphi ukuchezuka eMbikweni Wokwenza Uphenyo ogunyaziwe, kuhlangukane nepulani locwaningo, kanye- (i) nanoma yikuphi ukuchezuka enqubeni esetshenzisiwe ekunqumeni ubungako bokuchaphazeleka kwezemvelo kanye nezingozi ezihambisana nakho; kanye (ii) nembangela yalokho kuchezuka; (v) nanoma yiluphi ulwazi oluqondile olungase ludingwe yisiphathimandla esibhekelele lokhu; kanye	ISahluko 7 neSahluko 8
(w) nezinye izindaba ezidingekayo ngokuvumelana neSigaba 24(4)(a) no-(b) soMthetho.	N/A

1.8

UKUMA KOMBIKO WE-EIA

Ukuma kwalo Mbiko we-EIA kuboniswe *IThebula 1.3*.

IThebula 1.3 Ukuma koMbiko we-EIA okuhlongozwayo

Inombolo yeSahluko	Isihloko Sokuqokethwe	Amanothi Achazayo
Ukunqanyulelwa Kwamagama Ezinto Nezifushaniso		
Ukufingqwa Okukhulu		Ukufingqwa kwawo uMbiko we-EIA.
1	Isethulo	Lesi sahluko sichaza ukwakhiwa nokuma koMbiko we-EIA kuhlangukane nemvelaphi, imibandela yokwenza izikhombo, inqubo ye-EIA kanye nezimemezelo.
2	Uhlaka Lwezokuphathwa	Lesi sahluko sikhuluma ngenqubomgomo, ezomthetho kanye nohlaka lwesikhungo izinqubo ze-EIA ezenziwe ngaphansi kwaso.
3	Incazelo Yomsebenzi	Lesi sahluko sinikeza isizathu sokubaluleka kwalo msebenzi, kanye nencazelo ebanzi yomsebenzi kanye nendawo ozokwenzelwa kuyo. Sizochaza nokuba kwendawo esetshenzwayo, amazwibela omsebenzi kanye neminingwane yezinto ezifezwa yilo msebenzi.
4	Isimo Esivamile Esisuke Sikhona	Lesi sahluko sifingqa iminingwane etholakalayo ephathelene nezemvelo, ezenhlalo kanye nabazothinteka eNdaweni Yomsebenzi. Sizosekelwa olwazini olutholakale kweminye imithombo futhi sizobheka izinguquko esimweni esivamile sendawo lapho kungekho msebenzi owenziwa khona. Kufakwe novo lukachwepheshe kulesi sahluko.
5	Inqubo Yokubamba Iqhaza Komphakathi	Lesi sahluko sethula imiphumela yokuxoxisana okwenziwe njengengxenywe yenqubo ye-EIA, kanye nezinhlelo zokuxhumana esikhathini esizayo. Sichaza ababambiqhaza abavelele bese sichaza inqubekela phambili yomsebenzi.
6	Inqubo Yokuhlola Ukuchaphazelek	Lesi sahluko sihlazisa ngenqubo esetshenziswe ukuhlola amagalelo omsebenzi ekwakhekeni kwendawo, ukuma kwayo kanye nezimo ezenhlalo nezomnotho.
7	Ukuhlola	Lesi sahluko sikhuluma ngemiphumela emihle nemibi

Inombolo yeSahluko	Isihloko Sokuqukethwe	Amanothi Achazayo
	Amagalelo – Imisebenzi Ehleliwe	yalo msebenzi, sichaze izinyathelo ezivamile neziqondile zokunciphisa umonakalo, ukuwususa noma ukuwugwema emvelweni kanye nakwezenhlalo bese futhi sikhuluma ngokukalwa kokulinganiswa kwamagalelo. Kuchazwa nganoma yimiphi imiphumela ewumxhantela esalayo (ngemva kokuchishiswa kwamagalelo). Amagalelo esikhathi eside kuyakhulunywa nangawo lapho kufanele.
8	Ukuhlola Amagalelo – Izigameko Ezingahleliwe/ Ezenzeka Ngengozi	Lesi sahluko sikhuluma ngamagalelo abangelwa yizigameko ezingahleliwe kodwa acatshangelwayo bese sinikeza izinyathelo zokunciphisa, ukususa noma ukugwema imiphumela engemihle emvelweni nakwezenhlalo kanye nokuhlola indlela yokubheka la magalelo.
9	Uhlelo Lokuphathwa Kwemvelo (EMPr)	I-EMPr iqoqa izinyathelo zokunciphisa umonakalo ezingase zithathwe; izihlanganise ndawonye ngononina ngokwezihloko; ichaze izinyathelo eziqondile okufanele zithathwe kanye nesikhathi sokuzithatha; ibheke izidingo zokuqeqesha, indima yezikhungo kanye nemithwalo yokwenza lokhu kusebenze.
9	Isiphetho	Lesi sahluko sinikeza isiphetho esisekelwe ekuhlolweni sibuye sichaze nezinye izincomo neziphakamiso.
Umlando Nezikhombo		Zonke izikhombo ezifakwe kulo mbko kanye namabhuku okuthathwe kuwo ezinye izinto phakathi nokuhlola
Izenezelo		- Isenezelo A: Imininingwane Kachwepheshe Wokuhlola Kwezemvelo kanye Nesimemezelo Zokuzimela Geqe - Isenezelo B: Inqubo Yokubamba Iqhaza Komphakathi - Isenezelo C: Ukuxhumana Neziphathimandla - Isenezelo D: Ucwangingo Lochwepheshe - Isenezelo E: Ukuhlinzekwa Kwezimali

2.1 ISINGENISO

Lesi *Sahluko* sinikeza ukwaziswa okuningiliziwe komthetho, izivumelwano nokwaziswa okubhaliwe okunolwazi olubanzi lophenyo noluqukethwe yilo mbiko kanye nokufinyelela kule nqubo ye-EIA.

2.2 UKUBUKA KABANZI 'UHLELO OLULODWA LWEZEMVELO'

Ngo-2007 kuya ku-2008, uMnyango Wezemvelo (DEA) noMnyango Wezokumbiwa Phansi (DMR) yavumelana ngokuthi umthethonqubo wezemvelo uzosuswa ophenyweni lwe-MPRDA futhi uzosebenza ngaphansi kwe-NEMA, lokhu kuzophakamisa "Uhlelo Olulodwa Lwezemvelo" lezwe elinemayini neminye imisebenzi ehlobene nayo. Ukusebenza kwalokhu kwagunyazwa uMthetho Ochitshiyelwe Wokuphathwa Kwezemvelo Kazwelonke, ka-2008 (No. 62 of 2008) (NEMAA) noMthetho Ochitshiyelwe Wokuthuthukiswa Kwezokumbiwa Phansi Nowoyela, ka-2008 (No. 49 of 2008) (MPRDAA).

Ngemva kwezi-8 December 2014, zonke izicelo Zokugunyazwa Kwezemvelo i-(EA's), kuhlangukise nezicelo zemisebenzi ephathelene nemayini nehlobene nowoyela, ngaphambili zazilawulwa ngokwemigomo ye-MPRDA, manje kumelwe zenziwe ngaphansi kwemigomo ye-NEMA kanye nemithetho ehambisana ne-EIA.

2.3 UMTHETHO OYINHLOKO OBALULEKILE

2.3.1 UMnyango Wokuthuthukiswa Kwezokumbiwa Phansi noWoyela (Act No. 28 ka-2002)

Umthetho oyinhloko olawula umkhakha wezimayini noWoyela waseNingizimu Afrika i-MPRDA. Nakuba i-MPRDA ilawula imboni kawoyela yaseNingizimu Afrika kanye nembali yezimayini, imisebenzi ehlanganisa uwoyela ngokuyinhloko iboniswe kwesinye isahluko esihlukile somthetho, okungukuthi, *Isahluko 6*. *Isahluko 6* somthetho sinikeza izimvume ezimbili (izimvume zokuqashelwa nezimvume zokusebenzisana kwezobuchwepheshe) kanye namalungelo amabili (amalungelo okuhlola namalungelo okukhiqiza).

Ngokwe-MPRDA, ilungelo Lokuhlola kumelwe livunyelwe ngaphambi kokuqala imisebenzi yokuhlola. I-Eni neSasol banalo kakade ilungelo LokuHlola le-ER236, okwamanje eliseminyakeni emibili yenkathi yokuvuselelwa, ngo-Julayi 2017.

UMthetho kufanele ufundwe ndawonye kanye neMithetho yoMnyango Wokuthuthukiswa Kwezokumbiwa noWoyela, ka-2004 (GNR.527 of 23 April 2004); (IMithetho ye-MPRDA) futhi kufanele kuphawulwe ukuthi i-MPRDA okwamanje isalinde ukuchitshiyelwa yi-MPRDA Amendment Bill 15D, ka-2013. Noma kunjalo ifomu lamanje lezichibiyelo ngeke liyishintshe inqubo Yokugunyazwa Kwezemvelo noma izimfuneko ngokwe-NEMA.

2.3.2 *UMthetho Wokulawulwa Kwezemvelo kazwelonke (Act No. 107 ka- 1998)*

UMthetho Wokulawulwa Kwezemvelo Kazwelonke (No.107 of 1998) i-(NEMA) ngumthetho wohlaka lwaseNingizimu Afrika ophathelene nokuvikelwa nokuphathwa kwemvelo. Isigaba 2 se-NEMA sinikeza izimiso zemvelo okumelwe zisetshenziswe yizinhlaka zombuso lapho zenza izinqumo ezithinta kakhulu imvelo. Izimiso ezimbili eziyinhloko zihlanganisa:

- Ezokulawulwa Kwemvelo kumelwe zibeke abantu nezidingo zabo phambili, inakekele izidingo zabo ezingokomzimba, ezingokwengqondo, ukuthuthukiswa, amasiko kanye nenhlalakahle yabo ngokulinganayo.
- Intuthuko kumelwe ibonakale kwezenhlalo, kwezemvelo nomnotho usimame ngokuqhubekayo.

I-NEMA inikeza nethuba lokubamba iqhaza kwabanesithakazelo namaqembu athintekayo i-(I&APs) futhi ichaze ukuthi izinqumo kumelwe zicabangele izithakazelo, izidingo nokubaluleka kwayo yonke i-I&APs.

Isigaba 28 se-NEMA sibeka umthwalo wokunakekelwa kwemvelo kuwo wonke umuntu oke wabangela noma ongase angcolise noma acekele phansi imvelo ukuba athathe izinyathelo ezifanele zokuvimbela ukugcola okunjalo nokucekeleka phansi kwemvelo ukuba kungaqhubeki.

Inqubo yoKugunyazwa kwezemvelo eNingizimu Afrika ilawulwa i-NEMA njengoba ichitshiyelwe kanye neMithetho Elawula Ukuhlolwa Kokuchaphazeleka Kwemvelo i-(EIA) yango-2014 (njengoba ichitshiyelwe) ishicilelwe ngaphansi kwe-NEMA. Ukubaluleka kwalo mthetho kufingqwe ngezansi.

Ukugunyazwa Kwezemvelo yi-NEMA

Isahluko 5 se-NEMA, njengoba sichitshiyelwe, sichaza imigomo jikelele kanye nokusetshenziswa Nokulawulwa Kwezemvelo okuhlanganisiwe. Lokhu kunikeza uhlaka lokuhlanganiswa Kwezinkinga kwezemvelo ukuze kuhlelwe, kuklanywe, kwenziwe izinqumo futhi kusetshenziswe izinhlelo neziphakamiso zokuthuthukisa ezingacishe zibe nomthelela oyingozi emvelweni. Kuyilapho Ingxenye 23 ibeka imigomo eyisisekelo nezimiso zenqubo ye- IEM, Ingxenye 24 ibeka indlela le migomo nezimiso ezizofezwa ngayo.

Imithetho elawula inqubo yokugunyazwa kwezemvelo iye yashicilelwa ngokwe-NEMA futhi ihlanganisa lokhu okulandelayo:

- Imithetho Elawula Ukuhlolwa Kokuchaphazeleka Kwemvelo (GNR R982/2014);
- Isaziso 1 Somthetho Olawula Ukuhlolwa Kokuchaphazeleka Kwemvelo (GNR 983/2014);
- Isaziso 2 Somthetho Olawula Ukuhlolwa Kokuchaphazeleka Kwemvelo (GNR 984/2014); and
- Isaziso 3 Somthetho Olawula Ukuhlolwa Kokuchaphazeleka Kwemvelo (GNR 985/2014).

*Kumelwe kuphawulwe ukuthi imithetho engenhla yachitshiyelwa ngo-April 2017 eZazisweni zikaHulumeni 324, 325, 326 no 327.

Imisebenzi ethinta i-GNR 983 ne- GNR 985 idinga ukuba kwenziwe inqubo Yombiko Wokuhlolwa Okuyisisekelo (BAR), kuyilapho imisebenzi evezwa ngokomgomo we-GNR 984 izodinga inqubo yoKwenziwa Kophenyo noMbiko Wokuchaphazeleka Kwezemvelo (S&EIR). I-GNR 982 ibeka inqubo elandelayo okumelwe ilandelwe lapho kuqhutshwa inqubo ye-BAR noma S&EIR.

Kubhekiselwa eMithethweni ye-EIA ka-2014 (njengoba ichitshiyelwe), ukuvezwa kwegunya elifanele kufundeka kanje:

‘Igunya elifanele ngokuphathelene nemisebenzi evezwe ohlwini lwale ngxenye yesimiso yigunya elifanele esifundazweni lapho lowo msebenzi uzoqhutshwa khona, ngaphandle uma-

a) Kuwumsebenzi ocatshangelwe esicelweni esisengxenyeni 24C(2) soMthetho, lapho igunya elifanele kunguNgqongqoshe noma isikhulu sombuso esinikwe amandla ngokwengxenye 42(1) yoMthetho; futhi

b) Umsebenzi oveziwe noma osohlwini uhlobene ne:

- i. **Ukuhlolwa Kwezokumbiwa Phansi nowoyela;** noma
- ii. Ukususwa nokucutshungulwa kokumbiwe phansi nowoyela’

Ngakho-ke kuyaqondakala ukuthi igunya elifanele lalolu hlelo kuzoba uMnyango Wezokumbiwa phansi i-(DMR). Njenge-Eni kuzodingeka kutholakale uKugunyazwa Kwezemvelo okuhle okuvela kuyi-DMR ngaphambi kokuba kuqhutshwe nemisebenzi ehlongoziwe. INkampani kaWoyela yaseNingizimu Afrika i-(PASA) yamukela futhi icubungulele iMDR izicelo Zokugunyazwa Kwezemvelo i-(AE) zikawoyela ovela phesheya kwezilwandle, nokho iDMR kudingeka isayine esinqumweni sokugcina.

Imisebenzi eminingi ethintekayo ivezelwe lolu hlelo ngokwazo zonke izaziso ezosohlwini (bheka i-*Thebula 2.1*).

Ezimweni lapho uhlu lwezaziso luthinteka (njengakulolu hlelo), izimfuneko ze-GNR 984 zizodingeka kanye Nombiko woPhenyo wokuthinteka Kwemvelo ngaphambi kokuba imisebenzi ehlobene nakho iqale.

Thebula 2.1 Uhlu lwemisebenzi ngokweMithetho ye-NEMA EIA, ka-2014 (njengoba ichitshiyelwe, 2017)

Uhlu Lomsebenzi	Incazelo Yomsebenzi	Isizathu Somsebenzi
GNR 983 Umsebenzi 14	Ukuthuthukiswa nokusebenza kwezikhungo noma izingqalasizinda, zokugcina noma ukusingatha impahla eyingozi, lezi zindawo ziyiziqukathi zamabhokisi ezingamamitha angu-80 noma ngaphezulu kodwa azidluli amamitha angu-500.	Umsebenzi wokumba ohlongozwayo uzosebenzisa izingqalasizinda ezizosingatha futhi zigcine uwoyela, igesi noma uphethiloli (diesel). Ulwazi mayelana nobukhulu bendawo elindelekile yokugcina lezi zinto okwamanje ayiqinisekisiwe futhi lomsebenzi ufakwe ohlwini ukuze kuthi uma kwenzeka indawo yokugcina izinto igcwala ize idlulele ngale kuka-80 m ³ kodwa ibe ngaphansi kuka-500 m ³ .
GNR 983 Umsebenzi 22	Ukumiswa kwanoma imuphi umsebenzi kudinga – (i) isitifiketi sokuvala ngokwengxenywe 43 yoMthetho Wokuthuthukisa Kwezokumbiwa Phansi noWoyela, ka-2002 (Act No. 28 of 2002); noma (ii) ilungelo lokuhlola, ilungelo lemayini, ilungelo lokukhiqiza noma ilungelo lokuhlola, lapho umsebenzi owenziwayo uncishiswe ngamaphesenti angu-90 noma ngaphezulu eminyakeni engaphezu kwengu- 5 ngaphandle kwalapho igunya elifanele linesivumelwano esibhalwe phansi sokuthi ukuncishiswa komsebenzi akusho ukuvalwa komsebenzi.	Ngokwengxenywe 43(3) ye-MPRDA, isitifiketi sokuvala kumelwe sisetshenziswe phakathi kwalezi zinto: • Ilungelo lokuHlola eliphelelwe isikhathi ; noma • Ukuvalwa kwanoma iyiphi ingxenywe yendawo egunyaziwe. Ngokwemiphumela yohlelo lokumbiwa kwemithombo, kuyonqunywa ukuthi imithombo izoyekwa ngokuphelele noma okwesikhashana. Uma kwenzeka imithombo ishiywa dengwane lokho kungaholela ukuba -Eni iyivale indawo egunyaziwe noma ingxenywe yayo.

Uhlu Lomsebenzi	Incazelo Yomsebenzi	Isizathu Somsebenzi
GNR 984 Umsebenzi 7	Ukuthuthukiswa nokusebenza kwezakhiwo noma ingqalasizinda yokuthutha izinto eziningi eziyingozi— (i)kusetshenziswa amagesi, ngaphandle kwezakhiwo zezimboni, kusetshenziswa amapayipi , angaphezu kwamamitha angu- 1 000 ngobude, athwala amathani angaphezu kuka-700 ngosuku; (ii) ngoketshezi, ngaphandle kwezakhiwo zezimboni , kusetshenziswa amapayipi angamamitha angaphezu kuka-1 000 ubude, athwala 50 cubic metres ngosuku;	Umsebenzi ohlongoziwe uzosebenzisa ingqalasizinda yokumba (ngokwesibonelo, amapayipi, izivalo njll.) azothutha uwoyela noma igesi lapho okumbiwa khona. Ngenxa yokucatshangelwa kobubanzi bemithombo ehlongoziwe, le ingqalasizinda izoba ngaphezulu kwamamitha angu-1,000 ubude. Umthamo wale ngqalasizinda eklanyiwe ingadlula lokhu okubaluliwe ohlwini lomsebenzi.
GNR 984 Umsebenzi 14	Ukuthuthukiswa nokusebenza kwe- (ii) kwesiteshi esisolwandle sokusebenza; noma (iii) kwanoma isiphi isakhiwo noma ingqalasizinda engaphansi ekujuleni noma eduze kolwandle	Umsebenzi wokumba ohlongoziwe uzokwenza ukuba kufakwe izinto zokumba (njengesakhiwo phezu komthombo) esisekujuleni kolwandle. Uma kwenzeka lesi sakhiwo singaphumeleli, umthombo uyashiywa futhi izinto ezivimbela ukuqhuma i-BOP zizosuswa.
GNR 984 Umsebenzi 18	Noma imuphi umsebenzi kuhlangukise e nomsebenzi odinga ilungelo lokuhlola njengoba kubonisiwe engxenyeni 79 YoMtheotho Wokuthuthukiswa Kuzokumbiwa Phansi nowoyela, 2002 (Act No. 28 of 2002), kuhlangukise — (a) ingqalasizinda, izakhiwo nomhlaba;	I-Eni inelungelo lokuHlola le-ER236. UHlelo Lokulawulwa Kwezemvelo i-(EMPr) lasetshenziselwa isicelo seLungelo lokuhlola ngokwezimfuneko ze-MPRDA. Umsebenzi Wohlelo owanikezwa imvume yeLungelo LokuHlola ne-EMPr awuzange uhlangukise nokumbiwa kwemithombo yokuhlola. I-PASA iqinisekile ukuthi i-EIA ngokwe-NEMA iyadingeka kulo msebenzi.

Imithetho Yokuxhaswa Ngokwezimali, ka-2015

Ingxenye 24P ye-NEMA, lowo ofake isicelo soxhaso ngokwezimali i-EA ngokuqondene nezimayini, ukuhlola , ukukhiqiza noma indawo okusetshenzelwa kuyo (*Annex E*).

NgokoMthetho Wokulawulwa Kwezemvelo Kazwelonke: IMithetho ephathelene Nokuxhaswa Ngokwezimali ukuze kwenziwe Ucwangingo, Uphenyo, Izimayini noma Umsebenzi wokukhiqiza, Imisebenzi (GN R1147, eyaqala ukusebenza ngo-20 Novemba 2015 kwalandela nokuchitshiyelwa okwashicilelwa ngezi-16 April 2018) ofake isicelo noma onelungelo kumelwe acele ukuxhaswa ngokwezimali ukuze kuqinisekise ukuthi imali eyanele iyatholakala ukuze kuvuselelwe futhi kulungiswe umonokalo kwezemvelo obangelwe imisebenzi yokuhlola, njengoba kucatshangelwe eMthethweni uNgqongqoshe aneliseke .

Ukuxhaswa ngokwezimali nokuhlehliswa kwezinhlelo kumelwe kuhanjiwe kuNgqongqoshe njengengxenywe yenqubo yesicelo soKugunyazwe Kwezemvelo.

Uxhaso ngokwezimali olunikeziwe ukuze kuvuselelwe, kulawulwe futhi kuqedwe umonakalo emvelweni luzotholakala ngaphambi kokuba kuqalwe umsebenzi wokumba.

Ekuphetheni komsebenzi (ngokwesibonelo, wokumba nokuqedwa komthombo) umthombo uzovalwa futhi ushiywe (“uvalwe”). Lokhu kuhlenganisa ukuqiniswa kukasimende ngaphakathi embobeni yomthombo nokuhlola ukuthi uphephile yini. I-BOP izobe isikhishelwa ngaphandle. Iseabed nomthombo kuyobe sekuhlolwa nge- ROV bese ekugcineni umshini wokumba nemikhumbi ebistshenziswa kukhiswa kuleyo ndawo.

Ukuxhaswa ngokwezimali kokuvalwa nokushiywa kwemisebenzi (ukumiswa) kuyadingeka futhi kuzohanjiswa kuNgqongqoshe njengengxenywe yenqubo yesicelo soKugunyazwa Kwezemvelo. Kubhekiselwa kwi- *Annex E* ukuze kutholakale uxhaso ngokwezimali oluhlbeni nokumiswa kohlelo lokuhlolwa komthombo.

I-Eni izokwenza ukuba uhlelo lobuchwepheshe nezindleko zokuvalwa kwemisebenzi ziyaqinisekiswa yilungu langaphandlelapho kubekwa isiqinisekiso. Ukuxhaswa ngokwezimali okuhlobene nokumiswa kwemisebenzi kuzobukezwa unyaka nonyaka.

2.3.3 Ukulawulwa Kwezemvelo Kazwelonke: UMthetho Wokulahlwa Kwemfucuza (UMthetho No. 59 ka- 2008)

Ingxenywe 19 Yezokulawulwa Kwezemvelo Kazwelonke : UMthetho Wokulahlwa Kwemfucuza (No. 59 ka-2008) (NEMWA) unikeza uhlu lwemisebenzi yokulawulwa kwemfucuza enomthelela noma enomthelela ongaba yingozi emvelweni.

Ngakho, i- GN 921 ka- 29 November 2013 ibala imisebenzi yokulawulwa kwemfucuza edinga olayisensi Yokulawulwa Kwemfucuza i(WML) ngokweNgxenywe 20 yoMthetho. Ngaphezu kwalokho, uhlu kanisa umsebenzi iwokulawula kwemfucuza ngamunye ngokwezigaba ezahlukene, exhaswe kakhulu ngenxa yemisebenzi enomthelela oyingozi emvelweni. Kulokhu, imisebenzi ‘YeSigaba A’ idinga inqubo ye- NEMA BAR ngaphambi kokuba kuqalwe. Imisebenzi ‘Yesigaba B’ idinga ukuba inqubo ye-S&EIR ngokugcwelel ukuze yenziwe, kuyilapho imisebenzi ‘Yesigaba C’ ingabophekele enqubweni ye-WML, uma nje ihambisa nemibandela ebekiwe.

I-ERM eqondayo ukuthi i-WML ayidingeki kule misebenzi ehlongoziwe. Nokho ekuphetheni komsebenzi wokumba, uma imisebenzi ephathelene nokulahlwa kwemfucuza ishintsha, i- Eni iyobukeza izimfuneko zeLayisensi Yokulawulwa Kokuahlwa Kwemfucuza engaphansi koMthetho.

Ukulawulwa Kwezemvelo Kazwelonke: Umthetho Onqanda Ukunukutshezwa Komoya (No. 39 of 2004) (NEMAQA) ulawula ukuphuma kwemisebenzi ebaliwe Emsebenzini Yokuphathwa kwemikhiqizo nezindinganiso GN 893 ka-22 November 2013 (MES). INEMAQA ibonsa isidingo sokuba neLayisensi yomsebenzi okhiphela ukungcola emkhathini (AEL) uma ngoku kushiswa imfucuza engaba ngaphezu kuka-10 kg. Inqubo ye-AEL ihlanganisa Ukuhlola Okuyisisekelo kanye ne- NEMA.

Uma kwenze i- Eni inquma ukushisa imfucuza engenabuthi futhi esha kalula endaweni yokumba nasemikhnjini, kuyodingeka ifake isicelo kuyi- DEA: Kwezokunqandwa Kokunukutshezwa Komoya ukuze bathole i- AEL. Nokho kungumsebenzi we-Eni ukukhipela yonke imfucuza ogwini ukuze ishiswe kahle.

Ukulawulwa Kwezemvelo Kazwelonke: UMthetho Wokuphatha Ugu Ngendlela Efanele (No. 24 of 2008) (NEMICMA) wenze uhlelo lokulawula ugu nokuhlangana komfula nolwandle eNingizimu Afrika ukuze kugqugquzelwa ukongiwa kwemvelo esogwini futhi kuqinisekise ukuthuthukiswa ukuze ukusetshenziswa kwezinsiza zemvelo esezindaweni ezisogwini zisetshenziswe ngendlela efanele emphakathini futhi zisimamisa umnotho. Ingxenye 69 ye-NEMICMA inqabela ukulahlwa kwanoma yini evela endaweni eyomile ilahlwe emanzini asogwini ngaphandle uma kuvunyelwe i- CWDP eshicilelwe i-DEA.

I-NEMICMA yaphinde yakhapha uMthetho wogu Lolwandle No.21 ka-1935 NoMthetho wokulawula Ukulahlwa Kwemfucuza Olwandle 73 ka-1980.

Imithetho Yokulahla Imfucuza

Imithetho yokulahla imfucuza Olwandle yashicilelwa ngo- 21 July 2017 ngokwezingxenye 83(1) (g), (h), (k)no (r) ye- NEMICMA, le mithetho ilawulwa izicelo zemvume yokulahla imfucuza njengoba kuvunyelwe engxenyeni 71(1) ye-NEMICMA. Nokho, kufanele kuphawulwe ukuthi ngokwe-NEMICMA, imfucuza elahlwayo ayihlanganisi:

- Ukulahlwa noma ugcina doti wezimayini olwandle noma enye imfucuza evela phansi olwandle nesihlabathi samanzi angasogwini esikhishwe ngokusemthwethweni lapho kuhlolwa nalapho kucutshungulwa okumbiwe phansi olwandle noma izihlabathi noma okukhishwe; kanye
- Imfucuza yomsebenzi evela emikhunjini, endizeni , esiteshini noma kwesinye isakhiwo esenziwe olwandle.

Imvume yokulahla izinto ezinjengalezo ngeke idingeke kulolu hlelo.

2.3.6 *Umthetho Wokugcola Kolwandle (Umthetho wokulawula Nomthwalo & Civil Liability Act) (No.6 ka- 1981) Nokugunyazwa kwezokuphepha Olwandle za seNingizimu Afrika (No. 5 ka-1998)*

Ngokomthetho Wokungcola Kolwandle (Control and Civil Liability) 6 ka-1981, uMnyango Wezokuthutha wabekwa icala ukuze kuqinisekise ukuthi kuthathwa izinyathelo ezifanele ukuze kuncishiswe umonakalo obangelwa ukuchithwa koketshezi oluyingozi (njengowoyela) ovela emikhunjini, tankers, noma izinto ezixhunyiwe ogwini. Ngokomthetho Wokuphepha Kwezinto Eziphila Olwandle waseNingizimu Afrika ka-1998, lo mthwalo udluliselwa Eginueni Lokuphepha Kwezinto Eziphila Olwandle laseNingizimu Afrika (SAMSA). Ingxenye 52 yoMthetho we-SAMSA, nokho, iqondisa umthwalo wokuliswana nokungcoliswa kolwandle nogu ngowola kuNgqongqoshe Wezemvelo (DEA). Ukumiswa kwale- DEA ukuba kuvukelwe futhi kuhlanzwe uwoyelauchithelwe olwandle , kuyilapho i-SAMSA"s inomthwalo rolinganiselwa uma uwoyela usemikhunjini. Ngaphambi kokuba kumbiwe kudingeka kube Nohlelo Lokuchitheka kukawoyela Ngephutha. Futhi luhamnjiwe ku-SAMSA ukuze lwamukelwe kwenziwe nesitifiketi. UPASA ne DEA kuyodingeka baphawule ku-OSCP ngaphambi kokuba i- SAMSA yenze isitifiketi.

2.4 *EMINYE IMITHETHO ESEBENZAYO*

Le ngxenye ibonisa uhlu lomthetho kazwelonke nomthetho wamazwe omhlaba nezivumelwano ezingase isebenze kulolu hlelo oluhlongoziwe.

Ukugunyazwa okwengeziwe noma izimvume zingase zidingeke ngokwalowo mthetho, kodwa ziwela ngaphandle kwale nqubo i-EIA.

2.4.1 *Umthetho Kazwelonke*

Umthetho Kazwelonke uyadingeka kulolu hlelo (ngaphezu kwalezo eziveziwe ezingxenyeni ezandulelein) olubhalwe ngezansi.

- UMthethosisekelo kaHulumeni waseNingizimu Afrika (No. 108 of 1996);
- UMthetho Wokulawulwa Kwezemvelo Kazwelonke: Umthetho Wokuphathwa Kogu Ngendlela Efanele (No. 24 ka-2008);
- UMthetho Wamanzi Kazwelonke (No. 36 ka- 1998);
- UMthetho Kazwelonke Wezinsiza zamaGugu (No. 25 ka-1999);
- UMthetho Wokulawulwa Kwezemvelo Kazwelonke: Biodiversity Act (No. 10 of 2004);
- UMthetho Wokulawulwa Kwezemvelo Kazwelonke: Umthetho Wezindawo Ezivikelekile (No. 57ka- 2003);
- UMthetho woLwandle (No. 21 ka-1935);
- UMthetho Wezinsiza Eziphila EmanziniMarine (No. 18 ka-1998);
- Umthetho Wezempilo Nokuphepha (No. 73 ka-1989);
- UMtheo Wegesi (No. 48 ka- 2001);

- UMthetho Wokulawulwa Komsindo kokulondolozwa Kwemvelo (No. 73 of 1989);
- IMithetho yokuxwayisa Ngengozi (GNR. 692 ka- 30 July 2001);
- UMthetho woketshezi Oluyingozi (56 ono-1973) neMithetho (No. 85 ka-1983);
- UMthetho Weziqhumane (No. 15 ka-2003);
- UMthetho Wokulawula Ugesi (No. 4 of 2006);
- UMthetho wokulondolozwa Kwemvelo (No. 19 ka-1974);
- Umthetho Wokugncoliswa Kolwandle (Ukulivimbela lingangcoliswa imikhumbi) (No. 2 ka -1986);
- Umthetho kazwelonke Wamachweba (No. 12 ka-2005);
- UMthetho Wokuqondiswa Kwezithuthi Zasolwandle (No. 2 ka-1981);
- UMthetho Wokuthwala Kwezimpahla Ngolwandle, 1986 (No. 1 ka-1986);
- UMthetho Wokulawula kulahlwa Kodoti Olwandle, ka-1980 (No. 73 ka-1980);
- UMthehto Olawula Ukungcoliswa Kolwandle, 1987 (No. 65 of 1987);
- UMthetho Wokugunyazwa Kokuphepha Olwandle, 1998 (No. 5 of 1998);
- UMthetho Wokugunyazwa Kwentela Yokuphepha Olwandle, 1998 (No. 6 of 1998);
- Maritime Zones Act, 1994 (No. 15 of 1994);
- UMthetho Wokuthuthwa Kwezintio Ezithengiwe, ka-1951 (No. 57 of 1951);
- UMthetho Wokuphepha Ezimayini, 1996 (No. 29 of 1996);
- UMthethoKazwelonke Wokulawulwa kwamandla Enuzi, ka-1999 (No. 47 ka-1999);
- UMthetho wamandla Enuzi, ka-1999 (No. 46 ka- 1999);
- UMthehto Wokuvikelwa Kwezinyoni zasolwandle Seals ka-1973 (No. 46 ka-1973);
- UMthetho Wokubhaliswa Kwemikhumbi, ka-1998 (No. 58 ka- 1998);
- UMthetho Wokugunyazwa kokuphepha Olwandle waseNingizimu Afrika, ka-1998 (No. 5 of 1998);
- UMthetho Wokugunyazwa Kokuphepha Olwandle waseNingizimu Afrika, 1998 (No. 6 ka-1998); no
- Umthetho Wokuphuka Nokutakulwa koMkhumbi, 1995 (No. 94 ka-1995).

Ukusetshenziswa kwalemithetho kuzofakwa ohlelweni lwalo msebenzi.

2.4.2 *Izimfuneko Zamazwe Omhlaba*

Imihlangano Yomhlaba wonke Yokunqandwa Kokungcoliswa Kolwandle

- Isivumelwano Somhlaba wonke Wokunqandwa Kokugcola Ngenxa Yemikhumbi, 1973/1978 (MARPOL);
- Ukuchitshiyelwa Kwesivumelwano Somhlaba wonke Wokunqandwa Kokugcola Ngenxa Yemikhumbi, 1973/1978 (MARPOL) (Bulletin 567 – 2/08);

- Isivumelwano Somhlaba wonke Sokulungiselelwa Kokugcolisa kukaWoyela, nokubambisana, 1990 (OPRC Convention);
- Isivumelwano Nezizwe Ezihlangene Somthetho Wasolwandle, sika-1982 (UNCLOS);
- Isivumelwano Sokunqanda Kokunqandwa kokungcoliswa Kolwandle Ngokulahla Imfucuza nokunye, ka-1972 (isivumelwano saseLondon) nomthetho thka-1996 (the Protocol);
- Isivumelwano Somhlaba wonke esiphathele Nokungenelela Okusezingeni Eliphezulu endabeni Yokungcolisa Kukawoyela okulimazayo (1969) noMthetho Wokungenelela Osezingeni Eliphezulu ngokuphathelene noketshezi Olugcolisa Ulwandle ngaphandle kukawoyela (1973);
- Isivumelwano Sokuhamba Kwezithuthi Ezithutha Imfucuza Eyingozi nokulahlwa kwayo (1989); ne
- Isivumelwano ngokuhlukahluka Kwemvelo (1992).

Omunye Umthetho Wamazwe Omhlaba

- Umthetho Womhlaba Wonke Wezinto Ezibangela Ingozi (ICRC); ne
- Inkampani yamandla kagesi Kazwelonke (IAEA) Imithetho Yokuthuthwa Ngokuphepha kwe-Radioactive Material, 1984.

3.1

ISINGENISO

Lesi *Sahluko* sinikeza incazelo ngesidingo nokufaneleka kwiphrojekthi ehlongozwayo, sinikeza ulwazi olubanzi lweprojekthi, ukubuka ngokubanzi uhlelo oluhlongozwayo lokuhlola okuhlongozwayo kanye nencazelo yezinye izindlela zeprojekthi.

3.2

ISIDINGO NOKUFANELEKA KWEPROJEKTHI

Izinhlayiya (ezihlanganisa igesi nowoyela) zidlala indima ebalulekile ekuthuthukiseni ezenhlalo nezomnotho eNingizimu Afrika, ngesikhathi esifanayo ihlinzeka isisekelo esidingekayo sezomnotho wengqalasizinda yezwe ukuba libe umklomelo okhangayo wokutshalwa kwezimali zakwamanye amazwe emkhakheni wamandla (Isandulela esithembekile Sephepha Elimhlophe Ngenqubomgomo Yamandla 1998).

Iphepha Elimhlophe laseNingizimu Afrika elibhekene nenqubomgomo yamandla (1998) yimiqulu yenqubomgomo eliye laqondisa futhi lisaqhubeka liqondisa inqubomgomo yesikhathi esizayo nokuhlelwa emkhakheni wezamandla eNingizimu Afrika. Iphepha elimhlophe lithi ‘uHulumeni uzoqinisekisa ukuhlolwa okunamandla nokusimeme kwemvelo kanye nokuthuthukiswa kowoyela wemvelo nemithombo yogesi wezwe ukuze kuzwe bonke’ futhi uzimisele ‘ukuqinisekisa ukutshalwa kwezimali ezizimele kanye nobuchwepheshe ekusetshenzisweni nasekuthuthukisweni kwemithombo yowoyela negesi yezwe’. Ukusetshenziswa okuphumelelayo kwalemithombo yemvelo kuzonezela ekukhuleni komnotho nokunciphisa ubunzima bokukhokha.

Isikhundla Secebo Likazwelonke Lokuthuthukiswa (NDP) liqiniswa Ohlelweni Oludidiyelwe Lwezamandla (IEP) (2016¹), oluhlose ukubonisa ukuthi izidingo zamandla amanje nawesikhathi esizayo angasetshenziswa kanjani ngokuphumelelayo. Izinhloso eziyinhloko eziveziwe ohlelweni zihlanganisa ukuvikelwa kokuhlinzeka, ukunciphisa izindleko zamandla, ukuhlukahluka emithonjeni yokuhlinzeka kanye nemithombo eyinhloko yamandla nokunciphisa ukukhishwa kwamanzi. Loluhlelo lubonisa ukuthi isidingo esicatshangelwe owoyela ongcolile sizoqhubeka ukwanda esikhathini esiphakathi ukuya esikhathini eside uma izinqubomgomo zamanje, ezombusazwe namazinga okuzifinyelela eqhubeka (IEP, 2016).

¹ Isesengaphansi kokubuyekiswa komphakathi nokubekwa kwamazwana

¹ http://www.energy.gov.za/files/petroleum_frame.html

Khona manje isidingo sikawoyela oluhlaza eNingizimu Afrika ungaphezulu kwamabharele angu 600 000 / usuku. Okwamanje iNingizimu Africa ithengisa amaphesenti abalelwa ku 70 amafutha ayo, atholakala kuwoyela oluhlaza nasemikhiqizweni ephelile. Enye Ingxenye engamaphesenti angu-30 isuka ekukhiqizweni kwendawo kwamafutha aphuma emalahleni nasegadini².

Izidingo zamanje zowoyela ongahluziwe zaseNingizimu Afrika zifinyelelwa ngokuthengiswa kwempahla, ikakhulukazi esuka eMpumalanga Ephakathi naseAfrika. Cishe wonke uwoyela ongahluziwe usetshenziselwa ukukhiqiza amafutha amanzi, namaphesenti amancane asetshenziswa ekwenzeni amafutha amanzi, ibitume, amakhemikhali awuketshezi nezinye izinto ezenziwa ngamakhemikhali kawoyela. Njengoba kwenjalo nakwezinye izindawo emhlabeni, amafutha amanzi ngokuyinhloko asetshenziselwa ukuhlangabezana nezidingo zezokukuthutha zezwe (IEP, 2016).

Njengomthengisi wengqikithi kawoyela onahluziwe, nezwe elisathuthuka, iNingizimu Afrika ayikho esikhundleni sokuthonya intengo yowoyela ongahluziwe. Imboni yamafutha amanzi yaseNingizimu Afrika ithintwa kakhulu ezentuthuko zomhlaba wonke kanye nokushintshashintsha kwamanani owoyela ongahluziwe njengalokho wonke umnotho usengcupheni kakhulu nokuguquguquka kwezimakethe zomhlaba wonke zikawoyela (IEP, 2016).

Ukukhiqiza uwoyela negesi eyengeziwe ngaphakathi eNingizimu Afrika kulindeleke ukuba ukuze kube negalelo ekuthengiseni amanani azinzile, kwakhiwe imisebenzi eyengeziwe kanye nezimboni emkhakheni wezokuthutha kanye nemikhakha ehlinzeka ngowoyela negesi nokungazinzi okukhulu ezindaweni ezikhiqiza amafutha.

Ukwenezela kulokhu, maphakathi no 2014 uhulumeni waseNingizimu Afrika waqalisa iOperation Phakisa¹, indlela ehloselwe ukuvumela iNingizimu Afrika ukuba isebenzise izinqubomgomo nezinhlelo zayo kangcono, ngokushesha, nangempumelelo enkulu. Enye injongo ye Operation Phakisa ukuvula amathuba omnotho wezilwandle zaseNingizimu Afrika. Kulendaba kukhethwe izikhungo ezine ezibalulekile njengezintsha ezikhulayo ezikhethiwe emnothweni wolwandle, kuhlanguke ne:

- Ezokuthutha olwandle kanye nemisebenzi okukhiqiza;
- Ukuhlola uwoyela negesi engasogwini;
- Ukuzalanisa; kanye ne
- Izinsizakalo zokuvikelwa kolwandle kanye nokulawulwa kolwandle.

Ukumbiwa kokuhlola okuhlongozwayo kunikeza ithuba yokufeza inhloso ye-Operation Phakisa yokuvula umnotho wolwandle ngokunikeza amathuba okuhlola amafutha kanye negesi emanzini aseNingizimu Afrika.

Ngokwalokho okushiwo ngenhla, impumelelo yokuhlola izothola izinzuzo zesikhathi eside eNingizimu Afrika ehlanganisa ukuthuthukiswa kwezokuphepha okuhlinzekwayo, ukutshalwa kwezimali ezweni ngaphakathi kwiphrojekthi yentuthuko (kuhlanganise nokudala amathuba emisebenzi), ukwandisa izimali zikahulumeni, umthelela ekuthuthukiseni ukukhula komnotho nokunciphisa ukwethembela ekungenisweni kwama-hydrocarbon ezweni.

3.3

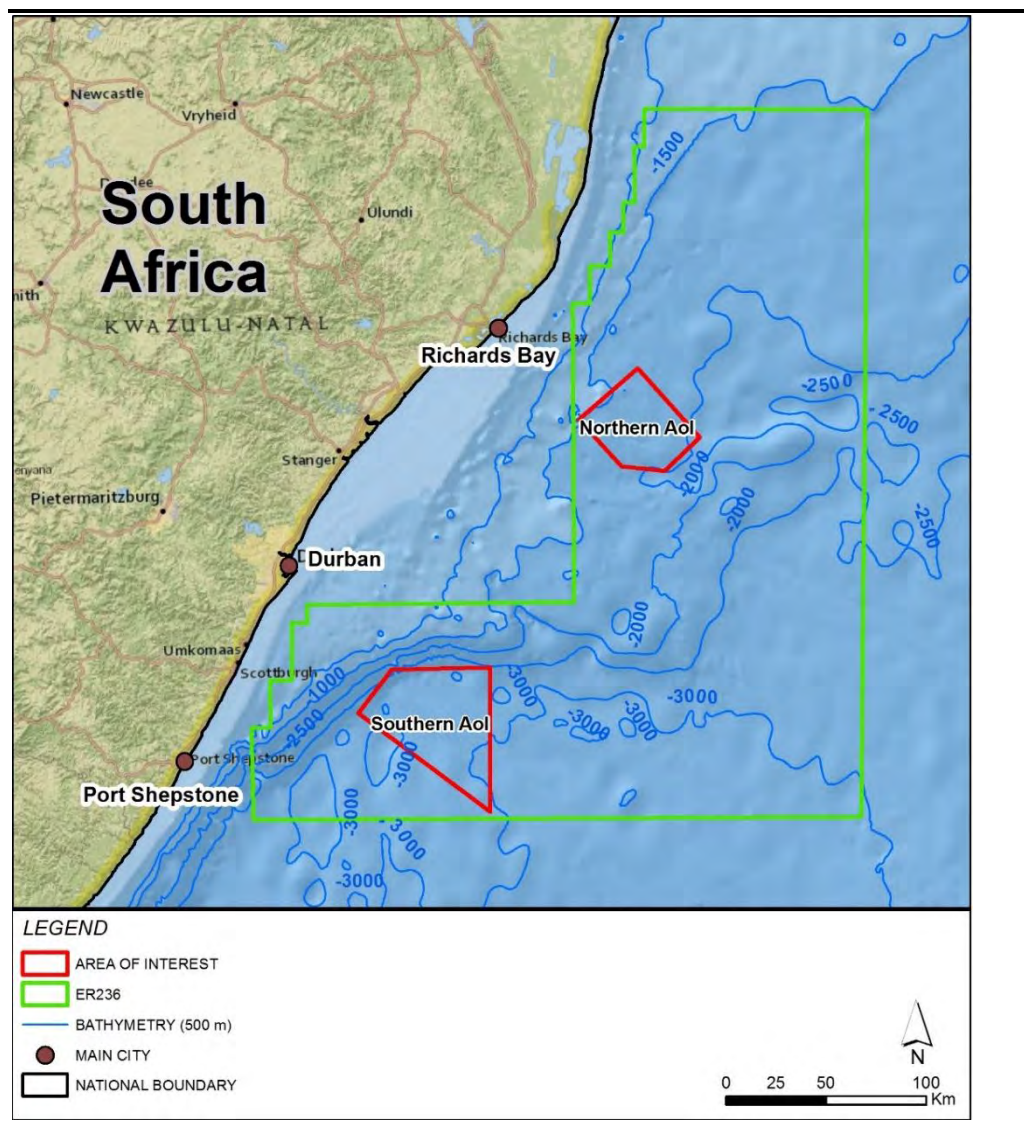
INDAWO YEPROJEKTHI

UEni uhlongoza ukufaka imithombo yamanzi ejulile eyisithupha ngaphakathi kwe-Block ER236, ngaphakathi **kwezindawo ezimbili ezithakazelwayo:**

- **Indawo engasenyakatho yesithakazelo** eyizi-1,717.50 km², esendaweni yayo, eseduzane, amakhilomitha angabalelwa ku 62 ukusuka ogwini, emanzini aphantsi abalelwa phakathi kuka 1,500 m no 2,100 m (*Umfanekiso 3.1*).
- **Indawo engaseningizimu yesithakazelo** ecishe ibe yizi-2,905 km², esendaweni yayo, eseduzane, amakhilomitha angabalelwa ku 65 ukusuka ogwini, emanzini aphantsi abalelwa phakathi kuka 2,600 m no 3,000 m (*Umfanekiso 3.1*).

Ukujula komgodi okulindelekile kuzoba cishe ngu-3,800 m no 4,100 m ukusuka olwandle, ngasolwandle, ekujuleni okuhlosiwe endaweni ethakazelelwayo esenyakatho, futhi cishe u5,100 m endaweni ethakazelelwayo engaseningizimu. Izixhumanisi ze-Block ER263 nezendawo ngayinye ethakazelelwayo zinikeziwe *Kuthebula 9.3 neThebula 9.4* ngokulandelayo.

Umfanekiso 3.1 Indawo ye-Block ER236, Nezindawo eziseNyakatho naseNingizimu esithakazelwayo



Ithebula 3.1 Izixhumanisi ze-Block ER236 (WGS84 UTM Zone 36S)

Indawo	Ilatithudi	Ilongithudi
A	27°48'30"S	32°52'0"E
B	27°48'30"S	34°0'0"E
C	31°0'0"S	34°0'0"E
D	31°0'0"S	30°49'0"E
E	30°35'0"S	30°49'0"E
F	30°35'0"S	30°55'0"E
G	30°22'24,6"S	30°55'0"E
H	30°22'24,72"S	31°2'0"E
I	30°7'0"S	31°2'0"E
L	30°2'0"S	32°30'0"E
M	28°41'18"S	32°30'0"E
N	28°41'18"S	32°35'20"E
O	28°31'4"S	32°35'20"E
P	28°31'4"S	32°41'30"E

Q	28°21'59"S	32°41'30"E
R	28°21'59"S	32°45'40"E
S	28°13'51"S	32°45'40"E
T	28°13'51"S	32°49'0"E
U	27°58'47"S	32°49'0"E
V	27°58'47"S	32°52'0"E

Ithebula 3.2 Izixhumanisi zendawo ethakazelwayo yaseNyakatho (WGS84 UTM Zone 36S)

Indawo	Ilatithudi	Ilongithudi
A	29° 12' 33.341"S	32° 31' 46.013"E
B	28° 58' 47.34"S	32° 49' 32.73"E
C	29°17'28.529"S	33°8'58.59"E
D	29°26'34.962"S	32°58'11.965"E
E	29°25'22.117"S	32°44'46.372"E

Ithebula 3.3 Izixhumanisi zendawo ethakazelwayo yaseNingizimu (WGS84 UTM Zone 36S)

Indawo	Ilatithudi	Ilongithudi
A	30°19' 39.588"E	32° 3' 48.518"E
B	30°58' 35.904"E	32° 3' 25.921"E
C	30°31' 35.022"E	31° 22' 26.396"E
D	30°19' 49.794"E	31° 33' 7.656"E

3.4 ISIMISO SEPHROJEKTHI

Ukumba kokuhlola kanye/ noma ukuhlolwa kwemithombo kuzokwenziwa njengemikhankaso ehlukene; indawo yokuqala (endaweni esenyakatho noma eningizimu) kanye nokulandelana kwemithombo, okuhambisana nemiphumela yomthombo wokuqala wokuhlola nokuchazwa kwemininingwane yokuma komhlaba ayikashiwo.

Ukumbiwa komthombo wokuqala wokuhlola kuhlelwe isikhathi esithile esiphakathi kukaNovemba 2019 noMashi 2020. Ukumbiwa komthombo owodwa kulinganiselwa ukuthi kuzathatha cishe izinsuku ezingaba ngu-71 ukuba uqedwe.

Ukulandelana kwesikhathi kanye nenombolo yemithombo eyengeziwe yokuhlola nokuhlola (ukufika emithonjeni engu-6 njengenani eliphezulu inani, kuhlangele nomthombo wokuqala ozochotshozwa) kuyoxhomeka emiphumeleni yomthombo wokuqala wokuhlola

Ukushayela kuyokwenziwa kusukela e-West Afrika futhim izofaka amanzi aseNingizimu Afrika kumngcele waseNamibia noma waseMozambique; njengalokhu kulesi sigameko esibi kunazo zonke kuzothatha ngokulandelana kwezinsuku ezingu-5.

Lengxenywe ichaza izingxenywe eziyinhloko zeprojekthi futhi zihlanganisa okulandelayo:

- Umkhumbi wokumba emanzini ajulile;
- Indawo yokukhipha;
- Isisekelo sogu;
- Izikebhe zokuhlinzeka nokulinda;
- Abasebenzi;
- Ukudluliselwa kwabasebenzi;
- Ingqalasizinda nempatho.

3.5.1

Umkhumbi Wokumba Emanzini Ajulile

Izinhlobo ezihlukene zezikebhe zokwemba zisetshenziswa emhlabeni wonke emsebenzini wokumba ngasogwini, ngohlobo lwengxenywe oluncike endleleni amanzi ajule ngayo lapho kudingeka isetshenziswe khona. Ezinye izinhlobo zezikebhe zokwemba ezingasetshenziswa zichazwe kabanzi ku *Engxenyeni Error! Reference source not found.* Ngenxa yokujula kwamanzi endaweni ngayinye yesithakazelo, kulindeleke ukuba ukumba kokuhlola kuzoqhutshwa kusetshenziswa umkhumbi wokwemba emanzini ajulile. Umkhumbi wokumba emanzini ajulile (*Umfanekiso 3.2*) uzogcinwa endaweni yawo kusetshenziswa uhlelo oluhle lokubeka esikhundleni (DPS) oluvumela ukuphazamiseka okuncane ngaphansi kolwandle ngenxa lekhono layo lokusebenza ngaphandle kokuhleleka. Inzuzo ephawulekayo yokusebenzisa umkhumbi wokumba yinkululeko yokuhamba njengesikebhe esithuthumayo esinezimo eziguquguqukayo zokuhamba ukusuka endaweni ukuya kwenye ngaphandle kwesidingo semikhumbi yokuthutha. Isibonelo somkhumbi wokumba emanzini ajulile siboniswe *Ithebula 3.4* ngezansi.

Umfanekiso 3.2 Isibonelo Somkhumbi Wokumba



Umthombo: Shutterstock, 2017

Ithebula 3.4 Isibonelo Sempawu Zomkhumbi Wokumba

Umngcele	Isibonelo somkhumbi wokumba
Ubukhulu Obuyinhloko / Ukusebenza Kwemingcele	
Ubude	228 m
Ububanzi	42 m
Ukujula	19 m
Uhlaka lomsebenzi	12 m
Uhlaka lokuhanjiswa	13 m
Ukujula kwamanzi amaningi	3,658 m
Ukujula okukhulu kokumba	10,660 m
Imoonpool	25.6 m x 10.26 m
Indawo yokuhlala etholakalayo	Abantu abangu-200 abasebhodini (POB)
Izindawo zokugcina izinto	
Udaka olusebenzayo	2,000 bbl
Udaka olubuyayo	10,000 bbl
Amanzi anosawoti	3,000 bbl
Uwoyela oyisisekelo	3,000 bbl
Udaka oluningi/usimende	34,500 bbl
Amanzi okumba	18,000 bbl
Amafutha	50 000 bbl
Imishini / Insizakusebenza / Ukufakwa	
Amasethi ayinhloko e-generator	Ama-generator angu-6 x kadizili, 9, 900 HP ngayinye

Umthombo: UEni, 2015 noSaipem, 2017¹

3.5.2

Indawo Yokukhipha

Ngesikhathi sokumba, kuyoba nendawo yokuphepha yesikhashana engu-500 m ezungeze umkhumbi wokwemba, oyobe unamathelwe isikebhe sokulinda. Indawo yokuphepha izochazwa kwiSaziso kuMatilosi njengesixwayiso sokuhamba.

Injongo yendawo yokuphepha iwukuvikela ukushayisana kwezikebhe nomkhumbi wokumba ngesikhathi sokumba. Ngaphansi Komthetho Wokuhamba Olwandle, 1981 (Unomb. 2 ka 1981), “indawo yokuhlola” noma “isikebhe sokuhlola” esetshenziselwa ukufuna noma ukumbiwa kwanoma iyiphi into ewela ngaphansi kwencazelo “yokufakwa kwezilwandle” futhi kanjalo kuvikelwe ngendawo yokuphepha engu-500 m.

Ngaphansi Komhlangano Emithethweni Yomhlaba Wonke Yokuvimbela Ukushayisana Olwandle (COLREGS, 1972, Ingxenye B, Isigaba II, Umthetho 18), umkhumbi ohlanganyele emsebenzini wokumba uchazwa ngokuthi “umkhumbi ovinjelwe ekusebenzeni kwawo”, okudinga ukuba imikhumbi eqhutshwa ngamandla nemikhumbi yokuhamba (isib. Imikhumbi yokudoba) idedela imikhumbi evinjelwe ekhonweni layo lokuzikhandla. Imikhumbi edobayo kudingeka ukuba, ngangokunokwenzeka, igweme indawo yokumba imithombo.

3.5.3

Isisekelo sogu

Isisekelo sohlelo logu sizotholakala eRichards Bay noma eDurban, endaweni eke yasetshenziswa (indawo ethuthukile kakade) phakathi Nochwebe noma Indawo Yokuthuthukiswa Izimboni (IDZ). Isinqumo sokugcina sizokwenziwa ngemuva kokuhlola okusebenzayo ezindaweni ezichaziwe.

Lesi sisekelo sizohlanganisa izikhungo ezilandelayo:

- Indawo yokugcina izinto evulekile efakwe indawo yokubeka amapayipi okumba nendawo yokugcina izinto esashubhu;
- Indawo yokugcina impahla esitshekelwe yezinto zokwemba naminye imishini emincane;
- Indawo yokubeka izinto ezisetshenziswayo (usimende, i-barite, i-bentonite); futhi
- Namahhovisi esikhashana abasebenzi bokwenza lomsebenzi (abantu abangu 5 ukuya ku 8).

Indawo yokugcinwa (izinsuku ezingaphansi kwezingu 90) kwemfucuza ejwayelekile engaphansi kuka-100m³ nenkunkuma eyingozi engu-80m³ nganoma yisiphi isikhathi esisodwa.

Lezi zimfucuza zizothunyelwa endaweni yokulahlwa kwemfucuza esemthethweni abakhiqizi bezinkunkuma abafanelekile, futhi ngeke igcinwe ngaphakathi kwesisekelo ngaphandle kokuba uma kuyisikhathi esidingekile sokuyehlisa emkhunjini nokuyilayisha emalorini ukuze ithuthelwe endaweni yokulahla.

Izidingo ezilandelayo eziphezulu¹ zesikhala esiphezulu sezidingo zitholiwe:

- Indawo evulekile /ipayipi legceke ukufika ku 6,000 m²;
- Igumbi: ukufika ku-500 m²; ne
- Ndawo yokuhlala: ukufika ku-100 m².

UEni uhlela ukusebenzisa ingqalasizinda ese-Richards Bay noma ochwebeni lwaseThekwini, ukuze ahlinzeke ngezikhungo zokuthutha, ezokugcina nezokugcina indawo. Bazophinde basebenzise uhlelo olukhona ochwebeni ukuze imikhumbi ifake izinto zokuhlinzeka nezokusekela.

Kulindelekile ukuba izitshalo zodaka zesikhashana zidingeke ukuze kuhlenganiswe isisekelo samanzi, izinsalela nokuqina ukuze uthole ubuningi obufunayo kanye nesakhiwo sokugeleza kwamanzi, kanye nokugcinwa kwamanzi okugaya kanye nokuqedwa kwezinsalela. Isitshalo sesikhashana sodaka sitholakala ngaphakathi kolwandle futhi sizofaka amathangi amabili angu-80 m³ okugcina izinsalela nodaka.

Imikhumbi ehlinzeka ngowoyela, ukudla, amanzi njll. emkhunjini wokumba izokuma Esikhumulweni esikhethiwe, esizoba nendawo yokubopha enezinhla ezingamamitha angu-6.5 ubuncane nobude obungaba ngamamitha angu-100.

Uchwebe lwendiza enophephela emhlane lokuguqula abasebenzi kanye nezinhlelo zeMEDEVAC zizonqunywa uma isisekelo sokuhlela indawo siqinisekisiwe.

3.5.4 Imikhumbi yokuhlinzeka neyokulinda

Ngenxa yesikhathi sokwemba, umkhumbi wokwemba uzosekelwa yizikebhe zokuhlinzeka ngamapulatifomu (amaPSV), okuyizinhloso ezijwayelekile ezenzelwe ukuthwala imishini ehluahlukene kanye nempahla. Lezi zikebhe zizohlinzeka umkhumbi wokumba ngodaka lokumba, usimende nemishini enjenge-casing, ipayipi lokumba netubing kathathu noma kane ngeviki. Bayosusa nemfucuza okumelwe ilahlwe ngendlela efanele emhlabeni. Inani lama-PSV aqinile alikachazwa (kulindeleke ukuba kuzoba khona ababili noma abathathu).

Isikebhe sokulinda (noma iPSV kwimodi ekabili – iyohlinzeka futhi ilinde) iyobuye itholakale ukuze isekele imisebenzi yokumba ngesikhathi esiphuthumayo, kuhlenganise nokugcinwa kukawoyela/ukutakula nokusindisa nokuhlinzeka noma yimiphi imishini ekhethekile edingekayo uma kuvela isimo esiphuthumayo.

Isikebhe sokulinda naso sizosetshenziselwa ukugada indawo ukuze kuqinisekise ukuthi ezinye izikebhe zivumelana nomthetho wokuba zingasondeli isikebhe sokumba ngamamitha angu-500 ukusizungeza.

3.5.5

Izisebenzi

Isisekelo sogu sizobe siseRichards Bay noma eThekwini futhi bonke abasebenza ogwini bazohlala eduze. Iningi labasebenzi abahlala ngasogwini abaqashiwe bayoba nendawo uma inkampani ekhona yendawo yokuhlala ekhona izohlolwa njengendlela efanele yokusekela ukuphathwa kwezinto zokusebenza nokulandela. Uma kungafanele, ochwepheshe basezifundeni ezizosebenza ezindaweni zokumba bazozibandakanya kanye nokuqeqesha abasebenzi basekhaya abangenalwazi. Abameli bakaEni nabo bazobe betholaka eHhovisi Cape Town.

Isikebhe siyoba nabasebenzi abanga ngu-150 kuya ku-200. Iningi labasebenzi abaqashiwe bayoba ngabathuthukisi ngenxa yemvelo yesikhathi somsebenzi kanye nobuchwepheshe obudingekayo kanye namakhono adingekayo ezobuchwepheshe. Ngokuhambisana nemikhomandlela yakaEni, umkhumbi uzothathwa njengento encane ngokuhambisana nezidingo Zezwe Lefulegi ne IMO Reg A 890 (21) – Isimiso Sokuphepha, ngomhla ka-25 Nov. 1999. Ngaphezu kwalokho, abasebenzi kumele bakwazi ngokwanele ngokwezibalo kanye neziqu zokusebenzisa umkhumbi ngokuphepha futhi benze yonke imisebenzi.

Inani labasebenzi emikhumbi yokunikezela lizohluka ngokusekelwe usayizi womkhumbi, kanye nezihlobo zemisebenzi abayisekelayo. Okukhethwa kukho kuqala ukusebenzisa umkhumbi wendawo kanye nabasebenzi, uma kufanelekile, ukuhlinzeka ngemisebenzi yokumba. Bonke abasebenzi bazohlinzekwa ngokuqeqeshwa kwezempilo nokuphepha kanye nokunikezwa iPersonal Protective Equipment (PPE) efanelekayo ngezinhlobo zemisebenzi.

3.5.6 *Ukudluliselwa Kwabasebenzi*

Ukuthuthwa kwabasebenzi ukuya nokubuya emkhunjini wokumba kungenzeka kusetshenziswa indiza enophephela emhlane ukusuka eRichards Bay noma eThekwini. Umkhumbi uzothwala abasebenzi abangaba ngu-200. Izisebenzi ngokujwayelekile ziyosebenza amahora angu-12 emjikelezweni wamaviki angu-2 ukuya kwangu-4. Ukuguqulwa kwabasebenzi kuzokwenyuka, futhi kuhlenganiswe nezidingo zabasebenzi ezikhethekile.

3.5.7 *Ukwesekwa Kwengqalasizinda Nezinsiza*

Amanzi ahlanzekile

Iprojekthi izodinga amanzi olwandle kanye namanzi amancane asezimbonini ekwenzeni amanzi asekelwe ekumbeni ingxenye engajulile yomthombo nokuhlanza imishini yokumba. Lamanzi emboni azohanjiswa ukusuka ogwini.

Amanzi okuphuza (aphathwayo) we-POB yomkhumbi wokumba ayofakwa noma ahlinzekwe ngohlelo ngohlelo lokususa i-osmosis. Inani lamanzi asetshenziswa yiporoyekthi azolawulwa ngokusebenzisa isiqondiso sikaEni sokuphathwa kwamanzi.

Amafutha

Ukulinganisa kwamafutha (uwoyela kagesi wezinto zokuhamba emanzini) asetshenziswa umkhumbi wokumba ngosuku nemikhumbi yokuhlinzeka ngesikhathi sokuhamba, ukulinda nomsebenzi wokumba sinikezwe *Kuthebula 3.5* ngezansi. Ukulinganiswa kwawo wonke amafutha asetshenziswayo ngesikhathi sokuhamba nokumba (cishe izinsuku ezingu-5 zokuhamba nezingu-71 zokumba) okwenziwa yiyo yonke imikhumbi yeproyekthi kuvezwe *Kuthebula 3.6*.

Ithebula 3.5 Ukulinganiswa Kwamafutha Asetshenziswa Umkhumbi Wokumba Nemikhumbi Yokuhlinzeka Kosuku Nosuku

Imikhumbi	Ukugqugquzela	Isigaba sokumba
Umkhumbi wokumba (amathani/usuku)	90	30
Imikhumbi Yokuhlinzeka ukuze Kuhlinzekwe Izinsizakalo (amathani/usuku/umkhumbi)	10	10
Supply Vessel yeznsizakalo zokulinda	4	4

Ithebula 3.6 Inani Elilinganiselwe Lokusetshenziswa kukawoyela Yimikhumbi Yokumba nezikebhe Zokuhlinzeka

Ukulinganiswa kwesidingo sikawoyela	Inani lokusetshenziswa kukawoyela (amathani)
Umkhumbi wokwemba	2,580
Isikebhe sokuhlinzeka nohlelo lokuhlinzeka	710
Isikebhe sokuhlinzeka nohlelo lokulinda	284
Inani	3,574

Ukudla Nezinhlelo Zokuhlinzeka Zendawo

Inkampani yokulungiselela ukudla izohlinzeka ngokudla nokokuphuza ezikebheni ezisogwini. Ukukhethwa kokudla, ubungako, nokucutshungulwa kuzokwenziwa ngokusekelwa ukusuka esisekelweni sogu (xhumanisa izindawo zokuthenga eziseduze, njll.), akukaqinisekiswa; kodwa kungenzeka ukuthi iningi lokudla lizothengwa eRichards Bay noma eThekwini.

3.6 IMISEBENZI YEPROJEKTHI

Imisebenzi yeprosjekthi ehambisana nokumba ihlanganisa izigaba ezilandelayo:

1. Ukusetshenziswa kemikhumbi yokuhlinzeka eRichards Bay noma eThekwini, ukusebenza kwezikhungo ezisogwini zokusekela izinsizakalo ezidingwa umkhumbi wokumba;
2. Ukumba umthombo;
3. Ukukhishwa komthombo (ukuchezukisa, ukubhala izilinganiso, ukuqedwa) ongakhetha kukho;
4. Ukuhlolwa komthombo ongazikhethela ukukwenza noma cha;
5. Ukushiya umthombo; futhi
6. Ukukhishwa komkhumbi wokumba kwiprosjekthi, umkhumbi nesisekelo sohlelo lwendawo.

Yonke imisebenzi izokwenziwe ngokuhambisana nomkhuba omuhle wamazwe omhlaba wonke.

3.6.1 Isigaba Sokuhambisa

Ukuhambisa Imikhumbi Nokulungiselela indawo

Izindawo zokumbiwa zizoqashelwa ngaphambi kokuhanjiswa komkhumbi wokumba ngokwemiphumela yokuhlolwa kwemininingwane

yokuzamazama. Izindawo zokumba zizoba phakathi kwezindawo ezichaziwe ezithakazelelwayo.

Ngesikhathi sokusetshenziswa, umkhumbi wokumba uyofika ngokuqondile endaweni evela ezweni langaphambili lokungenelela (mhlawumbe eNtshonalanga Afrika noma eMpumalanga Afrika). Imikhumbi yokusekela ingahamba ilandelana nomkhumbi wokumba ukuya endaweni yokusebenza noma ukusuka endaweni yokusebenza eRichards Bay noma eThekwini

Umkhumbi wokumba uzobe ufakwe imishini yokuhamba yokugcina iziteshi eziqondile kunendawo efanelekile (ukuma okunamandla – usebenzisa izinto ezisunduzayo). Lapho usume endaweni yawo, umkhumbi wokumba uzoqhuba umsebenzi wangaphambi kokumba okuqukethwe ukuhlola okungaphansi kolwandle; imoto elawulwa ikude (ROV) iyacwila; ibekwa endaweni; ukubekwa kwesikhuthazo nokuvivinya okunamandla kokuma (DP).

Uma kungenzeka kutholakala izithiyo/ ukuzwela endaweni yokumba, umthombo uyokuswa ubekwe endaweni eseduze lapho kungekho izithiyo/ ukuzwela.

Lemisebenzi izolandelwa ukuhlola ukuthi iphephile yini, imigodi, ukuhlolwa kokukhulumisana nokwembiwa kwezimbobo ezincane. Lokhu kungathatha cishe izinsuku eziyisishiyagalolunye ukuba kuqedwe.

3.6.2 Isigaba Sokumba

Ukumba Umthombo

Ngemva kokuhanjiswa, isigaba sokuqala yisigaba sokumba. Ukulandelana kokumba ukuze kuhlolwe ukumba akukachazwa njengoba kuzoncika emphumelweni wokuhlola kokuqala. Noma kunjalo, kuhleliwe ukuthi ukumbiwa kwindawo ethakazelelwayo esenyakatho neseningizimu kuzokwenziwa ngemikhankaso ehlukeneyo.

Ukuze kuhlolwe futhi kuqinisekise ukuthi ukusebenza kwamanzi, umthombo oqondile uzokwembiwa ukufika ekujuleni okucishe kube ngu-3,800 m no 4,100 m ngaphansi lapho umthombo ukhona endaweni ethakazelelwayo enyakatho, no-5,100 m yomthombo ongasendaweni ethakazelelwayo eseningizimu. I-hydrocarbon yalemithombo uwoyela (*Umfanekiso 3.3*).

Umklamo ojwayelekile womthombo nesimiso somthombo ojulile uchazwe ngezansi, kodwa lokhu kuzolungiswa ngemuva kokuqedwa kwencazelo yokuzamazama nokuhlolwa kwezingxenye ezingaphansi yisazi sokuma kwezwe nonjiniyela bowoyela. Indlela yomthombo izochazwa ngokufanele.

Ngesikhathi sokumba, izinsimbi ezahlukeni zokumba zisetshenziselwa ukubhoboza uchungechunge lwezimbobo ezibonwa ngesibonakude, ukusukela olwandle ukuya ekujuleni okuphelele komthombo. Imbobo yokuqala, engaphandle, yiyo enkulu futhi ibizwa imbobo yokuqala engajulile, kanti izimbobo ezilandelayo ezingaphakathi futhi ziqhubeka ziba zincane njengoba ukujula komthombo kukhula. Lokhu kuqhubeka kuze kube yimbobo yokugcina, okuyimbobo encane kakhulu, efinyelela ezingeni lamanzi. Imininingwane eyengeziwe ngokuqondene nobubanzi, ukujula, nomlando omfushane ohleliwe wengxenye yomthombo unikeziwe *esithombeni 3.4 nasesithombeni 3.5*.

Ngesikhathi sesigaba sokuqala somthombo (umgodi ongajulile), ukumba okungena mkhawulo (isb. ngaphandle kokufaka insizakuphakama) udaka kuyampontshwa ngaphakathi kwepayipi lokumba futhi kuphume embotsheni encane ukuze kwandise umsebenzi wokumba. Engxenyeni yokuqala (umgodi onjalule) womthombo, ukumba ngaphandle kwensiza kuphakama (isb. ngaphandle kokufaka izinto zokuphakamisa) uzokwenziwa ngamanzi olwandle ngokuhambisana namaphilisi ayingozi nokushanela. Ezingxenyeni ezingaphansi zomnotho, ukukhishwa kwezinsiza kuphakamisa zokumba (isb. kufakwe into yokuphakamisa Nevimbela Ukuqhuma ekhanda lomthombo), Ezingxenyeni ezingaphansi zomthombo, insiza kuphakama yokwemba (isb. ezininto ephakamisayo exhunywe into Evimbela Ukuqhuma phezu kwekhanda lomthombo), ebuye ibizwe isisekelo soketshezi lwamanzi (WBF), noma uketshezi olungekho manzi (NADF). Uhlolo lodaka luzochazwa ngokuqondene nomklamo wokugcina ne-rheology elindelwe.

Imisebenzi eyinhloko yamanzi okumba (ebizwa nangokuthi udala lokumba):

- Ukususwa kwamadwala embiwe ngaphansi komthombo nasekumbeni umthombo nokuhanjiswa kwawo;
- Ukulawula ukwakheka kokucindezeleka nokuvimbela kokwakheka kwamanzi angena emthonjeni owembiwayo (isib. 'ukulawula kahe okuyinhloko');
- Ukudluliselwa kwamandla ashehayo emshinini wokumba;
- Ukuhlinzeka ngokucindezela kwe-hydraustatic kanye nokuzinza kwamakhemikhali edwaleni ukugcina ubuqotho bomgodi nokuvimela ukuwa komgodi;
- Ukulawulwa kokungcoliswa kwezingxenye zensimbi zamathuluzi okumba; futhi

- Ukubambisana nokupholisa umshini wokumba.

Umshini wokumba uxhunywe phezulu ngochungechunge lwezintambo zeshubhu ebizwa uchunge lokumba. Phansi emshinini, amapayipi axhunyiwe, ngakunye ngakunye, phezu kwentambo njengoba umshini wokumba uqhubeka ungena emgodini wamanzi. Isenzo sokumba (ukudala umgodi ongqimbeni ledwala) itholakala ngokufaka isisindo nokuzungeza emshinini.

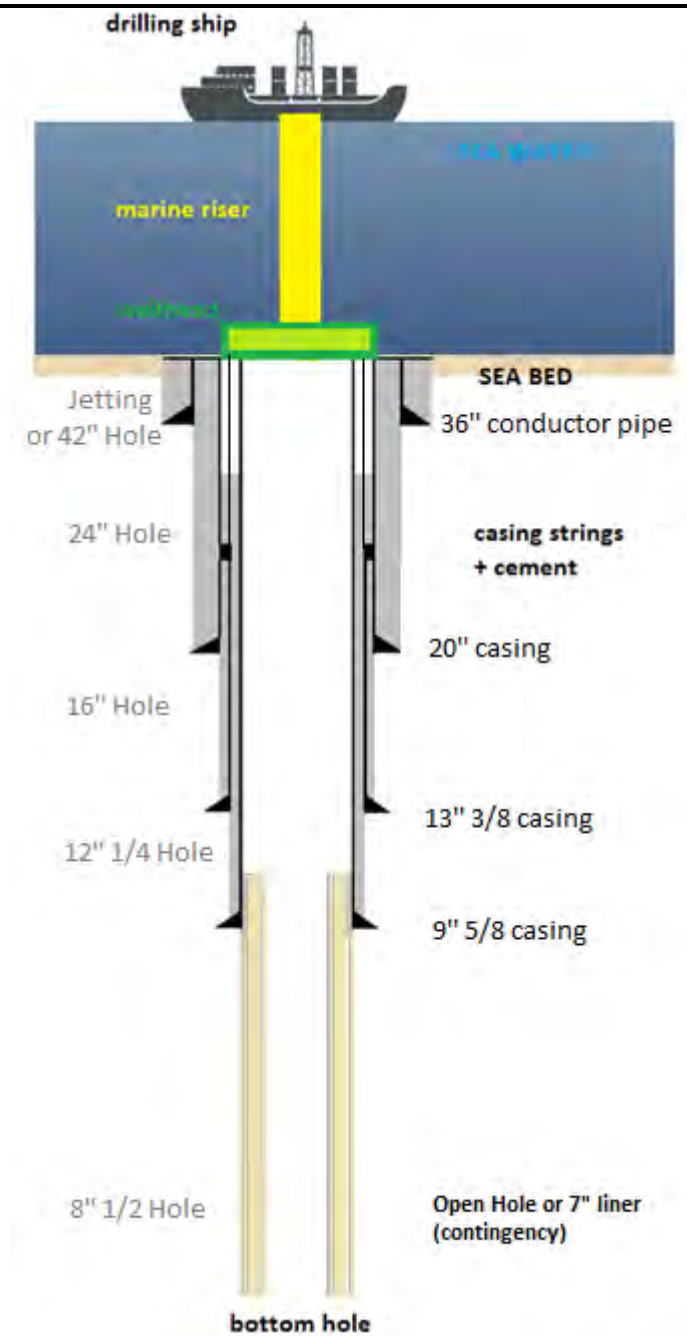
I-topdrive, efakwe endaweni yokumba, iqhubekela phambili imicibisholo yokumba emthonjeni, futhi inikeza ukujikeleza nesisindo ngesibalo sokumba. Ukunikeza izinga elengeziwe, ngezinyeizikhathi umshini womgodi ufakwe phansi kochungechunge, umshini wayo ojikelezayo uxhunyiwe kancane. Uhlelo oluyinkimbinkimbi lwesayensi luxhunywe kwizintambo futhi ludlulisela ukuphakamisa imingcele yokumba (ukuqondisa, ukucindezela, ukujikeleza, isisindo,njll) ukuqinisekisa ukulawula nokuphepha okugcwele ngesikhathi sokumba.

Uma umgodi ngamunye usumbiwe, ama-casing (amashumbu ensimbi) azofakwa emthonjeni bese ewasimendela endaweni ezowenza iphephe/ kuvalwe isikhawu esisanda kumbiwa nokuvumela ukumbiwa kwesigaba esilandelayo somgodi (omncane). Umsebenzi wosimende ukusiza ekumpontshweni uketshezi entanjeni yokumba kuze kufikele ngaphansi. Usimende uyagijima, ungene ngaphansi kwensiza kusebenza iphinde ibuyele emuva esikhaleni sonyaka esizunge isikhunta, isikhala phakathi kwegodi elifa isikhunta, isikhala phakathi kwegodi elifakiwe kanye nomgodi ovulekile. Ukubopha kanye nosimende yisithiyo esivivinyiwe esenza ukuba ukubiwa kwesigaba esilandelayo, okuvumela ukuba ufinyelele ekujuleni kokugcina endleleni ephephile.

Ikhandla lomthombo lixhunywe ebhokisini elingaphezulu, ukuze uxhumane futhi ibe nendawo yokuma yalezizingxenywe nensiza yokuphakamisa amanzi. Ngemuva kokwemba isikhala sokuqala sokukhishwa, ukuphakama kokumba isikhala sokuqala sokukhishwa, ukuphakama komshini wokumba okusho ukuthi ithubhu elingenalutho eyaziwa ngokuthi yinsizakuphakamisa iqhutshwa phakathi kokumba kanye nomthombo ophansi olwandle, ukuze umshini wokushisa ungagcwaliswa ngepayipi lokudonsa, ngaphandle kwenkomba futhi yasakazwa emuva kuze kufike ngaphesheya kwensiza kuphakamisa.

Ngesikhathi sokumba ngaphandle kwezinto zokuphakamisa (isigaba sokumba umgodi ungajulanga), uketshezi kanye nokusika kuncike olwandle lapho sisondele eduze komthombo. Ukulandela ukufakwa kwensiza kuphakama (ekupheleni kwesigaba somgodi ongajulile) amanzi amaningi asolwandle agcinwe ngamathangi kanye nokushisa okwedlulele kuzokhishwa ngaphandle. Inani lemishini yokumba ezokhishwa ngesikhathi sokumba okuhleliwe komthombo njengoba kuchaziwe *Emfanekisweni 3.7.2*.

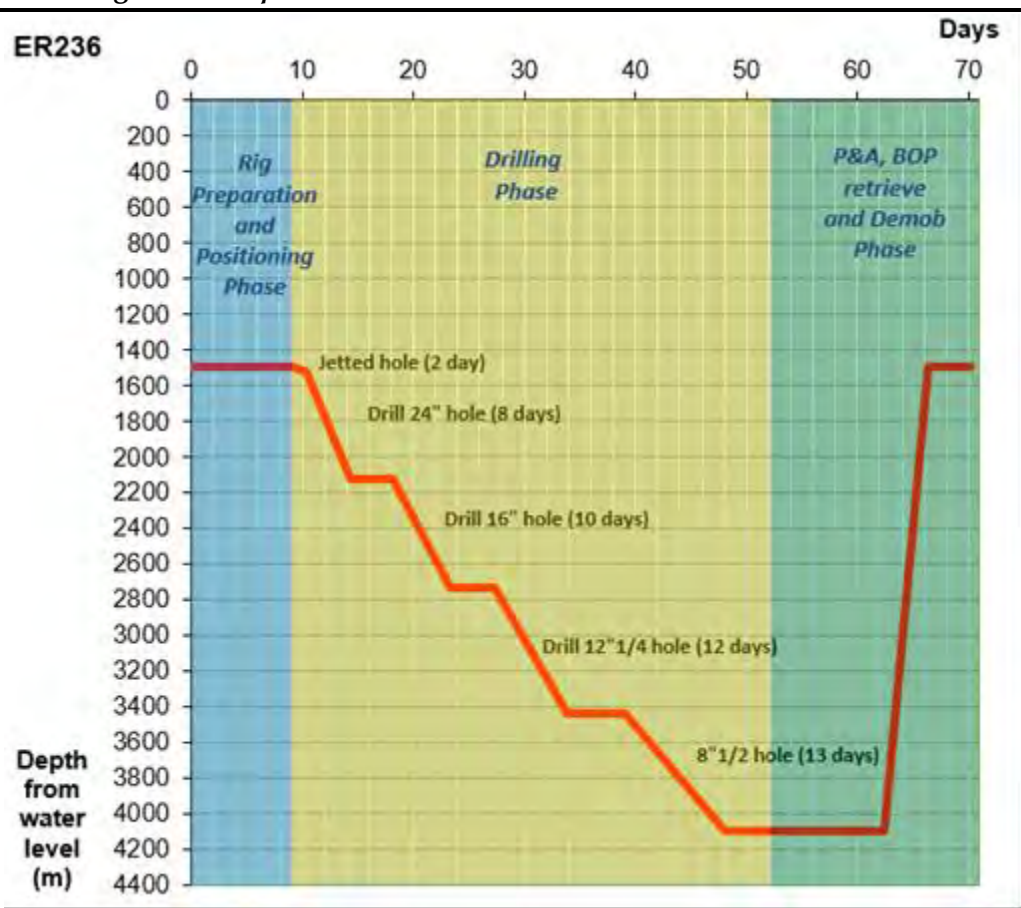
Umfanekiso 3.3 Umfanekiso Womthombo Ongaphansi Kolwandle Ekupheleni Kokwemba



Umthombo: ENI, 2018

Phawula: Lomfanekiso akuwona owokulinganisa, ikakhululukazi ubukhulu besikhungo vs izinsiza kusebenza

Umfanekiso 3.4 Izigaba Zokuqala Zokwakha Umthombo



Umthombo: Eni; 2018

Indlela yaseceleni

Uma kunenkinga ehlobene nokucwaninga (isib. izindawo ezinobungozi ezinezinkinga ezihlukahlukene ezicindezelayo, ukungabi khona kwemingcele yezinhlawulo ezikhona, isidingo sokwandisa ukuthambekela komthombo ukufezekisa umgomo wamanzi) noma inkinga ngesikhathi sokubhoboza ngokwayo (isib. i-BHA inamathela) ukusebenza okuvamile ukwenza eceleni. Indlela ivame ukuhlanganiswa ipulaki yosimende, ukushiya umgodini ovulekile wamanje, nokubekwa kwe-whipstock emgodini ovulekilenoma ngaphezu kwesicathula somthombo kubekwe i-casting/umngcele.

I-Whipstock yithuluzi lensimbi elenzwa ukufakwa kabusha ngocingo lokumba, ukumba uma kwenzeka umgodini oqediwe uphinde uqhube ukubunjwa ekwakhekeni nokuma okuhlukene nokuthambekela.

Ukugawulwa Kwemithombo

I-sensor ehlukeni isetshenziselwa yonke imisebenzi yokumba ukukala imingcele eminingana ngesikhathi sangempela: isidingo sodaka, ukucindezela, ukwakheka, ukushisa, isisindo, kancane ukujikeleza, i-tourqe, ijubane, ukutholakala, isipopolo segamma ray, ukumelana, okuqukethwe kwegesi odakeni, ukugoqka, njll.

Yonke leyo mingcele isetshenziselwa ukwandisa imisebenzi yokumba, ukuthuthukisa ukuzinza kwezimoto, nokukhomba i-lithology ehlukeni ukuze kuvuselelwe uhlelo lodaka futhi kuqinisekise ukuthi imfundo yokuma komhlaba isilinganiso esifanayo ukusukela ekuqondweni kwemininingwane yemvelo.

Izikhathi zangempela zibalulekile kakhulu ukubona ukuthi i-hydrocarbon ikhona yini kanye ne-typology (uwoyela, ukuphenduka kwamafu, igesi). Lolu lwazi luhlinzekwa ngezikhathi zangempela kokubili ukusuka emgodini ongaphansi (inzwa efakwe emhlanganweni ophansi) futhi phezulu, lapho kuhlolwa khona udaka nezicutha ukuze kuqinisekise imininingwane yezinzwa.

Ngaleyondlela kungenzeka ukuthi ngokushesha uthola ukuthi ulahlekelwa udaka, ukuqhuma ukumba noma ukudonsa (ukukhahlela) kwe-hydrocarbon, ikakhulukazi emgodini wokumba ovulekile, ukuze kutholakale ngokushesha isilinganiso sokulawula (isb. ukwanda kwesisindo sodakanoma ukwehla noma isilinganiso sokungenelela) futhi uphinde uqhubeke / uqhubeke nokuphepha.

Umshini ozinikezele ukulinganisa/ ukungena isibopho sikasimende nokuvumelana ngonyaka we-annuli kwenziwa ekupheleni komsebenzi ngamunye wesimende, ngaphambi kokuqala komsebenzi wokumba esigabeni esilandelayo.

Ukwaziswa okuningiliziwe okutholakele kutholakala ezindaweni ezibonakalayo zokwakhiwa kwamadwala kanye namanzi (amanzi, uwoyela, igesi) ngokusebenzisa imbobo evulekile.

Isigaba sokuqeda, uma kuqinisekisiwe ngokuqondene nokutholwa, izosebenza ukucubungula imithombo kuphela. Lomsebenzi uvamise ukwenziwa ekupheleni kwesigaba sokumba, ngemva kokucoca umgodi ongaphansi okokugcina.

Uhlelo lokugawula imithi lithuthukiswa ngokuhambelanda nezindinganiso zomsebenzi wemboni. Ngokuqondene nemithombo eyomile noma imithombo yokuhlola, uma uhambo oluphele lwesigaba samanzi selwenziwe, umthombo uzoxhunywa bese uyashiywa. Isigaba sokuqeda, uma kuqinisekisiwe ngokuqondene nokutholwa, izosebenza ukucubungula imithombo kuphela. Lomsebenzi uvamise ukwenziwa ekupheleni kwesigaba sokumba, ngemva kokucoca umgodi ongaphansi okokugcina.

Ukuqedwa Komthombo

Ukuqedwa komthombo nokuhloliswa kwawo kuzokwenziwa ngesikhathi sokumba umthombo wokuhlolisisa (imithombo yokuqala), noma kunjalo uma ama-hydrocarbon etholwa, kungase kwenziwe ngemuva kokumba noma yimuphi wemithombo yokucubungula.

Isigaba sokuqeda amafutha noma igesi uzokwenzeka ngemva koklanywe kwemithombo yamakanye nomsebenzi wokusimenda. Ukuqedwa kokuqala kudingeka ukuba kuhlangezwe futhi kube nesimo somthombo ovela odakeni, ukuze ulungiselele kahle imisebenzi elandelayo.

Ekuqaleni kokuqedwa komsebenzi, lomthombo uhlala endaweni yokuqeda, okudingekayo ukulinganisela ukucindezela komgodi oya phansi futhi, ngesikhathi esifanayo ukuqedela ukususwa kodaka nokuqina kwamanzi emthonjeni ukuze kuncishiswe noma yimuphu umonakalo ongase ukwazi ukuwasebenzisa.

I-Brine uhlobo oluthile lwe-WBM: ngokuyisisekelo amanzi asemanzini, ngokuvamile ayingxube yamanzi ezimboni, i-NaCl noma i-KCl usawoti kanye namakhemikhali amancane engeziwe (isb. inhibitor ezinto eziyingozi, into ekhipha igwebu). Ukukhethwa kosawoti kanye ne-brine yokwakhiwa kuzokuchazwa ama-hydrocarbon afunyenwe ekuhloleni kahle kanye lithology yamanzi.

uchungechunge lungabizwa ngokuthi yizicathula eziqanjwe kahle noma eziqediwe, uma zisetshenziswe ngesikhathi sokuhlolwa kahle noma uma kulungiswa ukukhiqizwa okulandelayo.

Lolu chungechunge luvumela ukuphepha kwezindawo ezingaphansi kolwandle, kuqinisekise ukulawula okugcwele kwe-hydrocarbon ngesikhathi sokuhlolwa noma isigaba sokukhiqiza.

Ngemuva kwalokho isisindo esiqedilwe esiphezulu esinezimpande ezanele futhi evimbela ukwakhiwa kwamanzi okungena emgodini, sishiywa ngaphandle kumthombo obhoriwe ukuze uqale isigaba esilandelayo, uma kudingeka, isigaba sokuhlola umthombo.

Ukuhlolwa Kwemthombo

Njengoba kushiwo ngaphambilini, ukuhlolwa kwemthombo kungenziwa emithonjeni yokuhlola uma beveza ukuthi kungenzeka yini ukuthi i-hydrocarbon ikwazi ukuhweba.

Ukuhlolwa kwemthombo ukugcwaliswa kwesikhashana komthombo ukuze uthole isilinganiso esinamandla ngesikhathi, ukucindezela, kanye neminingwane yendawo yamafutha. Uza ngayo kahle uma kuhambisana nezimo ezihlukahlukene zokugeleza.

Ukuhlaziya ngokuvamile kuvunyelwe eminingwaneni ukucacisa imingcele yemigomo kanye nezici ezibandakanye ukucindezela, ivolumu, kanye nezinga lomshiso.

Ukuhlolwa kwamanje kwenziwa ngokusebenzisa imishini yokuhlola yesimanje kanye nohlelo lokunciphisa iminingwane ukuthola izinhloso zokuhlola amanzi kuxhomeke ekuziphatheni kwezakhiwo zokwakheka kwamanzi ahlanzekile, ukugcwaliswa kahle, nokuqinisekiswa kwezimo ziyaziwa uma kwenziwa ukuhlola.

Izinhloso zokuhlolwa kwemthombo uku:

1. Thola izici ezisemqoka zobuchwepheshe emgodini (isb. ubukhulu, ukubonakala kanye nezici zamafutha) kanye namanani okusetshenziswa esikhathini esizayo.
2. Thola iminingwane emele ebandakanya ukucindezelwa kwamanzi, amazinga okukhiqiza kanye nesampula.

Ngenkathi kuhlolwa, ama-hydrocarbon athunyelwa ku-flame boom nge-burner ukuqinisekisa ukuthi ukubhujiswa okuphelele kwamanzi (okufaka ama-hydrocarbon) ngangokunokwenzeka. Ukufiphaza kungase kuqalwe ngokusebenzisa i-LNG noma uphethiloli ofanayo ukuze ubambe ingxube. Ukuqinisekisa ukuthi ukushisa kungenziwa phansi kweskebhe sokumba, kungasetshenziswa okungaphezu kokukodwa kokufiphaza, noma imikhumbi yokubeka indawo ingashintshwa. Amagoli amanzi angasetshenziselwa ukunciphisa ukushisa emgqeni.

Izinkathi zokugeleza nezilinganiso zizobekwe eceleni okungenani okudingekile ukuthola ulwazi oludingekayo lwamanzi ngesikhathi sokuhlolwa kwemthombo. Kulindeleke ukuthi isikhathi esiphezulu sokuhlolwa sephrojekthi sizoba izinsuku ezingaba ngu-20.

Isampula esezansi, uma kudingeka, ngokuvamile iqukethe ukubuyiswa kwamanzi kagesi ngamanethi noma ngamathuluzi athile afakwe ngokuqondile emgqeni wokuhlola wesikhashana. Ukuhlolwa kwe-wireline kuhilela ukusebenzisa izinto ngaphakathi kwemfula kukhebula ukuze ulinganise ukucindezelwa kwesakhiwo futhi uthole amasampula amafutha. Ukwakheka kwamafutha kulethwa phezulu lapho ukubunjwa kungabuye kuhlanziwe khona.

Lezi zindlela ezilandelayo zokuhlola ukuvimbela umthombo zizosetshenziswa ngesikhathi sekuhlola umthombo:

- Ukuqapha ukusebenza kwe-flare ukukhulisa ukusebenza kahle kwemsebenzi we-flare;
- Qinisekisa umoya owanele ophethwe umoya oshiswa ngamafutha ukuze usebenze kahle;
- Imishini evulekile ihlolwe kahle, iqinisekise futhi ihlolwe umsebenzi ngaphambi kokusebenza;
- Imishini yokuvuleka igcinwe kahle futhi ihlolwe yonke imisebenzi yokuhlolwa komthombo;
- Imishini yenzelwe futhi yakhiwe kumakhodi afanelekayo namazinga futhi aqinisekisiwe; futhi
- Izindlela ezifanele zokumisa eziphuthumayo zisendaweni zokumisa ukuhlolwa uma kwenzeka eziphuthumayo.

Ukulawulwa komthombo Nokuvimbela Ukuqhuma

Impilo, ukuphepha nokuvikeleka kwendawo kubaluleke kakhulu phakathi nohlelo lokumba. Empeleni, kukhona ukugxila okuqondile nokuqaphela phakathi nokulungiselela nokusebenza ukuze kuvinjelwe izimo zengozi ezingase zivele, ezihlobene nokukhululwa kwama-hydrocarbon noma ukugeleza okungalawuleki okuphuma emgodini ophansi ukuya olwandle noma ngaphezulu (emgogodla womshini).

Ukulawulwa kahle ngesikhathi sokusebenza emthonjini kuwuhlelo lomsebenzi, ngalunye oluhlelwe kahle futhi lusekhenzisela ukunciphisa ingozi yokuthuthukisa isigameko sokulawula kahle. Izimo zomgodi ongezansi, njengokungathi igesi ilingajulile kanye nezindawo eziphezulu zokucindezela kungabangela izinkinga zokulawula njengokushintha ngokungazelelwe kokucindezelwa komthombo.

Ukukhahlela komthombo kungenzeka uma kunomthelela wezakhi zokwakheka okwanele okucindezelayo ukukhipha imithombo yamanzi. Ukulawula kahle komthombo ngokumeleme mokukhahlela komthombo kunikezwa ukugcinwa kwekhanda elanele le-hydrostatic lokumba udaka / ukuphothulwa kwe-brine emthonjini obhoriwe ukulinganisela izingcindezi ezenziwa uketshezi ekubunjweni okucwebeziwe.

Ukulawulwa kahle kokubili kuhlinzekwa ngokufakwa kwe-divayisi yomshini, njengekhamera ye-float emgqeni wokumba kanye ne-blowout preventer (BOP) elwandle, efakwe phezulu kwekhanda lomuthi ngemuva kokusebenza nokusethwa kwesikhwama semvelo.

I-BOP ivala futhi igcizelele i-annulus uma kunemfucumfucu ngokuzumayo yamanzi okubunjwa emithonjeni ebhorilwe, ngokusetshenziswa kochungechunge lwezinqama eziphathekayo kagesi. Ngaphezu kwalokho, le divayisi ivumela ukuthi amanzi okwakhiwa aphephe noma agonywe emhlabathini ngokuvaliwe komthombo, ngaleyo ndlela enze ezinye izindlela zisetshenziselwe ukubuyisela udaka olusenhloko lwe-hydrostatic emthonjini obhoriwe, ngokwesibonelo, ukudonsa ivolumu ephakeme yedaka, okuthiwa 'udaka olubulalayo'. Amandla kanye nokulinganisa kwemshini, imishini yokuphepha kanye nokulinganisa kwe-BOP kudlulele izingcindezi ezilindeleke zamanzi.

Ifilosofi yokulawula umthombo nenqubo, evuselelwe njalo ngumnyango we-Eni wokumba, kufaka phakathi ukuhlonza nokuhlolwa kwazo zonke izingozi zokuqhuma komthombo.

3.6.4

Ukulahlwa Komthombo (i-Plug Nokulahlwa “ukungasebenzi”)

Uma ukumba sekuphelile, lo mthombo uzoxoshwa futhi ulahlwe (P&A). Umkhawulo wokushiya umthombo ukuvikela imvelo ngokushumeka ngokugcwele kuzo zonke izindawo ezihlukene ezibonakalayo (okungukuthi, izingxenye zamakhemikhali angama-hydrocarbon noma ukuphuma kwamanzi okungena emiphakathini noma emaphandleni), ukuqinisekisa ukuthi ukwakhiwa kwamanzi ahlukaniwe, kokubili ngaphakathi indawo yokuzijabulisa kanye nasezindaweni zangasese, nokuthi ukufuduka kwabo phakathi kwamafomethi ahlukahlukene kanye / noma kuze kufike olwandle kuvinjelwe.

Ekupheleni kokwakhiwa komthombo, umshini wokubeka ipulaga uzokwenziwa kuzo zombili izinhlobo zemithombo (ukuhlola) nokutholakala kwe-hydrocarbon ephumelelayo noma umthombo owomile.

Emithonjeni yokuhlola, usebenzi yokuxuba nokushiya uzoba ngowekucina ngoba akukho ukufakwa kabusha komthombo okuhleliwe. Uma kwenzeka ukutholakala, ukuhlolisisa imithombo ipulaki yesimende kuyoba nokubunjwa okuhlukile nokulinganisa (ubude) ukuvumela amandla okuphinda amise isitimela futhi alulame kahle isigaba sokuthuthukiswa esizayo.

Kukho kokubili ukulungiselela, amapulaki osimende afanelekela ukuqinisekisa ukusebenza nobuqotho besivalo futhi kulungiselelwe ukuba kungaphinde kubuyelwe kukho esikhathini esizayo.

Phambi kwendawo eyodwa ephephile, umthombo uzoba wodwa ngokusebenzisa okungenani umkhawulo owodwa (ipulaki).

Lapho kulindelekile ukuba kwakheke ingcindezi yembotshana endaweni ephephile noma yikuphi embotsheni evulekile, izithiyo ezimbili zomthombo zizoba khona ukuze kuvinjelwe akwakheka kokuphuka noma ukuqhuma kwangaphansi.

Endaweni ngayinye ehlukile ezimele, ebizwa ngokuthi “eyinhloko” futhi “eyesibini”, izobe ikhona ukuze ivimbele futhi ukugeleza kuya phezulu noma ngasolwandle noma ngokuphambene nalokho. Njengomkhakha ngamunye owenza kahle, imvilophu eyimhloko yokuvimbela impela iyoba nesakhi esiyinqaba esimisiwe noma ngaphezulu kwephuzu eliphakeme kakhulu le-influx engaba khona (indawo ephezulu enobungcweti noma ama-perforations angaphezulu) noma esiseduze njengoba kungenzeka khona. Into eza kamuva engavimbela umthombo kumelwe ibe nelungu eliza kamuva eliwumvimbeli elibekwe ngendlela eqinisekisa ukuvalwa kwendawo ephephile ukuze ivikele umthombo uma isivikelo sokuqala singenzi kanjalo.

I-BOP izobe ibuyiselwa ukuze ibonakale futhi inhloko yomthombo izoshiywa endaweni olwandle.

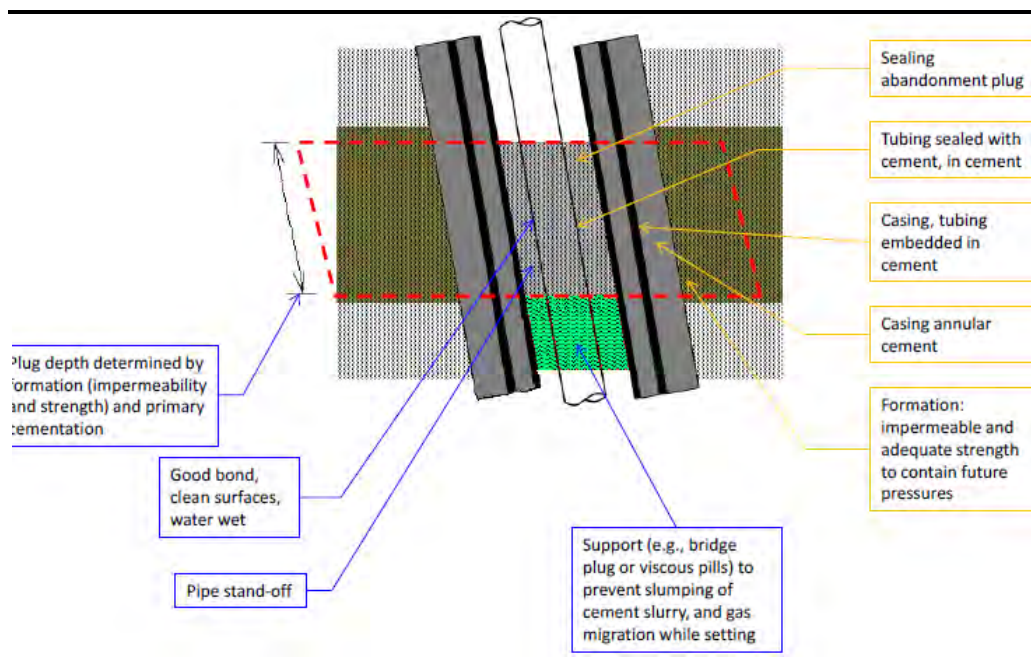
Emanzini angajulile, ukusika nokubuyiswa kwekhanda lomthombo kuyindlela ehlukile yokushiya kahle imithombo yokuhlola, okungekho ukungena kabusha okulindeleke futhi ukusebenzisana kungenzeka futhi kungenakwenzeka, neminye imisebenzi ezindaweni ezithakazelisayo (isb. imisebenzi yokudoba i-dermesal). Ehambisana neBlock nokuthi ukujula kwamanzi kuzo zombili izindawo ezithakazelisayo zijule kunamamitha ayi-1,500, cishe akunakwenzeka ukuthi kube nokuxhumana nemisebenzi yokudoba i-dermesal kanye nenhloko yomthombo iyoshiywa elwandle.

Ukuxhuma nokuyeka ukusebenza (“ukudiliza”) kuzoklanywa futhi kwenziwe ngokuhambisa nemikhiqizo yamafutha imikhuba emihle kanye nezindinganiso zobuchwepheshe ezisebenzayo. Uhlelo lokugcina lokuxoshwa lokupulaka umthombo nokushiya kahle luzoqedwa ngemuva kokuphela kokumba isigaba nokuhlolwa kokungena ngemvume, ukuze ukwandise inombolo nokubunjwa kwamapulaki ukuvalwa uphawu ezindaweni eziningi ezitholakalayo.

Ngenxa yomthombo ojulile ipulaki yokuhlinzeka kanye nenhlelo yokushiya, kuhlanganiswe ohlelweni lokumba, futhi uhlelo lokugcina luvame ukulungiswafuthi lubuyekwezwe ngokuqondene negunya lezochwepheshe Endlunkulu Yenkampani kaEni. Uhlelo lokugcina lwamapulangwe, ukulandelana kwemidwebo kanye nokubunjwa kubuyekwezwa nguMnyango WeNkampani ezokumba, abakhiqizi bezinkontileka kanye nabasonkontileka bamasheya ngaphambi kokuqeda nokufezwa. Uhlelo lwezo lwezobuchwepheshe kanye nezindleko ezihambisanayo zokwenza imisebenzi kufakazelwa yingxenye yesithathu inkontileka ezohlola uhlelo ukusukela ekubonenu kokuphepha kwezobuchwepheshe nezomnotho.

Ekupheleni kwemisebenzi yepulaki kanye nokulahlwa, kulinganiselwa ezinsukwini eziyishiyagalombili ngaphansi kokuvuselelwa, indawo ehlelekile yokuhlehlisa indawo (okubandakanya ukukhishwa kwama-casing amade, ubude, ipulaki ende nokwakheka ukucindezela kanye nokufaka imiphumela njll.) kuzofakwa umbiko wokugcina uthunyelwe ku-PASA. Ukulinganiswa kwezindleko ezihambisanayo zokufakelwa kwamapulaki nokulahlelwa komthombo owodwa endaweni nokumbiwa kwendawo kuyavela kuSithasiselo E. ISithasiselo E sibonisa zonke izindleko zemisebenzi yokulahlwa.

Umfanekiso 3.5 Ukuhlelwa Kwepulaki Kasimende Ngaphansi



Umthombo: I-manual kaEni yokupulaka nokushiya)

3.6.5 Ukuqeda

Lapho kuqedwa ukumbiwa, umkhumbi wokumba nezikebhe eziwusekelayo zizowushiya umthombo. Umbiko wokugcina i-ROV uzokwenziwa olwandle.

3.6.6 Ukulawulwa Kwengozi ye-HSE ngesikhathi Somsebenzi

Njengengxenye ye-HSE kaEni (impilo, ukuvikeleka, imvelo nokuphepha) ukulawulwa kwezinhlekelele, inqubomgomo ye-HSE isendaweni ehlanganisa ukuhambisa nokuvuselela; ukumba nokuqedela nezinqumo.

UEni uzinikele ekuvikeleni ukuphila, ukuphepha nokuvikeleka kwabasebenzi nabezinkontileka, ukuqinisekisa ukuthi yonke imisebenzi yenziwa ngendlela evikela indawo nabantu abangathinteka ngemisebenzi yayo.

Lengxenywe ibonisa imithombo eyinhloko yokukhishwa emoyeni, okukhishwa olwandle kanye nemfucuza okuzobangelwa ukumba okuhleliwe kanye nemisebenzi ehambisana nakho.

Isimiso sikaEni sokulawula imfucuza siwukulandela uhlelo olulandelanayo lukaEni lokulawula imfucuza; ngendlela yokuqala: nciphisa, sebenzisa kabusha, ukubuyisela kabusha, ukubuyisela, ukuphatha, nokulahla.

Zonke isikebhe zizoba nemishini, izinhlelo kanye nemithetho endaweni yokuvimbela ukungcola ngamafutha, ukuthuthwa kwamanzi nemfucuza ngokuhambisana noMARPOL 73/78. Iprojekthi ethile yeHlelo Lokulawulwa Kwezinkunkuma (oluhlanganisa zonke izinkunkuma ezikhiqizwa ngaphandle ngolwandle nasekwandle) luzokwenziwa ngokuhambisana nezimfuneko ze-MARPOL, imithethonqubo yaseNingizimu Afrika kanye nemihlahlandlela yokuphatha imfucuza ye-Eni.

Izindawo zokulahlwa kwemfucuza kanye nezindawo zokuphathwa kwemfucuza zizobonakala, ziqinisekise futhi zivunywe ngaphambi kokuqala kokumba.

3.7.1

Ukukhishwa Emoyeni

Imithombo eyinhloko yokukhishwa emoyeni emikhankaso ehlongozwayo yokumba izovela ekukhishweni kwamandla okuvela emikhunjini. Uma ukuhlolwa kwemithombo kwenziwa ngokuhlolisisa kahle, khona-ke ukukhishwa kuyokwenziwa kusuka ku-hydrocarbon flaring yesikhathi esilinganiselwe sokuhlola umthombo

Izikebhe ezinamandla zisebenzisa iphethiloli kakhulu ngenxa yalokho amazinga aphezulu okukhishwa kwemoya ohambisanayo. Amafutha e-diesel noma amafutha kagesi welwandle, uma ekhona, azosetshenziswa njengamafutha emkhunjini yonke azoveza ngokuyinhloko emkhathini we-carbon dioxide (CO₂), ama-sulphur oxide (SO_x), ama-nitrogen oxide (NO_x) ne-carbon monoxide (CO). Ezihlobene nalezi zinhlayiya, amanani mancane amakhemikhali e-volatile organic compounds (VOCs), methane (CH₄) ne-particulate matter (PM₁₀/PM_{2.5}) azokhishwa.

Lokhu kukhishwa kukhishwa phakathi nokusebenza okujwayelekile kwezikebhe sezilwandle futhi kunomphumela wokukhupha kwesikhashana esifundeni sokungcola okungcolile. Nazo zifaka izandla ekungcoleni kwesimo sezulu nesifundazwe.

Amazinga okukhishwa kwezindiza ezinophephela emhlane ayoxhomeka ekusethenzisweni kwamandla kagesi futhi ngaleyo ndlela azohluka ngesikhathi sokushayela, ukukhokhela, isimo sezulu, isivinini njl. Ngalezi zinkinga, izindiza ezinophephela emhlane ziye zacatshangwa ukuthi zisebenzisa amathani angu-15 kuya kwangu-20 ngesikhathi sokumba.

Ukukhwiswa okuvela ekwenzeni umsebenzi wokumba kuzolawulwa ngokusebenzisa izinyathelo zokusebenza kahle kwephethiloli.

Ngengoba kubonakala *Ithebula 3.7*, kulinganiselwa ukuthi amathani angama-3,599 wephethiloli azosethenziselwa ukumba okuhlongozwayo, izikebhe zokuhlinzeka kanye nendiza enophephela emhlane okuzobangela ukuthi cishe 13.08 kt ye-GHG (CO₂, CH₄, N₂O) kukhishelwe emoyeni ngesikhathi sokumba.

Ithebula 3.7 Ukukhishelwa Emoyeni Okuvela Ezikebheni Ngesikhathi Sokumba

	Ukukhishwa Kwamacala	Isikebhe Sokumba	Isikebhe Sokuhlinzeka	Indiza Enophephela Emhlane	Inani	Okulinganayo ne-CO ₂
Ukusetshenziswa (amathani)		2,580	994	25	3,599	
Ukukhishwa (amathani)	CO ₂	9,355.08	3,604.33	76.20	13,035.61	13,035.61
	CO	1.79	0.69	0.12		
	NO _x	8.62	0.33	0.06		
	N ₂ O	0.07	0.03	6.62E-4	0.10	30.85
	SO ₂	22.65	8.73	0.02		
	CH ₄	0.36	0.14	3.31E-3	0.50	10.47
	VOC	7.65	2.95	0.02		
Inane Elilinganayo le-CO₂			13,076.92			

Umthombo: Kubaliwe kusetshenziswa isofthiwe ye-SANGEA <http://www.api-sangea.org/>

Konke ukukhishwa kwezikebhe zeprojekthi kuzohambisana nezidingo ezibekwe eMhlanganweni Wamazwe Omhlaba Wokuvimbela Ukungcoliswa Okuvela Emikhumbini, 1973, njengoba kuguqulwe uMthetho we 1978 (MARPOL 73/78).

3.7.2 Ukukhishelwa Olwandle

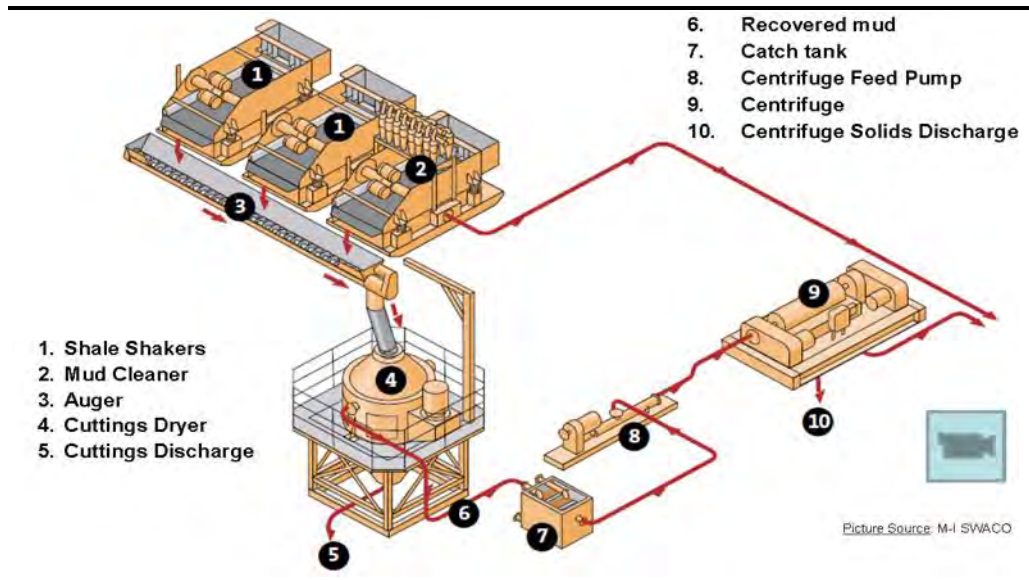
Ukusikwa Kokumba Nokulahlwa Ngodaka

Ngoba izingxenywe zokuqala (ukuphoqa) emthonjeni, ukumba okungenasiphelo (okunguthi ngaphandle kokufakwa kwi-sibuko) kuzokwenziwa ngamanzi olwandle ngokubambisana namaphilisi aphezulu ejengezi kanye nemithelo.

Ezingxenyeni ezizansi zomthombo, ukukhwabanisa okuphezulu (okunguthi isibuko sifakwe phezulu kwekhanda lomthombo kanye ne-BOP), kuzokwenziwa ngodaka olusekelwe emanzini (WBM), okubizwa nangokuthi amanzi asetshenziselwa amafutha (WBF), noma okungekho emanzi okumba amafutha (NADF). Uhlelo lwadaka luzochazwa ngokusekelwe ekuqalisweni kahle kokugcina kahle kanye nokulandelwa kwemvelo okulindelekile.

Ngesikhathi sokumba se-WBM/ NADF, udaka lokumba lisakazwa ohlelweni oluvaliwe olubuyisela kabusha udaka lokumba, ukulawula isisindo somdaka kanye nezakhiwo, nokususa ukusikeka kokumba. Izinto ezivela phansi (udaka kanye nokusikeka) kuhanjiswa ohlelweni lwezokwelapha (kuhlanganyise abashayeli, izihluzi, amadesander) okuzohlanisa ngokomzimba izitshalo zokudoba ezivela edakeni lokumba (*Isithombe 3.6*).

Isithombe 3.6 Ukulawula Ukuqina/Uhlelo Lokubuyisela Uphethiloli



Umthombo: MI-Swaco, 2016

Udaka Olusekelwe Emanzini

Udaka Olusekelwe Emanzini (WBM) liqukethe izihlanganisela zombula, akakhemikhali amvelo kanye nokwenziwa, amkhemikhale okulinganisa amaminerali, nezinye izithasilelo ezincibilikisiwe noma ezinqunywe emanzini ahlanzekile, amanzi anosawoti noma i-brian (OGP, 2016). Loludaka losetshenziswe ngemva kokufakwa kwesibuko. Izizama-WBM ezisetshenziselwa embonjeni, imisebenzi yayo kanye nencazelo yobungozi bayo endalweni inikezwa *Thebula 3.8* ngezansi.

Thebula 3.8 Izingxenywe Eziyinhloko Zedaka Olusekelwe Emanzini

Impahla	Isetshenziselwa	Ubungozi Endalweni
i-Aluminium stearate	Isusa igwebu	Engenabuthi, engacibiliki
i-Barite	Ukulinganisa	Engenabuthi, engacibiliki, engaboli
i-Bentonite	Ukushuba	Engenabuthi, engacibiliki, engaboli
i-Calcium carbonate	Okuxhumanisa, ukulahlekelwa uhambo	Engenabuthi, engacibiliki
i-Caustic soda	pH nokulawula asidi	Ecibilikayo, corrosive
Cellulose based polymers	Ukulawula ukulahlekelwa ngamanzi	Engacibiliki, engenabuthi
i-Citric acid	i-pH control	Ecibilikayo, inobuthi kancane, ecasulayo
Diesel oil pill (< 0.1 % mud volume)	Amafutha anamathele ipayipi	Ecibilikayo kancane, 96 hr LC ₅₀ >0.1-1000 ppm
i-Gilsonite (asphalt based)	Yokuthambisa, enciphisa ukulahlekelwa amafutha	Inobuthi kancane, ecibilika kancane
i-Glutaraldehyde (0.01 % mud vol)	Kubulala amagciwane	Ephawulwe ngezindawo zayo ezinobuthi, ecasulayo
i-Lime	i-Carbonate nokulawula i-CO ₂	Ecibilika kancane, engenabuthi, ecasulayo
Organic synthetic polymer blends	Yokunciphisa	Engenabuthi, 96 hr LC ₅₀ >500 ppm
Palm oil ester	Yokuthambisa, amaphilisi okunyamathelisa	Ecibilika kancane, ebolayo
i-Potassium chloride	Ukhethe oluthambile / i-inhibitor yebumba	Ecibilikayo, engenabuthi
Soda ash	Ukulawula asidi, kunciphisa i-calcium	Ecibilikayo, engenabuthi
i-Sodium bicarbonate	Ukulawula asidi, kunciphisa i-calcium	Ecibilikayo, engenabuthi
Xanthan gum	Ukushuba, ukwakhekha	Ecibilikayo, engenabuthi

Umthombo: OIGP 2016, Neff 2005, Boehm et al. 2001

Ama-WBM azosetshenzwa ngaphakathi futhi asetshenziswe ngangokunokwenzeka ngezigaba ezahlukene zokumba. Uma kusetshenziswe, ama-WBM azogcinwa emthunjini futhi athunyelwe ogwini ukuze kuzetshenziswe izikhungo zokuvuselela kabusha noma ukulahla uma kuhambisane nezincomo zamazwe ngamazwe kanye neZinkombandlela Zokulawula Kwezinkunkuma ze-Eni. Imisiko ye-WBM ikhishwa ngokweqile uma izohlolipha izimo ezilandelayo kanye nokulinganiselwa okuchazwe yizincomo zendawo, ezizweni jikelele kanye nemikhuba ye-Eni Best:

- Ukukhishwa kwemisiko nge-caisson >15 m ukujula;
- Ukukhishwa kwemisiko kuphela emanzini angu->30 m ukujula;
- Hg: max 1 mg/kg isisindo esomile ku-stock barite;
- Cd: max 3 mg/kg isisindo esomile ku-stock barite;
- Ukucithwa kwe-chloride ephezulu kufanele kube ngaphansi kwesikhathi esinezinhlalanisela ezincane zamanzi okuthola amasha noma ama-brackish; ne

- Umkhumbi ogwini olunye.

Amafutha Awomile Okumba

Amafutha Awomile Okumba (NADF): Imiqondo ejulile yokumba amanzi iyinselele futhi idinga ukushisa okuphezulu kokusebenza kwamanzi okusebenza ngamandla ngaphezu kwalabo abatholakala ku-WBM, ikakhulukazi ngokuvimbela ukwakheka kwezithambisi nokulondolozwa kokuzinza kwekubhora umthombo. Ngenxa ye-NADF, lapho isigaba esilandelayo ngokuyinhloko isisekelo samanzi angasetshenziselwa amafutha, asetshenzisiwe kakhulu embonini yepethiloli. Amafutha amaminerali anobuthi obuncane, amafutha amaminerali ahlanjululwayo kanye namafutha okwenziwa (ama-ester, iparafini nama olefin) asetshenziswa njengesisekelo samafutha. Izinxenye eziyinhloko ze-NADF zicazwa *Ithebula 3.9*.

Ithebula 3.9 Izinxenye eziyinhloko zaMafutha Awomile Okumba

Impahla	Incazelo
Amafutha esisekelo	Amafutha awomile okumba asebenzisa amafutha esisekelo okunciphisa kakhulu ama-aromatic namakhemikhale aphansi kakhulu e-polynuclear. Izinhlelo ezintsha ngokusebenzisa amafutha femifino, ama-polyglycols noma ama-esters ziye zaqubeka futhi zisethenziswa.
Isigaba se-brine	CaCl ₂ , NaCl, KCl.
Imikhiqizo yokugaya	Ubumba obuguquliwe busabela ngama-amines aphilayo.
Amakhemikhali we-alkaline	Eluhlaza isb Ca (OH) ₂ .
Ukulawula ukulahleka kwamafutha	Amakhemikhali avela kuma-lignite asabela ngeketheni elide noma ama-amine angamashumi.
Ama-emulsifiers	Amafutha weasidi kanye nezidakamizwa, iasidi ye-rosin nezidakamizwa, i-dicarboxylic acid, ama-polyamine.

Umthombo: Ithathwe ku-OGP, 2003

Iqembu 3 le-IOGP yamafutha awomile okumba (NABF) elinokuqukethwe okungcolile okungekho emthethweni kuzosetshenziselwa iphrojekthi. ⁽¹⁾ Lawa mafutha aphethwe yi-PAH okuqukethwe okungaphansi kwezingamaphesenti angu-0.001 kanye nokuqukethwe okwenziwe okunephunga okungaphansi kwamaphesenti angu-0.5. Iqembu III ihlanganisa uketshezi olwenziwe ngamakhemikhali ezithintz ama-hydrocarbons (ama-olefini, amaparafini, ama-esters). Ama-fluid basebenzisa amakhemikhali amaminerali asetshenziswe kakhulu besebenzisa izinqubo zokuhlaza okukhethekile kanye / noma ukuhlukaniswa (ama-paraffini, amafutha amaminerali asezingeni eliphansi ase-fluid (EMBF), njll) afakiwe. Kwezinye izimo, amanzi ahlanganiswa ukuze afinyelele izimo ezithile zokusebenza zokudoba (OGP, 2003).

Ama-muds ama-NADF azosetshenzwa ngaphakathi futhi asetshenziswe ngangokunokwenzeka ngezigaba ezahlukeni zokudoba.

(1) Based on classification by the International Oil and Gas Producers (IOGP).

Uma kusetshenziswe, i-NADF izogcinwa ebhodini futhi ithunyelwe ogwini ukuze kusetshenziswe kabusha / ukulahla. Awekho i-NADF esetshenzisiwe izokhishwa ngaphezulu. I-NADF drill cuttings izohanjiswa ngokusebenzisa inqubo eyengeziwe yokwelashwa, i-cuttings dryer (imishini yocingo le-centrifuge) ukuze kukhuliswe ukususwa kokuqukethwe kwamanzi. Isigaba esiphuthumayo se-liquid sizophinde sisebenzise futhi siphindwe emuva emdakeni we-mud.

I-cuttings ye-drill kanye ne-NADF egcinwe kuzokhishwa ngokulandela ukwelashwa ngokulandela izincomo zendawo kanye nezomhlaba kanye nezinkombandlela zokulawulwa kwezinkunkuma ze-Eni. I-base fluid egcinwe kwi-cuttings ngeke idlulele imingcele echazwe *esigabeni* 3.7.2. Ukusebenza kahle kokukhipha izitshalo zezingxenywe zomgodi ngamunye kuzoqapha ukuqinisekisa ukulawulwa kwamanzi kanye nokusetshenziswa kwemishini yokuthambisa amanzi okusebenza njengokwakhiwa.

Ama-muds ama-NADF azophinde athole, asetshenziswe futhi asetshenziswe azogcinwa ngaphakathi ngaphambi kokuthunyelwa ogwini ukuze avuselelwe / alahleke. Akukho ivolumu esetshenzisiwe ye-NADF izokhishwa ngokweqile ngokukhishwa kwesamba esinqunyiwe esilinganiselwe esilandelwe ukusika ukugaya. Eqinisweni i-NADF drill cuttings izobe isetshenziswe ngokusebenzisa uhlelo olwengeziwe lwezokwelapha, i-cuttings dryer (i-centrifuge type imishini) ukukhulisa ukwedlula uketshezi olusele ukuze kusetshenziswe kabusha. I-NADF egcinwe kwi-cuttings ye-drill izokhishwa ngaphansi kwe-underboard futhi uma izohlonipha izimo ezilandelayo kanye nokulinganiselwa okuchazwe yi-MARPOL, izincomo zomhlaba jikelele kanye nemikhuba e-Eni Best:

- Ukukhishwa kwe-cuttings nge-caisson ku > 15 m ukujula;
- Ukukhishwa kwezicucu kuphela emanzini > ukujula kwamamitha angu-30; I-Organic Phase Drilling I-concentrated fluid: isisombululo esiphezulu se-non-aqueous phase drilling fluid (NAF) 5% (ama-olefini angaphakathi angama-C16-C18) noma i-9.4% (i-C12-C14 ester noma i-esters C8) ekucutheni okumanzi;
- Hg: max 1 mg / kg isisindo esomile ku-stock barite; I-Cd: inqwaba ye-3 mg / kg isisindo esomile ku-stock barite; futhi Ngaphandle komkhumbi.

Lemfucua yokukhipha imfucua elikhishwa ngamanzi elilodwa lilinganiselwe ku*Thebula* 3.10 ngezansi. Bheka *Isigaba* 3.9.2 ukuze uthole ingxoxo ngezinye izindlela zokukhishwa kwezicucu.

Ithebula 3.10 Ukuhlelwa Kwemvelo Okuhle Kanye Nokukhishwa Okulinganisiwe

Isigaba	Hole Size (inches)	Casing size (inches)	Proposed Mud Type	Volume of cuttings (m3)	Volume of mud to be disposed of (m3) ^o
1	42"	36"	Seawater and sweeps	100	200 (seabed)
2	24"	20"	Seawater and sweeps	300	700 (seabed)
3	16"	13" 3/8	WBM/NADF	120	WBM Discharged/ recovered; NADF only recovered
4	12" 1/4	9" 5/8	WBM/NADF	70	WBM Discharged/ recovered; NADF only recovered
5	8 1/2	Open hole or 7"	WBM/NADF	30	WBM Discharged/ recovered; NADF only recovered
Total	-	-	-	620	900

Umthombo: Eni; 2018

Qaphela: kusetshenziswe i-WBM kukhishwa ngokweqile uma kuhambisana nokucaciswa okudingekayo, kanti i-NADF izobuyiselwa futhi ilahlwe ngasolwandle. Inani lokugcina le-WBM likhishwe lingalinganiselwa kuphela ekupheleni kwemisebenzi yokudoba ngoba ivolumu yodaka izovuselelwa kabusha / isetshenziswe kabusha kwisigaba sokudoba esilandelayo noma ngangokunokwenzeka.

Usimende

Ngesikhathi sokusebenza kokuqala kokumiswa (ukugoqa kwesigaba), ivolumu edingekayo yomswakama izothunyelwa emkhathini wonyaka phakathi kwe-casing kanye nodonga lwamanzi. Ukunciphisa amakhemikhali, okudingekayo ukuqinisekisa ukutholakala okwanele kwe-samente ngokusebenzisa i-annulus jikelele, kuzovela phezulu komthombo.

Ngemuva kokuthi i-riser efakwe, imisebenzi elandelayo ye-sement yamaphasethi, isamente esiphezulu ngokweqile lizobuyiselwa nge-riser kuya emkhunjini wokugaya futhi ikhishwe ngaphezulu.

Ngesikhathi sokumiswa kwesigaba sokuqhaqhazela, isamente esiphezulu (esiphezulu se-100 m3) sizovela phezulu komthombo bese ungena olwandle, laphe uzohlakazeka khona emanzini azungezile. Amakhemikhali adingekayo ukuze kuqinisekise ukuthi ipayipi yomqhubi kanye nekhanda lomhlaba liqiniswa yonke indlela eya olwandle. Ngesikhathi samakhemikhali alandelayo asebenza ngamakhemikhali angaphezu kwesimiso azobuyiselwa emkhunjini wokudoba nge-riser futhi ekhishwe ngokweqile.

Imisebenzi yokudoba e-Offshore isebenzisa izicucu zasePortland, ezichazwe njengezinhlanzi ezinamapulisi eziqukethe ama-silicates e-hydrated futhi ngokuvamile aqukethe eyodwa noma ngaphezulu izinhlobo ze-calcium sulphate. Izinto ezisetshenziswayo ziyi-lime, i-silika, i-alumina ne-ferric oxide. I-sement slurry esetshenzisiwe yenzelwe ngokukhethekile izimo eziqondile ezihlangene nazo. Izithasiselo zingasetshenziselwa ukulungisa izindawo ezihlukahlukene ukuze kufinyelele imiphumela efunayo. Kunezihlanganisi ezingaphezu kuka-150 zokumisa ezitholakalayo.

Inani (ukugxila) lalezi zithasiselo ngokuvamile zihlanganisa ingxenye encane kuphela (<amaphesenti ayishumi) esamba sonke samasheya esetshenziselwa kahle. Ngokuvamile, kunezithasiselo ezintathu eziyinhloko ezisetshenzisiwe: abazilahlezi, ama-agent okulawulwa kokulahlekelwa kanye nokunciphisa ama-friction. Lezi zithasiselo ziyi-polymers ngokuvamile ezenziwe ngezinto eziphilayo futhi zibhekwa njengeziyoketshezi. Lapho umsebenzi wokumiswa usuqedile, kuhlolwa isisindo somshini nokufaka uphawu.

Bilge Water

Yonke imithombo yamanzi emanzini okusebenza (amanzi amachibi) ayoqoqwa futhi aqhubekela emathini e-sump emikhumbi yemiklamo ukuqinisekisa iMarpol 1973/78 ukuhambisana no-Annex I. I-fluid izobe ihlolwe futhi noma yikuphi amanzi oily azocubungulwa ngokusebenzisa uhlelo olufanele lokuhlukanisa nokwelapha ngaphambi kokukhipha amafutha angaphezu kwama-15 ppm amafutha emanzini.

Ukuthuthwa kwamanzi

Ukuthuthwa kwamanzi okuphuma emikhumbi yeprojekthi kuzohlangabezana nezimfuneko zikaMarpol 73/78 Isiqephu IV. I-MARPOL 73/78 Isihlomelo IV sidinga ukuba amanzi okuthuthwa kwamanzi avezwe ezikhungweni aphethwe yi-disinfected, ashintshiwe futhi ukuthi ama-effluent akumelwe akhiqize izinhlabathi ezibonakalayo ezibonakalayo, futhi angabangela ukuguqulwa kwamanzi azungezile. Uhlelo lwezokwelapha kufanele luhlinzekele ukuxazululwa okuyisisekelo, ukuchlorisa nokuchithwa kwemifino. I-effluent ephathekayo ihanjiswa elwandle.

Galley Wastes

Ukulahlwa ngaphakathi ngolwandle ngemfucufucu kuvunyelwe, ngokwemigomo ka-MARPOL 73/78 Isithasiselo V, lapho umkhumbi utholakala ngamamayela angaphezu kuka-3,5 ukusuka kulelozwe futhi uudla okonakele kumbelwa phansi noma kuyasikwa kube yizicucu ezincane kune-25 mm.

Izinto Zokuhlanza

Amakhemikhale asetshenziselwa ukugeza izikhala zomkhumbi angasetshenziswa ngengamanzi abhajwe emkhunjini. Utshevu wezinto zokuhlanza uyahluka ikakhulukazi ngokuncike kuye ngokubunjwa kwawo. Izithako ezisekelwe emanzini noma ezakhiweni ngamakhemikhali zikhethwa ukusetshenziswa ngenxa yobuthi babo obuphansi.

Ezimweni ezithile zokuhlanza indawo ethile, isib. Indawo yokudoba ngaphandle kokungcola kokungcola, ukungasebenzisi isitshalo esinamandla esiyingozi, ukucutshungulwa okungaqondakali kungacatshangwa.

Ezinye izinhlobo zamadaka ezakhiwe ngesikhathi semisebenzi yokudoba ngeke zikhishwe olwandle kodwa zizothunyelwa ogwini ukuze zilahlwe. Lezi zidakamizwa zizosetshenziswa kabusha noma zisetshenziswe kabusha uma kungenzeka noma zithuthwa futhi zilahlwe endaweni evulekile yokuthuthwa komasipala kamasipala noma kwenye indawo evunyiwe .

Lapho kungenzeka, lezi zinhlobo zokudoba ezilandelayo zizovuselelwa kabusha noma ziphinde zisetshenziswe emhlabathini:

- Imfucuza (isb. Iphepha, ipulasitiki, izinkuni neglasi) kufaka phakathi izidakamizwa ezivela ezindaweni zokuhlala kanye nama-workshop njll;
 - Izinto ezincibilikisiwe nezinye izinto;
 - Amafutha asetshenzisiwe, kuhlenganise namafutha okugcoba namafutha; i-solvents; ama-detergents asekelwe e-hydro-carbon, ukushisa okwenzekayo kanye namafutha omshini; futhi
 - Ukushayela amanzi, kuhlenganise ne-LTSBM kanye nokusika, imfucumfucu yokudoba nokuqedela imisebenzi.
- Lezi zidakamizwa ezilandelayo zizolahlwa yilabo abanikezwe amalayisensi abanikezwe amalayisensi ezindaweni zokudoba ezinelayisense.
- Amathrekhi kanye neziqukathi ezinezinsalela (isb. Amafutha okugcoba) okungaba nemiphumela yemvelo;
 - Izinkunkuma eziyingozi (isb. Izinto zokusakaza, ama-tuby neon nama-batteries);
 - Imfucuza yezokwelapha kusukela ekwelashweni komuntu siqu ngaphakathi emkhunjini; futhi
 - Izihlungi nemidiya yokuhlunga kusuka kumishini.

Ekupheleleni komsebenzi, ukuchithwa kwamanzi kukhipha amakhemikhali ayingozi, usimende omningi noma yimaphi amanye amakhemikhali akuvunyelwe ngu-Eni. Isixazululo esisetshenziswayo samakhemikhali angasetshenziswanga ukuwabuyisela kumhlinzeki ukuba awasebenzise futhi/awenze kabusha kwamanye amaphrojekthi. Uma lokhu kungeke kusebenze lamakhemikhali angagciwa noma alahlwe njengoba kuchawe emthethweni ongaphezulu ka-Eni wendlela yokulawula imfucuza.

Umthombo oyinhloko womsindo ohlelweni lokumba okuhlongozwayo kuhlenganisa umsindo owenziwa umkhumbi wokumba nemikhumbi yokuhlinzeka. Izici zomsindo nezinga lemikhumbi ehlukahlukene esetshenziswa ohlelweni lokumba izohluka phakathi kuka-130 no-182 dB re 1µPa ku-1 m (Simmonds *et al*, 2003; Richardson *et al*, 1995). Lomsebenzi owenziwa ngemikhumbi ushintsha izici zemisindo, ngokwesibonelo, uma izulazula, ubambe isikhundla usebenzisa umnsalo wokujikijela, noma ugijima.

Lengxenywe izeza imithombo eyinhloko yokukhishwa engaba umphumela wezenzakalo ezingahleliwe/ ezingalindelwephakathi nokumbiwa kwemithombo nezihambisana nemisebenzi.

Izinhlobo ezimbili eziyinhloko zezenzakalo ezingahleliwe/ eziyingozi ezingavela ngesikhathi sokumba imithombo ezingabangela ukukhishwa kwama-hydrocarbons noma amakhemikhali endaweni yasemanzini ukulahlekelwa kokukwazi ukuphatha amanzi komthombo isenzakalo esisodwa/ ukuchitheka okuningi.

Ukulahlekelwa ukukwazi ukuphatha komthomboyinto eqhubekayo (ezimweni ezimbi kakhulu, lapho kungalawuleki futhi kukhululeka kakhulu, kubizwa “ukuqhuma komthombo”) okungase kuthathe isikhathi esilinganiswe, njengoba isenzakalo esisodwa sokuchitheka ngokushesha noma kuvela kancane. UEnni uzimisele ukunciphisa ukukhululwa kwama-hydrocarbon namakhemikhali ayingozi endaweni yamanzi ukuze kugwenywe ukuchitheka okungahleliwe.

Lapho kuvela izenzakalo ezingahleliwe/ ezingalindelwe, uEnni unciphisa noma yimiphi imiphumela emibi endaweni futhi uhlela ukufinyelela lomgomo ngoku:

- i) Faka amafutha nokugwema ukuchitheka kwamakhemikhali emaplanini okumba; futhi
- ii) Qinisekisa ukuthi isimo esingalindelekile sihlelelwe nendlela yokubhekana naso ngokuphumelelayo lapho sivela.

UEni uzoklama Uhlelo Lwesimo Esingalindelekile Sokuchithwa Kukawoyela ngaphambi kokuba kuqhutshekwe ngomsebenzi wokumba futhi lelisebo lizokwenziwa lapho kuvela ukuchitheka kukawoyela okungahlelwanga/ okungalindelwe ngasemthonjeni.

Ukwenezela kulokho, kuthathwa izixwayiso zokuphepha ukuze kuqinisekiswa ukuthi wonke amakhemikhali nemikhiqizo yamafutha egcinwa nokudluliswa ogwini nangasogwini idluliswa nokugcinwa ngendlela yokunciphisa ukuchitheka nokonakaliswa kwendawo uma kuvela izimo ezingahleliwe/ ezingalindelwe.

3.9 *EZINYE IZINDLELA ZEPHROJEKTHI*

Enye yemigomo ye EIA iwukufunisisa ezinye izindlela phrojekthi. Ngokuphathelene nomsebenzi ohlongoziwe **“ezinye izindlela”** zichaza izindlela ezahlukile zokuhlangabezana nezinjongo ezivamile nezidingo zomsebenzi ohlongoziwe.

Isithasiselo 2 Ingxenye 2 (h)(I) yemithetho ye-EIA, 2014 (njengoba ilungisiwe), idinga ukuba zonke izinqubo zeS&EIR zibonise nokuchaza ezinye izindlela zomsebenzi ezihlongozwayo ezifinyelelekayo nezinengqondo. Izinhlobo ezihlukile noma izigaba zezinye izindlela zingabonwa, isb. ezinye izindlela zendawo, uhlobo nomsebenzi, ezinye izindlela zomklamo noma zesakhiwo, ezinye izindlela zezochwepheshe nezinye izindlela zezokusebenza. Ezinye izindlela ‘Eziyingozi’ noma ‘Ezingena Ndawo Yephrojekthi’ kumelwe ezicatshangelwe.

Akuzona zonke izigaba zezindlela ezisebenza kuzo zonke izinhlelo. Ukucutshungulwa kweminye imikhakha kuhambisana nokuklanywa okuningiliziwe kanye nokuhlonza izinyathelo zokunciphisa, ngakho-ke, nakuba kungahlolwe ngokuqondile, ezinye izindlela ziye zaqhubeka futhi zizoqhubeka zicatshangelwa ekwakhiweni nasezinhlelo ze-EIA.

Naphezu kwentuthuko eminingi ekuthengeni kwedatha kanye nokuhlaziywa kwedatha, okwamanje ayikho enye indlela ekhona ekhona ekuqinisekiseni ukuba khona kwemithombo ye-hydrocarbon ngaphandle kokuhlola nokuhlolwa kokuhlolwa. Ngakho-ke ezinye izindlela ezenziwa umsebenzi ziye zahlolwa.

Kodwa kufanele kuqashelwe ukuthi ezinye izinto zangaphambi kokudoba zingase zenze, kufaka phakathi inhlobo ye-ROV. Isifinyeto sinikwe ngezansi kwezinye izindlela ezibhekwe kulo Mbiko we-EIA.

3.9.1 *Ezinye Izindlela Zendawo Eseduze*

Indawo Yokumba

UEni ungumqondisi futhi Unelungelo Lokucwaninga le-ER236. Zombili izingcwaningo zokuzamazama ze-2D ne-3D zenziwe yi-ER236 nezindawo okungenzeka zaziwa njengezesithakazelo. Ngokwenzazelo yokwaziswa kokuzamazama, uEni uthole izindawo ezimbini zesithakazelo ezihlanganisa indawo encane ye-ER236, kuzo kucatshangelwa ukuhlolwa kwazo ukuze kwenziwe umsebenzi wokumba ukuze kubonwe ukuthi inqolobane iyatholakala futhi isebenza kahle.

Indawo esenyakatho yesithakazelo (1,717.50 km²) cishe ingu-62 km ngasogwini lwaseRichards Bay, nasendaweni eseningizimu yesithakazelo (2,905 km²) cishe 65 km ngasogwini lwasePort Shepstone.

Nakuba izindawo zemithombo zingakaqedwa ngokwezibalo yezici, kuhlenganise nokuhlolwa okuqhubekayo kwemininingwane kokuzamazama, inhloso yokuma komhlaba nezingqinamba zolwandle. *Isahluko 7* sicabangela ukuba imithombo ingembiwa noma yikuphi phakathi nendawo yesithakazelo esenyakatho neseningizimu.

Isisekelo se-Onshore Logistics

Isisekelo sezinto zokugcina indawo esiphezulu se-ocean sezotholakala ePort of Richards Bay noma ePort of Durban, isinqumo esiphakathi kwalezi zindawo sizoxhomeka ezingxoxweni neTransnet kanye nokutholakala kwesikhala esanele sokubhekana nesisekelo sezinsiza.

Lo Mbiko ohlaziyiweyo we-EIA uzohlola impikiswano kusuka kwisisekelo sezinsiza kuRichards Bay noma eThekwini .

Akukho ukungafani okuphawulekayo okuhloswe nendawo yendawo yokugcina indawo e-onshore ePort of Richards Bay noma Port of Durban.

3.9.2 Obunye Ubuchwepheshe

Ukugaya izimpahla ezihlukile

Kukhona imikhumbi eminingi yokudoba etholakalayo ukuze kuqhutshekwe ukugoba kahle kwe-offshore. Izindawo ezijulile zamanzi lezi zikhawulelwe kokubili okukhethwa kukho, ukushayela phansi noma izimbungulu ezingaphansi komhlaba. *Umdwebo 3.7* ubonisa izinketho ezitholakalayo kanye nokujula kokusebenza okuhambisanayo.

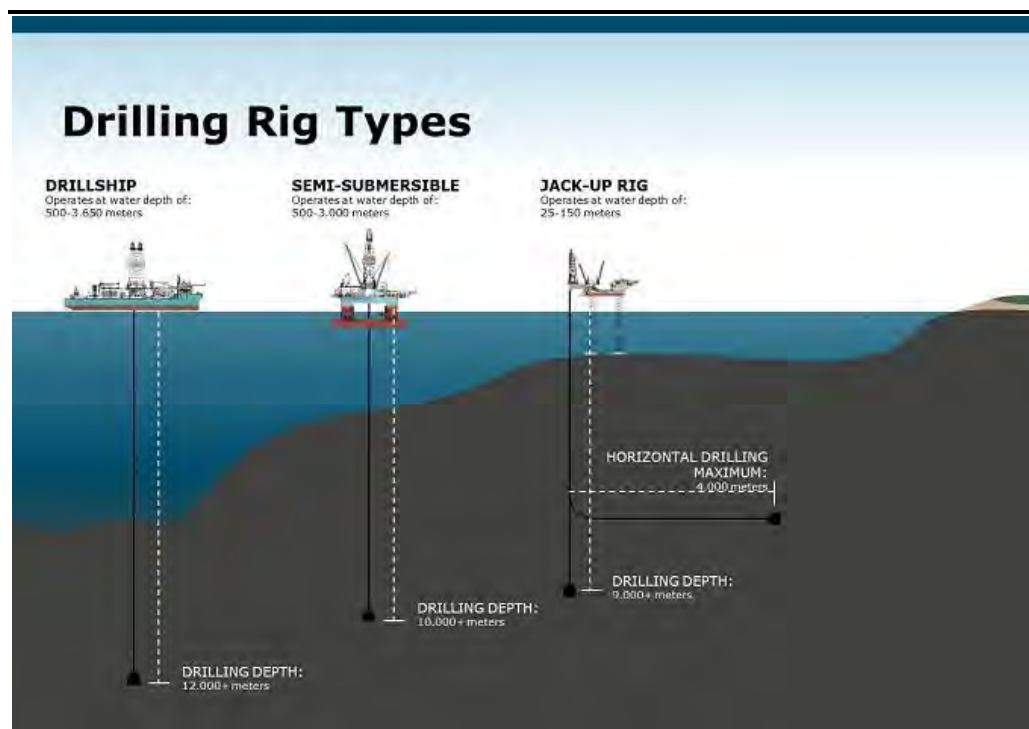
Njengoba kuxoxwe *eSigabeni 3.5.1*, ukuqhutshwa kwemishini ngokuvamile kugcinwe endaweni esebenzisa i-DPS evumela ukuphazanyiswa okungezansi kwe-subsea ngenxa yokukwazi ukusebenza ngaphandle kwemizwa. Inzuzo ephawulekayo yokusebenzisa umshini wokudoba iyinkululeko yokuhamba njengesikebhe esithuthumayo esinezimo eziguquguqukayo zokuhamba ukusuka kahle kuya endaweni noma endaweni ngaphandle kwesidingo semikhumbi yokuthutha. Lolu khetho ludinga ukuthi lisebenzise amandla amakhulu (ngakho-ke ukukhishwa) kanti i-DPS ikhiqiza umsindo omkhulu ngaphansi kwamanzi ngesikhathi sokusebenza.

I-rig encane engasetshenziselwa ukugoba kufanele ihanjiswe kusayithi futhi ihanjiswe ohlangothini lolwandle isebenzisa uchungechunge lwezinsimbi ezingase zifinyelele ku-1 km ukusuka ku-rig noma zingasebenzisa ukuma okunamandla ukuze uhlale endaweni. Lezi zimbambo zinezici ezingaphansi komhlaba ngaphansi komugqa wamanzi.

Amanzi asetshenziswa njengendlela yokulawula i-ballast ukuze kugcinwe ukuhamba nokuqina. Lolu khetho luzobangela ukuphazamiseka okukhulu olwandle ngenxa yobuningi be-moorings, kodwa kudinga ukusetshenziswa okungaphezulu kwamandla futhi kuvelise umsindo ongaphansi kwamanzi.

Zombili izingxenye zokudoba yizinyunithi ezithintekayo ezinomshini wokukhwabanisa nokugaya, ukungena kwangaphakathi emanzini okubizwa ngokuthi i-moonpool, i-helicopter pad, imishini yomlilo kanye nensiza yokulondoloza kanye nezindawo zokusebenza. Ukusebenza nokukhishwa kufana nalokhu. Iyunithi ngayinye yokudoba izophinde idinge phakathi kweyodwa kuya kwezintathu zokudoba, kungenzeka ukuthi imishini yokusekela encane engaphansi komzimba izodinga imikhumbi engaphezulu yokusekela (noma ukuhamba okungaphezulu kwesitsha sokusekela esisekelweni) kunokuba kubhekwe phansi, njengoba ukushayela kubhekene nokuningi umthamo wokugcina. Umshini wokudoba uphinde ube neselula

Isithombe 3.7 Drilling Vessel Alternatives



Umthombo: <http://www.maerskdrilling.com/en/about-us/the-drilling-industry>

Umkhumbi wokudoba okhethwayo ka-Eni ungumgogodla webanga lokungena kude ukusuka ogwini, izinkinga zokujula kwamanzi nokutholakala kwawo, ukuguquguquka kwemvelo nokukhululeka kokuhamba.

Izinto ezihlukahlukene zilawula inhlanganisela engcono kakhulu yamakhemikhali okugaya asetshenziselwa ukukhiqiza udaka oludingekayo odakeni oludingekayo ukuze lubisike kancane kancane, ugcine ukulawula ukucindezela kahle, futhi uthwale ama-cuttings phezulu.

Ngokwezigaba ze-IOGP, lezi zinhlobo ezintathu ze-NADF ezingasetshenziselwa ukudoba kwe-offshore zingachazwa kanje:

- Iqembu I-NADF (okuqukethwe okunephunga eliphakeme) - Lawa ma-fluid base asetshenziswa ngesikhathi sokuqala kokuhlolwa kwamafutha nogesi futhi afaka idizili kanye nama-futha ajwayelekile amaminerali asekelwe ngamanzi. Bahlanjululwa emafutheni angcolile futhi beqoqo elingelona elithile lama-hydrocarbon compounds okufaka i-paraffini, ama-olefini nama-hydrocyboni anamakha amahle (ama-PAH). Iqembu lama-NADF eli-1 lichazwa ngokuba namazinga e-PAH angaphezu kuka-0.35%.
- Iqembu lama-NADF (okuqukethwe okunomsoco ophakathi) - Lawa mahlandla ngamanzi ngezinye izikhathi abizwa ngokuthi yi-Low Toxicity Mineral Oil Based Based Fluids (LTMBF) futhi athuthukiswa ukubhekana nokukhathazeka okukhuphuka ngenxa yobuthi obuyingozi obungasetshenziselwa uketshezi lwe-dizeli. Zibuye zakhiwe ekuhlanjululeni amafutha angcolile kodwa inqubo yokucwiliswa kwezidakamizwa ilawulwa ngendlela yokuthi ingqikithi yenani lama-hydrocarbon elimnandi lingaphansi kwamaQembu I-NADF (0.5 - 5%) kanti okuqukethwe kwe-PAH kungaphansi kuka-0.35% kodwa kunamaphesenti angu-0.001%.
- I-Group III i-NADF (okuqukethwe okuncane okungekho emakhakheni) - Lawa manzi aphethwe yi-PAH okuqukethwe ngaphansi kuka-0.001% nokuqukethwe okwenziwe okunephunga okungaphansi kuka-0.5%. Zibandakanya uketshezi oluyisisekelo (SBF) olukhiqizwa yizimboni zamakhemikhali ahlanzekile futhi zingabandakanya ama-hydrocarboni (ama-olefini, ama-parafini nama-esters). Ukusebenzisa ukucwenga okukhethekile kanye / noma izinqubo zokuhlukanisa, ama-fluid base Blue III nawo angatholakala emafutheni amaningi amaminerali asetshenziswe kakhulu (ama-paraffini, amafutha amaminerali athuthukisiwe ase-fluid based (EMBF)). Ukuqukethwe kwe-PAH kungaphansi kuka-0.001%.

Inhlanganisela yamanzi olwandle, ama-WBM kanye / noma ama-NADF angasetshenziselwa ukugcoba kahle ukuhlola okuhlongozwayo. Kulindeleke ukuthi i-IOGP Group III engekho emanzini amanzi angenawo amanzi aphansi angasetshenziselwa le phrojekthi uma kwenzeka i-NADF ikhetha.

Indlela yokuLawula ukusika izigxobo

I-solids control system isebenza ngezindlela ezahlukahlukeni zokususa izinsila (ukusika ama-cuttings - izinhlayiya zamatshe, ubumba, shale nesihlabathi) kusuka emzimbeni we-drill kanye nokubuyisela ukugaya amanzi ukuze kusetshenziswe kabusha. Ngesikhathi sokugaya okungenasiphelo, ukusebenzisa amanzi olwandle kanye nezikhukhula eziphakeme ze-viscous kanye namaphilisi, ama-cuttings alahliwe ngqo olwandle.

Uma iphakethe selifakwe phezulu kwekhanda lomuthi kanye nezinsika zingabuyiselwa kumgogodla, akukho mkhuba ojwayelekile wokwelashwa nokulahlwa kwezinto zokusika ezisebenza emhlabeni wonke.

Njengoba i-IOGP ngayinye (2016) kunezinye izindlela ezintathu zokukhishwa kwezinto zokusika, okungukuthi:

- Ukwelashwa kwe-offshore nokukhishwa olwandle - lapho kusetshenzwa khona izidakamizwa eziphuma emgodini wokugaya noma endaweni yesikhulumi ngemuva kokwelashwa yimishini yokulawula okuqinile kanye nesistimu yokunciphisa okumanzi;
- Umjovo – lapho izinto zokusika zomshini wokumba zenziwa ukuba zibe zincane bese ziyalahlwa, namanzi noma uketshenzisiwe ngomjovo endaweni evikelekile ezintweni ezingaphansi ngomhlaba; futhi
- Ukulahlwa kwamazwe womhlaba nokwelashwa – lapho kutholokala khona ukucutshungulwa kanye nokuhanjiswa okusetshenziselwa okwelapha (isib ukucitshwa kwawmafutha ashisayo, ukulinywa komhlaba) uma kunesidingo futhi ucithwa kokucina ngamasu afana nokucwaliswa ngomhlaba, ukusabalalisa umhlaba, ukujova noma ukusebenzisa kabusha.’

Ukujova kabusha akulona ukhetho kulendawo futhi ngokuvamile akunakwenzeka ngenkathi kusetshenzwa ukuhlola futhi ngaleyo ndlela izindlela ezimbili ezingalahlwa ezixoxwa ezansi kukhishwa ekulahlweni kolwandle nasogwini. Bheka *Ithebula 3.11* elibhalwe izinzuzo nezinkinga zendlela ngayinye.

impatho Yasogwini Nokukhishwa Olwandle

Lendlela ihilela ukukhipha izinto zokusika, emva kokwelashwa okuqondile, endaweni yokumba. Izinto zokusika zomshini wokumba zizololongwa ukuze kuhlukaniswe amanzi okumba bese ikhethe okuwasebenzisa futhi.

Nkokuyinhloko izinto zokusika zomshini we-NADF zizonakekelwa ukuze kukhishwe amanzi omshini wokumba ukuze kusetshenziswe nokunciphisa kwezinto zewoyela ezingaphansi kwamaphesenti angu-5 wesisinda zezinto zokusika (ngokuphansi ngangokunokwenzeka) besebenzisa inhlakaniselo efanelekayo yama-shakers, - centrifuge kunye/noma omshini owomisa izinto sokusika.

Izinto zokusika ezinensalela yamanzi zihlanganyiswa namanzi olwandle futhi ahanjiswa olwandle ngokusebenzisa ipayipi ebizwa ngokuthi i-chute (noma i-caisson). Ukuphela kwe-chute kutholakala cishe ngamamitha angu-15 ngaphansi kwamanzi. Ngokungafani nezinye izindlela zokulahlwa, akukho isitoreji sesikhashana sokusika esidingekayo.

ENingizimu Afrika, ukukhishwa kwamazwe omhlaba yindlela yokwamukelwa yokulahlwa, uma izicucu zelashwa futhi zikhona ukungcola okungaphansi kwezinsika ezingavumelekile. Ukusabalalisa okulindelekile (ukuwa kanye nendawo ye-deposition) yemshini wokusika ekhishwe kwabikezelwa “ekutheni imfucufucu youkufakela imfucuzi” (*Isithasiselo D*).

I-Offshore pre-treatment kanye nokulahlwa kwe-Onshore

Njengokwezi-OGP (2003), lolu khetho luzobandakanya ukucutshungulwa kwezicucu esikebheni sokudoba, kulandelwe ukugcina nokuthutha ogwini ukuze kulahlwe.

Ngenxa yalokho, kunezici ezithile zokulahlwa kwezwe okumele zicatshangelwe uma kuhlolwe ukufaneleka kwalolu khetho, izinzuzo kanye nokungalungile:

- Ukuthuthwa kwamanzini (ukweqa nokuthumela, okuvamile kuzo zonke izinketho zokuthuthwa kwamanye amazwe);
- Inketho yokuhlazwa kwe-onshore;
- Ukunyuka okungeziwe kokungena emkhunjini wemikhumbi ngenengozi eyengeziwe yabasebenzi ngesikhathi sokuqhutshwa kwemisebenzi; futhi
- Ukutholakala okulinganiselwe endaweni ekhoneni ebhodini ukuze kusetshenziswe imishini kanye namakhemikhali anciphise kanye nomthamo wokugcina amanzi; kunzima kakhulu ukwabelana ngezinto zokuqinisekisa ukuzinza kwesikebhe.

Izinketho ezingase zibe khona zokuthuthwa kwamanzi zihlanganisa:

- Ukulahla kokuthuthwa komgwaqo: Ngokuya kwezinga lokwelashwa nokuqokethwe kweoli okusalayo emaphesenti we-cuttings eyomile, ama-cuttings ayoba ngaphezu kokudinga ukulahlwa endaweni engozini yokuthutha.

- Ukulima umhlaba: Lokhu kuhilela ukusabalalisa ukusika okuphethwe ngokugcwele ngokulandelwa kokumiswa kwemishini ngokufaka izakhi, amanzi kanye ne-oksijeni uma kudingeka ukuze kuvuselelwe i-biodegradation ngamagciwane okulimaza ngokwemvelo, okusetshenziswe izikhathi eziningana endaweni efanayo. Kuye ngokuthi indawo yendawo epulazi, i-liner, i-liner, kanye ne-sprinkler system ingadingeka.
- Sebenzisa kabusha (isb. Ukwakhiwa komgwaqo). I-cuttings ethintwa ingase isetshenziswe ekwakhiweni noma kwezinye izindlela zokusebenzisa. Uma kunesidingo noma okulungile, izicucu zingaphinde ziphathwe ngaphambi kokusebenzisa kabusha, isb. nge-thermal-mechanical treatment noma bio-remediation.

Ithebula 3.11 Izinzuzo (+) Nokungalungi (-) Kwezokuthuthwa Kwe-Offshore Nokulahlwa Kwe-Onshore ye-Drill Cuttings (eguquliwe kusuka ku-OGP, 2003)

Economics	Operational	Environmental
Offshore Discharge		
+ Izindleko eziphansi ngayinye ukwelashwa kweyunivesithi + Azikho izikweletu ezikhona ezingasolwandle - Imali engenakwenzeka yekusasa elwandle - Izindleko zokufanisa kanye nokuhlaziya (isib., Ukuhlolwa kokuthobela, imodeli yokuhlakazeka) - Ukuhlaziya kwensimu ye-cuttings ngaphambi kokukhipha kanye nemithelela engaba khona (isibonelo, ukuhlolwa kokuhambisana, izinhlelo zokuqapha insimu)	+ Inqubo elula enezinto ezilinganiselwe ezidingekayo + Akukho ukuthutha okuya emhlabathini ohilelekile (ukuhamba kancane kweqa kanye nokuhambisa umkhumbi, izindleko ezingaphansi) + Inombolo elinganiselwe yokuphumula ebhodini, ukuphathwa kwe-logistics elula nokuphathwa kwamapulangwe + Izidingo eziphansi zamandla kanye nophethiloli + Izidingo zabasebenzi abaphansi + Ukuphepha okuphansi, imvelo nezingozi zezempilo (isib. Ukugcwalisa nokuthutha ukweqa, ukuzinza kwesigubhu, isigameko esingenzeke kanye nokungcola emgodini) + Kunomkhawulo noma akukho nsizinda esekelwe elwandle edingekayo - Ukubaluleka kokunciphisa ama-cuttings ukwandisa ukusika amandla okugcina ngaphambi kwenqubo yokwelashwa - Isivinini sokushayela esithinteka ukwelashwa nokukhipha izinyathelo + Kuncane kakhulu noma Ayikho imingcele yesimo sezulu - Imishini yokwelashwa edingekayo - Imishini yokwelashwa edingekayo Ingozi yokuxhuma imigqa lapho usebenzisa uhlelo lokugaya nokugeza - Izidingo zokuphatha zamakhemikhali amanzi - Ukuhlaziya okuqhubekayo kwezicuttings ngaphambi kokuba kukhishwe	+ Awekho ukukhishwa komoya okwandayo + Ukusetshenziswa kwe-Low energy + Azikho izinkinga ezithinta indawo ezindaweni ezise-onshore - Kungenzeka ukuthi kube nemithelela yesikhashana esifundeni se-seafloor (umphakathi we-benthic) kanye ne-biology yamakholomu wamanzi ngenxa yamakhemikhali kanye nezidakamizwa emkholomu wamanzi futhi uhlezi olwandle

Ukulahla Olwandle		
Ukuthuthwa kolwandle: + Udoti lungasuswa endaweni yokugaya indawo ekuqedeni umthwalo wesikhathi esizayo endaweni yokugunda - Izindleko zokuthutha zingaba phezulu ekuhambeni okungeziwe komkhumbi wokuhlinzeka futhi kungashintsha ibanga elincane elisuka endaweni yokumba - Ukuthutha kungadinga ukuguqula izitsha zokunikezela ezezeziwe - Izindleko ezezeziwe ezihambisana nemishini yokuthutha e-offshore (izivunguvungu, ama-augers) eziqunyiwe ziyazaqa noma izitsha eziningi nabasebenzi - Ukuvalwa kokusebenza ngenxa yokungakwazi ukusingatha izicucu ezakhiwe kuzokwenza imisebenzi ibe yindleko	Ukuthuthwa kolwandle: - Izingozi zokuphepha ezihlobene nokulayishwa nokulayishwa kweziqukathi zemfucuzo ezikebheni zomsebenzi nase-shorebase - Ukwenyuka okungeziwe kwemfucuzo kuyadingeka endaweni yokudoba nase-shorebase - Izisebenzi ezezeziwe ziyadingeka - Ingozi yokuchayeka kwabasebenzi kuma hydrocarboni aphunga - Iqoqo elihle kanye nokuthuthwa kwemfucuzo kuyadingeka endaweni yokudoba - Kungase kube nzima ukusingatha ukuthengwa kwe-cuttings okwenziwe nge-drill yezinga eliphakeme lokungena emigodini emikhulu - Isimo Sezulu noma izinkinga zokungena ngemvume kungavimbela ukulayisha nokuthuthwa kwezicucu, okuholela ekujinjeni kokumba noma isidingo sokukhipha - Ukuzinza kwe-Rig kungenziwa uma kwenzeka kube nzima	Ukuthuthwa kolwandle: + Azikho impikiswano emphakathini we-benthic + Kugwema ukugeza amanzi kanye nekhohlo yamanzi impumelelo engenzeka emvelweni nasezintweni eziphilayo - Ukusetshenziswa kwamafutha kanye nokukhishwa kwamanzi okulandelana okuhambisana nokudluliswa kwamademeshe ogwini lolwandle - Ingozi eyenzeziwe yokwehliswa kokudluliselwa (ukuthutha ogwini nokukhipha) - Ukulahlwa kwezilwandle kudala izinkinga ezintsha (isib., Ukungcola kwamanzi angaphansi komhlaba) - Ukuphazanyiswa okungenzeka kokuthunyelwa kanye nokudoba kusuka emkhunjini wezimoto ezikhuphukile kanye nokwanda kwezimoto esangweni
Ukusebenza kwe-onshore: + Izindleko zokuthutha komhlaba - Izikweletu ezingenzeka esikhathini esizayo	Ukusebenza kwe-onshore: - Ukuthutha kwezemvelo okuya endaweni - Ingozi yokuphepha kwabasebenzi kanye nezakhamuzi zendawo ezokuthutha nokuphatha - Izakhiwo zokulahla zidinga ukuqapha nokuphathwa isikhathi eside - Isinyathelo esenzeziwe kwisisekelo sokungena kwesitoreji sesikhashana sokweqa	Ukusebenza kwe-onshore: + Iyanciphisa impembe ku-seafloor ne-biota - Kungenzeka ukuqhuma kwe-onshore - Ukukhipha umoya okuhlobene nokusebenza nokuthutha

Ukuliywa komhlaba: + Ukungabizi imali okuhlobene nokunye kokukhethwa kukho kogu - Idinga ukuqashwa kwezomhlaba isikhathi eside - Okungadingeka kwemisebenzi yokubuyisela emuva/ yokubuyisela ukugunyazwa kokusetshenziswa komhlaba	Ukuliywa komhlaba: -Ukusetshenziswa okulinganiselwe ngenxa yokungafinyeleli izwe elifanele - Idinga isimo sezulu esifanele - Ngeke isetshenziselwe imfucuzwa enosawoti omning ngaphambi kokuba kwenziwe inqubo - Isidingo sokuthuthukisa izindawo zokwelashwa	Ukuliywa komhlaba: +Uma iphathwa ngokufanele If managed correctly minimal potential for groundwater impact + Ukukhiqizwa kwemvelo yamakhemikhali e-hydrocarbon - Ukukhishwa kwemoya kusuka ekusetshenzisweni kwemishini nokuqeda-gassing kusuka ekuhlungeni inqubo - Ukukhwabanisa ezindaweni eziphezulu zemvula kungabangela ukungcola kwamanzi angaphezulu -Kungabandakanya izidingo zokuqapha okukhulu - Ukutholakala okulinganiselwe / isipiliyoni sokuphathwa kwezinsimbi eNingizimu Afrika
Ukuqothula: - Ukucindezela okungaphezulu kwezindleko zokuhlala ezikhona - Imfuneko engenzeka yokwenza imisebenzi yokubuyisela emuva / yokubuyisela ukugunyazwa kokusetshenziswa komhlaba	Ukuqothula: - Ucela ukuphathwa nokuqapha okufanele kungase kube nezidingo ekuqokethwe okunezikhulu zamafutha ezinsalela - Kubalulekile ukuthuthukisa izindawo ezithile zokwelapha - Izidingo zomhlaba - Kungenziwa ukunciphisa imithetho yendawo	Ukuqothula: - Imithelela yamanzi angaphansi komhlaba namanzi angaphezulu - Ukukhipha umoya okuhlobene nemishini yomhlaba- Kungenzeka kube nemingcele ekuqokethwe kweoli yama-waste - Ukutholakala okulinganiselwe / isipiliyoni sokuphathwa kwezinsimbi eNingizimu Afrika

Nakuba ukhetho lokudoba olwandle lunomvuzo wokuthi alushiya ukuqoqwa kwezicucu olwandle, kunezimo eziningana (isb. Ukucindezela okwengeziwe eziteshini ezikhona zokungena komhlaba kanye nemithelela engaba khona emifinini nasemanzini angaphansi komhlaba) futhi kuhlela inani elikhulu lemishini eyengeziwe, ezokuthutha, nezindawo.

Izimfuneko zokuthutha ezengeziwe zokudlulisa izicucu ogwini ziyandisa izingozi zemvelo nezokuphepha ezihlobene nokuthunyelwa nokuphathwa kwezinto.

Ukucabangela izici ezixoxwa ngazo ngaphambili, isimo esinamandla semvelo yasolwandle endaweni ngayinye yesithakazelo kanye nokunciphisa izinyathelo zokulima umhlaba kanye nezindawo zokuchitha imfucuzwa endaweni, kucabangela ukungabi khona kwezindawo ezininikezele zokwelashwa kwe-cuttings, ngokusho kweNingizimu Umthetho wase-Afrika, umkhuba wamazwe omhlaba wonke kanye nemihlahlandlela ye-Eni, ukhetho olukhethwa ngu-Eni lungelapha futhi lukhipha izidakamizwa ngokuhambisana nezidingo ezichazwe ngaphambilini.

3.9.3

Umklamo noma Ezinye Izindlela Zesakhiwo

Amanani Emithombo

UEni uhlongoza ukumba:

- Imithombo efika kwemine phakathi nendawo esenyakatho yesithakazelo: efika kwemibili imithombo yokuhlola nefika kwemibili imithombo yokucusumbula; futhi
- Imithombo efika kwemibili phakathi nendawo eseningizimu yesithakazelo: owodwa umthombo yokuhlola nowodwa umthombo wokucusumbula.

Ukulandelana kwezikhathi nenani lemithombo yokuhlola zizoncika emphumelweni womthombo wokuqala wokuhlola.

Eminye imithombo eyengeziwe ngeke yembiwe ngesikhathi esifana nesomthombo wokuqala. Lombiko uhlola ithonya lokumba umthombo owodwa phakathi kwendawo ethakazelelwayo.

Ukuhlela

Ukwembiwa komthombo wokuqala wokuhlola kulungiselelwe isikhathi esiphakathi kukaNovemba 2019 noMashi 2020, kuncike ngokuba khona komkhumbi wokumba, phakathi kwezinye izidingo zokuhlela. Ukumbiwa komthombo owodwa cishe kuzothatha izinsuku ezingu-71 ukuba uqedwe. Isikhathi esilandelanayo nenani lokuhlola okwengeziwe kuzoncika emphumelweni yokwembiwa komthombo wokuqala.

Isahluko 7 no 8 salombiko sihlolisisa umphumela wokumba omunye walemithombo ephakathi kwendawo yesithakazelo engxenyeni ngayinye ngesinye nesinye isikhathi onyakeni futhi kucatshangelwa isikhathi senkathi.

3.9.4

Isinqumo Esingathintwa

Umthelela Yokungayiz okunye uhlolwe, eSahlukeni 7 salombiko, ngokuhambisana nezidingo zoMthetho we-EIA, 2014 (njengoba uchitshiyelwe). Ukungayi okuhlukile awufaki ukuguqulwa kwesimo somumo, ngamanye amazwi imisebenzi yokuhlongozwa kokuhlola ehlongozwayo ngeke iqhutshwe ku-ER236.

Inketho yokungaqhubeki nokuhlola ukuhlolwa noma ukuhlolwa kwe-appraisal izoshiya izindawo zezindawo zokudoba ezingaba khona esimweni sabo samanje esingokwemvelo, okukhona okungenzeka okungaziwa ngamafutha / kwegesi.

4.1

AMANQAMPUNQAMPU ESIHLOKO

Inhloso yalesi *Sahluko* ukuveza izici zezinto eziphilayo ezikhona kanye nezenhlalo nezomnotho eNdaweni YeProjekthi. Isisekelo siba yiphuzu okuqhathaniswa nalo ngokuphathelene nezinguquko ezingabikezelwa nezingalokhu zibhekiwe.

Lesi *Sahluko* siveza izimo eziyisisekelo eNdaweni YeProjekthi. Isisekelo satholwa ngokuhlola imininingwane ekhona, ebandakanya amaphrojekthi adlule enzeke ezindaweni eziseduze, amadokhumenti kamasipala, namawebhusaythi ezenhlalo njengoba kuboniswe ekupheleni kwale dokhumenti. Ngaphezu kwalokhu, i-Marine Ecology Assessment, okuyiSifundo Sezokudoba kanye ne-Underwater Cultural Heritage Assessment, kwaqhutshwa ukuze kutholwe izimo zesisekelo seNdawo YeProjekthi.

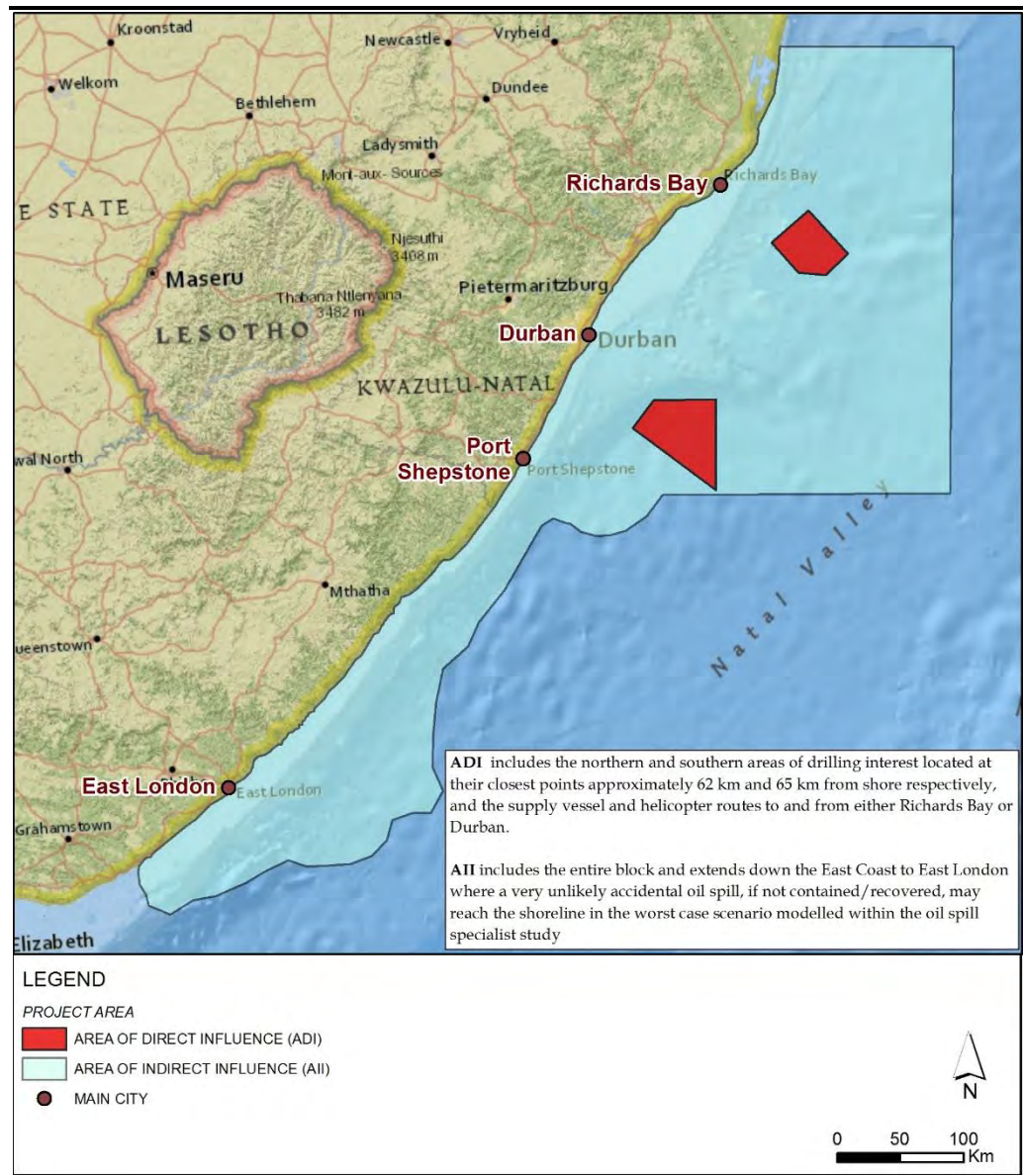
4.2

INDAWO YEPROJEKTHI

INDawo YeProjekthi yakhiwa yizinto eziphilayo nezimo zezenzhlalo nezomnotho ezingathe zithintwe ngokuqondile noma ngokungaqondile yimisebenzi yeprojekthi echazwe ngezansi. INDawo YeProjekthi ihlukaniswe ngokuthi i**NDawo Enomthelela Oqondile (ADI) neNDawo Enomtholela Ongaqondile** kuye ngomthombo nezisusa zomthelela futhi-ke ububanzi bazo buzohlukahluke kuye ngohlobo lwesitho esithintekayo.

INDawo YeProjekthi iwugu lwaKwaZulu-Natal (KZN), phakathi kwe-St Lucia ne-East London bese ihlanganisa nalo lonke iBlok ER236. I-ADI ihlanganisa izindawo ezisenyakatho naseningizimu zokubhola (*INGxenye 4.2*), ezibekwe kude-bu duze cishe ngo-62 km no-65 km ukusuka ogwini, nezindlela zemikhumbi nezezindiza ezinophephela emqolo ezisuka noma ziya eRichards Bay noma eThekwini. I-AII ihlanganisa yonke ibloki ibuye yenabele ezansi oGwini Lwasempumalanga kuya e-East London lapho uchitheka ngephutha kukawoyela, uma unganqandwa / ungabuthwa, ungase uyofika emaphethelweni ogu esimweni esibi ngempela esiboniswe ocwaningweni longoti ekuchithekeni kukawoyela (*IShadi 4.1*).

IShadi 4.1 Ibalazwe elibonisa iNdawo YeProjekthi, kanye ne-ADI ne-AII



Amagesi Ayingozi ENingizimu Afrika (GHG)

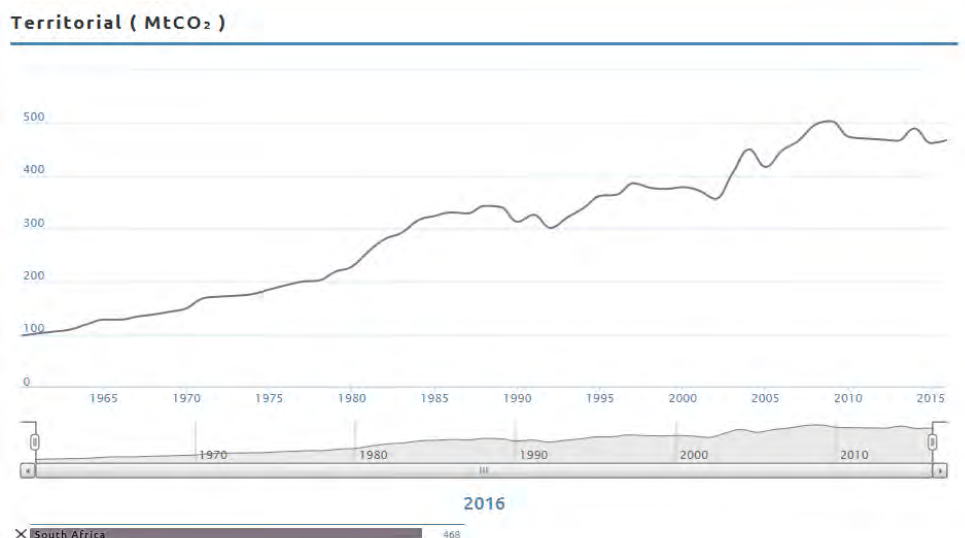
Ngenxa yokukhathazeka ngokwanda kwamagesi ayingozi emoyeni kanye nomthelela angase abe nawo esimweni sezulu embulungeni yonke, kuvele amasu amaningi, abandakanya neMbizo Yohlaka LweZizwe Ezihlangene Lwezinguquko Esimweni Sezulu ngo-1992. Kwathiwa inhloso ye-UNFCCC iwukudambisa amandla amagesi emkhathini abe sezingeni elizokwazi ukugwema izingozi kwezemvelo esimweni sezulu. UHulumeni waseNingizimu Afrika wagunyaza i-UNFCCC ngo-Agasti 1997.

Ngemva kuka-2001, ukutshelwa komphakathi ngemiphumela yokuxhumana kokuqala kweNingizimu Afrika ne-UNFCCC kwagqugquzela ukuba kuthathwe isinyathelo esinamadla nesizwakalayo ekusungulweni kwenqubomgomo kazwelonke kanye nasezingxoxweni ze-UNFCCC. Ngemva kwalokho, izishayamthetho nezifundiswa zaseNingizimu Afrika bezisebenzisana odabeni lokushintsha kwesimo sezulu. Ngo-2005, umsebenzi wabonakala ngezingxoxo zososayensi nezishayamthetho e-National Climate Change Summit, 'Climate Action Now'. Phakathi kwezinqubomgomo eziyinhloko ezavela lapho kwaba ne-National Climate Change Response White Paper ne-South Africa's Second National Communication ngaphansi kwe-United Nations Framework Convention on Climate Change (SNC) (WIREs Clim Change, 2014).

Ukushintsha kwesimo sezulu kuyikhathaza kakhulu iNingizimu Afrika. Amazinga amabi okushisa akhuke okungenani izikhathi ezingu-1.5 emazingeni abonakele embulungeni ka-0.65°C emakhulwini eminyaka amahlanu adlule nenani lezikhathi zezimvula ezinkulu liye lakhuphuka (WIREs Clim Change, 2014).

Umnotho waseNingizimu Afrika uncike kakhulu kuwoyela wemvelo futhi leli zwe kungashiwo ukuthi yilo eliwasebenzisa kakhulu ngenxa yezinzuzo ezinkulu ezingatholwa ngokuqina kwemikhiqizo kanye nemikhiqizo yekhaphitha ngayinye (DEAT, 2004).

INingizimu Afrika inekhaphitha yomkhiqizo ephezulu kakhulu uma iqhathaniswa namanye amazwe ase-Afrika futhi, ngezinga elithile, emhlabeni wonke. Ngenxa yalokho, ukudambisa ukushintsha kwesimo sezulu bekulokhu kuseqhulwini iminyaka eminingi. Ikhaphitha yamanje yemikhiqizo ye-CO₂ iphezulu (isilinganiso esingu-8.3 tonnes/ngomuntu) uma iqhathaniswa namanye amazwe ase-Afrika futhi, ngezinga elithile, emhlabeni wonke (isilinganiso esingu-4.8 tonnes/ngomuntu) futhi ngenxa yalokho, ukudambisa ukushintsha kwesimo sezulu bekulokhu kuseqhulwini iminyaka eminingi. Ingqikithi yamanje yemikhiqizo ye-CO₂ eNingizimu Afrika ingu-468 Mt ye-CO₂ (Global Carbon Atlas, 2018, WIREs Clim Change, 2014, *IShadi* 4.2).



Umthombo: Global Carbon Atlas, 2018

Umthelela Ongabangelwa Ukushintsha Kwesimo Sezulu

I-South African Country Studies Programme yabheka umkhakha wezempilo, umakhakha wezolimo (ikakhulu ukukhiqizwa kommbila), izitshalo nezilwane, imithombo yamanzi, kanye namadlelo, njengezindawo ezichayeke kakhulu ekushintsheni kwesimo sezulu okudingeka kugxilwe kuzo ekutholeni izindlela zokwamukela izimo (DEAT, 2004).

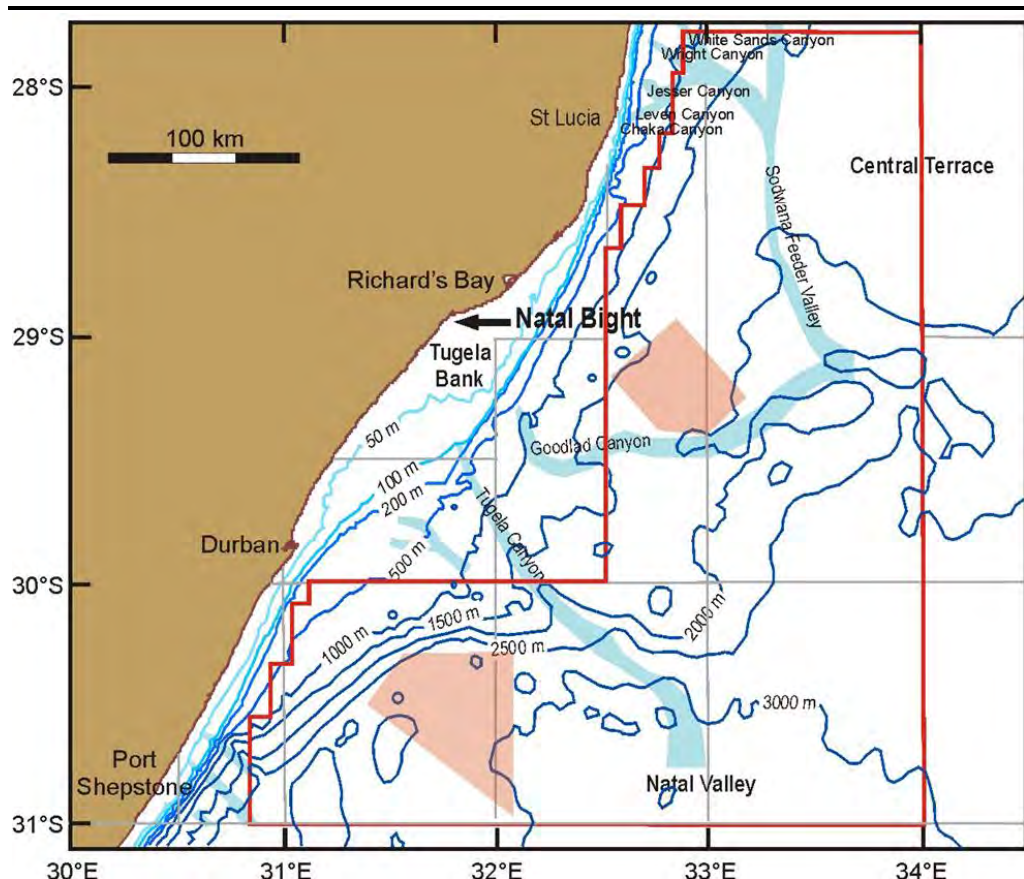
Ngokwe-Madzwamuse (2010), amazing okushisa aphakeme, ukuncipha kwezimvula nokuswelakala kwamanzi kuzozithinta kabi kabi kakhulu ezolimo eNingizimu Afrika. Imithelela emikhulu iyoba ukuncipha kwamasimu alimekayo nezindawo zokufuya, ukuncipha kobude kengathi yokulima kanye nokuncipha kwezivuno, ikakhulukazi ezindaweni ezithi azome nalezo ezomile.

Ingxubevange ibalulekile eNingizimu Afrika ngenxa yendima yayo ekulondolozeni izitshalo, ukubaluleka kwayo ngokwezomnotho ezivakashini kanye nendima yayo ekwesekeni impilo. Umthelela wokushintsha kwesimo sezulu kungabangela ukulahleka kwezinto eziningi eziphilayo okuyoyikhinyabeza kabi imiphakathi yendawo nezomnotho wezwe lonkana.

Imithombo yamanzi nayo ingakhinyabezwa kabi yimiphumela yokushintsha kwesimo sezulu okuyobangela izinguquko ekutholakaleni kwamanzi okuyophumela ekuncipheni nasekuswelakaleni kwamanje ngaleyo ndlela kukhinyabeze imisebeniz yezinto eziphilayo.

Ukujula Kolwandle Nenzika

Ukwakheka kwamaphethelo oGu Lwasempumalanga kuthi akufane, kuthi ukushintsha empuma-nyakatho yasenyakatho. Uphawu olugqame kakhulu yi-Natal Bight, isikhala esiphakathi kwe-Cape Vidal neTheku (ISHadi 4.3).

*ISHadi 4.3**Ukujula Kolwandle Lwasegwini Lwasempumalanga YaseNingizimu Afrika*

Phawula: Eshadini kuboniswe iBloki ER236 (ngamashashalazi abomvu), izindawo zokubhola enyakatho naseningizimu (amashashalazi a-orenji) kanye nezici nezindawo okukhulunywe ngazo embhalweni. Imigodi yemikhumbi-ngwenya nemisele engenelayo (amashashalazi aluhlaza) njengoba kuboniswe kuyi-Lombard *et al.* (2004) nayo iveziwe.

Umthombo: Pisces, 2018

Ingxenye enkulu yoGu Lwasempumalanga inesigodi esincane kanye nawa. UGu LoTugela, olungasogwini lwase-KZN phakathi kuka-28° 30' S no-30° 20' S, luyindawo eqavile esigodini. Lapha isigodi siyavuleka sibe ngu-50 km, ububanzi obukhulu bufinyelela oGwini Lwasempumalanga (Lutjeharms *et al.*, 1989) kuthi iwa lingabi libi kakhulu (Martin & Flemming, 1988). Ukuya eningizimu, ubukhulu behlela e-Natal Valley, kuyilapho ukuyela empuma-nyakatho bunwebekela e-Central Terrace (ISHadi 4.3).

UGu LoTugela lungenelwa yimihosha emibili: iTugela Canyon enkulu neqavile, ejulile kune-Goodlad Canyon encane (ebizwa nangokuthi i-29° 25' S).

Indawo engasenyakatho yokubhola kahle isempumalanga yeNatali Bight ekujuleni kwamanzi okungu->1,500 m. Indawo eseningizimu ethandekayo ise-Port Shepstone ekujuleni kwamanzi okungu-2 600 m, eningizimu yeTugela Canyon. Awukho kule mihosha ongenelwa yilezi zindawo ezibhekiwe.

Omunye umhosha useningizimu yoGu lapho indawo engasolwandle incipha khona futhi le ndawo yehlela khona eNatal Valley (eseduze ne-Port Shepstone).

Ayiyiningi imininingwane ekhona nge-Goodlad Canyon; kodwa, kubikwa ukuthi iqale njengendawo encane ejule ngamamitha angu-20 (Martin & Flemming, 1988) yaya ijula ngamamitha angu-250 kuyilapho ivuleka ngamakhilomitha angu-50, isigodi esingajulile endaweni engu-1,400 m. Iwa lezindonga zomhosha alitshekile kakhulu kunele-Tugela Canyon futhi mincane imingenela yayo (Young, 2009). Akukho mininingwane etholakalayo nge-Goodlad Canyon ngqo (Pisces, 2018).

Imihosha ye-Tugela neye-Goodland ihluke kakhulu kunesenyakatho KZN. Okokuqala, izinhloko zemihosha azimile okwenkundla yokudlala. Okwesibili, itholakala ekujuleni okukhulu kakhulu kuneSodwana Feeder Valley futhi ayikwazi ukuxhumana, futhi okokugcina, ayikhombisi kuba nemingenela egqamile (Wiles et al., 2013).

UGu LoTugela luyinzika eyinhloko yendawo engasolwandle e-KZN, engenelwa uMfula uTugela noMfula uMgeni. Ukusakazeka kwenzika eBight kulawulwa ukusebenzisana okuxakile kwendawo engasolwandle, uMoya I-Agulhas, amagagasi, ukujikeleza okuqhutshwa umoya, inzika kanye nokutholakala kwe-gyre engapheli. Ngaleyo ndlela iphansi lolwandle liyinzika ngokwemvelo kodwa lihlukahluka ngezinga elihlanganisiwe ngalo (CBD, 2013).

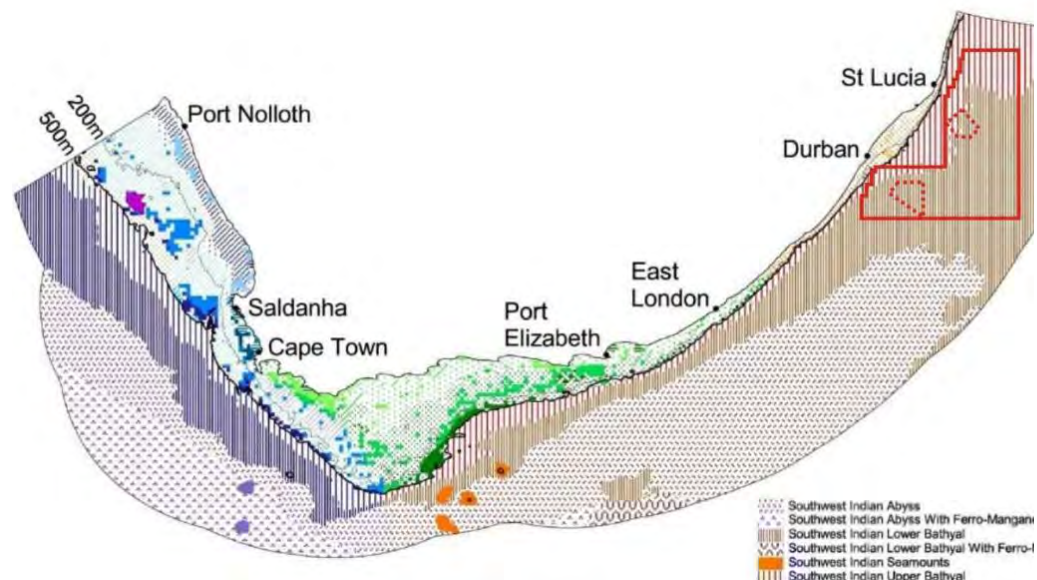
Enyakatho yeTheku, indawo engasolwandle igcwele kakhulu isihlabathi (0.063 kuya ku-2 mm), nezindawanyana zamatshe amancane (> 2 mm) okwezenzeka kuyo yonke indawo. Izingxenye eziphakathi nendawo engasolwandle ziqukethe inzika engamaphesenti angaba ngu-60 odaka. Izindawo ezinkulu ezimbili okuthululekela kuzo udaka zitholakala emlonyeni woMfula uTugela, kuyilapho encane itholakala eSt Lucia. Lezi zindawo zodaka azivamile ngasogwini olusempumalanga yeNingizimu Afrika, zakhiwa amaphesenti angu-10 kuphela endawo engasolwandle (Demetriades & Forbes, 1993). Udaka nezinye izakhi ezihambisana nalo kwakha indawo yokuhlala egcwele izinto eziphila olwandle ezithanda izidaka namanzi angcolile. Naphezu kokuba kakhulu yinzika ethambile, amagquma amadwala asolwandle (Fennessy, 1994a, 1994b; uLamberth et al., 2009) ezenzeka nje endaweni engu-50m edolobheni laseThekwini nango-200m eRichard's Bay.

Eningizimu yaseThekwini, inzika yakhiwa kakhulu yisihlabathi phakathi ogwini nangaphandle, nakuba kunanezinhlayi ezininganga zamatshe phakathi nangaphandle kwesigojana kuze kuyofika ePort St Johns, okuba mahhadlahhdla ezindaweni ezinomswakama noma ezingenayo imfucuza Iminonjana yodaka ikhona ezindaweni eziningi zesigojana, nakuba izindunduma zodaka zingekho.

I-Agulhas Yamanje kanye/noma amagagasi ayakuthinta ukuma kwenzika ezigojaneni sase-KZN. Enyakatho naseningizimu yoGu uTugela, i-Agulhas Current ikhiqiza izindunduma zamasimu emikhawulweni yesigonjana (Flemming & Hay, 1988). Ngokuphambene nalokho, izinzika esigojaneni endaweni yoGu uTugela kuya ekujuleni okungamamitha angu-100 zithintwa ikakhulukazi ngamagagasi (CSIR, 1998). Eningizimu yoMfula i-Ilovo isigojana sakhiwa isihlabathi, kuyilapho amaribhoni esihlabathi nemisebe yenzeka phakathi nesigojana, kunonqenqema lwamatshe kakhulu emkhawulweni wesigojana.

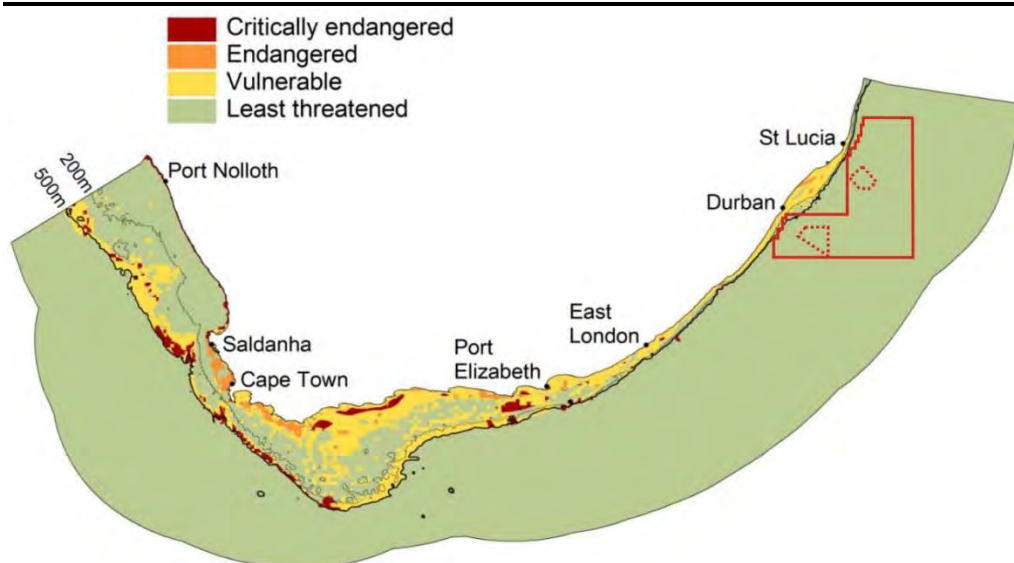
Isigojana esingaphandle sigcwele izicucu zegobolondo kanye nezinto ze-algal-nodule (Heydorn et al., 1978). Izinzika zesigojana sangaphandle zithintwa kuphela yi-Agulhas Current enamandla, kwakheke izindunduma ezinkulu eziya ngaseningizimu-ntshonalanga. Izindunduma ezisesigojaneni zichayeke ezinguqukweni zamanje (Uken & Mkize, 2012). Indawo engasenyakatho yokubhola ihlanganisa izindawo ezihlala izinto zasolwandle eNingizimu-Ntshonalanga ye-Indian Upper and Lower Bathyal, kanti indawo yezinto zasolwandle ye-Indian Lower Bathyal benthic ilawula indawo eseningizimu (IShadi 4.4). Zombili kwathiwa zibheke nosongo olungelubi e-SANBI 2011 National Biodiversity Assessment (Sink *et al.*, 2011)) okubonisa izinga elikhulu lokwenaba kwalezi zindawo-South African Exclusive Economic Zone (EEZ) (IShadi 4.5).

IShadi 4.4 Izinhlobo Zezindawo Zokuhlala Izinto Zasolwandle OGwini Lwasempulanga ENingizimu Afrika



Phawula: EShadini kuboniswe iBloki ER 236 (ngomugqa obomvu) nezindawo ezikahle zokubhola (umugqa wamachashaza abomvu)

Umthombo: Ithathwe e-Sink *et al.* 2012 in Pisces, 2018



Phawula: Ishadi libonisa iBloki ER 236 (ngomugqa obomvu) nezindawo ezikahle zokubhola (ngomugqa wamachashaza abomvu)

Umthombo: Ithathwe eSink *et al.* 2012 in Pisces, 2018

Umthamo Wamanzi Nokujikeleza Kwawo

I-oceanography yalolu gu cishe ilawulwa kakhulu yi-Agulhas Current efudumele evunguza eningizimu eceleni kwesigojana (Schumann, 1998) (Ishadi 4.6). Umthombo oyinhloko we-Agulhas Current uvela ekujikelezini kwamanzi e-South-West Indian Ocean.

Ezinye izinto ezixhasa i-Agulhas Current zivela eMozambique Current kanye nase-East Madagascar Current ngemimoya ebalulekile eheleza ngamandla (uLutjeharms, 2006). Iheleza ngaseningizimu ngesilinganiso esisheshayo ngemuva konqenqema lwesigojana oGwini Lwasempumalanga, ngaphambi kokuphindaphindeka phakathi kuka-16 ° no-20 ° E (Shannon, 1985). Kuwukutshuza okuchazwe kahle nokujulile okungaba ngu-100 km ububanzi kanye no-2,300 m ukujula (Schumann, 1998; Bryden *et al.*, 2005). Isivinini samanje sika-2.5 m / s noma ngaphezulu sirekhodiwe (Pearce *et al.*, 1978).

Lapho ihlangana khona engxenyeni esenyakatho yoGu uTugela ngase-Cape St Lucia, i-Agulhas Current iyithuthela emanzini ajulile. Lokhu kudala ukungazinzi okwamanje (Gill & Schumann, 1979) okuholela ezivunguvungwini nemimoya (Pearce *et al.*, 1978). Kutholwe izinhlobo ezintathu zemimoya e-Agulhas Current (Gründlingh, 1992):

Umdwebo 4.1 Izinhlobo Zemimoya Ezitholwe Kuyi-Agulhas Current

Uhlobo	Incazelo
Uhlobo I	Yizivunguvungu ezakhiwa yimimoyana engaba okungenani ngu-50 m, enyamalalayo ngokuhamba kwezinsuku
Uhlobo II	Yizivunguvungu ezakhiwa yimimoya ejikelezayo esuka e-Natal Bight. Le mimoya ichazwe ngezansi: - Le mimoya enamandla ye-Natal Pulse yenzeka lapho izivunguvungu zingena ngaseningizimu yogu, okubangela ukuvunguza ngamandla kwangezikhathi ezithile ngasenyakatho kuye ngaphakathi kolwandle (Schumann, 1988); - I-Natal Gyre enkulu ijikeleza isuka eThekwini iyofika eRichard's Bay, okubangela ukuva ivunguzele phakathi enyakatho yolwandle (Pearce, 1977a, 1977b).
Uhlobo III	Yizivunguvungu, eziyizivunguvungu ezinkulu eziqala enyakatho ye-St Lucia.

Umthombo: Pisces, 2018

Eningizimu yeThekwini, isigojana siphinde sinciphise futhi i-Agulhas Current inamathele kabusha ogwini, kuze kube sePort Edward isondelene kakhulu nolwandle kangangokuba unqenqema lwalo (okuboniswa yizinga lokushisa komoya) aluvamile ukubonakala (Pearce, 1977a). E-Port St Johns, nokho, kukhona imimoya engapheli, ehlela ezivunguvungwini eziya ngasenyakatho kanye nokuhamba kwamanzi apholile emthambekeni phakathi nendawo esigojaneni esincane kakhulu (uRoberts et al., 2010). Ngaseningizimu, lapho i-Agulhas Current ifinyelela uGu i-Agulhas olubanzi futhi lapho imithambeka ithambe khona, iqala ukukhipha izivunguvungu, imimoya emincane nesitimu samanzi afudumele onqenqemeni lwesigojana, ngaphambi kokuphindaphindeka empumalanga njenge-Agulhas Return Current ukuze ulandele i-Subtropical Convergence (uLutjeharms, 2006) (*IShadi 4.6*).

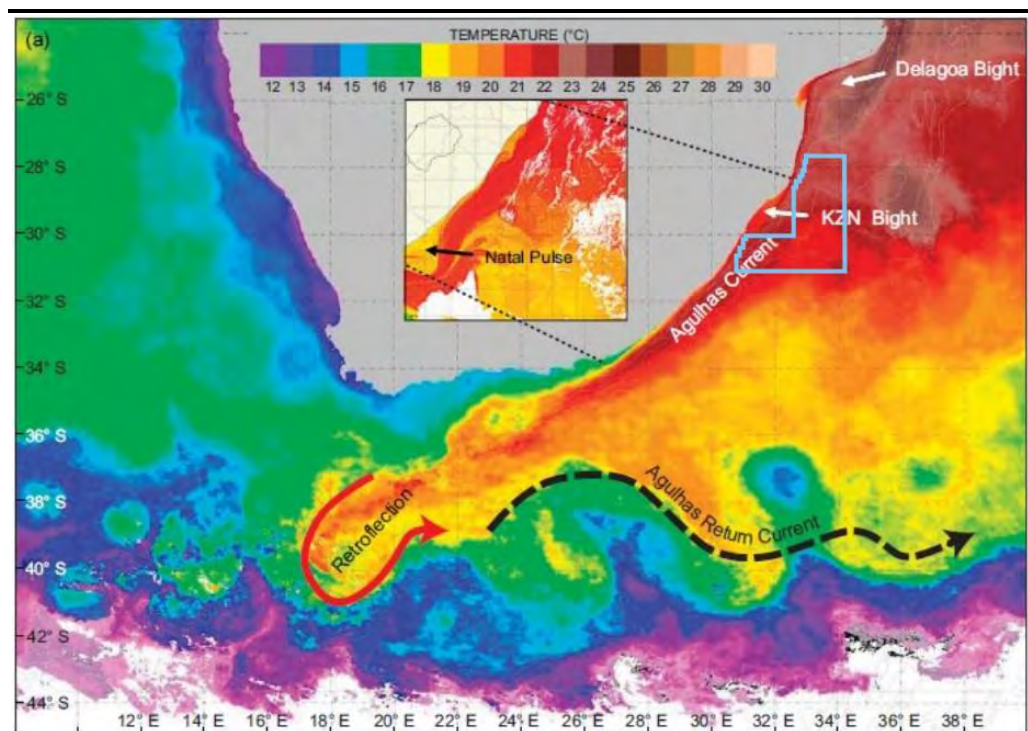
Ngokufanayo neminye imikhawulo yemingcele yasentshonalanga, imimoya engaphansi yasenyakatho (kuya ngasenkabazwe), okuthiwa i-Agulhas Undercurrent, itholakala emthambekeni wase-East Coast ekujuleni okuphakathi kuka-800 m no-3,000 m (Beal & Bryden, 1997).

Njengoba i-Agulhas Current ivela esifundeni se-equatorial entshonalanga ye-Indian Ocean, amanzi ayo avame ukuba luhlaza futhi ahlanzekile, anezinga eliphansi lokudla kanye nezinga eliphansi lwezingqimba ze-chlorophyll. Kodwa-ke oGwini LoTugela, izakhi zibhekene nokushintshashintsha kwesikhathi esifushane, kodwa ziphakeme kunezindawo lapho isigojana sisincane khona (Carter & d'Aubrey, 1988).

Lokhu kuboniswa ngokwengxenywe, yizindunduma ezenzeka endaweni engaphansi kwamanzi eNatal Bight (Gill & Schumann 1979; uSchumann 1986; uLutjeharms et al., 1989). Izindunduma zezakhi zamanzi abandayo ziyimithombo yamanzi angaphansi eNatal Bight (Lutjeharms et al., 2000a, b). Kodwa-ke, kuzo zonke ezinye izindlela, i-Bight ingase ibhekwe njengesiziba esingavalekile kahle (Lutjeharms & Roberts, 1988) njengoba i-Agulhas Current enamandla onqenqemeni lwakha umgoqo wokushintshana kwamanzi ne-biota olwandle oluvulekile.

Indawo efunywano ikujana futhi ingasempumalanga yoGu LoTugela, okusho ukuthi umsoco ungase uyoba phansi kakhulu lapho.

IShadi 4.6 Ukudlondlobala kwe-Agulhas Current iBloki ER 236



Note: Shown on the Figure is Block ER236 (pale blue outline)

Source: Adapted from Roberts *et al.* 2010 in Pisces, 2018

Amanzi ahamba phezulu ayinhlangezisela ye-Tropical Surface Water (evela e-South Equatorial Current) futhi i-Subtropical Surface Water (evela maphakathi ne-latitude ye-Indian Ocean). Amanzi ahamba phezulu afudumele ngamazinga okushisa angu-20°C futhi anosawoti omncane uma kuqhathaniswa ne-Equatorial Indian Ocean, amanzi atholakala ngaphansi e-South Indian Ocean ne-Central. Nakuba kunjalo, izici zamanzi ahamba phezulu ziyahluka ngenxa yokuchayeka emisebeni yelanga (insolation) nokuxubana (Schumann, 1998).

Ukuhluka kwamazinga okushisa ngezinkathi zonyaka kulinganiselwe ngamamitha angaphezu kwangu-50 kwengxenye yamanzi (Gründlingh, 1987), ukuphuka kogu luya phakathi kwamanzi e-Agulhas Current lapho amazinga okushisa angadlula amazinga angu-25° C ehlobo futhi abe ngu-21° C ebusika (Schumann, 1998). Amazinga okushisa ayancipha nakakhulu ogwini lwamanzi angaphakathi futhi kwenzeka cishe kulo lonke i-Bloki ER 236.

Imimoya nokuKhukhumala

Izisekelo zomoya eziyinhloko zasogwini lwase-KZN zihambisana nomoya ogudla ugu, nemimoya edlangile cishe unyaka wonke yasenyakatho nenyakatho esempumalanga neyaseningizimu yeningizimu esentshonalanga

(Schumann & Martin, 1991) nezivivini zomoya ezivamile ezimaphakathi no-2.5 m/s (Schumann, 1998) (*IShadi 4.7 IShadi 4.8*)

Ezindaweni zolwandle eziqhelile eThekwini, ukukhukhumala okuningi kuvela eNingizimu naseNingizimu-yeningizimu-mpumalanga, okukhulu kunakho konke kuba amamitha angaphezu kwayisikhombisa. Phakathi nehlobo nentwasa-busika, okunye ukukhukhumala kuvela empumalanga (*IShadi 4.9*). Isimo sezulu esingavamile esithinta uGu oluseMpumalanga (ngokwesibonelo amaseli omfutho ophansi otholakala eNingizimu Mpumalanga yaseThekwini, uhlukanisa amaseli omfutho ophansi neziphapho zasezindaweni ezishisayo) siba nethonya elinamandla esimweni sezulu, lokho kwenza ukukhukhumala okungaphezu kwamamitha ayishumi (Hunter 1988; Schumann 1998). Amagagasi amakhulu kakhulu (>angamamitha angu-20 ukuphakama) abonakalayo ezikhathini eziningi phakathi kwe-Agulhas Current (Heydorn & Tinley, 1980), ayaphakama lapho kuhlanguka ukukhukhumala kwaseningizimu-mpumalanga ne-Agulhas Current evunguzayo yaseningizimu, ngezinye izikhathi mhlawumbe kuba ingozi yokuhamba olwandle.

Kuyi-AII esoGwini oluseNingizimu, imimoya evela entshonalanga inamandla ebusika, ngokuvamile iba isivunguvungu. Phakathi nehlobo, iziqondiso zomoya ovela empumalanga uyakhula ngendlela ephawulekayo ugcine sewunamandla afanayo nemimoya evela entshonalanga nasempumalanga phakathi naleyo nkathi yonyaka (Jury, 1994). Imimoya enamandla iyabonakala ekapa, kuhlanguka ne-Agulhas, i- Infanta, i-Cape Seal, i-Robberg ne-Cape Recife (Jury & Diab 1989). Izikhathi ezizolile zivamile entwasahlobo (CCA & CSIR 1998).

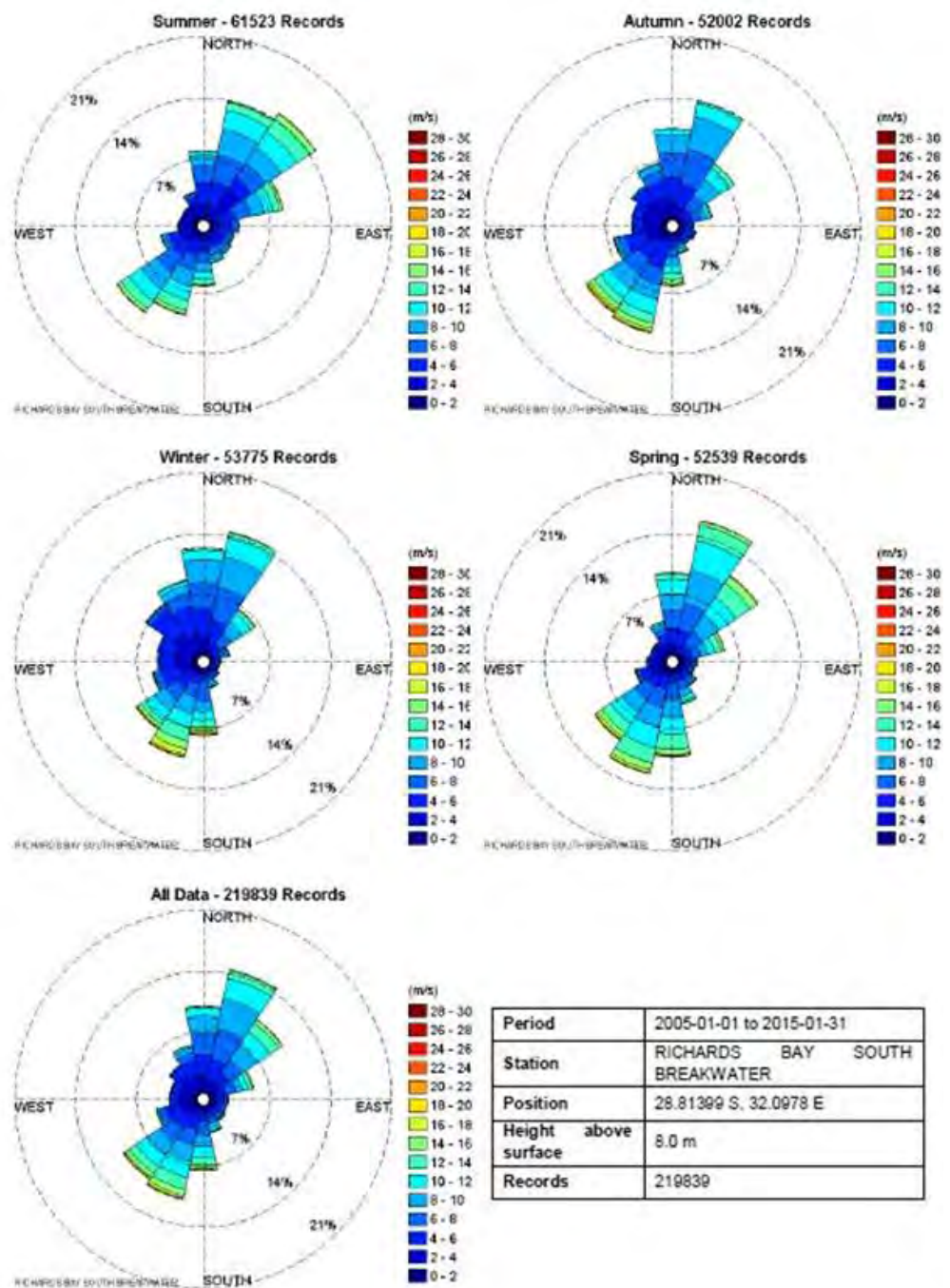
Umoya oqhutshwa yimisinga uvela oGwini oluseNingizimu, ngokukhethekile phakathi ehlobo lapho imimoya evela empumalanga ivela (Schumann *et al.* 1982; Walker 1986; Schumann 1998). Le misinga ngokuvamile iqala ezinhlonhlonhweni bese iqhubekela entshonalanga (Schumann *et al.* 1982; Schumann 1988), futhi lokho kungaholela ekushintsheni kwamazinga okushisa aze afinyelele amazing okushisa angu-8° C phakathi namahora ambalwa (Hutchings 1994).

Imisinga yamanzi emikhulu ye-Indian Ocean Central Water ivela izikhathi ezithile onqenqemeni lolwandle, maphakathi ne-Agulhas Current (Schumann 1998). Le nqubo yenzeka ngenxa yokuhlanguka phakathi kwe-Agulhas Current nesimo sendawo esingezansi (Hutchings 1994), kwenzeka kakhulu emaphethelweni asempumalanga oGu oluseNingizimu, lapho ugqimba olungaphansi luyaqhekeka. Imisinga yamanzi onqenqemeni yolwandle ibonisa ngezina elikhulu namandla esimo sendawo ye-thermocline ne-halocline yesifunda se-Agulhas Bank, ikakhulukazi ehlobo.

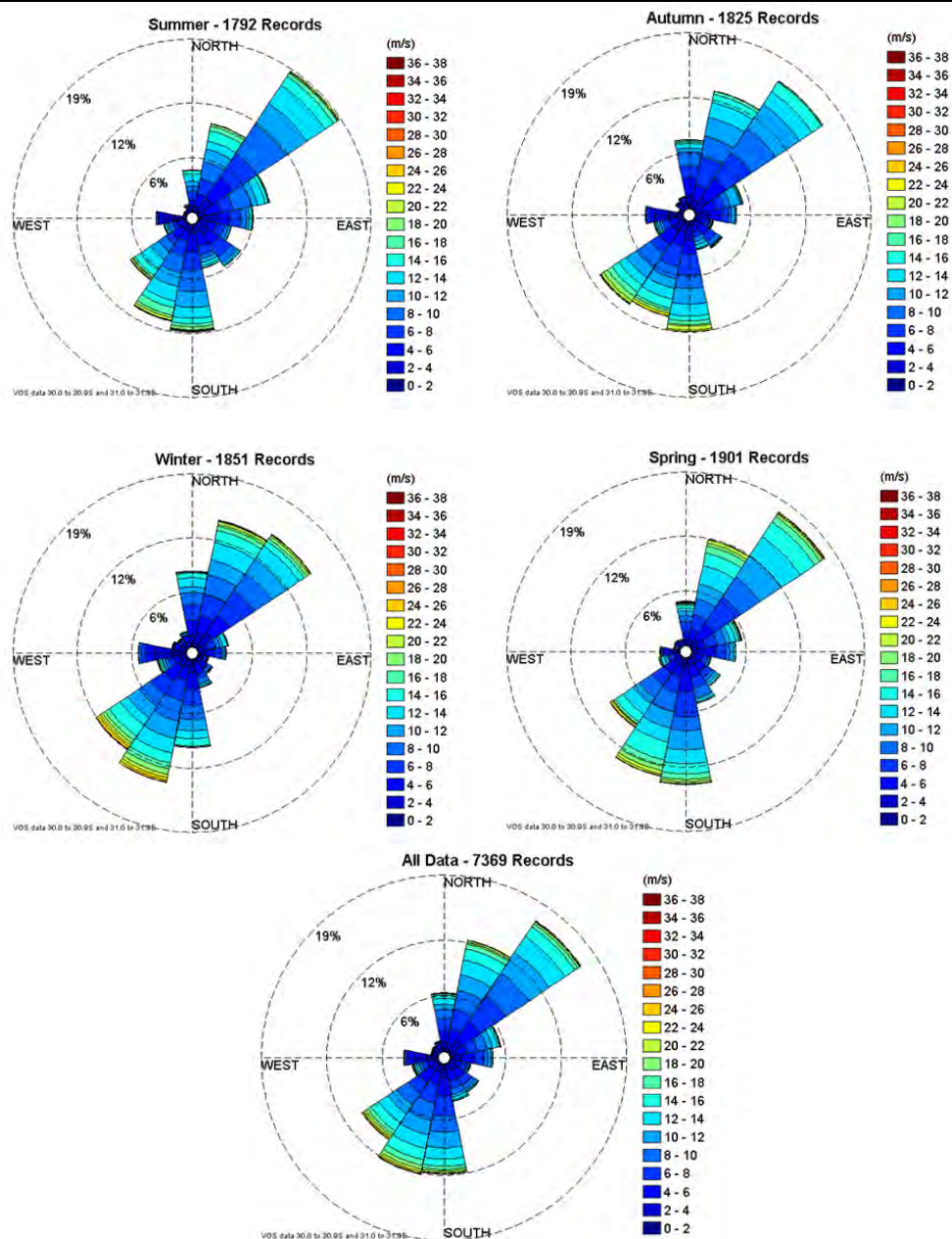
Umsinga wamanzi opholile uyehla ngasohlangothini olumaphakathi olusonqenqemeni enyakatho-esempumalanga (NE) – iningizimu-esempumalanga (SW) ezifundeni eziphakathi konqenqema lwamanzi

asogwini eduze nogu (Swart & Largier 1987; Boyd & Shillington 1994; Schumann 1998), ukuhlukanisa amanzi ezingxenyeni ezimbili esifundeni esisogwini nesimo esihlanganisiwe esifundeni esisogwini olusempumalanga.

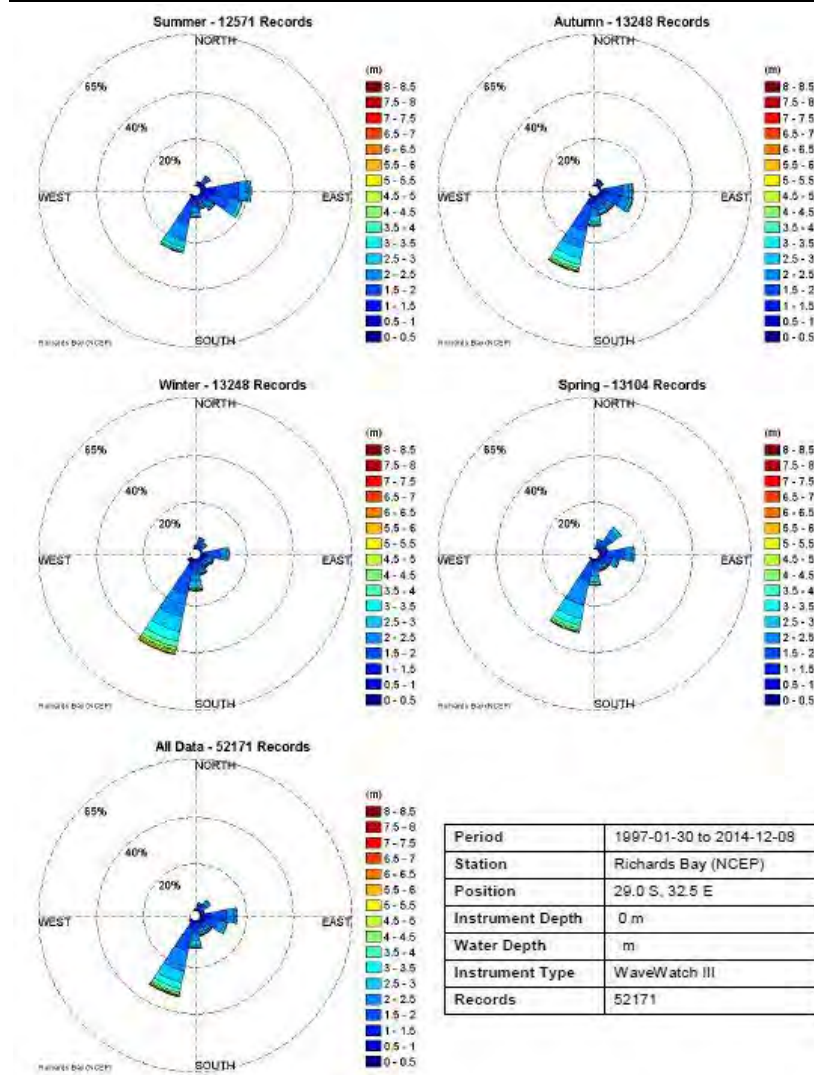
OGwini oluseNingizimu, amagagasi amaningi avela kuyi-quadrant eseningizimu-ntshonalanga (Whitefield *et al.* 1983), izimo zamagagasi ezinamandla phakathi kobusika nentwasahlobo (Carter & Brownlie, 1990). Amagagasi avela kuloluhlangothi luvame ukudlula amamitha ayisithupha (6m) (Swart & Serdyn 1981, 1982) futhi angafinyelela amamitha ayishumi (10m) (Heydorn 1989). Phakathi nehlobo, imimoya evela empumalanga iyavela 'ezilwandle' (Heydorn & Tinley 1980; Heydorn 1989; Carter & Brownlie 1990).



Umthombo: 1960-02-15 to 2012-04-13; 4,515 imibiko eku-Pisces, 2018

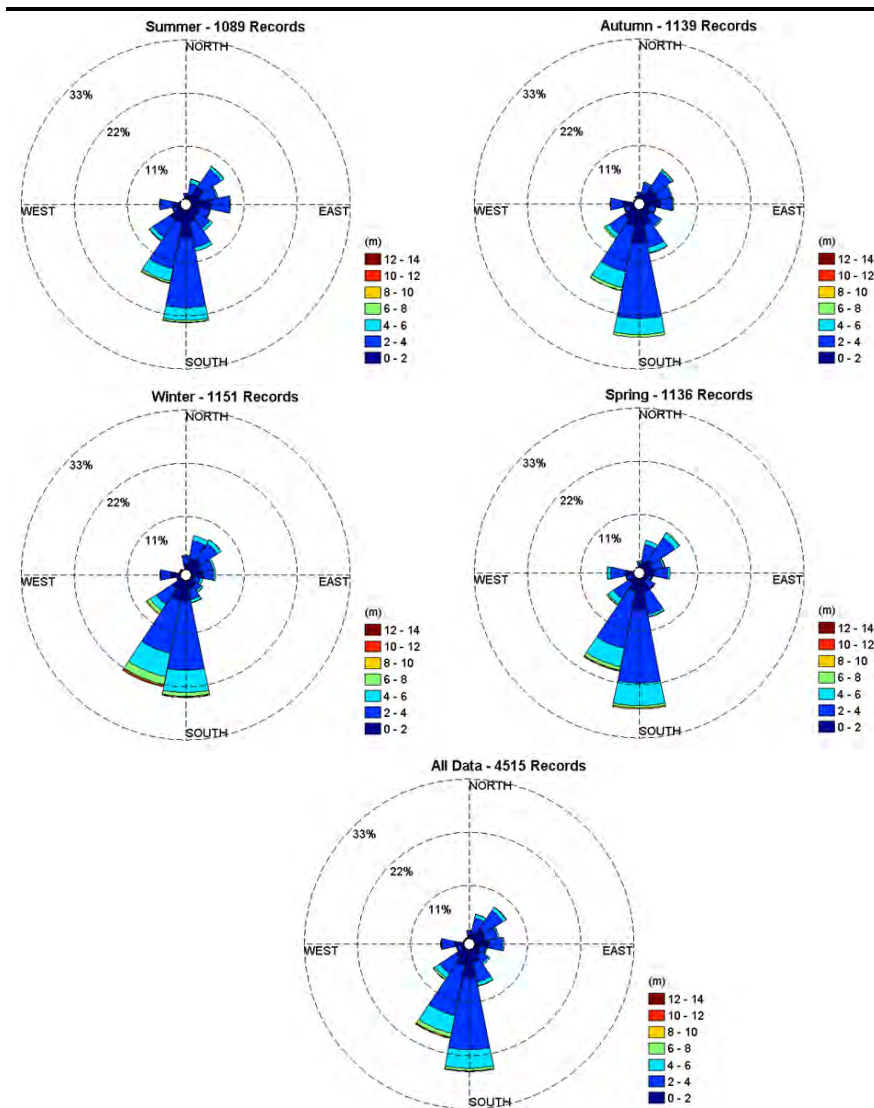


Umtombo: CSIR 1960-02-15 to 2012-04-13; 7,369 imibiko eku-Pisces, 2018



Umthombo: CSIR 1960-02-15 to 2012-04-13; 7,369 imibiko eku-Pisces, 2018

ISHADI 4.10 I-VOS Wave Height (H_{mo})uma iqhathaniswa nesiQondiso Samagagasi e-Port Shepstone (30.0° to 30.9° S and 31.0° to 31.9° E)



Umthombo: CSIR 1960-02-15 to 2012-04-13; 4,515 imibiko eku-Pisces, 2018

Umsoco

Umsoco otholakala eTugela Banks kucatshangelwa ukuthi uvela enhlanganiseleni yomsinga wamanzi ovela e-Richards Bay, i-Tugela River nesiphapho esasivela eThekwini. Umsoco wasolwandle uthathwe emsingeni wamanzi esimweni somhlaba esiseningizimu yase-Richards Bay (Gill & Schumann, 1979; Schumann, 1988; Lutjeharms *et al.*, 1989). Umsoco obandayo womsinga wamanzi angumthombo wamanzi angezansi wayo yonke i-Natal Bight (Lutjeharms *et al.*, 2000a, b), kodwa inani nokuvama kwalo msoco akwaziwa. I-cyclonic eddy inothisa, igcine nama-concentration mechanism kuhlangukise nomsinga wamanzi akhuphula ukukhiqizwa kwe-phytoplankton enyakatho ye-Bight (Lutjeharms *et al.*, 2000b), idala izimo ezidingekile ukuze kuthuthukise ukuphila kwe-larvae nama-juveniles e-pelagic spawners (Beckley & van Ballegooyen, 1992; Hutchings *et al.*, 2003).

Ukutshezi olukhishwa umfula nalo lunengxenywe ebalulekile ekwakheni kwamakhemikhali nezinqubo ezingokwemvelo emanzini asogwini, futhi e-KZN umthelela walo msoco uthululela e-Tugela Banks kucatshangelwa ukuthi umsoco otholakala kulo msinga wamanzi ulinganiselwe (Lamberth *et al.*, 2009). Ukubaluleka kwezinqubo ze-fluvial (ngaphansi kokuhamba kwamanzi okuvamile, ukuncishiswa kokuhamba kwamanzi nalapho kunezikhukhula) ekuhambiseni ukudla kwasolwandle kuye kwathola ukucwaninga nokuqashelwa okudingekile (DWAF, 2004; Lamberth *et al.*, 2009; Turpie & Lamberth, 2010).

Ukungena komsoco emvelweni esogwini kungeniswa umfula kuye kwabikezelwa ukuze kukhuthaze ukukhiqizwa kwe-phytoplankton ne-zooplankton bese ekugcineni kube i-larval, i-juvenile nezinhlanzi esezikhulile ezixhomekeke kuzo njengomthombo wokudla. Ukubanjwa okusikiselwe e-Tugela River kungase kube nomthelela omkhulu ekusebenzeni kwe-ecosystem ye-Tugela Banks, nemiphumela efinyelela kude ukuze kugcineke ukudoba kwezinhlanzi (ezithengiswayo nezokuzidlela ekhaya).

Izimo zamanzi anodaka, anothile ngomsoco zibalulekile ukuze umlando wokuphila (ukuzala, ukunakekela nokudla) kwezinhlobo eziningi zezilwane olwandle. Indawo iphethe okuwukuphela kwendawo yokudoba kwama-prawn trawl ezweni lonkana ngakho-ke ibaluleke kakhulu emnothweni wase-KZN.

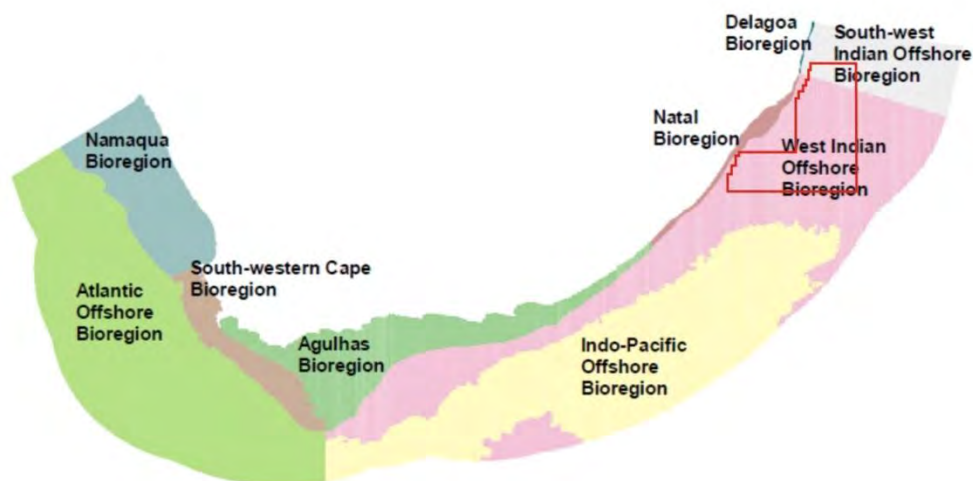
4.3.3

I-Biological Environment

Ngokwesimo sezwe, i-Block ER 236 nendawo esinesithakazelo kuyo iwela e-West Indian Offshore bioregion (*IShadi 4.11*) (Lombard *et al.*, 2004). Izindawo ezisogwini zihlanganisa ngokuyinhloko amanzi ajulile ahlala ama-benthic nendikimba yamanzi. Ngenxa yamathuba angemangingi okuvivinya, ukwazisa kwemiphakathi e-pelagic ne-demersal onqenqemeni logu, ne-continental slope ne-bathyal ephezulu nephansi ayaziwa kabanzi.

Ukwaziswa okuningi esisekelweni semvelo okunikeziwe ngezansi lukhuluma izifuna zogu (amanzi angajulile lapho unqenqema lwe-Thukela Bank luqala ukushona, ngokuvamile amamitha angu-50 okujula kwamanzi) ne-continental shelf (amanzi ajule ngaphansi kwamamitha angu-100), oluwela phakathi kwe-Natal Bioregion (*IShadi 4.11*).

Imiphakathi okukhona kuyo lezi zindawo zokuhlala izilwane ngokuvamile igcwele yonke indawo kulo lonke ugu oluseningizimu LoGu OluMpumalanga ye-Afrika, evame kuphela kuma-substratum type futhi / noma ama-depth zone. Ahlanganisa izinhlobo eziningi kakhulu, izikhathi eziningi zibonisa ukuhluka kwesikhashana. Imiphakathi yemvelo 'evamile' yalezi zindawo zokuhlala izilwane zichaziwe kafushane ngezansi, zigxile kakhulu kuzo zombili eziningi, ezibalulekile kwezomnotho ngisho nezinhlangothi ezisobala, ngisho nalezo zinhlobo ezisengozini noma ezingekho ziningi kakhulu, engase ithintekwe ngenxa yeprojekthi ehlosiwe noma esikiselwe.



Phawula: Okubonisiwe kuleli shadi i-Block ER236 (i-polygon ebomvu)

Umthombo: Ithathwe ku-Lombard *et al.* 2004 ku-Pisces, 2018

I-Phytoplankton ne-Ichthyoplankton

Izici ezingenawo umsoco zamanzi ase- Agulhas Current ziboniswa ngokuqhathaniswa ngokukhiqizwa okuphansi ezindaweni ezisogwini e-KZN, enama-concentration ye-chlorophyll a concentrations asuka ezingeni eliphakathi kuka-0.03 no-3.88 $\mu\text{g}/\text{l}$ (Carter & Schleyer, 1988; bheka futhi Coetzee *et al.*, 2010).

Uma uqhubeka ogwini naku-Block ER236, i-pelagic environment inezici zokukhiqiza eziphansi kakhulu, nokuhluka okuphansi kwamazinga okushisa kwamanzi aphumela ekutheni i-chlorophyll ibe phansi. I-Phytoplankton, i-zooplankton ne-ichthyoplankton (amaqanda ezinhlanzi) ubuningi ku-Block ER236 kulindelwe ukuba kube phansi kakhulu.

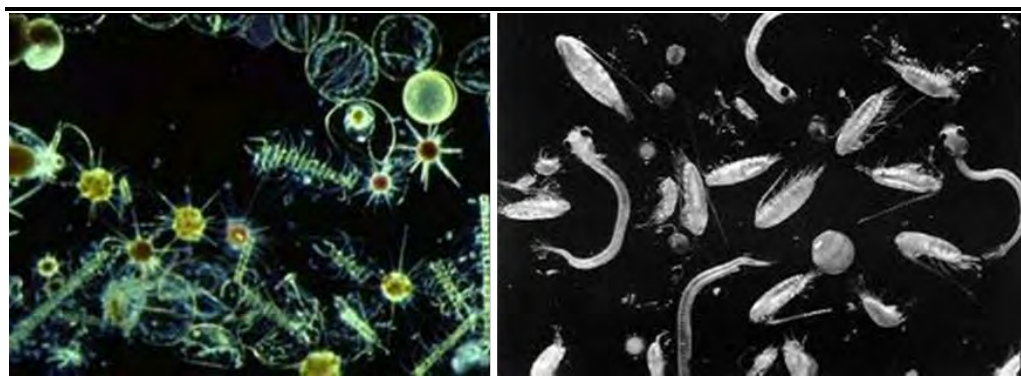
Ngokuhlukile kulokho, e-Tugela Bank, ukukhula komkhiqizo okwesikhashana okuhlotshaniswa nomsinga wamanzi (Oliff, 1973). Amanzi e-continental shelf asekelwa kakhulu nezinhlobo ezihlukahlukene ze-zooplankton biomass (IShadi 4.11) ukudlula amanzi asogwini (Beckley & Van Ballegooyen, 1992), nezinhlobo ezihlukahlukene eziba khona ngezinkathi ezithile zonyaka (Carter & Schleyer, 1988). Ama-copepods amelela izinhlobo okuyizo ezinigni ezisemanzini asonqenqemeni (Carter & Schleyer, 1988), nakuba ama-chaetognaths nawo emaningi (Schleyer, 1985).

Izici zokungabi nomsoco emanzini ase-Agulhas Current ayaboniswa ngokuqhathaniswa okuyinhloko akhiqizwa e-Eastern Cape Coast, nge-chlorophyll a concentration encane ephakathi kwesilinganiso esingu-1-2 mg/m^3 onyakeni wonke kumamitha angu-30 m engxenyeni yamanzi.

I-*Chlorophyll a* concentration ziyahluka ngokwezikhathi zonyaka, ebusika nasehlobo zibancane kakhulu ($<1 - 2 \text{ mg/m}^3$), ne-maximal ($2 - 4 \text{ mg/m}^3$) entwasahlobo nasentwasa busika (Brown, 1992).

Ngasengxenyeni yasempumalanga ye-South Coast (indawo ekude futhi engasenyakatho ye-Port Elizabeth) ubuningi bama-phytoplankton buphezulu kunasentshonalanga (ugu lwase-Agulhas nezindawo zangakhona), zakhiwa kakhulu ama-cells amakhulu (Hutchings 1994). Ukukhuphuka kwasempumalanga kwe-*chlorophyll a* kunquma ukukhuphuka kwe-biomass ye-mesozooplankton kusukela ku-0.5 kuya cishe ku-1.0 g C/m² entshonalanga kusukela cishe ku-1.0 kuya cishe ku-2.0 g C/m² ezanzi yempumalanga. Izindawo ezicinene ze-euphausiids zigcwele kakhulu, futhi ziba umthomb obalulekile wokudla izinhlanzi zasolwandle oluvulekile (Cornew *et al.* 1992; Verheye *et al.* 1994).

IShadi 4.12 Ama-Phytoplankton Nama-Zooplankton Ahlotshaniswa Nama-Upwelling Cells Ogwini Lo Tugela Bank.



Source: left, photo: hymagazine.com, right, photo: mysciencebox.org)

I-Ichthyoplankton

Amaqanda e-Pilchard (*Sardinops sagax*) enzeka, ngokuyinhloko, emanzini angaphandi kuka-200 m, ngaphandle kwe-Block ER236, ngasogwini lwe-Eastern Cape naseningizimu ye-KZN kanye nesiqalo “sokuhamba kwamasadini” phakathi kuka-Meyi noJulayi (Anders, 1975; Connell, 1996). Amaqanda amasadini nezinye izinhlanzi ayaqhubekela emanzini aphakathi ubusika bonke – entwasahlobo, ngaphambi kokuba anyamalale ngasekuqaleni kwehlobo njengoba behlakazeka futhi beya ngasenyakatho nakude nogu (Connell, 2010). Ubufakazi bamuva bubonisa ukuthi izindawo ezimaphakathi nolwandle ogwini lwase-KZN zingase zibe yizindawo zokuzalela zelwanayana ezincane ngezinyanga zobusika (Connell, 2010; Coetzee *et al.*, 2010) ngoba amanzi asasemasha asuke egeleza esuka emifuleni emikhulu aba indawo ekahle yokuchamusela nokwanda (Lamberth *et al.*, 2009). Amaqanda e-anchovy (*Engraulis japonicus*) abikwa emanzini phakathi noDisemba enyakatho ye-St Lucia (Anders, 1975).

Ezinye izinhlobo eziningi zezinhlanzi (njengama-squaretail kob nezinhlobonhlobo zama-sciaenids (ama-snapper, ama-sin croaker, ama-bearded croaker)) zizalela oGwini LoTugela ngenxa yokuba khona kokudla nokuvikeleka ezilwaneni eziyingozi emanzini (Fennesy, 1994a). Ngokwesibonelo, ama-squaretail kob nama-snapper kob amancane avame ukuba maningi ngo-Januwati kuya ku-Mashi, ngaphambi kokuthuthela ezindaweni zokudla ezindaweni eziphansi lapho ekushintsha khona ukudla kube yi-teleosts (Fennessey, 1994a).

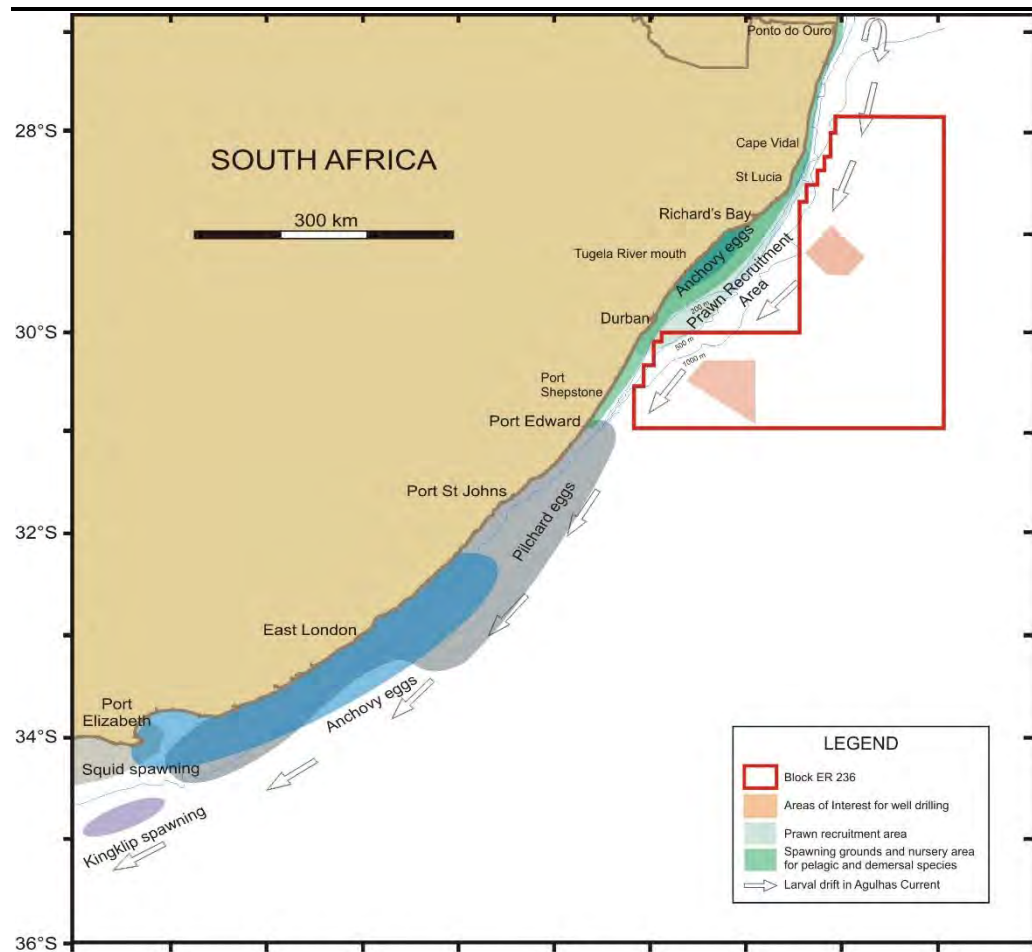
UGu LoTugela lwaziwa ngokuba indawo yokuzalela yoshaka ama-hammerhead abasengcupheni yokushabalala, izimbaza ama-slinger nama-black mussel cracker (CBD, 2013), nezinhlobo ezinhlanu zama-dasyatid rays (Fennesy, 1994b).

Ugu luba indawo yokuzalela (phakathi kwezinye) yama-bull shark, ama-sand tiger shark, ama-black mussel cracker nama-king mackerel nayimizila yofuduko yosadini ('sardine run') (Haupt, 2011; Harris *et al.*, 2011; Sink *et al.*, 2011; Ezemvelo KZN Wildlife, 2012; CBD, 2013). Inqwama yezinhlanzi (njenge-dusky kob *Argyrosomus japonica*, i-elf *Pomatomus saltatrix* ne-garrick *Lichia amia*) zithatha uhambo lokuyozalela amaqanda ezindaweni ezingaphakathi kogu emanzini ase-KZN phakathi nezinyanga zobuzika (Van der Elst, 1976, 1981; Griffiths, 1988; Garratt, 1988).

Iningi lalezi zinhlobonhlobo zibhekwa 'njengezisongelwayo' yi-IUCN (2017) noma libhekwa njengezidinga ukuvikelwa ngenxa yokuxhashwazwa (Sink & Lawrence, 2008).

Ngemva kokuchamusela amaqanga entwasahlobo nasehlobo (Novemba kuya ku-Ephreli), amaqanda nezibungu kuhlakazekela eningizimu yi-Agulhas Current (Connell, 2010) (*IShadi* 4.13), ezincane zivele maphakathi nogu lwase-Agulhas Bank (Van der Elst, 1976, 1981 & Garret, 1988). Ngokufanayo i-ichthyoplankton ihlala emanzini angaphansi kuka-200 m, ne-larval eshiyashyanayo phakathi kuka-0.005 no-4.576 larvae/m³. Ukuqina kuncipha ngokushesha ngebanga elisuka osebeni (Beckley & Van Ballegooyen, 1992). Indawo efunwayo isemanzini ajule ngaphezu kuka-500 m futhi-ke ukwanda kwe-ichthyoplankton kuyoba kuphansi. Njengoba kungabonakala *IShadi* 4.13, indawo ufunwayo ikude nemizila yokuzalela neyofuduko lwezinhlanzi eziningi.

IShadi 4.13 Izindawo Zokuzalela Amaqanda, Ukuchamusela Nokwanda ngasoGwini Lwase-KZN Ngokuqondene NeBlock ER236



Note: Shown on the Figure on Block ER 236 (red polygon) and the areas of interest (orange square)

Umthombo: Pisces, 2018

Inhlanzi

Ama-Pilchards (*Sardinops sagax*) ayizinhlanzi ezincane ngokuvamile ezitholakala ezigojaneni zamanzi phakathi kuka-14 °C no-20 °C. Ukuzalela kwenzeka e-Agulhas Bank phakathi nentwasahlobo nehlobo (Novemba kuya ku-Ephreli). Ngezinyanga zobusika ngoJuni kuya ku-Agasti, ukudlanga kwamanzi aphilile enyakatho ngasogwini lwase-Eastern Cape kuya eningizimu ye-KZN kwandisa kahle indawo yokuphila lolu hlobo lwenhlanzi, okubangela 'ukuputshuka' kwamaqoqo ezinhlanzi ukuya ngasenyakatho egudla ugu kulento okuthiwa 'uhambo lwamasadini'. Ukubanda kwamanzi asogwini kubalulekile kulolu 'hambo' ngoba amasadini kuphakathi kokuthi ayohlala eningizimu noma ayothuthela phakathi nogu enyakatho uma amanzi angasosebeni engaphezu kuka-20 °C.

Amaqoqo ezinhlanzi angaba ngu-20 kuya ku-30 ubude futhi avame ukusukelwa ama-Great White Sharks, Copper Sharks, ama-Common Dolphins (*IShadi 4.16*, kwesokudla), ama-Cape Gannets nezinye izilwane ezinkulu eziyingozi (www.sardinerun.co.za, O'Donoghue *et al.*, 2010a, 2010b, 2010c).

Uhambo lwamasadini lwenzeka ngasesigojaneni (kweqele endaweni yokuzalela amaqanda eboniswe *IShadi 4.13*) phakathi kweBlock ER236 nendawo efunwayo.

Izinhlobonhlobo zama-pelagic Teleosts (izinhlanzi ezinamathambo) nama-Chondrichthyans (izinhlanzi ze-cartilage) zihlotshaniswa nezinhlobonhlobo zezindunduma eziphakathi kogu nezigojana zamanzi zeBlock ER236, kuyi-AII. Izinhlanzi eziningi zixhaphakile ogwini lwaseNingizimu Afrika futhi ziba yisici esibalulekile kwezohwebo nakwezokudobela ukungcebeleka e-KZN.

Izinhlanzi ezivame ukubonakala ezigojaneni, ngamva kwezigojana nasemanzini akude nosebe eBlock ER236 yizinhlanzi ezinkulu ezifudukayo, kuhlenganise nezinhlobonhlobo zama-tuna (*IShadi 4.14*, kwesobunxele), i-billfish (*IShadi 4.14*, kwesokudla) naboshaka (ama-great white shark (*Carcharodon carcharias*) nama-whale shark (*Rhincodon typus*)), iningi lawo elibhekwa 'njengelisengcupheni yokushabalala' ngokwe-IUCN (2017) noma zisohlwini lwezinhlobo ezidinga ukuvikelwa ngenxa yokudotshwa ngokweqile. I-tuna ne-swordfish (*Xiphias gladius*) ngokukhethekile zithagekwa abadobi ababutha inqwaba futhi ukudoba ngokweqile ngokungemthetho kulilimaze kakhulu inani lalezi zinhlanzi eziningi. Ngokufanayo, oshaka basolwandle oluvulekile, kuphakathi kokuthi bayabambeka lapho kubanjwa amasadini, noma bathagekethelwa ngokukhethekile izimpiko zabo, lapho izimpiko zabo zibhonculwa bese umzimba wona ulahlwa.

IShadi 4.14 Ufuduko Olukhulu Lwezinhlanzi Zasolwandle Oluvulekile Lwenzeka Emanzini Aphakathi Nogu



Note: Longfin Tuna (Left) and Blue Marlin (Right)

Source: www.samathatours.com; www.osfimages.com

Ama-Coelacanth's ayizinhlanzi ezingandile eziyizinhlobo ezimbili zama-genus *Latimeria*: i-West Indian Ocean coelacanth (*Latimeria chalumnae*) (eyaziwa nangokuthi yi-African coelacanth), etholakala kakhulu ngase-Comoro Islands ngasempumalanga yogu lwase-Afrika, ne-Indonesian coelacanth (*Latimeria menadoensis*).

Kuze kube muva nje, ama-African coelacanth's bekucatshangwa ukuthi enzeka ekujuleni okungu-120 kuya ku-300 m, emigedeni yase-Comoros Islands, ukuya eMozambique. Kodwa, ukutholakala kweqoqo lama-coelacanth's emanzini angashoni kangako (90 kuya ku-140 m ukujula) emihosheni yamanzi yase-Greater St Lucia Wetland Park (GSLWP) World Heritage Site ngo-Novemba 2000 (Venter *et al.*, 2000), kwakushintsha lokho.

Kusukela lapho, bezilokhu zibanjwa ekuhloleni kwasekujuleni nasemanethini afakwa ekujuleni ogwini lwaseKenya (De Vos & Oyugi, 2002) naseTanzania (Nyandwi, 2006; Benno *et al.*, 2006) lapho kunamazinga angu-10 kuya ku-15 m ukuphakama no-70 kukya ku-140 m ukujula (Benno *et al.*, 2006) aye abonakala enyakatho, futhi imigodi ephansi kwamanzi ebibhekwa njengemihosha iye yabonakala ekujuleni okungu-400 m eningizimu (Nyandwi, 2010). Ngokuphambene, lezo zinhlanzi ezabanjwa e-East London (1938), eMozambique (1991: Bruton *et al.*, 1992), eMadagascar (1995: Heemstra *et al.*, 1996; also 1997, 2001) naseKenya (2001: De Vos & Oyugi, 2002) kwabikwa ukuthi zibanjelwe ezihlabathini esiphansi phakathi olwandle.

Ezifundweni ze-Comoros zika-Hans Fricke nabalingani, kwabikezelwa ukuthi ama-coelacanth's anendawo encane yokuphila, kanje:

- Adinga imigede nemipheme azokhosela kuyo;
- Ayazwela ekushiseni okungaphezu kuka-21°C;
- Ahamba kancane emanzini (cishe 5 cm/s), ayayigwema imimoya enamandla;
- Adinga amanzi ane-oksijini eningi; futhi
- Ayaphuma emigedeni yawo akhosele kuyo ebusuku ukuze ayozingela, ngokuvamile emanzini ashona kakhulu.

Ngemva kokutholakala kwama-coelacanth e-GSLWP, ziningi izifundo zocwaningo eziye zenziwa ngengengxenye ye-African Coelacanth Ecosystem Project (ACEP). Kanye nokutholakala kwama-coelacanth's kwezinye izindawo, izifundo zocwaningo ziveze ukuthi ama-coelacanth's:

- Asakazeke kabanzi kulokho okwakucatshangwa ekuqaleni;
- Ayakwazi ukubekezelela amazing okushisa ahlukahlukene, i-oksijini, ukukhanya nokujula kunalokho okwakucatshangwa;
- Ayakwazi ukubekezelela izindawo ezihlukahlukene zokuphila kunalokho okwakuphethwe ngakho eminingwaneni ye-Comoran, futhi ogwini lwaseMpumalanga Afrika kubonakala ethanda imihosha esemanzini; kodwa

- Awekho ezindaweni lapho lezi zimo zikhona, okusho ukuthi inani lawo e-GSWLP kungenzeka lincane kulokho okwakushiwo ngaphambili.

Imiphumela yocwaningo olwenziwa njengengxenye ye-ACEP ifushaniswe ngezansi.

Izifundo zocwaningo eziningana zenziwa ogwini lwase-Maputaland, ngenhloso yokuthola ama-coelacanth ahlala emihosheni yasemanzini kuleyo ndawo (Ramsay & Miller, 2006). Inqikithi yemihosha engu-23, yatholakala ngasogwini lwaKwaZulu-Natal.

Izinhloko zemihosha ngokuvamile zincane (2 kuya ku-4 km) ekujuleni okungu-90 kuya ku-120 m, kanye nama-thalwegs azo (iphansi) ajule ngamakhulu amaningana amamitha. Amaphethelo asenyakatho ezinhloko zemihosha avame ukutshika futhi azinze ngaphezu kwamaphethelo aseningizimu. Amatshe ezinzika enzeka emaweni nasezindundumeni zesihlabathi ekujuleni okungu-40 kuya ku-130 m.

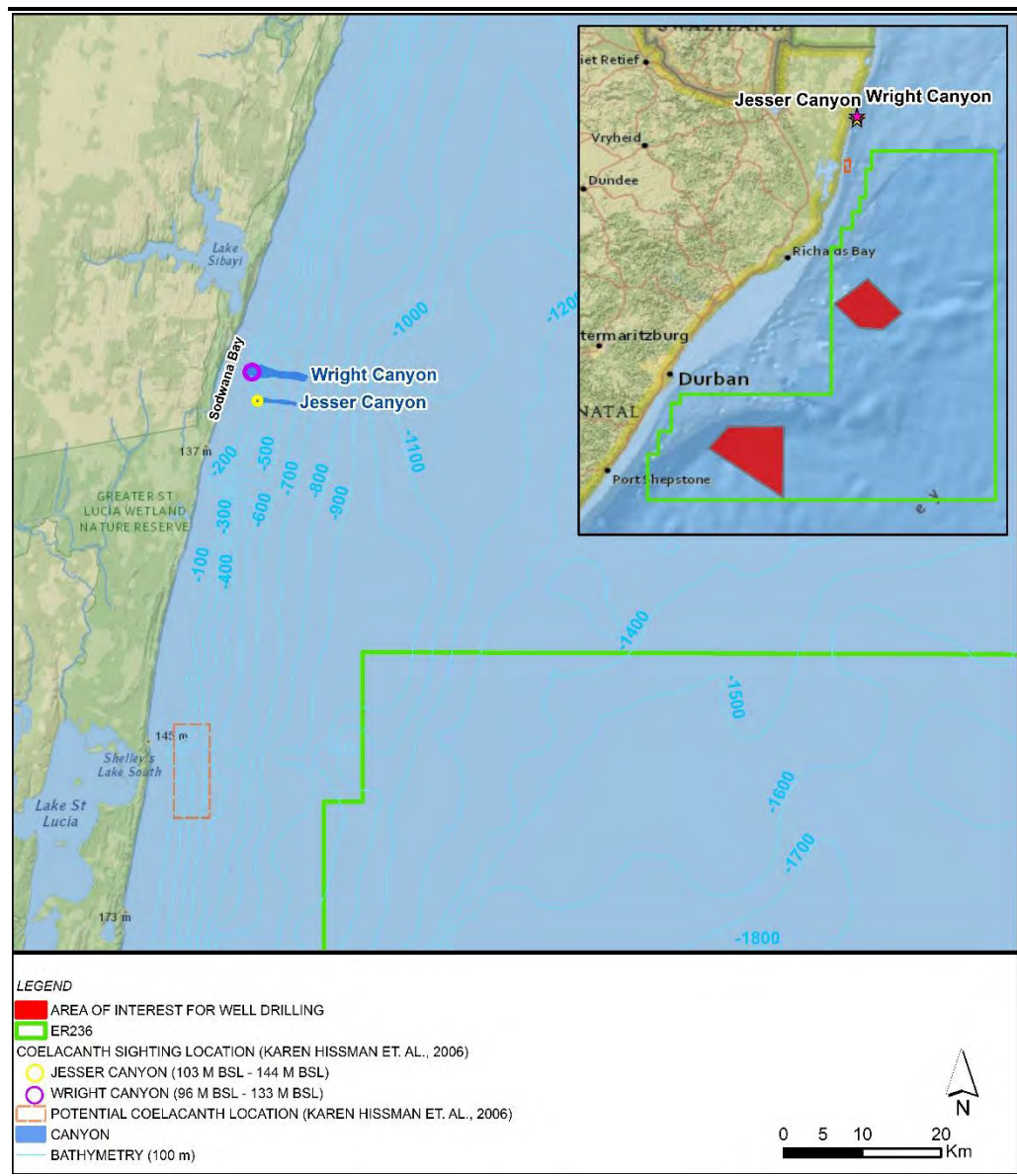
Ukuqhunyiswa kwezinzika zamatshe ngezinkathi ze-geology ekujuleni kolwandle kwabangela ukukhaka kwemigede nemipheme ngezansi kwezingenqema zemihosha ezitshekile (cishe ngo-100 m ukujula) kanye nangasezindongeni zemihosha kuya ku-160 m (Ramay & Miller, 2006). Ngokwezifundo zokwakheka kwemihosha, indawo ejule ngo-110 kuya ku-130 m ngaphansi kolwandle ibhekwa njengendawo yokuphila ama-coelacanth.

Ngokuphambene, imihosha eyenzeka eduzane kwama-subaqueous dune fields kucatshangwa ukuthi azikho ezingeni lokuhlala ama-coelacanth, njengoba kulindeleke ukunyakaza okukhulu kwezinzika ngenxa yezingqema ezingazinzile zemihosha, nokubhidlika kwezinzika okungase kube nomthelela omubi kuma-coelacanth ngokubhidlika kwemigede yawo ayithandayo. Naphezu kwemihosha okuhlalekayo kuyo e-GSLWP ihluke kakhulu kuleyo ye-volcanic Comoros, imipheme nemigede kwenzeka kuzo zombili lezi ndawo, okunika ama-coelacanth indawo yokukhosela emini.

Imininingwane ethathwe kuyi-Comoros, eyabonisa ukuthi ama-coelacanth ahlala ekujuleni kwamanzi apholise, yholelela ekulindeleni ukuthi ama-coelacanth emuhosheni yaseMaputaland ayezoba maningi, kucatshangwa ukuthi lawo ayetholwe ezinhlokwini zemihosha ayeshe ukuthi kunamanye amaningi emajukujukwini. Kodwa, ama-coelacanth abonakala eSodwana Bay ayegcina emhoshaneni omncane (90 kuya ku-140 m ukujula) lapho imigede, imipheme noma izigxenye ezihlephukile ziwakhoselisa khona ayemaningi (*IShadi 4.15*). Ama-Coelacanth abahamba ngalinye noma ngeqoqo lagcina kwayisikhombisa emigedeni, futhi nakuba abonisa ukwethebeka, abonakala esebenzisa imigede eiminingi endaweni engasekhaya lawo. Ubukhulu bendawo yangasekhaya lawo emihosheni ye-GSLWP ibingakachazwa, kodwa amanye aziwa ngokuhamba ibanga elingu-4 km ukusuka emihosheni ye-Jesser kuya e-Wright enxanxatheleni ye-Sowdana Canyon (Hissman *et al.*, 2006). Kuyi-Comoros, indawo yangasekhaya ingase inabe ngamakhilomitha ayishiyalombili.

Amanye ama-coelacanth ase-Sodwana Feeder Valley aziwa ngokuhlala endaweni okungenani iminyaka emine. Ukwanda kwalezi zinhlanzi emigedeni akubonakali kwenzeka ngezinkathi ezithile.

IShadi 4.15 Indawo ye-Jesser ne-Wright Canyons, eSodwana Canyon Complex, lapho ama-Coelacanth Atholakala khona okukuqala



Green *et al.* (2006) wasebenzisa ama-bathymetric data set ayekhona kakade neshadi le-geo-referenced ukuze kutholakale eminye imihosha eseningizimu yempumalanga ye-Afrika onqenqemeni lolwandle. Baphetha ngokuthi izindawo ezihlala ama-coelacanth zingatholakala onqenqemeni lolwandle lwase-Port Shepstone zigudle ugu zize ziyofika e-Port St Johns (isilinganiso esilindelwe esiseningizimu sokusakazeka kwama-coelacanth) nasengxenyeni engaphandle phakathi kwe-Olumbe ne-Porto Amelia, i-Pemba, i-Nacala, i-Mossuril ne-Vilanculos eningizimu yase-Mozambique. Lezi zindawo zifana ngokuthi zinemihosha engaphansi kolwandle, futhi isekelwe ku-regional geological setting, imigede eyakheke kahle ekhandeni lomhosha kulindelekile.

Nakuba imihosha engaphansi kolwandle engase-Tanzania ibonakala ingakhekile kahle, imininingwane emincane etholakele ibonisa ukuthi nemihosha engase-Mtwara, e-Lindi nase-Mchinga. E-Madagascar, imihosha engaphansi olwandle iyavela ngasogwini olusempumalanga e-Toliara (kwatholakala i-coelacanth) nasenyakatho ye-Morondava.

Izinga lokushisa okuvamile lwama-coelacanth e-Comoros, eNingizimu Afrika nase-Indonesia liba ngu-15-20°C. Izinga lokushisa kakhulu ama-coelacanth akwazi ukulibekezelela liphakathi kuka-22 ukuya ku-23 °C (Fricke *et al.*, 1991), nakuba izinhlanzi zibonakale ziphumule emigedeni enamazinga okushisa angaphezu kuka-24°C.

Izinga lokushisa lomoya-mpilo lokugcina ama-coelacanth akwazi ukulithatha ama-degree angu-15°C (Hughes & Itazawa, 1972), amazing okushisa aphezulu angase awacindezele ukuthi angaphefumili kahle. Ama-coelacanth ase-Sodwana Feeder Valley angase alindelwe ukuba avele ejuleni kwamamitha angu-200, kodwa njengoba kubonakala sengathi kuneziphephelo ezikahle ezimbalwa ezidlula amamitha angu-140, ukuvela kwawo emigedeni ekujuleni okungamamitha angu-90 ukuya kwangu-140 kungenxa yesidingo sokuthi ahlale ethule anganyakazi ukuze agcine ukuphefumula nokugaya kwawo ukudla kusezingeni eliphansi (Roberts *et al.*, 2006). Ama-coelacanth aseNingizimu Afrika angakwazi ukubekezelela amazing okushisa angu-6 °C ngosuku olulodwa. OGwini laseMaputaland; amazinga okushisa ama-isotherm angu-16 ukuya kwangu-20 °C, ngokuvamile ahlala ekujuleni kwamamitha angu-100 ukuya ku-140, yona ijule ngamamitha acishe abe ngu-100 uma uqhathanisa ne-Comoros (200 ukuya ku-300 m). Ukujula okwake kwabika kwe-coelacanth kwakungamamitha angu-54, ngaphansi kwesixhobo onqenqemeni oluseningizimu lwe-Diepgat Canyon (Hissmann *et al.*, 2006; Roberts *et al.*, 2006) eningizimu yeSodwana Bay. Lesi senzakalo senzeka ngesikhathi esifanayo nomsinga wamanzi, lapho izinga lokushisa lancipha lasuka ku-17 ukuya ku-19 °C (Roberts *et al.*, 2006).

Amazinga omoya-mpilo e-GSLWP atholakala ahamba ngohlelo 3.6 ml/l. Umoya-mpilo osezingeni eliphansi (isici esifanayo esitholakala ezingxenyeni eziningi olwandle lwe-South-West Indian Ocean) okuye kwavela kwakuphakathi kokujula okungamamitha angu-100-250, lapho amazinga aye ehlela ku-o 3.2 ml/l. Ngokushesha ngaphansi kwezinga lomoya-mpilo ama-concentration aye akhuphuka futhi alingisa lezo eziphezulu ngaphambi kokwehla ngokujula okungu-3.2 ml/l ngamamitha angu-1,000 . Umoya-mpilo osezingeni eliphansi uyahambelana nokujula okuvela kuma-coelacanth aseSodwana Feeder Valley (Roberts *et al.*, 2006; Hissmann *et al.*, 2006). EComoros, umoya-mpilo omncane ongu-2.9 ml/l uyavela phakathi kamamitha angu-200-320, nalokho kuyahambisana nokujula kwama-coelacanth lapho.

Ama-coelacanth azingela ebusuku, adla izinhlanzi ezingama-benthic, ama-epibenthic nama-mesopelagic nama-cuttlefish atholakala esixhobeni esijulile nasemthambekeni wentaba-mlilo.

Azikhho iziwombe lapho ama-coelacanth aye azama ukudla izinhlobo ezibhekwa njengezizingelwayo eziye zatholwa eSodwana Bay, nakuba isisindo nokuhlukahlukana kwezinhlanzi onqenqemeni lomhoshana nasemigedeni ephezulu (Hissmann *et al.*, 2006). I-Transmitter tracking experiment yaseSodwana Bay ibonisa ukuthi ukuzingela ebusuku okwenzeka kumamitha angu-70 kuya kwangu-130, okungaphezu kokujula kwasemini futhi lokho kujula ilapho izilwane ezizingelayo ziziningi khona.

Ukuba kuningi kwezinhlobo zezilwane ezingama-planktivorous emhosheni wa-Kwa-Zulu abonisa isimo somhlaba somsinga wamanzi ukuqhuba ukukhiqizwa kwendawo yokuhlala izilwane. Izinhlanzi ezihamba ndawonye nezibalulekile ekungeniseni imali ezifana ne-slinger, i-*Chrysoblephus puniceus*, i-Englishman, i-*Chrysoblephus anglicus*, i-Scotsman, i-*Polysteganus praeorbitalis*, ne-blueskini i-*P. caeruleopunctatus*, nezinye izinhlanzi ezidla ezinye izinhlanzi, kuhlanguke nama-serranid nazo zazibikiwe (Sink *et al.*, 2006).

Kwakucatshangwa ukuthi lezi zinhlanzi zingaba ukudla okuhle kwama-coelacanth. Indawo eyaziwayo ehlala ama-coelacanth lapha eNingizimu Afrika isekela umkhomo omkhulu wezinhlanzi ezishintshayo neziyizakhamizi ukudlula indawo yazo yokuhlala e-Comoros, lapho ukuhlukaniswa kwezilwane ezidla ezinye eziye zaboniswa njengesici esinciphisa ukusakazwa nobuningi bama-coelacanth (Bruton & Armstrong, 1991; Fricke & Plante, 1988; Fricke & Hissmann, 2000). Inani lezinhlanzi ezihlala eSodwana Feeder Valley canyons lici she libe likhulu ngezikhathi ezintathu ukuya kwezine ezindaweni ezifanayo ezihlala ama-coelacanth eComoros (Heemstra *et al.*, 2006b).

Umbono ofanale nge-Block ER236

I-Block ER236 idlulela ezinqubweni ezimbili zemihosha (Ishadi 4.3), okuyi-Tugela ne-Goodlad Canyon, ecishe isondelane nezindawo zaseningizimu nasenyakatho. Kumelwe kuphawulwe ukuthi le mihosha akumelwe ibhotshozwe.

I-Tugela Canyon iyisibonelo somkhumbi-ngwenyas omkhulu ongavunyelwe ukuhambela phansi maphakathi nomthambeko. Ngokungafani ne-GSLWP, lo mhume akukho ukuxhumana emthambekeni nasonqenqemeni. Inhloko yesihosha isendaweni engamamitha acishe abe ngu-600 (600m) ukujula i-thalweg ephelela eNatal Valley engamamitha acishe abe ngu-2800 (2800m) (Wiles *et al.*, 2013). Impumuzo enkulu engavamile iyavela ekhandeni lomhoshana, bese kuvela izindawo eziyisicaba emhosheni osempumalanga ukudlulela ekujuleni okungamamitha angu-1,500 m. Njengoba ukuqhelelana kukhula okusuka onqenqemeni lolwandle nokujula okuqhubekayo, umhoshana nawo uyaqhubeka uba banzi. Kodwa i-Tugela Canyon ihlukile ikakhalukazi i-morphology ngokuya kwalezi ezisenyakathi yaKwaZulu-Natal, lapho okubikwe khona ama-coelacanth. Okwesibili, isekujuleni kwe-Sodwana feeder valley canyons futhi ekugcineni akubonisi ukuthi ukhona kukhona imifudlala (Wiles *et al.*, 2013).

Nakuba izindawo eziyizicaba zikhona futhi ziyindawo yokukhosela njengemigede nezindawo eziphumile, zivame ukujula (>1,500 m) ukudlula lezo ezibikiwe zama-coelacanth.

Mincane imininingwane ye-Goodlad (29°25' S) Canyon. Kuye kwabikwa ukuthi kuqala kuyisigodi esincane esijulile esingamamitha angu-20 (Martin & Flemming, 1988) ujule ngamamitha angu-250 bese ivuleka amakhilomitha angu-50 ububanzi, isigodi esingajulile kakhulu, sijule ngamamitha angu-1,400. Ivela o-Thukela Cone ngamamitha angu-2,320 (Goodlad, 1986). I-gradient yezindonga zomhosha aziwona umqansa kangako uma kuqhathaniswa ne-Tugela Canyon futhi mincane imifula evelayo (Young, 2009).

Ngaphandle kocwaningo olwenziwa u-Roberts *et al.* (2006) oGwini lwaseMaputaland, akukho ukwazisa okukhona mayelana namazinga okushisa noma umoya-mpilo okhona onqenqemeni lolwandle. Ukucaphuna ukwazisa kwamazinga okushisa nemininingwane yomoya-mpilo esifundeni saseTugela Canyon kubonisa ukuthi amazinga okushisa emhosheni ijule ngamamitha angu-600 kungenzeka ingaphezu kwamazinga okushisa ayishumi (<10 °C), umoya-mpilo ngaphezu kuka-3.4 ml/l.

Nakuba inani lomoya-mpilo lingafanela ama-coelacanth, ukwehla kwamazinga okushisa amanzi ukudlula amamitha angu-600 angaphansi kakhulu kwezinga elingabekezelelwa ama-coelacanth (15 °C).

Iphuzu lokuthi lemiyosha ayinakho ukuxhumana nonqenqema lwamanzi, nokuthi umthombo wokudla okufanelekile kunzeka kuncane, lokhu kubonisa ukuthi i-Tugela ne-Goodlad Canyon ayikwazi ukunikeza ama-coelacanth indawo yokuhlala efanele.

Izilwane ezihlala kumaKhorali (izixhobo zamakhorali)

Izixhobo ezingajulile ezinamazinga aphansi amagagasi asoGwini oluseMpumalanga zisuka ematsheni ezixhobo ambozwe amakhorali enyakatho ukuya ematsheni ezixhobo aseningizimu. Ukuya enyakatho ye-Block ER236, inqubo ye-Maputaland Coral Reef, yona esuka eKosi Bay ize ifike eLeven Point (27°55'40"S, 32°35'40"E), ihlanganisa izixhobo zamakhorali ezingxenyeni eziseningizimu ye-Afrika (UNEP-WCMC, 2011). Eningizimu ye-iSimangaliso Wetland Park (eSt Lucia), izindawo zokuhlala zezilwane ezihlala ezixhobeneni zenziwa amagquma, nakuba amakhorali athambile naqinile asavela.

Zombili lezi zixhobo zinezici ezihlukahlukene ezenziwa izilwane ezingenawo umgogodla nama-ichthyofaunal biota ezivela e-Indo-Pacific (*IShadi* 4.16, ngasobunxele). Isixhobo sekhorali sinikeza izilwane indawo yokufihla ikhanda nomthombo wokudla ngenxa yezinhlanzi ezihlukahlukene ezitholakala e-Indo-Pacific.

Zombili izixhobo ezinamakhorali ase-Sodwana Bay (ukuya eningizimu ye-Block ER236) namatshe amakhorali aseThekwini nawasoGwini oluseNingizimu ye-KZN (ogwini lwe-Block ER236) adumile kubatshuzi ngenxa yokuceba kwawo kwezilwane ezinganamgogodla nokuhlukahlukana kwezinhlanzi.

IShadi 4.16 Izixhobo zase-KZN ne-Annual Sardine Run



Umthombo: www.sa-venues.com; www.sea-air-land.com

Izilwane Ezincelisayo Ezihlala Olwandle

Izimila zezilwane ezincelisayo zasolwandle zasoGwini oluseMpumalanga zihlanganisa izinhlobo eziphakathi kwezingu-28 nezingu-38 zemikhoma nezinhlengethwa ezaziwayo (ezabonwa emlandweni noma ezaziphumele ogwini) noma ngokuvamile (izindawo zokuhlala ezibikezelwe ezisekelwe emingceleni yezilwane ezaziwayo) okuzovela lapho (Findlay, 1989; Findlay *et al.*, 1992; Ross, 1984; Peddemors, 1999; Best, 2007) (*IThebula 4.2*). Izimvu zamanzi (Seals) zivela ngalezo zikhathi ziyimihambuma ebizwa ama-Cape fur seals (*Arctocephalus pusillus pusillus*) (CSIR, 1998).

Izindawo ezisogwini azitadishwanga kahle cishe konke ukwazisa okukhona okuvela ekujuleni kolwandle (>200 m) kusekelwe emibikweni yemikhoma eyenziwa endulo futhi ukwaziswa kwezilwanyana ezincane zasekujuleni kolwandle akukuhle.

Kunezinhlobo ezingu-36 zemikhoma nezinhlengethwa ezingase zitholakale phakathi kwe-Block ER236. Kulezi nhlobo ezingu-36, ngokuya kwe-South African Red List Assessment, i-Antarctic Blue whale (*Balaenoptera musculus intermedia*) 'isengozini enkulu yokunyamalala', i-Indo-Pacific humpback dolphin (*Sousa chinensis*), i-fin whale (*Balaenoptera physalus*) ne-sei whale (*Balaenoptera borealis*) nazo zibhekwa 'njengezizonyamalala' futhi amanani aphansi e-Indo-Pacific bottlenose dolphin (*Tursiops aduncus*) ase-Ifafi-Kosi Bay, i-Sperm whale (*Physeter macrocephalus*) namanani e-Bryde's whale (*Balaenoptera brydei*) nawo 'asengozini' (Child *et al.*, 2016). Ziyisishiyagalolunye izinhlobo eziphawulwe ngokuthi 'azinayo imininingwane ephelele' kugqanyiswa ukuthi kuncane okwaziwayo ngemikhoma nezinhlengethwa, ukusakazeka namanani azo (Pisces, 2018).

Ukusakazeka kwemikhoma nezinhlengethwa oGwini oluseMpumalanga kungahlukaniswa ngokwaleyo esemanzini olwandle angajulile nangokwaleyo esemanzini ajulile asolwandle. Izinhlobo ezivela ezindaweni zombili zingatholakala eshalofini lolwandle (amamitha angu-200 ukuya kwangu-1000), lokhu kwenza le ndawo ibe ngecebile ngemikhoma nezinhlengethwa. Inani lemikhoma nezinhlengethwa ezisemanzini angajulile ivame ukuba likhulu uma kuqhathaniswa nasemanzini asolwandle ajulile, njengoba nje izinhlobo ezihlala ekujuleni kwamanzi asolwandle zivame ukuba ziningi zigcwele indawo engamakhilomitha ayizinkulungwane. Izinhlobo ezivamile phakathi ne-Block ER236 (ezivamile ukubonwa hhayi inani lazo eliphelele) i-bottlenose dolphin evamile (*Tursiops truncatus* Ishadi 4.17, kwesobunxele), i-Indo-Pacific bottlenose dolphin (*Tursiops aduncus*), i-short-finned pilot whale (*Globicephala macrorhynchus*), i-Indo-Pacific humpback dolphin (*Sousa chinensis*, Ishadi 4.17, kwesokudla) ne-humpback whale (Ishadi 4.18, kwesobunxele).

Ama-Cetaceans abunjwa amaqembu amabili abizwa ama-taxonomic groups: ama-mysticetes (ama-baleen whales) nama-odontocetes (imikhoma nezinhlengethwa ezinamazinyo abulalayo). Ngenxa yokungafani kobukhulu, amakhono okuxhumana, ukuziphatha kwawo nekhono lokulalela umculo, la maqembu omabili acatshangelwa ngokuhlukile.

Ishadi 4.17 I-Bottlenose Dolphin ne-Indo-Pacific Humpback Dolphin



Umthombo: www.fish-wallpapers.com; www.shutterstock.com

Ama-Baleen whales atholakala emanzini ogwini oGu lwaseMpumalanga ahlanganisa imikhoma ebizwa nge-blue, i-fin, i-sei, i-minke, i-dwarf minke, i-inshore Bryde, i-Pygmy Right, i-Humpback nama- Southern Right. Izinhlobo eziningi zivela emanzini ajulile olwandle, ziyaqabukela ukuza emanzini angajulile. Lezi zilwane ziyabonisa ngezanga elithile ngokufuduka zinqamula phakathi noma ziya e-Block ER 236 lapho ziya phakathi kwezindawo zokudla eziphakeme (e-Antarctic noma e-Subantarctic) nezindawo zokudla eziphansi.

Njengoba imikhoma ilandela izici zomhlaba noma izici zasolwandle, ukufudukela ngasenyakatho naseningizimu kungenzeka ngokuqhelelana okuhlukile ukusuka ogwini, kanjalo kuthonyeka ukuvelwa kwayo izinkathi ezithile ezindaweni ezihlukahlukene. Ngenxa yokuba inkimbinkimbi kwendlela yokufuduka, izinhlobo eziyinhloko ezibamba iqhaza (ama-humpback nama-southern right whale) kuchazwe kabanzi ngezansi.

Ama-Humpback whales (*Megaptera novaeangliae*)

Ama-Humpback whales (*IShadi 4.18, left*) aziwa ngokuthuthela phakathi kwezindawo zazo zokudlela zase-Antarctic nezindawo zazo zokukhulisela zamanzi abandayo kumanzi e-tropical. Izindawo eziyinhloko zamakhaza aya kuzo ama-humpback whales asogwini olusempumalanga ye-Afrika kuhlanguke ne-Mozambique, i-Madagascar, i-Kenya ne-Tanzania ogwini olusempumalanga. Njengoba zifuduka zisebenzisa izindawo ezisogwini ze-subtropical njengezindawo ezibalulekile zokuhamba zize zizibonise kakhulu ngaleso sikhatahi ngasogwini olusempumalanga yeNgizimu Afrika (Best, 2007).

Ama-Humpback whales nokuthutha kwawo bekufundwa ngawo iminyaka eminingi, abonisa i-bimodal enamandla ngezinkathi zonyaka ekubeni khona kwama-humpback whales ogwini olusempumalanga 'yeNingizimu Afrika,' aba maningi ngo-June/ July nango-September okuhambisana nofuduko oluya enyakatho naseningizimu (Findlay *et al.* 2011). Nakuba kunjalo, ngo-2013, ucwaningo olwenziwe ngu-Banks lwaqaphela ukufuduka oludlelela phambile enyakatho ngokungafani nalokho okwakubikiwe ngaphambili, amaningi afika emanzini aseningizimu ye-Afrika cishe ngo-April, kudlulele ku-September/October lapho ukufuduka kwaseningizimu kuqala kuyaqhubeka kuze kube u-December kuze kube ngasekupheleni kuka-February (Banks, 2013).

Ngokuvamile amaqembu emikhomakazi namankonyane yiwona awokugcina ukuhamba emanzini aseningizimu ye-Afrika lapho ebuya ofudukweni olungaseningizimu, nakuba kukhona ukwahluka kwezikhathi ngesikhathi sokuhamba ezindaweni zokuzalela ezibikiwe (Barendse *et al.*, 2010).

Njengoba kubonisiwe ku-Banks (2013), amanani amakhulu ama-humpback whales aseduze noma ase-Block ER236 angalindelwa ngo-June ukuya ku-July no-October ukuya ku-December. Ama-Humpback whales akuvamile ukuthi abekhona eduze noma e-Block ER236 ukusukela ku-February ukuya ku-March.

Ama-Southern right whales (*Eubalaena australis*)

Inani lama-southern right whale aseNingizimu ye-Afrika (*IShadi 4.18*, kwesokudla) ngokomlando asuka eNingizimu yaseMozambique (eMaputo Bay) (Banks *et al.*, 2011) ukuya eNingizimu ye-Angola (eBaie dos Tigres) futhi leli nani libhekwa njengelilodwa kule ngxenye (Roux *et al.*, 2015). Amanani asebusika abikiwe asoGwini oluseNingizimu naseMpumalanga aseNingizimu Afrika kuze kuyofinyelela eMaputo Bay, inani eliphawulekayo oGwini oluseNingizimu phakathi kweCape Town nePort Elizabeth. Ivamile ukuvela emanzini asogwini aqhelile oGwini oluseNingizimu phakathi kuka-June no-November, nakuba izilwane zingabonwa kusukela ngo-April kuze kube u-January. Ziyafuduka ziye esifundeni esiseningizimu ye-Afrika ukuze ziyozala, zihlale emanzini asogwini angajulile emachwebeni avikelekile (amaphesenti angu-90 atholakala ebangeni elingaphansi kwamakhilomitha amabili uma usuka ogwini; Best, 1990; Elwen & Best, 2004).

Ngesikhathi esemanzini alapha ekhaya, ama-southern right whale atholakala ehamba ngamaqembu elilodwa ukuya kwayishumi, amaqembu emikhomakazi namankonyane amaningi ezindaweni zokukhulisa ezisogwini. Kusukela ku-July kuya ku-October, izilwane ziyahlanganiswa bese zibandakanyeke kuma-surface active groups, lokho kungenzeka amahora amaningana.

Ama-Southern right whales ayadlula ku-Block ER236 ngo-July nango-August aphinde futhi uma esefudukela ngaseningizimu ngo-October/November.

IShadi 4.18 I-Humpback Whale ne-Southern Right Whale



Umthombo: www.divephotoguide.com; www.aad.gov.au

Ama-Odontocetes

Ama-Odontocetes iqembu lezilwane ezihlukahlukene ezihlanganisa izinhlengethwa (dolphins) ama-porpoise, imikhomo enemilomo ecijile nemikhomo ebizwa ama-sperm whales. Izilwane ezivela phakathi kwe-Project Area zibonisa izici ezihlukahlukene, ngokwesibonelo izimo ziyahluka ukusuka kwezisogwini nezisolwandle phakathi nezibanzi. Lezi ezisesifundazweni zingaqala kumamitha angu-1.9 ubude (i-Spinner dolphin) ukuya kumamitha angu-17 (i-bull sperm whale).

IThebula 4.2 Izilwane Ezincelisayo Zasolwandle Ezingase Zibonakale KuBlock ER236

Igama Elivamile	Uhlobo	I-Shelf	Kujana Nosebe	Inkathi	Izikhathi Zokubonakala	Isimo Se-IUCN Sokulondolozwa	Isimo Se-IUCN Emhlabeni Wonke
Delphinids							
Common bottlenose dolphin	<i>Tursiops truncatus</i>	Yebo	Yebo	Unyaka wonke	Monthly	Asisibi Kangako	Asisibi Kangako
Indo-Pacific bottlenose dolphin	<i>Tursiops aduncus-Ifafa-Kosi Bay subpopulation</i>	Yebo		Unyaka wonke	Ngesonto	Isenkingeni	
	<i>Tursiops aduncus-Ifafa-False Bay subpopulation</i>	Yebo		Unyaka wonke	Ngesonto	Akunasongo	
	<i>Tursiops aduncus-Seasonal subpopulation</i>	Yebo		Unyaka wonke	Ngenyanga	Ayikho Imininingwane	Ayikho Imininingwane
Common (short-beaked) dolphin	<i>Delphinus delphis</i>	Yebo	Yebo	Unyaka wonke	Ngenyanga	Asisibi Kangako	Asisibi Kangako
Common (long-beaked) dolphin	<i>Delphinus capensis</i>	Yebo		Unyaka wonke	Ngenyanga	Asisibi Kangako	Ayikho Imininingwane
Fraser's dolphin	<i>Lagenodelphis hosei</i>		Yebo	Unyaka wonke	Ngezikhathi	Asisibi Kangako	Asisibi Kangako
Pan tropical Spotted dolphin	<i>Stenella attenuata</i>	Yebo	Yebo	Unyaka wonke	Ngezikhathi	Asisibi Kangako	Asisibi Kangako
Striped dolphin	<i>Stenella coeruleoalba</i>		Yebo	Unyaka wonke	Ngezikhathi	Asisibi Kangako	Asisibi Kangako
Spinner dolphin	<i>Stenella longirostris</i>	Yebo		Unyaka wonke	Ngezikhathi	Ayikho Imininingwane	Ayikho Imininingwane
Indo-Pacific humpback dolphin	<i>Sousa chinensis</i>	YYeboes		Unyaka wonke	Ngenyanga	Isengcupheni	Near threatened
Long-finned pilot whale	<i>Globicephala melas</i>		Yebo	Unyaka wonke	<Ngesonto	Asisibi Kangako	Ayikho Imininingwane
Short-finned pilot whale	<i>Globicephala macrorhynchus</i>		Yebo	Unyaka wonke	<Ngesonto	Asisibi Kangako	Ayikho Imininingwane
Killer whale	<i>Orcinus orca</i>	Ngezikhathi	Yebo	Unyaka wonke	Ngezikhathi	Asisibi Kangako	Ayikho Imininingwane
False killer whale	<i>Pseudorca crassidens</i>	Ngezikhathi	Yebo	Unyaka wonke	Ngenyanga	Asisibi Kangako	Ayikho Imininingwane

Igama Elivamile	Uhlobo	I-Shelf	Kujana Nosebe	Inkathi	Izikhathi Zokubonakala	Isimo Se-IUCN Sokulondolozwa	Isimo Se-IUCN Emhlabeni Wonke
Risso's dolphin	<i>Grampus griseus</i>	Yebo(kancane)	Yebo	Unyaka wonke	Ngezikhathi	Asisibi Kangako	Asisibi Kangako
Pygmy killer whale	<i>Feresa attenuata</i>		Yebo	Unyaka wonke	Ngezikhathi	Asisibi Kangako	Ayikho Imininingwane
Sperm whales							
Pygmy sperm whale	<i>Kogia breviceps</i>		Yebo	Unyaka wonke	Ngezikhathi	Ayikho Imininingwane	Ayikho Imininingwane
Dwarf sperm whale	<i>Kogia sima</i>		Yebo	Unyaka wonke	Ngezikhathi	Ayikho Imininingwane	Ayikho Imininingwane
Sperm whale	<i>Physeter macrocephalus</i>		Yebo	Unyaka wonke	Ngezikhathi	Isenkingeni	Isenkingeni
Beaked whales							
Cuvier's	<i>Ziphius cavirostris</i>		Yebo	Unyaka wonke	Ngezikhathi	Asisibi Kangako	Asisibi Kangako
Arnoux's	<i>Berardius arnouxii</i>		Yebo	Unyaka wonke	Ngezikhathi	Ayikho Imininingwane	Ayikahlolwa
Southern bottlenose	<i>Hyperoodon planifrons</i>		Yebo	Unyaka wonke	Ngezikhathi	Asisibi Kangako	Asisibi Kangako
Hector's	<i>Mesoplodon hectori</i>		Yebo	Unyaka wonke	Ngezikhathi	Ayikho Imininingwane	Ayikho Imininingwane
Strap-toothed whale	<i>Mesoplodon layardii</i>		Yebo	Unyaka wonke	Ngezikhathi	Ayikho Imininingwane	Ayikho Imininingwane
Longman's	<i>Mesoplodon pacificus</i>		Yebo	Unyaka wonke	Ngezikhathi	Ayikho Imininingwane	Ayikho Imininingwane
True's	<i>Mesoplodon mirus</i>		Yebo	Unyaka wonke	Ngezikhathi	Ayikho Imininingwane	Ayikho Imininingwane
Gray's	<i>Mesoplodon grayi</i>		Yebo	Unyaka wonke	Ngezikhathi	Ayikho Imininingwane	Ayikho Imininingwane
Blainville's	<i>Mesoplodon densirostris</i>		Yebo	Unyaka wonke	Ngezikhathi	Ayikho Imininingwane	Ayikho Imininingwane
Baleen whales							
Antarctic minke	<i>Balaenoptera bonaerensis</i>	Yebo	Yebo	>Ebusika	Ngenyanga	Asisibi Kangako	Ayikho Imininingwane
Dwarf minke	<i>Balaenoptera acutorostrata</i>	Yebo		Unyaka wonke	Ngezikhathi	Asisibi Kangako	Asisibi Kangako

Igama Elivamile	Uhlobo	I-Shelf	Kujana Nosebe	Inkathi	Izikhathi Zokubonakala	Isimo Se-IUCN Sokulondolozwa	Isimo Se-IUCN Emhlabeni Wonke
Fin whale	<i>Balaenoptera physalus</i>		Yebo	MJJ & ON	Ngezikhathi	Isegcupheni	Isegcupheni
Antarctic Blue whale	<i>Balaenoptera musculus intermedia</i>		Yebo	MJJ	Ngezikhathi	Isengcupheni Ebucayi	Isegcupheni
Sei whale	<i>Balaenoptera borealis</i>		Yebo	MJ & ASO	Ngezikhathi	Isegcupheni	Isegcupheni
Bryde's (inshore)	<i>Balaenoptera brydei (subspp)</i>		Yebo	Unyaka wonke	Ngezikhathi	Isenkingeni	Ayikho Imininingwane
Pygmy right	<i>Caperea marginata</i>	Yebo		Unyaka wonke	Ngezikhathi	Asisibi Kangako	Ayikho Imininingwane
Humpback	<i>Megaptera novaeangliae</i>	Yebo	Yebo	AMJJASOND	Nsuku zonke	Asisibi Kangako	Asisibi Kangako
Southern right	<i>Eubalaena australis</i>	Yebo		JJASON ¹	Nsuku zonke	Asisibi Kangako	Asisibi Kangako

¹ Codes are referring to the months names starting from J=January to D=December

Kukhona izinhlobo ezinhlanu zezimfudu zasolwandle ogwini oluseMpumalanga yeNingizimu Afrika; ufudu oluluhlaza (*Chelonia mydas*), i-olive ridley (*Lepidochelys olivacea*), i-leatherback (*Dermochelys coriacea*), i-hawksbill (*Eretmochelys imbricata*) ne-loggerhead (*Caretta caretta*).

Ama-loggerhead nama-leatherbacks abeka amaqanda emabhishi anesihlabathi enyakatho-mpumalanga yogu lwase-KZN, eNingizimu Afrika, kanye naseningizimu ye-Mozambique phakathi nezinyanga zasehlobo. Le miphakathi ebeka amaqanda yama-loggerhead nama-leatherback yiyo eseningizimu kakhulu ezweni (Nel *et al.*, 2013). Ngisho nakuba le miphakathi imincane (ngokwezimbobo zokubeka amaqanda) kuneminye imiphakathi eminingi, ngokuvamile ihlukile (Dutton *et al.*, 1999; Shamblin *et al.*, Submitted) futhi ngenxa yalokho iyimiphakathi ebalulekile emhlabeni wonke ukuba kulondolozwe lolu hlobo lwayo.

Ukulandelela nge-satellite izimfudu zezinsikazi ama-loggerhead nama-leatherback phakathi nezinkathi zokuzalela amaqanda kwadalula ukuthi ama-loggerheads ahlala eduze nosebe (ngaphakathi kwemingcele ye-Simangaliso Wetland Park) phakathi nezenzakalo zokuzalela amaqanda (*Umdlwebo 4.19*), kuyilapho ama-leatherbacks ehamba amabanga amade (ngaphezu kuka-300 km) futhi ege imingcele ye-MPA. Ngenxa yalokho, kuye kwahlongozwa ukuwetshwa kwe-MPA iye eningizimu ukuze ihlanganise nengxenywe enkulu yonqenqema oluyinhloko lwama-leatherback azalelayo futhi iwavikele kangcono.

Izindawo ezingaphakathi ogwini engxenyeni esenyakatho ye-Block ER236, ziqondana nokuthutha kwama-leatherback eyozalela, kodwa indawo ethandwa kakhulu iseceleni kogu lonqenqema okuzalelwa kulo. Ngakho-ke zombili lezi zinhlobo makhulu amathuba okuba uhlangane nazo ku-Block ER236 lapho zidla zilungiselela ukuthutha.

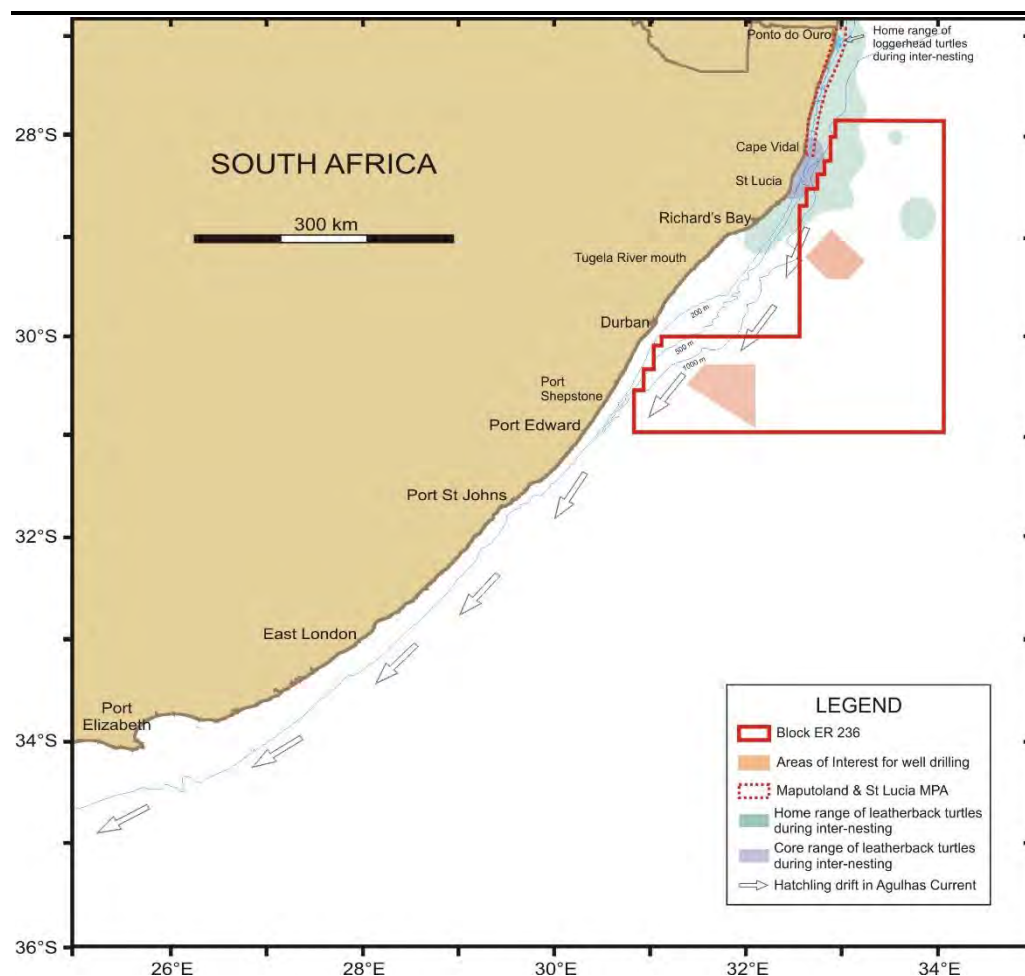
Izinsikazi ezingama-loggerhead nezingama-leatherback ziza ogwini zizozalela amaqanda kusukela phakathi no-Okthoba kuye phakathi no-Januwari unyaka ngamunye. Ziyahamba ziye ebhishi futhi zibekele amaqanda angaba ngu-100 (ama-loggerhead) noma cishe angu-80 (ama-leatherback) esidlekeni ezisimbe ngezinyawo zazo zangemuva. Amaqanda achumusela izinyanga ezimbili bese amachwane ephuma esidlekeni phakathi no-Januwari kuye phakathi no-mashi. Impumelelo yokuchamusela yama-loggerheads (amaphesenti angu-73) nama-leatherbacks (amaphesenti angu-76) emabhishi okuzalelwa kuwo eNingizimu Afrika (de Wet, 2013) iphezulu kunale ebikwa kwezinye izindawo zokuzalela emhlabeni wonke. Noma kunjalo, amaqanda namachwane aphumayo awukudla okunomsoco ezilwaneni eziningi ezizingelayo ogwini, okuholela ekutheni ibe ncane impumelelo yaphumayo futhi amachwane aphuma ngemva kokuchamusela abe mancane kunamaqanda afukanyelwe.

Kodwa-ke, inani laphumayo nachamuselwayo kuzo zombili izinhlobo liphezulu ngokufanayo eNingizimu Afrika kunalelo elibikwayo kwamanye amabhishi okuzalelwa kuwo ngoba ezifayo zibulawa yizinto zemvelo kuphela ngenxa yokuthi kukhona ukulondolozwa kwemvelo okunamandla ebhishi okuzalelwa kulo, okuye kwanciphisa izenzakalo zokwebiwa kwamaqanda nokuthathwa kwezimfudu zezinsikazi kwaba sezingeni eliphansi (Nel, 2010).

Ngakho-ke ukukhiqizwa kwakho kokubili amachwane e-loggerhead ne-leatherback kuphezulu ngokuphawulekayo eNingizimu Afrika, okwenza amabhishi okuzalelwa kuwo enyakatho KZN abe ngamanye akhiqiza kakhulu (ngokwezinqwamba zamaqanda azalelwayo) emhlabeni.

Ku-IUCN Red listing, ufudu i-hawksbill luchazwa 'Njengolusengozini Kakhulu Yokushabalala', ufudu oluluhlaza 'Lusengozini Yokushabalala' kanti i-Leatherback, i-Loggerhead ne-Olive Ridley 'Zisengcupheni' emhlabeni wonke. Izimfudu i-leatherback ne-loggerhead zisezigabeni eziphezulu mayelana nesidingo sokulondolozwa ku-CITES (Convention on International Trade in Endangered Species), ne-CMS (Convention on Migratory Species). Njengoba kuyiyo esayinela i-CMS, iNingizimu Afrika isisekele futhi yasayina izivumelwano ezimbili eziqondene nokulondolozwa nokulawulwa kwezimfudu zasolwandle (lezi yi-Africa-Atlantic and Indian Ocean South East Asia Memoranda of Understanding). Ngakho-ke, iNingizimu Afrika, njengesizwe, izibophezele ekuvikelweni zonke izinhlobo zezimfudu zasolwandle ezisemanzini kazwelonke, noma ngabe zingababekeli bamaqanda abangahlali lapha (izimfudu i-loggerhead ne-leatherback) noma zingabafuni bokudla abahlali lapha (izimfudu ama-hawksbill nezimfudu eziluhlaza; Ezasolwandle Nezasogwini, ulwazi olungashicilelwe). Ngaphezu kwendawo okuhlala kuyo ufudu lwasolwandle nokuvikelwa e-St. Lucia nase-Maputaland Marine Reserves, izimfudu eNingizimu Afrika zivikelwe ngaphansi koMthetho Wemithombo Yokuphila Emanzini (1998).

Umdwebo 4.19 Ikhaya Nezingu Eziyinhloko Zama-Loggerheads Nama-Leatherbacks phaka Nokuzalela Ezindaweni Ezihlukene



Phawula: Okuboniswe Emfanekisweni Yizindawo Ezivikelwe Zasemanzini (ulayini onamachashazi abomvu) kanye nezindawo ezithandwayo (umugqa ogwingcizayo osawolintshi) ngaphakathi ku-Block ER236 (umugqa obomvu).

Umthombo: Oceans and Coast, ulwazi olungashicilelwanga

Izinyoni Zasolwandle

I-East Coast inikeza izindawo zokuzalela ezimbalwa ezifanelekayo ezinyonini zasogwini nezasolwanle ezinezinhlolo ezintathu kuphela (inyoni yasolwandle eneKhanda Elimpunga, inyoni i-Caspian tern ne-Swift tern) (Umdwebo 4.20) ezarekhodwa ukuthi zizalela njalo ogwini (CSIR, 1998). Endaweni engaphandle kogu i-Block ER236, izinyoni ezivame ukubonakala lapho yizinyoni zohlobo olufuduka olwandle njengama-albatross, ama-petrels nama-shearwaters. Zivame ukuba ziningi izikhathi zokuhlangana nazo ezinyangeni zasebusika nangenkathi 'yokubaleka' kosayidindi ngaphakathi ogwini, lapho eziningi zezinhlobo zasolwandle, lapho eziningi zezinhlobo zasolwandle ziza ngaphakathi ogwini zizolandela inani elikhulu lezinhlanzi ziye enyakatho zikhuphule ugu (O'Donoghue *et al.*, 2010a, 2010b, 2010c). Izinhlobo zasogwini kungase kuhlanguwe nazo ngaphakathi ezindaweni zogu ku-Block ER236, ikakhulukazi endaweni yezizalo zomfula ezinkulu (Richards Bay, St Lucia).

Ku-AII ezungeze uGu OluseNingizimu, kungenzeka kube khona izinhlobo ezingu-60. Izinyoni zasolwandle oGwini OluseNingizimu zingafakwa ezigabeni ezintathu: 'izinhlobo ezihlala khona ezizalelayo', 'izinhlobo ezifudukayo ezingazaleli' kanye 'nezinhlobo eziyimvelakancane ezingozulane' (Shaughnessy 1977; Harrison 1978; Liversidge & Le Gras 1981; Ryan & Rose 1989). Izinhlobo eziyishumi nanhlanu zizalela ngaphakathi kwendawo esoGwini OluseNingizimu (*Ithebula* 4.3), kuhlangukane ama-Cape Gannets (Algoa Bay islands), ama-African Penguins (Algoa Bay islands), ama-Cape Cormorants (umphakathi omncane eziqhingini zase-Algoa Bay islands nasezweni), i-White-breasted Cormorant, i-Roseate Tern (Eziqhingini i-Bird ne-St Croix), i-Swift Tern (Stag Island) neZinyoni Zasolwandle ama-Kelp.

Ithebula 4.3 Izinyoni Zasolwandle Ezihlala Lapha Zizalele Amaqanda Ezikhona Ogwini Oluseningizimu

Igama lohlobo	Igama Elivamile	Isimo Ku-IUCN Yomhlaba
<i>Haematopus moquini</i>	African black oystercatcher	Iseduze Nosongo
<i>Spheniscus demersus</i>	African Penguin	Isengozini Yokushabal
<i>Phalacrocorax carbo</i>	Great Cormorant	Ukukhathazeka Okunc
<i>Phalacrocorax capensis</i>	Cape Cormorant	Iseduze Nosongo
<i>Phalacrocorax neglectus</i>	Bank Cormorant	Isengozini Yokushabal
<i>Phalacrocorax coronatus</i>	Crowned Cormorant	Ukukhathazeka Okunc
<i>Phalacrocorax lucidus</i>	White-breasted Cormorant	Ayikahlolwa
<i>Morus capensis</i>	Cape Gannet	Isengcupheni
<i>Larus dominicanus</i>	Kelp Gull	Ukukhathazeka Okunc
<i>Larus cirrocephalus</i>	Greyheaded Gull	Ukukhathazeka Okunc
<i>Larus hartlaubii</i>	Hartlaub's Gull	Ukukhathazeka Okunc
<i>Hydroprogne caspia</i>	Caspian Tern	Isengcupheni
<i>Sterna bergii</i>	Swift Tern	Ukukhathazeka Okunc
<i>Sterna dougallii</i>	Roseate Tern	Ukukhathazeka Okunc
<i>Sterna balaenarum</i>	Damara Tern	Iseduze Nosongo

Umthombo: ilungiswe isuka ku-CCA & CMS 2001

Umdwebo 4.20 Izinyoni Ezingena Olwandle Zidobe Ukudla Ogwini Olusempumalanga Yi-Swift Tern (Kwesobunxele) ne-Cape Gannet (Kwesokudla)



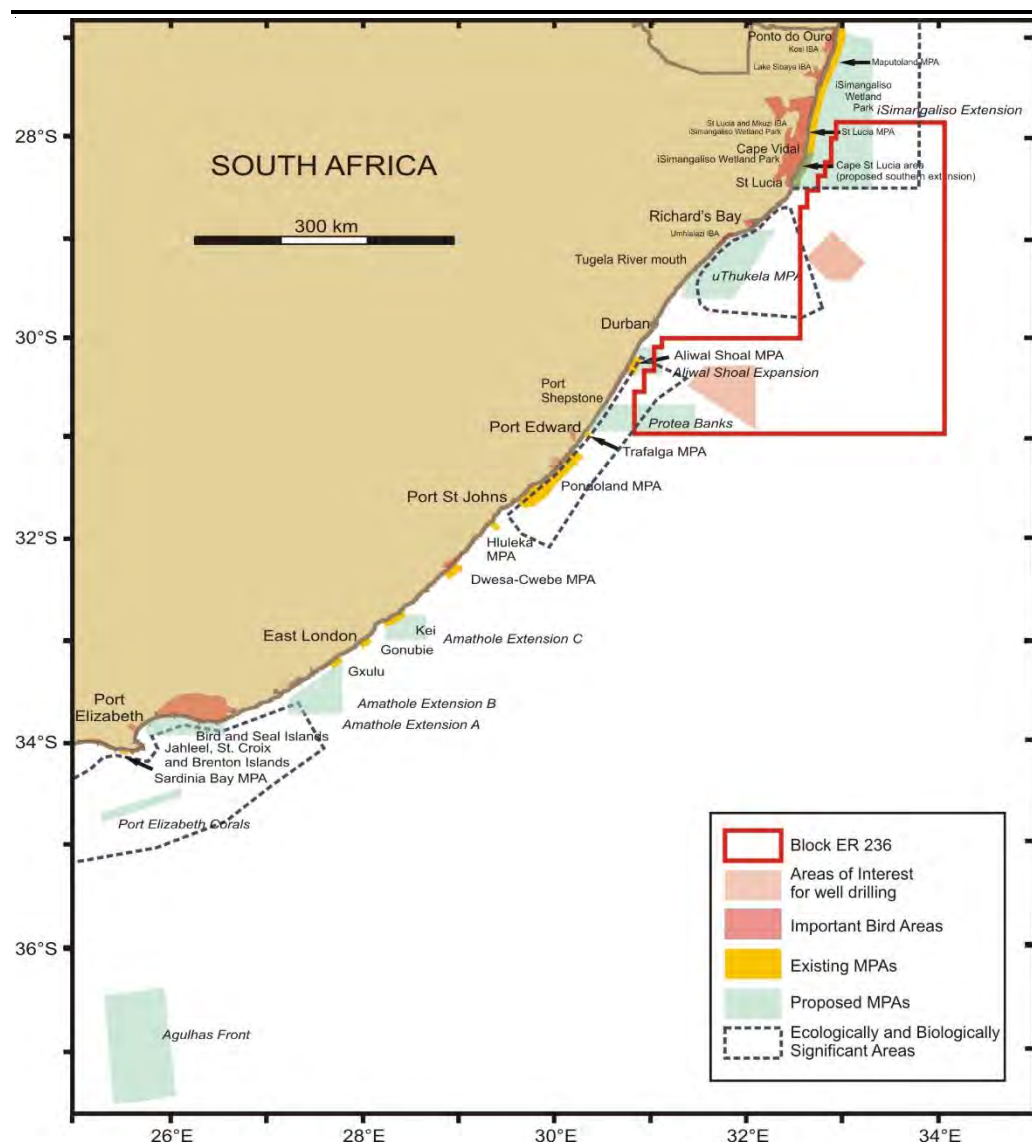
Sources: www.johanngrobelaar.co.za; www.oceanwideimages.com

4.3.4

Izindawo Ezivikelwe Zasemanzini

Nakuba zingekho izindawo zasemanzini ezivikelwe ezingena ngaphansi kwe-ADI yale projekthi, kunezindawo eziningana ezivikelwe ngaphakathai ku-AII okungase kube eyale phrojekthi (ikakhulukazi indawo okungase kuzwakale kuyo umthelela wezenzakalo ezingahleliwe). Umdwebo 4.21 ibonisa izindawo ezisemanzini ezivikelwe ezikhona nezihlongozwayo ezihlobene ne-ADI (okungukuthi izindawo zasenyakatho naseningizimu ezithandwayo ne-AII (kuhlanganise yonke i-Block ER 236 bese ziqhubekela oGwini Olusempumalanga kuya e-East London).

Umdwebo 4.21 Izindawo Ezivikelwe/Ezingase Zibe Bucayi Mayelana ne-Block ER236



Phawula: Okuboniswe eMdwebweni yiZindawo Ezibalulekile Zezinyoni (ama-IBA), iZindawo Zasemanzini Ezivikelwe ezikhona nezihlongozwayo (ama-MPA) neZindawo Ezisemqoka Ezindaweni Zemvelo Nezinto Eziphila Kuzo (ama-EBSA) ngokuhlobene ne-Block ER 236 (i-polygon ebomvu)

Umthombo: Pisces, 2018

- *Zamenyezelwa ngokuthi Izindawo Zasemanzini Ezivikelwe (ama-MPA) eNdaweni Yomthelela Ongaqondile (AII)*

Ku-AII, kunama-MPA amathathu amenyezelwe ngaphakathi kwemingcele yase-KZN kanye namane agudle ugu lwaseMpumalanga Kapa. Awekho kuma-MPA akhona eqela ku-ADI (*Umdwebo 4.21*).

I-Maputaland and St Lucia Marine Reserves

I-Maputaland ne-St Lucia Marine Reserve zakha indawo eqhubekayo evikelwe ethatha u-150km ukusuka emngceleni wase-Mozambique kuya cishe ebangeni elingu-1 km eningizimu ye-Cape Vidal futhi cishe u-5.5 km ukuya olwandle. Ziyizici ze-Simangaliso Wetland Park (*Umdwebo 4.21*).

Akuvunyelwe ukudoba eNdaweni Eyisizalo Somfula phakathi kwe-beacon N5 e-Red Cliffs ne-N6 e-Leven Point, kuqhubeka cishe indawo engu-5.5 km uma uya ngasempumalanga usuka kuphawu lwamanzi aphezulu. Ezindaweni Ezenqatshelwe, ezisenyakatho ye-beacon N5 e-Red Cliffs naseningizimu ye-beacon N6 e-Leven Point, ngokulandelana, labo abadoba ngezindobo bangase bayibambe inhlanzi, nabadoba ngama-skiboat nabadoba ngomnsalo bangase babambe inhlanzi i-pelagic bony.

Indawo eseceleni kwe-St Lucia yaqokwa njenge-MPA ngoba iyindawo ebalulekile ezimfudwini ama-leatherback, ezizalela amaqanda emabhishi ancikene futhi zidle emaphethelweni ogu, futhi ulwazi lokuzilandeleta lubonisa ukuthi indawo yokuhlala izimfundo yeqa ngama-*nautical mile* amathathu (cishe u-5.5 km) ngale komngcele we-St Lucia ne-Maputaland MPA ekhona. Izinyoni zasolwandle ezisongelwayo zenza zibaluleke lezi zindawo ezisele nakuba ukukhathazeka ngokudoba kule ndawo evikelwe nakho kuneqhaza ekubalulekeni kwale ndawo.

I-MPA ivikela inani elikhulu lezindawo zezimfudu zokuzalela amaqanda; ukufuduka kwemikhomo, amahlengethwa nama-whale-sharks endaweni egudle ugu; ama-coelacanth ezindaweni eziqhekezekile olwandle; kanye nenani elikhulu lohlobo lwedada i-waterfowl aseSimangaliso Wetland Park, kuhlenganise namaqembu amakhulu azalelayo amavuba, onogolantethe, izindwandwe nama-tern.

Amanye ama-MPA amenyezelwe eNdaweni Yomthelela Ongaqondile (AII)

Amanye ama-MPA amenyezelwe ku-AII ahlanganisa Amathole MPA (endaweni yase-East London) nama-MPA ase-Dwesa-Cwebe, Hluleka ne-Pondoland (ase-Wild Coast) (*Umdwebo 4.21*).

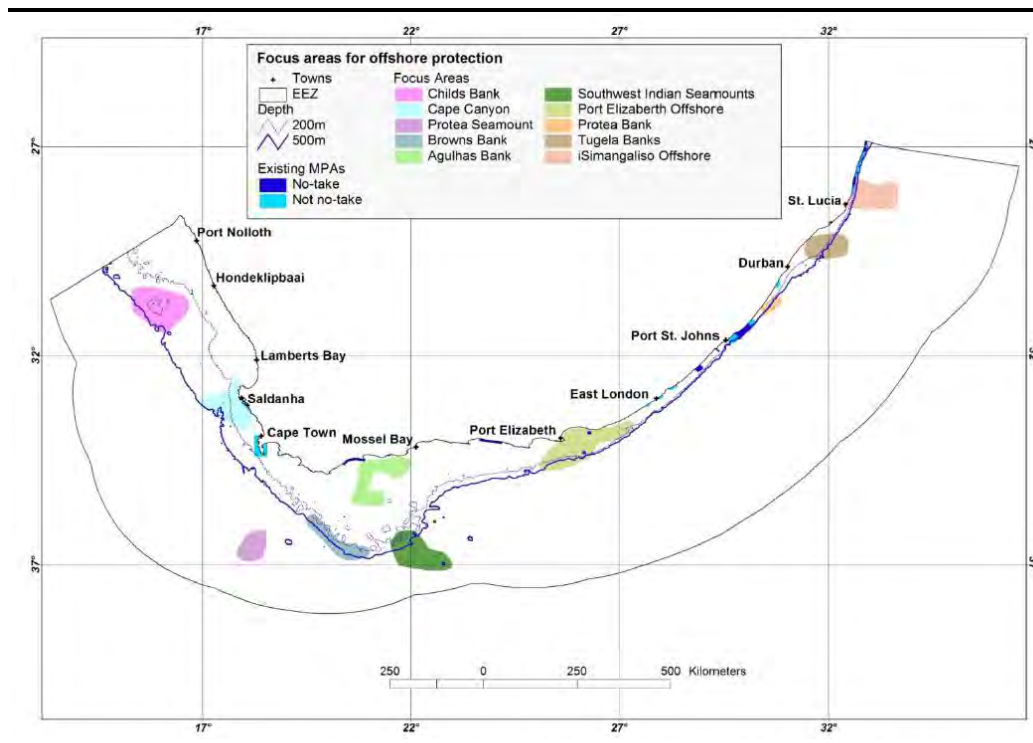
Ukunwetshwa Kwezindawo Okuhlongozwayo Kokuvelwa Kwezinto Eziphilayo Ezihlukahlukene Ngaphandle Kogu Endaweni Yomthelela Ongaqondile

Iphrojekthi Ye-MPA yangaphandle kogu (SANBI, 2011) ihloselwe ukusekela ukuqaliswa kweSu Lokunwetshwa Kwendawo Evikelwe Kuzwelonke

(uHulumeni waseNingizimu Afrika, 2010), okwaqokomisa isidingo sokusungula ama-MPA angaphandle kogu nokunikeza ukuvikela okufanele ezinhlelweni zangaphakathi kogu eNingizimu Afrika. Kwabhekwa izindawo eziseqhulwini zezinhlobo ezihlukene zemigomo phakathi nale phrojekthi futhi kuyaqashelwa ukuthi ukuvikelwa kungase kuhlukaniswe phakathi kwezinhlobo ezihlukene zokulawulwa kuhlukanise nezindawo ezihlukene zama-MPA kodwa futhi nezinye izinhlobo zokulawulwa.

Ngenxa yalokho, kwahlonzwa izindawo ezingu-22 eziseceleni kogu ezizovikelwa phakathi kuka-30°E no-35°E, futhi lezi zaziqhuba i-Operation Phakisa yokuthuthukiswa okuhlongozwayo kwama-MPA aseceleni kogu (Umdwebo 4.22). Lezo ezingaphakathi kwendawo yePhrojekthi ziboniswe Umdwebo 4.21. Nakuba i-Block ER236 yelekanya nama-MPA ahlongozwayo i-Protea Banks, Aliwal Shoal neSimangaliso Wetland Park, akukho ukwelekanya kwezindawo ezithandwayo zokumba kahle kulezi zindawo ezivikelwe ezihlongozwayo.

Umdwebo 4.22 Izindawo Okugxilwe Kuzo Ekuvikelweni Okuseceleni Kogu



Umthombo: SANBI, 2011

- Ezinye Izindawo Ezivikelwe Ngaphandle Kogu Endaweni Yomthelela Ongaqondile

Izindawo Zethemba

Izindawo Zethemba zichazwa yi-Mission Blue of the Sylvia Earle Alliance njengezindawo ezikhethekile zokulondolozwa kwemvelo ezibalulekile empilweni yolwandle. Izindawo Zethemba Zokuqala eziyisithupha zaqaliswa eNingizimu Afrika ngo-2014 futhi zihlanganisa i-Aliwal Shoal e-KZN, Algoa Bay, Plettenberg Bay, Knysna, i-Cape Whale Coast (indawo yase-Hermanus)

ne-False Bay eNtshonalanga Kapa. Kulezi, i-Aliwal Shoal Hope Spot isendaweni encikene nekhona eliseningizimu ntshonalanga ye-Block ER236, cishe u-250 km eningizimu ntshonalanga yendawo ethandwayo yokumba umthombo futhi cishe ebangeni elingu-75 km ngaphakathi oogwini nasentshonalanga yendawo eseningizimu yendawo ethandwayo.

Indawo Engaphandle kogu iSimangaliso: Indawo Yamagugu Ezwe

ISimangaliso Wetland Park siqashelwa njengexhaphozi elibalulekile emhlabeni wonke ngaphansi kwe-Ramsar Convention futhi siye saqokwa njengeNdawo Yamagugu Ezwe ngokuvumelana noMthetho Womhlango Wamagugu Ezwe (No. 49 ka-1999). ISimangaliso Wetland Park sihlanganisa indawo engamahektha angu-324 441, kuhlanganise indawo engu-230 km yogu ukusuka e-Kosi Bay (esenmgceleni we-Mozambique) kuya eningizimu ye-Maphelane futhi cishe nengama-5.5 km ukuya olwandle.

Leli paki lilawulwa uMthetho Kazwelonke Wokulawulwa Kwezemvelo Kwezindawo Ezivikelwe (No. 57 ka-2003), futhi ngaphansi kweSigaba 48(1) akukho muntu ongenza imisebenzi yezentengiso yokuhlola noma yokumba eNdaweni Engamagugu Ezwe.

Ngaphezu kwalokho, iSigaba 50(5) sithi akukho misebenzi yokuthuthukisa evunyelwe eNdaweni Yamagugu Ezwe ngaphambi kwemvume ebhaliwe etholakale kusengaphambili egunyeni elilawulayo, okuyiGunya LeSimangaliso Wetland Park.

4.3.5 Ezinye Izindawo Ezibucayo Endaweni Yomthelela Ongaqondile

Izindawo Eziyizivikelo

Kunezindawo eziyizizalo zomfula ezingaba ngu-188 ezisendaweni yoGu Olusempumalanga, phakathi kwe-Gonubie (cishe e-East London) naseSipingo (eduze naseThekwini). *Umdwebo 4.23* ngezansi ubonisa indawo okukuyo izindawo eziyizizalo zomfula kanye nezindawo ezivikelekile eziyizizalo zomfula (ama-EPA) 'eziku-Wild Coast', ngaphakathi kwendawo yogu oluseMpumalanga Kapa. Lezi zifakiwe nawo njengoba zingase zithole umthelela uma kwenzeka isenzakalo esiyingozi.

Izindawo eziyizizalo zomfula zingase zibhekwe njengezindawo zokuhlala eziwusizo, ngoba zinikeza izinsizakalo eziwusiso kwezemvelo, njengemisebenzi yokunakekela izindawo zezinhlanzi, amanzi ahlanzekile ezindawni zamanzi, ukuvuselelwa kwezakhi, nezinto zemvelo kuye ezintweni ezihlala ogwini, izikhukhula nokuvikelwa kwezivunguvungu zasolwandle, i-carbon sequestration, izindawo zokugeza eziphephile nokutshalwa kwezitshalo zokukhiqiza uwoyela ngaphandle kwamanzi ahlanzekile (Van Niekerk & Turpie, 2012). Zibhekwa njengezikwazi ukumelana nezimo ezinzima ngokwemvelo, ngoba ukushintshashintsha kwazo kusho ukuthi izilwane nezitshalo ezikulezi zindawo zemvelo ngokuvamile zivumelana nokuhlala ezimweni zoshintsho olukhulu.

Ngenxa yalokho, lezo zinhlobo ezingase zikwazi ukubekezelela indawo enjengesizalo somfula ngokuvamile ziyaphumelela kakhulu futhi zande endaweni yazo ekhethiwe (isib. ama-prawn asesihlabathini / asodakeni, i-mullet nenhlanzi edla ekujuleni komfula noma edla i-plankton).

Umdwebo 4.23 Izizalo Zomfula ezigudle i-Wild Coast. Izizalo Zomfula Ezinombala Obomvu Yizindawo Eziyizizalo Zomfula Ezivikelwe (ama-EPA)



Umthombo: Reyers & Ginsburg, 2005.

Ingxenye enkulu yeZizalo Zomfula ezigudle uGu OluseMpumalanga (ikakhulukazi lezo ezitholakala ku-‘Wild Coast’ ⁽¹⁾) ziye zahlonzwa emhlabeni wonke njengezinezinhlobonhlobo zezinto eziphilayo nezibalulekile kwezemvelo (okungukuthi isizalo somfula i-Mngazana ne-Mbashe). Lokhu kuhlobene nokuhlanzeka kwezizalo zomfula eziningi ezigudle ugu. Ikakhulu, isizalo somfula i-Mngazama (esitholakala e-‘Wild Coast’) siye safakwa ezizalweni zomfula eziphambili ezingu-20 eNingizimu Afrika, kuyilapho ezinye eziyisishiyagalombili ziye zafakwa phakathi kwezizalo zomfula eziphambili ezingu-50 eNingizimu Afrika (Reyers & Ginsburg, 2005). *Ithebula 4.4* inikeza uhlu lwezizalo zomfula eziyisisekelo ku-‘Wild Coast’ ngokokubaluleke konkana kokulondolozwa kwemvelo.

(1) The ‘Wild Coast’ is a section of the coast of the Eastern Cape, South Africa. The region stretches from East London in the south to the border of KwaZulu-Natal in the north.

Ithebula 4.4 Izizalo Zomfula Eziyisisekelo Ze-Wild Coast

Isizalo Somfula	Uhlobo	Usayizi (ha)
Mngazana	Sihlala njalo	224.9
Mbashe	Sihlala njalo	132
Mtata	Sihlala njalo	168.8
Mzimvubu	Umlomo womfula	151
Xora	Sihlala njalo	150.6
Nxaxo/Ngqusi	Sihlala njalo	159.5
Great Kei	Sihlala njalo	222.4
Mzamba	Sihlala njalo	70.94
Mtentu	Sihlala njalo	52.93
Qora	Sihlala njalo	89.63
Mtakatye	Sihlala njalo	116.8
Mdumbi	Sihlala njalo	76.07
Mntafufu	Sihlala njalo	24.07
Mbotyi	Esesikhashana	50.39
Nqabara	Sihlala njalo	109.7
Qolora	Esesikhashana	22.9
Mtamvuna	Esesikhashana	63.53
Mnenu	Esesikhashana	90.52
Ntlonyane	Esesikhashana	41.34
Msikaba	Sihlala njalo	15.13

Kuye kwenziwa ucwaningo olulinganiselwe eminyakeni yamuva ukuze kutholakale ukwakheka kwezinto eziphilayo ezihlukahlukene esizalweni somfula ezitholakala kulolu gu. Kulokhu, i-National Biodiversity Assessment (Van Niekerk & Turpie, 2012) iyaqaphela ukuthi ucwaningo olukhona seludlulelwe yisikhathi futhi kudingeka kwenziwe ucwaningo olusha ngokushesha oluzokwenziwa kanye oluqhathaniseka nezinhlobo-vo zangaphambilini. Naphezu kwalokhu, ukufingqwa okufushane kwezici eziyinhloko zokwakheka ezihlobene neSizalo Somfula i-Mngazana Estuary (esinye sezizalo zomfula eziyinhloko ezisendaweni yase-Transkei ehlongozwayo), kunikeziwe ngezansi.

Isizalo Somfula I-Mngazana

Isizalo Somfula i-Mngazana yisizalo somfula esihlale sivulekile esiseningizimu ye-Port St Johns, ogwini lwe-Eastern Cape. Ubude besizalo somfula bulinganiselwa kumakhilomitha ayisithupha, kuye ngokushintsha kwamagagasi (USAID, 2005). Lesi sizalo ngokwaso sibhekwa njengesinye sezizalo ezibaluleke kakhulu eMpumalanga Kapa, njengoba sakha ingxenye yamahektha angu-140 asehlathini elisemanzini, eliye lahlonzwa ukuthi lakhe isitende esingesesithathu ngobukhulu eNingizimu Afrika.

Isizalo Somfula i-Mngazana sinezinhlobo ezihlukahlukene zemiphakathi yezinhlanzi nezilwane ezingenamgogodla. Lokhu kuhlenganise nezinhlobo eziphila ezindaweni ezikahle nje, ezishisa kakhulu, ezishisayo, ezandile ezansi, phakathi nendawo, nasekhanda, ngokulandelanda (De Wet 2004). Kwahlonzwa izinhlobo ezintathu zezinkalankala ezisohlwini lwe-Red Data kulesi sizalo (Sgwabe *et al.*, 2004).

Kuye kwarekhodwa izinhlobo zezinyoni ezingaphezu kuka-100, kuhlanganise nezinhlobo eziyimvelakancane njengevuba i-Mangrove (Sgwabe *et al.*, 2004). Izitshalo eziseSizalweni Somfula i-Mngazana zihlanganisa inani lemiphakathi yezitshalo nehlati elisemanzini eliyisici esikhulu. Kukhona notshani basolwandle namaxhaphozi, nezindunduma zenhlabathi osebenzi olusempumalanga yomlomo wesizalo.

4.4

ISISEKELO SEZOMNOTHO NEZENHLALO

Le phrojekthi isendaweni engaphandle kogu lweSifundazwe saKwaZulu-Natal (KZN), futhi iyosekelwa izinto zokusetshenziswa ezisogwini lwe-Port of Richards Bay noma i-Port of Durban.

Imisebenzi eminingi ehlobene nale phrojekthi iyokwenziwa ngaphandle kogu, ngaphandle kwemisebenzi ehlobene nezinto ezenziwa ogwini. Phakathi nokusebenza okuyinjwayelo, imithelela yezenhlalo neyezomnotho yephrojekthi (kokubili emihle nemibi) iyoba nemingcele ngoba imisebenzi eminingi iyokwenzeka ngaphandle kogu.

Ngenxa yalokho, isisekelo sezenhlalo nezomnotho sigxile komasipala bendawo okungase kube kubo izinto ezizosetshenziswa, uMasipala Wedolobha LaseThekwini noMasipala Wendawo Wedolobha LaseMhlathuze. Labo masipala babhekwa njenge-ADI. I-AII ihlanganisa omasipala bendawo abagudle ugu abavela kuMasipala Wendawo Wedolobha LaseMhlathuze kuya kuMasipala Wendawo Wedolobha LaseBuffalo, ababalwe lapha *Ithebula 4.5*. Ukufingqwa kwezikhombisi ezisezingeni eliphezulu zalabo masipala kufakwe ku-Senezelo D. *Umdwebo 4.24* kanye *Umdwebo 4.25* yethula omasipala abase-KZN naseMpumalanga Kapa.

Uma kwenzeka kuchitheka okuthile ngengozi, imiphumela ingase izwakale oGwini OluseMpumalanga e-KZN naseMpumalanga Kapa, okungase kube nomthelela ezintweni eziphila emanzini nasogwini njengezinhlanzi, (kokubili ezithengiswayo nezokusimamisa ukuphila) kanye nemboni yezokuvakasha. Incazelo yemboni yezindawo zezinhlanzi ifakiwe *eSigabeni 4.4.3*, futhi ulwazi oluthe xaxa mayelana nezokuvakasha lwethulwe *eSigabeni 4.4.2*.

Ithebula 4.5 Omasipala Bendawo abaku- AII

Omasipala Bendawo E-KZN	Omasipala Bendawo EMpumalanga Kapa
Wendawo uMfolozi	Wendawo iMbizana
Wendawo uMlalazi	Wendawo Ingquza Hill
Wendawo uRay Nkonyeni	Wendawo iKing Sabata Dalindyebo
Wendawo Umdoni	Wendawo iNyandeni
Wendawo Umzumbe	Wendawo i-Port St Johns Local
Wendawo KwaDukuza	Wendawo iGreat Kei
Wendawo iMandeni	Wendawo iMbhashe
	Wendawo iMnquma



Umthombo: ERM, 2018



Umthombo: ERM, 2018

4.4.1

Incazelo Eyisisekelo Yomasipala Bendawo

Uhlaka Lokulawula

Uhulumeni wesifundazwe yiwo obhekelele ukunikeza umbono wesikhathi eside nohlaka lokusebenza lweSifundazwe. Unesibopho sokuqinisekisa ukubambisana nokusebenzisana phakathi komasipala nokuthi umasipala ngamunye wenza imisebenzi yawo. Kanti, ngamunye woMasipala Besifunda ubhekelele ukulungiselela uhlaka lwentuthuko nokuhlinzeka ngezinsizakalo nengqalasizinda eSifundeni sawo. Omasipala bezifunda baphinde bahlukaniswe ngomasipala bendawo.

Omasipala bendawo banesibopho sokwenza uHlelo Lwentuthuko Oluhlangene (IDP), oluhambisana nombono wesikhathi eside wesifundazwe, futhi olucaba indlela yokufinyelela intuthuko kwezenhlalo nezomnotho.

Provincial Context

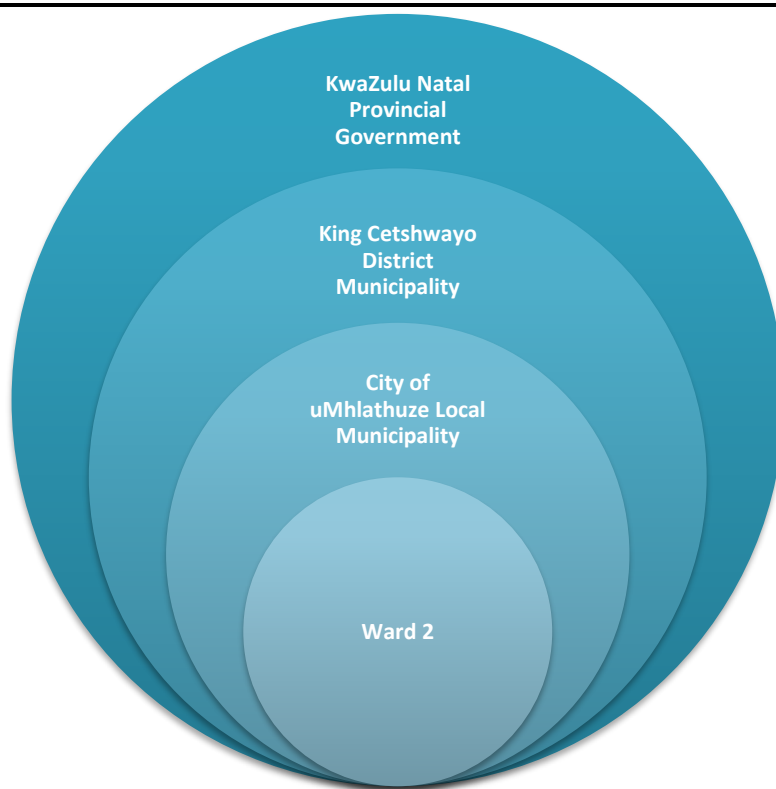
Le phrojekthi isendaweni engaphandle kogu lweSifundazwe sase-KZN, isifundazwe sesithathu ngobuncane eNingizimu Afrika, esihlanganisa indawo engu-94,361 km². I-KZN inenani Labantu elingalesibili ngobuningi ezifundazweni zaseNingizimu Afrika, inabantu abangu-11,065,240.

Isemngceleni weMpumalanga ne-Free State entshonalanga kanti eMpumalanga Kapa iseningizimu-ntshonalanga. Ibuye ihlukanise iLesotho, iSwazini neMozambique. UMgungundlovu yinhloko-dolobha, kanti iTheku yidolobha elikhulu, futhi libhekwa njengesidleke somnotho walesi Sifundazwe. Amanye amadolobha namadolobhana amakhulu e-KZN ahlanganisa i-Richards Bay, i-Port Shepstone, i-Newcastle, i-Escourt, i-Ladysmith ne-Richmond. *Umdwebo 4.24* ubonisa omasipala abakulesi sifundazwe.

Imboni yezokuvakasha idlala indima ebalulekile emnothweni wase-KZN njengoba inezindawo ezithandwa yizivakashi ezihlanganise amadolobhana agudle ugu, kanye naphakathi ezweni kanye neZintaba Zokhahlamba.

UMasipala Wesifunda i-King Cetshwayo kanye noMasipala Wendawo Wedolobha LaseMhlathuze

Isikhumbulo semikhumbi sase-Richards Bay sisendaweni yoMasipala Wendawo Wedolobha LaseMhlathuze (uMhlathuze Local Municipality), ongena ngaphansi kukaMasipala Wesifunda i-King Cetshwayo (KCDM). I-KCDM ingomunye womasipala besifunda abayishumi nanye abasesifundazweni sase-KZN. Unomasipala bendawo abahlanu sebebonke, okuyilaba: uMasipala Wendawo Wedolobha LaseMhlathuze, Umlalazi, iNkandla, uMfolozi noMthonjaneni (uMasipala Wesifunda i-King Cetshwayo IDP, 2018/19 – 2021/22). Isisekelo sokuhlelwa kwezinto zasogwini sizoba kuWadi 2. *Umdwebo 4.26* ubonisa uhlaka lokulawula lwamazinga ahlukene kuhulumeni.



Umthombo: uMhlathuze Municipality SDF, 2017/2018; Ward Delimitation 2016

I-KCDM isenyakatho yendawo esempumalanga ye-KZN, ihlanganisa indawo engu-8,213 km². Inenani Labantu elingalesithathu ngokuba phezulu eSifundazweni sase-KZN futhi inabantu ababalelwa ku-971,135. Lesi sifunda sinisikhumbi semikhumbi esijulile esikhulu kakhulu ezwekazini lase-Afrika, okuyi-Port of Richards Bay.

I-Port of Richards Bay isingatha amathani angaphezu kwezigidi ezingu-75 emithwalo ngonyaka, okuyinani eliphindwe kabili kunalelo elingasingathwa i-Port of Durban eningizimu. Ngenxa yalokhu okungenxa, iSikhumbi Semikhumbi sase-Richards Bay siye sadlala indima ebaluleke kakhulu ekuthuthukiseni imboni yokukhiqiza kule ndawo, ngaleyo ndlela sayenza yaba eneqhaza elikhulu emnothweni kanye nomkhiqizo endaweni (uMasipala waseMhlathuze SDF, 2017/2018).

Kodwa-ke, i-KCDM inezinselele ezihlukahlukene, kuhlangele imiphakathi yasezindaweni zasemakhaya ekhungethwe ububha, ukungabi bikho kwezinsizakalo eziyisisekelo njengamanzi nokukhucululwa kwendle kanye nokungabi bikho kwemisebenzi (uMasipala waseMhlathuze SDF, 2017/2018).

Amanani Ezenhlalo

UMasipala Wendawo waseMhlathuze unabantu abangu-410,465 ngokwenhlolo-vo yomphakathi yango-2016 (StatsSA). Leli nani liye lakhula ngamaphesenti angu-22.73 kusukela ekubalweni kokugcina ngo-2011.

Uma kusetshenziswa inhloko-vo eyenziwa ngo-2011, kwalinganiselwa ukuthi uMasipala waseMhlathuze unomuzi ngamunye onabantu abalinganiselwa ku-3.95 futhi unemizi ebalelwa ku-103,915 isiyonke (uMasipala waseMhlathuze SDF, 2017/2018). Ulwazi oluqhathanisayo ezibalweni zabantu kumasipala wesifunda nowendawo lunikeziwe lapha *Ithebula 4.6*.

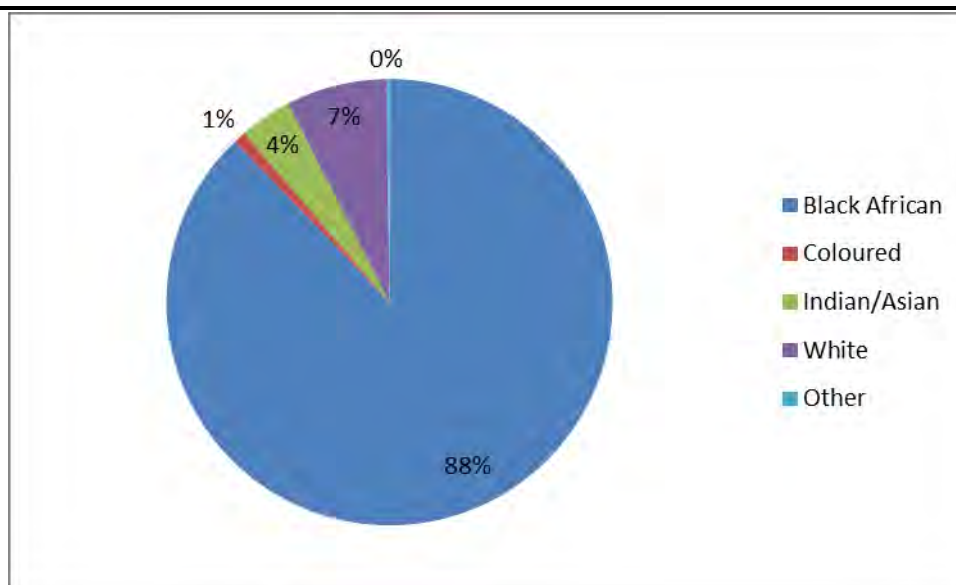
Ithebula 4.6 Ukufingqwa Kwemiphakathi

Unyaka	Igama Lendawo Elawulayo	Usayizi	Inani Labantu	Iphesenti Lokukhula
2011	UMasipala Wesifunda iKing Cetshwayo	8,213 km ²	907,519	
2011	Umasipala Wendawo Wedolobha LaseMhlathuze	1,233 km ²	334,459	
2016	UMasipala Wesifunda iKing Cetshwayo	8,213 km ²	971,135	7.01
2016	Umasipala Wendawo Wedolobha LaseMhlathuze	1,233 km ²	410,465	22.73

Umthombo: uMasipala waseMhlathuze SDF, 2017/2018

Ngokwezibalo zango-2011, abantu abaNsundu abangama-Afrika yibo abaningi kakhulu abakha amaphesenti angu-87.7 womphakathi walapha. AbeLungu bakha amaphesenti angu-7.3, kanti amanye amaqembu akha amaphesenti asele njengoba kuboniswe lapha *IShadi 4.27*.

IsiZulu ulimi oluyinhloko olukhulunywayo kuMasipala Wendawo uMhlathuze njengoba bengamaphesenti angu-78.7 abantu abakhuluma lolu limi (StatsSA, 2016).



Source: StatsSA 2016

Ezomnotho Zendawo Nezenhlalo

Umasipala Wendawo yase-Mhlathuze nezomnotho ze-KCDM kokubili kuqondiswa ngokuyinhloko ichweba lase-Richards Bay, okungelinye lamachweba amakhulu nasebenza kakhulu e-Afrika. Lendawo ingenisa u-16.7 wamaphesenti wemikhiqizo ye-KZN Gross Domestic Product (GDP).

Imisebenzi eyinhloko eyenziwa ngaphansi koMasipala Wendawo yaseMhlathuze ihlanganisa imisebenzi eminingi yezimboni ehlanganisa isikhumulo samalahle, indawo okwenzelwa kuyo i-aluminium, izimayini, izindawo zokwenza amaphepha, ezamahlathi, ukwenziwa kwamathuluzi nomanyolo, namakhemikhali akhethekile (uMasipala wase-Mhlathuze IDP, 2012/2017).

Ukungabikho kwemisebenzi

Izinga lokungabikho kwemisebenzi ngaphansi kukaMasipala Wendawo yaseMhlathuze lilinganiselwa kumaphesenti angu- 40 (uMasipala waseMhlathuze IDP, 2012/2017). Lokhu kuhlanganisa abantu abangasebenzi, nalabo abangafuni misebenzi. Ngokuya kwe- IDP, ukungabikho kwemisebenzi kuwumphumela wokuswelakala kwamakhono, okubangwe umbuso wobandlululo lapho kwakweziwe isimiso esibandlulula iningi labantu ukuba bangatholi imfundo enhlethe, kodwa yabenza bafundela imisebenzi enamakhono amancane noma enganamakhono (uMasipala waseMhlathuze IDP, 2012/2017).

Imfundo

Inhlolovo Yezinga Lokuphila yase uThungulu (KCDM) eyenziwa ngo-2009 yabonisa ukuthi ingxenye eningi yenani labantu ifinyelele imfundo yase sekondari (30.52 wamaphesenti). U-22.41 waphesenti kuphela ofinyelele ku-grade 12 kanti amaphesenti angu- 8.45 afinyelele imfundo yezinga eliphezulu (uMasipala waseMhlathuze IDP, 2012/2017). Kulesi Sigodi kunephethini eqhubekayo yokwehla kwamazinga emfundo kune izinga lamakhono adingekayo linyuka.

- *Ingqalasizinda namaSevisi*

Amanzi Nokuthuthwa kwendle

Idolobha laseMhlathuze lithola imali Yesibonelelo Sengqalasizinda kuMasipala (Municipal Infrastructure Grant (MIG). Le mali isetshenziselwa amasevisi amanzi (70 wamaphesenti) nokuthuthwa kwendle (30 wamaphesenti). Kodwa le mali ayizange isize ekuthuthukiseni amasevisi okuthuthwa kwendle endaweni. Amaphesenti angu- 86.37 ezindlu ezingaphansi kukaMasipala Wendawo YaseMhlathuze uthola amasevisi amanzi ezinga lama- RDP ⁽¹⁾ avamile, kuyilapho amaphesenti angu- 57.91 athola amasevisi okuthuthwa kwendle okusezingeni elivamile.

Udoti

Cishe u- 53.5 wamaphesenti wezindlu uthuthelwa udoti izikhulu zendawo noma inkampani ezimele okungenani Kanye ngesinto. Kunezindlu eziningi ezinezindawo zazo zokulahla udoti, (38.4 wamaphesenti) kanti ingxenye encane ithembele ezindaweni zokulahla udoti zomphakathi (2.6 wamaphesenti) (StatsSA, 2016).

Ugesi

Umasipala Wendawo yaseMhlathuze awunalo uhlu lwezindlu ezisalele emuva zilindele amasevisi okufakelwa ugesi endaweni. Abaqondisi bafake imithetho yamakhodi, enikezezela ngeziqondiso nemithetho elawula indlela omasipala okufanele benze futhi banekela ingqalasizinda. Bonke abahlinzeki bakagesi kumelwe banze ngokuvumelana ne-Distribution Grid Code njengengxenye yelayisensi yabo (uMasipala waseMhlathuze IDP, 2012/2017).

Ezempilo

KuMasipala Wendawo yaseMhlathuze, kunezibhedlela ezine nemitholampilo engu- 23. I-IDP ibone isidingo sezakhiwo ezengeziwe zempilo ezindaweni ezikude Ezinababusi Bendabuko.

(1) Reconstruction and Development Programme (RDP)

I-KCDM ibinokwanda kwe-HIV okungamaphesenti angu- 38.5 ngo- 2012 eminyakeni engu-15 kuya kwengu 45, kube ngu- 33.4 wamaphesenti ngonyaka odlule (District Health Plan 2015/2016). Lamanani aphezulu kunamanani okwanda eKZN (25 wamaphesenti) naseNingizimu Afrika (18 wamaphesenti). IDP kuMasipala Wendawo yaseMhlathuze uphawule ukuthi akukho ukwaziswa okucacile nokunokwethenjela mayelana ne-HIV/ AIDS kumasipala wendawo, kodwa kucacile ukuthi lokho kuyinkinga enkulu.

Iphinde yaphawula nokuthi izigameko zesifo sofuba zandile kokubili e-KCDM nakuMasipala Wendawo yaseMhlathuze, nokuyi-TB eyimbangela ehamba phambili yokufa kwabantu e- KCDM (District Health Plan 2015/2016).

eThekwini Metropolitan Municipality

Isimiso Sokuqondisa

Isisekelo sokuthutha uwoyela nogesi singase sibe sochwebeni lwase-Durban, oluse-eThekwini Metropolitan Municipality, ku-Ward 32. *IShadi 4.28* sibonisa isimiso sokuqondisa samazinga kahulumeni.

Umasipala waseThekwini Metropolitan Municipality (eThekwini Municipality) uyingxenywe ka-A esoGwini oluseMpumalanga yeNingizimu Afrika, endaweni ebalelwa cishe ku-2,297 km² enabantu ababalelwa ku-3,555,868 (eThekwini Municipality IDP, 2016/2017).

eThekwini Metropolitan izungezwe izigodi ezintathu zikamasipala: iLembe kuya enyakatho, uGu kuya eningizimu naseMgungundlovu kuya entshonalanga (SDF, 2016/2017). Idle kakhulu ngamagquma nemihosha. Iphinde ibe ikhaya lechweba laseAfrika elisesimweni esihle nelimatasa kakhulu iChweba LaseDurban. I-Durban idolobha elikhulu lase KZN elinenani labantu lengxenywe eyodwa ezingxenyeni ezintathu, futhi idolobha lesithathu ngobukhulu ezweni (StatsSA, 2016).



Source: eThekweni Municipality IDP, 2016/2017; eThekweni Ward Map - 2011 Ward Boundary
Isibalo Sabantu

Inani labantu kuMasipala waseThekwini cishe unabantu abangu- 3,555,868 (eThekweni Municipality IDP, 2016/2017). Inani labantu lihlukaniswe ngendlela yokuthi ingxenywe emaphakathi nendawo esenyakatho izindawo ezinabantu abaningi. Nokho indawo yengxenywe esemaphethelweni asentshonalanga, okuyiyona ndawo enkulu (cishe ama-hectares angu- 78,438 ha) unamaphesenti angu- 11 wabantu abangaphansi kwalo Masipala. Ingxenywe esenyakatho unamaphesenti angu-33 abantu abangaphansi kwalo Masipala, kanti ingxenywe emaphakathi inamaphesenti angu-34 engxenywe esele yenani labantu abangaphansi kwalo masipala (eThekweni Municipality SDF, 2016/2017).

Iphrofayeli yobulili kuMasipala waseThekwini inezinga eliphezulu lamaphesenti elebantu besifazane (51 amaphesenti) uma kuqathaniswa nabantu besilisa (49 wamaphesenti). Iningi labanti liwela eminyakeni ephakathi kuka- 0- 29 ubudala, kanti abantu abaphakathi neminyaka engu- 60 – 70 ubudala bewela engxenyeni encane yenani labantu (uMasipala waseThekwini SDF, 2016/2017).

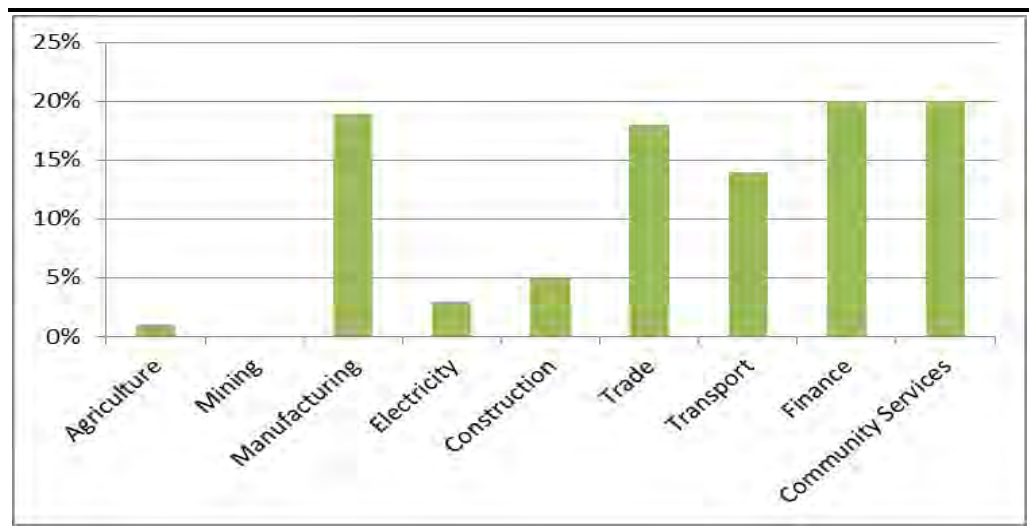
Ezomnotho Zendawo Nokusekela ukuphila

Ngokuya kwenhlolovo ye- Quarterly Labour Force eyenziwe i-Statistics South Africa, umasipala waseThekwini ubunezinga eluphansi labantu abangasebenzi engxenyeni yesibili onyakeni ka- 2015 ngamaphesenti angu-16 kuphela wabantu abangasebenzi endaweni (uMasipala waseThekwini IDP, 2016/2017). Lendawo iqhasha abantu abacishe babe amaphesenti angu-9 ezwe lonke.

Okwamanje uMasipala waseThekwini wenza amaphesenti angu- 57.1 eProvincial Gross Domestic Product (GDP), nephesenti elilodwa kuyi-national GDP (uMasipala waseThekwini IDP, 2016/2017).

Imikhakha enomthelela omkhulu emnothweni kaMasipala waseThekwini umkhakha wamaSevisi Ezezimali nawoMphakathi (20 wamaphesenti umkhakha ngamunye), ezolimo zinomthelela ngephesenti elilodwa okungenani (eThekwini Municipality IDP, 2016/2017). Ishadi elingezansi libonisa umthelela wemikhakha kuyi GDP kaMasipala Wedolobha laseThekwini.

IShadi 4.29 Umthelela Wemikhakha kuyi GDP ngo2014: uMasipala Wedolobha laseThekwini

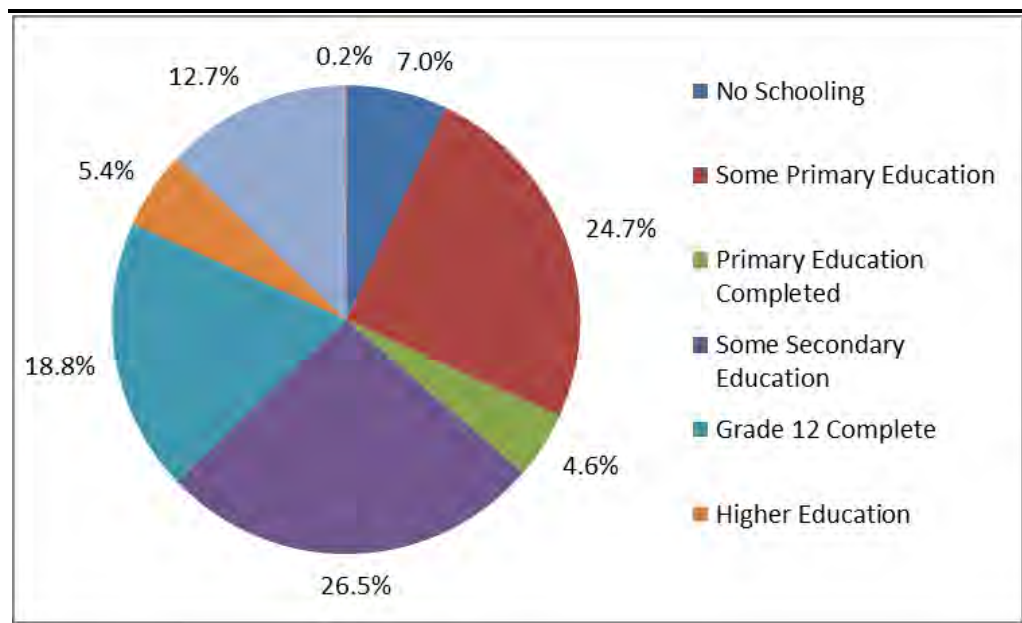


Source: eThekwini Municipality IDP, 2016/2017

Imfundo

Ngokuya kwe eThekwini Spatial Development Framework (2016/2017), amaphesenti angu-29 abantu abangaphansi kukaMasipala Wedolobha laseThekwini banemfundo yase sekondari, kanti, amaphesenti angu 8 kuphela anemfundo ephakeme. *IShadi 4.30* lingezansi libonisa amazing emfundo ngaphansi kukaMasipala waseThekwini.

IShadi 4.30 Iphrofayela Yemfundo Ngaphansi kukaMasipala Wasedolobheni LaseThekwini



Source: eThekweni Municipality SDF, 2016/2017

- *Social Infrastructure and Services*

Amanzi Nokuthuthwa kwendle

Kurekhodwe ukuthu cishe izindlu ezibalelwa ku- 933,121 zikwazi ukuthola amasevisi amanzi kaMasipala ngo 2014/2015. Lokhu ukuphawuleka okungamaphesenti angu- 98.65 kokufinyelelwa endaweni yonke. Okwamanje uMasipala waseThekwini ugcina futhi unakekele amatanki amanzi angu- 327.

Ugesi

Ingxenye yezindlu ezingenawo ugesi inciphe ngamaphesenti angu- 6.1 phakathi nesikhathi sika 2011/2012 no-2014/2015. UMasipala waseThekwini izimisele ukugcina lokhu kukhula ngokunakekela iziteshi ezinkulu ezingu- 152 ezisendaweni. Ukwenezela kulokho, uMasipala ulawula izindawo ezingu- 31 zokuhlazwa kwamanzi angcolile, neziteshi ezingu- 300 eziye zenza ukuba kunciphe ukublokha kwezitamkoko ngamapgesenti angu-24 eminyakeni engu-5.

Ezempilo

Ukwanda kwe-HIV/ AIDS kuMasipala waseThekwini kuphezulu, njengakuyo yonke iNingizimu Afrika (18 wamaphesenti) nase- KZN (25 wamaphesenti). Isifo Sofuba (TB) sibonakala sihamba phambili ekuhlaseleni labo abane- HIV cishe ngxenye yesibili kweyesithathu kubantu abane- HIV abaphinde bangenwe i-TB.

Ngo 2009 kwaba nezigameko ezintsha zokwelashwa ezingu- 43,739 (kokubili zabantu abane HIV nabangenayo i- HIV) eziye zabhaliswa kuMasipala waseThekwini, okwenza ibe isigodi esinamanani aphezulu e-TB eNingizimu Afrika. Nokho amananzi okwelashwa aphezulu kuMasipala waseThekwini Municipality futhi athuthuke kusuka kumaphesenti angu- 70.8 ngo-2011 kuya kumaphesenti angu-79,5 ngo-2013 (uMasipala waseThekwini IDP).

Izinselele ezinhloko eziphathelele namasevisi ezempilo kuMasipala waseThekwini ziwuku:

- Izinga eluphezulu le HIV/ AIDS ne TB.
- Izinga eliphezulu lokukhulelwa kwentsha.
- Ukukhukunyezwa kwezingane ezingaphansi kweminyaka eyishumi nesithupha.
- Ukusetshenziswa kabi kwezidakamizwa (izidakamizwa notshala). Isidingo sokushintsha umthethosisekelo.
- Izinga eliphezulu lokulimala nokuthukwa.
- Ukungasatshalaliswa kwezinsiza ngendlela elinganyo ezindaweni zasemadolobheni.
- Amaphesenti angu-66 kuphela abahlali baseThekwini abakwazi ukufinyelela izindawo zokwelashwa eziyinhloko emabangeni angamakhilomitha angaba ngu-5.
- Amasevisi Ayinhloko Ezokwelapha abhekwa njengangafanele ukukhokhelwa umasipala nokho kunezingxoxo eziqhubekayo zokuthuthukisa lokhu.
- Inani Labesebenzi Bezempilo (EHPs) liqhubeka lingaphansi kwenani elivamile, nokho, umasipala unohlelo lwezimali lokwandisa lezi zibalo ngokuqala ngokuqasha abasebenzi bezempilo abangu-35 onyakeni wezimali ka 12/13.
- Izinselele zabasebenzi abafanelekayo nesimiso sokuqondisa.

4.4.2

Ezokuvakasha

Ezokuvakasha umkhakha obalulekile emnothweni waseNingizimu Afrika, futhi ungenisa amaphesenti angu- 2.9 kuyi gross domestic product (GDP) yaseNingizimu Afrika ngo-2016 (StatsSA). Umkhakha wezokuvakasha waqasha abantu angu- 686,596 ngo- 2016, amaphesenti angu-4.4 enanini elingu 15.8 million labasebenzi baseNingizimu Afrika (StatsSA).

Ezokuvakasha zidlala indima ebalulekile kwezomnotho zezwe Ogwini Olusempumalanga yeNingizimu Afrika. Abantu badonseleka ezindaweni zogu olucwebile kanti okudonsela abantu ogwini nakakhulu imisebenzi yokuzithokozisa ehilela ugu nolwandle, njengokudoba, i-surfing, ukushayela. Ezokuvakasha ogwini lwaKwa-Zulu Natal zizinzile futhi izakhiwo zezokuvakasha njengezondawo zokulala nezindawo zokudla zime ngomumo futhi zitholaka kalula.

Ngokuphambene nalokho, ukuvakashelwa kwe Wild Coast akuthuthuki, kanti izinselelo ezibhekiswe kumkhakha wezokuvakasha zibandakanya izinga elibi lomgwaqo (ikakhulukazi imigwaqo yokufinyelela e-N2 eya ezindaweni ezihlukahlukene zaseWild Coast) nokuntuleka kwezindawo zokuhlala (Fuller Frost & Associates, 2010). Kuyaqapheleka ukuthi kukhona okungenziwa ukuthuthukisa ezokuvakasha ogwini nokuthi ukuvikelwa kwempahla yemvelo kubalulekile ekukhuthazeni ukuvakasha. Ezokuhamba nezokuvakasha zaqasha abantu abangu- 32,917 ngokuqondile e-Eastern Cape ngo- 2014 (<https://www.ujuh.co.za/eastern-cape-tourism-industry-is-boosted-by-domestic-travellers/>).

I-Block ER236 isendaweni eqhele ogwini ngamakhilomitha angu-20 futhi indawo okunesizakazelo kuyo iqhele ngamakhilomitha angu-60 ogwini. Le phrojekthi ngeke ithinte kangako imisebenzi yezokuvakaza phakathi nesikhathi sokusebenza. Kunamathuba okuthi ezokuzithokozisa ezingekho ogwini njengokudoba kuphazamisek uma behamba ngasogwini beka ku-Block ER236.

Ezokuvakasha Endaweni Enomthelela Omkhulu

UMasipala waseThekwini

Ukuvakasha kuyisandla esiyinhloko ekuthuthukiseni umnotho wendawo. Imiphakathi yasendaweni ibonwe ukuthi ibambe iqhaza ebalulekile ekuthuthukiseni ukuvakasha, ngoba, ezimweni eziningi, ingumhlinzeki omkhulu wezimpahla namasevisi kubavakashi (uMasipala waseThekwini, 2014).

Umbiko Wezokuvakasha eThekwini report (uMasipala waseThekwini, 2014) usukisele ukuthi inani lezivakashi ezifika eDurban zabalelwa ku-15.5 million 2012. Kulezo zivakashi, u-260 009 kwakuyizivakashi ezichithe ubusuku ezivela ngaphandle kanti u- 175 428 izivakashi ezichithe usuku ezivela ngaphandle. Ngaphezu kwalokho, 1.9 million walezo zivakashi izivakashi ezichithe ubusuku zakuleli, kanti u- 13.1 million izivakashi zakuleli ezichithe usuku (uMasipala waseThekwini, 2014).

UMasipala Wendawo YaseMhlathuze

Umkhakha wezokuvakasha ukhonjwe njengendawo ebalulekile yokuthuthukiswa komnotho kuMasipala waseMhlathuze.

Izimpahla eziyinhloko zokuvakasha eziye zabonwa ukuthi zingase zibe nomthelela emnothweni wendawo zihlanganisa amabhishi, imicimbi ehlukahlukene, ukulondolozwa kwezindawo zamagugu, izindawo zokulondolozwa kanye nendawo eningizimu yePort. Lesi sifundazwe sibonwe njengezokuvakasha kwesifundazwe kuqala kanti i-IDP iyaqaphela ukuthi kunakho ukuthuthukisa umkhakha esikhathini esizayo. Kodwa-ke, i-IDP iyavuma ukuthi kunethuba elilinganiselwe lokusekela ukukhula komnotho ngenkathi kucatshangwa izidingo zokongiwa nokuthuthukiswa.

Ezokuvakasha Endaweni Engenamthelela Oqondile – Kwa-Zulu Natal

uMasipala Wendawo Yase uMfolozi

Umkhakha wezokuvakasha ukhonjwe njengendawo yokuthuthukiswa kwezomnotho endaweni yezokuthuthukiswa kwezimbongi zaseRichards Bay (RBIDZ), ewela kuloMasipala. Izimpahla eziyinhloko zokuvakasha kumasipala zibandakanya amahlathi asolwandle acebile, izindawo zokulondolozwa kwemvelo, namasiko nezindawo zamagugu. I-N2 iyindlela enkulu yokuvakasha ehlanganisa izindawo ezisenyakatho njengeLake St Lucia, eya eMargate eya eNingizimu. UMasipala uke wakha intuthuko eyengeziwe engasiza emkhakheni njenge-eco-tourism kanye neHluhluwe-uMfolozi Game Reserve. I-IDP iphawula ukuthi umkhakha wezokuvakasha ubaluleke kakhulu kwi-GDP kaMasipala waseKhaya.

uMasipala Wendawo yaseMlalazi

Imikhakha yezokuvakasha iyakhuthazwa ngenxa yobuningi bomlando namasiko kumasipala. Impahla eyinhloko yezokuvakasha ihlanganisa i-Famous Heritage Heritage R66, amabhishi ajwayelekile, ihlathi lemvelo yemvelo kanye namagugu akwaZulu, okungabangela ukuthuthukiswa kwesikhathi eside kwalomkhakha. I-IDP iphawula ukuthi umkhakha wezokuvakasha unamandla amakhulu ekukhuleni kanti umasipala uhlonze isidingo sokuthuthukisa nokuthuthukisa umkhakha wezokuvakasha.

uMasipala Wendawo Yakwa

Indawo kaMasipala ibhekwa njengengxenye ebalulekile ekuthuthukiseni umkhakha wezokuvakasha njengoba itholakala phakathi kwamadolobha amabili asechwebeni, eThekwini naseRichards Bay. Indawo ihlinzekela ukuthuthukiswa kwezinhlelo eziningi zokuvakasha ezisekelwe emafeni angasogwini.

Izinto eziyinhloko zokuvakasha zihlanganisa amabhishi e-blue flag, imisebenzi yokuzilibazisa, izenzakalo zezokuvakasha izindawo ezihlala ezindaweni zasemaphandleni, izindawo zamahlathi nezindawo zamagugu. I-IDP iphawula ukuthi imisebenzi yokuzilibazisa iyisihluthulelo sokuvakasha kumasipala. Iqhubeka ithi umkhakha ukhula emnothweni wendawo futhi kubalulekile ekukhuleni kwesikhathi eside.

uMasipala Wendawo YaseMandeni

Umkhakha wezokuvakasha ubhekwa njengengxenye yomnotho wendawo kulo Masipala ngenxa yendawo yayo eqondile emgwaqeni weN2 wezokuThuthukiswa koMphakathi kanye nomgwaqo wezokuhweba phakathi kwendawo yezomnotho yesifundazwe eThekwini naseRichards Bay. Impahla eyinhloko yezokuvakasha ihlanganisa uMfula iTugela, amatshe e-Quarry, izindawo zokugcina amanzi kanye nolwandle. Umasipala uhlanganisa umhlaba omude onogwadule obunokusho kwezomnotho we-eco-tourism, ukuthuthukiswa kwezebhizinisi kanye nezimboni. I-IDP iphawule ukuthi umasipala unamandla okuthuthukisa umkhakha esikhathini eside futhi unethuba lokuthuthukisa izimboni zeDube Trade Port kanye neRichards Bay SEZ.

uMasipala Wendawo YaseRay Nkonyeni

Umkhakha wezokuvakasha uthathwa njengengxenye yezinto ezibalulekile zomnotho wendawo okubandakanya izinsizakalo, ezolimo kanye nokukhiqiza. Izimpahla eziyinhloko zokuvakasha zihlanganisa amabhishi, ingqalasizinda enhle kanye nezindawo zasemadolobheni ezifana noMargate nasePort Shepstone. UMasipala unamabhishi ambalwa ahlangebazana namazinga omhlaba njengemabhishi eblue-flag agunyaziwe (alawulwa eNingizimu Afrika managed i-WESSA). Lonke ugu oluseLwandle oluseNingizimu lulodwa nje ludonsa izivakashi, ngaleyo ndlela lulawula umnotho kaMasipala. Ngenkathi i-Oribi Gorge inikeza imikhiqizo namasevisi ahlelwe kahle kuMasipala, yiMargate efaka isandla kakhulu ekuvakashelweni kukaMasipala kusukela ekungeneni kwemali, cishe amaphesenti angu-37 (SDF, 2017). I-Margate inezindawo eziningi zokuvakasha zeholide, izindlu zeholide nezindawo ezihlobene nezivakashi, futhi ngenxa yalokho ine nani elincane labaphathi balezo zindawo zamaholide ngaphezulu kunezakhamuzi. Kuye kwaphawula ukuthi isidingo sezindawo zamaholide siya ngesikhathi sonyaka lapho ihlobo lithola khona amaphesenti angama-80, ekwindla engamaphesenti angu-79, entwasahlobo ilandisa ngamaphesenti angu-70.8, kanti ubusika buthola indawo engamaphesenti angama-72.2 (SDF, 2017).

uMasipala Wendawo Yase umdoni

UMasipala uthathwa njengendawo yezokuvakasha yogu oluseningizimu efaka isandla ekuthuthukiseni umnotho. Izimpahla ezihamba phambili ezihanjelwa izivakashi zihlanganisa ama-estuaries, izintunduma, amabhishi asolwandle namagwala amahle. I-IDP iphawula ukuthi umkhakha wezokuvakasha uthathwa njengomthelela omkhulu kwezemisebenzi, ukunciphisa ubuphofu nokuvikelwa kwamagugu emvelo namasiko kaMasipala.

uMasipala Wendawo Yasemzumbhe

Imikhakha yezokuvakasha igxile ikakhulukazi emadolobheni angasogwini, okuthe ngemva ngokuhamba kwesikhathi yaba indawo ethandwayo.

Izimpahla eziyinhloko zokuvakasha zihlanganisa umlando ocebile, izindawo ezithandwayo zokuvakasha kanye nezici zemvelo. Ngokusho kwe-IDP, uMasipala ubhekwa ukuthi njengokwazi ukuthuthukisa ezomnotho zamabhizinisi amancane nokuthi imithombo yemvelo kufanele ivikelwe engozini futhi kuqinisekiswa ukusetshenziswa okuqhubekayo ngenkathi ihlanganisa izidingo zokuthuthukiswa.

Ezokuvakasha Endaweni Engenamthelela ngokuqondile – Eastern Cape

uMasipala Wendawo YaseMbizana

Umkhakha wezokuvakasha ukhonjwe njengengathuthukiswa kuMasipala futhi ubhekwa njengongaba nomthelela kwezomnotho esikhathini esizayo. Izimpahla eziyinhloko zokuvakasha zihlanganisa izimfanelo zamasiko eziyingqayizivele, imvelo ekhangayo kanye nezindawo zamagugu. I-IDP iphawula ukuthi umkhakha wezokuvakasha ukhonjwe njengengxeny ebalulekile kuHlelo Lokuthuthukiswa Komnotho Wendawo. Ibuye yaphawula ukuthi kunezinhlalo zokuheha abatshala izimali ukuba batshale imali kuMasipala ukuze kudalwe imisebenzi emide futhi baqhubeke nokuthuthukisa umkhakha.

uMasipala Wendawo Yase Ingquza Hill

UMasipala unethuba lokuthuthukisa imboni yokuvakasha yomphakathi ngenxa yezinto ezikhangayo ezihlukahlukene endaweni. I-Wild Coast imelela indawo engaba khona emhlabeni jikelele, uma ingqalasizinda, ukufinyeleleka kanye nokuphepha nokuvikeleka kwemvelo kuthuthukiswa. Imbonini yezokuvakasha, okungenzeka ibe yimbangela enkulu ekuphumeni kwezohwebo, ihlala ingakhi kahle futhi ingasetshenziswa kahle. Ukwamukelwa kwamuva koHlelo lwakamuva loMkhakha Wezokuvakasha kubonisa isinyathelo esibaluleke kakhulu ekusetshenzisweni kwecebo lokuguqula kulo mkhakha.

I-Port St Johns

Izimpahla eziyinhloko zokuvakasha kuMasipala zihlanganisa izici zemvelo ezifana namagquma, izintunduma, imifula, kanye nezwe elisezintabeni namabhishi amahle. I-IDP iphawula ukuthi idolobha lasePort St Johns libhekwa njengelikwazi ukuthuthukiswa embonini yesevisi, ezokuvakasha kanye nezinhloko zikahulumeni.

uMasipala Wendawo yaseNyandeni

UMasipala unebhande elingama-20 km elisogwini olusuka eMthatha Estuary eningizimu-ntshonalanga kuya eMnenu Estuary enyakatho-mpumalanga. Izimpahla eziyinhloko zokuvakasha zihlanganisa amahlathi, izindawo ezikhethelwe ukugcinwa kwemvelo, izindawo zokuhlala, izilwane zasendle kanye neHluleka Game Reserve.

I- IDP iphawule ukuthi kukhona ukuvakasha okuphezulu, ikakhulukazi kwe eco-tourism. Imigwaqo embi kanye nokungabi nendawo yokuhlala manje kuyinselele.

uMasipala Wendawo Yase King Sabata Dalindyebo

Umkhakha wezokuvakasha esifundeni uhlanganisa izindawo ezikhangayo ezifana neKafay Bay neHole-in-the-Wall. Indawo engasogwini ikhonjwe njengendlela yokuvakasha kumasipala. Izimpahla eziyinhloko zokuvakasha zihlanganisa amahlathi asogwini, izintunduma nolwandle oluseduze. I- Nelson Mandela ne-Mvezo Museum inamathuba okuba indawo yezokuvakasha. I-IDP iphawula ukuthi kunezinhlelo ezehlukene ezifuna ukuthuthukisa umkhakha njengaseKwezizi Development Plan ohleliwe ukuze kuvuselelwe i-Coffee-Bay futhi ibe yindawo ekhangayo.

uMasipala Wendawo YaseGreat Kei

Imikhakha yezokuvakasha yendawo igxile endaweni yangasogwini futhi idayiswa ngomshini oqinisekisiwe. Izinto eziyinhloko zokuvakasha zihlanganisa izindawo zamagugu, izindawo ezisogwini kanye namabhizinisi ahlukahlukene. I-IDP iphawula ukuthi umkhakha wezokuvakasha kufanele uthuthukiselwe phambili.

uMasipala Wendawo YaseMbhashe

Izimpahla eziyinhloko zokuvakasha kuMasipala yizona zindawo zamagugu kanye nezindlela ezinkulu eziya ezindaweni zamagugu. Izindawo zamagugu zihlanganisa amathuna amaKhosi afile, izinqaba nezinye izikhumbuzo. Isimo esibi semigwaqo sinciphisa ukuvakasha kwezivakashi futhi sekuye kwaphawulwa ku-IDP njengendawo yokuthuthukisa umkhakha wezokuvakasha nokuthuthukisa ezomnotho ngokwesikhathi eside.

UMasipala Wendawo YaseMnquma

UMasipala uhlelwe ngokusemthethweni eceleni kwe-N2 futhi kuyindlela eya eSouth Coast. Izimpahla eziyinhloko zezivakashi zihlanganisa amabhishi, ama-rocky coast, ama-estuaries, nezintundane nezimila ezisogwini, i-Bawa Falls, i-Gcuwa Dam, neCebe Campsite, imigwaqo ehambayo ehlanganisa iKei Farm, Qolorha, neJacaranda Ship Wreck e-Ngcizele. I-IDP iphawula ukuthi ngenxa yezivakashi eziningi umkhakha wezokuvakasha ungabamba iqhaza emnothweni wendawo.

UMasipala Wendawo YaseNdlambe

Umkhakha wezokuvakasha ugxile ekuhlinzekeni indawo ephephile kubavakashi. Izimpahla eziyinhloko zezokuvakasha ziyizinqolobane zemvelo, izindawo zokulondoloza umdlalo, olwandle kanye nolwandle, ukuzingela, ukuvakasha kwe-agri, nokuhlala epulazini. Okukhangayo okusezigabeni kubandakanya izakhiwo zamagugu, ubuciko kanye nezincwadi.

I-IDP iphawula ukuthi lesi sifunda sinenani elikhulu lemvelo elidinga ukuvikelwa futhi elingasiza ekuthuthukisweni kwezokuvakasha esikhathini esizayo.

4.4.3

Ezokudoba

INingizimu Afrika inomkhawulo ogwini oluthatha indawo emibili engaba ibanga elingamakhilomitha angu-3,623, lisuka eMfuleni i-Orange ngasentshonalanga emngceleni weNamibia, ePonta do Ouro empumalanga emngceleni waseMozambique.

Ishalofu elisentshonalanga elisenxwemeni linokukhiqiza okudoba kakhulu okudoba njengamanye amazwe asekuhlaleni, ngenkathi i-East Coast ingakhiqizi kakhulu kodwa kunezinhlolongoboko ezihlukahlukene zezinto ezihlukahlukene, kuhlanganise nezinhlolongoboko zombili eziphilayo nezase-Indo-Pacific. Ukudoba kwezokuhweba eNingizimu Afrika kulawulwa futhi kuhlolwe yi-DAFF (ngaphambilini eyayiwulwa uMnyango Wezemvelo: Iqondiswa: Abalawuli Bokuphathwa Kwezilwandle Nogwini). Bonke abadobi eNingizimu Afrika, kanye nokucubungula, ukudayiswa nokuhweba cishe zonke izinsiza zasolwandle, balawulwa ngaphansi koMthetho Wezinsiza ZaseMarine, 1998 (No. 18 of 1998) (MLRA).

Cishe imikhakha eyi-14 ehlukene yokudoba yezokuhweba isebenza ngaphakathi kwamanzi aseNingizimu Afrika. Ngamafuphi, umkhakha uhlanganisa okulandelayo:

- Izindawo zokudoba eziyinhloko ngokubaluleka kwezomnotho kanye ne-tonnage jikelele yokuthuthwa komhlaba yi-demersal (ngezansi) trawl ne-long-line fisheries ebhekelele ama-hake aseKapa (*Merluccius paradoxus* ne *M. capensis*) ne pelagic-eqondiswa i-purse-seine ebhekelele ukudoba i-pilchard (*Sardinops ocellatus*), i-anchovy (*Engraulis encrasicolus*) ne- red-eye round herring (*Etrumeus whitheadii*).
- Izinhlanzi ze-tuna ezihamba phambili ngokufuduka kanye nezinhlolongoboko ze-tuna ezifana nezinhlanzi zibanjelwa ezilwandle eziphakeme futhi ngezikhathi ezithile zonyaka emanzini aseNingizimu Afrika ezokudoba ze- pelagic long-line ne- pole fisheries. Izinhlobo ezifunwa kakhulu zihlanganisa i-albacore (*Thunnus alalunga*), i-bigeye tuna (*T. obesus*), i-yellowfin tuna (*T. albacares*) ne- swordfish (*Xiphias gladius*).
- Ezokudoba ze- traditional line fishery ibhekelele izinhlobo eziningu eziseduze nogu kuhlanganise ne-snoek (*Thyrsites atun*), i-Cape bream (*Pachymetopon blochii*), i-geelbek (*Atractoscion aequidens*), i-kob (*Argyrosomus japonicus*), i-yellowtail (*Seriola lalandi*) nezinye izinhlanzi zamakhorali.
- Ezokudoba ze-Crustacean zibhekelele ezokudoba i- trap kanti ezokudoba ze- hoop net fishery zibhekelele i- West Coast rock lobster (*Jasus lalandii*), ezokudoba ze- line trap fishery zibhekelele i- South Coast rock lobster (*Palinurus gilchristi*) i- trawl fishery eseMpumalanga nogu ibhekelele

ukudoba i-penaeid prawns, i-langoustines (*Metanephrops andamanicus* and *Nephropsis stewarti*), i-deep water rock lobster (*Palinurus delagoae*) ne- red crab (*Chaceon macphersoni*).

- Ezinye izinkampani zokudoba zohlenganisa i- mid-water trawl fishery ebhekelele i- horse mackerel (*Trachurus trachurus capensis*) egcwele kakhulu e -Agulhas Bank, Ogwini oluseNingizimu ne- hand-jig fishery ebhekelele ukudoba i- chokka squid (*Loligo vulgaris reynaudii*) Ogwini oluseNingizimu kuphela.

Ukwenezela kwimikhakha yezohwebo, ukudoba kokuzithokozisa kwenzeka ngasogwini olunezinhlanzi nolwandle, ngezikebhe ezincane ezingamamitha angu-10 ubude. Kubikwe ukuthi ezokudoba zezokuhweba nezokuzilibazisa zidobe izinhlobo ezingaphezu kuka-250 zasolwandle, nakuba ngaphansi kwamaphesenti angu-5 kulezi zidotshwe izinkampani zezokudoba, ezihlanganisa amaphesenti angu-90 walezo ezibanjwe ogwini.

Ukukhishwa kwezinhlati ezidotshiwe eziningi zokuhweba kumelwe kwenzelwe amachwebeni okudoba aqokiwe. Imboni enkulu ebhekelele ukudotshwa kwe-hake, amachweba amabili amakhulu i- Saldanha Bay, Cape Town, Mossel Bay ne Port Elizabeth yiwo asetshenziswayo. Kuneni elingu-230 ⁽¹⁾ lemiphakathi edoba ngezanga eliphansi ogwini lwaseNingizimu Afrika, kusukela ezindaweni zasemakhaya kuya emadolobheni. Abadobi bezinga eliphansi bavame ukusebenzisa isikebhe ezincane kodwa badobela kakhulu ngasogwini.

Inhlolovo Yomkhakha Wohwebo Lwezokudoba Nocwaningo Lwezokudoba

Imikhakha yokudoba ehambisana ne-Block ER236 ingase ithinteki ngemisebenzi yephrojekthi echazwe kulesi sigaba.

I-Large Pelagic Long Line

Izinhlanzi ze-tuna ezihamba phambili ngokufuduka kanye nezinhlobo ze-tuna ezifana nezinhlanzi zibanjelwa ezilwandle eziphakeme futhi ngezikhathi ezithile zonyaka endaweni ekhethekile eNingizimu Afrika (EEZ) yi- pelagic long-line ne-pole fisheries. Izinhlobo ezifunwayo zihlanganisa i- albacore (*Thunnus alalunga*), i-bigeeye tuna (*T. obesus*), i-yellowfin tuna (*T. albacares*) ne-swordfish (*Xiphias gladius*).

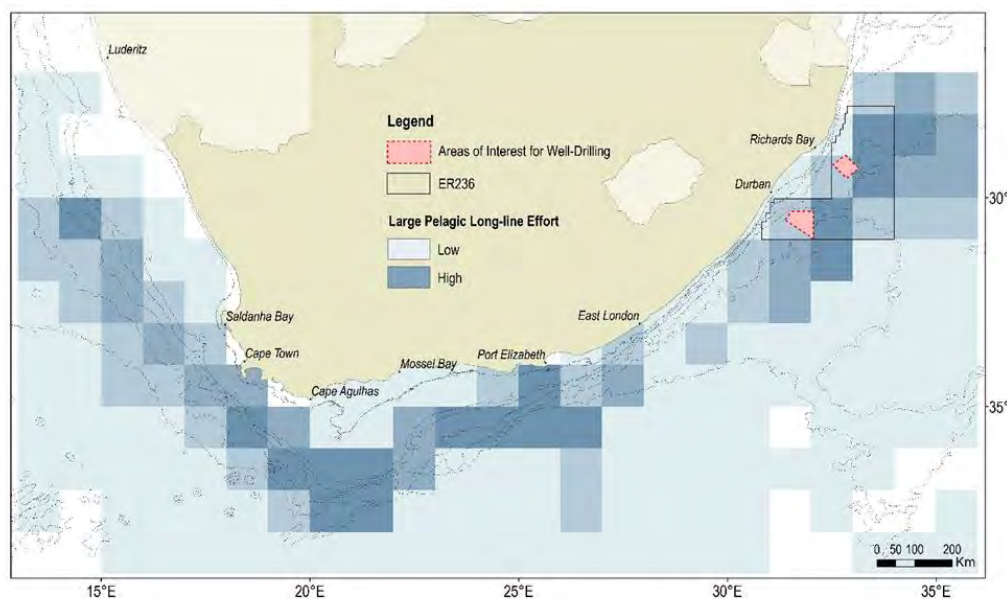
(1) DAFF. 2016. Small-Scale Fisheries. A guide to the small-scale fisheries sector. <http://small-scalefisheries.co.za/wp-content/downloads/SSF%20Booklet%20English.pdf>

I-tuna, nezinhlobo ezifana ne-tuna nama- billfishes isitoko esifudukayo futhi silawulwa “njengomthombo ohlanganyelwayo” phakathi namazwe ahlukahlukene aphakathi kwe- jurisdiction of the International Commission for the Conservation of Atlantic Tunas (ICCAT) ne- Indian Ocean Tuna Commission (IOTC). Ngawo 1970 kuya phakathi nawo -1990 ezokudoba zazilawulwa kuphela ezokuthutha zase-Asia (imikhumbi emikhulu engaba u-130) ngaphansi kwesivumelwa ne-Ningizimu Afrika. Kusukela ngawo 1990s lemikhumbu yavinjelwa olwandle lwaseNingizimu Afrika kanti iNingizimu Afrika yaba ngaphansi lapho imisebenzi yokudoba yayisezingeni elingaphansi. Ngemva kwalokho izinkampani zokudoba zakuleli zaqala futhi iNingizimu Afrika yanikezwa amalungelo okudoba angu-50.

Lamalungelo manje ahlunganisa ingxenye encane yezokuthutha ze- long-liners, nakuba izinkampani zokudoba zisasebenzisa ngokuyinhloko nemikhumbi yaseJapani eyenze isivumelwa nezinkampani zaseNingizimu Afrika. Manje kunamalungelo okudoba kwezohwebo angu-30 akhishiwe nemikhumbi engu-21 esebenzayo yezokudoba.

UKudoba kwenzelwa kakhulu phakathi neNingizimu Afrika EEZ, ikakhulu ngasogwini nasendaweni eqhele kancane nogu. Njengoba kuboniswe ku- *IShadi 4.31*, i- Block ER236 izeza imizamo yokwaba ezokudoba kwe- pelagic long-line.

IShadi 4.31 Ukusabalalisa Kwendawo Yomzamo Wokudoba e- Long Pelagic



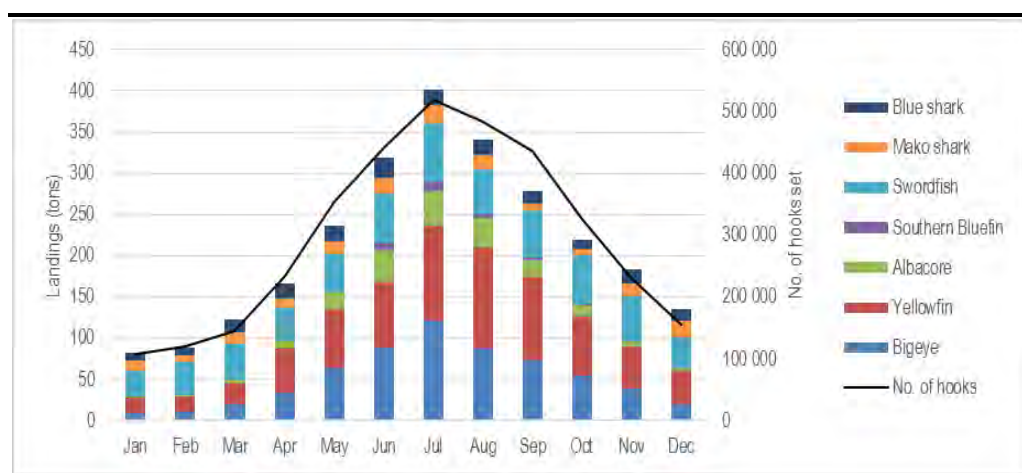
Phawula: Umzamo wokudoba usetshenziselwa umkhakha omude obhekiswe ezinhlotsheni ezinkulu ze-pelagic ngokuphathelele ne-ER236 nezindawo ezihlongozwayo zentshisekelo

Source: Capmarine, 2017

I-fishery isebenza unyaka wonke ngokunyuka okunomthelela emzamweni ebusika nasentwasahlobo (*IShadi 4.32*). Ukudoba (CPUE) ukuhlukahluka kuqhutshwa kokubili ngokusabalaliswa kwendawo kanye nesikhathi sendawo ezihlosiwe kanye nokuchazwa kwamagesi okudoba.

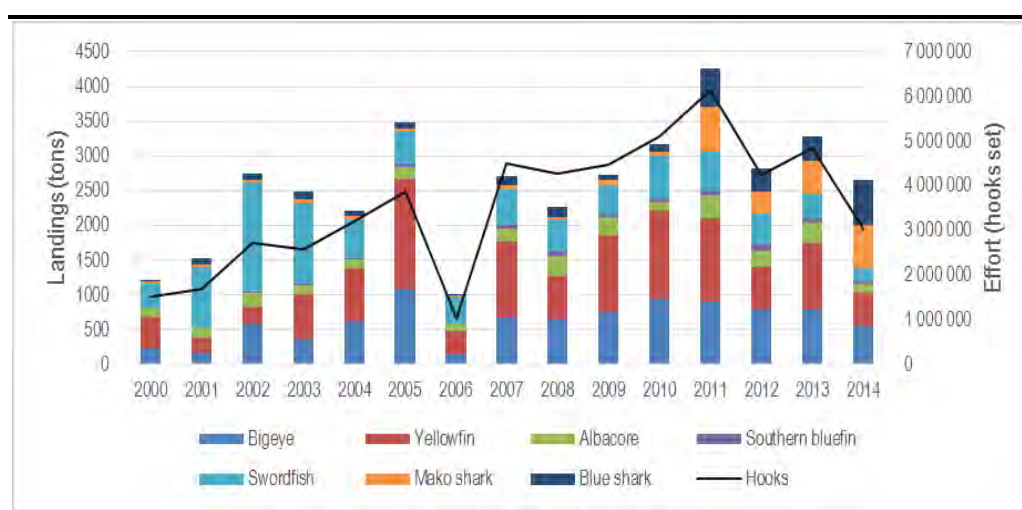
Ukuhlukahluka kwezimo eziphilayo ezifana nesakhiwo se-oceanic kanye nomoyampilo ohlakazekile kungaholela ekuguqulweni kokuziphatha ezinhlotsheni ezibhekiswe kuzo, okungase kube nethonya CPUE (Punsly and Nakano, 1992). Phakathi nonyaka ka-2000 kuya ku-2014, umkhakha wafika ngokudoba okujwayelekile kwamathani angu-4 527 futhi wabeka izingwegwe eziyizigidi ezingu-3.55 ngonyaka. Amanani emizamo yokudoba abikwe abezokudoba eminyekani ephakathu kuka 2000 kuya 2014 iboniswe ku- *IShadi* 4.33

IShadi 4.32 *Ukuhluka Kwezikhathi Zonyaka Zokubamba Nokuzikhandla Okurekhodiwe Ngomkhakha Omude Wama-Long Pelagic (Amanani Aphakathi Nesikhathi Sonyaka ka-2000 - 2014)*



Source: Capmarine, 2017

IShadi 4.33 *Ukuhluka Kwezikhathi Zonyaka Zokubamba Nokuzikhandla Okurekhodiwe Ngomkhakha Omude Wama-Long Pelagic (Amanani Aphakathi Nesikhathi Sonyaka ka-2000 - 2014).*



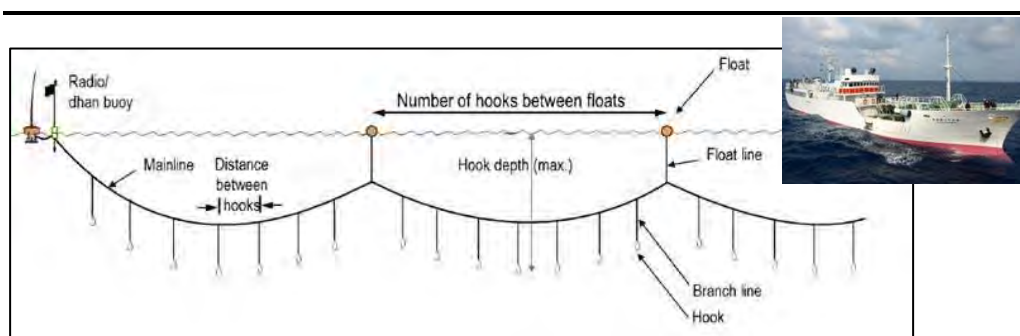
Source: Capmarine, 2017

I-Gear iqukethe ukugcina kwe-monofilament okuphakathi kuka-25 km no-100 km ubude obumiswe emanzini obukhulu futhi kumakwe ekupheleni kwawo konke (bheka i-*IShadi* 4.34). Njengoba i-gear isondela eduze kwamanzi, ingabonisa ukuvimbela okungase kube khona ukuhamba kwemikhumbi.

Umzila wokudoba unqanyuliwe cishe ngamamitha angu-20 ngaphasi kwamanzi ngamanqamu amaconsi axhuma ku-buoys ngezikhathi ezithile. Kuze kube yizingwegwe ezi-3 500 ezilindelwe zixhunye kwi-mainline ngamamitha angu- 20 emide imigqa, ukukhomba izinhlanzi ekujuleni kwamamitha angama-40 ngaphansi komhlaba. Izinhlobo ezihlukahlukene ze-buoys zisetshenziselwa izinhlanganisela zokugcina i-mainline eduze kwe-surface futhi ithole uma umugqa unqunywe noma uphule nganoma yisiphi isizathu. Ukuphela komugqa ngamunye kuphawulwe nge-buah ye-dahn ne-reflective radar, ekhomba isikhundla selayini yokubuyiswa kwesikhathi esizayo.

Imigqa ijwayelele ukuhlelwa ebusuku, futhi ingase ishiywe ikhuphuke isikhathi eside (ukufikela amahoreni angu-18) ngaphambi kokuba ikhishwe, okwenziwa nge-controller ene-powered ngejubane cishe elilodwa. Ngesikhathi sokudonsa, umkhumbi wokuhamba ngomkhumbi uvinjelwe kakhulu futhi, uma kwenzeka isimo esiphuthumayo, umzila ungase uphonswe futhi uhanjiswa esikhathini esilandelayo.

IShadi 4.34 Ukulungiswa okujwayelekile kwezinhlobo ze-Long-Line Gear Targeting Pelagic Species (Ngakwesobunxele)



Note: Lesi sibalo sihlenganisa isithombe se-mainline nomugqa we-dropper nomzila wokulandelela (phezulu kwesokudla) kanye nesithombe sezilwandle ezivamile ezihamba phambili.

Umthombo: Capmarine, 2017

I-Traditional Line Fish

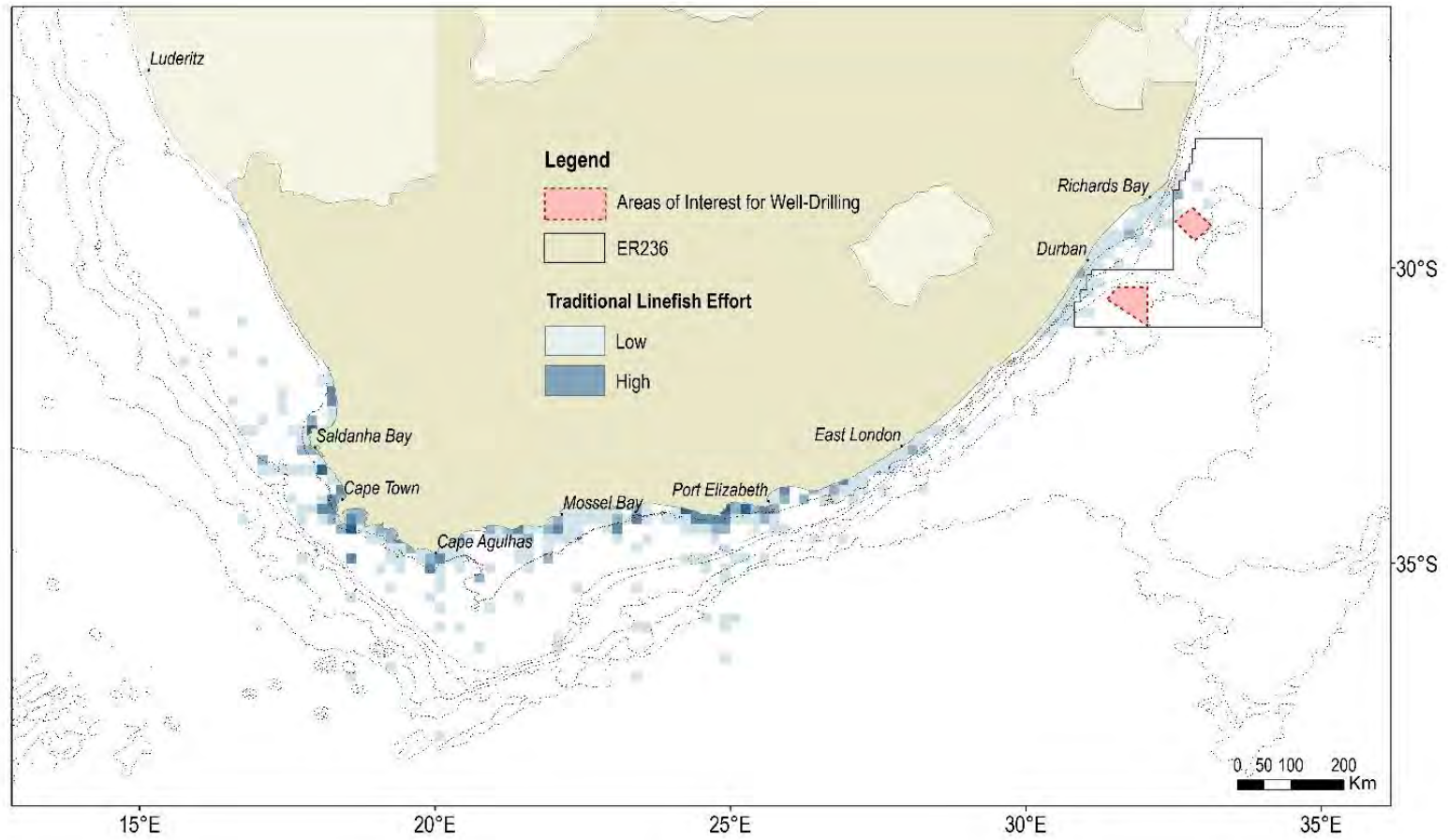
Ukudoba komdabu wendabuko yizokudoba okwesithathu okubaluleke kunayo yonke ezweni ngokulandela amathani ayizigidi ezithintekayo kanye nezomnotho. Kuyinto yokudoba okude, edoba ngasolwandle ngokusekelwe enhlanganweni enkulu yezinhlobo ezahlukene.

Ngaphakathi eNtshonalanga Kapa izinhlobo zokudoba ezithandwa kakhulu ziyi-snoek (*Thyrsites atun*) noma ezinye izinhlobo ezifana ne- Cape bream (hottentot) (*Pachymetopon blochii*), i-geelbek (*Atractoscion aequidens*), i-kob (*Argyrosomus japonicus*) ne- yellowtail (*Seriola lalandi*) nazo zibalulekile. Ngase-East Coast inani lezinhlobo zokudoba landa futhi lihlanganisa nezinhlanzi zasemfuleni (*Sparidae* and *Serranidae*), i-pelagic migrants (*Carangidae* and *Scombridae*) ne- demersal (*Sciaenidae* and *Sparidae*). Ukudoba kusakazeke ngasogwini lolwandle kusukela ePort Nolloth eWest Coast kuze kube seCape Vidal e-East Coast (IShadi 4.35).

Umzamo ulawulwa ngokwemvelo nomzamo wendawo wokudoba uhlukaniswe ngezigaba ezintathu. Izinhlanzi eziningi (kufikela kumaphesenti angu- 95) ihanjiswa yi-Cape commercial fishery, esebenza eshefini yezwekazi kusukela emngceleni waseNamibia ngaseNtshonalanga Kapa kuya eMfuleni iKei eMpumalanga Kapa. Imikhumbi yokudoba ivame ukufika ebangeni elingasemaphandleni elingama-70 km, nakuba ukudoba kulo mngcele wangaphandle nangaphezulu kunesiphambano (C. Wilke, pers. comm¹). Ukusatshalaliswa kwendawo yomzamo wokudoba imigqa kuhambelana nezindawo zasogwini lwe-Block ER236.

¹ Mr C. Wilke (christopherW@daff.gov.za) is the chief technician at DAFF and is the principle contact for linefish data collation.

IShadi 4.35 **Ukusatshalaliswa Kwendawo Yomzamo Wokudoba Owenziwe Ngomkhakha Wezinhlanzi Zendabuko**



Source: Capmarine, 2017

Ukudoba kwe-crustacean trawl yaseNingizimu Afrika kusebenza kuphela esifundazweni saseKZN. Ezokudoba ziqukethe imikhakha yaseningizimu engekho ogwini, ehluke ngokwezinhlobo zazo ezihlosiwe, izindawo zokusebenza kanye nezinhlobo zamagesi. Ezokudoba ziphethwe inkampani i-Total Applied Effort (TAE), elawulainani lemikhumbi elivumelekile ukudoba ezindaweni ezingaseningizimu nasolwandle. Njengamanje kunemikhumbi emihlanu esebenza ngaphakathi kwezilwandle zasemgodini neminye emibili evunyelwe ukusebenzela ezindaweni zasogwini kuphela.

Izithuthi ze-KZN prawn trawler zihlanganisa imikhumbi yensimbi exubile emide ubude kusuka ku-25 kuya ku-40 m kuya ku-Tross Gross Registered (GRT) wamathani angu- 280 tons. Yonke ine GPS, i-echosounders, i-radar nomsakazo weVHF/SSB. Imikhumbi eminingi ine-otter trawlers elilodwa, zihambisa amanetha avela ngasentshonalanga noma ecaleni ngesivinini samagxolo amabili kuya kwamathathu. Osayizi bamanethi e-trawl asukela ku-25 wamamitha kuya ku 72 wamamitha, anezimbobo ezingu- 60 mm. Ubude bomgwaqo ojwayelekile buyihora ezine. Ubude bokuhamba buya emasontweni amathathu kuya kwamane futhi imikhumbi ingathatha abantu abafinyelela ku-20.

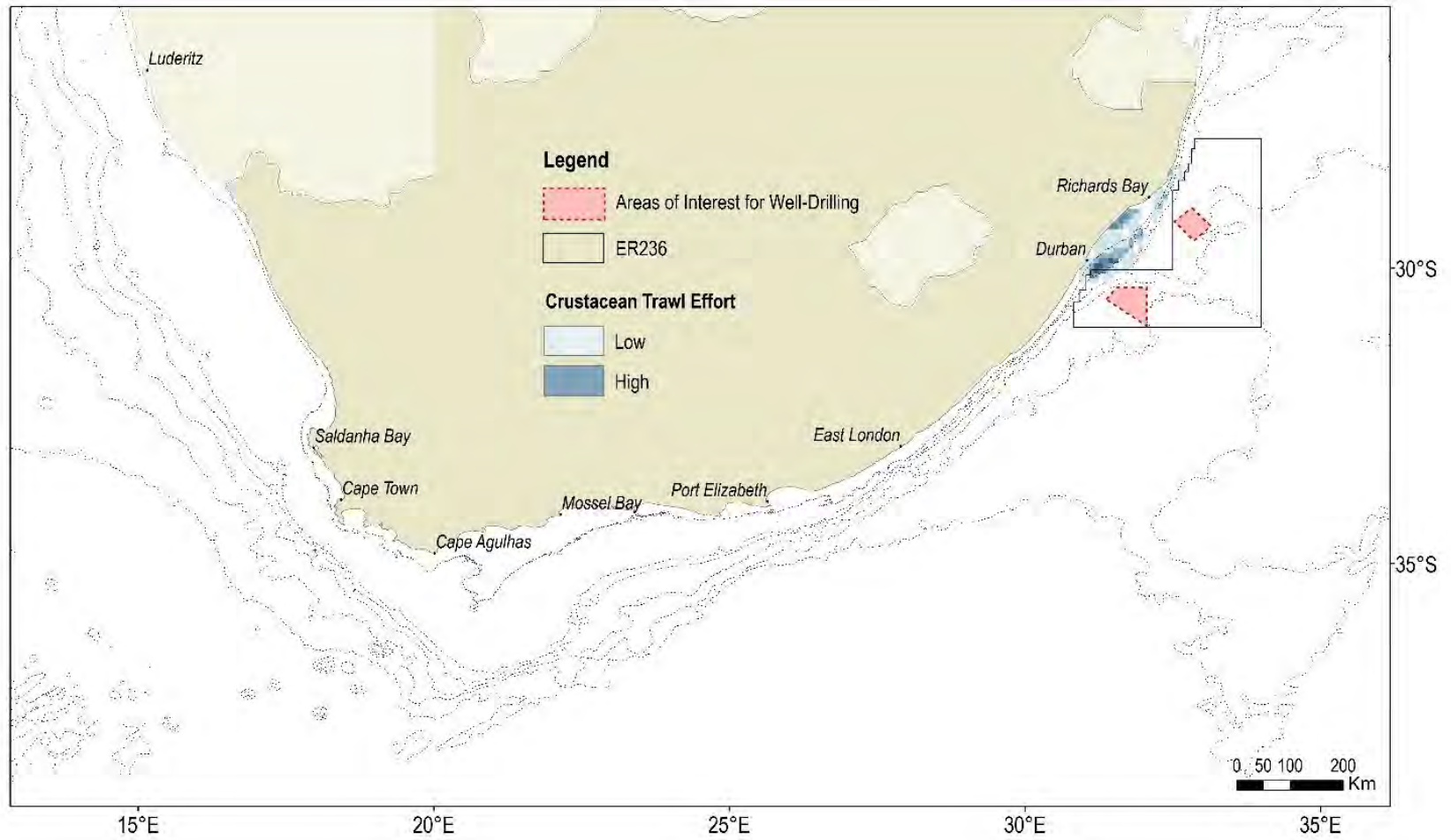
Ezokudoba ezenziwa pakathi olwandle sizekelwe kuma- prawns amhlophe(*Fenneropenaeus indicus*), i-tiger prawns (*Penaeus monodon*) nama-prawns ansundu (*Metapenaeus monoceros*) okuyinto eyenzeka emanzini ano daka amanzi adle ngasogwini olusenyakatho-mpumalanga KZN. Kukhona izindawo ezimbalwa ngaphakathi kokusabalaliswa kwemvelo kwama-penaeid prawns afanelekile ukuhamba ngezinyawo ngenxa yokuwa kwehla emkhakheni we-continental e-East Coast. Ukudoba kwasolwandle kusebenza e-Tugela Bank emanzini angaba ngu-50 m nangakhilomitha angu-10 e-nautical (cishe 18.5 km) ogwini. I-Tugela Bank iyavalwa ngezikhathi ezithile zonyaka ukuze kunciphise amazinga aphezulu, ngakho-ke ama-trawlers asebenza kuphela kulezi zizathu zasolwandle phakathi no-Mashi kuya ku-Agasti. Ngesikhathi sezinyanga zasehlobo umsebenzi uhamba ngasenyakatho ukuya eSt Lucia, lapho ukudoba kuhloselwe khona ama-bamboo prawns (*Penaeus japonicus*) ngaphezu kwezinhlobo ezibalwe ngenhla. Izinhlobo zama-prawn lapho kusekelwe khona ezokudoba olwandle zikhula ngokushesha futhi zithembele ezindaweni zokuhlala ezincane ngesikhathi sokuqala komjikelezo wazo wokuphila. Njengama-juveniles, baqala emagqumeni omdaka lapho bevuthwa futhi bezala khona. Ukubanjwa kwezinhlanzi ngaphakathi kwezokudoba ngokuvamile kuhlanganisa izinhlobo ezingu-20 ze-prawn, kuyilapho cishe amaphesenti angu-10 okunye okubanjwe khona kubanjwa futhi okugcinwa ngenani lazo lokuhweba futhi kuhlanganisa i-crab, i-octopus, i-squid, i-cuttlefish ne-linefish. Okusele kokubanjwe kuyalahlwa.

Ukudoba okwenziwa emanzini ajulile kusebenza phakathi kwamanzi angamamiktha angu-100 kuya kumamitha angu-600 ukusuka e-Amanzimtoti eningizimu kuya eCape Vidal enyakatho, ehlanganisa cishe u-1,700 km² ecaleni komkhawulo we-continental.

Umngcele ophakathi Umngcele ophakathi kokunqotshwa kwezinhlanzi zasolwandle kanye nasolwandle olungamahlathi kungamamitha angu-7 angu-nautical (12,9 km) ukusuka ogwini. Ukudoba endaweni engekho ogwini kwenzeka unyaka wonke. Izinhlobo ezidotshwayo zihlanganisa amaprawns a-pink (*Haliporoides triarthus*) nabomvu, i-langoustines (*Metanephrops andamanicus* and *Nephropsis stewarti*), i-red crab (*Chaceon macphersoni*) ne-deep water rock lobster (*Palinurus delagoae*). Okudotshiwe kuyapakwa beseke kufakwa esiqandisini bese kuyiswa emachwebeni ase-Richards Bay noma e-Durban.

I-Ishadi 4.36 ibonisa indawo yokudoba ngokuhlobene no- Block ER236. Kukhona ukuqhuma okungahle kwenzeke kwe-crustacean trawl fishery ne-Block ER236. fishery with the Block ER236.

IShadi 4.36 *Spatial Distribution of Effort Expended by the Crustacean Trawl Fishery*



Source: Capmarine, 2017

Abadobi Abancane

Imboni encane yezokudoba ngeyokuhlangabezana nezidingo zokudla nezokuphila, futhi kungenzeka ibandakanyeke ngokuqondile ekuvuneni, ekugayweni nasekuhanjiseni kwezinhlanzi ngenhloso yokuhweba. Laba dobi ngokuvamile basebenza ezindaweni zokudoba ezingasolwandle, besebenzisa izindlela zokudoba zakudala ezingenabuchwepheshe obutheni noma izicupho ukuze bavune izinto eziphila olwandle ngesikhathi esigcwele, ngesikhathi ezithile noma ngezinkathi ezithile zonyaka. Uhambo lokuyodoba ngokuvamile luba usuku olulodwa futhi amasu okudoba / ukuvuna awumsebenzi onzima.

Imishini esetshenziswa abadobi abasezingeni elincane ihlanganisa izikebhe ezigwedlwayo ezindaweni ezithile, izikebhe zenjini ogwini oluseningizimu nasogwini olusentshonalanga kanye namathuluzi avamile okudoba abandakanya izandla, izinyawo, ama-crew driver, izintambo, amaphampu ama-prawn, izinduku ezinesondo, imikhonto, amanethi nezicupho. Abadobi abasezingeni elincane bayingxenye ebalulekile yemiphakathi yasemaphandleni nasogwini abahlala kuyo futhi lokhu kubonakala kwezenhlalo nezomnotho kuleyo miphakathi. E-Eastern Cape naKwaZulu-Natal, abadobi abancane bahlala kakhulu ezindaweni zasemaphandleni.

Izinto zokudoba kubadobi abancane zilawulwa ngokwemigomo yokusebenzisana kwemiphakathi ehlose ukuqikelela ukuthi ukuvuna nokusetshenziswa kwalezo zinto kwenzeka ngendlela eqhubekayo ngokuhambisana nokulondolozwa kwezinto eziphilayo. Inqubomgomo yoMnyango Wezolimo eMkhakheni Omncane Kwezokudoba eNingizimu Afrika uhlangoza ukuthi izindawo ezithile ogwini zibekwe phambili futhi zibekwe ezindaweni zokudoba ezincane. Kwezinye izindawo, amalungelo okufinyelela angagcinelwa kuphela ukusetshenziswa ngabadobi abancane. Umphakathi, uma ubhalisiwe njengenhlangano engokomthetho esekelwe emphakathini, ungafaka isicelo sokuhlukaniswa kwalezi zindawo futhi uma kuba nokuphikisana, kufanele kubhekiswe ekuxazululweni kwemibango ngaphansi kweNqubomgomo. Le nqubomgomo idinga indlela ehlukahlukene yokwehlukana amalungelo, okuzibandakanya ukwabiwa kwamalungelo kabhasikidi wezilwanyana ezingase zivunwe noma zibanjwe ezindaweni ezithile ezikhethiwe.

I-DAFF incoma ukuba kube obhasikidi abahlanu njengoba kuboniswe *IBhokisi 4.7*.

IBhokisi 4.7 Izindawo “ZoBhasikidi” Babadobi Abancane

Indawo Kabhasikidi	UGu	Inani Lezinsiza
Indawo Kabhasikidi A	Umngcele waseNamibia eCape of Good Hope	57 wezinsiza ezihlukene
Indawo Kabhasikidi B	ECape of Good Hope kuya eCape Infanta	109 wezinsiza ezihlukene
Indawo Kabhasikidi C	ECape Infanta kuya eTsitsikamma	107 wezinsiza ezihlukene
Indawo Kabhasikidi D	ETsitsikamma kuya ePondoland MPA	138 wezinsiza ezihlukene

Indawo Kabhasikidi	UGu	Inani Lezinsiza
Indawo Kabhasikidi E	Pondoland MPA to the Mozambican border	127 wezinsiza ezihlukene.

Umkhakha wabadobi abancane emanzini “angasogwini” (akuvamile ukuba badlule ngale kuka-3 nm ukusuka ogwini (cishe ngu-5.5 km) futhi, ngenxa yalokho, ngeke ushayisane nezindawo zokubhola eziphakanyisiwe.

Abadobi abancane bahlukaniswe ngezigaba ezine, nazi:

- Ukudobela ukuzondla;
- Izicupho zakudala eKosi Bay;
- Amanetha angekho emthethweni e-gill nawe-seine; kanye
- Nezilwane zasolwandle ezingenamgogodla.

Isigaba ngasinye sichazwe kabanzi ngezansi.

Ukudobela Ukuzondla

Ukudobela ukuzondla kusho ukudoba lapho abantu bevuna khona izinhlanzi noma ezinye izilwane zasolwandle eduze nalapho behlala khona njengendlela yokuhlangabezana nezidingo zabo eziyisisekelo zokudla (Branch *et al.* 2002). Ngokujwayelekile laba badobi badoba ngasolwandle noma olwandle olusenxwemeni futhi abakwazi ukuthenga izikebhe zanoma yiluphi uhlobo. Amathuluzi abo ngokuvamile madala, amasekeni noma izinduku namasondo okuzenzela noma izintambo kanti abadobi bavame ukuziqoqa ukudla kodobo (njengezimbaza, ama-mussels, ama-red bait, izinkalankala noma ama-prawns asesihlabathini). Laba dobi abavamisi ukudoba izinhlanzi ezanele ukuthengiswa futhi izinhlanzi eziningi ezibanjiwe zidliwa umuntu ozibambile noma umndeni njengesishebo. Ezimweni lapho kubanjwa eziningi, insalela ingathengiswa noma kushintshiselwane ngayo.

Clark *et al.* (2002) kulinganiselwa ukuthi kwakukhona imizi engaba ngu-21,641 ngasogwini lwaseKZN esekudobeleni ukudla. Kodwa lokhu kukholakala ukuthi kuwukweqisa okukhulu njengoba i-Dunlop (ngo-2011), yabonisa ukuthi abadobi “bangempela” abadobela ukuzondla bangamaphesenti amancane (amaphesenti angu-3-6) abo bonke abadobi basogwini, abalinganiselwa ku-65,000 ngo-2010 (Dunlop 2011), okungukuthi isilinganiso esingcono kakhulu siphakathi kuka-2,000 no-4,000 babadobela ukuzondla. Abantu abacela ku-2 500 abavela emiphakathini engu-23 eKZN basezinhlotsheni zokudoba eziyisikhombisa. Ngo-2012, ngokusebenzisa izinhloka zokulawulwa kokudoba endaweni, kwatholwa izicelo zamalungelo okudoba (izimvume zokukhululwa) zabadobela ukuzondla abangu-938 abavela emiphakathini engu-12 ebandakanya: iKosi Bay, Mabibi, Mbila / Sodwana Bay, Sokhulu, Nhlabane / Mbonambi, Port Durnford, Mpembeni, Amatikulu, Nonoti, Umgababa, Mfazazana / Mthwalume noNzimakwe / Port Edward.

Ngokomthamo wokudla okuvuniwe ngonyaka, kulinganiselwa ukuthi izivuno ezitshelwa ukuzondla cishe zingu-23 t wezilwanyana zasolwandle ngonyaka (Mkhize 2010, Kyle 2013c, WIOFish 2013). Ngokwezilinganiso ezenziwe yiDunlop (2011), inani lezinhlanzi ezidotshelwe ukuzondla lihamba ku-16 t ngonyaka.

Ngenxa yesimo sokudobela ukuzondla neqiniso lokuthi abadobi abaningi abanayo invume, kunzima kakhulu ukusho bangaki. Ngokwemiphumela ye-Dunlop (2011) izilinganiso ezingcono kakhulu zezilwane zasolwandle ezidotshelwa ukuzondla zingaba phakathi kuka-24,000 no-48,000 wabadobi ngezinsuku zokudoba ngonyaka.

Kunemininingwane enganele mayelana nenani kokudobela ukuzondla emnothweni. Inani elibikiwe lezibanjwa ngonyaka lingahaba ko-R150,000 (Mkhize 2010) kuya ku-R920,000 (ngokwezibalo eziku-WIOFish 2013).

Izicupho Zakudala EKosi Bay

Izicupho zakudala zisetshenziswa echwebeni laseKosi olusuka esizalweni kuya emachwebeni aseMakhawulani, eMpungwini naseNhlangeni. Sekuyizizukulwane eziningi lezi cupho silokhu zisetshenziswa eKosi Lakes. Lezi cupho ngezanomphela futhi zakhiwe ukuze ziqondise izinhlanzi kobhasikidi ezingenakuphuma kubo. Izicupho ikakhulukazi zithagetha izinhlanzi ezihamba ebusuku zisuka echwebeni ziya ziya olwandle. Zibhajwa kobhasikidi ebusuku bese abadobi beyazihlaba bazikhiphe ekuseni.

Kunabadobi abangaba ngu-150 abasebenza ekudobeni (WIOFish 2013). Ngo-2012 kwabanjwa izinhlanzi ezilinganiselwa ku-64 392 zinesisindo esingaba ngu-66 t (WIOFish 2013). Abadobi bathola cishe u-R50 nge-kg ngayinye ngezinhlanzi abazibamba ngo-2012 (WIOFish 2013). Ngakho-ke imali engenayo kusukela ekubambeni ingaba cishe u-R3.3 miliyoni.

Ukudoba Izilwanyana Ezingenamgogodla Ogwini Olunamatshe Nasolwandle Olunesihlabathi

Abadobi abancane / abadobela ukuzondla abahlala e-KZN nase-Wild Coast baqoqa izinhlobo ezihlukahlukene zezinto eziphilayo ezihlanganisa izilwanyana ezingenamgogodla ezihambayo nezingahambi ezihlala emadwaleni asosebeni nasesihlabathini solwandle. Abavuni abahlala eningizimu yeSimangaliso Wetland Park baqoqa ikakhulukazi izimbaza emadwaleni futhi kukhona nokuqoqwa kwa-lobsters okungemthetho (*Panulirus* spp). Kukhona abadobi abangaba ngu-300 eSimangaliso Wetland Park kodwa lokhu kungase kube ihaba njengoba abadobi bengase baqoqe izinhlobo ezingaphezu kweyodwa zezinto eziphilayo. Abaqoqi bezilwanyana ezingenamgogodla abahlala ngasengxenyeni esele yogu lwase-KZN bathi ababe ngu-256 kanti inani labadobi bama-lobster abangekho emthethweni alaziwa.

Inani lezinto ezidotshwayo (2011) eziyingxenye yezilwanyana ezingenamgogodla njengoba libikwe kuyi-WIOFish (2013) ziyinkalankala ze-mangrove (8 043 kg), izinkalankala ze-ghost (200 kg), izinkalankala ze-mole (100 kg), inhlanguanisela yezilwanyana ezingenamgogodla (1700) kg) nezimbaza (9000 kg).

Kwafakwa izicelo semvume yokudoba osebeni ezingu-470 ngonyaka ka-2013. Isibalo besilokhu sikhula njalo kusukela ngo-2007. Ukwanda kungabonisa ukuthi abadobi abasaqala noma ukwenza ngokuvumelana nemithetho ngezininga eliphezulu.

Abadobi banezindleko ezimbalwa ngaphandle kokuthenga kwamathuluzi okuqoqa njengamimese, ama-scaper, ama-screwdriver namageje futhi, kwezinye izimo, izithuthi zokuya ezindaweni zabo zokudoba. Ukubaluleka kwangempela kwalokhu kudoba kwakuwukuthi ngokuvamile kwakunikeza abanye babantu abampofu kakhulu abahlala ngasogwini amathuba okuqoqa ukudla okuhle, ikakhulukazi esikhathini esingaphambi kwezibonelelo zomphakathi.

Amanetha Angekho Emthethweni E-Gill Nawe-Seine

Ukusetshenziswa ngokungemthetho kwamanethi e-gill nawe-seine bekulokhu kwenzeka emifuleni eminingi yase-KZN, ezizalweni zemifula nasemithonjeni yamanzi ahlanzekile kusukela okungenani ekuqaleni kwawo-1950 (Mann 1995, 2003, Kyle 1999, 2003). Inethi ye-gill *ifakwa* emaphethelweni esizalo, emihumeni yesizalo, ukuya emachibini esizalo noma emihoshe. Ubude benetha bungaba phakathi kuka-10 no-1000 m futhi isuke ku-2 kuya ku-4 m ububanzi. Amanetha amaningi ayendlalwa ngezinyawo kodwa muva nje futhi ikakhulukazi ezizalweni ezinkulu njenge-Lake St Lucia, izikebhe zasendulo ezenziwa ekhaya zisetshenziselwa ukuphonsa amanetha. Amanetha e-seine asetshenziswa kulo mkhakha wokudoba avela emanetheni enziwe kahle anamafindo anesisindo, intambo entantayo nesikhwama esinomphetho omncane, kuya ezindwangwini ezidonswa emanzini.

Ukusetshenziswa kwamanethi kuyindlela esesebenzayo yokudoba ngokuvamile eyenziwa ngokuhudula inethi ngaphandle nokuyidonsa olwandle emini ngenjongo enkulu yokubamba ama-prawn (Penaeidea). Lokhu akufanele kudidaniswe namanetha e-seine asolwandle nawokudoba. Abantu abaningi abathintekayo kulama nethi okudoba bangabantu abangasebenzi / basezindaweni zasemaphandleni abahlala eduze kwezizalo zemifula. Kodwa-ke, njengoba kuwukudoba okungekho emthethweni, ukudoba ngamanethi manje kwenzelwa ukuhweba futhi kuhlelwe kahle yizigebengu nabathengi beza emaphandleni nezimoto ezineziqandisi bezothonga izinhlanzi kanye / noma ama-prawn bese eyothengiswa ezimakethe eziseduze nezikude.

Izizalo zemifula eziyinhloko lapho kusetshenziswa khona amanetha ngokungemthetho zihlanganisa iKosi Bay, Lake i-St Lucia, uMfolozi / uMsundusi, iLake Nhlabane, iRichards Bay Harbor, iMhlatuze, Umlalazi, Amatikulu / Nyoni, uThukela, iZinkwazi, uMgeni ne-Durban Harbour (Beckley *et al.* 2000). Ngenxa yokungabi semthethweni, amanani ezinto ezidotshwayo kulo mkhakha azikho.

Ngo-2012 i-EKZNW elwa nokweba yasusa futhi yashabalalisa amanethi angekho emthethweni e-gill nawe-seine angaba ngu-26 eLake St Lucia, kanye nezikebhe ezingu-56. Amakhilomitha amaningi amanethi asuswa kwezinye izizalo zemifula.

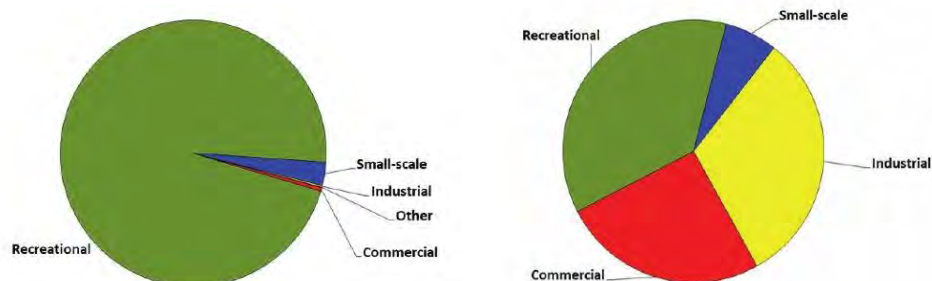
Ukudobela Ukudlala

Imikhakha yezokungcebeleka esebenzayo ogwini lolwandle lwaseKZN ihlanganisa ukudoba ogwini, ezizalweni zemifula nangokudoba ngezikebhe nangemikhonto. Ukudobela ukungcebeleka kubandakanya amanethi aphonswayo, adonswayo nayizindilinga. Sekukonke, abadobi bezokungcebeleka yibo abaningi esifundazweni.-akhawunti yokudoba yokudoba yabaningi abadobi esifundazweni.

Ngokuphathelene nokudoba, umkhakha wezimboni zokudoba yiwo onomthamo omningi e-KZN kodwa ulandelwa eduze abadobi bezokungcebeleka nabezohwebo (bheka *IShadi* 4.37).

Incazelo ngayinye yethulwe ngezansi ngolwazi olutholwe encwadini ekhethekile yezokudoba olwandle nasezizalweni zemifula eKZN eyakhishwa yi-Oceanographic Research Institute (2014), ngokubambisana ne-Ezemvelo KwaZulu-Natal Wildlife (EKZNW)

IShadi 4.37 Izingxenye zabadobi abaneqhaza kwa-KwaZulu-Natal (kwesobunxele) and nomthamo wabadobi abaneqhaza kuzo zonke izinto ezidotshiwe kwa-KwaZulu-Natal (kwesokudla) (ORI, 2014)



Ukudoba Osebeni

Ukudoba osebeni (ngentambo), kuwumdlalo owenziwa osebeni, kusetshenziswa ihhuku nentambo. Lolu hlobo lokudoba luvulelekele wonke umuntu futhi lugcwele lonke ugu lwase-KZN (Dunlop & Mann 2012). Lokhu kwenza lutholakale emiphakathini eminingi, kusukela kubadobi bokuzondla kuya kwabadlalayo nabancintisanayo (Dunlop & Mann 2012). Ukudoba osebeni bekulokhu kukhona kusukela emandulo kulesi sifundazwe, futhi ukufinyeleleka kwako kalula nokuthi amathuluzi akhona awabizi nezindleko nokuba phansi kwezindleko zokuqala kwenza ukudobela ukungcebeleka osebeni kube yikona okukhulu kakhulu eKZN ngokwezibalo zabadobi (Brouwer *et al.* 1997; McGrath *et al.* 1997; Dunlop 2011).

Ngo-2009/10, abadobi bezokungcebeleka sebebonge babephakathi kuka-41,283 no-68,087 (Dunlop & Mann 2012). Kwabikwa nokuthi kunabadobi abadoba osebeni abaphakathi kuka-8,463 no-13,958 (20.5%) abavakashela i-KZN ngonyaka bevela kwezinye izifundazwe noma amanye amazwe (Dunlop & Mann 2012).

Kunezinhlolongobonhlobo zezinhlanzi ezithagethwayo, kuhlenganise ne-shad (*Pomatomus saltatrix*), i-karanteen (*Sarpa salpa*) ne-blacktail (*Diplodus capensis*), nedlanzana lezinye izinhlobo ezibanjwa osebeni nalezo ezibanjwa phakathi olwandle ngezikebhe (Dunlop & Mann 2012). Umthamo obanjwayo ngomzamo ngamunye (CPUE) wezokudoba osebeni lwase-KZN ngo-2009/10 kwakulinganiselwa ku-0.82 wenhlanzi ngosuku noma u-0.32 kg ngosuku lokudoba (Dunlop & Mann 2012). Lokhu kufinyelela ku-263 t wezinhlanzi ngonyaka ngokusekelwe ezilinganisweni zazo wonke umzamo wokudoba osebeni ne-CPUE (Dunlop & Mann 2012).

Usuwonke umzamo wokudoba wabalwa waba izinsuku zokudoba ezingu-779,382 kuya ku-843 702 ngonyaka ka-2009/10 (Mann *et al.* 2008; Dunlop & Mann 2012).

Ucwaningo lwezomnotho olungelokugcina ukwenziwa kwezokudoba osebeni lwaseKZN lwenziwa yi-Dunlop (2011) ngo-2009-10. Ngokusekelwe enanini lezinto ezibanjiwe elilinganiselwa ku-263 t kanye nemali yokuthengisa (ukudayiswa kokuqala) kwenhlanzi ngaleso sikhathi (cishe u-R30 / kg), ingqikithi yemali yezinto ezazidotshiwe yayilinganiselwa ku-R7.9 million.

Ukudoba Ezizalweni

Izizalo zemifula zikhiqiza kakhulu futhi zinezinto eziphilayo eziningi kakhulu okuzenza zibe indawo ebalulekile yokuhlala izinhlanzi ezincane kanye neyokudla kwezinhlanzi ezindala. Ukudobela ukungcebeleka e-KZN kwenzeka ezizalweni ezine ezinkulu, ichweba laseThekwini (Guastella 1994, Pradervand *et al.* 2003), ichweba laseRichards Bay (Everett & Fennessy 2007, Beckley *et al.* 2008), iLake St Lucia (Mann *et al.* 2002) neKosi Bay (James *et al.* 2001). Abadobi basebenzisa kakhulu izindlela ezilula zokudoba osebeni lwesizalo kanye nasezikebheni phakathi emanzini kungeqi ku-25 m emachwebeni futhi kuqabukela kudlula ku-5 m eSt Lucia naseKosi Bay.

Ababambiqhaza sebebonge ekudobeni kokungcebeleka e-KZN balinganiselwa ku-50 000 (Lamberth & Turpie 2003). Izinto ezibanjwayo ziyahlukahluke kuye ngendawo kodwa zihlanganisa i-grunter enamabala, i-dusky kob (*Argyrosomus japonicus*), i-Natal stumpnose, i-mullet (*Mugilidae*), i-riverbream/perch (*Acanthopagrus vagus*) nezinye izinhlobo ezihlukahlukene. Ngo-2012, i-EKZNW yarekhoda i-CPUE isiyonke esekelwe ekudobeni osebeni lwezizalo yaba ngu-0.06 wenhlanzi.umdobi oyedwa.ngehora elilodwa (Maggs nango-2013). Umthamo wonyaka wezinhlanzi ezibanjwa ekudobeni kokungcebeleka ezizalweni ezine ezinkulu ulokhu ulinganiselwa ezinhlanzini ezingu--85,000 (cishe u-103 t) (James *et al.* 2001, Mann *et al.* 2002, Pradervand *et al.* 2003, Everett & Fennessy 2007, Beckley *et al.* 2008) futhi umsebenzi usuwonke kwezokudobela ukungcebeleka ezizalweni ezine ezinkulu ulinganiselwa ku--850,000 wamahora ngonyaka (James *et al.* 2001, Mann *et al.*

2002, Pradervand *et al.* 2003, Everett & Fennessy 2007, Beckley *et al.* 2008). Inhlanzi kungenzeka ingathengiswa; kodwa-ke, ngokusekelwe emathemweni wezinto ezibanjwayo kanye nentengo yenhlanzi entsha ethi ayibe u-R40 / kg (2014, ekudayisweni kokuqala), intengo yezinto ezidotshiwe ingu--R4.1 miliyoni. I-Lamberth neTurpie (2003) ilinganisela ukuthi inzuzo yomnotho isiyonke emkhakheni wezokudobela ukungcebeleka e-KZN ingu-R84.5 miliyoni ngonyaka.

Boat-Based Fishery

Ukudobela ukungcebeleka usesikebheni kwenziwa ngezinhlobonhlobo zezikebhe kusukela kwezigwedlwayo (ezaziwa nangokuthi fishing-ski) kuya emikhunjini emikhulu yasemachwebeni > 10 m. Noma kunjalo, isikebhe esivame kakhulu ukusetshenziselwa ukudobela ukungcebeleka phakathi ogwini lwase-KZN yi-skiboat. Ama-Skiboats aqinile, akwazi ukudonsa inqola, zingamamitha angu-5 kuya ku-10 ubude, ngokuvamile zixhaswa yizinjini ezimbili ezingambi eqolo futhi zonga uphethiloli futhi zishibhile ukuzisebenzisa kunezikebhe ezinkulu zasemachwebeni (Penney *et al.* 1999). Lezi ke bhe zifakwa ezindaweni zokufaka izikebhe olwandle nasemachwebeni futhi zikwazi ukukuyisa ezindaweni eziningi ogwini lwase-KZN (Dunlop & Mann 2013). Ngenxa yokudobela ukungcebeleka, kusetshenziswa amthuluzi amaningi kuye nangezinhlobo ezithagethwayo. Lapho kudotshwa izinhlanzi ezisekujuleni, kusetshenziswa izinduku eziqinile ze-fiberglass kanye ne-Scarborough, zifana kakhulu nalaze ezisetshenziswa abadobi bezohwebo. Lapho kuthagethwa izinhlanzi zemidlalo (izinhlobo ezivame ukuthagethwa), kusetshenziswa izindobo eziba namasondo amaningi kanye nokudla kodobo okuphilayo ezindaweni ezingafani kuye nangenhlanzi ethagethwayo. Kubanjwa izinhlobonhlobo zezinhlanzi ze-pelagic ne-demersal (ezingaba ngu-78), kuhlanganise ne-yellowfin tuna (*Thunnus albacares*), i-slinger (*Crysolephus puniceus*), i-dorado (*Coryphaena hippurus*), i-black musselcracker (*Cymatoceps nasutus*), i-tuna encane yasempumalanga (*Euthynnus i-affinis*), i-blue emperor (*Lethrinus nebulosus*), i-chub mackerel (*Scomber japonicus*) ne-Englishman (*Chrysoblephus anglicus*) (Dunlop & Mann, 2013). Kukhona ukunqwabelana okukhulu kwezinhlobo ezibanjwa ekudobeleni kokungcebeleka, ngokunemvume nomkhakha wezohwebo ekudobeni ngezikembe ogwini (Dunlop & Mann 2013).

Inani labadobi bezikebhe kongcebeleka abaneqhaza ogwini lase-KZN lilinganiselwa ku-7,662 no-9991 ngo-2009/10, besebenzisa izikebhe ezilinganiselwa ku-2,448 kuya ku-3,192 (Dunlop & Mann 2013). Ngaphezu kwalokho, kunenani elingu-650 lababambiqhaza abasebenzisa izikebhe ezigwedlwayo ngonyaka (Mann *et al.* (2012). I-CPUE ngesikhathi senhlolovoka-2009/10 kwakuyizinhlanzi ezingu-8.58 ngesikebhe ngasinye esiphumile, noma u-15.0 kg ngesikebhe ngasinye esiphumile kanye nengqikithi yezibanjiwe elinganiselwa ku-457 t ngonyaka (izinhlanzi ezingu-261 133 ngonyaka) (Dunlop & Mann 2013).

Phakathi no-2012 kwafakwa izikebhe zokungcebeleka ezilinganiselwa ku-26,913 okwenziwe ngenjongo yokudobela ukungcebeleka ngasogwini lwase-KZN (Mann *et al.* 2013) nenani elilinganiselwayo elingu-6,685 wokufakwa kwezikebhe ezigwedlwayo ngonyaka (Mann *et al.* 2012).

Ucwaningo lokugcina kwezomnotho ekudobeleni ukugcebeleka ngezikebhe lwenziwa yi-Dunlop (2011). Ngokusekelwe ekubanjweni kwezinhlanzi okulinganiselwa ku-457 t kanye nokudayisa (ukudayiswa kokuqala) intengo yenhlanzi ngaleso sikhathi (engaba u-R30 / kg), ingqikithi yentengo yezinhlanzi ezibanjwayo yayilinganiselwa ku-R13.7 miliyoni.

Ukudoba Ngamanethi Aphonswayo

Ukudobela ukungcebeleka kuyasebenza ezizalweni zemifula ezingashoni, emachwebeni nasemabhishi athile (WIOFish 2013) ngemvume yokudoba ngamanethi ekhishwa yi-EKZNW yokusebenza ezizalweni ezithile kuphela. Abadobi basebenzela kusukela osebeni, bephonsa amanethi, bawakale kahle, ngendlela yokuthi inethi inabe kakhulu emanzini bese iyazika, ibambe izinhlanzi.

Ngo-2012, kwakhishwa izimvume ezingu-1,233 ngonyaka zokudoba ngamanethi kanye nezinye izimvume zesikhashana ezingu-113 e-KZN (ICS 2013). Ubungako bomsebenzi usuwonke wokudoba e-KZN abaziwa. Kwahlanganwa nengqikithi yabadobi bamanethi abangu-182 osebeni lwase-102 EKZNW ngesikhathi kuhlolwa ngo-2012 (ICS 2013). Ayaziwa imali etholakala kulolu hlobo lokudoba ngoma akukho mininingwane yenani lezint ezidotshwayo.

Ukudoba Ngamanethi Adonswayo

Lolu kholo oluncane lokudobela ukungcebeleka lwenziwa ezizalweni zemifula kusetshenziswa amanethi ahudulwayo ukuze kubanjwe izinhlobonhlobo zama-prawn (WIOFish 2013). Kungase kungasetshenziswa isikebhe (Tomalin 1995). Ngo-2012, kwakhishwa ingqikithi yezimvume zokudoba ngamanethi ahudulwayo ezingu-169, kanti ezinye ezingu-155 ezazithengwe ngonyaka owawandulele zazisasebenza ngo-2012 (ICS 2013).

Akukho mininingwane engathenjela yenani lezinto ezibanjwayo, kodwa inani lezinto ezibanjwayo ngonyaka lilinganiselwa ekubeni ngaphansi kuka-100 kg (ORI, 2014). Izinto ezibanjwa kulolu hlobo lokudoba azithengiswa, zisetshenziselwa ngokuyinhloko ukuba ukudla kodobo.

Ukudoba Ngamanethi Anembenge

Loku kudobela ukungcebeleka kuthagezwa ama-baitfish nama-squid amancane emachwebeni nasezizalweni zase-KZN (Tomalin 1995). Izilwanyana ziyaqoqwa kusetshenziswa inethi nembenge ekugcineni kwendukwana.

Loku kudoba kwamiswa kusukela ngo-2005 kuya ku-2009, kodwa ngo-2010, zaphinde zathengiswa izimvume zokudoba ngamanethi anembenge e-KZN (ICS 2013). Ngokwenani lezimvume ezathengiswa emaposini ase-KZN, ingqikithi yabadobi abangu-302 bathenga izimvume ezingu-81 ngonyaka kanye nezesikhashana ezingu-221 ngo-2012. Ezinye izimvume ezazithengwe ngo-2011 zazisasebenza ngo-2012 (ICS 2013). Akukho mininingwane yomsebenzi usuwonke walolu hlobo lokudoba. There is no information on fishing effort. Ayaziwa imali etholakala kulolu hlobo lokudoba ngoma akukho mininingwane yenani lezint ezidotshwayo.

4.4.4

Ugu Lokungcebeleka Nokusetshenziswa Kolwandle

Ukudobela ukungcebeleka izinhlanzi zase-East Coast nase-Wild Coast kubandakanya kokubili ukuzidla nokungazidli. Ukuzidla kubandakanya abadobi basosebeni nabasebenzisa izikebhe bakhiphe izinhlanzi abazozidla bona (e.g. ukudobela ukungcebeleka, bheka *iNgxenywe 4.4.2* ukuze uthole ingcazelo yokudobela ukungcebeleka), kuyilapho ukudobela ukungazidli kubandakanya abadobi abangazikhiphi izinhlanzi kuleyo ndawo.

Ukusebenzisela Ukudla

Ukudotshelwa kwezinhlanzi ukudliwa ogwini lwase-East Coast kubandakanya abadobi basosebeni nabasebenzisa izikebhe (Brouwer *et al.*, 1997), imikhonto (Mann *et al.*, 1997), nabatshuzi abalanda izilwanyana ezingenamgogodla, kanye nafuna izinto eziphilayo ezingasosebeni. Ukudobela ukungcebeleka ngase-East Coast nase-Wild Coast ngokuvamile kwenzeka emanzini asosebeni phambi kwamadolobha asogwini, nezindawo zamaholidi, futhi kuhlange kakhulu nezokuvakasha.

Njengoba indawo efunwayo yasenyakatho iqhele ngangaphansi kuka-62 km ukusuka osebeni futhi indawo efunwayo yaseningizimu iqhele ngangaphansi kuka-65 km ukusuka osebeni, akubonakali indawo yokubhola eshiwo izothikameza ezokungcebeleka ogwini. Kungenzeka-ke kodwa ukudobela ukungcebeleka ngezikebhe kuthikameke uma bengena kakhulu olwandle bayofika kuBloki ER236.

Ukungalisebenziseli Ukudla

Ukungayisebenziseli ukudla i-East Coast ne-Wild Coast kubandakanya imidlalo yasemanzini njenge-surfing, izikebhe zikaseyili, izikebhe zezinjini, nokubuka indalo nokudlala ebhishi. Indalo yasogwini nezinto zasemanzini zinomthelela omkhulu kwezokuvakasha ogwini (njengoba kuchazwe *eNgxenyeni 4.4.1*).

Njengoba kushiwo ngenhla, iBloki ER236 iqhele ngo-20 km ukusuka osebeni futhi-ke ngenxa yalokho ukuhamba ngezikebhe zikaseyili ngeke kuyofika kuBloki ER236. Kodwa, kungenzeka kuhlange nezikebhe zikaseyili ezidlulayo emanzini aseNingizimu Afrika.

Kunenqwaba yemikhumbi ehamba e-East Coast ilibangise eningizimu yezwekazi lase-Afrika. Iningi lalezi kebhe, kuhlanguke nezohwebo nezokudoba, zisalokhu zihambela eduze nosebe lwe-East Coast. Izikebhe enyakatho naseningizimu zivame ukuba phakathi nesigojana (100 m isobath). Ngokuphambene, amathange nemikhumbikazi ihlala iphakathi nogu, ngaphandle uma kunesidingo sokuyiyisa osebeni ukuze kugwenywe izimo ezimbi kakhulu engenzeka e-Agulhas Current. IBloki ER236 ingase yeqele ezindlelen ezihamba amathange nemikhumbikazi. Le mikhumbi ingase ixhumane nezikebhe ezihambela osebeni ukuze kulandwe izinto ezizithwele eChwebeni lase-Richards Bay noma eChwebeni LaseThekwini. Amachweba abalulekile kwezomnotho ase-East Coast ahlanguke i-Port Elizabeth, i-East London, i-Durban ne-Richards Bay.

INingizimu Afrika inothile ngezinhlobozinhlobo zamagugu asemanzini. Njengoba isengudwini wasendulo wezohwebo phakathi kweYurophu neMpumalanga, ugu olunamatshe noluyingozi lwaseNingizimu Afrika lubone izinto eziningi, kuphuka imikhumbi nezimangaliso zasolwandle iminyaka edlule engu-500 years. Okungenani kunemikhumbi engu-2,400 eye yacwila, yamiswa, noma yaphuka, yalaxazwa noma yamoshwa emanzini aseNingizimu Afrika kusukela ngowo-1500. Lokhu akuhlanguke, njengoba kungakaqinisekiswa, imikhumbi eyaphuka ngaphambi nezinye izindawo ezihlobene nokuhlolwa, uhwebo nokuxhumana kwangaphambi kweYurophu ne-Indian Ocean ogwini lwaseNingizimu Afrika.

Ngaphezu kwemikhumbi eyaphuka kudala, umlando omude wokuhlobana kweNingizimu Afrika nomalwandle unabe kakhulu futhi owakudalal kakhulu.

Lesi sici samagugu ethu ezinto zasolwandle nezasemanzini uboniswa kulo lonke ugu lwaseNingizimu Afrika yizinkulungwane zamagobolondo angaphambi kwamakoloni kanye nenqwaba yezibazi zezinhlanzi, okubonisa izinto zasolwandle zangaphambi kokufika komuntu kusukela nge-Middle Stone Age, iminyaka engaphezu kuka-150,000 eyedlule. Esinye, kuze kube muva nje, isici samagugu ebesilokhu singaqashelwa sasolwandle nasemanzini izindawo zomlando ezimbiwe zangaphambi kwamakoloni manje ezigqitshwe ulwandle.

Umlando Ogqibekile

Amazinga olwandle embulungeni yonke abelokhu ehla ekhuphuka ezimweni okungenani ezintathu phakathi neminyaka edlule engu-500,000 years. Njengoba namazinga olwandle lwanamuhla eshintsha, lezi zinguquko bezilokhu ziwumphumela wokukhuphuka nokwehla kwamagagasi asezingaweni ezibandayo kuya kumaphethini esimo sezulu embulungeni yonke.

Ukwehla kwamazinga olwandle kwabangelwa ukubambeka kwamanzi olwandle amaningi ezindawe ezibandayo njengoba amazing okushisa aya ephola. Ukwehla kwamazinga olwandle okukhulu kwamuva kwenzeka phakathi kweminyaka edlule engu-20,000 no-17,000 lapho i-Weichselian glaciation, ulwandle lwaluphansi ngaphezu kuka-120m kunanamuhla (Van Andel 1989).

Amazinga aphansi olwandle ange-Weichselian (c. 115,000 - 11,700 weminyaka edlule) nawangaphambili e-Saalian (c. 352,000 - 130,000 weminyaka edlule) nawange-Mindel (c. 478,000 - 424,000 weminyaka edlule) ukuba yiqhwa kungenzeka “kwanezela ugu olukhulu eNingizimu Afrika” (Van Andel 1989:133) lapho izigojana ezithile zambuleka zaba indawo eyomile. Lokhu kwakuzoshiwo kakhulu e- Agulhas Bank ebanzi ukusuka ogwini lwaseningizimu yeKapa, kodwa futhi kwenzeka nasezigojaneni ezincanyana zasogwini lwantshonalanga nasempumalanga eNingizimu Afrika. Kulinganiselwa ukuthi lesi sigojana ezimbulekile kungenzeka saveza umhlaba omusha ongu-80,000km² ngobukhulu phakathi nokuba yiqhwa kolwandle (Fisher *et al* 2010). *IShadi 4.38* ngezansi libonisa ubungako besigojana esembuleka phakathi nokuba yiqhwa kolwandle kwesibili kuya kokokugcina.

IShadi 4.38 Possible extent of the South African Continental Shelf c. 137,000 Years Ago during the Saalian glaciation



Umthombo: Franklin *et al*, 2105

Phawula: Indawo ecatsangelwayo ye-Kleinsee imakwe ngenkanyezi ebomvu.

Isigojana esembuleka ngokushesha nje sagcwala izimila nezilwane, kanye nokhokho bethu ababephila ngalezi zinto.

Ngenxa yalokho, isikhathi esibalwa ngamashumi ezinkulungwane zeminyaka okungenani ezikhathini ezintathu phakathi neminyaka edlule engu- 500,000 okhokho bethu babehlala ezindaweni manje ezingaphansi kolwandle ogwini lwaseNingizimu Afrika. Lokhu kusho ukuthi izinto eziningi zasendulo zisesigojaneni futhi manje “zigqitshwe amanzi futhi zonke izinjongo zazo azikho kulelo rekhodi” (Van Andel 1989:133-134).

Ukuphuka Kwemikhumbi

NgoKhisimusi ka-1497, ugu olwalubonakala kulokho manje okuthi yiTheku lwatholwa abathuthu bempahla abancane bamaPutukezi beholwa induna u-Vasco da Gama futhi waliqamba ngokuthi yi-Terra Natalis (Axelson 1973). UDa Gama waba ngumuntu wokuqala waseYurophu ukufika e-Indian Ocean futhi ukuphumelela kwakhe ukufika eNdiya ezinyangeni ezine kamuva kabeka isisekelo neminyaka engaphezu kwengu-500 semisebenzi yasolwandle yabantu baseYurophu emanzini aseningizimu-ntshonalanga ye-Indian Ocean.

AmaPutukezi kanye nezinye izizwe zaseYurophu ezalandela lo mgudu oya e-Indian Ocean zajoyina ezohwebo zasolwandle ezase zinezinkulungwane zeminyaka zikhona lapho impumalanga neningizimu-mpumalanga ye-Afrika yayibalulekeke kakhulu.

Lokhu kuhwebelana kwagcwala i-Indian Ocean futhi kwaxhumanisa i-Far East, i-South East Asia, i-India, iziqhingi zase-Indian Ocean kanye ne-Afrika. Ubufakazi bezinto ezivunjululiwe e-Afrika bubonisa imikhiqizo yase-Afrika yezohwebo yasendulo – igolide, isikhumba, izimpondo nezigqila – kushintshiselwane ngemigexo, izindwangu, i-porcelain, insimbi nekhophha. Ubufakazi obuphathekayo balokhu kuhwebelana buhlanganisa izindawo ezivunjululiwe zama-ceramic ase-Persia naseShayina e-African Iron Age njenge-Khami, iMapungubwe ne-Great Zimbabwe (bheka iGarlake 1968, Huffman 1972, Chirikure 2014), kwathola izingilazi zemigexo yokuhwebelana eziningi ezindawo ezivunjululiwe empumalanga naseningizimu ye-Afrika (Wood 2012).

Kunobufakazi bokuphuka kwemikhumbi ogwini lwaseMpumalanga Afrika kwangaphambi kwalokhu kuhwebelana kwase-European Indian Ocean (isibonelo Pollard *et al* 2016) kanye nobufakazi obuvunjululiwe namadokhumenti bokuthi lokhu kuhwebelana kwanabela naseningizimu eMaputo eMozambique. Lokhu kusho ukuthi isesekhona imikhumbi ephukile nezinye izindawo ezihlobene nesikhathi sangaphambi kokuhlolwa, ukuhwebelana nokuxhumana kwase-European, Indian Ocean ogwini lwasempumalanga eNingizimu Afrika nasemanzini asogwini.

Imisebenzi yasolwandle yabantu baseYurophu ogwini lwaKwaZulu-Natal (KZN), kuze kube sekusungulweni kwamakoloni nokwandiswa kwawo eKapa naseNatali, yayiwukuhamba ikakhulu, izinto eziningi zimane zidlula kula manzi, ziya kweziye izindawo. Kodwa, kusukela ekuqaleni nje, kwaba nemikhumbi eminingi eyaphuka ogwini oluseduze, irekhodi lokuqala logu lwase-KZN libonisa i-Sao Joao, yamaPutukezi eyaphukela ePort Edward ngo-1552, eningizimu yeBlok ER236 (Axelson 1973; Burger 2003).

Njengoba kucacile emarekhodini akhona okuphuka kwemikhumbi ogwini lwase-KZN, iningi layo lenzeka ngasosebeni, imbalwa kakhulu eyaphukela phakathi emanzini, kude nogu. Izizathu zalokhu ziyahlukahluka kodwa zihlanganisa iqiniso lokuthi imikhumbi yokuqala yabaseYurophu, namathuluzi ayo okucinga, yayizobambeka ogwini. Ukuba khona kamuva kwechweba eThekwini kwakuyodonsa imikhumbi ehambela kuze iyilethe ngasogwini – phakathi neMpi Yezwe I, ngokwesibonelo, lapho iTheku laba yichweba elibalulekile lokuthatha amalahle – lapho izingozi zemikhumbi zizinkulu khona kunangaphakathi olwandle (Ingpen 1979).

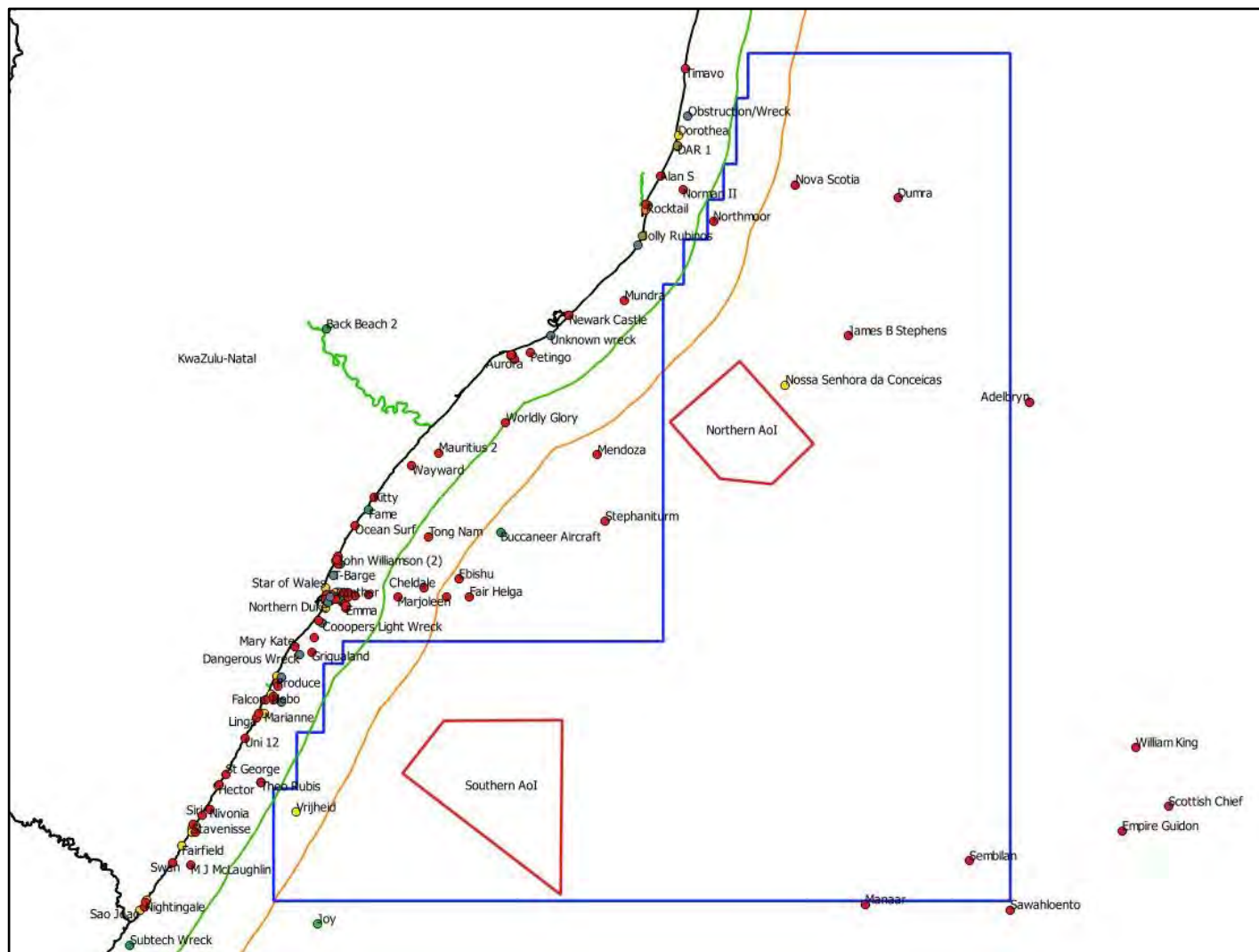
Ocwanigweni olubanzi lwalokhu kuhlaziya, kunamarekhodi okulahleka kwemikhumbi eyisikhombisa. Ngokwezindawo ekuyo ayikho kuyo ekwenye yezindawo ezimboli ezifunwayo zokubhola, nakuba ithemba lokuba khona kwayo lilincane kakhulu kulezi zindawo.

Yonke le mikhumbi eyaphuka, ngaphandle kwemibili, yenzeka ngekhulu leminyaka lesi-20 kungeyaseJalimane nase-Ithali iya e-Mozambique ngesikhathi seMpi Yezwe II. Imikhumbi emibili eyaphuka eyangengxenye yesibili yekhulu leminyaka lesi-19.

Imininingwane eyaziwayo yemikhumbi eyisikhombisa eyaphuka imi kanje:

- I-Dumra – umkhubi wenjini waseBrithani, 5 Juni 1943;
- I-James B Stephens – umkhumbi wesitimu, 8 Mashi 1943;
- I-Northmoor – umkhumbi wesitimu othwala impahla, 17 Meyi 1943;
- I-Nossa Senhora da Conceicas – umkhumbi wamaPutukezi (cishe umkhumbi wezigqila), 29 Meyi 1869;
- I-Nova Scotia – umkhumbi wesitimu othwala abagibeli, 28 Novemba 1942;
- I-Sembilan – umkhumbi wesitimu waseDashi, 17 Ephreli 1943; kanye
- Ne-Vrijheid – umkhumbi waseDashi, 30 Ephreli 1883.

IShadi 4.39 Izindawo Zemikhumbi Ephukile Ogwini Lwasempumalanga YeNingizimu Afrika



Phawula: Umkhawulo wamanzi aseNingizimu Afrika nendawo yamagugu uboniswe ngombala oluhlaza nowolintshi. Izindawo zemikhumbi eyisikhombisa eyaphuka echazwe embikweni ngezansi iboniswe endaweni yocwaningo evezwe ngemikhawulo yeBloki ER236.

Empendulweni yayo embikweni we-Scoping, i-SAHRA yaveza ukuthi kungenzeka ukuthi ukuphuka komkhumbi wesitimu i-*Waratah*, owalahleka ngaphandle komkhondo ngo-1909, kungeka usendaweni yocwaningo. Umbiko wokugcina wokubonakala komkhumbi okukholakala ukuthi yi-*Waratah* wasesimweni esibi kakhulu sezulu ebusuku ngo-26 Julayi 1909, cishe amamayela angu-180 eningizimu yeTheku. Eminye imibiko ibonisa ukuthi wacwila eMfuleni iMbashe endaweni eyayibizwa nge-Transkei, nokuthi imizimba nomkhumbi ohlotshaniswa ne-*Waratah* kwatholwa eningizimu ye-Mossel Bay (Smith 2009). Nakuba kwakunamahemuhemu okuthi isikhathi owanyamalala ngaso i-*Waratah* yayingahambi futhi yayintanta, izinhloli zolwandle enyakatho naseningizimu yogu lendawo eyayiyi-Transkei azithola mkhondo wawo. Kungenzeka impela ukuthi i-*Waratah* yacwila endaweni egcina ukubonakala kuyo, phambi koMfula iMbashe, nakuba ukuhlola kwamuva bekungakatholi mkhumbi ophukile (Brown, 2016). Akunakwenzeka ukuthi lo mkhumbi ophukile useZindaweni Ezifunwayo zokubhola.

Kodwa njengoba sekushiwo ngenhla, izingebe erekhodini lamagugu asemanzini eNingizimu Afrika zisho ukuthi kungenzeka ukuthi imikhumbi ephukile okwamanje engaziwa nengarekhodiwe ibe sendaweni yocwaningo.

4.4.7 *Mineral and Petroleum Prospecting and Exploration Rights and Activities*

Exploration activities are being undertaken in neighbouring oil and gas blocks including the following Exploration Rights:

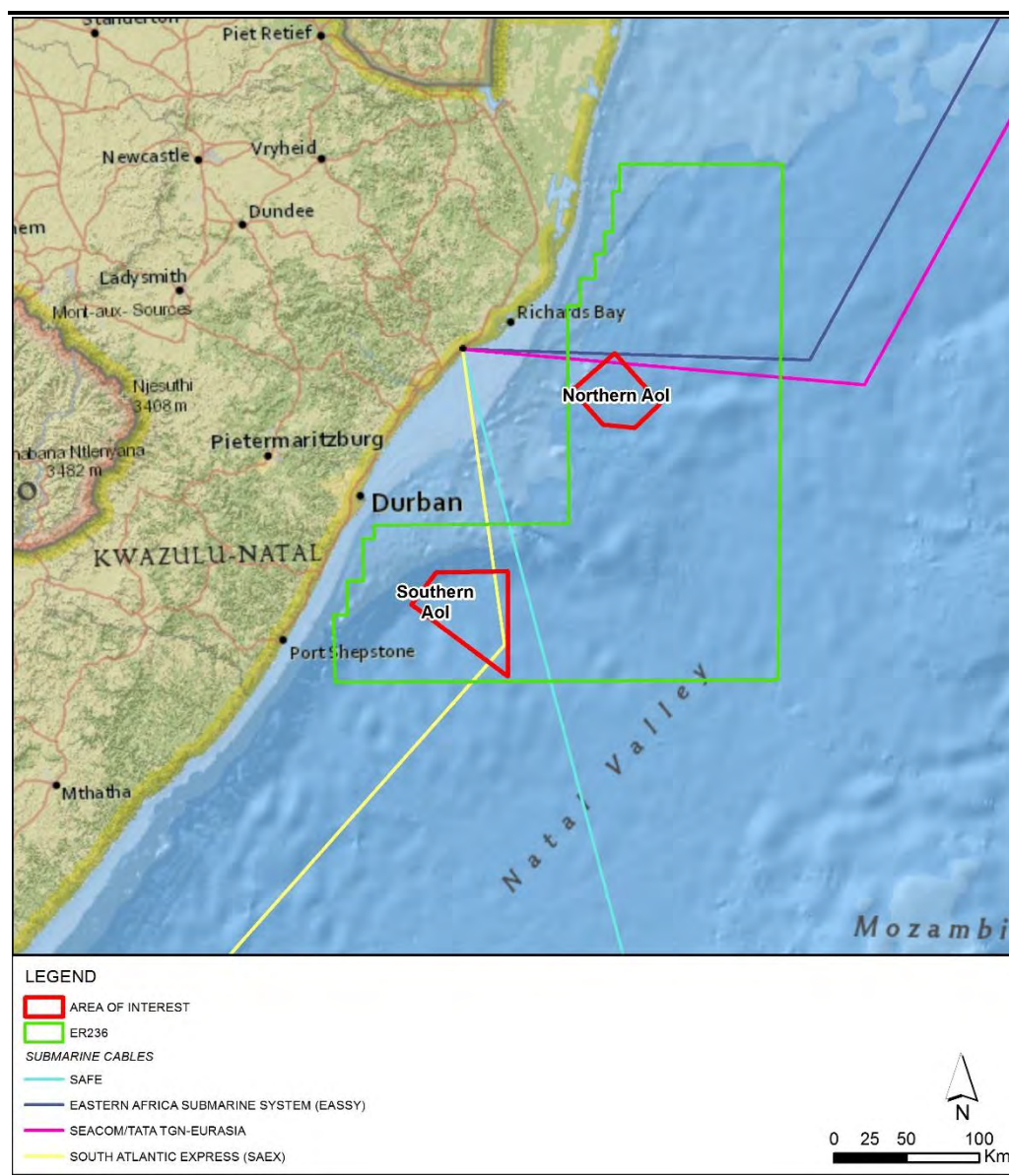
- Tugela South operated by EMEPSAL to the north-west.
- DeepWater Durban operated by EMEPSAL to the south.
- Silverwave deepwater block to the east.

Awekho amathemba ezinto ezimbiwa phansi acatshangelwayo njengamanje phakathi neBlok ER236, esekujuleni kwamanzi. Nakuba zikhona izinto ezimbiwa phansi eziye zambiwa emanzini aseNingizimu Afrika, i-ore engathengiseka ibingakatholakali.

4.4.8 *Izintambo Ezihamba Emanzini*

Kunenqwaba yezintambo zokuxhumana ezisemanzini aseNingizimu Afrika (*IShadi 4.40*). Izintambo ze-SAExpress, i-SAFE, i-EASSy ne-Seacom ziphumela eMtunzini, ethi ayibe ngu-40 km eningizimu ye-Richards Bay. Zonke lezi ntambo ezine zidlula kuBlok ER236.

IShadi 4.40 Izintambo Ezihamba Emanzini



4.5 ISAMATI YEZINTO EZIYINHLOKO

IBhokisi 4.8 Isamati Yezinto Eziyinhloko

Isici	Incazelo
Izici zasemajukujukwini olwandle kanye nendawo yasolwandle yokuphila izilwanyana	- Indawe esenyakatho efunwayo yokubhola ikude nogu, empumalanga ye-Natal Bight ku- >1,500 m ekujuleni kwamanzi. - Iphoyinti eliseningizimi yentshonalanga yendawo efunwayo leqela engxenyeni ye-Goodlad Canyon. Kufanele kodwa kuphawuleke ukuthi ngeke kubholwe kulowo mhosha. - I-Goodlad Canyon ayixhumene nesigojana futhi ijule kakhulu ukuba kungaba khona into ephila kuyo noma ukudla ngakho-ke akunakwenzeka ukuthi kungatholakala izinto eziphilayo kulo mhosha.

Isici	Incazelo
	- Engxenyeni esenyakatho yendawo yokubhola, i-Southwest Indian Upper ne-Lower Bathyal okuphilekayo kuyo (ekujuleni kolwandle) ziyatholakala, kuyilapho i-Southern Indian Lower Bathyal kuyiyo enkulu engxenyeni eseningizimu yendawo efunwayo, zombili kuthiwe 'zisengcupheni' kusho i-SANBI 2011 National Biodiversity Assessment. - Izinto eziphila emanzini kulezi zindawo okuphilekayo kuzo ziyafana kuzo zonke izingxenye zoGu Lwasempumalanga Afrika, kuhluka nje kuphela uhlobo lempansi lolwandle kanye/noma ukujula kwendawo.
Ama-Coelacanth	- Ama-Coelacanth ayizinhlanzi ezingandile ezaziwa ngokuhlala emihosheni esentshonalanga ye-Indian Ocean. Arekhodwa emihosheni ephansi kwamansi yase-St Lucia ngo-Novemba 2000 (Venter <i>et al.</i>, 2000). - Ama-Coelocanth aphinde arekhodwa e-Sodwana Bay ekujuleni okuphakathi kuka-90 no-140 m emihosheni lapho kwakunezindawo eziningi zokucasha njengemigede, imipheme noma izindawo ezihlephukile (Hissman <i>et al.</i>, 2006). - IMihosha YasoTugela nase-Goodlad ingaseningizimu nangasenyakatho yezindawo ezifunwayo zokubhola. Zona kanye neqiniso lokhu le mihosha ayixhumene nesigojana, futhi ukudla cishe akukho ekujuleni kwale mihosha, kuphakanyiswa ukuthi iMihosha YasoTugela nase-Goodlad ayikulungele ukuphila ama-coelacanth. Ngaphezu kwalokho, ngeke kubholwe kule mihosha.
Ama-carol Asemajukujukwini Amanzi	Ukuvela kwama-carol asemajukujukwini amanzi kuBlok ER 236 nasezindaweni ezifunwayo akwaziwa.
Imikhomo Namahlengethwa	- Kunezinhlobo ezingu-36 zemikhomo namahlengethwa (cetaceans) ezingase zitholakale kuBlok ER236. Kulezi ezingu-36, umkhobo i-Antarctic Blue 'usengcupheni enkulu yokushabalala', ihlengethwa i-Indo-Pacific humpback, ihlengethwa i-fin nehlengethwa i-sei abhekwa 'njengasengcupheni yokushabalala' futhi amahlengethwa ase-Ifafi-Kosi Bay ayingxenye yama-Indo-Pacific bottlenose, amahlengethwa i-Sperm namahlengethwa i-Bryde (akude nosebe) abhekwa 'njengaseningeni' encwadini yoHlu Lokuhlaziya ye-IUCN South African Red Data. - Izinhlobo ezixhaphakile ngasendaweni efunwayo (ngokwenani lezikhathi zokuhlangana nazo, hhayi inani lazo zizonke) cishe kuyoba amahlengethwa i-bottlenose, umkhomo i-short-finned pilot nomkhomo i-humpback. - I-ER236 ingasenzilani wokufuduka kwemikhomo i-Humpback (Least Concern) ne-Southern Right (Least Concern). - Imikhomo yase-Southern right iyodlula kuBlok ER236 ngo-Julayi nango-Agasti ibuye futhi lapho ifudukela eningizimu ngo-Okthoba/Novemba. - Ama-Humpbacks asabalalela ogwini oluMpumalanga, amaningi efika emanzini aseningizimu ye-Afrika ngabo-Ephreli, aqhubeke kuyofika ku-Septemba / Okthoba lapho ufuduko lwaseningizimu luqala kuyoshaya uDisemba kuze kuyoba uFebhruwari. Inkathi yokuzala kwama-Humpbacks iqala ngo-Julayi kuya ku-Okthoba, ibe namandla ekuqaleni kuka-Agasti.

Isici	Incazelo
Izimfudu Zazolwandle	- Zinhlanu izinhlobo zezimfudu ezaziwelwa e-East Coast: i-leatherback, okuyiyo evame ukubonakala, ne-loggerhead, i-green, i-olive ridley ne-hawksbill. Ohlwini lwe-IUCN Red, ufudu i-hawksbill luchazwe 'njengelisegncupheni enkulu yokushabalala', ufufu i-green 'lusengcupheni yokushabalala' ne-leatherback, i-loggerhead ne-olive ridley nazo 'zisenkingeni' emhlabeni wonke. - Zombili izimfudu i-leatherback ne-loggerhead zizalela osebeni logu olusenyakatho ye- KZN (St Lucia, iSimangaliso) phakathi kuka-Okthoba kuya phakathi no-Januwari. Ukuchamusela kwenzeka kusukela phakathi no-Januwari kuya phakathi no-Mashi lapho i-Agulhas Current isuke ifudumele kakhulu. Lapho izimfudu ezichamuselwe zingena olwandle, ziya ngaseningizimu zilandela i-Agulhas Current futhi kucatshangwa ukuthi zihlala eningizimu ye-Indian Ocean iminyaka yazo yokuqala eyisihlanu. - Ingxenywe emaphakathi yogu yengxenywe yeBlok ER236, ihlangana nofuduko lwama-leatherbacks, kodwa indawo efunwayo ingaphandle kwendawo yawo yokuzalela. - Ama-leatherback nama-loggerheads angase abonakale kuBlock ER236 phakathi nofuduko lwawo.
Izindawe Zazolwandle Ezivikelwe (MPA)	- Awekho ama-MPA aziwayo eqela endaweni efunwayo yokubhola. - Nakuba iBlok ER236 yeqela endaweni ehlongozwayo ye-Protea Banks MPA nokwenatshiswa okuhlongozwayo kwe-iSimangaliso Wetland Park MPA, akukho kweqa kwezindawo ezifunwayo zokubhola kuma-MPA ahlangozwayo. - Kufanele kuphawulwe ukuthi izingxenywe zasekuqaleni ze-ER236 ezazeqela kuma-MPA e-iSimangaliso ne-Aliwal Shoal zakhishwa ngesikhathi senqubo yokuvuselela ye-Exploration Right ngo-2016.
Amaqanda ezinhlanzi, ukuzalela nezindawo zokwanda	- Izindawo ezifunwayo zikude nemizila yofuduko lwezinhlanzi futhi ama-ichthyoplankton ngeke abe maningi. - Osadini bahamba ngasogwini lwase-Eastern Cape kuya eningizimu ye-KZN bangasendaweni efunwayo. - Amaqanga ama-Pilchard angasendaweni efunywayo.
Izindobo Ezindle Ezinkulu	Indawo efunwayo yeqela ngokumgqa omude endaweni yokudoba ngokuyinhloko ethagetha ama-tuna kodwa futhi nama-swordfish.
Itrafiki Yasolwandle	- Indawo Yeprojekthi ingase yeqele emizileni yamathange nemikhumbikazi. Imikhumbi yezimpahla ingase ixhumane nezikebhe ezingasosebeni ukuze zilange izimpahla eChwebeni LaseThekwini noma e-Richard's Bay. - Amachweba abalulekile kwezohwebo ase-East Coast yi-Port Elizabeth, i-East London, i-Durban ne-Richards Bay.
Abangcebeleki	Ukudobela ukungcebeleka e-East Coast kuvame ukwenzeka ngasosebeni lwamanzi phambi kwamadolobha angasogwini nezindawo zamaholidi.

5.1 IMIGOMO YOKUHILELA UMPHAKATHI

Ukuthintana nomphakathi kuyisinyathelo esihlanganisa wonke umuntu nesifanele, esibandakanya ukucobelelana ulwazi neminingwane, ukufuna ukuqonda izinto ezikhathaza abanye nokwakha ubudlelwano obusekelwe ekubambisaneni. Kuvumelana izinhlaka ezihlukahlukene ukuba ziqonde izingozi, amagalelo kanye namathuba avulwa umsebenzi ohlosiwe ukuze kufinyelelwe imiphumela emihle.

Ukuhileleka komphakathi kuklanyelwe ukuhlinzeka ngolwazi nokuthola umbono wama-I&AP phakathi nayo yonke inqubo ye-EIA, ngaleyo ndlela kunikezwe izinhlangano kanye nabantu ngabanye amathuba okuveza izikhalazo zabo, ukuphawula nokuveza uvo ngokuqondene nendlela yokwenza umsebenzi ohlongozwayo. Ngokuba yingxenywe yenqubo yokuhlola, izinhlangano ziba nethuba lokufaka igalelo endleleni umsebenzi ozohamba ngayo noklanywe ngayo, zifake izwi mayelana nezinyathelo zokunciphisa umonakalo futhi ziveze amakhambi ezinkinga ezikhona futhi zibe neqhaza nasoHlelweni Locwaningo oluzofakwa eMbikweni we-EIA.

Imigomo esemqoka yokuhileleka komphakathi yelena:

- Ukuqiniseka ukuthi kuhlinzekwa ngolwazi olwanele nolufike ngesikhathi kulabo abazothintwa yilo msebenzi;
- Ukunikeza la maqembu ithuba elanele nokuveza izimvo zawo nezinto eziwakhathazayo; kanye
- Nokuqiniseka ukuthi ukuphawula kufika ngesikhathi ukuze kucatshangelwe lapho kwenziwa izinqumo zomsebenzi ohlongozwayo.

5.2 OKUSHIWO UMTHETHO

Ukuhileleka komphakathi ngokuqondene nama-EIA eNingizimu Afrika kulawulwa yiziqondiso zoMthetho Kazwelonke Wokuphathwa Kwezemvelo (NEMA) (uMthetho 107ka-1998, owachibiyelwa) nokukhulunywa ngawo 'kuGN 657: Iziqondiso 4: Ukuhileleka Komphakathi' (uMnyango Wezemvelo, ka-2017), othi: *"Inqubo yokuhileleka komphakathi" ngokuqondene nokuhlola ukuchaphazeleka kwezemvelo kwanoma yisiphi isicelao sokugunyazwa kwezemvelo esifakwayo, ichazwe ngokuvumelana noMthetho Kazwelonke Wokuphathwa Kwezemvelo, ka-1998 (uMthetho 107 ka-1998) (NEMA) njengenqubo izinhlangathi ezithintekayo nezinesithakaselo zinikwa khona ithuba lokuzwakalisa izimvo zazo, noma ukuveza izikhalazo ezihlobene nesicelo esifakwayo."*

Ukuhilelwa komphakathi kuyimfuneko yenqubo Yokugunyazwa Kwezemvelo ngokokusho kweZiqondiso ze-EIA iGN R.982 (Desemba 2014, ezachibiyelwa).

ISigaba 23, somthetho ongaphansi (1)(a) weZiqondiso zeNEMA EIA esachibiyelwa ngo-2017 sithi:

“Isicelo kumelwe phakathi nezinsuku ezingu-106 zokwamukelwa kombiko wophenyo sithunyelwe kusiphathimandla esifanele –

(b) isaziso esibhaliwe sokuthi [environmental impact report inclusive of any specialist] imibiko, kanye ne-EMPr, kuzothunyelwa zingakadluli izinsuku eziyi-156 [acceptance of the scoping report] zokwamukelwa kwesicelo okwenziwa yisiphathimandla esifanele, lapho kwenziwe izinguquko eziphawulekayo noma kwenezelwe ulwazi olusha oluningi embikweni wokuhlolwa kokuchaphazeleka kwezemvelo noma i-EMPr, okuyizinguquko noma ulwazi olwalungekho embikweni owahlolwa phakathi nenqubo yokubandakanywa komphakathi ekuqaleni eshiwo eziqondisweni eziwumxhantela (1)(a), kanye nombiko wokuhlola ukuchaphazeleka kwemvelo obukeziwe noma i-EMPr kuzodingeka ungene kwenye inqubo yokuhilelwa komphakathi okungenani ezothatha izinsuku ezingama-30.”

ISigaba 21(2) sistho lokhu - “Ngokwesiqondiso 46, futhi uma okutholakale embikweni wophenyo kungakashintshi kanti nesimo semvelo asikakashintshi, ukuthunyelwa kombiko wophenyo njengoba kuyalezwe eziqondisweni eziwumxhantela (1) akudingeki kulandelwe –

(a) lapho umbiko wophenyo wamukelwa njengengxenye yesicelo sangaphambili sokugunyazwa kwezemvelo futhi isicelo sanqamuka noma senqatshwa ngenxa yokuntuleka kolwazi olwanele;

(b) ngaphansi kwezimo lapho iziqondiso 16 zilandelwe khona nalapho isicelo esinjalo sihambisana nobufakazi bokuthi abantu abanesithakaselo nabathintekayo, ababamba iqhaza ekuhilelekeni komphakathi okwenziwa njengengxenye yenqubo yokufaka isicelo esikhathini esidlule, babikelwe ngokuthunyelwa kwesicelo kwamuva ngaphambi kokuba sithunyelwe;”

Ngokuvumelana nalokhu okungenhla, i-ERM ifuna ukuqala inqubo entsha ye-EIA ngokuthumela ifomu lesicelo elichibiyelwe nokukhulula umbiko wokuqala we-EIA ukuze kufakwe kuwo ukuphawula. Zonke izinhlanga nezinhlangano nama-I&AP ababhalisiwe basitholile isaziso sengubo entsha ye-EIA ezoqala njengamanje. Imininingwane ephathelene nokubikelwe kwezinhlangano ezithintekayo uyatholakala kulthebula 5.1 ngezansi.

Ithebula 5.1 lifake imisebenzi yokuhileleka komphakathi eyenziwe yi-ERM kuze kube manje.

Ithebula 5.1 Imisebenzi Yokuhileleka Komphakathi

Umsebenzi	Incazelo Nenhloso
Imisebenzi Yangaphambi Kokufakwa Kwesicelo (2017)	
Ukulungiselelwa kokugcinwa kokuqala kwemininingwane yabathintekayo	Kwenziwa uhlu lokuqala lwemininingwane yeziphathimandla (zendawo nezesifundazwe), Izinhlangano Ezizimele, abanikazi bemihlaba abaseduze kanye nezinye izinhlangano ezithintekayo (bheka <i>iSenezelo B soMbiko Wophenyo</i>). Lolu hlu lwemininingwane egciniwe yama-I&AP abhalisiwe luzolondolozwa futhi kufakwe ulwazi lwamuva phakathi nenqubo ye-EIA eqhubekayo.
Ukulungiselelwa Nokusakazwa Kwebhuku Lolwazi Kwemvelaphi [Background Information Document (BID)]	Ama-BID (ngesiNgisi) athunyelwa ngekheli le-email/ngeposi kuwo wonke ama- I&AP atholakala ohlwini lwemininingwane egciniwe ngo-15 Septemba 2017. Bheka <i>iSenezelo B soMbiko Wophenyo</i> . I-BID ihlinzeka ngesethulo emsebenzini nasenqubeni ye-EIA.
Ukukhanyiswa Kwalo Msebenzi noma iProjekthi	Iprojekthi yakhishwa emaphepheni amane; iMercury (ngesiNgisi) kanye ne-Isolezwe (ngesiZulu) asakazwa eThekwini, bese kuba iphephandaba iZululand Observer neLanga (ngesiZulu), asakazwa eRichards Bay. Izinsuku zokusakazwa kwawo yilezi: • I-Mercury – 18 Septemba 2017 • I-Zululand Observer – 18 Septemba 2017 • Ilanga (isikhangiso sesiZulu) – 21 Septemba 2017 • Isolezwe (isikhangiso sesiZulu) – 21 Septemba 2017 Bheka ubufakazi besikhangiso ku<i>Senezelo B soMbiko Wophenyo</i>.
Ukuchonywa Kwezaziso Zendawo Yokusebenza	Izaziso eziphathelele nendawo yomsebenzi zabekwa kulezi zindawo ezilandelayo: AmaLibrary KaMasipala WaseThekwini: • EDurban North; • EDurban Central Lending; • EManzimtoti; • EBhishi yaseWarner; • EBhishi yaseSipingo; • EMkomaas; kanye • NaseBhishi yasoTongaat. OMasipala Bendawo BaseMhlathuze: • UMasipala waseRichards Bay; kanye • NeRichards Bay Library. • Esangweni Letheku laseRichards Bay.
Ukwakhiwa Kombiko Wokuphawula Kokuqala Nezimpendulo	Konke ukuphawula okwatholakala phakathi nezingxoxo zokuqala kwafakwa eMbikweni Wokuphawula Nezimpendulo. Bheka <i>iSenezelo C soMbiko Wophenyo</i> .

Umsebenzi	Incazelo Nenhloso
Isigaba Sophenyo (Januwari kuya kuMashi 2018)	
Ukukhululwa Kombiko Wophenyo Ukuze Umpakathi Uphawule	Ngomhlaka-22 Januwari 2018, uMbiko Wophenyo wakhululwa ukuze umpakathi uphawule futhi watholakala kuyi-inthanethi nasezindaweni zomtapo wezincwadi ezilandelayo: - IDurban Public Library - IRichards Bay Public Library - IPort Shepstone Public Library Ngosuku olufanayo, kwashicilelwa isikhangiso emaphephandabeni amane; iMercury (yesiNgisi), Isolezwe (lesiZulu) asakazwa eThekwini namaphethelo, bese kuba amaphephandaba iZululand Observer kanye neLanga (ngesiZulu), asakazwa eRichards Bay. Izaziso zathunyelwa nakulabo ababhalisiwe eminingwaneni yethu. Isikhathi sokuveza uvo saqala ngomhlaka-22 Januwari 2017 saphela ngomhlaka-1 Mashi 2018. Konke ukuphawula okwatholakala engakadluli umhlaka-5 Mashi 2018 kwafakwa eMbikweni Wophenyo. *Kumelwe kuphawulwe ukuthi uhlelo lokuqala loMbiko Wophenyo Ongakaphothulwa lwakhishwa ukuze kuphawulwe ngomhlaka-27 Okthoba 2017. Ngenxa yoshintsho ezingeni lomsebenzi, kwathunyelwa isaziso ngomhlaka-7 Novemba 2017 ukuze kubikelwe ababambiqhaza ukuthi kuphinde kukhishwe umbiko ozotholakala izinsuku ezingama-30 esigcwele ukuze kuphawulwe ekuqaleni kuka-2018.
Umhlangano Womphakathi	Kwaba nemihlangano yomphakathi emithathu ezindaweni ezilandelayo: - ERichards Bay (eRichards Hotel) – 6 Febhuwari 2018 - EThekwini (eTropicana Hotel) - 7 Febhuwari 2018; kanye - NasePort Shepstone (ePort Shepstone Country Club) – 8 Febhuwari 2018. Kwakhishwa isaziso esiya kubabambiqhaza esiphathelene nalo mihlangano womphakathi sasakwazwa ngomhlaka-22 Januwari 2018. Kwaphinde kwakhishwa isikhumbuzo salo mihlangano womphakathi ngomhlaka-5 Febhuwari 2018. Le mihlangano yaqhutshwa ngenjongo yokwethula umsebenzi ohlongozwayo nokucela uvo lwababambiqhaza enqubeni yokuhlola. Ngenxa yezikhalazo ezavela kulo mihlangano, kwabukezwa iNon-Technical Summary (NTS) yoMbiko Wophenyo yase ihunyushelwa olimini lwesiZulu. Uhlelo lwesiZulu lweNTS lwabe selufakwa kuyiwebusayithi yale projekthi ngomhlaka-22 Febhuwari 2018. Kwabe sekunwetshwa isikhathi sokuphawula komphakathi ngeviki ukusuka kumhlaka-22 Febhuwari 2018 ukuze kunikezwe umpakathi ithuba lokuveza uvo lwawo ohlelweni lwesiZulu. Kwaphinde kwaba nomunye umhlangano (wesine) owalandela, ngenxa yesicelo seSouth Durban Community Environmental Alliance (SDCEA) waba ngomhlaka-28 Febhuwari 2018 eHholo Lomphakathi lase-Austerville

Umsebenzi	Incazelo Nenhloso
	kukhona notolika wesiZulu. I-ERM yayibhale incwadi yempendulo yayithumela yomhlangano ozolandela nababekhona beSDCEA. Le ncwadi yayihlose ukuphendula imibuzo ngokukhathazeka okwavela emhlanganweni womphakathi waseThekwini (ngomhlaka-7 Febhuwari 2018), engazange iphendulwe ngokwanele emhlanganweni ngenxa yokungabi nesikhathi esanele. Ngenxa yezikhalazo ezavela emhlanganweni womhlaka-28 Febhuwari, isikhathi sokuphawula selulwa safinyelela kumhlaka-5 Mashi 2018 ukuze kuvunyelwe umphakathi ukuba uphawule encwadini enezimpendulo eyayibhaliwe. Kwafakwa okwashiwo, inani lababekhona kanye namaphuzu omhlangano <i>kuSenezelo B soMbiko wokugcina Wophenyo</i>.
Ukuthunyelwa Kombiko wokugcina Wophenyo	Isaziso sokuthi uMbiko wokugcina Wophenyo wathunyelwa kuPASA sathunyelwa kubabambiqhaza ngomhlaka-9 Mashi 2018.
Isigaba se-EIA (ngoMashi kuya kuSeptemba 2018)	
Isaziso ngomhlangano wokuchazwa komsebenzi	Ngaphambi kokukhululwa kohlelo lokuqala loMbiko we-EIA, ngo-28 Meyi 2018 ama-I&AP abhalisiwe abikelwa ngomhlangano owawuzoba ngeviki lika-11 kuya ku-15 Juni 2018. Ngenxa yokubambezeleka kwezinto okwakungalindelekile ekulungiseleleni lowo Mbiko we-EIA, kwakhishwa isaziso ngomhlaka-4 Juni 2018 sokuthi lowo mhlango uhlehlisiwe.
Isaziso Ngokubambezeleka Kwesicelo Se-EIA	Ngomhlaka-13 Agasti 2018 kwathunyelwa isaziso kuwo wonke ama-I&AP abhalisiwe ebikelwa ngokuphazamiseka kweSicelo se-EIA, nokuthi i-Eni yayihlose ukuqalisa inqubo entsha ye-EIA yalo msebenzi.
Isigaba se-EIA ngaphansi Kwesicelo Esisha Se-EIA	
Ukukhishwa kwe-EIR ne-EMP ukuze uMphakathi Uphawule	NgoSeptemba 2018, kuzotholakala uhlelo lwesiNgisi loMbiko we-EIA ongaphothuliwe ne-EMPr (lo mqulu) kunikezwe izinhloko nababambiqhaza kanye neziphathimandla ezifanele, ukuze baveze ukuphawula kwabo isikhathi esiyizinsuku ezingama-30. Uhlelo lwesiZulu kanye nolwesiXhosa lwaloku kuFingqwa Komsebenzi luzotholakala nalo. Kuzophinde kukhishwe isaziso esiya kuma-I&AP abhalisiwe atholakala emininigwaneni egciniwe. Le ncwadi izobikela ama-I&AP ngeSicelo esisha se-EIA esithunyelwe kwaPASA nokuthi inqubo ye-EIA izophinde iqale, futhi izomema ama-I&AP ukuba aphawule eMbikweni we-EIA ongaphothulwa. Kuzofakwa izikhangiso emaphephandabeni endawo ukuze kwaziswe abathintekayo ngokutholakala koMbiko we-EIA ukuze bawuhlole futhi bamenywe nasemhlanganweni womphakathi. Konke ukuphawula okutholakele, kanye nezimpendulo kuzofakwa eMbikweni wokugcina we-EIA.

Umsebenzi	Incazelo Nenhloso
Umhlangano Ohilela Umphakathi	Imihlangano ehilela umphakathi izohlelwa phakathi nesigaba sokuphawula se-EIA ukuze kwethulwe okutholakele phakathi nenqubo ye-EIA kwabathintekayo. Imihlangano eSigaba se-EIA izoba seRichards Bay, eThekwini, nasePort Shepstone njengasesikhathini esidlule, bese kuba nomhlangano wokwenezela ozoba se-East London nasePort Elizabeth. Njengoba kuceliwe emihlanganweni yeSigaba Sophenyo, kuzoba notolika wesiZulu emihlanganweni eseKZN phakathi nomhlangano womphakathi wesigaba se-EIA. Kuzoba notolika wesiXhosa emihlanganweni ezoba se-Eastern Cape.
Isaziso Sokugunyazwa Kwezemvelo	Ama-I&AP azokwaziswa Ngokugunyazwa Kwezemvelo kanye nesikhathi sokufaka isikhalo.

5.4

UMBIKO OFINGQIWE WAMAZWI OKUPHAWULA APHAKANYISWA ESIGABENI SOPHENYO

Konke ukuphawula okwatholakala kwabanesithakaselo nabathintekayo (I&APs) phakathi nezingxoxiswano zoPhenyo kwafakwa eMbikweni Wokuphawula Nezimpindulo [Comments and Response Report (CRR)] (Bheka *iSenezelo B soMbiko Wophenyo wokugcina*).

I-Eni ibambisene ne-ERM, yanikeza izimpindulo ekuphawuleni nasemazwini aveza ukukhathazeka kwama-I&AP lapho kwakungenzeka khona lokhu phakathi nomhlangano womphakathi. I-Eni yanikeza izimpindulo eziphathelene nobuchwepheshe bemisebenzi yokumba kanti i-ERM yanikeza izimpindulo zesigaba sophenyo kanye nenqubo ye-EIA. Umbiko ofingqiwe wezinto ezaphakanyiswa ulapha ngezansi.

Ithebula 5.2 elingezansi lihlinzeka ngokuphawula okuvelele nemibuzo eyaphakanyiswa yizinhlangano phakathi nomhlangano wokuhilela umphakathi.

Ithebula 5.2 Ukufingqwa Kwamazwi Okuphawula Avelele Phakathi Nezingxoxo Zombiko Wophenyo Ongaphothuliwe

Isihloko	Inkinga
Inqubo yokubandakanya abathintekayo	Ababambiqhaza baba nomuzwa wokuthi inqubo yokubandakanywa kwabantu abathintekayo ayihlanganisanga zonke izindawo ezithintekayo ezigudle ugu. Ngaphezu kwalokho, izindlela ezasetshenziselwa ukubikela umphakathi ngalo msebenzi kanye nemihlangano yomphakathi zazingenele.
Isigaba sokwenza uphenyo asizibalanga izinto ezithile zemvelo enqubeni ye-EIA	Ababambiqhaza babuza umbuzo ngamagalelo lo msebenzi ohlongozwayo ongase ube nawo emvelweni yezinto eziphila olwandle. Ababambiqhaza babekhathazekile ngokuthi la magalelo akukhulunywanga ngawo embikweni wophenyo nokuthi ashalazelelwa.
Indima ye-ERM kanye nochwepheshe abazimele	Kwaba nokukhathazeka okwavezwa ngendima ye-ERM nendaba yokuthi ochwepheshe bazimele ngempela abekho ngaphansi kweklayente (Eni) nokuthi umbiko wocwaningo ngeke yini ufihle amaqiniso ukuze ucheme ne-Eni.

Isihloko	Inkinga
Amathuba omsebenzi	Ababambiqhaza babefuna ukwazi ukuthi azoba khona yini amathuba omsebenzi emphakathini wendawo nokuthi kuzoba khona yini ukuqeqeshwa lapho kudingeka khona amakhono athile.
Amagugu esizwe asolwandle	Inhlangano yezamagugu esizwe iSouth African Heritage Resources Agency yazwakalisa ukukhathazeka ngokuthi ukumba kokuhlolwa kukawoyela negesi kungase kuphazamise izinto ezingamagugu esizwe ezikhona ekujuleni kolwandle, ikakhulukazi izinsalela zemikhumbi eyaphahlazeka.
Igalelo lokuchitheka ngengozi kukawoyela ezintweni eziphila olwandle	Ababambiqhaza baveza ukukhathazeka ngamagalelo ukuchitheka kukawoyela okuzoba nawo ezintweni eziphila olwandle kule ndawo.
Igalelo lokuchitheka ngengozi kukawoyela empilweni yabasebenzi nezokuphepha	Ababambiqhaza baveza ukukhathazeka ngokuthi njengoba indawo ezombiwa ikude impela ukungena phakathi olwandle usuka ogwini, okwenza amathuba okungenela uma kunenkinga abe yinkinga nokuthi ukuphepha nempilo yabasebenzi kungaba nemiphumela engemihle.
Igalelo lokumba kumaMPA	Ababambiqhaza baveza ukukhathazeka ngegalelo lokumba kokuhlolwa kukawoyela negesi kumaMPA.
Isikhathi sokusingatha ukuchitheka kukawoyela	Ababambiqhaza bazwakalisa ukukhathazeka ngokukwazi kweNingizimu Afrika ukukusingatha ngesikhathi ukuchitheka kukawoyela futhi bafuna ukwazi ukuthi i-Eni izokwenzenjani uma kuba nale ngozi nokuthi ubani okuwumthwalo wakhe ukuphendula ngalokhu.

6.1 ISINGENISO

Indlela ye-EIA kufanele inciphise ukuzithoba ngokwezinga eliphezulu kanye ngokuqonda ngqo ukuhlola imiphumela yeprojekthi. Ukuze kufezuke le-ERM ilandele indlela echazwe ngezansi ukuze ihlelwe. Indlela yokuthola ukubaluleka kokusebenza kwemisebenzi engakahlelwa ichazwe eSahlukweni sesishagalombili salombiko.

6.2 UMTHELELO OKOKWAZISA KANYE NOKUPHILA

'Umthelela' kunoma yikuphi ushintsho kumthombo noma umamukeli ebangelwa ukuba khona kwephrojekthi okuyingxanye noma umsebenzi ohlobene neprojekthi. Impacts can be negative or positive. Imthelelo kungaba elungile noma engalungile. Imthelelo echazwe ngokwezimfanelo zabo, kufaka phakathi uhlobo lomthelela kanye nezici zendawo nomthelela (okungukuthi ubude, ubude, isilinganiso kanye nemvamisa). Imibandela esetshenziswe kulo mbiko ichazwe kuThebula 6.1.

Ithebula 6.1 Umthelelo wezimilo

Isimilo	Incazelo	Imigomo
Uhlobo	Incazelo ebonisa ubuhlobo bomthelela kuphrojekthi (ngokusho kwesizathu nomphumela).	Imithelela eqondile - Imiphumela ephumela ekusebenzisane ngokuqondile phakathi kweprojekthi kanye nemithombo / imithombo (isib. Phakathi kokusebenza kolwandle nolwandle oluthintekayo). Okungaqondile - Imiphumela elandela ngokuqondile ukusebenzisana phakathi kweprojekthi kanye nemvelo yayo ngenxa yokubambisana okulandelayo emvelweni (isib. ukuphila kwabantu abaphilayo ngenxa yokulahlekelwa ingxanye yendawo yokuhlala ngenxa yomsebenzi ohlala olwandle). Ukwenyuka - Imithelela evela eminye imisebenzi (engeyona ingxanye yephrojekthi) eyenzeka njengomphumela wephrojekthi. Ukubaluleka - Impikiswano ephakama ngenxa yethonya nomphumela ovela kule phrojekthi ehlangene nalabo abavela komunye umsebenzi ukwenza umthelela owengeziwe nomphumela.
Isikhathi	Isikhathi laphe umthombo / iphatheka khona umamukeli.	Imithelela yesikhathi esifushane ibikezelwa ukuba yesikhathi esifushane nesikhashana / ngezikhathi ezithile. Imishanguzo yesikhathi esifushane ebikezelwa ukuthi ihlale kuphela isikhathi sokugaya kanye nokuhlolwa okuhle, okuyizinyanga eziyisithupha noma ngaphansi.

		Ithemu eliphakathi - impikiswano ebikezelwa ukunweba ngaphezu kwesigaba sokudoba kodwa hhayi isikhathi esingaphezu kweminyaka emithathu. Imithelela yesikhathi eside eyoqhubeka iminyaka engaphezu kwemithathu kodwa kungakapheli iminyaka eyishumi. Imithelela engapheliyo eyenza ushintsho oluhlala njalo ku-receptor ethintekile noma insiza noma inqubo yemvelo, futhi ehlala iminyaka engaphezu kungaka kweshumi.
Isilinganiso	Ukufinyeleleka komthelela (isib. Isimo sangempela umthelela uzothuthukela)	Izingosi ezingenasayithi ezilinganiselwe endaweni yesayithi kuphela, okungukuthi ngaphakathi kwe-500m yokugaya kahle (indawo yokukhipha). Imiphakathi - impikiswano elinganiselwe kwisayithi yeprosjekthi futhi ngaphakathi kwebhulogi. Imiphakathi - impikiswano ethinta imithombo ebalulekile yemvelo noma ihlangene nesilinganiso sesifunda njengoba inqunywe yimigcele yokuphatha, uhlobo lwendawo yokuhlala / imvelo, okusho ukuthi yande ezindaweni ezingaphandle kwebhulogi. Imiphakathi kazwelonke - impikiswano ethinta izinsizakalo ezibalulekile zomhlaba noma ithinte indawo ebaluleke kakhulu emhlabeni / noma ibe nemiphumela enkulu emnothweni. Imiphakathi umngcele wokudlulisa / phathelene nezizwe ezihlukene - ethinta izinsiza ezibalulekile emhlabeni wonke njengezindawo ezivikelwe yizivumelwano zomhlaba wonke noma izindawo ezingathintekayo ngaphandle kweNingizimu Afrika.
Isilinganiso	Isilinganiso esilinganiselwe somthelela (isb. Ubukhulu bendawo obonakalisiwe noma obuthintekayo, ingxenyana yensiza elahlekile noma ethintekile, njll).	Izinyathelo zokulinganiseka njengoba kusebenza isici noma izinsiza ezichaphazelayo. Ayikho imidwebo eqondile njengoba kuhloswe ukuba yinani lamanani.
Ukulinganisa	ukuphindaphindiwe kokuhlala noma isikhathi sokuthinta umthelela.	Azikho izinhlamvu ezihleliwe; okuhloswe ukuba yinani lezinombolo noma incazelo enembile.

6.3

UKUQALA UMTHELELO

Uma izimpikiswano sezibekwe eceleni, zinikezwa 'ubukhulu'. Ubukhulu busebenza ngokuyinhlanganisela ethile (kuye ngokuthi imithombo / umamukeli okhonjiwe) yezici ezilandelayo zethonya:

- Isilinganiso;
- Isikhathi;

- Isikali; futhi
- Ukuvama.

Isilinganiso sobukhulu (kusukela ukunganaki kuya Esikhulu) sigxilwe yiqembu le-EIA besebenzisa isahlulelo nesipiliyoni. Umthelela ngamunye uhlolwe esimweni sokwethenjela ngamacala futhi isisekelo sokuzimisela ngasinye siyaqaphela. Izimpawu ezinomqondo wemiphumela emibi yilezi: Ukungahloniphi, Okuncane, Okuphakathi Nekulu. Izinkomba zokuphakama ngokwazo zivumelana ngokugcwele, kodwa incazelo yezinhlamvu ihlukahluka ngokukhishwa. Uma kunomthelela omuhle, akukho ukuphakanyiswa kokuphakama okwenziwe njengoba kubhekwa njengokwanele ngenhloso yokuhlolwa komthelela ukukhombisa ukuthi iphrojekthi kulindeleke ukuthi ibangele umthelela omuhle.

Ezinye izimpembezo zizohlela ekushintsheni kwimvelo okungenakulinganiswa, engabonakaliyo noma ngaphakathi kobubanzi bokuhlukahluka kwemvelo. Izinguquko ezinjalo zibhekwa njengezingenawo umthelela, futhi zibhekwa njengokuba nobukhulu bokunganaki.

6.3.1 *Ukuqaphela Ukubaluleka Kwempikiswano Yezinto Eziphilayo*

Ngezimpikiswano zezinto eziphilayo, izincazelo ezilinganiselwe ezilinganiselwe zesilinganiso sendawo nesikhathi sobukhulu bemithelela esetshenziswe kuloluhloko zihlinzekwe ngezansi.

Ubukhulu obukhulu bomthelelo uthinta indawo yonke, uhlelo (ngokomzimba), isici, inani labantu noma izinhlobo (eziphilayo) kanye nobukhulu obanele ukudala ukwanda okulinganiselwe kwamanani ezilinganisweni ezilinganiselwe noma amazinga (okumele kuqhathaniswe nemigomo nemigomo yamazwe omhlaba okuqondene nokamukela) (ngokomzimba) noma ukwehla kokuningi kanye / noma ukuguqulwa ekusatshalaliseni okungaphezu kwalokho ukuqashwa kwemvelo (ukukhiqiza, ukufuduka ezindaweni ezingenakuthinteka) ngeke kubuyisele leyo nhlobo noma izinhlobo, noma noma yikuphi abantu noma izinhlobo ezisekelwe kuyo, ezingeni layo langaphambili ngaphakathi kwezizukulwane eziningana (ngokomzimba nangokwemvelo). Umthelela omkhulu wamandla angaphazamisa ubuqotho besayithi, indawo yokuhlala noma indawo.

Ukulinganisa Okulinganisako Kwathinta ingxenye yendawo, isistimu, isici (ngokomzimba), isibalo sabantu noma izinhlobo (eziphilayo) kanye nobukhulu obanele ukuze kubangele ukwanda kwenani elilinganiselwe emazingeni okulinganisa noma emazingeni (okumele kuqhathaniswe nemingcele nemigomo yamazwe ngamazwe kuya emitholampilo) (ngokomzimba) futhi kungaletha ushintsho ngobuningi kanye / noma ukusabalalisa phezu kwezizukulwane ezilodwa noma eziningi zezitshalo / izilwane, kodwa akusongeli ubuqotho balobo bantu noma noma yikuphi abantu abancike kulo (ngokomzimba nangokwemvelo).

Umthelela omkhulu wamandla angaba nomthelela ekusebenzeni kwemvelo yesayithi, indawo yokuhlala noma indawo kodwa ngaphandle kokuphazamisa ubuqotho bayo. Indawo ethintekile ingaba yendawo noma yesifunda.

Ukulingana Okunciphisa Amandla kuthinta indawo ethile, uhlelo, isici (ngokomzimba), iqembu labantu abahlala endaweni yangaphakathi (i-biological) nangokwanela okwanele ukuze kubangele ukwanda okuncane kumanani okulinganisa noma amazinga (okumele kuqhathaniswe nemingcele yomthetho noma yomhlaba wonke izindinganiso eziqondene nama kamumela) (ngokomzimba) ngesikhathi esifushane (esinye isizukulwane sesitshalo / isilwane noma ngaphansi, kodwa asithinti amanye amazinga we-trophic noma isibalo ngokwawo), nendawo yendawo.

Ukulinganiswa Okulinganiselwe Umthelela kungenye lapho indawo yomthelela kumthombo / ukamumeleli(kubandakanya abantu) ingenakulinganiswa, engabonakaliyo noma phakathi kobubanzi obujwayelekile kusukela ekuhlukeni kwemvelo.

6.3.2 *Ukuqaphela Ukubaluleka Kwempikiswano Yezenzalakahle nezezomnotho*

Eminye impikiswano yezenzalalo nezezomnotho, ubukhulu bubheka umbono wabantu abathintekayo ngokucatsangelwa ukuthi kubalulekile ukubaluleka komthelela, ikhono labantu lokuphatha nokuvumelanisa nokushintsha nokulinganisa kokuthola umuntu noma ukulahlekelwa ukufinyelela, noma ukulawula izinsizakalo zezenzalalo nezezomnotho ezibangelwa umphumela omuhle noma omubi empilweni yabo. Izakhi zokulinganisa zifakiwe ekuhloleni ngokuqokwa nokucubungula izinga nobukhulu bomthelela.

6.4 **UKUQALA UKUQALA KWEMPELA**

Ngokungeziwe ekubaleni ubukhulu bomthelela, esinye isinyathelo esiyinhloko esidingekayo ukunikeza ukubaluleka komthelela onikeziwe ukuchaza uzwela lwamukeli. Kunezinto eziningi okufanele zicatshangelwe uma zichaza ubuzwe be-receptor, okungenzeka kube ngokomzimba, wezinto eziphilayo, amasiko noma abantu. Lapho i-receptor isemzimbeni (isibonelo, umzimba wamanzi) ikhwalithi yayo yamanje, ukuzwela ukushintsha, nokubaluleka (ngesilinganiso sendawo, lesizwe nakwamanye amazwe) kubhekwa. Lapho i-receptor iyimvelo noma imasiko (okungukuthi imvelo yasolwandle noma i-coral reef), ukubaluleka kwayo (kwendawo, isifunda, isizwe noma emazweni angaphandle) nokuzwela uhlobo oluthile lomthelela kubhekwa. Lapho i-receptor engumuntu, ukukhathazeka kweqembu ngalinye lomphakathi, lomphakathi noma elibanzi kubhekwa.

Njengokwesimo sobukhulu, izinkomba zokuzwela ngokwazo zisebenza ngokuvumelana nendawo yonke, kodwa izincazelo zalezi zinhlamvu zizohlukahluka kwisisekelo semithombo / isakhiwo. Ukuzwela kwendawo yonke ye-receptor iphansi, i-Medium nephezulu.

Ukuze kutholakale impembelelo yemvelo, ukuzwela kunikezwa njenge-Low, Medium noma High ngokubaluleka kokongiwa kwemvelo nezinhlobo. Ukuzwela kwezinhlobo ezihlukahlukene, iThebula 6.2 linikeza izindlela zokunquma ngokubaluleka noma ukuzwela kwezinhlobo ezithile.

Ngempikiswano yezenhlalo nezomnotho, izinga lokuzwela kwe-receptor lichazwa njengezinga lokuqina (noma amandla okubhekana nalo) ngokushintsha okungazelelwe komphakathi nezomnotho. Ithebula 6.2 neThebula 6.3 linikeza indlela yokunquma ngokubaluleka noma ukuzwela kwezimboni zezinto eziphilayo nezomnotho.

Itafula 6.1 I-Biological and Species Value /Ukuhlonipha

Ukuzwela	Phansi	Okuphakathi	Phezulu
Inani/Ukuzwela Okuphansi	Imigomo Ayivikelwe noma ibhalwe njengokujwayelekile / iningi; noma kungabaluleki kwezinye izinhlelo zokusebenza (isb. izinhlanzi ezibalulekile ezilwaneni nezinye izinhlobo).	Akuvikelwe noma kubalwe kodwa kungaba yizinhlobo ezivamile emhlabeni wonke kodwa ezingavamile eNingizimu Afrika ezinokuthi zikwazi ukuguquguquka kokuguquguquka kwemvelo, kubalulekile ekusebenzeni kwemvelo, noma kusongelwa noma ukuncipha kwabantu	Ngokukhethekile ivikelwe ngaphansi komthetho waseNingizimu Afrika kanye / noma imihlangano yezizwe ngezizwe njengeCITES. Kubhalwe njengokungavamile, okusongelwa noma okusemngceleni, isb. IUCN

Qaphela: Lezi zindlela ezingenhla kufanele zisetshenziswe nge-degree of caution. Ukuhlukahluka kwenkathi kanye nezinhlobo zezinhlobo zezinhlobo zempilo kufanele kucatshangelwe lapho kucatshangelwa ukuzwela kwezinhlobo zezilwane. Isibonelo, isibalo sabantu singabhekwa njengento ebucayi kakhulu ngesikhathi sokubeletha / ukuzala kanye nezikhathi zokubeletha. Leli tafula lisebenzisa uhlu lwezilwane (isib. I-IUCN) noma ukuvikelwa njengombonakaliso wezinga lokusongela ukuthi lezi zinhlobo zihlangene ngaphakathi kwendalo (jikelele, yesifunda, yendawo). Lokhu kusetshenziselwa ukunikeza isahlulelo sokubaluleka kokuthinta lezi zinhlobo kumongo wezinguquko wezinga leprojekthi.

Ukuzwela	Phansi	Okuphakathi	Phezulu
Ukuzwela Okuphansi	Isihlonzi Labo abathintekayo bayakwazi ukuvumelanisa nokukhululeka futhi balondoloze isimo sangaphambi komthelela	Iyakwazi ukuvumelanisa nobunzima obuningi futhi igcine isimo esithintekayo kodwa kuphela ngezanga lokusekela.	Labo abathintekayo ngeke bakwazi ukuvumelanisa nezinguquko futhi baqhubeke nokucina isimo esithinta isimo

6.5

UKUHLOLA UKWENZISWA

Uma ubukhulu bomthelela nokuzwela kwe-receptor kuye kwavezwa, ukubaluleka kungathathwa ngomthelela ngamunye. Ukulinganiswa kokubaluleka komthelela kuyothathwa, kusetshenziswa i-matrix enikeziwe kumdwebho 6.1.

Umdwebo 6.1 Impumelelo Okubalulekile

		Ukuzwela / ukuhlukunyezwa / Ukubaluleka kweNsiza / umamukeli		
		Okuncane	Okuphakathi	Okuphezulu
Ubukhulu Bomthelela	Uncinyane	Uncinyane	Uncinyane	Uncinyane
	Okuncane	Uncinyane	Into encane	Isilinganiso
	Okuphakathi	Into encane	Isilinganiso	Esikhulu
	Okukhulu	Isilinganiso	esikhulu	Esikulu

I-matrix isebenzela yonke indawo yonke imithombo / imitholampilo, nayo yonke impikiswano kulezi zinsiza / izimpendulo, njengoba izincazelo eziqondene nezinsiza / izimpendulo zithathwa kwisabelo sobukhulu nokuzwela / izinkomba zokubaluleka / ukubaluleka okufaka ematrix. Ibhokisi 6.1 linikeza umongo walokho okushiwo ukulinganisa okubalulekile okubalulekile.

Ibhokisi 6.1 Umongo we Impact Okubalulekile

Umthelela wokubaluleka **okungadingekile** yilapho insizakalo / i-receptor (kubandakanya abantu) ingeke ishintshwe nganoma iyiphi indlela ngomsebenzi othile noma umphumela obikezelwe uthathwa njengokungathi 'awutholakali' noma awukwazi ukungafani nemvelaphi yemvelo.

Umthelela wokubaluleka **okuncane** kunomunye lapho insiza / i-receptor izothola umphumela ophawulekayo, kodwa ubukhulu bomthelela buncane ngokwanele futhi / noma imithombo / i-receptor inokuzwela okuphansi / ubungozi / ukubaluleka. Kunoma yikuphi, ubukhulu kufanele bube kahle ngaphakathi kwamazinga asebenzayo.

Umthelela wokubaluleka **okulinganiselwe** kunomthelela omkhulu ongaphakathi kwamazinga asebenzayo. Ukugcizelela imithelela emaphakathi kungukubonisa ukuthi umthelela wehlisiwe waba yizinga eliphansi futhi elilinganiselwe (ALARP). Lokhu akusho ukuthi imithelela yokubaluleka okulinganiselwe kufanele ihlasiwe ibe yincinjana, kodwa leyo mpilo elinganisiwe ilawulwa ngokuphumelelayo nangempumelelo.

Umthelela wokubaluleka **okuyinhloko** yilapho umkhawulo owamukelekile noma izinga elivunyelwe lingadlulelwa, noma impikiswano emikhulu emikhulu ivela emithonjeni ehlonishwayo / ethintekayo kakhulu. Inhloso ye-I ukufika endaweni lapho iphrojekthi engenayo impikiswano emikhulu yokuhlala, ngokuqinisekile akuyona leyo eyohlala ihlala isikhathi eside noma idlulele endaweni enkulu. Kodwa-ke, kwezinye izici zingase zibe nemithelela enkulu yokusala emva kokuba zonke izinketho zokunciphisa ezisebenzayo seziphelile (ie i-ALARP isetshenzisiwe). Isibonelo singase sibe umthelela obonakalayo wesakhiwo. Kungumsebenzi wabaqondisi kanye nabathintekayo ukuba bahlale izinto ezinjalo ezimbi ngokumelene nezinto ezinhle, njengokuqashwa, ekufikeni esinqumweni sephrojekthi.

6.6

UKUNCIPHISA KOKUPHAKATHI NEMIBUZO YOKUPHAKATHI

Inhloso eyinhloko yenqubo ye-EIA ukuhlonza nokuchaza imigomo yomphakathi, yemvelo, eyamukelekayo nezindleko zokuphatha nokunciphisa impumelelo engaba khona. Izinyathelo zokunciphisa zenzelwe ukugwema, ukunciphisa, ukulungisa noma ukubuyisela impembelelo engalungile, nokuthuthukisa izinzuzo ezingokwemvelo nezenhlalo.

Indlela esetshenziselwa ukuchaza izinyathelo zokunciphisa isekelwe ebukhosini obujwayelekile bezinqumo nezindlela, njengoba kuchazwe kuMdwebho 6.2. Okubalulekile ukuqala ukusebenzisa izinyathelo zokunciphisa umthombo wethonya (okusho ukugwema noma ukunciphisa ubukhulu bomthelela ovela emsebenzini ohambisana nawo wephrojekthi), bese ulungisa umphumela ophumela emithonjeni / i-receptor nge-abatement noma izinyathelo ezikhokhelwayo noma (okungukuthi ukunciphisa ukubaluleka komphumela lapho konke ukunciphisa okusemandleni okusetshenziselwa ukusetshenziselwa ukunciphisa ubukhulu bomthelela.

Uma izinyathelo zokunciphisa zitshengiswa, isinyathelo esilandelayo kwinqubo yokuhlola umthelela ukunikeza ukubaluleka komthelela wokunciphisa. Lokhu kubalulekile ukuphindaphindiwe kwezinyathelo zokuhlola ezithintekayo ezikhulunywe ngenhla, kucatshangelwa ukuqaliswa kokusetshenziswa kwezinyathelo zokunciphisa ezithengisiwe.

Indlela esetshenziselwa ukuchaza izinyathelo zokunciphisa isekelwe ebukhosini obujwayelekile bezinqumo nezindlela, njengoba kuchazwe kuMdwebo 6.2

Umdwebo 6.2 Ukunciphisa ubukhosi obuphezulu

Ukunciphisa ubukhosi obuphezulu Gwema Emthonjeni; Nciphisa eMthonjeni:
Ukugwema noma ukunciphisa emithonjeni ngokusebenzisa uhlelo lweProjekthi (isib. Ukugwema umsebenzi wokumisa noma ukuvuselela kabusha ezindaweni ezibucayi noma ukunciphisa indawo yokusebenza noma ukushintsha isikhathi somsebenzi).
Abate/Minimize on Site:
Engeza okuthile kumklamo ukuze uphathe umthelela (isib. Imishini yokulawula ukungcola).
Bamba / Nciphise kuReceptor:
Uma umthelela awukwazi ukuchithwa kusayithi, izinyathelo zokulawula zingasetshenziswa ngaphandle kwesayithi (isib. Izinyathelo zethrafikhi).
Ukukhanda noma Ukulungisa:
Imithelela eminye ihlela ukulimala okungenakuvinjelwa kumthombo (isib. Izindawo zokugcina impahla) futhi lezi mphumela zidinga ukulungiswa, ukubuyisela nokubuyisela izinyathelo.
Qondisa ngohlobo; Ukukhokhela ngezinye izindlela:
Lapho ezinye izindlela zokunciphisa zingenakwenzeka noma ziphumelela ngokugcwele, khona-ke isinxephezelo sokulahlekelwa, ukulimala nokuphazamiseka kungase kube kufanele (isib. Isinxephezelo semali sokulimaza umhlaba wezolimo kanye nomthelela wesitshalo).

Njengoba kudingeka yiMithethonqubo ye-EIA yaseNingizimu Afrika (njengoba ichitshiyelwe ngo-2017) lezi zinto ezengeziwe ezilandelayo zizocatshangelwa ekuhloleni kwemithelela kanye nezingozi ezivezwe:

- Izinga lapho umthelela nomngcipheko ungasuswa khona (lokhu kuzobekwa ngezina eliphezulu, eliphakathi, noma eliphansi);
- Izinga lapho umthelela nomngcipheko kungabangela ukulahlekelwa okungenakutholakala kwemithombo (lokhu kuzobekwa ngezina eliphezulu, eliphakathi, noma eliphansi).

Lokhu kuzokwazisa ngokubaluleka komthelela wokunciphisa.

6.7 UKUHLOLA KWEMPILO YOKUPHAKATHI

Uma izinyathelo zokunciphisa zitshengiswa, isinyathelo esilandelayo kwinkqubo yokuhlola umthelela ukunikeza ukubaluleka komthelela wokunciphisa. Lokhu kubalulekile ukuphindaphindiwe kwezinyathelo zokuhlola ezithintekayo ezikhulunywe ngenhla, kucatshangelwa ukuqaliswa kokusetshenziswa kwezinyathelo zokunciphisa ezithengisiwe.

Umthelela okhulayo yilowo ovela kumphumela wethonya elivela kuPhrojekthi lokusebenzisana nomthelela ovela kwenye umsebenzi ukuze wenze umthelela owengeziwe.

Indlela impikiswano nemiphumela ehlolwe ngayo ithonywa kakhulu ngesimo seminye imisebenzi (isb. Ekhona kakade, ivunyiwe noma ihlongozwa) nokuthi kungakanani idatha etholakalayo ukuveza ubukhulu bemithelela yabo.

Indlela yokuhlola impikiswano yokubamba iqhaza ukuhlola ukusebenzisana okungenzeka kwamanye amaphrojekthi ngesisekelo se:

- Amaphrojekthi asevele ekhona futhi esebenza;
- Amaphrojekthi avunyelwe kodwa angakasebenzi okwamanje; futhi
- Imiklamo eyisiphakamiso esiyiqiniso kodwa engakakhiwa.

7.1

ISETHULO

Kulesi *Sahluko* kuchazwa ngamagalelo angase achaphazele imvelo kanye nokuchaphazeleka kwezenhlalo ngenxa yalo msebenzi ohlongozwayo okuphawuleke phakathi nenqubo yokuHlola Ukuchaphazeleka Kwezemvelo [Environmental Impact Assessment (EIA)], kuchazwa nangezinyathelo zokuvikela umonakal, ukuwudambisa nokuwulawula. Imikhakha esetshenzisiwe ukuze kuhlolwe amagalelo nokuba kulinganiswe ubukhulu bawo kuhlanganisiwe *kuSahluko 6*. Ukubaluleka kwamagalelo kuye kwahlolwa kusetshenziswa inqubo enemigomo ukuze kunqunywe ukuthi yini engase yenzeke emvelweni, kwezenhlalo nakwezempilo ngenxa yalokho okuzobe kwenziwa kulo msebenzi ohlelwayo.

7.2

UKUBONA NOKUHLOLA AMAGALELO AYINHLOKO

Phakathi nenqubo ye-EIA yokuHlola neSigaba Sokwenza Uphenyo, ithimba le-EIA liphawule amagalelo ayinhloko ezemvelo nawezenhlalo, phakathi kwemisebenzi ehleliwe nengahleliwe kanye nasezintweni ezithinta ezemvelo nezenhlalo kanye nakulabo abangase bachaphazeleke, okuyizinto ezidinga ukuba kwenziwe ukuhlola okwengeziwe.

Phakathi nesingxoxo esihilela izinhloko ezithintekayo eSigabeni Sokwenza Uphenyo, kuxoxwe ngawo la magalelo ayinhloko izinhloko zomphakathi zase ziphakamisa eminye imithelela umsebenzi ongaba nayo. Kube sekusetshenziswa lezi zikhalo ukuze kulungiswe umbiko ofingqiwe wokuchaphazeleka okungase kube khona okuphawulwe eSigabeni Sokwenza Uphenyo futhi lokhu kuvezwe *IThebula 7.1*. Ukuchaphazeleka okuyinhloko okuhlobene nezigameko ezingahleliwe / ezenzeka ngengozi kuhlolwe *kuSahluko 8*.

Ukuchaphazeleka okubhekwa yiThimba lomsebenzi kanye nezinhlalo zomphakathi njengokukhulu kuhlolwa kabanzi kulo mbiko. Ukuchaphazeleka okubhekwa njengokuwubala kuxoxwa kafushane ngakho bese kukhishwa ekuhlolweni okunemininingwane ebanzi. Izindaba ezingabalulekile zethulwe *IThebula 7.2*.

Ukwenezela ekusingatheni indaba yamathuba okuchaphazeleka ngenxa yezinto ezizokwenziwa kulo msebenzi, le ngxenye ibuye inikeze izimpawu zokuqala zezinto okufanele zihlolwe kulokhu okuzokwenziwa kulo msebenzi kanye nezinyathelo zokunqanda umonakalo, ukunciphisa amathuba awo kanye nokuwulawula. Imikhakha esetshenzisiwe ukuze kuhlolwe amagalelo noma ukuchaphazeleka kufakiwe *kuSahluko 6*.

IThebula 7.1 Amagalelo Angase Abe Khona Emisebenzi Ehleliwe

No.	Inkinga	Imisebenzi	Imiphumela Yophenyo
1	Imisebenzi Ehleliwe		
1.1	Ukuguquka kwesimo sezulu	Ukushiswa kwemithombo yamandla eyizinsalela	Ukuguquka kwesimo sezulu kuyathinteka lapho imikhumbi eyenza umsebenzi ishisa izinto zokuphehla amandla ezinjengodizili namalahle. Ubungako begalelo lalokhu kuphawulwe eNgxenyeni 7.3.1 ngezansi.
1.2	Amanzi asolwandle nokuzika kwezinto / ukungcoliseka kanye nokuphazamiseka kwezilwanyana zasolwandle	Amanzi angcolile aphuma emkhunjini wokumba, umkhumbi oletha impahla neminye yokusekela	Udoti ophuma lapho kusetshenzwa okhishwa umkhumbi ombayo kanye neminye imikhumbi ehileleke kulo msebenzi kungase kuyehlise ikhwalithi yamanzi endaweni bese kulimaza izinhlanzi, izilwane zasolwandle nezimfudu zasolwandle ezikhona kule Ndawo Yomsebenzi. Ngenxa yokukhathazeka kwezinhlanzi ezithintekayo, ubungakho baleli galelo kuhlolwa kabanzi eNgxenyeni 0 ngezansi.
		Ukuchishwa kosimende ongeke usasetshenziswa	Udaka lukasimende olungasebenzanga luzolahlwa khona olwandle. Kudingeka kukhonkwe nepayipi lensimbi elehla olwandle ukuze kuqinisekwe ukuthi umthombo uphephile futhi kuvinjelwe ukuqhuma nokuchitheka kukawoyela. Ukuba khona kodaka lukasimende olungeke lusetshenziswe phakathi nesikhathi sokusebenza ngeke kugwemeke futhi lolu daka luzolahlwa khona olwandle ukuze kuvinjelwe ukulimala kwezintambo, izinto zikasimende kanye namathangi. Kuzokwenziwa umzamo wokuthi lungabi luningi udaka lukasimende olusalayo bese kudingeka lulahlwe. Izinga lolungcola kwamanzi olwandle kulindeleke ukuthi liyolungiseka abuyeke esimweni sawo ngokushesha, ngosizo lwemisinga yamanzi kanye namagagazi alokhu enyakaza okwenza amanzi axubane (ukuxubana okunjalo kwamanzi kulindeleke ukuthi kuzonciphisa umonakalo ongase udaleke) bese izinto eziphila olwandle zingaphazamiseki kangako. Ubungako begalelo lalokhu kuxoxwa ngakho eNgxenyeni Error! Reference source not found. ngezansi.
		Ukumba	Igalelo lokumba phansi okujuleni kolwandle lizogxila endaweni eyodwa futhi lizothatha isikhathi esifushane, ngeke kuthintekwe kangakho indawo ngenxa yomthombo wokuqala (ingxenyeni yokuqala) ogujiwe, ukuphuma kwezinto, inzika yeWBM kanye nosimende osalayo. Ubungako begalelo lalokhu kuba ekujuleni kolwandle kuhlaziywa eNgxenyeni Error! Reference source not found. ngezansi.
		Ukulahlwa kwezinto ezisahiwe ekujuleni kolwandle naphezu kwamanzi ngesikhathi kumbiwa	Izimvuthu eziphuma ekujuleni kolwandle (ngaphambi kokuba kufakwe izinsimbi ezehlayo) kanye naphezu kwamanzi (lapho sezifakiwe izinsimbi ezehlayo) zizidala ifu lokungcola okuzoziphazamisa izinto eziphila olwandle, imiphakathi eseduze kanye nezinye izilwane eziphila olwandle ezisondelene neNdawo Yomsebenzi. Ubungakho baleli galelo buyahlaziywa eNgxenyeni Error! Reference source not found. ngezansi.

No.	Inkinga	Imisebenzi	Imiphumela Yophenyo
1.3	Ukuphazamiseka kwezinto eziphila olwandle	- Umsindo womkhumbi ombayo kanye neminye imikhumbi ngenxa yokuma ngezindlela ezihlukahlukene kanye nokuhamba - Umsindo wokumba (kuhlanganise nokugxumeka emgodini) - Ukuphazamiseka kokukhanya ngenxa yomkhumbi ombayo neminye	Ukuhlola kwembule ukuthi umsindo wangaphansi kwamanzi obangelwa ukusebenza komkhumbi ombayo, kuhlanganise nokugxumeka emgodini kanye nokuba khona kweminye imikhumbi kanye nawo lo wokumba kuzoziphazamisa izilwane zasolwandle nezinye izilwanyana eziphila endaweni. Ubungako baleli galelo kuxoxwa ngabo eNgxenyeni 7.3.5 kuya ku- Error! Reference source not found. ngezansi.
1.4	Ukuphazamiseka kokudoba (kwebhizinisi nokwazithandelayo)	- Umkhumbi wokumba, izinto ezilethwayo, ukuhlola indawo neminye imikhumbi esekela umsebenzi ehamba phakathi kweRichards Bay/netheku laseThekwini - Ukuba khona komkhumbi ombayo endaweni okumbiwa kuyo (kuhlanganise nendawo engamamitha angama- 500 okumelwe kungasondelwa kuyo - Wellhead abandonment	Womabili amatheku elaseRichards Bay nelaseThekwini (Durban) makhulu, kuqhutshelwe kuwo amabhizinisi, abhizi kakhulu, futhi ngenxa yalokho, imikhumbi yalo msebenzi ngeke ize iphawuleke kangakho, futhi ngeke elithe shintsho esimweni samanjanje uma kuziwa endabeni yokudoba, nemikhumbi esuke ilethe impahla. Uhude lwemisebenzi eyenziwa olwandle luyashiyashiyana ngezinjongo ezihlukahlukene futhi le misebenzi ingase ichaphazelwe ukuba khona komkhumbi ombayo endaweni okumbiwa kuyo kanye nendawo eyenqatshelwe eyibanga elingama-500 m. Izinga imisebenzi yokudoba engaphazamiseka ngalo noma ibe sengozini ngenxa yomsebenzi wokumba, ukuhamba kwemikhumbi kanye nokuba khona kwesakhiwo esiphezu komthombo kawoyela kuhlaziywa eNgxenyeni Error! Reference source not found. kanye naseNgxenyeni 7.4.4 ngezansi.
Okunye Ukuchaphazeleka Okuhlobene Okuphawulwe Phakathi Nezingxoxo Nezinhloko Zomphakathi Ngesikhathi Sophenyo			
2	Imisebenzi Ehleliwe		
2.1	Amagugu Esizwe Asemanzini	Ukumba Kokuhlola	Inhlangano ebhekelele amagugu esizwe eNingizimu Afrika i-South African Heritage Resources Agency izeve ukukhathazeka ngokuthi imisebenzi yokumba okuhloselwe lokhu kuhlola ingase iphazamise izinto ezingamagugu esizwe ezisekujuleni kolwandle, ngokukhethekile izinsalela zemikhumbi eyaphahlazeka eyakha umlando wakuleli. Ngenxa yokuthi kuyaziwa ukuthi ikhona imikhumbi eyaphahlazeka eNdaweni Yomsebenzi ohlongozwayo, ukubaluleka kwalokhu kuchaphazeleka kuyahlaziywa eNgxenyeni Error! Reference source not found. ngezansi.
2.2	Ukuqashwa kwabantu bendawo / amathuba omsebenzi	Ukuqashwa kwabasebenzi nokuqeqeshelwa umsebenzi / ukuhlinzeka abantu bendawo ngolwazi	I-Eni ilinganisele ukuthi kuzoba nemisebenzi eyishumi eqondile evulekela abantu bendawo ngenxa yalo msebenzi. Lo msebenzi uzoqasha abantu bendawo ngezinga lokhu okungenzeka ngalo kuye ngamakhono abanawo bese kuqeqeshwa nabasebenzi abasha abangenamakhono. Ngokusekelwe kulokho okushiwo yizinhloko phakathi neSigaba Sophenyo, igalelo lamathuba emisebenzi kuxoxwa ngalo eNgxenyeni 7.4.1 ngezansi.

No.	Inkinga	Imisebenzi	Imiphumela Yophenyo
2.3	Ukushiywa kwezinsimbi eziba phezu komthombo kodwa ezizike olwandle	Ukuphazamiseka kokudotshwa kwezinhlanzi ezihamba phansi ekujuleni kolwandle	IPASA iveze izikhalazo ngomphumela ongaba khona uma izinsimbi eziphezulu ezakha ompompi bomgodi wokumba ziyeka ukusebenza (sishiywa dengwane) bese zehla zizike ekujuleni kolwandle ziphazamise izilwanyana ezihamba phansi olwandle. Ngakho kwenziwe ukuhlola eNgxenyeni Error! Reference source not found. ngezansi

IThebula 7.2 Amagalelo Angatheni

No.	Igalelo	Imisebenzi	Imiphumela Yophenyo
1	Imisebenzi Ehleliwe		
1.1	Impilo Yomphakathi, Ukuphepha Nokulondeka	Ukuhlangana kwabasebenzi bangaphandle / bokufika nezakhamuzi zakuleli	Nakuba uPhenyo luthe lo msebenzi uzoqasha abasebenzi phakathi nazo zonke izigaba zawo, ngenxa yohlobo lomsebenzi owenziwayo, abasebenzi abaningi abazobe bekhona emikhunjini wokumba kuzobe kungabasebenzi bokufika abangase bashintshe besuka eThekwini baye eRichards Bay izikhathi ezimfushane. Abasebenzi abazobe besebenzela ngaphandle kolwandle cishe ngokuyinhloko kuzobe kungabasebenzi abaqashwe yizinkampani ezithutha impahla ngisho kwamanje ezikuyo le ndawo. Ngenxa yobufushane besikhathi lo msebenzi ozokwenziwa ngaso, nenani elincane labasebenzi abazoqashwa leli galelo libonakale liwubala ngakho ngeke lihlolwe ngokwengeziwe.
1.2	Umntho wendawo	Ukuhweba ngemikhiqizo yendawo enjengokudla, izinto ezinjengophethiloli, amanzi, ihotela, ukuhlanzwa kwemfucuzo nezinye izinto.	Uphenyo lwembule ukuthi lo msebenzi ozodala amathuba ezohwebo ngemikhiqizo yakuleli enjengokudla, izinto ezifana nophethiloli, amanzi, amahhotela, ukukhucululwa kwendle kanye nezinye izinto. Lokhu kungaba negalelo elihle, nokho ngenxa yobufushane besikhathi salezi zinzuzo kanye nenani elikhulu labahlinzeka ngezidingo abangase bathintwe kubonakale ukuthi lokhu kuyoba yigalelo elingatheni futhi ngeke kuhlolwe ngokwengeziwe.
1.3	Ukonakala komoya	Intuthu ekhishwa yimikhumbi kanye nezindiza ezinophephela emhlane. Ukukhiqizwa kwamandla ngezikhathi kumbiwa kusetshenziswa umkhumbi wokumba Amathange okugcina uwoyela	Ukwehla kwezinga lomoya ngenxa yemikhumbi nezindiza ezinophephela, amagenereyitha kanye nokugcinwa kukawoyela kulindeleke ukuba kube yinto engatheni ngokwesimo sendawo, noma ukuba kubangele inkinga yempilo kubantu ngenxa yokuthi lo msebenzi uyoba yinto yesikhathi esifushane, umoya okahle ovela ogwini kanye nokuqhela kwendawo yomsebenzi ukusuka ogwini. Ngakho leli galelo liphawulwe njengelingatheni futhi ngeke lihlolwe ngokuqhubekayo.
1.4	Impilo Yomphakathi, Ukuphepha Nokulondeka	Umsindo wendiza enophephela emhlane	Umsindo obangwa yizindiza ezinophephela ezithwala abasebenzi uzogxila ethekwini laseRichards Bay noma laseThekwini; lezi zindiza ngeke zindizele phezu kwemizi yabantu ngakho lokhu ngeke kube nalo igalelo elitheni futhi ngeke kuhlolwe ngokwengeziwe.

No.	Igalelo	Imisebenzi	Imiphumela Yophenyo
1.5	Ukwanda kodoti ongeyona ingozi kanye noyingozi olahlwayo	Ukulahlwa kukadoti ongeyona ingozi kanye noyingozi okwenziwa endaweni yomsebenzi ulahlelwa ogwini endaweni elungiselelwe lokho	Lo msebenzi uzobangela ukwanda kukadoti ongeyona ingozi (eg: udoti wasekhishini kanye nezinsimbi ezingasasebenzi) kanye noyingozi (eg ogrisi bezinjini kanye nezisefo zikawoyela) ozokhiqiseka kuyo le ndawo. Udoti uzothuthwa umkhumbi uwuyise ogwini oluseRichards Bay noma eThekwini ukuze ugcinwe isikhashana bese ulahlwa endaweni efanele. Udoti oyingozi uzosingathwa ngendlela efanele ulahlwe endaweni yokulahla enelayisensi yakhona /endaweni yokulahla udoti. Ngakho nalokhu kwabhekwa njengokunegalelo elingatheni futhi ngeke kuhlolwe ngokwengeziwe.
1.6	Ukutholakala kwamanzi angenawo usawoti	Ukutholakala kwamanzi okuphuza kuyo yonke imikhumbi Ukugcinwa kwamanzi angenawo usawoti endaweni esogwini	Amanzi azohlinzekwa ngenqubo yokuhlaza amanzi ezobe isemkhunjini futhi lapho kudingeka, kuzotholakala amanzi asemabhodleleni. Ngakho, igalelo lalokhu nalo libhekwe njengeliwubala ngeke lihlolwe ngokuqhubekayo. Amanzi agcinwe ogwini asetshenziswa abantu abangekho olwandle azotholakala kumasipala wendawo futhi lokhu ngeke kube nagelelo elitheni.
1.7	Ukungcola kolwandle nokuchaphazeleka kwezilwanyane eziphila khona (isibonelo: izilwanyane ezincane, izinhlanzi, okusanda kuchanyuselwa, izilwane ezincelisayo zasolwandle, izimfudu)	Udoti ophuma lapho kuhlanzwa umthombo namanzi okuhlola umthombo angcolile Ukugxumeka izinsimbi emgodini: Ukugxumeka ngesikhathi kumbiwa (LWD) nokufakwa kwezintambo (ama-radioactive). Ukuhlola ubungakho balokho okufunwayo [Vertical Seismic Profiling (VSP log)] -	Ngemva kokuba sekuqedwe ukumba, ukungcola okusemanzini olwandle kulindeleke ukuba kubuyele esimweni esivamile ngokushesha, ngosizo lwemisinga nokuxubana kwamanzi okubangelwa amagagasi (ukuzihlanza kwamazi kwemvelo, ukuhlaza kwawo udoti nokukwazi kwawo ukuxubana kulindeleke ukuthi kuzowunciphisa umonakalo) futhi ngenxa yalokho amagalelo ngeke abe ngako ezilwanyeni zasolwandle. Kuzobandakanywa izinyathelo zokulawula kuyi-EMPr. Amagalelo okuhlaza umthombo kanye nokuhlola izinga lamanzi kanye nokuchaphazeleka kwezilwanyana zasolwandle ngeke kube yinto etheni ngakho ngeke kwenziwe ukuhlola okwengeziwe. Akukho kungcola okuzophumela emvelweni lapho kugxunyekwa emgodini ngakho imvelo ngeke ithintekwe kulokhu. Ngakho, igalelo lalokhu liphawulwe njengelingatheni futhi ngeke lihlolwe ngokukwengeziwe. I-VSP izoba neyodwa yezinqubo ezintathu zokuthwebula futhi izothatha isikhathi esifushane emgodini ngamunye (izikhathi zokuthwebula kanye namahora ambalwa okuthola ukuthi kunani). Ngaphambi kokuba kwenziwe iVSP log, ukulandelwa kweziqondiso zeJNCC kuhlanganise nemisebenzi eyandulela ukuthwebula kuzokwenziwa umhloli wezilwane zasolwandle ozobe esemkhunjini. Isikhathi sokwenza ukuthwebula sihlanganiswe nokusetshenziswa kweziqondiso zeJNCC kusho ukuthi amagalelo alokhu ayoba angatheni futhi ngeke kuhlolisiswe ngokwengeziwe.
1.8	Ukugcwala kobuthi namakhemikhali emanzini asolwandle nokugcwala kodoti ozikayo olwandle nokuchaphazeleka kwezinto eziphilayo	Ukuchithwa kwamanzi olwandle angcolile kanye nezinto ezinobuthi olwandle ngesikhathi sokumba	Izinto zokuhlaza kanye nemithi kuyingxube esebenzisa amanzi angenasawoti noma awasolwandle kanye nobumba i-bentonite viscosifer, olungenabuthi, olungancibiliswa amanzi nolunezakhi zemvelo olungenayo i-soda elawula i-pH nezinga le-alkaline. Izinto zokuhlaza kanye namaphilisi okuzosetshenziselwa ukuhlaza umthombo phakathi nokumba engxenyeni yokuqala yomthombo ngeke kube noketshezi olunobuthi noma ogrisi abangcolisayo, futhi igalelo lalezi zinto zokumba uma kuziwa endabeni yokufaka ubuthi nokungcolisa ngowoyela kulindeleke ukuba kube yinto encane kakhulu engeke ihlolwe ngokwengeziwe.
1.9	Ukuphazamiseka kokuma kwendawo ephansi olwandle	Ukumba	Amagalelo okumba endaweni azogxiliswa endaweni eyodwa lapho umshini wokumba uzongena khona emhlabathini phansi olwandle. Ngakho, amagalelo alokhu awamakhulu neze futhi ngeke kuhlolwe ngokwengeziwe.

No.	Igalelo	Imisebenzi	Imiphumela Yophenyo
1.10	Ukwanda kwezinto eziqinile phansi olwandle	• Ukuzika kwezinsimbi eziba phezu komthombo wokudonsa uwoyela • Ukuchitheka kwezinsalela zikakhonkolo ngesikhathi ezingasuswa ngaso • Ukushiywa dengwane kwezinsimbi ezizikile	Amagalelo ezingqalasizinda eziqinile ekujuleni kolwandle kugxile endaweni eyodwa futhi ngeke kuziphazamise izinto eziphila phansi olwandle ezihlukahlukene. Ngakho amagalelo alokhu abhekwa njengawubala futhi ngeke ahlolwe ngokuqhubekayo.
1.11	Ukubona	Umkhumbi wokumba	Umkhumbi ombayo uzoba sebangeni elingama-60 km ukusuka ogwini uya phakathi olwandle. Ngakho, amagalelo alokho mancane futhi ngeke kuhlolwe ngokwengeziwe.
2	Amanyane Amagalelo Aphawulwe Phakathi Nezingxoxo Nezinhlaka Ezihlukahlukene eSigabeni Sophenyo		
2.1	Amagalelo okumba kumaMPA	Ukumba kokuhlola	Izinhlaka ezihlukahlukene zizwakalise ukukhathazeka ngegalelo lokumba ngenjongo yokuhlola kumaMPA. Indawo ehlongozwayo ayifiki kumaMPA akhona njengamanje nahlongozwayo ngakho lena ngeke kube yinkinga edinga ukuphinde ihlolwe.

Izingxenye ezilandelayo zethula ukuhlaziywa kwamagalelo kusukela emisebenzini ehleliwe aphawulwa njengamakhulu phakathi nophenyo kanye nezingxoxo nezinhloka zomphakathi.

Amagalelo angase abe makhulu ekuchaphazelekeni kwemvelo ahlaziywa lapha ngezansi futhi ahlanganisa lokhu:

IThebula 7.3 Ukuhlaziywa Kokuchaphazeleka Kwemvelo Okufingqiwe

Ukuchaphazeleka noma amagalelo	Ingxenye
Ukuchaphazeleka Kokuguquguquka Kwesimo Sezulu Ngenxa Yokungcoliswa Komoya Okubangelwa Yilo Msebenzi	7.3.1
Ukuchaphazeleka Kwezilwanyana Zasolwandle Ngenxa Yodoti Okhishwa Imikhumbi Esebenzayo	0
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Ukuphazamiseka Kwezilwane Zasolwandle Ngenxa Yomsindo Ongaphansi Kwamanzi Ohlobene Nomsebenzi Wokumba	7.3.5
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7.3.1

Ukuchaphazeleka Kokuguquguquka Kwesimo Sezulu Ngenxa Yokungcoliswa Komoya Okubangelwa Yilo Msebenzi

Incazelo Ngesimo Semvelo Esiyisisekelo Nezinto Ezingaphazamiseka Kalula

Njengoba kuchaziwe kuSahluko 4, ukuguquguquka kwesimo sezulu kungase kuwuchaphazele kakhulu umnotho waseNingizimu Afrika (Madzwamuse, 2010). Ngokukhetheleke, ezempilo, ezolimo, (ikakhulukazi ukulinywa kommbila), izitshalo kanye nezilwane, imithombo yamanzi kanye namadlelo kuyizinto ezingaphazamiseka kakhulu ngenxa yokuguquguquka kwesimo sezulu.

Ukuguquguquka kwesimo sezulu kuyinto ekhathaza ngokukhethile eNingizimu Afrika. Amazinga okushisa angemahle unyaka nonyaka aye enyuka izikhathi ezingu-1.5, isilinganiso esingu-0.65°C ngokwezinga lomhlaba kule minyaka engamashumi amahlanu edlule kanye nezimvula ezimbi ziye zavama kunanini ngaphambili (kusho iWIREs Clim Change, 2014).

Ukukhishwa kwesikhutha (CO₂) ngesilinganiso somuntu ngamunye eNingizimu Afrika kuphakeme (amathani angu-8.3 umuntu ngamunye) uma kuqhathaniswa namanye amazwe asewekazini lase-Afrika, futhi ngokwezinga elithile nasemhlabeni jikelele (isilinganiso samathani angu-4.8 /umuntu ngamunye) futhi ngenxa yalokho, ukudambisa ukuguquguquka kwesimo sezulu beculokhu kuyinto okugxilwe kakhulu kuyo iminyaka eminingi. Inqikithi yonyaka ngamunye yesikhutha esikhishwayo (CO₂) njengamanje eNingizimu Afrika ingamathani ayizigidi ezingu-468 zesikhutha (CO₂) (kusho iGlobal Carbon Atlas, 2018, WIREs Clim Change, 2014).

Izinto Okuhlongozwa Ukuba Zenziwe Kulo Msebenzi Kanye Nezinhlalelo Zokulawula Ezifakiwe Nezokuthobela Umthetho

Ithebula 7.4 ngezansi linikeza incazelo efingqiwe yezinto ezizokwenziwa ezizohlela ekukhishweni kwamagesi angcolisayo.

Ithebula 7.4 Incazelo Efingqiwe Yezinto Ezizokwenziwa Ezizoholela Ekukhishweni Kwamagesi Angcolisayo

Isigaba Somsebenzi	Okuzokwenziwa
Ukulungiselela	Ushemula womkhumbi ombayo kanye neminye imikhumbi kuzoqhubeka kukhiphela intuthu emkhathini lapho kusenxa endaweni. Nokho, amagalelo ale ntuthu awesikhashana ngenxa yokuthi umkhumbi ombayo uzolokhu usuka kule ndawo uye kwenye. Ngakho, le ntuthu ayiyona into enkulu futhi ngenxa yalokho ngeke ihlolwe ngokwengeziwe indaba yayo.
Ukusebenza	Imithombo eyinhloko yentuthu ekhishelwa emkhathini (ekhubekayo nengaqhubeki) ngenxa yokumba okwenziwa olwandle ihlanganisa lena: • Intuthu ephuma ngenxa yegesi eshayo noma imithombo yamandla ewuketshezi njengodizili esetshenziswa amaphampu, ohhanela, izinjini zegesi, amakhompresa nezinye izinjini ezikhiqiza amandla nokushisa ezisemikhunjini ezobe isolwandle kuhlanganise nomkhumbi wokumba, imikhumbi eletha izinto ezidingekayo nelinde ukusiza uma kudingeka kanye nezindiza ezinophephela. Lokhu kungase kube yimbanela enkulu yokukhishelwa komoya ongcolile emkhathini okuvela kulezi zakhiwo ezisolwandle. • Intuthu evuza kumavalvu, amashubhu, namanye amapayiphi kanye nokufakwa nokukhishwa kwe-hydrocarbon. • Lapho kuhlolwa umthombo, kungase kudingeke omunye uwoyela negesi kukhishelwe ngaphandle. Ukukhishwa kwalezi zinto kuyisinyathelo esibalulekile sezokuphepha esisetshenziselwa ukuqiniseka ukuthi igesi namanye amagesi amabi alahlwa ngokuphepha uma kuba nesimo esiphuthumayo, ukuphela kukagesi noma ukwehluleka kwemishini nezinye izimo kuplanti. Isikhathi sokukhishwa kwawo sizoba esanele nje ukuba kutholakale ukuthi umthombo kawoyela noma wegesi umemethe kangakanani lapho kuhlolwa umthombo. Kulinganiselwa ukuthi ukuhlola umthombo kuzothatha izinsuku ezingadluli ku-20.
Lapho Sekuyekwa	Oshemula bemikhumbi embayo neminye bazokhipha intuthu lapho ihamba. Nokho, amagalelo alokhu awesikhashana ngoba imikhumbi embayo ngeke izinze. Ngakho, le ntuthu ayiyona into enkulu futhi ngenxa yalokho ngeke ihlolwe ngokwengeziwe indaba yayo.

Izinto ezizokhipha igesi eningi kuzoba umkhumbi ombayo neminye imikhumbi (isibonelo: imikhumbi eletha izinto kanye neminye) ehileleke emsebenzini wokumba. Izinto eziyinhloko okulindeleke ukuba zikhishelwe emkhathini ngenxa yokumba zihlanganisa isikhutha [carbon dioxide (CO₂)], i-methane (CH₄), izakhi ze-nitrogen (NO_x), i-sulphur dioxide (SO₂), i-carbon monoxide (CO) kanye nama-volatile organic compounds (VOC). Ezinye zalezi zakhi zaziwa njengezinegalelo enqubweni yezemvelo nasezintweni ezinjengemvula eno-asidi (acid rain), ukwakheka kwezindawo ezintula umoya ohlanzekile, nokungcoliswa komoya.

IThebula 7.5 libonisa ingqikithi yegesi ebanga isifudumezi (GHG) okucatshangwa ukuthi izokhishwa yimikhumbi nezindiza ezinophephal phakathi nokumba. Amagesi azokhishwa ngenxa yokukhiphela uwoyela emoyeni phakathi nokuhlola umthombo owumthombo kawoyela akukatholakali ingqikithi yako *IThebula 7.5* njengoba kungaziwa ukuthi umthombo umi kanjani uma kuziwa emfuthweni obangelwa umthamo, izinga lokuphuma futhi lokhu kuyotholakala lapho sekumbiwa umgodi owumthombo wegesi noma kawoyela.

Njengoba kubonisiwe *IThebula 7.5*, kulinganiselwa ukuthi imikhumbi eyenza lo Msebenzi kanye nezindiza ezinophephela zizosebenzisa udizili noma ezinye izinto eziyimithombo yamandla okulinganiselwa kumathani angu-3,599 okuzoholela ekutheni kukhishelwe emkhathini amagesi abalelwa kumathani ayizigidi ezingu-13.1 ze- GHG (CO₂, CH₄, N₂O), kulokhu i-CO₂, iyona eningi, njengoba izokhishelwa emkhathini lapho kumbiwa (izinsuku ezifinyelela kwezingama- 71).

IThebula 7.5 Ingqikithi Yokukhishelwa Emkhathini Eyisilinganiso Evela Emikhunkini Phakathi Nokumba

	Amagesi Akhishwayo	Umkhumbi Ombayo	Imikhumbi Yezinto Ezidingekayo	Indiza Enophephela	Ingqikithi	I-CO ₂ elinganiselwa yo
Okusetshenziswayo (amathani)		2,580	994	25	3,599	
Igesi ekhishwayo (amathani)	CO ₂	9,355.08	3,604.33	76.20	13,035.61	13,035.61
	N ₂ O	0.07	0.03	6.62E-4	0.10	30.85
	CH ₄	0.36	0.14	3.31E-3	0.50	10.47
Ingqikithi yeCO₂ elinganiselwayo			13,076.92			

Umthombo: Ibalwe kusetshenziswa uhlelo lwekhompyutha okuthiwa yiSANGEA software <http://www.api-sangea.org/>

Iklayente lizibophezele ezinyathelweni zokwakha izinto zokulawula nezithobela umthetho zangaphakathi:

- Ukuthobela iMARPOL 73/78 Isenezelo VI semitheho ephathelene nokunciphisa iNO_x, iSO_x neGHG ekhishwa yizinjini zemikhumbi;
- Zonke izinjini zikadizili namajenereyitha kuzohlolwa njalo kuthi kulungiswe ukuze kuncishiswe ukukhishelwa kodizili ongashiswanga emkhathini;
- Kuzokwenziwa izinhlelo zokubheka ukuvuza kumavalvu, ama-flanges, ama-fittings, okokuvala (seals), nokunye; kanye
- Uma kwenziwa ukuhlolwa komgodi owumthombo kawoyela ukuze kulahlwe lolu ketshezi oluhlolwayo, kuzodingeka inani elincane kakhulu le-hydrocarbon kulokhu kuhlola futhi isikhathi sokuhlola sizoncishiswa ngezinga lokhu okungenziwa ngalo.

Izinga lokuchaphazeleka kokuguquguquka kwesimo sezulu ngenxa yokukhishelwa emkhathini kwamagesi eGHG okubangelwa yizinto ezinziwa kulo msebenzi wokumba kulunganisela ukuthi **Liwubala** njengoba iCO₂ ezokhishwa kulo msebenzi ingamaphesenti angu-0.0003 kuphela engqikithi yeCO₂ ekhishwa yiNingizimu Afrika. **Ukuba bucayi** kwesimo kulinganiselwa ukuthi **Kuphakeme** ngenxa yokuthi ukuguquguquka kwesimo sezulu eNingizimu Afrika sekuyinto esengcupheni.

Ngokusekelwe kulokhu kuhlaziya okunikezwe ngenhla nethemba lokuthi izinyathelo zokuthobela umthetho nokulawula izinto zizothathwa, igalelo elizobangelwa yilo msebenzi ekuguquguqukeni kwesimo sezulu lizoba **Wubala** (IThebula 7.6).

Izinyathelo Zokudambisa Umonakalo Nezokuphathwa Komsebenzi

Kuzothathwa lezi zinyathelo zokudambisa umonakalo nokuphathwa komsebenzi ezilandelayo ukuze kuncishiswe amagesi angcolisayo akhishelwa emkhathini:

- Uma ukuhlolwa komthombo kwenziwa oketshezini oluzolwahlwa, kuzotholakala umshini wokushisa othuthukisiwe ukuze kuncishiswe inkinga yokungashi ngokuphelele kwalezo zinto ezihlolwayo njengowoyela, kungandwe intuthu emnyama kanye ne-hydrocarbon engase iphumele olwandle. Kufanele kurekhodwe inani lama-hydrocarbon akhishwayo ¹:
- Ukusetshenziswa kwe-sulphur, uma ikhona; kanye
- Nokusetshenziswa kwepulani lokulondoloza imishini ukuze isebenze ngezinga elifanele.

Amagalelo Ezinsalela

Ngokusekelwe ekusetshenzisweni kwezinyathelo ezisikiselwe zokunciphisa umonakalo nokuphathwa komsebenzi, **ukuhlehliswa** kokuchaphazeleka **Kusesilinganisweni Esiphakathi nendawo** kanti izinga **lokulahleka kwezinto ezidingekayo Liphansi**, izinga legalelo lenzika evela kulo msebenzi ekuguquguqukeni kwesimo sezulu kuzoqhubeka **Kusezingeni eliphansi** (IThebula 7.6).

¹ Isekelwe Eziqondisweni Zezemvelo ze-IFC, Ezempilo Nezokuphepha Zokumbiwa Kukawoyela Negesi Olwandle, zika-June 2015.

IThebula 7.6 Ukuphawuleka Kwamagalelo Ahlobene Nokuguquguquka Kwesimo Sezulu

Incazelo	Igalelo	Igalelo Eliyinsalela
Izinga	Endaweni	Endawenil
Ubude besikhathi	Isikhashana	Isikhashana
Isikali	Sincane	Sincane
Ukuhlehliseka	Kuphakathi nendawo (kungahlehliseka ngokwezinga elithile)	
Ukulahleka kwezinto ezidingekayo	Kuphansi	
Ubungako	Ubala	Ubala
Ukuzwela/Ukuba bucayi/UKubaluleka Kwezinto /Okuchaphazelekayo	Kuphakeme	Kuphakeme
Ukuphawuleka Kwegalelo	Kuwubala	Kuwubala

7.3.2 Ukuchaphazeleka Kwezilwanyana Zasolwandle Ngenxa Yodoti Okhishwa Imikhumbi Esebenzayo

Incazelo Ngesimo Semvelo Esiyisisekelo Nezinto Ezingaphazamiseka Kalula

Njengoba kuxoxiwe kuSahluko 3, udoti ozokhishwa yimikhumbi ngenxa yomsebenzi owenziwayo ngokuyinhloko uzoba sezindaweni zemigodi ewumthombo kawoyela nasemzileni, futhi uzothathwa yimikhumbi esizayo uyisusa emkhunjini ombayo uyise esikhumulweni semikhumbi saseThekwini noma saseRichard's Bay. Imisebenzi yokumba izokwenziwa endaweni yezemvelo phakathi olwandle, ebangeni elilinganiselwa kumakhilomitha angu-62 kuya kwangu-65 ukusuka ogwini, kude nezinto ezingaphazamiseka kalula (njengezinyoni nezidleke zezimfudu zamanzi), kodwa kusengakuphazamisa ukufuduka kwezinhlobo ezithile zezinto eziphila olwandle ezisebenzisa umzila ophakathi kwalezi zindawo ezimbila ezihlolwayo.

Izinhlobo zezilwane ezingaphazamiseka kalula ngenxa yodoti ophuma Endawni Yomsebenzi kungaba izimfudi zasolwandle, isinyoni zasolwandle, izinhlobo zezinhlanzi ezifudukayo kanye nezilwane zasolwandle ezincelisayo ezifudukayo nezendawo. Eziningi zalezi zinto zibhekwa emhlabeni kabanzi 'Njengezisengcupheni Yokuqothulwa (njengenhlanzi i-Southern Bluefin tuna), 'Ezingozini (njengezinhlanzi i-whale shark, i-Fin, nemikhoma i-Blue ne-Sei whale), 'Ezilimala kalula (njengofudu i-Leatherback turtle, i-short-fin mako, ushaka i-whitetip, umkhoma i-sperm whale) noma 'Osekusele Ezimbalwa Ezisaphila (njengoshaka i-blue shark).

Nokho, wonke udoti ozophuma ngenxa yomsebenzi owenziwa yimikhumbi ochazwe ngenhla uzoba mncane ngesilinganiso, awunawo amakhemikhali ayingozi noma angapheli futhi ushabalala ngokushesha. Ngakho, amanzi asebenzile aphuma emikhunjini yomsebenzi abhekwa njengengenabungozi obutheni emvelweni kanye nasezilwaneni okukhulunywe ngazo ngenhla.

Ithebula elilandelayo lifingqa imisebenzi yomkhumbi ezoholela ezintweni ezizokhishelwa imikhumbi olwandle ngenxa yokusebenza.

Ithebula 7.7 Ukufingqwa Kwemisebenzi Eyenziwa Umkhumbi Ekhiphela Udoti Olwandle

Isigaba somsebenzi	Okwenziwayo
Ukulungiselela	Ukuthuthwa kwemishini yokumba nemikhumbi esekelayo kuya endaweni okuzombiwa kuyo
Ukusebenza	Ukumba nemisebenzi eyenziwa yimikhumbi esizayo
Ukuphothula	Imishini yokumba / nesekele lomsebenzi iyasuka endaweni yomsebenzi iya ethekwini noma endaweni elandelayo okuzosetshenzwa kuyo

Lezi zinto ezizokwiwa eziyingxenye yalo msebenzi, okubalwa kuzo izinyathelo zokuthobela umthetho ezihlanganisiwe kanye nokulawula, zichazwa kabanzi lapha ngezansi:

- **Ukuqoqwa kokuchithekayo:** konke okuchithekayo endaweni okusetshenzwa kuyo kuyaqoqwa bese kuhamba ngamapayipi kuye ethangeni lokuhlunga ukungcola elisemkhunjini wokumba ukuze kuqikelelwe ukuthi kulandelwa iziqondiso zeMARPOL 73/78 Isenezelo I (u-15 ppm kawoyela emanzini). Lolo ketshezi luzohlaziywa bese kukhishwa ama-hydrocarbon ngaphambi kokuba luchithwe. Okungamafutha noma uwoyela kuzofakwa edotini owuwoyela bese kuphinde kulungiselelwa ukuba kusetshenziswe futhi noma kulahlwe ezweni endaweni yokulahla udoti efanelekayo.
- **Isimiso sokukhuculula indle:** indle izocolisiswa bese kufakwa isibulala magciwane. Ngokuvumelana neMARPOL 73/78 Isenezelo IV, leyo ndle akufanele ibonakale intanta emanzini, noma ishintshe umbala wamanzi. Isimiso sokukhuculula kumelwe sihlinzeke ngokuzikisa, ukufaka ikhemikhali yokubulala amagciwane okuthiwa yi-chlorine kanye nokuyikhipha le khemikhali ngaphambi kokuba amanzi anendle asehlanziwe akhishelwe olwandle. Ukuthi okukhishelwa olwandle kuzozika kangakanani kuyahlukahluka, kuye ngomoya obandayo osemshinini wokumba / emikhunkini esekelayo ngaleso sikhathi, kodwa ngeke kube ngaphansi kwamamitha angu-5 ngaphansi kwamanzi.
- **Izindawo zemishini emkhunjini, izinsalela zodala olukhululwe emgodini kanye namanzi agcinwa emathangeni emikhumbi angaphansi ukuze ingayendayendi:** inani likawoyela emanzini aphuma endaweni enemishini emkhunkini noma emathangeni amanzi akufanele libe ngaphezu kuka 15 ppm (iMARPOL Isenezelo I). Uma umkhumbi uhlose ukukhiphela olwandle amanzi ahlala emathangeni emikhumbi angaphansi, lokhu kungafezwa ngokusebenzisa isimiso sokuhlunga amanzi nowoyela. Udoti onowoyela kumelwe uthunyelwe ezweni ukuze uhlanzwe bese uyalahlwa.

- **Udoti owukudla:** udoti owukudla ungase uchithwe ngemva kokuba udlule emshinini wokugaya futhi uma umkhumbi wokumba ubekwe ebangeni elingaba ama-5,5 km ukusuka ogwini. Ukulahlwa kokudla okungagayiwe kuvumelekile ebangeni elingaphezu kwama-22 km ukusuka ogwini uya phakathi olwandle. Ukungcola okuwumhlabathi kufanele kukwazi ukudlula ezikhaleni zokuhlunga ezingama <25 mm. Okulahlwayo usuku ngalunye emshinini wokumba ngamunye kulindeleke ukuba kube ngaphezu kuka <0.5 m³.
- **Izinsipho nezinto zokukhuculula:** izinsipho ezisetshenziselwa izindawo zemikhumbi ezisobala zichithelwa emanzini. Izinga lobuthi obukulezi zinsipho liyahluka kuye ngokwakheka kwensipho ngayinye, kodwa kukhethwa ukuba kusetshenziswe izinsipho ezinobuthi obusezingeni eliphansi kakhulu nezinobuthi obuphela kalula lapho buxubana nezinye izinto njengamanzi. Izinsipho ezisetshenziswe endaweni yomkhumbi yokusebenzela zizoqoqwa amapayiphi okuqoqa amanzi bese zihlungwa ngendlela eboniswe ngenhla.
- **Amanzi Okupholisa:** ugesi emikhunjini yokumba ngokuvamile uhlinzekwa ngezinjini zokuphehla ugesi namajenerayitha apholiswa ngokuba kudluliswe amanzi ezindaweni ezenzelwe ukupholisa. La manzi okupholisa abe esechithekelwa olwandle. Eminye imishini ipholiswa ngesimiso esivalekile samanzi ajikelezayo, okungase kusebenzise ichlorine njengesibulala magciwane. Lawo manzi ayohlolwa ngaphambi kokuba akhishelwe olwandle futhi kuyoqikelelwa ukuthi isimo sawo siyavumelana neZiqondiso Zezinga Elifanele Lamanzi (Water Quality Guidelines).
- **Ukuvula nokuvala ivalvu yokuqikela ukuqhuma ebizwa ngokuthi yiBlowout Protector (BOP):** Okunye ukungcola okuphuma lapho kusetshenzwa kuhlobene nokuvulwa nokuvalwa komgodi owumthombo okwenziwa njalo. Njengengxenye yalokhu kusebenza, kuye ngeziyalezo zabakhiqizi beBOP kanye nezincomo zokwenza isivivinyo, iBOP esolwandle izokhipha amalitha aphakathi kwama- 500 kuya kwayi-1,000 ngenyanga amanzi asetshenziswa imishini, iwakhiphele olwandle.

Kuyinjongo ye-Eni ukuqiniseka ukuthi imisebenzi yokumba ehlongozwayo yenziwa ngokuvumelana nenqubo enhle yezimboni zomhlaba, kuhlunganise nemibandela ebekwa yi-ISO ne-API. Yonke imikhumbi esetshenziselwa ukumba (eletha izinto ezidingekayo, elindile kanye neyokumba) kufanele ihlangabezane nezimfuneko ezibekwe kuyiMARPOL 73/78 Isenezelo I, iSenezelo IV, neSenezelo V.

Amagalelo alindelekile okulahlelwa kwezinto emanzini ezivela emkhunjini wokumba azohlenganisa ukwehla kwezinga lokusebenza kahle kwezinto eziphila olwandle ngenxa yesimo samakhemikhali asemanzini, ukwanda kokutholakala kokudla okudliwa yizinhlanzi ngenxa yalokhu kudla okuchithwa olwandle okungase kuholele ekwandeni kwezinhlanzi eduze komkhumbi ombayo kanye nezinye izinhlanzi ezizozingela lezi ezigcwele lapha.

Uma kucatshangelwa izindawo ezisolwandle okuhloswe ukuba kumbiwe kuzo, udoti ozolahlwa kulindeleke ukuba usabalale ngokushesha futhi ayikho ingozi yokuba unqwabelane okungaholela emthelweni ophawulekayo ozohlala isikhathi eside. Iningi lodoti olahlwayo awuyona into yalo mkhumbi kuphela kodwa uvamile nakweminye imikhumbi esebenzela noma edlula ogwini lwaseNingizimu Afrika nsuku zonke.

Njengoba inani lokuzolwahlwa lizoba phansi, amagalelo ahlobene nakho ngeke abe makhulu futhi azophelela endaweni okumbiwa kuyo leso sikhathi esifushane.

Izinto ezichithwa yimikhumbi esekelayo ehamba phakathi kweTheku neRichard's Bay, ngokufanayo zizoba sendaweni yemikhumbi kuphela leso sikhathi esifushane.

Ukuchaphazeleka okulindelekile kwezemvelo zasolwandle ngenxa yokuchithwayo okubangelwa umsebenzi owenziwayo kuzophelela endaweni yomgodi owumthombo kawoyela noma igesi leso sikhathi esifushane. Uma kuhlenganiswa ukungabi nabuthi, ukubuyiseleka kalula ezintweni zemvelo kanye nokushesha zishabalele lezi zinto kuyosho kukuthi **izinga** legalelo liyoba **Lincane**.

Ngokusekelwe esimweni esiyisisekelo sezemvelo okukhulunywe ngaso ngenhla, **ukuba bucayui** kwezinto ezithintekayo kule ndawo **Kuyoba phansi**.

Ngokusekelwe ekuhlaziyeni okunikezwe ngenhla nokuthi izinyathelo zokuthobela iziyalezo nezokulawula ezinikeziwe ziyalandelwa, ubungako begalelo lodoti ozokhishwa ngenxa yomsebenzi owenziwayo ovela emikhunjini yomsebenzi uchaphazele izilwane eziphila olwandle lizoba **Wubala** (*IThebula 7.8*).

Izinyathelo Zokunciphisa Umonakalo Nezokuphithwa Komsebenzi

Ukwenezela ekuthobeleni imithetho yeMARPOL 73/78 ephathelene nokukhishelwa emanzini ngenxa yomsebenzi oqhubekayo kule mikhumbi okukhulunywe ngako ngenhla, kutuswa lezi zinyathelo ezilandelayo zokuphathwa komsebenzi ukuze kuncishiswe udoti olahlwayo:

- Kusetshenziswe isimiso sokuphathwa kukadoti ngkuvumelana neZiqondiso Zokuphathwa Kukadoti Ze-Eni (Eni's Waste Management Guidelines) ezikhuluma ngabo bonke odoti abasezikhungweni zokusebenza ezihlukahlukene, ezisogwini nasolwandle. Lokhu kufanele kuhlangukise:
- Ukuhlukaniswa kodoti lapho ususwa khona;
- Ukujikeleziswa nokubuye kusetshenziswe okulahliwe kodwa okusebenzisekayo uma kungenzeka;
- Ukusingathwa kodoti endaweni osuka kuyo (ukuthanjiswa kodoti owukudla, ukugqishwa, ukushishwa, ukukhucululwa kwendle kanye nokuhlungwa kwamanzi anowoyela); kanye
- Nokwenziwa kwezinhlelo zokubheka nokulungisa amavalvu avuzayo, ama-flanges, ama-fittings, okokuvala (seals), nokunye.

Amagalelo Ezinsalela

Ngokusekelwe ekuthathweni kwezinyathelo ezisikiselwe zokuphathwa komsebenzi, **ukuhlehliswa** kokuchaphazeleka **Kuphakeme** kanti izinga **lokulahleka kwezinto ezidingekayo Liphansi**, izinga legalelo lokukhishwa kwamanzi achithwayo aphuma emkhunjini achaphazele izilwane zasolandle liyoba **Wubala** (IThebula 7.8).

IThebula 7.8 Ubungako Begalelo Lamanzi Achithelwa Olwandle Asuka Emikhunjini Ezilwaneni Eziphila Olwandle

Incazelo	Igalelo	Igalelo Eliyinsalela
Izinga	Endaweni	Endaweni
Ubude besikhathi	Isikhashana	Isikhashana
Isikali	Lincane	Lincane
Ukuhlehliseka	Liphakeme (Lingahlehliswa Ngokuphelele)	
Ukulahleka Kwezinto ezidingekayo	Liphansi	
Ubungako	Lincane	Lincane
Ukuzwela/Ukuba bucyi/UKubaluleka Kwezinto /Okuchaphazelekayo	Liphansi	Liphansi
Ukuphawuleka Kwegalelo	Kuwubala	Kuwubala

7.3.3 Ukuphazamiseka Kwendawo Esekujuleni Kolwandle Kanye Nezilwanyana Eziphila Ekujuleni Kolwandle Ngenxa Yemisebenzi Yangaphambi Kokumba Kanye Nokumba Uqobo Lwakho

Incazelo Ngesimo Semvelo Esiyisisekelo Nezinto Ezingaphazamiseka Kalula

Indawo yolwandle esondele ogwini engajulile kakhulu igcwele amagobolondo ayizinsalela nezimila zasolwandle ezibizwa ngokuthi ama-algala (kusho iHeydorn *et al.*, ka-1978).

Umhlabathi osolwandle endaweni engajulile ulawulwa kuphela umsinga onamandla okuthiwa yi-Agulhas Current, obangela ukuba kwakheke izindunduma zesihlabathi ngaphansi kolwandle njengoba lo msinga ulibangise eNingizimu-nyakathi. Izilwanyana eziphila phansi olwandle ezikulezi zindawo ezimahhadlahhadla kule ndawo engajulile esolwandle nokudlulela ngale kwayo azaziwa kangako. Ngenxa yokuntuleka lolwazi ngokuma kolwandle ekujuleni kanye nezinto eziqinile, lezi zindawo ngeke zibe nazo izinhlobo ezingako zezinto eziphilayo noma indawo yokuhlalisa izilwane.

Izimila kanye nezilwanyana eziphila ekujuleni kwamanzi ezindaweni eziqinile zisengozini yokuphazamiseka ngenxa yezikhathi ezinde eziziphilayo. Njengoba amakhorali asekujuleni kwamanzi evame ukuba sezindaweni ezingenayo kangako inzika ethambile (ngokweMortensen *et al.* 2001), lezi zinto ezidla ekujuleni kolwandle kanye nezilwanyana eziphila khona zingase ziphazamiseke kalula ngenxa yokudungeka kwamanzi nodoti obangelwa ukumba. Ukuchayeka kwamakhorali asekujuleni kwamanzi ezintweni eziphuma lapho kumbiwa kungabangela ukufa kwawo ngenxa yokugqibeka, ukushintsha kwendlela adla ngayo kanjalo nezinga lawo lokukhula, ukuphazamiseka kokululeka kwawo nokufinyela, ushintsho ekwakhekeni nasekumeni kwawo kanye nokuphazamiseka kwekhalisiyamu (iRogers, 1999).

Okwamanje akwaziwa noma izilwanyana eziphila ekujuleni (amakhorali) zikhona yini ezigodini ezisamifula ezisolwandle ngasemingceleni yeBlock kanye noThukela neGoodlad, eseningizimu nje yendawo esenyakatho kulezi ezihloselwe ukumbiwa nasebangeni elinama-30 km enyakatho mpumalanga yendawo eseningizimu kulezi ezihloselwe ukumbiwa.

Ngenxa yalesi sizathu, i-Eni izibophezele ukuba iyigweme le miselekazi esolwandle (ngeke kumbiwe kuyo le miselekazi) njengendlela yokulondolozwa kwemvelo ukuze kkungachaphazeleki noma yini ephila khona.

*Izinto Okuhlongozwa Ukuba Zenziwe Kulo Msebenzi kanye Nokulawula
Nezinyathelo Zokuvumelana Nomthetho*

Ithebula elingezansi lifingqa izinto ezizokwenziwa kulo msebenzi ezingase ziphazamise izinto eziphansi olwandle.

Ithebula 7.9 Ukufingqwa Kwezinto Ezizokwenziwa Kulo Msebenzi Ezizophazamisa Ngokoqobo Izinto Eziphansi Olandle Nezilwanyana Eziphila Khona

Isigaba somsebenzi	Okuzokwenziwa
Ukulungiselela	Akukho lutho
Ukusebenza	Umshini Wokuhlola Kwangaphambi Kokumba Oyikhamera Ethwebulayo [Remotely Operated Vehicle (ROV)] wokubheka ekujuleni kolwandle
	Imisebenzi ehlobene nokumba (kubalwa ukususa izinto eziphansi nokuzigqiba)
	Ukulahlelwa kwezinqamu kanye nosimende osele ekujuleni kolwandle
	Ukususwa kwe-BOP
Ukuqoqa	Akukho lutho

Le misebenzi ichazwe kabanzi ngezansi:

- Phakathi nokuhlola kwangaphambi kokumba, kuzothunyelwa umshini oshuthayo okuthiwa yiROV ukuthe uthathe ividiyo ebonisa phansi olwandle endaweni okuzombiwa kuyo. Nakuba indlela evamile yokusebenzisa le vidiyo iROV kungekhona ukuba ihlaliswe phansi olwandle noma ithinte phansi, ophephela beROV banyakazisa inzika ethambile nezinye izinto ezingazinzile olwandle uma lo mshini uhambela phansi olwandle.
- Imingcele yamanje yalo mthombo ozombiwa ihlelwe ukuba kube nomthombo obanzi ngamasentimitha alinganiselwa ku-107 lapho kumbiwa okokuqala. Ukungena komshini ombayo emhlabathini olwandle esigabeni sokuqala kuzophazamisa indawo engaba ama-0.91 m², kususe izinto ezizike phansi (amatshe aqhephukile ama~400 m³) kube yinqwaba engatheni phezu komlomo womthombo.
- Phakathi nokumbiwa kwemigodi, into yokuqala ezophuma emkhunjini ombayo kuzoba yilokho okuphuma phansi. Ngokwalo msebenzi wamanje, kulindeleke ukuba lokhu kube wudaka nesihlabathi okulinganiselwa kuma-0.02 mm kuya kuma-60 mm. Ukwakheka nokutholakala kwamaminerali ematsheni kuzobonisa uhlobo lwezinto ezakha amatshe okungena kuwo ibhora.
- Izimvuthuluka ezibangelwa ukumba ezivela engxenyeni engaphansi yomthombo (ombiwe ngeWBM /neNADF) zizokhushulwa ngepayipi elifakwe emanzini ziye phezulu emkhunjini ombayo bese zihlukaniswa namanzi kusetshenziswa isimiso esiphezulu emkhunjini. Udoti oqinile ozayo uzothanjiswa ngamanzi asolwandle bese uchithelwa emanzini kusetshenziswa ipayipi elikhulu elivimba amanzi okuthiwa yi-caisson, elisithele ngamamitha ambalwa nje ngaphansi kwamanzi olwandle. Kuzokhishwa umhlabathi ongama-220 m³ (583 MT) emkhunjini ombayo, okuhlelwe ukuba kubonise izinga lokuchaphazeleka (Bheka *Isenezelo D*).

- Uma kuba khona iWBM esetshenzisiwe esele ekupheleni komsebenzi wokumba, lokhu kuyogcinwa emkhunjini noma kuthunyelwe ogwini ukuze kuphinde kusetshenziswe / kuthengiswe kabusha / kulahlwe noma ke kuzovele kulahlwe khona olwandle kusetshenziswa ipayipi le-*caisson* kodwa kuphela uma lokhu kuvumelana neziqondiso ezinikeziwe (Bheka *iSahluko 3*).
- Udaka lweNADF luzoqoqwa bese lugcinwa emkhunjini futhi luthunyelwe ogwini luyochithwa khona. Udoti okhishwe yiNADF lapho imba uzokhushulwa ngomshini owenzelwe le njongo (umshini wokukhlunga) ukuze kukhishwe uketshezi olungaphinde lusetshenziswe. I-NADF esele ezintweni eziphume lapho kumbiwa izolahllelwa olwandle kusetshenziswa i-*caisson* kodwa kuphela uma lokhu kuvumelana neziqondiso ezinikeziwe (Bheka *iSahluko 3*).
- Phakathi nomsebenzi owenziwa lingekho ipayiphi elifakwa phansi, ngemva kokuba kokuba umthombo usubiyelwe, udaka lukasimende olwenziwe ngendlela ekhethekile luzofakwa ezikhaleni eziyindilinga phakathi kokokubiyela umthombo kanye nezindonga zawo umthombo. Ukuze ukhonkolo uqine, kuzosetshenziswa usimende othe xaxa ngokuvamile.
- Phakathi nesigaba sokusebenza esihlanganisa ipayiphi, usimende osele ovela emathangeni uzolahllelwa olwandle.
- Ngaphambi kokuba kuqhaqhwe yonke into, imigodi izogqitshwa (izogqitsha ngosimende), ihlolwe ukuthi ayivuzi bese ishiywa, noma ngabe ama-hydrocarbon atholakele noma awatholakalanga. Ukhonkolo uzovimba unomphela ukuze kungaphumi ketshezi emthonjeni ombiwe kanye nakwezinye izindawo ezihlobene nawo. Udaka olusele kulolu obekugqitshwa ngalo luzochithelwa olwandle.
- Yonke imisebenzi yokumba ehlongozwayo izokwenziwa abakwa-Eni ngendlela evumelana nemithetho yokusenza kwezimboni yomhlaba wonke.

Ukuphazamiseka kwenhlabathi esolwandle kanye nezilwanyana eziphila khona ngenxa yokuthwebula ngomshini weROV (kuhlanganise ukuhlola indawo ngaphambi kokuqala komsebenzi)

Ukuphazamiseka komhlabathi osekujuleni kolwandle phakathi nokuhlolwa kwangaphambi kokumba kanye nokuhlola ngomshini weROV / ukusebenza (ukuhlola nokubheka isimo somhlabathi ukuze kubonakale izindawo ezibucayi zemvelo, ezinjengamakhorali, ezikhona endaweni ehloselwe ukumba ngaphambi komsebenzi wokumba, nokuhlola kwasikhathi sonke kwesihloko seROV / neBOP) kungenzeka kwandise ukuphazamiseka ezindaweni eziphansi olwandle. Lokhu kungabangela incindezi ezilwanyaneni zasolwandle eziphila endaweni eyodwa nezihambahamba phansi, ngokuphazamisa ukusebenza kahle kwezihlunga kudla noma ngokudida izilwanyana ezihambahambayo ngenxa yokudungeka kwamanzi (iClarke and Wilber 2000). Nokho, ezimweni eziningi izimo ezicishe zibe yingozi neziyingozi ziba khona kuphela ebuningini obungaphezu kakhulu kwalokho okulindelekile ngenxa yokuphakama kwenzika okubangelwa ophephela beROV.

Ukuchaphazeleka okubangelwa ukudungeka kwamanzi nenzika entathayo kuzogxila endaweni eyodwa (amamitha ambalwa eduze kweROV kanye / noma ne-ROV flight track) futhi kuzoqhubeka kukhona isikhathi esifushane kakhulu (amahora noma imizuzu, kuye ngesimo senzika). Ukuchaphazeleka kwezilwanyana eziphila phansi olwandle kuzoba okwesikhashana kanti **nobukhulu** banoma yikuphi ukuphazamiseka kwezimila nezilwanyana eziphila phansi kuyoba **Yinto ewubala**.

Uma kucatshangelwa ukuba khona kwendawo enezinto ezifanayo emngceleni naseduze komngcele wendawo okuthiwa yiWest Indian Offshore eseduze kogu engajulile, ukuphazamiseka kanye nokuncipha kwezinhlobo zezilwanyana eziphila phansi olwandle ngenxa yokudungeka kwamanzi kungase kubhekwe njengokuwubala, futhi akulindele miphumela ephikelelayo ngakho ngenxa yalokho **ukuba bucayi** kuphawulwe njengokusezingeni **Eliphansi**.

Njengendlela yokusebenza evamile, abasebenzisa iROV bafuna ukugwema ukuba ithintane nenhlabathi ephansi ukuze bagweme ukulimaza le khamera, ngenxa yalesi sizathu ukuthintana kweROV nomhlabathi ophansi kuyisenzakalo esiyivelakancane nesingafiswa. Ngenxa yokuhlaziya okunikezwe ngenhla nokucabangela ukuthi izinyathelo zokuthobela imithetho nokulawula zizolandelwa, ubungako bamachaphazelo okudungeka kwamanzi ngenxa yokusetshenziswa komshini weROV phansi olwandle nasezilwanyaneni eziphila khona kuzoba yinto **Engatheni** (Ithebula 7.10).

Ukuphazamiseka kwezinto eziphansi olwandle nezilwane eziphila khona ngenxa yokumba

Ukumbiwa kwemigodi ezindaweni ezimbili Zomsebenzi kuzoholela ekuphazamisekeni okuqondile kwendawo kanye nokususwa kwenhlabathi phansi ngesikhathi sokumba umgodi ophezulu, kungase kushintshe ukwakheka kwenhlabathi phansi nesimo sayo.

Imiphumela esheshayo yokuphazamiseka kwendawo nokususwa komhlabathi phansi ezimileni nasezilwanyaneni eziphila phansi kuncike ezingani lokunyakazo kwalezi zinto, futhi izinhlobo ezingayakazi kakhulu noma ezinganyakazi nhlobo zisemathubeni okulimala noma okonakala phakathi nokuphazamiseka okubangelwa ukumba.

Uma kucatshangelwa ukuba khona kwendawo enezinto ezifanayo emngceleni naseduze komngcele wendawo okuthiwa yiWest Indian Offshore eseduze kogu engajulile, ukuphazamiseka kanye nokuncipha kwezinhlobo zezilwanyana eziphila phansi olwandle ngenxa yokudungeka kwamanzi kungase kubhekwe njengokuwubala, futhi akulindele miphumela ephikelelayo ngakho ngenxa yalokho **ukuba bucayi** kuphawulwe njengokusezingeni **Eliphansi**.

Ukuphazamiseka okungokoqobo kanye /noma ukususwa kwenzika kanye nezilwanyana ezincane eziphila phansi olwandle phakathi nokumba kanye nokugubheka kwezinto ezimile phansi akunakugwemeka, kodwa amagalelo alokhu azogxila endaweni eyodwa futhi azoqhubeka kuphela isikhathi esifushane futhi azoba **Mancane Ngezinga**.

Ngenxa yokuhlaziywa okunikezwe ngenxa nokucabanga ukuthi izinyathelo zokulawula nokuthobela iziqondiso eziphawulwe ngenhla zizolandelwa, igalelo lokumba olwandle, ukuthinteka kwenzika kanye nezilwanyana eziphila phansi olwandle **Kuzoba kuncane** (*Ithebula 7.10*).

Ukuphazamiseka kwezinto eziphansi olwandle nezilwane eziphila khona ngenxa yokulahlwa kodoti okhishwa yibhora kanye nodaka

Ukulahlwa kodoti ophuma phansi emgodini kuzoba nemithelela eqondile neyimixhantela ezilwanyaneni eziphila phansi olwandle endaweni eseduze nomthombo kawoyela ogujwayo kanye nasendaweni ezungeziile okuwela kuyo udoti ophuma emgodini ochitshwa umkhumbi ombayo. Ukuphazamiseka kwenzika esolwandle kuzoholela ekulimaleni ngokuqondile, nokuphazamiseka kwezinto eziphilayo ezinjengemenenke ezihamba phansi noma phezu kwenzika.

Okuphuma lapho kumbiwa phansi umthombo okokuqala kuzokwakha indunduma eduze kwembobo yomthombo kawoyela noma wegesi, iye incipha leyo ndunduma uma uqhela emgodini. Amagalelo amakhulu ahlobene nokulahlwa kwezinto eziphuma emgodini ogujwayo kuzoba ukufa kwezinto eziphilayo (njengamakhorali), ukushintsha kwezinto eziphilayo (ushintsho endleleni indawo eyakheke ngayo) eduze kakhulu komthombo ombiwayo (<200 m).

Ucwaningo (i-Neff *et al.* 1992; i-Ranger 1993; i-Montagna & Harper 1996; ne-Schaanning *et al.* 2008), luye lwathola ukuthi ushintsho ezinhlotsheni nasebuningini bezilwanyana eziphilayo ngenxa yodoti olahlelwayo ophuma emgodini ombiwayo luphawuleka ebangeni ngokuvamile elingamamitha angamakhulu ambalwa ukusuka endaweni okuchithelwe kuyo, futhi kuye kwaphawuleka ukuthi izinto eziphila lapho ziyabuya ngemva kwezinyanga ezimbalwa noma iminyaka ethile ngemva kokuba umsebenzi uyekiwe kuleyo ndawo.

Izinhlobo zezilwanyana ezihambayo eziphila emigodini olwandle noma ezihamba phezu komhlaba nezinye izinhlobo zezilwane eziphila phansi olwandle ziyakwazi ukukhuphuka enzikeneni ewele olwandle ngaleyo ndlela zibangele ukuthuthela kwezilwanyana kwenye indawo nokuvuseleleka kwezindawo ezichaphazelekile. Ngenxa yokuphakama kwenani lezilwanyana kule ndawo, ukwakheka kwezinto eziphilayo cishe kuyoba nesikhala futhi kushintshe okwesikhashana.

Imiphumela yocwaningo lokusakazeka kwezinto eziphuma emgodini ombiwayo olwenziwe njengengxenywe yalo msebenzi (ERM, 2018a) ngokuyinhloko luqinisekisa imibiko yocwaningo lomhlaba olwathi amagalelo ezinto eziphuma emgodini awasabalali kakhulu (iPerry 2005).

Izinto eziphuma emgodini ezilahlwa olwandle kwahlawumbiselwa ukuthi zakha inqwathana engaba ama-1,000 mm ukuba ugqinsi eduze komgodi ombiwe, bese kuya kuncipha uma uqhela ngama- 5 mm ebangeni elizungezayo elingama < 50 m (indawo engama- 0.008 km^2), noma ngabe umthombo umi kuphi (N1, N2 naku- S) noma ukuthi izimo eziphansi noma eziphakeme zenyanga ngayinye zicatshangelwe yini. Izindawo okuwela kuzo udoti ezingama < 5 mm ubugqinsi ngokuyinhloko zazifinyelela ebangeni elingama-100 m omlomo womthombo, nakuba ezinye lapho nalaphaya zifinyelela ebanegni elingaphezu kuka-1 km, ikakhulu ukwehlisa umsinga osuka ngasemthonjeni ombiwayo. Indawo enodoti omningi ongama- > 50 m (ubugqinsi obuphawulwe ucwaningo lwekhompyutha) iphelela ebaneni elingaphansi kuka- 0.003 km^2 endaweni ngayinye.

Nakuba ukwehlukahluka kohlangothi umsinga wamanzi oya kulo phakathi kwezindawo ezimbiwayo kanye naphakathi kwezimo zomsinga eziphakeme neziphansi inyanga nenyanga eziphawulwe ngekhompyutha ziholela ekusakazekeleni ezinhlangothini ezingefani kwezinhlayiya, ukuchitheka kukonke okungaphansi kuka > 1 mm kuhlanganisa indawo enkulu ebicatshangelwa engaba amakhilomitha sikwele angu- 7 ukuzungeza indawo yomgodi ombiwayo. Umahluka usebenza ngokuyinhloko ekuzikeneni kwezinhlayiya ezincane (< 0.2 mm), ezizoqhubeka zisemanzini isikhathi eside.

Ukujula okukhulu endaweni yomgodi kanye nejubane lemisinga enamandla kuholela ekusakazekeni okukhulu kwezinto eziphuma emgodini. Nokho, lokhu, kunxephezela ukuba phansi kwezinga lobugqinsi bezinto ezilahliwe (< 5 mm) ezazicatshangelwe emabangeni adlulela ngale kwama-50 m ukusuka emthonjeni ombiwayo kawoyela noma umgodi.

Ukubuya okusheshayo kwezilwanyana eziphila phansi olwandle kungase kulindeleke (bheka isibonelo seKingston 1987, 1992; iTrefry *et al.* 2013), kanye nokuphazamiseka komhlabathi okubangelwa yizinto eziphilayo okuyodlala indima ebalulekile ekusimameni komhlabathi wasolwandle (iMunro *et al.* 1997).

Ukuchayeka kwamakhorali asemanzini ajulile ezintweni eziphuma emgodini ombiwayo kungase kubangele ukufa kwawo ngenxa yokugqibeka, ukushintsha kwendlela adla ngayo kanye nezinga lokukhula eliwumphumela, ukuphazamiseka kokweluleka kwawo nokufinyela, ushintsho ekwakhekeni nasekubukekeni, ukuphazamiseka kokwakheka kwekhalisiyamu. Phawula ukuthi okwamanje akwaziwa ukuthi amakhorali asemanzini ajulile akhona yini kuBlock nokuthi ayatholakala yini ezindaweni ezihloselwe ukumba futhi lokhu kusazohlolisiswa.

Amagalelo okugqibeka okubangelwa udoti ophuma lapho kumbiwa kulinganiselwa ukuthi azoba **Mancane ngokwezinga** ezilwanyaneni ezincane eziphilayo emhlabathini onezinto ezilahlelwe khona. Kuzo zombili izimo, amachaphazelo azoba sendaweni eyodwa futhi ukuvuseleleka kwezimila nezilwanyana zendawo kulindeleke ukuba kwenzeke ngeminyaka embalwa nje (iminyaka emi-2 kuya kwemi-5).

Ngenxa yokukwazi ukuvuseleleka ngokushesha kwezilwanyana ezincane futhi zisabalale endaweni, **ukuba bucayi** kwazo kuphawulwe njengokusezingeni **Eliphansi**. Njengoba kuphawulwe ngenhla, uma amakhorali atholakala emanzini ajulile ekhona Endaweni Yomsebenzini **Ukuba bucayi** kwawo ekugqibekeni ngenxa yodaka oluphuma lapho kumbiwa **Kusezingeni eliphezulu**.

Ngokusekelwe ekuhlaziyeni okunikezwe ngenhla nasesiphethweni sokuthi izinyathelo zokuthobela umthetho nokulawula zizolandelwa njengoba zichazwe ngenhla, ubungako begalelo lezinto eziphuma lapho kumbiwa kanye nodaka olutheleka phezu kwezilwanyana eziphila phansi namakhorali asemanzini ajulile kuzoba **Kuncane** noma kube **Okulingene**. (*Ithebula 7.10*).

Ngokusekelwe ekusetshenzisweni kwezinyathelo zokunciphisa umonakalo kanye nokulawula, **ukuhlehliswa** kwamagalelo **Kuphakathi nendawo** kanti izinga **lokulahleka kwezinto Liphansi**, ubungako bamagalelo enzika ebangelwa ukuchitheka kodaka lapho kumbiwa luhlale phezu kwezinto eziphilayo eziphansi nakumakhorali asemanzini ajulile kuzoba negaleli **Elingatheni** kuya **Kweliphansi**. (*Ithebula 7.10*).

Ukuphazamiseka kwezinto eziphansi olwandle nezilwane eziphila khona ngenxa kasimende ochithwa olwandle

Ukuchithwa kukasimende phakathi nokukhonka kuzoholela ekuphazamisekeni kwendawo ephansi olwandle nokunqwabelana kukasimende phansi, ozobe usuncibilikela emanzini.

Phakathi nokwakha okungasebenzisi amapayiphi, usimende osele (ongama-100 m³ ezimweni ezingavamile) uyovela ngaphezu komgodi ube sendundumeni yenhlabathi, lapho (kuye ngendlela oxovwe ngayo) ngeke uqine noma uyohlakazeka kancane kancane uthathwe amanzi olwandle, noma uma uqhubeka uyindunduma, ungase uphenduke indawo yokuhlala (i-reef) okuzophila kuyo izilwanyana ezincane zasolwandle futhi ukhange izinhlanzi nezinye izilwanyana eziphila ngezinye (iBuchanan et al., 2003).

Uma kucatshangelwa ukuba khona kwendawo enezinto ezifanayo emngceleni naseduze komngcele wendawo okuthiwa yiWest Indian Offshore eseduze kogu engajulile, ukuphazamiseka kanye nokuncipha kwezinhlobo zezilwanyana eziphila phansi olwandle ngenxa kakhonkolo kungase kubhekwe njengokuwubala, futhi akulindeleke miphumela ephikelelayo ngakho ngenxa yalokho **ukuba bucayi** kuphawulwe njengokusezingeni **Eliphansi**

Ukuphazamiseka kanye nokucinaniswa kwezilwanyana eziphila phansi ngenxa yokukhishelwa kukasimende endaweni ezungeze umgodi **Kuzoba okwezinga eliphansi** njengoba usimende uzokhishelwa endaweni kakade esinodoti okhishwe lapho kumbiwa.

Noma yimaphi amagalelo azogxila endaweni eyodwa (azoba sonqenqemeni lomgodi) futhi azophikelela kuphela isikhathi esifushane. Ngokusekelwe kulokhu kuhlaziya okungenhla, ukuphawuleka kwamagalelo kasimende olwandle, inzika kanye nezilwanyana eziphila phansi kuzoba okwezinga **Eliphansi kakhulu** (*Ithebula 7.10*).

Izinyathelo Zokunciphisa Amagalelo Nokuphathwa

Kutswa lezi zinyathelo zokunciphisa amagalelo nokuphathwa ezilandelayo ukuze kusizwe ekulaphathweni okufanele kwezilwanyana nezimila eziphila phansi olwandle:

- Ukubukelwa kwevidiyo yeROV ethathwe ekuhlolweni kwangaphambi kokumba ukuze kubonakale izindawo eziphila izinto okufanele zingalinyazwa ebangeni elingama- 500 m ukusuka endaweni okumbiwa kuyo;
- Ukuqiniseka ukuthi indawo okumbiwa kuyo isebangeni elingaphesu kwamamitha angu- 500 m ukusuka kunoma iyiphi indawo enezinto eziphilayo ezisesimweni esibucayi;
- Ukusetshenziswa kwemishini elawula izinto eziqinile ukuze kuncishiswe uketshezi oluqukethweni okuphume lapho kumbiwa, kwandiswe amathuba okuphinde kusetshenziswe kodaka oluphume uma kumbiwa, ukunciphisa isidingo sokushintsha uketshezi nokunciphisa inani lodaka oluyinzika;
- Kwandisa ukuphinde kusetshenziswe kweWBM neNADF ezindaweni ezihlukahlukene okumbiwa kuzo nasekumbeni eminye imigodi;
- Ukunciphisa iWBM elahlelwe olwandle; ukugwemva ukuchitha udaka lweNADF;
- Ukugcina isimiso sokulawula izinto eziqinile ezisemkhunkini.

- Ukunciphisa izinsalela zikasimende phakathi nokumba okungasebenzini amapayiphi;
- Ukubhekisisa okufezwa usimende osebenzile kanye nokuyeka ukuphampa uma kubonakala sengathi usimende uyachitheka; kanye
- Ukulandela izinqubo zokusebenzisa iROV ezithi iROV akufanele ihlale phansi olwandle lapho isebenza.

Amagalelo Ayinsalela

Ngokusekelwe ekusetshenzisweni kwezindlela zokunciphisa umonakalo kanye nokuphathwa ezingezansi, **ukuhlehliswa** kwamachaphazelo **Kuphakeme** kanti nezinga **lokulahleka kwezinto Liphansi**, ubungako begalelo lenzika ngaphambi kokumba, phakathi nokumba kanye nasezilwanyaneni eziphila phansi olwandle kuzoqhubeka kuyinto **Engatheni** (*Ithebula 7.10*).

Ithebula 7.10 Ubungako Bamagalelo Okuphazamiseka Okungokoqobo Kwenzika Esekujuleni Kolwandle Kanye Nezilwanyana Eziphila Ekujuleni Kolwandle Ngenxa Yomsebenzi Owandulela Ukumba (ukuhlola ngeROV) Kanye Nemisebenzi Ehlobene Nokumba

Incazelo	Igalelo lokusebenza kweROV Ezilwanyane ni Eziphila Phansi Olwandle	Igalelo Lezinsalela okusegenza kweROV Ezilwanyane ni Eziphila Phansi Olwandle	Igalelo lokumba Ezimileni Eziphila Phansi	Igalelo Eliyinsalela Yokumba Ezintweni Eziphila Phansi Olwandle	Igalelo Lokuchithwa kodaka nezinto eziphuma lapho kumbiwa Ezintweni Eziphila phansi	Igalelo Eliyinsalela Lokuchithwa Kodaka Nezinto Eziphuma Emgodini enhlabathini nasezintweni Eziphilayo	Igalelo Lokuchithwa Kodaka Nezinto Eziphuma Emgodini Olwandle Nakumakhori ali Asekujuleni	Igalelo Eliyinsalela Lokulahlwa Kodaka Nezinto Eziphuma Emgodini oLwandle Nakumakhori ali Asekujuleni	Igalelo likasimende ochithiwe Ezimileni Nasezilwanyaneni	Igalelo Likasimende Osele Ezimileni Nasezilwane ni Eziphila phansi
Izinga	Ligxila endaweni	Ligxila endaweni	Ligxila endaweni	Ligxila endaweni	Ligxila endaweni	Ligxila endaweni	Ligxila endaweni	Ligxila endaweni	Ligxila endaweni	Ligxila endaweni
Ubude besikhathi	Elesikhashana	Elesikhashana	Elesikhashana	Elesikhashana	Elesikhashana	Elesikhashana	Elesikhashana	Elesikhashana	Elesikhashana	Elesikhashana
Isikali	Liwubala	Liwubala	Lincane	Lincane	Lincane	Lincane	Lincane	Lincane	Lincane	Lincane
Ukuhlehliseka	Liphakeme (lihlehlika ngokugcwele)		Liphakeme (lihlehlika ngokugcwele)		Liphakeme (lihlehlika ngokugcwele)		Liphakeme (lihlehlika ngokugcwele)		Liphakathi nendawo (liyahlilelika ngokwengxenywe)	
Ukulahleka Kwezinto ezidingekayo	Liphansi		Liphansi		Liphansi		Liphansi		Liphansi	Liphansi
Ubungako	Liwubala	Liwubala	Lincane	Lincane	Lincane	Lincane	Lincane	Lincane	Lincane	Lincane
Ukuzwela/Ukuba bucaleni/UKubaluleka Kwezinto /Okuchaphazelekayo	Liphansi	Liphansi	Liphansi	Liphansi	Liphansi	Liphansi	Liphakeme	Liphakathi	Liphansi	Liphansi
Ukuphawuleka Kwegalelo	Liwubala	Liwubala	Liwubala	Liwubala	Liwubala	Liwubala	Lilingene	Lincane kakhulu	Liwubala	Liwubala

Indlela Okuzothinteka Ngayo Izilwane Zasolwandle Ngenxa Yodaka Oluphuma Lapho Kumbiwa Kanye Nezinye Izinsalela Zokungcola Ezikhishwa Umkhumbi Ombayo

Incazelo Ngesimo Semvelo Esiyisisekelo Nezinto Ezingaphazamiseka Kalula

Njengoba kuchaziwe *kuSahluko 4*, ngenxa yokuthi lezi zindawo okuhlongozwa ukuba kwenziwe kuzo lo msebenzi ziqhelile ogwini lolwandle, cishe liyoba phansi izinga lokutholakal kolwembu olubizwa ngokuthi yi-plankton kanye nezinhlanzi eziphila endaweni engajulile kanye nezilwanyana ezingenamgogodla njengeminenke nokunye okufuze yona. Njengoba incike komsoco, ulwembu oluningi (plankton) luzosabalala futhi okwesikhashana luzohlukahluka kakhulu futhi ngenxa yalokho lubhekwa njengolungeke luphazamiseke kangako. Nokho, ukukhiqizeka ngobuningi kanye nokwakheka komjikelezo wokudlana kwezilwane okusekelwe kulokho okudla izinto ezizifele okusekela izinhlobo zezinhlanzi eziphila ekujuleni kolwandle, kungase kulindeleke ukuba kube semiselekazini esekujuleni kolwandle ama-canyon.

Okwamanje akwaziwa ukuthi izinto eziphazamiseka kalula (njengamakhorali kanye nezinhlanzi zohlobo lwe-coelacanth) zikhona yini emiselekazini engaphansi kolwandle kuBlock, eseningizimu nje yendawo esenyakatho kulezi ezihlongozwayo kanye nasebangeni elingama-30 km enyakathompumalanga yendawo eseningizimu kulezi ezihlongozwayo. Akukho msebenzi wokumba ozokwenziwa kule miselekazi.

Izinto Ezizokwenziwa Ezihlongozwayo Nezinyathelo Zangaphakathi Zokulawula Nokuthobela Umthetho

- Phakathi nokumbiwa kwale mithombo, izinto eziyinhloko ezizokhishwa umkhumbi ombayo kuzoba yinhlabathi ephuma emgodini ombiwayo. Izinto eziphuma ezingxenyeni ezijulile zomgodi, ezimbiwe ngeWBM /NADF, zizokhushulelwa phezulu kusetshenziswa ipayipi elifakwe emanzini ziye emkhunjini ombayo bese zihlukaniswa noketshezi kusetshenziswa isimiso sokuhlunga izinto esisemkhunjini. Lezi zinto okufanele zilahlwe zithelwa amanzi olwandle bese uma sezixubene namanzi zichithelwe olwandle nge-*caisson*, engene ngamamitha ambalwa nje ngaphansi kolwandle. Kuzokhishwa umhlabathi ongama-220 m³ (583 MT) ukhishwa umkhumbi ombayo.
- Uma kuba khona iWBM esebenzile kodwa esalile ekupheleni komsebenzi wokumba, izogcinwa emkhunjini bese ithunyelwa ogwini ukuze ilahlwe / iphinde isetshenziswe noma izolahlwa olwandle kodwa kuphela um alokhu kuhambisana neziyalezo ezibekiwe (Bheka *iSahluko 3*).

- Udaka lweNADF luzoqoqwa lugcinwe emkhunjini bese luthunyelwa ezweni ukuze luyochithwa khona. Okuphume lapho kugubha iNADF kuzokhushulelwa phezulu kusetshenziswa umshini ohlunga amanzi ukuze aphinde asetshenziswe. I-NADF esale kulokho obekugujwa izochithwa olwandle kusetshenziswa i-*caisson* kodwa kuphela uma lokhu kuhambisana neziqondiso ezithile (Bheka iSahluko 3).

Igalelo Eliphawulekayo

Ukulahlwa kodoti ophuma lapho kumbiwa ngomkhumbi wokumba kuzoba namachaphazelo aqondile nawumxhantela emvelweni. Ukuchaphazeleka okuqondile kuhlobene nezinto ezingcolisayo ezisodakeni oluphuma lapho kumbiwa, nosimende oxoviwe osetshenziswa ngesikhathi sokumba. Amachaphazelo awumxhantela abangelwa ushintsho ezingeni lamanzi nasenzikeni.

Okuphuma lapho kumbiwa umgodi ngokuvamile kuyizinto ezizikayo, kodwa zingenza kube nemithonselana nezinsimbi kanye / noma ama-hydrocarbon emanzini akule ndawo (Neff *et al.* 1987). Noma kunjalo, iningi lezinsinjana ezibangelwa ukumba ziyizinto ezingahambi namanzi futhi ukwakheka kwazo kubonakala njengenzika nje yemvelo esekujuleni kolwandle. Ngakolunye uhlangothi, udaka oluphuma lapho kumbiwa luyingxube yobumba lwemvelo, ama-*polymers*, nokunye okusindayo kanye / noma nezinye izinto ezintanta emanzini. Iziinto ezakha kanye nezixubene nodaka oluchithwayo zingase zibe nomthelela wokufaka ubuthi emanzini nasenzikeni ephansi olwandle. Lokhu kuphinde kuxoxwe ngakho kabanti ngezansi.

Ukuba Nobuthi Nokunqwabelana Kwamakhemikhali Ayingozi Ezilwaneni Ngenxa yeWBM Eningi Kanye Nezinsalela zeNADF Kokuphuma Lapho Kumbiwa Kanye nakuyiWBM elahliwe

Kulo msebenzi owenziwa manje, izingxenye zomthombo ezisekujuleni zizombiwa kusetshenziswa iWBM kanye/noma neNADF ukuze umgodi uqine futhi uhlanzeke.

I-WBM (udoti omanzi ohlanziwe kanye nodaka olusebenzile okulahlwa olwandle)
Kulo msebenzi wamanje, kulinganiselwa ukuthi kuzolahlwa izinsalela zeWBM ezingama-220 m³ zichithwe olwandle nge-*caisson*. IWBM esebenzile ngokushesha izoncibilika emanzini futhi izinsalela zizosabalala endaweni eyibanga elingaba ama-7 km², esikhathini nje esifushane ngakho amagalelo kubonakala ezoba **Sezingeni eliphansi**.

Izinkinga ezikhathazayo ezihlobene nokuchithwa kweWBM zihlanganisa ukunqwabelana kwamakhemikhali emzimbeni wezilwane. Ngokuyinhloko, izinto ezivelele ezakha amaphesenti angaphezu kuka-90 ayo yonke iWBM amanzi angenasawoti noma amanzi olwandle, ibarium sulphate (barite), ubumba i-*bentonite clay*, i-*lignite*, i-*lignosulphonate*, ne-*caustic soda*. Ezinye izithako ziyanezelwa ukuze kushube futhi kube nezinto ezidingekayo ekumbeni.

Ukuphazamiseka kwezinto zendawo **Akungakanani**. ngakho, ubungako bamagalelo okungcoliswa ngamakhemikhali eWBM ezilwanyaneni zasolwandle **Kuzoba yinto engaphawuleki nhlobo** (*Ithebula 7.11*).

Ngenxa yokusetshenziswa kwendlela yokuphatha nokuncishiswa komonakalo kanye nezinyathelo zokuqondisa ezisikeselwe ngezansi, **amathuba okulungiseka** komonakala **Makhulu** kanti nezinga **lokulahleka kwezinto Liphakeme**, izinga lamachaphazelo ezinsalela zeWBM ezilwanyaneni zasolwandle lizoba **Lincane kakhulu** (*Ithebula 7.11*).

I-NADF (udoti omanzi ohlanziwe kanye nodaka olungasebenzanga okulahlwa olwandle)

Uma kwenzeka ukumba kwenza kudingeke ukuba kusetshenziswe udaka lweNADF, izinto eziphuma lapho kumbiwa zizosingathwa kusetshenziswa isimiso sokulawula esivamile esisetshenziselwa iWBM ukwenezela ekusetshenzisweni kwento yokomisa ukuze kuncishiswe inani loketshezi. Nakuba uketshezi oluningi oluphuma lapho kumbiwa luzohlungwa emhlabathini ophuma emgodini, enye iNADF izoqhubeka inamathele kulo mhlathi futhi ngenxa yalokho izongena olwandle. Kulinganiselwa ukuthi iNADF elahlwayo ingase iqukathe amaphesenti amahlanu oketshezi olusetshenziselwa ukumba (ERM 2018a), ngemva kokuhlungwa. Lapho kumbiwa izingxenywe ezijulile zomthombo, kuzochithelwa olwandle isilinganiso ezingu-38.36 m³ (29.2 MT) seNADF kusetshenziswa i-caisson, lapho lokhu kuzothathwa khona imisinga yamanzi ngaphambi kokuba kubuyele olwandle.

Izinkinga ezivelele ezihlobene nokuchithwa kweNADF zihlanganisa ukunqwabelana kobuthi obudliwa yizilwanyana kanye nokuba nobuthi kwamanzi. Ukuchithwa kodaka emvelweni yasolwandle kanye nomphumela ozoba khona kuyo kuye kwahlolwa kanzulu kusetshenziswa ucwaningo olwenziwe endaweni ngokwayo kanye nase-laboratory (libukezwe yiNeff, 2005). Ngokuyinhloko, kutholakale ukuthi amagalela awubala ezilwaneni zemvelo eziphila olwandle (iThomson *et al.* 2000; neHurley & Ellis 2004). Izikhi zemvelo ezihlobene nokusetshenziswa kweNADF ngokuvamile azitholakali ebanegni elingaphezu kwama-250 kuya kuma-500 m ukusuka emishininin yokumba (iHusky 2000, 2001a; iBuchanan *et al.* 2003; ne-IOGP 2016).

Amathuba okuba kube nokungcolisa kwamakhemikhali eNADF ezilwanyaneni eziphila emanzini ayamfimba ngenxa yokuthi awancibiliki emanzini kanti futhi awanazo izinto ezilimazayo (OGP, 2003). Nokho, amanye ama-hydrocarbons ayaziwa ukuthi ayazingcolisa izinhlanzi kanye nezilwanyana ezinamagobolondo.

Amathuba okuba kube nokungcolisa kwamakhemikhali eNADF ezilwanyaneni eziphila emanzini ayamfimba ngenxa yokuthi awancibiliki emanzini kanti futhi awanazo izinto ezilimazayo (IOGP, 2016). Ngakho, **ukuba sengozini** kwezinto eziphila endaweni kuphawulwe **Njengokuphansi**.

Kunokuba kube ukonakaliswa amakhemikhali ngokuqondile, ukuchaphazeleka kwezilwanyana zasolwandle kubangelwa ngokuyinhloko ukucinaniswa kwezilwane zasemanzini (*Ingxenye Error! Reference source not found.*) kanye nokuntuleka komoya mpilo (oxygen) okubangelwa ukuhlakazeka ngokushesha koketshezi olwehlele phansi enzikeni.

Kulo msebenzi wamanje, ibanga udoti ozotholakala kulo ngenxa yokuchithwa kweNADF kulindeleke ukuba lifinyelele indawo engaba ama-7 km², esikhathini nje esifushaneterm (ERM, 2018b). Ubukhulu bendawo udoti ozosakazekela kuyo, nokho, kwanxephezeleka ngenxa yokuthi ngeke kube wugqinsi kangako (< 5 mm) ebangeni elingaphezu kwama-50 m ukusuka endaweni yomthombo kawoyela futhi ngenxa yalokho amagalelo abhekwa **Njengaphansi kakhulu.**

Ngokusekelwe kulokhu kucubungula okungenhla nomcabango wokuthi izinyathelo zokulawula isimo ezichaziwe zizothathwa, ubungako bamagalelo amakhemikhali alimaza izilwane zasolwandle eNADF azoba **Mancane** (*Ithebula 7.11*).

Ngokusekelwe ekusebenzeni kohlelo lokunciphisa umonakalo kanye nokulawulwa kwezinto okungezansi, **ukuhlehliseka** kwamagalelo **kuphakathi nendawo** futhi nezinga **lokulahleka kwezinto Liphansi**, ukuphawuleka kwamagalelo ezinsalela zeNADF ezilwanyaneni eziphila olwandle kuzoqhubeka **Kukuncane** (*Ithebula 7.11*).

Izinyathelo Zokunciphisa Umonakalo Kanye Nezokuphathwa

Kutswa lezi zinyathelo ezilandelayo zokunciphisa umonakalo kanye nokuphathwa komsebenzi ukuze zisize ekulawuleni ukuchaphazeleka kwezilwanyana nezitshalo zasolwandle:

- Kuphinde kubhekwe ividiyo ethathwe ngeROV ngesikhathi sokuhlola kwangaphambi kokumba ukuze kubonakale izindawo ezinezinto ezingalimala ebangeni elingaba ama-500 m ukusuka endaweni okumbiwa kuyo;
- Kuqinisekwe ukuthi indawo okumbiwa kuyo iqhele ngebanga elingaphezu kwama-500 m ukusuka endaweni enezinto eziphilayo ezingaba sengozini;
- Ukukhetha kahle izinto ezenezelwayo eziwuketshezi kucatshangwa ngokushuba kwazo, ubuthi, ukutholakala kwamakhemikhali nethuba lokuba achaphazele izilwane;
- Kuqinisekwe ukuthi kusetshenziswa kuphela izinto zokwenezela ezibolayo;

- Kusetshenziswe imishini esezingeni eliphakeme yokulawula izinto eziyisigaxa ukuze kuncishiswe uketshezi kulokho okuphuma uma kumbiwa, ukuzama ukuphinde kusetshenziswe udaka olumbiwe, kuncishiswe isidingo sokushintsha uketshezi futhi kuncishiswe udaka oluyinsalela lokugcina; ukuba kuncishiswe ukutholakala kweNADF ezintweni eziphuma lapho kumbiwa, ukuba kusetshenziswe umshini wokomisa olawula izinto eziyisigaxa ovamile;
- Ukwandisa amathuba okuphinde kusetshenziswe iWBM neNADF ezingxenyeni ezihlukahlukene okumbiwa kukzo kanye nasekumbeni kweminye imithombo;
- Ukuqiniseka ukuthi kwenziwa itesti yase-*lab* njalo (ukuze kutholakale ubuthi, ukungcoliswa yi-*barite* kanye nokuba khona kukawoyela nokunye) emkhunjini ukuze kuqinisekwe ukuthi okuphuma lapho kumbiwa kanye nezathi zeWBM ziyavumelana nesilinganiso esivumelekile ngaphambi kokuba kuchithwe olwandle;
- Ukunciphisa iWBM esebenzile echitshwa olwandle; ukugwema udaka lweNADF oluchithwa olwandle; kanye
- Nokugcina isimiso sokulawula izinto eziyisigaxa sisebenza kahle njalo.

Ithebula 7.11 Izinga Lokuchaphazeleka Kwezilwane Zasolwandle Ngenxa Yamakhemikhali Alimaza Izinto Eziphilayo Okuhlobene Nezinto Eziphuma Lapho Kumbiwa Nasodakeni

Incazelo	Igalelo lokulinyazwa amakhemikhali akhona eWBM neWBM kokuphuma emgodini ombiwayo	iWBM nezinto ezikuyiWBM, amagalelo amakhemikhali ayinsalela	Okuqukethwe yiNADF kokumbiayo (akukho NADF echithwayo) amagalelo amakhemikhali ezilwaneni	Insalela yeNADF kokuphuma emgodini ombiwayo (akuchithwa NADF) Igalelo Lezinsalela Zamakhemikhali alimaza izilwanyana
Izinga	Kugxile endaweni	Kugxile endaweni	Kugxile endaweni	Kugxile endaweni
Ubude besikhathi	Isikhashana	Isikhashana	Isikhashana	Isikhashana
Isikali	Kuncane	Kuncane	Kuncane	Kuncane
Ukuhlehliseka	Liphakeme (lihlehlelisa ngokugcwele)		Kulingene (kuyahlehliseka kancane)	
Ukulahleka Kwezinto ezidingekayo	Kuphansi		Kuphansi	
Ubungako	Kuncane	Kuncane	Kulingene	Kuncane
Ukuzwela/Ukuba bucayi/UKubalule ka Kwezinto /Okuchaphazeleka yo	Kuphansi	Kuphansi	Kuphansi	Kuphansi
Ukuphawuleka Kwegalelo	Kuwubala	Kuwubala	Yinto engatheni	Kuwubala

Incazelo Ngesimo Semvelo Esiyisisekelo Nezinto Ezingaphazamiseka Kalula

Ulwandle ngokwemvelo luyindawo enomsindo futhi izilwane eziphila olwandle zihlale zizwa umsindo obangelwa umoya, imvula, amagagasi neminye imisindo yemvelo, noma imisindo yamaduna ezilwane zasolwandle afuna izinsikazi, ukuvikela indawo, ukudla, noma umsindo okhishwa esinye lapho sihlola okusemanzini (McCauley, 1994). Kucatshangwa ukuthi le misindo ibalulekile ezilwaneni eziningi zasolwandle ukuze ziqonde indawo ezikuyo ukuze zithole indlela, zigweme izilwane ezidla ezinye nokuba zifune ozakwabo bobulili obuhlukile. Ngakho, umsindo wemishini kungase kulindeleke ukuba uphazamise lezi zinto ezenziwa yizilwane zasolwandle nokuziphatha kwazo (NRC, 2003). Umsindo ongokwemvelo uyahlukahluka ngenxa yesimo sezulu nesimo solwandle, kusukela koyisilinganisa sika-80 kuya ku-120 dB re 1 μ Pa (Croft & Li, 2017).

Kuyo yonke imisindo edalwa abantu olwandle, ohlale ukhona owemikhumbi. Kuye ngobukhulu bomkhumbi nejubane lawo, amazinga omsindo wemikhumbi asukela ku-160 kuya ku-220 dB re 1 μ Pa at 1 m (NRC, 2003). Ikakhulukazi lapho unswininiza ngezinga lika-5 kuya ku-100 Hz, imikhumbi ehamba olwandle inomthelela omkhulu kakhulu emsindweni waselwandle emhlabeni jikelele, futhi ngaphansi kwezimo ezikahle, le misindo ingafinyelela ebangeni elingamakhilomitha abalelwa emakhulwini athile endaweni ebanzi (Coley, 1994, 1995; NRC, 2003; Pidcock *et al.* 2003). Izinga lemisindo edalwa yimikhumbi liba phakathi kuka-160 no-170dB re 1 μ Pa endaweni eseduze nalowo mkhumbi, ube uzwakalela esingeni lika-1 no- 500 Hz (McCauley, 1994; NRC, 2003).

Igalelo lomsindo owandayo obangwa yizinto ezenziwe umuntu ezilwaneni zasolwandle uyinto ekhathazayo emhlabeni kabanzi (Koper & Plön, 2012).

Izinga lomsindo obangelwa ukumba ufinyelela phakathi kuka-120 no-190 dB re 1 μ Pa endaweni enomkhumbi ombayo, imisindo evelelayo kuba yileyo engaphansi kuka-0.2 kHz, kuye ngohlobo lomkhumbi ombayo neminye imikhumbi ewusekelayo (Croft & Li, 2017).

Imikhumbi ehambahamba inomsindo omkhulu kunezinto zokumba ezakhiwe olwandle. Lokhu kubangelwa umsindo owengeziwe okhishwa ophephela bokugwedla umkhumbi kanye nendawo ebanzi umkhulu ofinyelela kuyo, okubangela ukundindizela kwamanzi okukhulu (uHurley no-Ellis, 2004).

Ngakho umsindo wangaphansi kwamanzi obanelwa umsebenzi wokumba emisebenzini evamile nakulona, ziyawuzwa izinhlanzi eziningi nezilwane zasolwandle, futhi uzwakala ebangeni elide impela (amashumi amakhilomitha) ngaphambi kokuba unciphe (*Ithebula 7.12*).

Ithebula 7.12 Amazinga Emisindo Okwaziwayo Ukuthi Iyenzwakala Nebanga Elifinyelelwa Yimisindo Ekhishwa Yizinhlobo Zezilwane Zasolwandle

Uhlobo Lwesilwane	Umkhakha	Izinga lokuzwa (kHz)	Umsindo okhishwayo (kHz)
AmaShellfish	iCrustaceans	0.1 – 3	
AmaSnapping shrimp	<i>i-Alpheus/ Synalpheus</i> spp.		0.1 – >200
Izinkalankala	i-Ocypode spp.		0.15 – 0.8
Izinhlanzi	i-Teleosts		0.4 – 4
Ochwepheshe Ekuzweni		0.03 – >3	
Ukuzwa okuvamile		0.03 – 1	
Izimfudu zolwandle	<i>i-Chelonia</i>	0.1 – 1	Unknown
Oshaka nama-skates	i-Elasmobranchs	0.1 – 1.5	Unknown
AmaSeals	i-Pinnipeds	0.25 – 10	1 – 4
Ama-elephant seal	<i>i-Mirounga agurostris</i>	0.075 – 10	
AmaManatees nama-dugongs	i-Sirenians	0.4 – 46	4 – 25
Imikhomo enamazinyo	i-Odontocetes	0.1 – 180	0.05 – 200
AmaBaleen whales	i-Mysticetes	0.005 – 30	0.01 – 28

Umthombo: iKoper & Plön 2012

Umsindo wangaphansi kwamanzi obangelwa yilo msebenzi ungathikameza izinhlobo eziningi zezilwane; kusekela ezilwanyaneni ezingenamgogodla nalezo ezikhasa phansi olwandle eduze komthombo, kanye nalezo zilwane ezinomgogodla nezingenawo ezihlala emanzini kanye neziphila maphezulu namanzi olwandle.

Izinhlobo zezilwane ezizophazanyiswa kakhulu umsindo kule Ndawo Yomsebenzi izimfudu zamanzi, izinyoni zasolwandle, izinhlanzi ezihambela phezulu ezifudukayo, izilwane zasolwandle ezincelisayo ezihlala endaweni nezifudukayo eziningi zazo ezibhekwa ‘njengeziseNgcupheni Yokuqothulwa’ emhlabeni jikelele (njengeSouthern Bluefin tuna), ‘Ezisengozini (njenge-whale shark, iFin, imikhomo iBlue neSei whale) ‘Ezilimala Kalula (njengofudu lwamanzi iLeatherback turtle short-fin mako, ushaka i-whitetip sharks, umkhoma i-sperm whale) ‘Ezisongelwayo’ (njengoshaka okuthiwa yi-blue shark) kanye ‘Nezingekho engozini kangako (njengemikhomo iHumpback neSouthern Right Whales.

Izinto Ezizokwenziwa Ezihlongozwayo Nezinyathelo Zangaphakathi Zokulawula

Ithebula elingezansi lifingqa imisebenzi ezokwenziwa ezobangela ukuba kube nomsindo emanzini.

Ithebula 7.13 Ukufingqwa Kwezinto Ezizokwenziwa Ezizodala Umsindo Ozophazamisa Izilwanyana Eziphila Emanzini

Isigaba somsebenzi	Okusokwenziwa
Ukulungiselela	Ukuthuthwa kwemikhumbi egubhayo nesekeleyo iya endaweni okuzombiwa kuyo
Ukusebenza	Ukusebenza komshini wokumba (kanye neVSP log ¹) nokwemikhumbi esizayo
Ukuphuthulwa	Umkhumbi othwele imishini yokumba / neminye imikhumbi esekelayo kuyasuka endaweni yokusebenza kuyela ogwini noma endaweni elandelayo

Ubungako bemisebenzi ezokwenziwa buphawulwe ngokwengeziwe ngezansi:

- Ukusebenza komkhumbi ombayo kanye neminye imikhumbi esekelayo phakathi kokuhamba kuyiwa endaweni yomsebenzi, phakathi nokumba uqobo lwakho, naphakathi nokuqhaqha kuzobanga imisindo eminingi emisha ngaphansi kwamanzi engase inezele noma yeqise ezingeni lomsindo ophazamisayo okhona kule ndawo.

Ukuphawuleka Kwegalelo

Umsindo wangaphansi kwamanzi osuka lapho kumbiwa khona umthombo ungase ubangele ushintsho endleleni yokuphila yezilwane zasolwandle noma uphazamise imisindo yemvelo eziyidingayo, kodwa akukho bufakazi bokuthi ukuziphatha kwalezi zilwane kuzoshintsha kakhulu futhi kuphazamise ukusebenza ngokubambisana kwemvelo (Perry, 2005).

Ushintsho endleleni yokuziphathwa kwezilwane ngokuvamile lungahlanganisa umkhuba onjengokubaleka endaweni enomsindo, kodwa futhi kwezinye izimo ukusondela kuleyo ndawo enomsindo. Ngokuvamile, izilwane ezincelisayo zasolwandle zinodlebe, futhi kunobufakazi bokuthi amazinga omsindo angaphezu kuka-90 dB re 1 μ Pa angalubangela ushintsho ekuziphatheni kuhlangukise ukubaleka kuleyo ndawo noma ukucindezeleka. Noma kunjalo, ulwazi olutholakalayo alunakusetshenziswa ukufinyelela iziphetho eziqinisekile (Moulton & Richardson, 2000) futhi ngokuvamile luchazwa ngokungeyikho.

Buyantuleka ubufakazi obuqinile wegalelo lomsebenzi wokumba ezilwaneni ezincelisayo zasolwandle; nokho, umphumela olindelekile ushintsho ekuziphatheni, ngokuvamile okuhlangukise ukubaleka endaweni enomsindo.

¹ Umsindo okhishwa yiVSP log ubhekwa njengophansi ngenxa yokuthi owesikhashana kodwa iNkampani izithathile izinyathelo zokwenezela zokuqapha futhi zichaziwe kule ngxenye

ISouthall *et al* (2007) yathola ukuthi izilwane zasolwandle ezizwa imisindo ephansi (njengemikhoma emikhulu ama-baleen whales) ngokuvamile ziqala ukugwema indawo enomsindo nokubonisa ezinye izimpawu zoshintsho ekuziphatheni emisindweni ephakathi kuka-120 no-160dB re 1 μ Pa ebangeni eliphakathi kwama-10 m nama-3.5 km ukusuka emkhunjini ombayo. Indlela ezisabela ngayo izilwane zasolwandle ezizwa imisindo ephakathi nendawo (njengezinhlobo zama-dolphin nemikhoma i-toothed whales) emisindweni engaphikeleli iyahlukahluka futhi ayinaso isiphetho esicacile oshintshweni ekuziphatheni (iSouthall *et al*, 2007).

Komunye umsebenzi wokumba umthombo owenziwa olwandle oluseningizimu yeNamibia (SLR, 2017), kwalinganiselwa ukuthi umsindo osuka ezintweni ezenziwa kuprojekthi uyancipha uba ngaphansi kwezinga eliphakathi nendawo (100 dB re 1 μ Pa) ebangeni eliphakathi kuka-14 kuya ku-32 km ukusuka endaweni okumbiwa kuyo, kuye ngohlobo lomkhumbi osetshenziswayo, inani lemikhumbi esekelayo esebenza kuleyo ndawo kanye nezinye izimo. Imisebenzi yokulungisa iyona eyabonisa izimo zomsindo ezimbi kakhulu, nakuba lokhu kulindeleke ukuba kwenzeke isikhathi esifushane kuphela (Croft & Li, 2017). Nokho, izinga legalelo lomsindo, lungase lwencike nasemisindweni engemuva ngenxa yesimo sezulu kanye nokuthi eminye imikhumbi edlulayo ihambela kude kangakanani (engasebenzi kule projekthi).

Igalelo lomsindo ongaphansi kwamanzi obangelwe ukumbiwa komthombo nayimikhumbi embayo nesekelayo ezilwaneni zasolwandle libhekwa **Njengeliphansi** endaweni okumbiwa kuyo naphakathi nomkhankaso wokumba. Ekugcineni kungaphethwa ngokuthi ngeke lube khona ushintsho ekusebenzeni kwemvelo ngokubambisana njengoba lokhu kungokwesikhashana.

Ngokusekelwe ezimweni zemvelo eziyisisekelo okuxoxwe ngazo *eSahlukweni 4*, **ukuphazamiseka** kwezinto eziphila endaweni ngokuqondene nokusitheka kwemisindo eziyidingayo lezi zinto ngenxa yomsindo ongaphansi kwamanzi kuzoba **Kukhulu** ngenxa yokuba khona kwezinhlobo zezinto eziphilayo ezidinga ukuvikelwa Endaweni Yeprojekthi. **Ukuphazamiseka** kwezinto eziphila endaweni okuholela ukuba zigweme umsindo ngokusuka kuyoba **Phansi** ngenxa yebanga okumbiwa kulo ukusuka ogwini.

Ngokusekelwe ekuhlaziyeni okunikezwe ngenhla, igalelo lomsindo ongaphansi kwamanzi ekwenzeni ukuba imisindo yemvelo ingezwakali libhekwa **Njengeliphansi** ngisho noma kungancishiswa galelo, kuyilapho igalelo lomsindo ongaphansi kwamanzi eliholela ekugwemeni ukudla kanye / noma ukuzalana kwezilwane endawnei **Alibonakali Nhlobo** ngisho noma kungekho zinyathelo zokunciphisa igalelo ngenxa yokuthi umsebenzi wenzelwa kude nogu (*Ithebula 7.14*).

Izinyathelo Zokunciphisa Amagalelo Nokuphathwa Komsebenzi

Kutuswa izinyathelo zokunciphisa igalelo nokuphathwa komsebenzi ezilandelayo ukuze kusizwe ekusingatheni amagalelo ezinto ezinzeka ngaphansi kwamanzi ezingaphazamisa izilwane zasemanzini:

Ngezinga okungenzeka ngalo, imikhumbi esebenza kule projekthi kufanele ihlanganise izinyathelo zokunciphisa umsindo emanzini ngale ndlela:

- Imikhumbi kufanele ilungiswe njalo ukuze ingabi nomsindo okuhlanganisa ukuhlanza ophephela bayo kanye nomzimba oba ngaphansi emanzini; kanye
- Ngaphambi kokutholakala kweVSP log, njengesinyathelo sokwenezela sokuqapha, kuzoba nengqapheli yezilwane eziphila emanzini emkhunjini ombayo futhi ibheke indlela yokusebenza.

Igalelo Eliyinsalela

Ngokusekelwe ekusebenzeni kwezinyathelo zokuphatha ezihlongoziwe, **ukuhlehliswa** komonakalo odalwe amachaphazelo **Kusezingeni eliphakeme** nezinga **lokulahlekwa kwezinto ezidingekayo Liphansi**. Ukuphawuleka kwegalelo eliyinsalela lomsindo wokumba ngokusitha imisindo yemvelo kuzolokhu kuphansi, kanti igalelo somsindo wasemanzini oholela okugwemeni indawo kwezilwane kanye / noma ukuyeka ukuzalana kwazo **Alikho nhlobo** (Ithebula 7.14).

Ithebula 7.14 Ubungako Bokuphazamiseka Kwezilwane Zasemanzini Ngenxa Yomsindo Wangaphansi Kwamanzi Odalwa Umsebenzi Wokumba

Incazelo	Igalelo lokusithaka Kwemisindo	Igalelo lokusithaka eliyinsalela	Igalelo Lokugwema indawo	Igalelo Lokugwema Eliyinsalela
Izinga	Lisendaweni	Lisendaweni	Lisendaweni	Lisendaweni
Ubude besikhathi	Isikhashana	Isikhashana	Isikhashana	Isikhashana
Isikali	Sincane	Sincane	Sincane	Sincane
Ukuhlehliseka	Liphakeme (lihlehlika ngokugcwele)		Liphakeme (lihlehlika ngokugcwele)	
Ukulahleka Kwezinto ezidingekayo	Kuphansi		Kuphansi	
Ubungako	Buncane	Buncane	Buncane	Buncane
Ukuzwela/Ukuba bucayi/UKubaluleka Kwezinto /Okuchaphazelekayo	Kuphakthi nendawo	Kuphakthi nendawo	Kuphansi	Kuphansi
Ukuphawuleka Kwegalelo	Kuncane kakhulu	Kuncane kakhulu	Kuwubala	Kuwubala

Ukuphazamiseka Kwezilwane Zasolwandle Kanye Nezinyoni Zasolwandle Ngenxa Yomsindo Wendiza Enophephela Esiza Kulo Msebenzi Wokumba

Incazelo Ngesimo Semvelo Esiyisisekelo Nezinto Ezingaphazamiseka Kalula

Umsindo odalwa yizindiza ezithathwa abasebenzi zibasusa eThekwini zibayhisa eRichard's Bay kanye nodalwa umkhumbi ombayo ungaziphazamisa izinyoni zasolwandle ekuzaleleni kwazo nasekwakheni izidleke ogwini. Izindiza ezihambela phansi olwandle zingaziphazamisa nezilwane zasolwandle kanye nezimfudu zamanzi eziseduze neNdawo Yomsebenzi.

Imisindo ephawulekayo yezinjini zezindiza (phakathi kuka-10 no-550 Hz) ingena emanzini njengemisindo ehlabayo (ama-26° emanzini angenamagagasi amakhulu) ngaphansi nje kwaleyo ndiza, bese wanda uma kuba namandla omoya >2 (kusho iRichardson *et al.*, 1995). Izinga lomsindo ofinyelela ngaphansi kwamanzi lihlobene nokuthi indiza leyo indizela phansi kangakanani.

Ulwazi olutholakalayo okwamanje lubonisa ukuthi izinga lemisindo elindelekile nokuzwakala kwalena eminingi ekhishwa yizindiza nophephela kuyayithinta indlela yokuzwa yemikhoma efana nama-ballen whales kanye nemikhomo enjenge-toothed whale (Richardson *et al.* 1995; Ketten, 1998). Ukuthola ukuthi lezi zilwane zizosabela kanjani kulezi zindiza ezidlulayo kunzima nokho, ngenxa yokuthi ukuhlola lesi simo kwenziwa kuyo ngokwayo indiza ephazamisayo (Richardson & Würsig, 1997), noma emkhunjini omncane oseduze.

Ucwaningo lwembule ukuthi ukusabela ezindize ezidlulayo kuyahluka ezinhlotshenzi ezifanayo nezihlukahlukene, futhi kusukela ekungawunakingi kuya ekuphazamisekeni okuphawulekayo.

Ucwaningo oluningi luthole ukuthi ukusabela kuholele ekutheni izilwane ziphawule imisindo noma izinto ezizibonao eziyisixwayiso (indiza kanye /noma isithunzi sayo).

Njengoba kungase kulindeleke, ukuzwela kwemikhuma ekuphazanyisweni yizindiza kuyancipha lapho kunebanga elizihlukanisile elikhulu, noma umzila wendiza useceleni noma uphazamisana nomoya, noma uma isithunzi sayo singazange sidlule phezu kwesilwane leso (Watkins 1981, 1986; Smultea *et al.* 2008). ISmultea *et al.* (2008) yaphetha ngokuthi ukusabela okwabhekwa kwemikhoma ezindizeni ezithi shwi kwaba okwesikhashana futhi kwezinye izigameko akubanga nhlobo negalelo kwezemvelo kanti iStewart *et al.* (1982) yasikisela ukuthi ukuphazamiseka kungaqedwa noma kuncishiswe ngokugwema ukundiza ngokuqondile phezu kwemikhoma nangokundizela ebangeni lokuphakama elingama-300 m phezu kwamanzi.

Nokho, ukuchayeka ngokuphindaphindiwe noma isikhathi eside ezindizeni ezidlula phezu kolwandle kungakuphazamisa ukusebenza kwemvelo, ikakhulu ezindaweni zokunakekelwa kwezilwane ezibalulekile, izindawo zokudla nezokuzalela (Richardson *et al.* 1995). Imikhoma amaHumpback yacishe yasuka ngokuphelele emanzini aseMpumalanga Yogu phakathi nokuzingelwa kwemikhomo osekuwumlando futhi isanda nje kubuya ohambweni lwayo lokuyozala oluseMozambique. Lezi zinhlobo ziyabonakala phakathi nolwandle oluqondene Nempumalanga Yogu phakathi kukaMeyi noFebhuwari, futhi ibonakala ngobuningi ngoJuni kanye noNovemba/noDisemba (iBanks, 2013).

Izinga lokuphazamiseka lincike nasebangeni lokuqhela nokuphakama kwendiza ukusuka ezilwaneni (ikakhulu uhlangothi indiza engakulo nesilwane emanzini) kanye nezimo zasolwandle ezihlale zikhona.

Izingozi izinyoni eziba kuzo ngenxa yendiza zihlanganisa ukushayiswa kanye nokuphazamiseka, okuyinto eshiyanayo ngamazinga. Ukuchaphazeleka okungekuhle kokuphazamiseka kwezinyoni okubangelwa yizindiza kwahlolwa uDrewitt (1999) futhi kuhlangukisan ukulahlekelwa yindawo esebenzisekayo yokuhlala, ukuncipha kwezinga lokuhla nokuphumula kwezilwane kanye nesimo somzima esingasihle, ukungazali kahle nokushintsha kokwakheka komzimba. Izinyoni ezizalelayo nezifukamayo nazo zingawashiya dengwane amaqanda namachwane, okuyophazamiseka ukuchamiseleka kwawo noma ukukhula kwamaphuphu (Zonfrillo, 1992).

Izindlela ezihlukahlukene zokusabela ezinhlotsheni ezingefani zezindiza nazo ziye zaphawuleka, izindiza ezinophephela ziphazamisa kakhulu kunezindiza ezinamaphiko. Imiphumela yocwaningo lwezindiza ezincane ezidlula phezu kwendawo egcwala izinyoni eGerman Wadden Sea yabonisa umkuthi izindiza ezinophephela ziphazamisa njalo (100 %), kulandele ama-*jet* (84 %), izindiza ezincane (56%) bese kuba izikebhe ezidumayo (50 %) (Drewitt, 1999).

Ukuphazamiseka kalula kwezinyoni ngenxa yezindiza akuyi ngohlobo oluthile kuphela, kodwa ngokuvamile kuyancipha kuye ngebanga, noma uma umzila wokundiza useceleni noma uphazamisana nomoya. Ibanga ukwehla nokuqhela elibangela ukuphazamiseka liyahluka kakhulu, njengoba kubikwe ukuthi umsindo ovamile omkhulu wokuhlala nokusuka kwezindiza awuziphazamisi izinyoni ezinjengama-*gulls*, ama-*lapwings*, i-*ospreys* kanye nohlobo lwenyoni okuthiwa yi-starling, uma kubalwa ezimbalwa (kuhlolwe kuyiDrewitt, 1999).

Kudingeka kwenziwe umsebenzi othe xaxa ukuze kuhlolwe amagalelo alo msindo, njengoba ubufakazi bembula ukuthi lapho umsindo wemvelo uqhubeka uphakeme (njengobangwa umoya namagagasi), ukubona isithunzi noma into ezayo kungaba nomthelela ekuphazamisekeni. Kunendawo eyi-Important Bird Area (IBA) eRichards Bay, engasemzileni wezindiza osuka esikhumulweni saseRichard's Bay ukuya endaweni esenyakatho ehlongozwayo ukuba kumbiwe kuyo umthombo.

- *Izinto Okuhlongozwa Ukuba Zenziwe Nezinyathelo Zangaphakathi Zokulawula*

Ukuthuthwa kwabasebenzi ngendiza enophephela besuka eRichards Bay / eThekwini bese endaweni okumbiwa kuyo umthombo, phakathi nomsebenzi, kuzodala umsindo emkhathini ongase uphazamise izinyoni zasolwandle nama-seals.

Umshayeli wendiza kufanele ahloniphi le mithetho yaseNingizimu Afrika:

- Umthetho Kazwelonke Okuphathwa Kwezemvelo: Umthetho Wezindawo Ezivikelwe (ka-2003) uthi izinga lokwehla kwendiza lapho idlula izindawo zemvelo, iziqiwi nezindawo zamagugu esizwe kufanele kungabi ngaphansi kwama-762 m (2,500 ft).
- Umthetho Wezilwane Eziphila Olwandle (ka-1998) uyakwenqabela ukuba indiza usondele ngama-300 m emkhomeni. Ngakho, ngaphandle kwalapho indiza ihlala phansi, lapho indiza izophakama ngama >300 m.
- Ukusebenza kwezindiza ezinophephela nezinamaphiko kulawulwa uMthetho Wezinto Ezindizayo Wakulaleli [Civil Aviation Act (No. 13 ka-2009)] neminye imithetho ehambisana nawo.
- *Ukuphawuleka Kwegalelo*

Ukundizela phansi ngokunganaki kwezindiza zidlule phezu kwemikhoma, imihlambi yezinyoni zasolwandle nezimfudu lapho zisekela umkhumbi ombayo kungaziphazamisa lezi zilwane nendlela yazo yokuphila nokuzalana. Izinga lokuphazamiseka liyoya ngebanga nokuphakama kwendiza ukusuka esilwaneni (ikakhulu uhlangothi emanzini) kanye nezimo ezikhona olwandle kungaba **Kuncane** noma kube **Kukhulu**.

Nakuba la magalelo ezogxila endaweni eyodwa futhi abe awesikhashana, azobangelwa cishe ukundizela phansi ngakho angase abe nemiphumela engemihle ezinhlotsheni ezithintekayo. Ngokusekelwe esimweni semvelo esiyisisekelo okuxoxwe ngaso kuSahluko 4, **ukuzwela kalula** kwezilwane kule ndawo **Kuphakeme**.

Ngokusekelwe ekuhlaziyeni okungenhla, igalelo lomsindo wezindiza ezinophephela ezilwaneni zasemanzini lizoba **Elilingene** (Ithebula 7.15).

Izinyathelo Zokunciphisa Umonakalo Nokuawula

Kutswa lezi zinyathelo ezilandelayo zokunciphisa umonakalo nokuqondisa ukuze zisize ekulawulweni kwegalelo lokuphazamiseka kwezinto eziphila olwande ngenxa yomsindo wezindiza:

- Ukuhlela imizila ezohamba indiza kusengaphambili ukuze kuqikelelwe ukuthi akukho ndiza ezodlula pheze kwama-IBA;

- Ukugwema ukundizela phansi ngasogwini (<914 m ebangeni elisondele ngama-2 km ogwini);
- Imizila yezindiza exhumanisa izindaweni ezisezweni nomkhumbi ombayo osolwandle kufanele iqonde ngqo ogwini;
- Kufanele ngaso sonke isikhathi izindiza zihambe ebangeni lokuphakaama elingama >305 m, ngaphandle kwalapho indiza ihlala noma isuka emkhunjini ombayo nasendaweni esezweni egcina izinto;
- Kufanele kundizelwe ebangeni lokuphakama okungenani elingama-914 m eZindaweni Ezivikele Izilwane Zasolwandle;
- Abasebenza ngenkontileka kufanele bahloniphe imithetho neziqondiso zezindiza; kanye
- Mabachazelwe bonke abashayeli bezindiza ngezinguzi emvelweni ezihlobene nokundizela phaansi phezu kolwandle noma phezu kwezilwane zasolwandle.

Igalelo Eliyinsalela

Ngokusekelwe ekusetshenzisweni kwezinyathelo zokunciphisa ukuchaphazeleka nokulawula izinto, **kungenzeka ngokusesilinganisweni ukuhlehlisa** izinga lokuchaphazeleka nezinga **lokulahleka kwezinto ezidingekayo** liphansi, igalelo eliyinsalela ezilwaneni zasolwandle elidalwa ukumba lizonciphisa libe **Phansi** (*Ithebula 7.15*).

Ithebula 7.15 Igalelo Lomsindo Wezindiza Ohlobene Nokkumba Ezilwaneni Zasolwandle Nasezinyonini

Incazelo	Igalelo	Igalelo Eliyinsalela
Izinga	Lisendaweni	Lisendaweni
Ubude besikhathi	Sifushane	Sifushane
Isikali	Sincane	Sincane
Ukuhlehliseka	Kuphakathi nendawo (kuyahlehliseka)	
Ukulahleka Kwezinto ezidingekayo	Kuphansi	
Ubungako	Kuncane kuya kokukhulu	Kuncane
Ukuzwela/Ukuba bucayi/UKubaluleka Kwezinto /Okuchaphazelekayo	Kuphakathi nendawo	Kuphakathi nendawo
Ukuphawuleka Kwegalelo	Kulingene	Kuwubala

7.3.7 Ukuphazamiseka Kwezilwane Zasolwandle Kanye Nezinyoni Ngenxa Yomsebenzi Wokumba

Incazelo Ngesimo Semvelo Esiyisisekelo Nezinto Ezingaphazamiseka Kalula

Imisebenzi yokumba izobe iphakathi olwandle kwezemvelo ezisolwandle, amakhilomitha angu-62 ukusuka osebeni, ikude nezindawo okuhlala kuzo izinto ezingase ziphazamiseke zasogwini (njengemihlambi yezinyoni), kodwa isengakuphazamisa ukuphila kwezinhlobo zezilwane ezifuduksayo kuzo zombili lezi zindawo ezihlolwayo.

Izinhlobo zezilwane ezisengcupheni kakhulu yokuphazamiseka eNdaweni Yomsebenzi yizinyoni eziphila olwandle, nakuba izimfudu zasemanzini, izinhlanzi ezifudukayo, imikhombo yendawo nefudukayo zingase zidonswe ukukhanya.

Izinto Okuhlongozwa Ukuba Zenziwe Nezinyathelo Zangaphakathi Zokulawula

Ithebula elingezansi lifingqa imisebenzi ezobangela ukukhanya okuseduze:

Ithebula 7.16 Ukufingqwa Kwemisebenzi Ezokwandisa Ukukhanya

Isigaba somsebenzi	Umsebenzi
Ukulungiselela	Ukuthuthwa kwemikhumbi yokumba nesekelayo iya endaweni yomsebenzi
Ukusebenza	Ukuseshayelwa komkhumbi ombayo nesekelayo Ukukhanya ngesikhathi sokuhlola
Ukuphuthula	Umkhumbi ombayo / nemikhumbi esekelayo isuka endaweni yokusebenza iya ogwini noma endaweni elandelayo

Le misebenzi ichazwe kabanzi ngezansi:

- Ukuthuthwa nokusebenza kwemikhumbi yokumba nesekelayo. Ukukhanyisa umkhumbi wokumba nemikhumbi esekelayo kungase kube umthombo omkhulu wokukhanya okungekhona okwemvelo phakathi olwandle; futhi
- Phakathi nokutesta kungase kudingeke ukukhiphela emoyeni omunye uwoyela negesi okufika phezu kwamanzi. Ukukhiphela emoyeni kuphinde kube yisinyathelo zokuphepha esibalulekile sokuqinisekisa ukuthi igesi namanye ama-*hydrocarbon* kulahlwa ngokuphepha laphe kuba nesimo esiphuthumayo, kunqamuka ugesi noma kufa umshini noma ezinye izinto eziphazamisa iplanti. Ukukhiphela uwoyela emoyeni nokuwushisa kukhipha ukukhanya okukhulu emshinini wokumba.

Amagalelo okukhanya okukhulunywa ngawo ngenhla ngokuyinhloko azoba sendaweni yomthombo emzileni wemikhumbi esekelayo laphe isuka emkhunjini ombayo iya ogwini eThekwini noma eRichard's Bay.

Ubungako Begalelo

Nakuba kukuncane okungenziwa phakathi olwandle kuze kunqandwe ukushayiseka kwezinyoni zasolwandle, imibiko yokushayiseka kwezinyoni noma ukufa kwazo endaweni okumbiwa kuyo iyivelakancane. Kulindeleke ukuthi izinyoni zasolwandle kanye nezilwane zasolwane zijwayelane nemishini yokumba esolwandle ngemva nje kwezinsukwana, okwenza ukuphazamiseka kwalezi zinto kungabi yinto etheni. Ubungako bokuzingelana kwezinhlanzi nama-*squid* ngenxa yokukhangwa ukukhanya okusendaweni yokusebenza **Ngeke kube kukhulu.**

Ukwanda kokukhanya okungekhona kwemvelo olwandle **ngeke kube negalelo elikhulu** futhi kuzophelela endaweni okumbiwa kuyo isikhathi esifushane. Ngenxa yokuqhela ogwini kwezindawo ezihlosiwe **ukuphazamiseka** kwezilwane ngeke kube **kukhulu**.

Ngokuqondene nemikhumbi esuka eThekwini noma eRichard's Bay ukwanda kokukhanya kuzophelela endaweni eseduze kwemikhumbi leso sikhathi esifushane futhi ngeke **Kuphazamise kangako**. Ngenxa yokuhamba kwemikhumbi isuka ezweni iya endaweni yokusebenza phakathi olwandle **ukuchaphazeleka** kwezilwane eziphila emzileni kuzoba **Okulingene**.

Ngokokuhlaziya okungenhla, igalelo lokukhanya okuphuma emikhunjini yomsebenzi ezilwaneni zasolwandle kuzoba **Yinto engatheni** (*Ithebula 7.17*).

Izinyathelo Zokunciphisa Igalelo Nokulawula

Kutswa lezi zinyathelo zokunciphisa igalelo nokulawula ezilandelayo ukuze kusizwe ekulawuleni amagalelo okuphazamiseka kwezilwane zasolwandle ngenxa yokukhanya okungekhona kwemvelo:

- Ukukhanya okusemikhunjini ombayo nakwesekelayo kufanele kubekwe ezingeni eliphansi ngokuvumelana nezinga lokukhanya elanele ukuba kusebenzeke uma kungenzeka. Uma kungenzeka futhi kuvumelana nemithetho yezokuphepha, izibani kufanele zibekwe endaweni ezokwenza ukuba zingayikhanyisi kakhulu imvelo ezungezile; futhi
- Izinyoni zasolwandle zingagcinwa zivalelwe kodwa zingalinyazwa endaweni emnyama bese zidedelwa emini sekukhanya. Izinyoni ezilimele kufanele zilashwe ngobunono. Uma kunezinyoni ezifakwe uphawu kufanele zibikwe kubanikazi balolo phawu olufakwe kuzo (iringi esuke ifakwe enyonini iba nayo imininingwane).

Igalelo Eliyinsalela

Ngokusekelwe ekusetshenzisweni kwezinyathelo zokunciphisa umonakalo nokulawula ezisikiselwe, **ukuhlehliseka** kwegalelo **Kukhulu** kanti nezinga **lokulahleka kwezinto ezidingekayo Liphansi**, igalelo lokukhanya ezilwaneni eziphila olwandle **Liphansi kakhulu** (*Ithebula 7.17*).

Ithebula 7.17 Ubungako Begalelo Lokukhanya Okuvela Emkhunjini Wokusebenza Ezilwaneni Zasolwandle Nasezinyonini

Incazelo	Igalelo	Igalelo Eliyinsalela
Izinga	Liphansi	Liphansi
Ubude besikhathi	Isikhashana	Isikhashana
Isikali	Lincane	Lincane
Ukulehliseka	Liphakathi nendawo (liyahlehliseka kancane)	
Ukulahleka Kwezinto ezidingekayo	Liphansi	
Ubungako	Liwubala	Liwubala
Ukuzwela/Ukuba bucali/UKubaluleka Kwezinto /Okuchaphazelekayo	Lilingene	Liphansi
Ukuphawuleka Kwegalelo	Liwubala	Liwubala

7.4 IMISEBENZI EHLELILE: UKUCHAPHAZELEKA KWEZENHLALO OKUYINHLOKO

Ngezansi kuhlaziywa ukuchaphazeleka kwezenhlalo futhi kuhlenganisa:

Ithebula 7.18 Ukufingqwa Kokuhlaziywa Kokuchaphazeleka Kwezenhlalo

Igalelo	Ingxenye
Ukudaleka Kwamathuba Omsebenzi	7.4.1
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Okungenakwenziwa	7.4.5

7.4.1 Ukudaleka Kwamathuba Omsebenzi

Incazelo Ngesimo Semvelo Esiyisisekelo Nabachaphazelekayo

Ukuntuleka kwemisebenzi kuyi-ADI, (kuMasipala waseThekwini kanye noMasipala waseMhlathuze) kuyahlukahluka, kodwa izinga lokuntuleka kwemisebenzi ngaphansi kukaMasipala waseMhlathuze LM liphakeme (ngamaphesenti angu-40) kanti kuMasipala waseThekwini MM liphansi ngokuphawulekayo (ngo-16 wamaphesenti).

Kunesidingo esikhulayo sabasebenzi abanamakhono e-ADI, noma kunjalo, amakhono asantuleka kubantu. Kulinganiselwa ukuthi ikota yomphakathi isiphothulise isikole samabanga aphakeme kanti babalelwa kumaphesenti ayi-8 kubanti abangaphansi kwe-ADI abathole imfundo yasekolishi noma enyuvesi (kusho iStatsSA).

Izinto Okuhlongozwa Ukuba Zenziwe Nezinyathelo Zangaphakathi Zokuthuthukisa

Le projekthi akulindlekile ukuba idale amathuba emsebenzi abantu abahlala kuyi-ADI.

Umkhumbi ombayo uzodinga abantu abangaba ngama-200 futhi ngenxa yobufushane bawo namakhono adingekayo abantu abachwepheshile, iningi labazosebenza kuzoba abantu ababuya ngaphandle.

Into encomekayo ukusetshenziswa kwemikhumbi yakuleli nabasebenzi bayo ukuba balethe izinto ezidingekayo. Inani labantu abazosebenza emkhunjini ngamunye lizohluka kuye ngobukhulu bawo uhlobo lomsebenzi wokusekela owenziwayo. Kulindeleleke ukuba kusayiniswe inkontileka nemikhumbi ekhona kanye nabasebenzi bayo futhi akukho bantu abasha abazovulekelwa amathuba omsebenzi.

Kuzoqashwa abantu abaphakathi kwabahlanu nabayishumi besikhashana ezindaweni zokusebenza ezisezweni. Abanye babo kuzobe kungabasebenzi bakwa-Eni abakhona kwamanje.

Ukufingqwa kwemisebenzi ezokwenziwa namathuba omsebenzi kwethulwe *Thebula 7.19*.

Thebula 7.19 Ukufingqwa Kwemisebenzi Yeprojekthi Ehlobene Nokudaleka Kwamathuba Omsebenzi

Isigaba somsebenzi	Okuzokwenziwa
Ukulungiselela	Ukuthuthwa kwemikhumbi yokumba nesekeleyo kuya endaweni yokusebenza kanye nabasebenzi.
Ukusebenza	UKusebenza komkhumbi ombayo nesekeleyo kusetshenziswa abasebenzi abavele bekhona nemikhumbi esekelayo yakhona endaweni.
	Ukusebenza kwesikhashana kwendawo esezweni eThekwini naseRichards Bay.
Ukuphuthula	Umkhumbi ombayo uyasuka endaweni ebimbiwa ubuyela ezweni noma udlulela endaweni elandelayo nabasebenzi abakuwo. Izinkontileka ezisayinwe nemikhumbi ziyaphela.

Ubungako Begalelo

Igalelo lokudaleka kwamathuba omsebenzi lingaphawulwa ngokuthi likhona futhi lisondile. Ngokwezinga elithile kuzoba khona kuleli kuye ngokutholakala kwamakhono kubantu. Kuzoba okwesikhashana ngenxa yomsebenzi wokuhlola omfushane. Kulabo abazowuthola umsebenzi, nakubanikazi bemikhumbi yakuleli abazosayina izinkontileka zalo msebenzi, izinga legalelo lizoba phakathi nendawo futhi kuzoba yinto yasikhathi sonke kuze kuphothulwe.

Izinga legalelo **Lihle**, futhi **akuyona into etheni** uma sicabangela iqiniso lokuthi umsebenzi ozodaleka umbalwa (abahlanu kuya kwabayishumi abazoqashwa) emphakathini wendawo futhi iningi lomsebenzi uzofezwa abantu bokuhamba. Igalelo lalokhu kubonakala **Liyinto Engatheni** (*Ithebula 7.20*).

Izinyathelo Zokudambisa Nokulawula

Inhloso yokudambisa umonakalo nokulawula ukwakha amathuba omsebenzi kubantu bendawo, lapho kungenzeka khona.

- Le projekthi izosungula isimiso sokuqasha esizogxila kubantu baseNingizimu Afrika nabasezindaweni eziseduze nomsebenzi (abahlala endaweni kaMasipala Wendawo) ezindaweni esisezweni esikhundleni sokuqasha abantu bakwamanye amazwe, lapho abakuleli benawo amakhono adingekayo nolwazi lomsebenzi. Kuzokwenziwa uhlelo lokuqasha kuqala izakhamuzi zendawo bese kuba abanye abavela khona eNingizimu Afrika lapho kuqashwa.
- Kuzoqashwa izinkampani zemikhumbi zaseNingizimu Afrika kuqala ukuba sisekele nokuba zilethe izinto ezidingekayo ezisezingeni lomhlaba ezisetshenziswa lapho kumbiwa uwoyela negesi.

Igalelo Eliyinsalela

Ngokusekelwe ekusetshenzisweni kwezinyathelo zokuthuthukisa ezisikiselwe **ukuhlehliswa** kwegalelo **Kuphakeme**. Ngeke kulahleke lutho futhi igalelo **Liphansi** (*Ithebula 7.20*).

Ithebula 7.20 Ubungako Bamagalelo Ahlobene Nokudaleka Kwamathuba Omsebenzi

Incazelo	Igalelo	Igalelo Eliyinsalela
Izinga	Kuleli	Kuleli Nasamhlabeni
Ubude besikhathi	Isikhashana	Isikhashana
Isikali	Liphakathi	Liphakathi
Ukuhlehliseka	Liphakeme (lihlehlelisa ngokugcwele)	
Ukulahleka Kwezinto ezidingekayo	Akusebenzi	Akusebenzi
Ubungako	Kuhle	Kuhle
Ukuzwela/Ukuba bucayi/UKubaluleka Kwezinto /Okuchaphazelekayo	Kuphansi	Kuphansi
Ukuphawuleka Kwegalelo	Kuwubala	Kuwubala

7.4.2 Igalelo Lokuba Khona Kwendawo Ebekelwe Eceleni Yokudoba Ngenjongo Yebhizinisi

Incazelo Ngesimo Semvelo Esiyisisekelo Nabachaphazelekayo

Njengoba kuchaziwe kuSahluko 4, okuwukuphela kwendawo yokudoba engqubuzana nezindawo okuzombiwa kuzo yi-*pelagic longline fishery*.

Kusukela ngo-2000 kuya ku-2014, le mboni igxilise amaphesenti angu-1.95 kanye angu-2.32 emizamo yayo isiyonke ezindaweni ezisenyakatho naseningizimu yendawo ehlokelwe lo msebenzi.¹ Inani lezinhlanzi ezitholakele kulezi zindawo lingamaphesenti angu-2.34 (46.5 t) nangu-1.98, (39.2 t) azo zonke izinhlanzi ezitholakele.

Izindawo zokudoba ngezindoba eziphonswayo kanye nezokudoba ama-prawn ngamanetha zaKwaZulu-Natali ziyahlangana nendawo egunyazelwe ukuhlola okumbiwa phansi i-Exploration Rights Area 236. Nokho, abukho ubufakazi bokuthi kukhona lapho lezi zindawo zihlangana khona nale ndawo okuhlongozwa ukuba kuyombiwa kuyo nezindawo okudotshwa kuzo izinhlanzi nokubanjwa kuzo ama-prawn ngamanetha.

Indawo yaKwaZulu-Natali yokudoba izinhlanzi isebangeni elingaba ama-10 km kuya kuma-35 km ukusuka ogwini olusenyakatho noluseningizimu yezindawo ezihlongozwayo, ngakho akukho kuchaphazeleka kwezindawo zokudoba okulindelekile.

Izindawo zokudoba ngamanetha zaKwaZulu-Natali okudotshwa kuzo ama-prawn zisebangeni elingaba ama-35 km kuya kuma-30 km ukusuka ogwini olusenyakatho noluseningizimu yezindawo ezihlosiwe, futhi ngenxa yalokho

¹ Izindawo zokudoba ziphawulwa lapho kuqala khona ukudoba ngozingi. Izindobo zizoqala ngaphandle kwendawo ehlongozwayo okuzombiwa kuyo umthombo futhi ingase isondele kulezi zindawo. Njengomzamo wokufaka zonke izindawo zokudoba, zibale zonke ezibanjiwe nomzamo obikiwe ngaphakathi nangaphandle kwemingcele yendawo okufuneka kuyo okumbiwa phansi ibanga elingama-40 km.

akukho kuchaphazeleka kwezindawo okudotshwa kuzo izinhlanzi ezinamagobolondo okulindelekile.

Izinto Okuhlongozwa Ukuba Zenziwe Nezinyathelo Zangaphakathi Zokuthuthukisa

Ithebula elingezansi lifingqa izinto ezizokwenziwa kule projekthi ezizoba negalelo embonini yezokudoba.

Ithebula 7.21 Ukufingqwa Kwezinto Ezizokwenziwa Kuyiprojekthi Ezizoba Negalelo Embonini Yokudoba Ngenxa Yokuba Khona Kwendawo Ebekelwe Eceleni

Isigaba somsebenzi	Okuzokwenziwa
Ukulungiselela	Akukho
Ukusebenza	Ukuba khona kwendawo engama-500 m engathintwa eduze nomkhumbi wokumba
Ukuphuthula	Ukushiywa phansi kwesihloko somthombo ngemva kokuyekwa komsebenzi

Lezi zinto ezizokwenziwa zichazwe lapha ngezansi:

- Ukusetshenziswa komshini wokumba: ukwenqatshelwa kwemikhumbi ukuba ingene endaweni eyibanga elingama-500 m endaweni ephephile (cishe amakhilomitha sikwele angu-0.8 km²) ukuzungeza umkhumbi onemishini yokumba kuzoyichaphazela ngokuthe ngqo imisebenzi yokudoba kuphela uma ingxenywe yokudoba ifinyelela endaweni okukhulunywa ngayo. Indawo ephephile ihloselwe ukuqinisekisa ukuphepha kokuhamba nokokusebenza komkhumbi ombayo, ukugwema noma ukunciphisa amathuba okushayisana kwezikebhe zokudoba namagiya kanye nomshini wokumba.
- Ukushiywa kwesihloko somthombo phansi olwandle: imithombo yokuhlola neyokwenezela, ngaphambi kokuphuthulwa komsebenzi, izokhonkwa ngosimende, ivivinywe ukuthi ivalekile bese ishiywa (kuzophawulwa ngokuthi umsebenzi “uyekiwe”). Isikhoko somthombo, esiphakeme ngamamitha amathathu nesinobubanzi obuyimitha, sizosala phansi.
- Ngaphansi kweSivumelwano Somhlaba Semithetho Yokuvimbela Izingozi Olwandle [Convention on the International Regulations for Preventing Collisions at Sea (COLREGS, 1972, iNgxenywe B, iSigaba II, uMthetho 18)], umkhumbi owenza umsebenzi wokumba ngaphansi kwamanzi uchazwa ngokuthi “umkhumbi ongakwazi ukujika kalula” okwenza kudingeke eminye imikhumbi enezinjini nehamba olwandle iwuqhelele.
- Ngaphezu kwalokho, ngaphansi koMthetho Wezokuthutha Emanzini, ka-1981 (No. 2 of 1981), “indawo eyakhelwe ukuhlola” noma “umkhumbi wokuhlola” osetshenziselwa ukuhlola noma ukumba noma yini embiwa phansi ungena ngaphansi kwencazelo ethi “isakhiwo esisolwandle” futhi ngenxa yalokho kufanele eminye imikhumbi ingasondeli kuwo ngebanga

elingama-500 m. Kuwukwephula umthetho lapho umkhumbi ongunyaziwe usondela kuleli banga elibekelwe ukugcina ukuphepha.

- Kuzokhishwa isaziso esiya ematilosini kanye nesixwayiso somzila sizokhishwa sinikezwe amatilosi noma abashayeli bemikhumbi, ukuze baziswe ngendawo okukhona kuyo umkhumbi ombayo nebanga okungafanele badlule kulo, lokhu kuzokhishwa yiHhovisi laseNingizimu Afrika iSouth African Navy Hydrographic Office (HydroSAN). Imikhumbi yokusekela enethuluzi lokubona indawo eneminye imikhumbi nesivinini ehamba ngaso izosetshenziswa phakathi nokumba ukuze kuxwayiswe imikhumbi esengozini yokungena kule ndawo enqatshelwe.

Ubungako Begalelo

Njengoba kuphawuliwe ngenhla ukuphela kwendawo yokudoba okulindeleke ukuba iphazamiseke ngenxa yomsebenzi wokumba ohlelwayo yi-*pelagic longline fishery*. Indawo enqatshelwe eduze komkhumbi ombayo izoba eyesikhashana ngoba lapho umkhumbi ombayo usuqedile uzosuka. Igalelo lokudediswa endaweni yokudoba i-*pelagic longline* phakathi nesigaba sokusebenza sokumbiwa komthombo lizogxila endaweni leyo (lizophelela endaweni ehlosiwe) futhi kuzosheshe kudlule (izinsuku ezingu-71).

Izinga legalelo kuthiwa lizoba lincane, njengoba izinhlanzi ezabanjwa endaweni ethintekayo zikumaphesenti asukela ku-1 – 5 (iSahluko 4). Izinga le mboni esebenza ngalo eduze Kwendawo Yomsebenzi liphakeme, njengoba ukudoba kwenziwa ngokuqhubekayo cishe unyaka wonke.

Ngakho, **ukuzwela** kwendawo yokudoba i-*pelagic longline fishers* **Kuncane** futhi **Ubukhulu** begalelo **Buphakathi** nendawo.

Ngokusekelwe ekuhlaziyeni okungenhla, ukuphawuleka kokuba khona kwendawo enqatshelwe endaweni yokudoba i-*pelagic longline* kuphawulwe **njengokuNcane**.

Izinyathelo Zokunciphisa Igalelo Nokulawula

Kutswa lezi zinyathelo ezilandelayo zokunciphisa igalelo nokulawula ukuze zisize ekulawuleni ukuchaphazeleka kwezindawo zokudoba ngenjongo yebhizinisi e-*pelagic longline*:

- Ngaphambi kokuba kuqalwe umsebenzi wokumba kufanele kuthintwane nalezi zinhlaka ezilandelayo zibikelwe ngohlelo lokumba oluhlelwayo (kuhlanganise nendawo umthombo okuyo, izikhathi nobude besikhathi umsebenzi ozoqhubeka ngaso) kanye nokunye okungase kube umxhantela (ngokuthe ngqo indawo enqatshelwe engama-500 m kanye nokuhamba kwemikhumbi esekelayo):

- Imboni yokudoba / nezinhlango: iSA Tuna Association; kanye
- Nezinye izinhlangano: iHydroSAN, iPorts Authority neSAMSA.
- Lezi zinhlangano kufanele zibikelwe nasuphothulweni komsebenzi wokumba lapho umkhumbi ombayo nesekeleyo kusuka endaweni.
- Kufanele kubhalwe incwadi, kucelwe iHydroSAN ukuba isakaze isixwayiso somzila kuyiNavigational Telex (Navtext).
- Kusakazwe iSaziso kubashayeli bemikhumbi ngaphambi kokuba kuqale umsebenzi wokumba. ISaziso esiya kubashayeli bemikhumbi kufanele sazise (1) ngama-co-ordinates endawo yomthombo, (2) ukulinganisela ngesikhathi umsebenzi ozoqhubeka wenziwa ngaso, (3) nolwazi lokuthi ikuphi indawo evinjelwe engama-500 m eduze komkhumbi ombayo, futhi (4) kuhlinzekwe ngemininingwane yokuhamba kwemikhumbi esekelayo enikeza usizo kulo mkhumbi ombayo. Lesi Saziso esiya kubaShayeli bemikhumbi kufanele sisakazwe njalo ezinkampanini ezidobayo kanye nasemikhunjini uma kungenzeka.
- Kufanele izibani ezisemkhunjini ombayo zilawulwe ukuze kuqinisekwe ukuthi zikhanya ngokwanele ukuze izikebhe zabadobi ziwubone, nokuba kuqinisekwe ukuthi indlela yokusebenza ngokuphepha ayiphazamiseki.
- Kufanele kubikelwe noma yisiphi isikebhe esidobayo esisebangeni elikwazi ukuqondakala elikuma-45 km (24 nm) ukusuka emkhunjini ombayo kusetshenziswa i-radio, utshelwe ngezimfuneko zokuphepha eduze komkhumbi ombayo; futhi
- Indawo yomthombo esishiyiwe, kuhlalani nesihloko somthombo, kumelwe kuhlolwe futhi kwenziwe ibalazwe lako ehhovisi leHydroSAN.

Igalelo Eliyinsalela

Ngokusekelwe ekusetshenzisweni kwezinyathelo zokunciphisa umonakalo nokulawula ezisikiselwe, **ukuhlehliseka** kwegalelo **Kukhulu** kanti nezinga **lokulahleka kwezinto ezidingekayo Liphansi**, igalelo lokuvinjelwa kwezindawo zokudoba lizoba **phansi kakhulu** (*Ithebula 7.22*)

Ithebula 7.22 Ubungako Begaleloo Elihlobene Nokwenqatshelwa Kokungena Ezindaweni Ezithile Zokudoba Nokulimala Kwamanetha Okudoba

Incazelo	Igalelo	Igalelo Eliyinsalela
Izinga	Lisendaweni	Lisendaweni
Ubude besikhathi	Isikhashana	Isikhashana
Isikali	Lincane	Lincane
Ukuhlehliseka	Liphakeme (lihlehlelisa ngokugcwele)	
Ukulahleka Kwezinto ezidingekayo	Liphansi	
Ubungako	Lincane	Lincane
Ukuzwela/Ukuba bucai/UKubaluleka Kwezinto /Okuchaphazelekayo	Liphakathi nendawo	Liphakathi nendawo
Ukuphawuleka Kwegalelo	Liwubala	Liwubala

Incazelo Ngesimo Semvelo Esiyisisekelo Nezinto Ezichaphazelekayo

Ngemva kokuvalwa komthombo nokushiywa kwawo (“ukuyekwa komsebenzi”) kanye nokuphothula, imikhumbi ngeke isaba nagalelo endaweni ehlosiwe. Ngokuphambene nalokho, ukuba khona kwesihloko somthombo esishiyiwe kungachaphazela kuphela lezo indawo zokudoba ezisetshenziselwa ukudoba izinto eziphila phansi ekujuleni kolwandle (ukudotshwa kwezinto ezinamagobolondo). Ukubambeka kwezinto zokudoba namahange emikhumbi esihlokweni somthombo kungalimaza amathuluzi abadobi lapho indawo yokudoba ifinyelela esihlokweni somthombo esishiyiwe. Ngokuqondene nalo msebenzi, isihloko somthombo esishiyiwe sizoba sekujuleni okuphakathi kwama-1,500 m nama-2,100 m endaweni esenyakatho yaleyo ehlolwayo, naphakathi kwama-2,600 m nama-3,000 m endaweni eseningizimu yaleyo ehlolwayo.

Njengoba kungekho ukudotshwa kwezilwanyana ezinamagobolondo kule ndawo eneBlock nokuthi amanzi kule ndawo ajule ngaphezu kwama-1,500 m, mancane amathuba okuba nokushayisana phakathi kokudotshwa kwezilwanyana ezinamagobolondo kanye nesihloko somthombo esisele ekujuleni kolwandle phansi.

I-pelagic longline sector iyanqumula endaweni ehloselwe ukumbiwa umthombo, futhi imikhumbi isebenza kweningi yale ndawo enyakatho naseningizimu kwendawo ehlongozelwa ukumbiwa komthombo. Ngenxa yohlobo lwamathuluzi asetshenziswa ekudobeni nokuba sekujuleni kwesihloko somthombo, mancane amathuba okuthi isihloko somthombo singathintana namathuluzi okudoba.

Izinto Okuhlongozwa Ukuba Zenziwe Kule Projekthi

Ngemva kokuyekwa komsebenzi, imithombe yokuhlola izovalwa ngokukhonkwa ngosimende, ivivinywe ukuthi ivalekile bese ishiywa. Isihloko somthombo, eside ngamamitha amathathu esinobubanzi obuyimitha, sizosala phansi olwandle (*Ithebula 7.23*).

Isihloko somthombo esishiyiwe sizoba sebangeni eliphakathi kwama-1,500 m nama-2,100 m ukujula endaweni ehlongozwao esenyakatho, bese siba sebangeni eliphakathi kwama-2,600 m nama-3,000 m endaweni eseningizimu yendawo ehlongozwayo.

Ithebula 7.23 Ukufingqwa Kokuba Khona Kwesihloko Somthombo Ekusebenzeni Kwezinto Olwandle

Isigaba somsebenzi	Okuzokwenziwa
UKulungiselela	N/A
Ukusebenza	N/A
Ukuyeka	Kushiywa isihloko somthombo phansi olwandle

Ubungako Begalelo

Igalelo lokuba khona kwesihloko somthombo esishiyiwe kucatshangwa ukuthi lizophelela lapho sikhona kuphela (endaweni ezobe imbiwe) futhi lizoba elesikhathi eside. Amachaphazelo egalelo kubonakala ezoba mancane, njengoba ukuhlangana phakathi kwanoma yimuphi umuntu osebenzisa ulwandle, njengokudoba ngamanetha ekujuleni kolwandle nendawo isihloko somthombo esikuyo kungekho mathuba okuba kusondelane.

Ukuvama kokusebenza kwale mboni endaweni yomthombo kuphansi, njengoba kungekho kudoba okusebenzisa amanetha njengamanje kule ndawo. **Ukuphazamiseka** kwabathile **Kusezingeni eliphansi** futhi **ububanzi bako** kuzoba negalelo **Elincane**.

Ngokusekelwe kulokhu kuhlaziya okwenziwe ngenhla, ukuphawuleka kokuba khona kwesihloko somthombo nokuphazamisa kwaso izinto ezenziwa olawndle kulinganiselwa ukuthi **Kuphansi**.

Izinyathelo Zokunciphisa Igalelo Nokulawula

Indawo okushiywe kuyo isihloko somthombo kumelwe ihlolwe futhi ifakwe kahle ebalazweni yihhovisi leHydroSAN.

Igalelo Eliyinsalela

Ngokusekelwe ekusetshenzisweni kwezinyathelo zokunciphisa ukuchaphazeleka ezisikiselwe kanye nezinyaehtlo zokuphatha, **ukuhlehliseka** kwegalelo **Kuphakathi nendawo** futhi izinga **lokulahleka kwezinto ezidingekayo Liphansi**, ukuphawuleka kwegalelo ezintweni ezenzeka olwandle kuzoba **Kuncane** (*Ithebula 7.24*).

Ithebula 7.24 Ubungako Bamagalelo Okuba Khona Kwesihloko Somthombo Lapho Sekuyekiwe Ukumba

Incazelo	Igalelo	Igalelo Eliyinsalela
Izinga	Lisendaweni	Lisendaweni
Ubude besikhathi	Isikhathi eside	Isikhathi eside
Isikali	Lincane	Lincane
Ukuhlehliseka	Liphakathi nendawo (lihlehliseka ngokugcwele)	
Ukulahleka Kwezinto ezidingekayo	Liphansi	
Ubungako	Lincane	Liwubala
Ukuzwela/Ukuba bucayi/UKubaluleka Kwezinto /Okuchaphazelekayo	Lilingene	Lilingene
Ukuphawuleka Kwegalelo	Liwubala	Liwubala

Incazelo Ngesimo Semvelo Esiyisisekelo Nezinto Ezichaphazelekayo

Izinga lokuphakama kwamanzi olandle liye laguquguquka ngokuphawulekayo okungenani izikhathi ezintathu kule minyaka ayizi-500,000 edlule. Izinga eliphansi lamanzi olwandle kumelwe ukuba labangela ukuba ingxenye yolwandle engajulile ivele ibe semhlabathini owomile endaweni ewumdweshu esogwini olusentshonalanga nolusempumalanga lweNingizimu Afrika. Nakuba uhlangothi olusentshonalanga lweBlock ER236 lusemanzini angajulile, yonke le ndawo futhi ikakhulu izindawo ezimbili ezicatshangelwayo okuzogxiliswa kuzo ukuhlolwa kwamaminali zisemanzini ajule kakhulu ukuba yayingachayeka ngaphandle kolwandle esikhathini esidlule ngenxa yezinguquko ezingeni lokuphakama kwamanzi olwandle futhi ngenxa yalokho ifinyelelwe abantu basendulo.

Kuye kwaba nemikhumbi embalwa ephahlazekayo ogwini, owokuqala owaziwayo ogwini laseKZN yiSao Joao, iPortuguese nau yaphahlazeka ePort Edward ngo-1552, eningizimu yeBlock ER236 (Axelson 1973; Burger 2003). Endaweni ebanzi yocwaningo ehloselwe lokhu kuhlola, kunedlanzana lemikhumbi eyaphahlazeka. Uma kubhekwa izindawo eyaphahlazeka kuzo, azikho izinsalela ezisendaweni efunekayo ezombiwa, nakuba izinga lokuqiniseka lingelikhulu.

Ngokuqondene namathuba okunqwamana nomkhumbi ophahlazekile – kungaba yizinsalela zawo ezaziwayo njengalona esikhulume ngawo ngenhla noma ongaziwa okwamanje – phakathi nemisebenzi eyenziwa olwandle yokuhlola okudinga ukuba kumbiwe ezindaweni ezimbili Ezihlosiwe, lokhu kubonakala kunamathuba amancane okuba kwenzeke.

Izinto Ezizokwenziwa Ezihlongozwayo Somsebenzi

Umsebenzi wokumba ohlongozwayo ungase uwaphazamise amagugu esizwe asolwandle kuhlanganise nemikhumbi yakudala eyacwila neyaphahlazeka. Nokho, izindawo ezimbili Ezihlosiwe zisebangeni elisemanzini elingamamitha angu-1,500m ngakho mancane kakhulu amathuba okuba kube nomkhumbi owacwila okungahlanganwa nawo lapho kumbiwa lapha.

Ngaphezu kwalokho, akukho mikhombi eyaziwayo noma ekumarekhodi eyaphahlazeka kulezi zindawo ezimbili Ezihlosiwe ukuba kumbiwe kuhlolwe kuzo. Noma kunjalo, ama-co-ordinates ezinsalela ezaziwayo endaweni yocwaningo ayahlawumbisela (akukho lapho kuke kwabonakala ngokuqondile izinsalela zomkhumbi phansi olwandle) ngakho lezi zindawo zingaba noma kuphi olwandle. Khona-ke, kunamathuba okuba lezi zinsalela zibe sendaweni eseningizimu kulezi ezihlolwayo, noma ngaphandle kwendawo ehlolwayo.

Ithebula 7.25 elingezansi lifingqa izinto ezizokwenziwa kuyiprojekthi ezingase ziphazamise iphansi lolwandle nenzika, ngaleyo ndlela kuphazamiseke imikhumbi eyacwila neyaphahlazeka.

Ithebula 7.25 Ukufingqwa Kwezinto Ezizokwenziwa Zomsebenzi Ezizophazamisa Izindawo Zamagugu Esizwe Ezisemanzini

Isigaba somsebenzi	Okuzokwenziwa
Ukulungiselela	N/A
Ukusebenza	Ukumba (kuhlanganise nokususwa kwezinto eziphansi nokugqibeka kwezinye)
	Ukuchishwa kukasimende osele phakathi nesikhathi kusetshenzwa kungekho mapayiphi axhunyiwe
	Ukususwa kweBOP
Ukuphuthula	N/A

Ubungako Begalelo

Igalelo ezintweni zamagugu esizwe lingase liphawulwe njengeliqondile nelingelihle. Igalelo lizogxila endaweni futhi isikhathi salo sizoba sifushane, phakathi nesikhathi sokuhlola kuphela.

Izinga legalelo lizoba likhulu uma imithombo yamagugu esizwe esemanzini iphazamiseka noma ilimala ngenxa yomsebenzi ozokwenziwa, nokho, njengoba kungekho magugu atholakele kulezi zindawo ezihlosiwe, kubonakala izinga lokuphazamiseka lizoba phansi. Njengoba kungekho mithomba yamagugu esizwe eyaziwayo kulezi zindawo, kucatshangwa ukuthi akuzange kuvame.

Igalelo alilikhulu, kanti **akukho nokuba bucayi** ngenxa yokuntuleka kwemithombo eyaziwayo yamagugu esizwe kulezi zindawo ezimbili. Ubungako baleli galelo bulinganiselwa ezingeni **Eliphansi kakhulu** (*Ithebula 7.20*).

Izinyathelo Zokunciphisa Igalelo Nokulawula

Akukho zinyathelo zokunciphisa igalelo ezidingekayo ngokuqondene nemivubukulo engaphansi kwamanzi yasendulo njengoba emfimfa amathuba okuthi izinto ezinjalo zikhona kule ndawo ehlokelwe ucwaningo.

Akukho zinyathelo zokuvumbela umonakalo ezidingekayo noma ezisikiselwe ngokuqondene nezinsalela zemikhumbi ezaziwayo ezisendaweni okuhlolwa kuyo ukutholakala kwamamirali ambiwa phansi njengoba kubikwa kuthi zingaphandle kwendawo ezombiwa Ehlosiwe.

Ezindaweni ezihlokelwe ukumbiwa kutuswa kuthi noma yiluphi ulwazi oluqoqwe ngaphambi kokumba ngesimo somhlabathi luhlaziywe ukuze kubonakale kuthi ayikho yini imikhumbi eyaphahlazeka ekhona phansi.

Noma yimaphi amavidiyo ashuthiwe eduze kwendawo ehlongozwa ukumbiwa komthombo kufanele aphinde ahlolwe ukuze kubonakale uma kunezinsalela zemikhumbi eyaphahlazeka ephansi ekujuleni kolwandle.

Uma kwenzeka ulwazi oluqukethwe yila mavidiyo lwembula ukuthi kunezinsalela ezaphahlazeka endaweni noma eduze kwendawo okuhloswe ukuba kumbiwe kuyo, ukubekwa endaweni ekahle kwemithombo kanye nokuqashelwa kwendawo enqatshelwe ebekelwe umsebenzi wokumba eduze kwendawo yemivubukulo kuyokwanela ukuba kunciphise ukuphazamiseka kwendawo.

Kufanele kwenziwe inqubo yokutholakala kwezinto kungalindelekile kulo msebenzi owenziwayo okuyosiza uma kwenzeka kutholakala imikhumbi eyaphahlazeka engazange itholakale ngesikhathi kulandelwa izinqubo ezibonisweni ngenhla phakathi nenqubo yokumba kokuhlola.

Igalelo Eliyinsalela

Ngokusekelwe ekusethathweni kwezinyathelo zokuqondisa ezisikiselwe, **amathuba okuhlehliseka** kwamagalela **Aphakathi nendawo** kanti izinga **lokulahleka kwezinto Liphakeme**. Ukuchaphazeleka kwezindawo zamagugu esizwe ngeke **Kuphawuleke** (*Ithebula 7.26*).

Ithebula 7.26 Ubungako Bamagalelo Okumba Ezindaweni Ezinamagugu Esizwe Olwandle

Incazelo	Igalelo	Igalelo Eliyinsalela
Izinga	Lisendaweni	Lisendaweni
Ubude besikhathi	Isikhashana	Isikhashana
Isikali	Lincane	Lincane
Ukuhlehliseka	Liphansi (alihlehliseki)	
Ukulahleka Kwezinto ezidingekayo	Liphakeme	
Ubungako	Lincane	Lincane
Ukuzwela/Ukuba bucayi/UKubaluleka Kwezinto /Okuchaphazelekayo	Liphansi	Liphansi
Ukuphawuleka Kwegalelo	Liwubala	Liwubala

7.4.5 Okungenakwenziwa

Incazelo Ngesimo Semvelo Esiyisisekelo Nezinto Ezichaphazelekayo

Ukukhetha ukuyeka ukwenza ukumba ngenjongo yocwaningo kuzoshiya lezi zindawo okuhloswe ukuba zimbiwe zisesimweni sazo samanje semvelo, uwoyela negesi etholakala kuzo izolokhu ingaziwa ukuthi ingakanani.

Izinto Okuhlongozwa Ukuba Zenziwe Nezinyathelo Zangaphakathi Zokuthobela Umthetho

Izinto okunakukhethwa ukuba zenziwe ngeke zisishintshe isimo samanje, ngamanye amazwi imisebenzi yokumba ehloselwe ukuhlola izinto ezimbiwa phansi ngeke yenziwa ku-ER236.

Ubungako Begalelo

Uma indaba yomthombo iphumelela izoba nale miphumela emihle:

- Ukuthuthuka kwezomnotho zakuleli uma kwenzeka lezi zinto ezimbiwayo zitholakala (ngokuqondile noma ngenye indlela), izintela (eyokusebenza endaweni nezinye izintela) kanye nemali eyiholo ezokhokhelwa abasebenzi kanye nalabo abasebenza ukuletha izinto ezidingekayo;
- Ukudaleka kwamathuba omsebenzi kubantu bendawo ngenxa yomsebenzi we-O&G noma ngenxa yezimboni eziletha izinto ze-O&G;
- Ukwehlukahluka kwemithombo yamandla eNingizimu Afrika;
- Amathuba okuba le mithombo yamandle ihlomulise umphakathi (ikakhulu emaphandleni); kanye
- Ukwehla kwezinga lokuncika kwamanye amazwe ukuze kutholakale uwoyela negesi.

Imiphumela yokungaqhubeki nemisebenzi yokumba ehlongozwayo kuyi-Block ER236 yilena elandelayo:

- Ukulahleka kwethuba lokuba kumbiwe uwoyela negesi kulezi zindawo ezihlosiwe; kanye
- Uma kunowoyela negesi eningi engathuthukisa umnotho, uhulumeni waseNingizimu Afrika nomphakathi wakuleli uyolahlekelwa yithuba lokusebenzisa ngokugcwele uwoyela negesi yakuleli esikhundleni sokuncika kwamanye amazwe.

Ngakho, **ukuba bucayi** kwabachaphazelekayo **Kukhonyana futhi izinga** legalelo **Liphakathi nendawo**.

Igalelo elicatshangelwayo elihlobene nokulahleka kwethuba lokuhlola uwoyela negesi endaweni enemvume nokwandisa ithuba leNingizimu Afrika lokusebenzisa eyayo imithombo uma uwoyela ukhona ngokwanele libhekwa **njengelilingene** (*Ithebula 7.27*).

Izinyathelo Zokunciphisa Amagalelo Nokulawula

Akukho zinyathelo zokunciphisa amagalelo nokulawula ezidingekayo ukuze kuncishiswe amagalelo ezintweni ezingenakwenziwa.

Igalelo Eliyinsalela

Akukho zinyathelo zokunciphisa amagalelo nokulawula ezidingekayo ukuze kuncishiswe igalelo ezintweni okungafanele zenziwe futhi ngenxa yalokho imiphumela **Iphakathi nendawo** (*Ithebula 7.27*).

Ithebula 7.27 Ubungako Bamagalelo Kulokho Okungenakukhethwa

Incazelo	Igalelo	Igalelo Eliyinsalela
Izinga	Lisendaweni	Lisendaweni
Ubude besikhathi	Isikhashana	Isikhashana
Isikali	Lincane	Lincane
Ukuhlehliseka	Liphakeme (lihlehlelisa ngokugcwele)	
Ukulahleka Kwezinto ezidingekayo	Liphansi	
Ubungako	Liphakathi nendawo	Liphakathi nendawo
Ukuzwela/Ukuba bucayi/UKubaluleka Kwezinto /Okuchaphazelekayo	Liphakathi nendawo	Liphakathi nendawo
Ukuphawuleka Kwegalelo	Lilingene	Lilingene

7.5

AMAGALELO AWUMPHUMELA AVELA EMSEBENZINI OHLELIWE

Igalelo eliwumphumela yilelo eliba khona ngenxa yegalelo elibangwe omunye umsebenzi okwenza kube neminye imiphumela.

Nokho ukuthi amagalelo nemiphumela kuhlolwa kanjani kuthonywa ngokunamandla yisimo seminye imisebenzi (njengaleyo esuke isikhubeka, egunyaziwe noma ehlongozwayo) nokuthi lungaki ulwazi oluqoqiwe ukuze kuhlaziye ubukhulu balelo galelo.

Indlela yokuhlola igalelo eliwumphumela ukuhlaziya ukungqubuzana neminye imisebenzi okungaba khona:

- Imisebenzi esiqhubeka kakade;
- Imisebenzi ephasisiwe kodwa engakaqali; kanye
- Imisebenzi enengqondo ukuba yenziwe kodwa engakahlelwa.

7.5.1

Amaprojekthi Ahleliwe Nemisebenzi Ezokwenziwa Endaweni Yeprojekthi

Isikhathi esiseduze okulindeleke ukuba ukumba kuqale ngaso unyaka ka-2019. Ukumbiwa komthombo owodwa kulinganiselwa ukuthi kungathatha izinsuku ezingaba ama-71 ukuwuqeda. Akukho misebenzi ehleliwe esikhathini esizayo eyaziwayo kule Ndawo Yeprojekthi.

Imisebenzi eyaziwayo ethinta ezenhlalo nezomnotho (evezwe *kuSahluko 4*) engase ibe khona eNdaweni Yeprojekthi:

- Kunamathuba okuba ukudoba ngenjongo yokuqeda isizungu okwenziwa olwandle kungase kufinyelele kuBlock ER236;

- Ukuphela kwendawo yokudoba yezamabhizinisi ehlangana nalezi zindawo ezizombiwa yiKwaZulu-Natal pelagic longline;
- Indawo yokudoba ngezindobo yaKwaZulu-Natali kanye nendawo yokudoba ama-*prawn* ngamanetha iyahlangana neNdawo Egunyazelwe Ukuhlola Okumbiwa phansi (Exploration Rights Area 236) kodwa ayidibani nezindawo ezizombiwa ngokuqondile;
- Indawo Yomsebenzi ingase ibe semzileni okudlula kuyo imikhumbi ethwele uwoyela nempahla ehamba Ogwini Olusempumelanga lapho ihamba igudla ingxenye eseningizimu ye-Afrika;
- IBlock ER236 ingase ishayisane nendawo yemizila yale mikhumbi elayisha uwoyela nempahla. Imikhumbi esekela ukumba ingase ihlangane neminye imikhumbi lapho ilanda izinto esikhumulweni semikhumbi eRichards Bay noma eThekwini;
- Ikhebula ye-EASSy neyeSeacom ingase inqamule kuyo iBlock ER236; futhi
- Kunemisebenzi yokuhlola kutholakala kukawoyela negesi eyenziwayo, kuhlanguke neTugela South eyenziwa yi-EMEPSAL enyakatho ntshonalanga; iDeep Water Durban eyenziwa yi-EMEPSAL eningizimu kanye neSilverwave ohlangothini olusempumalanga.

7.6

UKUBONA NOKUHLUNGA AMAGALELO AWUMPHUMELA ANGASE ABE KHONA

Amathuba okuba ezemvelo nezenhlalo zichaphazeleke ngenxa yomsebenzi nokuhlangana nezinye izinto ezihleliwe ichaze ngale ndlela:

- Ukukhishwa kweGHG ephuma emikhunjini eyenza umsebenzi nokunezela kwayo ekuguquguqukeni kwesimo sezulu kanye neminye imikhumbi esendaweni;
- Umsindo wangaphansi kwamanzi okhishwa yile mikhumbi yomsebenzi nokwenezela kwayo emisindweni engaphansi kwamanzi evela kweminye imikhumbi esendaweni nokuchaphazeleka kwezilwane zasolwandle; kanye
- Ukuphazamiseka kwezitshalo nezilwane eziphila phansi olwandle ngenxa yemisebenzi ehlobene nowoyela negesi.

7.7

UKUHLAZIYWA KWAMAGALELO AWUMPHUMELA ANGASE ABE KHONA

Incazelo yohlobo lwamagalelo awumphumela angase abe khona ngenxa yomsebenzi kuhlanguke nezinye izinto okubonakalayo ukuthi zingase zenziwe inikezwe lapha ngezansi:

7.7.1

Ukukhishelwa emkhathini kweGHG

Ukukhishelwa emkhathini kweGHG isuka endaweni yomsebenzi ibaliwe futhi izonezela engqikithini yeGHG ekhishwa yizikhungo zikawoyela nezegesi ezisolwandle / imisebenzi yokuthuthukisa olwandle lwaseNingizimu Afrika, okungase kube negalelo ekuguquguqukeni kwesimo

sezulu. Ukwenezelwa kweGHG ekhishwa umsebenzi ohlongozwayo ekungqwabelaneni kwezinga leGHG endaweni yeProjekthi ngeke kube **kukhulu**.

7.7.2 *Ukuphazamiseka Kwezilwane Zasolwandle Ezincelisayo Nezimfudu Zasolwandle*

Ukumba nemisindo yamajenerayitha asemkhunjini ombayo, imikhumbi esekelayo kanye nendiza enophephela kungase kuphazamise futhi / noma kukhathaze izilwane zasolwandle nezimfudu eziseduze nesikude nendawo yomsebenzi. Umsindo uzokwenezela ngenxa yokuthi kakade kunemisindo ekhona ebangwa yimikhumbi esendaweni. Ukuhamba kwemikhumbi kuzokwenezela emisindweni engeyona eyemvelo engaphansi kwamanzi, kodwa ngisho nezinhlobo zezilwane ezizwela kalula (izilwane ezincelisayo zasolwandle njengama-dolphin kanye nezimfudu zasolwandle nezinye izinhlobo zezinhlanzi) mancane amathuba okuba ziphazamiseke. Ukwenezela kwezinto ezizobe zenziwa ezingeni lomsindo eNdaweni yeProjekthi ngeke kube **Kukhulu**.

7.7.3 *Ukuphazamiseka Kwezimila Nezilwanyana Eziphila Ekujuleni Kolwandle*

Amagalelo ayinhloko ezimileni nasezilwaneni eziphila ekujuleni kolwandle ahlobene nokumbiwa kwemithombo kokuhlola uwoyela olwandle iWest Indian Offshore Bioregion ngasogwini lwaseKZN, ahlobene nokuphazamiseka okungokoqobo phansi olwandle, ukukhishelwa kodaka lulahlelwe ezimileni nasezilwaneni eziphila phansi noma endaweni yazo, ukuba khona kwezingqalasizinda zokumba ezisele phansi kanye nemikhumbi embayo nasekela wona.

Umsebenzi ozokwenziwa kulo mthombo okuhlongozwa ukuba kwenziwe ucwaningo kuwo uzochaphazela indawo ebalelwa ku ~0.003 km² (umthombo ngamunye) ohlangothini lweWest Indian Bioregion, okungabhekwa njengenani eliphansi kakhulu uma kucatshangwa ngendawo iyonke. Amagalelo avela kwezinye izindawo okutholakala kuzo i-*hydrocarbon* angase ande esikhathini esizayo.

Amagalelo okwenezela emithombo ezombiwa kuhlolwe okumbiwa phansi ogwini lwaseKZN angabhekwa kufanele **njengawubala kakhulu**.

7.7.4 *Izindlela Zokunciphisa Amagalelo Okwenezela*

Izinyathelo zokunciphisa amagalelo zemisebenzi yokumba eziphawulwe ngenhla zanele ukunqanda amagalelo okwenezela angase abe khona evela kwezinye izinto ezenziwa eduze. Azikho ezinye izinyathelo zokunciphisa amagalelo ezidingekayo.

8.1

ISINGENISO

Ingozi noma isimo esiyingozi esingahleliwe sichazwa ngokuthi yisenzakalo okungenani esingabonakala kusengaphambili nakuba singalindelekile ukuba sivele phakathi nesikhathi sokusebenza, kodwa esenzekayo ngenxa yokuthi kuyasetshenzwa (isib. Izingozi zemikhumbi nokuhluleka ukulawula kahle izingozi /ukuqhuma nokunye), kodwa ezingenzeki njalo'. Ingozi ingavela noma nini uma kusetshenzwa. Lesi *Sahluko*, sichaza izingozi ezingase zenzeke ezihlobene nomsebenzi futhi sichaza ngokuhlolwa kwezingozi nemiphumela yazo ngokuhlola indawo okusetshenzela kuyo bese kubonakala izingozi ezingase zenzeke kanye nemiphumela engaba nazo

Izenzakalo eziyingozi ezilandelayo, ezibukezwe *Ithebula 8.1*, kucatshangelwe ukuthi azizimbi kakhulu futhi azihlolwanga ngokwengeziwe kulo Mbiko we-EIA

Ithebula 8.1 Izingozi Ezingezimbi Kakhulu

Imisebenzi	Imiphumela Yokuhlolwa
Uwoyela omncane /ukuchithaka kwamakhemikhali	Umkhumbi ngamunye osebenzayo kufuneka ube neNcwadi Yohlu Lweziqondiso Zokuvikela Ukungcoliswa Kolwandle Ngowoyela (SOPEP). Amakhemikhali amancane nowoyela ochithekile emikhunjini esebenzayo kufanele kuhlazwe ngokushesha futhi kunanyathelwe eziqondisweni eziku-SOPEP naku-EMPr ngaleyo ndlela igalelo lokuchithaka kukawoyela omncane kanye noma amakhemikhali ngeke libe likhulu futhi ngeke kwenziwe ukuhlola okuqhubekayo ngakho..
Okokusimamisa umkhumbi kwemikhumbi esekelayo noma ehlinzeka ngezinto (okungenzeka ivela kuwo wonke amazwe)	Yonke imikhumbi ephethe amanzi okusimamisa kumelwe iwakhiphe futhi iwabuyisele ngokuvumelana nemigomo neziqondiso zeNhlango Yomhlaba Wonke Yemikhumbi. (IMO) eziqondisa ukukhishwa kwamanzi okusimamisa olwandle. I-IMO ithi imikhumbi eshintsha amanzi okusimamisa, kufanele noma nini uma kungenzeka iwashintshe okungenani sekusele amaNonomitha angu-200 ukuba ifike ezweni elomile eliseduze elingamamitha angu-200 ukujula. Ezindaweni lapho lokhu kungenakwenzeka, kufanele ashintshwe kude ngangokunokwenzeka nendawo eyomile eseduze, zikhathi zonke, okungenani kufanele kuqhele ngamaNanomitha angu-50 endaweni eyomile
Izinto eziwile	Izinto eziwa emikhunjini zingase zibe yingozi enkulu futhi zisongele ukuphila. Nokho le ngozi ingalawulwa ngezimiso zenkampani eziphathelele nempilo nokuphepha, izinto zokulawula ezakhelwe emikhunjini kanye nokunamathela kuyi-Eni's H&S Standards. Ukuncishiswa nokuvikelwa kwezingozi kuhlenganisa ama-EMPr alo msebenzi ukuze kuncishiswe ingozi. Lokhu ngeke kuhlolwe ngokwengeziwe kulo mbiko we-EIA..
Izingozi zophephela	Ukushayisana kophephela kungaba yingozi kakhulu futhi kusongele impilo. Nokho le ngozi ingalawulwa ngezimiso zenkampani eziphathelele nempilo nokuphepha, izinto zokulawula ezakhelwe emikhunjini kanye nokunamathela kuyi-Eni's H&S Standards. Ukuncishiswa nokuvikelwa kwezingozi kuhlenganisa ama-EMPr alo msebenzi ukuze kuncishiswe ingozi. Lokhu ngeke kuhlolwe ngokwengeziwe kulo mbiko we-EIA.

Izenzakalo zengozi ezilandelayo zicatshangelwe njengeziyingozi ngesikhathi kuhlolwa futhi zibekwe *Engxenyeni 8.3*

- Ukuchitheka kukawoyela ngengozi ngenxa yokuqhuma komthombo;
- Ukuchitheka kukawoyela ngengozi ngenxa yokushayisana kwemikhumbi; kanye
- Ukuphuma ngengozi Koketshenzi Olungenawo Amanzi (Non Aqueous Drilling Fluid (NADF) ngenxa yokunqamuka kwezintambo okungalindelekile okungenzeka lapho kubhotshozwa ipayipi elithile.

Kunezici eziningi nezinto zokulawula ezafakwa lapho umkhumbi wakhiwa ukuze kuncishiswe izingozi ezingase zivele. Ngaphezu kwalokho, iziqondiso ezikhona ezafakwa yi-Eni kweminye imisebeni yayo ukuze inciphise ingozi yezenzakalo eziyingozi ezizosetshenziswa kulo msebenzi. Lezi zinyathelo zivezwe *Engxenyeni 8.3.5*. Zonke izinyathelo zokunciphisa izingozi ezivezwe kule Ngxenye zikhona Esimisweni Sokulawula Indawo Yomsebenzi (Environmental Management Programme (EMPr) salo msebenzi (*Isahluko 9*).

8.2 *INDLELA ESETSHENZISWAYO*

8.2.1 *Ukuhlola Ubukhulu Bezingozi*

Indlela esetshenziswayo ukuze kuhlolwe ubukhulu bengozi ehlobene nezimo eziyingozi iyehluka endleleni yokuhlolwa kwegalelo etholakala *kuSahluko 6* kulo mbiko. Ubukhulu bengozi nezimo ezingaba yingozi busekelwe ekuhlanganiseni amathuba (nenani) okwenzeka ngalo ingozi nemiphumela leyo ngozi engaba nayo. Ukuhlolwa kwamathuba kanye nemiphumela yengozi kuhlanganisa nokubambisana okukhona kakade kanye nezinyathelo ezithathiwe ukuze kulawulwe izingozi kulo msebenzi

Lapho kuhlolwa amathuba engozi kusetshenziswa ukwahlulela kobuchwepheshe, izinto ezenzeka emisebenzini ethi ayifane kanye nokusebenzelana nethimba eliqeqeshiwe.

Ukuhlolwa kwemiphumela kusekelwe emibonweni efakwe ongoti nasesipiliyonini sabo njengochwepheshe abasithole emisebenzini ethi ayifane, kanye nemiphumela abayithola emfundweni yabo ukuze kubonakale izinga uwoyela ochitheke ngalo nokuthi uhlale isikhathi eside kangakanani uchithekile. Ukuze kubonakale isikhathi okungenzeka uchitheke ngaso nokuthi uchitheke ngezinga elingakanani (ngalezo zikhathi ezingavamile okwenzeka ngazo) kwenziwa ukuhlolwa kokuchitheka kukawoyela ukuze kwenziwe lo msebenzi (*i-Annex D*).

Izincazelo ezisetshenziswe kuloku kuhlola ukuze kubonakale amathuba nemiphumela sitholakala **Error! Not a valid bookmark self-reference..**

eBhokisini 8.1 Ingozi Ohlwini Lezenzakalo Ezingahleliwe

Amathuba

Amathuba achaza ithuba lokwenzeka kwento ethile noma isimo esenzekayo. Acatshangwela ezicini ezilandelayo:

- **Izinga eliphansi:** isenzakalo esibikwa enkampanini kawoyela noma yegesi, kodwa engavamile ukwenzeka;
- **Izinga eliphakathi:** Isenzakalo siyenzeka kodwa asivamile kangako; futhi /noma
- **Izinga Eliphakeme:** isenzakalo sivamile ukwenzeka lapho kwenziwa umsebenzi.

Imiphumela

Umphumela ongase uvele ngenxa yegalelo lengozi uyinhlanganisela yezinto ezinquma izinga lokwenzeka kungahleliwe (ngokuphathelele nokusabalala, isikhathi nesisindo). Imiphumela ezimweni eziyingozi ifana nemiphumela (izinga+ukuzwela) yezenzakalo ezihlelelwe (*Ingxenye 7*) futhi ifakwa ngaphansi kwesigaba esithi:

- **Imiphumela emincane:** abahilelekile abathintekanga kakhulu/ indlela yokuthola usizo itholakala eduze, okwenza basheshe balulame ngesikhashana/ ukwelashwa kuyadingeka;
- **Imiphumela ephakathi nendawo:** Iba yigalelo lezinga Eliphansi kuya Kweliphakathi ezintweni ezithintekayo futhi ukwelulama kuthatha isikhathi esifushane noma esiphakathi ngaphandle kosizo noma ngosizo oluthile noma
- **Imiphumela Emikhulu:** idlula izimiso zegalelo Eliphakathi kuya Kwelikhulu ezintweni ezithintekayo ezingalulama emva kwesikhathi eside ngosizo olukhulu oluthilethe

Lapho izinga lamathuba okwenzeka nelemiphumela selaziwa, kusetshenziswa uhlelo oluku-*Ithebula 8.2* ukubona ubukhulu bengozi lapho ivela. Lapho kuhlawumbiselwa izingozi kubhekwa nezindlela elandelwa ngayo imithetho noma izindlela zokusingatha ingozi esezivele ziyingxenye enkulu yomklamo weprojekthi, kanye nezinhlelo zokuphatha okumele zilandelwe yiprojekthi.

Ithebula 8.2 Imiphumela Yezimo Eziyingozi

Izinga Lengozi				
Ingozi		Liphansi	Liphakathi Nendawo	Liphezulu
Umphumela	Encane	Incane	Incane	Iphakathi Nendawo
	Ephakathi Nendawo	Incane	Iphakathi Nendawo	Inkulu
	Enkulu	Iphakathi Nendawo	Inkulu	Inkulu

Akunakwenzeka ukuba izingozi zivinjwe ukuba zingenzeki nhlobo. Nokho, uhlelo lokunciphisa izingozi lwehlisa izinga izingozi ezenzeka ngalo njengoba kuchaziwe *Ebhokisini 8.2*.

Ebhokisini 8.2 Uhlelo Lokunciphisa Izimo Eziyingozi

Ukulawula: kuhlose ukuvimbela noma ukunciphisa ithuba lokwenzeka kwengozi noma ukunciphisa igalelo lemiphumela layo Liye Phansi Ngangokunokwenzeka (As Low as Reasonably Possible [ALARP]) kanje:

- Ngokunciphisa ithuba lokwenzeka kwengozi (isib. Ukwakha kahle, izinto zokulawula, izinto zokuvikela, ukusabela ngokushesha ezimweni nokuqeqesha);
- Ukunciphisa imiphumela (isib. izindlela zokuvala nokulawula umonakalo); nokuthi
- Kwenziwa inhlanganisela yalokhu okungenhla.

Ukululama: kuhlanganisa amapulani okulungiselela okungase kwenzeke nokusabela, isib.:

- Ipulani Yokusabela Ngokushesha; kanye
- Ipulani Yokulungiselela Ukuchitheka Kukawoyela

8.3 UKUHLOLWA KOKUCHITHEKA NGEPHUTHA KUKAWOYELA NOKUQHUMA KOKUTHILE

8.3.1 Ukubukeza

Ingozi yokuchitheka kukawoyela (kuhlanganisa uwoyela ongahluziwe nodizili) olwandle kwenze kulo lonke ugu lwezilwandle okusetshenzwa kuzo ngowoyela. Amathuba okuchitheka kukawoyela omningi (isib. Lowo ongafika ogwini lolwandle noma kwezinye izindawo ezibucayi) mancane kakhulu ngenxa yokuthi uba mncane kakhulu uwoyela ochithekayo futhi imvelo ithinteka ngezina elincane kakhulu..

Ukuchitheka kukawoyela yisenzakalo esingahlelwa futhi esingathandeki size sibhekwe njengesiyingozi noma njengesimo esiphuthumayo. Izinga noma ukuziphatha okubangela ukuchitheka kukawoyela okungahleliwe kungathinta imvelo uma kungalawulwa kahle. Ngokwesibonelo ukuchitheka kukawoyela okubangelwa ukuphuma kwe-hydrocarbon lapho kuqhuma okuthile (isimo esingathandeki esibangelwa igesi eningi engalawuliwe noma ukuphuma kukawoyela emthonjeni wawo uye olwandle), kubhekwa njengesimo esiphuthumayo futhi kumelwe sinakwe ngokushesha ukuze kunqandwe inani nezinga lolokho okuchithekayo.

Amathuba okuba kuqhume okuthile mancane kakhulu lapho inani okungenzeka ngalo kungu- 2.5×10^{-4} (isikhathi esisodwa emthonjeni engu-4,000) ukuze uthole inani lemithombo ebhotshozelwe (Umbiko we-OGP, wango- 2010)). Indlela esungulwe yinkampani yokubhekana nokuchitheka kukawoyela okungase kwenzeke, ukusungula ezobuchwepheshe nezindlela zokusebenza ezizokwehlisa izinga lokuchitheka kukawoyela (isib. Izimo ezingathandeki noma eziphuthumayo). Izimo ezibucayi njengokuqhuma komthombo i-Macondo (2010 in GoM - USA) ziye zenza ukuba kubuyekezwe okungenziwa ukuze kuthuthukise izimo emhlabeni wonke (API/ISO) kanye nemikhuba emihle kakhulu kanye nokwenziwa kwezinguquko kwezobuchwepheshe ezintsha kulo mkhakha.

Lokhu kuye kwaholela ekwehleni ngezinga eliphawulekayo kwezimo ezibucayi ezingae zenzeke esikhathini esizayo

Umgomo wenkampani, ukuzinikela kanye nokuzikhandla ikakhulukazi izinkampani zikawoyela ezinkulu njenge-Eni, kuwukufaka izinto ezenza ukuphepha kube sezingeni eliphezulu kakhulu, ukuze lapho kukhona okubhotshozwayo kungabi nangozi kubantu, emvelweni nakwezinye izinto ezibalulekile. Ukuze kuncishiswe izingozi ezihlobene nezinto ezichithekayo, kubekwe imigomo nemithetho yomhlaba wonke eqinile (API/ISO) futhi kumelwe kulandelwe imikhuba emihle yokusebenza ilandelwe yinkampani, izisebeni ezibhobozayo kanye nabanye abahilelekile emisebenzini yokubhobozwa kuhlanganise ezokuthutha nezokuthutha emanzini.

Ukuze kuvikelwe ukuchitheka kukawoyela okungadingekile, inkampani iye yachaza ukusabela okuninganga okungokomthetho, ezokulawula nezokubhekela izinto ezidingekayo lapho kubhotshozwa. Lokhu kuhlanganisa ukuhlela amathuluzi kusengaphambili angasetshenziswa futhi kuqeqeshwe abathile ukuze kuncishiswe igalelo lomonakalo uma kwenzeka kuchitheka uwoyela. La mathuluzi ahlanganisa ukusetshenziwa kwe-BOP (Blowout Preventer), ukuze kuvalwe imithombo ngokushesha uma kuvela isimo esiphuthumayo. Ngaphezu kwalokho ukuba khona kohlelo lokulawula umonakalo kungaba yithuluzi eliwusizo uma kwenzeka ingaphumeleli noma yehluleka i-BOP. Uhlelo olusha lokulawula umonakalo lwasungulwa ngemva kwesenzakalo sase-Macondo, lapho kwasetshenziswa khona ngempumelelo ithuluzi elifanayo ukuze kuvalwe umthombo nokuvimbela ukuchitheka okwengeziwe. Manje uhlelo lokulawula umonakalo selingenye indlela esebenzayo uma kuvela isimo esiphuthumayo.

Zonke lezi zindlela zokusabela ezimweni zakha ingxenye yePulani Lokulungela Ukuchitheka Kukawoyela Okungenzeka (Oil Spill Contingency Plan [OSCP]) okufanele zenziwe ngaphambi kokuba kuqalwe ukubhotshozwa okucatshangelwayo. I- OSCP kufanele ibukezwe futhi iphasiswe yi-South African Maritime Safety Authority (SAMSA) ngaphambi kokuba kuqalwe umsebenzi wokubhobozwa. Lapho isiphasisiwe, i-SAMSA iyokhipha isitifiketi se-Pollution Safety Certificate.

8.3.2 *Izibonelo Zokuchitheka Kukawoyela*

Injongo yokwenza izibonelo zokuchitheka kukawoyela ukuthi kusiza ekutheni lapho kuchitheka uwoyela kubonakala isimo esibi kakhulu ezimweni ezihlukene zokuchitheka kukawoyela futhi kutholakale amathuba uwoyela onawo wokuthinta ulwandle, amatheku nogu lwalo. Lokhu kuphinde kusize ekulungiselelweni kwe-OSCP.

Kubalulekile ukungaqondi nje kuphela ingozi eyinhloko yokuchitheka kukawoyela okuhlangene nokuqhuma okwenzeka lapho kubhotshozwa kuhlangukise nalokho okuhlobene neminye imikhumbi njengokushayisana kwemikhumbi okwenza kuchitheke uwoyela, kodwa futhi nemiphumela engaba khona uma kungake kwenzeke kuchitheke uwoyela. Into eyinhloko esiza ukuthi ubone imiphumela yokuchitheka kukawoyela ukuqonda ukuthi yini engase yenzeke ezintweni eziphila olwandle. Ukwenza izibonelo zokuchitheka kukawoyela kufeza lukhulu ekuboneni ukuthi uwoyela ungachithekelwa endaweni engakanani uma kubhekwa izimo ezimbi kakhulu, ngaleyo ndlela ibonise izinga lomonakalo ongaba khona endalweni

Kulo mdwebo woMbiko we-EIA, kuye kwenziwa isibonelo sokuchitheka kukawoyela ukuze kubonwe imiphumela yokuchitheka ezimweni ezintathu. Nazi lezi zenzakalo ezintathu:

- **Isenzakalo 1** – kushayisana imikhumbi, kuchitheke udizili
- **Isenzakalo 2a** – kuqhuma inhloko yomthombo okwenza umgodi udabuke
- **Isenzakalo 2b** – Ukuqhuma komthombo kulandelwa ukufakwa kwesimiso sokulawula umonakalo (isimiso esisetshenziswayo uma ihluleka i-BOP); Kanye
- **Isenzakalo 3** – ukunqamuka kwentambo ethile okwenza kuphume Uketshezi Olungenawo Amanzi (Non-Aqueous Drilling Fluids (NADF) ngenxa yokunqamuka kungalindelekile kokuthile lapho kubhotshozwa

Isenzakalo ngasinye sokuchitheka kukawoyela siphindwe izikhathi ezingu-120 kuqalwa ngosuku okuchitheke ngalo kuye esikhathini esiyiminyaka emihlanu. Kuphinde kunikeze inhlangukise yomoya nomsinga wolwandle ukuze kubonwe izinga legalelo lokuchitheka kukawoyela ezinkathini zonyaka ezihlukene. Esenzakalweni ngasinye kuvezwe isimo esibi kakhulu esivele lapho kuhlolwa ukuze kubonakale izenzakalo ezingahlelilwe, ngokuvumelana nezimfuneko zomhlaba wonke

Ngaphezu kwalokho, kwenziwe isibonelo sama-Dissolved Aromatic Hydrocarbons (DAH) eSenzakalweni 2a futhi imiphumela ivezwe ku-Annex D.

Kuye kwenziwa ukusikisela okuningana ukuze kunqunywe ukuthi yisiphi isenzakalo esingenziwa isibonelo. Kuhlangukise lokhu okulandelayo:

- Lesi senzakalo asilawuliwe nhlobo, futhi asenziwanga seqisa ngenjongo yokugwema noma yokunciphisa ingozi;
- I-BOP (Blowout Preventer) yehlulekile akwangabikho ukusabela esimisweni esizilawulayo, kwesokuqala noma kwesesibili (i-rigfloor nama-toolpusher office panels), futhi akwenzekanga lutho ohlelweni lwesibili/ kuyi-tertiary ROV nasohlelweni lokwenza i-beacon isebenze (isimo esingenzeki ngempela);

- Ukusetshenziswa kohlelo olusiza lapho kwehluleke i-BOP, kuye kwacatshangelwa esimweni esisodwa kuphela (2b) ngaphandle kokucabangela ikhono lalo lokuphinde lithole uwoyela futhi lehlise izinga lokugobhoza kwawo lapho lifakwa okokugcina phezu kwe-BOP/ ukutakisha enhloko yomthombo nokuvimbela umthombo;;
- Ukusetshenziswa kohlelo lokunciphisa ukuchitheka kukawoyela noma lokukulawula (ibhumu, iskima, amathangi njll.) akufakwanga kulesi sibonelo;
- Akuzange kucatshangelwe ukuphindaphindeka noma ukwehla kwezinga lokuchitheka ngaso sonke isikhathi obuchitheka ngaso.

Ukusikisela okungenhla kuveza isimo okunamathuba amancane ukuba senzeke, nokho ukubonisa isimo esibi kakhulu kuhambisana nomkhuba omuhle kakhulu futhi kuyimfuneko ukuze kuthuthukiswe iPulani Yokusabela ngokushesha Ezimweni Eziphuthumayo (Emergency Response Plan) kanye ne-OSCP.

Uma kwenzeka kuvela ingozi, ngokukhethekile, ithimba labasabela ngokushesha ezimweni eziphuthumayo (leli thimba liyoba khona ngaso sonke isikhathi lapho kwenziwa umsebenzi wokubhoboza) liyosabela ngokushesha, ngokuvumelana ne-OSCP, ukuze lehlise noma lilawule izinga lokuchitheka kukawoyela, uma kukhona okuqhumile, liyovala umthombo.

8.3.3 *Imiphumela Yezibonelo Zokuchitheka Kukawoyela*

Le ngxenye ichaza kafushane umphumela oyinhloko wesifundo ngokuchitheka kukawoyela. Okufakwe yilesi sibonelo, ukuhlolwa kwezimo kanye nemiphumela kuchazwe ngokuningiliziwe kuyi-Annex D.

Izenzakalo 1 no-3 zahlolwa ezindaweni ezimbili endaweni esenyakatho: N1 (Lat. -29.171510347, Lon. 32.773259341), N2 (Lat. -29.361772647, Lon. 32.901946107)) esinye saba sendaweni engaseningizimu S (Lat. -30.539622500, Lon. 31.779959861)) ye-Block ER236.

IZenzakalo 2a no- 2b zahlolwa e-N1 nase- S, ngoba u-N1 wabhekwa njengesimo esibi kakhulu ngoba usemathubeni amaningi okuba sengozini yokuba uwoyela uchithekele ogwini lolwandle ngoba itheku lakhona liseduze kakhulu.

Izibonelo zokuchitheka kukawoyela zenzelwa ukuba kubonakale:

- Indlela uwoyela ongachitheka ngayo ngokuhamba kwesikhathi;
- Izindawo okungenzeka ziyashelela negalelo ezingaba nalo ezilwaneni zasendle;

- Izindawo ezingaba nogu olusengozini yokuchithekelwe uwoyela; futhi
- Isikhathi esincane okungahanjwa ngaso ezindaweni ezishelelayo ukuze kufikwe ogwini.

Izenzakalo ezinathathu zokuchitheka kukawoyela ezenziwe isibonelo zichazwe kafushane *Itafula 8.3*. *Itafula 8.3* libonisa isilinganiso esichithwe yisenzakalo ngasinye, ukujula kokuchitheke, okuchitheke nenani lesikhathi okuchitheke ngaso.

Itafula 8.3 Ukuchazwa Kokuchitheke

Izenzakalo	I ncazelo	Isilinganiso	Isikhathi	Ukujula
1	Ukuchitheka kukadizili – Ingozi Yomkhumbi	5,000 bbl (794.9 m ³)	1 ihora / Izinsuku ezingu-7	N1: 0.5 m N2: 0.5 m S: 0.5 m
2 a	Ukuqhuma kwe-crude – Ukuwa Komgodi	Izinga eliqhubekayo lokuchitheka N1: 4,717 bpd (750 m ³ /d) S: 6,604 bpd (1,050 m ³ /d)	7 days/ 21 days	N1: 1,623 m S: 2,883 m
2b	Ukuqhuma kwe-crude– Kufakwa okokuvala		Izinsuku ezingu-20 / Ezingu-34	
3	Kuchitheka i-NADF – kunqamuka ipayipi	N1: 1,867 bbl (296.9 m ³) N2: 2,094 bbl (332.9 m ³) N2: 3,318 bbl (527.5 m ³)	1 ihora / Izinsuku ezingu-7	N1: 0.5 m N2: 0.5 m S: 0.5 m

Kulezi zibonelo ezenziwe zokungase kwenzeke, kukhethwe izimo ezimbi kakhulu eziphindaphindiwe ukuze kuchazwe ukuthi amanzi amaningi anowoyela, inani likawoyela ogwini lolwandle, izinga lejubane ukutheleka kukawoyela ogwini okwenzeka ngalo. Uma iqhanyukelwa nalokho esikwenze kwaba 'yisimo esibi kakhulu', azikho izinyathelo ezithathiwe zokuhlaza kule mifanekiso. Lezi yizimo ezingenakwenzeka ngoba esimweni sangempela, uma kwenzeka kuchitheka uwoyela, i-Eni ibiyothatha isinyathelo esifanele sokusabela futhi inqande igalelo lalokho kuchitheka.

Kusetshenziswe izimo ezibucayi ezintathu ezicatshangelwe kulo mklamo nalokho okungaba yimiphumela yazo. Lezi zimo ezicatshangelwe ziveza isikhathi lapho kuqala khona ukushelela okubangelwa uwoyela (njengoba kuchazwe ku-*Annex D*), ukungcola kogu nokuba khona kwe-DAH eningi okuthinta imvelo ngokuqondile. *Itafula 8.4* ichaza kafushane lokhu kucabangela

Itafula 8.4 Ukucatshangelwa Kwalapho Kuqala Khona

Okucatshangelwa yo	Inani	Ukubaluleka	Umthombo
Ukuncipha okukhulu	1.0 µm	Ukuncipha kobukhulu bezinto eziphila emanzini nezilwane zasendle. Encwadini kuvezwe ukuncipha kobukhulu okungu-1-10 µm. Kulo Mbiko We-EIA inani lokuncipha eliphansi kwathiwa lingu-1 µm.	I-Peakall <i>et al.</i> (1985); French-McCay (2009)

Okucatshangelwa yo	Inani	Ukubaluleka	Umthombo
Ukuncipha okukhulu kosebe	100 g kawoyela/m ² wosebe	Kuhlinzeka umkhawulo ophansi wokuchaza umthelela ongaba khona ekuyeni kwezilwane osebeni.	I-French-McCay (2009)
Ukuncibilika Kwe-Aromatic Hydrocarbons (DAH)	5 ppb	I-Narcosis ibilokhu ihlotshaniswa nge-aromatic hydrocarbons kuwoyela. Inani le-aromatic 96-hour LC50 encibikisiwe lihamba ku-100 ppb kuya ku-1,000 ppb. Ama-Low Reliability Trigger, ngaphansi lapho kungekho shevu ongalindeleka (empeleni kuyi-No Observable Effects Concentration noma-NOEC), kucatshwangwa ukuthi ayizikhathi ezingu-10 kuya ku-100 ngaphansi kwe-96-hour LC50. Ukuze kube nokuphepha okukhulu, kwakethwa i-5 ppb yezinga eliphezulu.	I-ANZECC Ne-ARMCANZ (2000) French (2000), French- McCay (2009)

Elithi “Uwoyela omningi obonakalayo” libhekisele kunoma yimuphi uwoyela odlula isilinginganiso esincane sowoyela ongaba sonqenqemeni, lesi silinganiso sichaza uwoyela obonakalayo kodwa ongenza ukuba izinto eziphila olwandle eziseduze zithintke kancane noma zingathinteki nhlobo ngenxa yowoyela ongahluziwe (u-Lewis, ngo-2007).

Kuye kwenziwa ucwaningo, ukuze kubonakale ukuthi uwoyela osogwini uzithinta kanjani izinyoni nezilwane ezincelisayo. I-Peakall et al. (1985) ne-French-McCay (2009) bathola ukuthi uwoyela ongaphansi kuka-1 μm awuyona ingozi ezinyonini zasolwandle; ngakho uwoyela obonakalayo ophakathi kuka-0.1 μm no-1 μm wakhethwa njengongeyona ingozi kakhulu. Izifundo ezengeziwe zathola ukuthi izinyonyi eziphila olwandle nezilwane zasolwandle ezincelisayo zingase zithintke ngezinga likawoyela elingu-10 μm no-25 μm [u-Engelhardt (ngo-1983), uClark (ngo-1984), uGeraci no-St. Aubin (ngo-1988), uJensen (1994), no Scholten et al (ngo-1996)]. Ngakho isilinganiso esilingene sowoyela ogwini sichazwa njengesilinganiso esiphakathi kuka-1 μm no-10 μm , kuyilapho isilinganiso esiphezulu ogwini lolwandle sichazwa ngokuthi yinoma yimuphi uwoyela ongaphezu kuka-10 μm . Umphumela wesibonelo sikawoyela ongaphandle kolwandle nesikhathi sokuqala kuyasefwa ukuze kususwe uwoyela ongaphansi kuka-1 μm .

Ukuze ahlole okungase kwenzeke ezinyonini nasezilwaneni zasendle ngenxa kawoyela osogwini lolwandle ezifundweni zakhe zokuhlola, uFrench-McCay (2009) wakhapha ukuhlola ngezilwane ezihlukahlukene ezithintwa ngokushesha uwoyela. UFrench-McCay wancoma unqenqema luka-of 100 g/m² njengenani elikahle lokubonisa ukuthi uwoyela ongakanani endaweni ethile ongabangela umonakalo ezinyonini zasogwini lwasolwandle nezinye izilwane zasendle noma eziphila ogwini.

Isenzakalo 1: Uwoyela kadizili ongu-794.9 m³ (5,000 bbl) ochithekile ungahamba uye ohlangothini olusengizimu-ntshonalanga ngenxa Yemisinga We-Agulhas elinganisene nogu. Kubonakala kungenakwenzeka kalula ukuthi ukuchitheka kukawoyela okunjalo kuzo zontathu izindawo kuhambe kungaphezu kwesilinganiso esincane (esingu-1.0 µm) kuyolimaza izilwane zasendle endaweni engamakhilomitha angaba ngu-20 ukusuka ogwini oluseNingizimu Afrika.

Ngesikhathi kwenziwa isibonelo sokuchitheka kukadizili, isenzakalo ngasinye sokuchitheka kwawo, saphindwa izikhathi ezingu- 120 kuqalwa osukwini uwoyela owachitheka ngalo, kwenziwa isilinganiso esilingene saze safikiswa eminyakeni emihlanu. Kwenziwa nenhlanganisela yomoya nomsinga wolwandle ukuze kubonakale indlela lo woyela ongahamba ngayo. Kwakhethwa futhi kwahlolwa isimo esibi kakhulu esibonelweni nasenkathini ngayinye.

Kulokhu kuphindaphinda, inani elihlangene lendawo esemanzini nezilwane zasendle elathintwa yinani elincane noma eliphezulu likawoyela (1-10 µm), kwesinye isikhathi, liphindaphindeka ezinsukwini ezingu-7 lalingu-1,896 km², 1,684 km² no-2,848 km² ekuchithekeni okwenzeka e-N1, N2 naku-S. Lokhu kuphindaphinda kwabuye kwabonisa ukuthi inani elihlangene lendawo esogwini ethintwe kakhulu uwoyela obusemanzini (10.0 µm noma ngaphezulu), kwesinye isikhathi, liphindaphindeka izinsuku ezingu-7 lalingu-210 km², 147 km² no-243 km² ekuchithekeni okwenzeka e-N1, N2 nase-S.

Uma ingekho imizamo eyenziwayo ukusabela kulesi simo, udizili ongaphezu kwenani elisesilinganisweni ezilwaneni zasendle (1.0 µm) uyakwai ukuhamba ibanga elifinyelela kumakhilomitha angu-230 km, 215 nangu-320 ekuchithekeni okwenzeka ku-N1, ku-N2 naku-S. Udizili uba khona kulezi zindawo emanzini futhi ube ngaphezu kwesilinganiso esilingene (1.0 µm) ube negalelo ezilwaneni izinsuku eziya kwezintathu ngaphambi kokuba lehle izinga lokuba khona kwawo (Itafula 8.5).

Izindawo ezinesilinganiso esingaphezu kwesilingene ezilwaneni (1.0 µm) ziqhubeka ziwumngcingo futhi zizinde njengogu lolwandle eNingizimu Afrika. Izimo ezibonisa igalelo eliba khona ogwini lapho kuchitheka uwoyela izinsuku eziphindaphindiwe ezingu-7 (ukuphindaphinda okuthathwe kwahlukaniswa ngezikhathi ezilinganayo kwaze kwaba isikhathi esingangeminyaka emihlanu, okumelela nezimo zolwandle nezezulu), zisuka ogwini oluseThekwini kuya koluse-East London.

Nakuba kungabonakali ukuchitheka kukawoyela okukhulu ogwini (>100 g/m²), esimweni esibi kakhulu sokuchitheka kukawoyela, esingalimaza izilwane zasendle singafinyelela amakhilomitha angu-200 kuya kwangu-370 ogo oluphakathi kweTheku ne-East London.

Nokho, amathuba okuba kuthinteki ugu kulokhu kuchitheka okusezindaweni ezintathu angaphansi kwamaphesenti angu-15. Uma kungenzeka kuchitheke uwoyela ezindaweni ezimbili ezisenyakatho lapho kukhona khona imithombo, udizili ungafika ogwini endaweni eseduze neRichards Bay ngesikhathi esincane kakhulu.

Ugu oluya ngaseThekwini yilona eliyiqala ukuthola udizili uma kungenzeka uchitheke usuka emithonjeni engaseningizimu. Nakuba kungachitheka uwoyela ogwini, ezikhathini ezingu-120 eziphindaphindiwe esikhathi esiyiminyaka emihlanu, amathuba okuba uwoyela uchithekele kunoma yiluphi ugu angamaphesenti angu-7.5, 3.3 nangu-15 ku-N1, N2 naku-S. Kunoma yisiphi isenzakalo, ukungabi khona kwemizamo yokusabela ngokushesha udizili ungafika ogwini phakathi nezinsuku ezintathu. Phawula ukuthi ngokungafani nowoyela ongahluziwe, uwoyela kadizili awuvamile ukwakha ungqimba olunamathelayo noma izigadla. Akuvamile ukuba kudingeki ukuhlanzwa kogu njengoba udizili uzehlele ngokwemvelo ngokushesha.

Itafula 8.5 Ukufingqwa Kwemiphumela Esenzakalweni 1 (Ukuchitheka kukadizili)

Indawo Yokubhoboza	Isigaba 1: Inani Elikhul Lamanzi Elinowoyela Ongaphezu kuka-1 μm Ugu (km^2)	Isigaba 1: Inani Elikhul Lamanzi Elinowoyela Ongaphezu kuka-10 μm Ugu (km^2)	Isigaba 2: Inani Elikhulu Lokungcola Kogu - Ubude Bogu (km)	Isigaba 3: Isikhathi Esisheshayo Sokungcola kogu (izinsuku)	Amathuba okuthinteka Kogu
N1	1,896	210	205	2.6	7.5%
N2	1,684	147	366	3.3	3.3%
S	2,848	243	336	2.8	15.0%

Umthombo: ERM, 2018b

Phawula: Lesi sibelo sibekwe njengoba sinjalo, okubonisa izimo ezingeki zenzeka ezmweni zangempela

Isenzakalo 2a – Ukuqhuma kuholela ekungasebenzini komgodi:-
Esanzakalweni lapho kube nokuqhuma, ukuchitheka kukawoyela ongahluziwe kwacatshangelwa ukuthi uma ku-4,717 bpd (750 $\text{m}^3/\text{ngosuku}$) ukusuka enhloko yomthombo ese-N1 ne-6,604 bpd (1,050 m^3/d) kusukela emthonjeni ose-S, izinsuku ezingu-7 ngaphambi kokuba umgodi uyeke ukusebenza futhi ungabe usakhipha lutho.

Isenzakalo 2b – Ukuqhuma okulandelwa ukufakwa kwesimiso sokulawula umonakalo ngokuvala: - Lapho kukhona okuqhumile, kwacatshangelwa ukuthi uwoyela ongahluziwe owaphuma wama ku-4,717 bpd (750 $\text{m}^3/\text{ngosuku}$) emthonjeni ose-N1 ne-6,604 bpd (1,050 m^3/d) ukusuka emthonjeni ose-S, izinsuku ezingu-20 ngaphambi kokuba isimiso sokuvala sifakiwe ukuze kunqandwe ukuchitheka kukawoyela.

Njengoba kuchaziwe ngaphambili, lokhu kusikisela okweqisayo kwakho kwala manani, akusona isimo sokuqhuma esingase senzeke. Uwoyela ophuma ngale kwamanzi uthintwa yimisinga nezigaba ezihlukene, lapho uwoyela; wehla, uzika, uphela amandla, noma uhlale usesimweni sokuba saketshezi ulokhu uconsa uze ufike endaweni ebonakalayo. Kwakhekha indawo eshelelayo emanzini.

Phakathi nesikhathi sokwenza isibonelo sokuqhuma, isenzakalo ngasinye saphindwa izikhathi ezingu- 120 ngosuku okwaqala ngalo ukuchitheka kuhlukaniswe ngezikhathi ezilinganayo isikhathi esiyiminyaka emihlanu. Lokhu kwenza kubonakale izinhlanganisela ezihlukahlukene zomoya nomsinga wolwandle ukuze kubonakale indlela ukuchitheka kukawoyela okuhamba ngayo. Kuthathwe futhi kwahlolwa isimo esibi kakhulu kunezinye.

Lapho kuba nokuqhuma, ukuhamba kowoyela ochithekile kuzofanikiselwa ngesikhathi seMetocean data yangempela, ukuze kubonakale kusengaphambili ukushesha kwethimba labasabela ezimweni eziphuthumayo ekusebenziseni i-OSCP ukuze inqande/ yehlise/ ivale lokho kuqhuma ngaleyo ndlela linciphise ingozi yokuchitheka kukawoyela ogwini.

Imiphumela yalesi sibonelo (bheka i-Annex D) ichazwe Etafuleni 8.6 ngezansi:

Itafula 8.6 Ukuchazwa kwesenzakalo 2a neSenzakalo 2b Imiphumela Yesibonelo

Isenzakalo	Umphumela
Isenzakalo 2a – Ukuqhuma okubangela umgodi ungasebenzi	• Uma uwoyela usuphumele ngaphandle, uvame ukuya ohlangothini oluseningizimu-ntshonalanga ngenxa yomsinga we-Agulhas, odlula imisinga nemimoya eseduze ngamandla. • Indawo eshelelayo esesilinganisweni esilingene ethinta izinto zasendle eziphilayo (1.0 µm) ayivamile (amathuba okwenzeka angaphansi kwephesenti elilodwa) ukuza ogwini ingakanciphi. • Isilinganiso esiphakeme senani lendawo esemanzini ethintekayo esikhathini esithile (ukuphindeka okungu-120 esikhathini esiyiminyaka emihlanu) sithintwa ungqimba oluyingozi >1.0 µm okwenzeka ngehlobo nekwindla kwaba u-401 km² (emthonjeni ka-N1) no-3,049 km² (emthonjeni ka-S). • Azikho izindawo ezadlula u-10 µm wokuchitheka kukawoyela ogwini okwaba yingozi ezinyonini nakwenzinye izinto zasendle eziphilayo. • Ukungcoliswa uwoyela okukhulu ogwini (>100 g/m²) akuvamile (amathuba angaphansi kwephesenti) ukuba kufike ogwini. • Uma uwoyela ungafika ogwini ungafika phakathi nezinsuku ezine kuya kweziyisithupha phakathi nehlobo/nekwindla ezindaweni eziphakathi kwePort Shepstone nePort St Johns (emthonjeni oku-N1 naku-S), nase-St Lucia (emthonjeni oku-N1 well site) nasePort Edward (emthonjeni oku-S) phakathi nobusika /nentwasahlobo. • Indawo enkulu ye-DAH engaphezu kuka-5 ppb ogwini esimweni esibi kakhulu sokuchitheka kukawoyela iphakathi kuka-2,033 km² (emthonjeni ongaseningizimu phakathi nehlobo/nekwindla) kuya ku-324 km² (emthonjeni ongasenyakatho ngobusika/ngentwasahlobo).
Isenzakalo 2b – Ukuqhuma okulandelwa	• Uma uwoyela uphumela ngaphandle, ngokuvamile uya ohlangothini lweningizimu-ntshonalanga. Ngenxa yemimoya nemisinga eseduze.

Isenzakalo	Umpumela
ukufakwa kwesimiso sokuvala (isimiso esisiza uma kuhluleka i-BOP)	• Indawo eshelelayo esesilinganisweni esilingene ethinta izinto zasendle eziphilayo ($1.0 \mu\text{m}$) ayivamile (amathuba okwenzeka angaphansi kwephesenti elilodwa) ukuza ogwini ingakanciphi. • Emthonjeni ose-N1, indawo enkulu ehlangenisiwe eyathinteka esikhathini esithile (ukuphindwa izikhathi ezingu-120 eminyakeni emihlanu) ngenxa kawoyela oyingozi $>1.0 \mu\text{m}$ yathinteka ebusika nasentwasahlobo, indawo engu-695 km^2. • Emthonjeni ose-S well site, indawo enkulu ehlangenisiwe eyathinteka esikhathini esithile (ukuphindwa izikhathi ezingu-120 eminyakeni emihlanu) ngenxa kawoyela oyingozi $>1.0 \mu\text{m}$ yathinteka ehlobo nasekwindla, indawo engu-4,386 km^2. • Ayikho indawo eyathinteka ukudlula isilinganiso sika-$10 \mu\text{m}$ ogwini eyafaka engozini izinyoni nezilwane zasendle. • Ukungcola ngokuphawulekayo kogu ngenxa kawoyela ($>100 \text{ g/m}^2$) akubonakali kungenzeka kufike ogwini lolwandle (amathuba okwenzeka yiphesenti elilodwa) • Uma kungenzeka uwoyela ufike ogwini ungafika phakathi nezinsuku ezinhlanu kuya kwezingu- 7 ngesikhathi sasehlobo/sasentwasahlobo ezindaweni eziphakathi kwePort Shepstone nePort St Johns (Imithombo u-N1 no-S), neSt Lucia (Umthombo oku-N1) nePort Edward (emthonjeni S) phakathi nobusika/intwasahlobo.

Umthombo: Ithathelwe kuyi-ERM, 2018b ka-Pulfrich, yango-2018

Phawula: Lesi sibelo sibekwe njengoba sinjalo, okubonisa izimo ezingeke zenzeka ezmweni zangempela

Isenzakalo 3: Ukunqamuka Kwepayipi – Esimweni lapho kunqamuke khona ipayipi, uwoyela ochithekile uhamba ngendlela efanayo nalapho kuchitheke khona udizili, ikakhulukazi ezindaweni eziseningizimu neziseningizimu-ntshonalanga, futhi usemathubeni okufika ogwini phakathi nezinsuku ezintathu.

Imiphumela yesibonelo (bheka i-Annex D) ibonisa ukuthi ibonisa ukuthi inani elisesilinganisweni ($1.0 \mu\text{m}$) ingahamba indawo engamakhilomitha angu- 25 ogwini lwaseNingizimu Afika. Uma ingekho imizamo yokusabelo, uwoyela ungahamba amakhilomitha angaphezu kuka-215, angu-160, angu-305 isuka ezindaweni ochitheke uphuma kuzo ku-N1, ku-N2 naku-S ngaphambi kokuba wehle. Isilinganiso esiphelele sendawo eyongcoliswa uwoyela esikhathini esithile (ukuphindeka izikhathi ezingu-120 esikhathini esiyiminyaka emihlanu) isilinganiso esingu- $>1.0 \mu\text{m}$ no-1,232 km^2 (emthonjeni u-N1), u-870 km^2 (emthonjeni u-N2) no-2,050 km^2 (emthonjeni u-S).

Awukho uwoyela omningi kakhulu owachithekela ogwini ($>100 \text{ g/m}^2$), nakuba esenzakalweni esibi kakhulu uwoyela wawungafika ogwini phakathi namalanga amabili noma amathathu uthinta ugu olungamakhilomitha angu-119 (emthonjeni u-N1), amakhilomitha angu-249 (emthonjeni u-N2) namakhilomitha angu-186 (emthonjeni u-S), phakathi kweTheku ne-East London. Amathuba okuthi kungcole ugu ngenxa kawoyela osuke kuzo zontathu lezi zindawo angamaphesenti angu-8.3 , 5.8 nangu-15 % emthonjeni u-N1, u-N2 no-S.

Imiphumela yesibonelo (bheka u-Annex D) iphinde ibonise ukuthi uwoyela omningi ovinjiwe ungahamba amakhilomitha ayisithupha ukwehla nolwandle kusukela lapho uchithekele khona uma umsinga ushaya ngamandla, kodwa ukuba kuningi kukawoyela kuhlala kungaphansi kuka-35 mg/l.

Itafula 8.7 Ukuchazwa Kwemiphumela – Isenzakalo 3 (NADF Ukuchitheka Okubangelwa Ukuqhuma Kwepayipi)

Indawo yokubhoboza	Isigaba 1: Inani Lendawo Yamanzi Engcole Ngaphezu akuka- 1 µm Ogwini (km²)	Isigaba 1: Inani Lendawo Yamanzi Engcole Ngaphezu Kuka- 10 µm Ogwini (km²)	Isigaba 2: Izinga eliphakeme Lokungcola Kogu Ngobude (km))	Isigaba 3: Ukushesha kokuhamba kokungcola kogu (izinsuku)	Amathuba oKungcola kogu ngowoyela
N1	1,232	0	119	2.5	8.3%
N2	873	0	249	3.2	5.8%
S	2,046	0	186	2.7	15.0%

Umthombo: ERM, 2018b

Phawula: Lesi sibelo sibekwe njengoba sinjalo, okubonisa izimo ezingeke zenzeka ezmweni zangempela

Kubalulekile lapha ukuphinda ukuthi, ngokuvumelana nemikhuba emihle eyenziwa emhlabeni wonke, zonke izimo eziyisibonelo zenziwe kucatshangelwa isenzakalo lapho kungekho ithimba elizosabela ezimweni zokuchitheka kukawoyela nalapho zingekho izindlela zokunqanda lokhu kuchitheka. Ngakho-ke njengoba nje zingekhe zibe khona izimo ezinjalo, imiphumela yalesi sibonelo 'siyisimo esibi kakhulu' esingenakwenzeka uma kungenzeka kuchitheke noma yimuphi uwoyela. Ukuchazwa kwemiphumela yesibonelo kwenzelwa imiphumela yokuhlola Esefifuleni 8.8.

Itafula 8.8 Ukuchazwa Kwesibonelo Sokuchitheka Kukawoyela Kuzo Zonke Izenzakalo

Indawo yokubhoboza	Ugu Olungcole Kakhulu (km)	Isikhathi Esifushane Sokufika Ogwini (izinsuku)	Amathuba Okufika Ogwini	Indawo enkulu Ngaphezu kuka- 1 µm Ogwini (km²)	Indawo enkulu Ngaphezu kuka- 10 µm Ogwini (km²)
Ukuchazwa kwemiphumela yokuchitheka kukadizili- Isenzakalo 1					
N1	205	2.6	7.5%	1.896	210
N2	366	3.3	3.3%	1,684	147
S	336	2.8	15%	2.848	243
Imiphumela yesibonelo sokuqhuma kukawoyela ongahluziwe – Isenzakalo 2a					
N1	0	4.25	0	401	0
S	0	5.00	0	3049	0
Imiphumela yesibonelo sokuqhuma kukawoyela ongahluziwe 2b					
N1	0	5.75	0	695	0
S	0	5.25	0	4386	0
Isibonelo somphumela wokunqamuka kwepayipi- Isenzakalo 3					
N1	205	2.5	8.3%	1,232	0

Indawo yokubhoboza	Ugu Olungcole Kakhulu (km)	Isikhathi Esifushane Sokufika Ogwini (izinsuku)	Amathuba Okufika Ogwini	Indawo enkulu Ngaphezu kuka- 1 µm Ogwini (km ²)	Indawo enkulu Ngaphezu kuka- 10 µm Ogwini (km ²)
N2	48	3.2	5.8%	873	0
S	49	2.7	15%	2,046	0

8.3.4 *Amathuba Okuchitheka Kukawoyela*

Kucatshangelwa ukuthi mancane amathuba okuchitheka kukawoyela ongahluziwe ngenxa yokuqhuma emanzini ajule ngokuvamile, kusikiselwa ukuthi emhlabeni wonke kuba semthonjeni owodwa kwengu-4,000 (2.5×10^{-4}) emithonjeni okuvivinywa kuyo ukusebenza kwezindlela ezingcono kakhulu (ngokuvumelana ngoMbiko we-OGP 434-02, ka-2010).

I-Eni ihlola ingozi yokuqhuma komthombo, ezimweni zemvelo, ukwethenjela kwamathuluzi namaphutha abantu, ngesikhathi kwakhiwa imithombo futhi kucatshangelwa kwezobuchwepheshe bamuva ukuze kwehliswe izingozi ezingase zenzeke. Ngokusebenzisa lezi zindlela, i-Eni iye yenza imiklamo ngohlobo oluthile lobuchwepheshe. Lokhu kuholela ekwehlisweni kwamathuba okuqhuma kuze kufinyelele ezimweni ezimbili: kusukela ku-10-4 kwehle kufinyelele ku-10-6, isib. Umthombo owodwa kwengu-400,000

8.3.5 *Ukwehliswa Kwengozi Nokusabela Ezimweni*

Ngokwe-OGP (ka-2016), ukuhlolwa kokuchitheka kukawoyela kufanele kufeze lokhu:

- Kugweme/ kwehlise amathuba ezingozi ezenzekayo isib. Kuthathwe izinyathelo zokukuvimba (isib. i-BOP, nezinto zokuvimbela ezengeziwe);
- Kwehlisa inani likawoyela ongachitheka isib. ukusabela ngokushesha/ ukulawula inani likawoyela ochithekayo (isib. ukufakwa kwesimiso sokuvala lapho kuchitheka khona); nokuthi
- Kwehlisa imiphumela uma kwenzeka kuvela izingozi isib. izimo ezingqandayo (isib. ukulungiselela ukuchitheka kukawoyela, ukulungiselela lapho kuzokwenziwa imisebenzi esengozini eyengeziwe phakathi nezinkathi zonyaka ukuba kungabi nemiphumela emibi kakhulu).

Itafula 8.9 ichaza ngezenzo zokugwema izingozi, ezisulungwe yi-Eni phakathi nesikhathi sokubhoboza uma kwenzeka kuchitheka uwoyela.

Itafula 8.9 Izenzo Zokuvikela Nezokunqanda Izingozi

Izinto Zokuvimbela Nokulawula (Izenzo Zokuvikela Nokulawula)	
Ezokuklama Nobunjiniyela	Ngaphambi kokuqala ukubhoboza, iNkampani (i-Eni) inezindlela eziningana zokuvimbela noma zokunqanda, iqala kwezokuklama nezobunjiniyela. Ngokwesibonelo, i-Eni ichaza umkalamo (umklamo ohlelwe kahle, ukuchazwa kwamadwala angase avele, ukuchazwa kwamazinga okushisa nokubanda nokuchazwa kwemigodi, ukuchazwa kwengaphandle namashubhu, i-wellhead, iBOP namapayipi asebenza olwandle, ukuzinza nezifundo ngezinguji njll.) nohlelo lokubhoboza okufanele lilandelwe lapho kwakhiwa umthombo. Uhlelo lokubhoboza luqeqeshwe yi-Eni Headquarters (HQ) ukuze iqiniseke ukuthi iNkampani ilandela imikhuba eyiziqondiso ezinhle kakhulu futhi ihambisana nesimiso somhlaba wonke esiphakeme kakhulu kanye nemikhumba yalo mkhakha emihle kakhulu. Ibuye inikeze isiqinisekiso ngezimfuneko zokusebenza ngendlela esezingeni elihle nezobunjiniyela kanye nokungenela kwabantu abaqeqeshiwe. Isigaba somklamo omuhle sihlanganisa nokuthola izinto, ukukhetha irig nenkontileka efanelekela ukwenza umsebenzi. Phakathi nesikhathi sokubhoboza, ezokubhoboza kanye nokufakwe kwe-HQ nokugadwa kwayo yonke imingcele okubhotshozwa kuyo phakathi nomsebenzi ukuze kwehliswe izinga lokuvula kwengozi uma kwenzeka kuphunyuka ihydrocarbon kungalindelekile phakathi emthonjeni ngaleyo ndlela kukhulisa ezokuphepha phakathi nesikhathi sokwakha umthombo ezingxenyeni ezihlukene zomthombo.
Okuningi	I-Eni izokopela, izindlela zokwakha umthombo, isimiso esikabili sokuvinbela. Ukuze kuncishishwe ingozi yokuvula kwezenzakalo ezimbi nezingathandeki (njengokuqhuma) umklamo womthombo nezindlela zokusebenza, imishini, izoqinisekisa ukuba khona isivimbo sesibili uma kwenze esokuqala singaphumeleli. Ngokwesibonelo izingcindezi eziqhamuka ngaphezulu nangaphakathi kwe-strata esikhipha ihydrocarbon zizolawulwa ngokusebenzisa udaka lokubhoboza. Udaka luyisivimbo sokuqala phakathi nesikhathi sokubhoboza uma kwenzeka ingasebenzi ihydrocarbon influx, i-BOP ingavala ngendlela ephephile izungeze ipayipi lokubhoboza okwenza kuvaleke umthombo nokukhula kwesilinganiso sodaka ukuze isekele isivimo sokuqala. Esinye isibonelo sesivimbo esiphindekile ukuvala nge-annulus ewusimende. Ukuvala, okuklanyelwe ukumelana nezimo ezihlukahlukene, njengokuhluleka, ukuqhuma nokungasebenzi kahle kwamakhemikhali, kuyisivimbo sokuqala sokuhlukanisa umthombo emadwaleni. Uma kwenzeka lokho kungasebenzi, ukuba khona kwe-annulus kasimende kungaba yisivimbo sesibili.
Isitaki seBOP	Izitaki zeBOP zisetshenziselwa ukulawula ingcindezi yomthombo ngemishini eklanyelwe ukuvala umthombo ngokushesha (noma “sivale”) uma kuvela izimo eziphuthumayo. I-BOP ikuvumela ukuba ukwazi ukuvala umthombo noma engekho amapayipi okubhoboza noma ukuvala ngaphakathi kwe-BOP iBOP(“engenalutho”). IBOP ingabuye ifakwe ibe yizitaki eziningana, ukuze uma kwenzeka isitaki sokuqala singalungi, kuzosebeneza isitaki sesibili. Lokhu kukuvumela ukuba uvale iram futhi unqamule amapayipi angaphakathi kuyi-BOP, ukuze uvumele ukuthi, uma kudingeka, uphume ngokuphepha emkhunjini wokubhoboza. Ngemva kwalesi sikhathi, kuyimpoqo ukuba kufakwe iBOP. I-Eni iyothatha iBOP njengengasasebenzi kuzo zombili izindawo phezulu (ezingxenyeni ezihlukene lapho kubekwe khona irig) nakwezinye izingxenyeni (eziphathelene nomsakazo, iROV)

Izinto Zokuvimbela Nokulawula (Izenzo Zokuvikela Nokulawula)	
Abantu Abazi Umsebenzi	I-Eni inabantu abazi umsebenzi futhi abachwepheshile abazoklama umthombo futhi benze umsebenzi. Okunye ukuze kulawulwe umthombo, bonke abasezikhundleni ezifanele (onjiniyela, izimenenja, abaphathi, ababhobozayo, abaphusha amathuluzi, umholi wezokuphepha lapho kubhotshozwa) bayafaneleka futhi bayaqeqeshwa ngezikhathi ezithile/ bahlolwe yi-IWCF ¹ okuwukuphela kwenhlangano ezimele ukuba isungule futhi ilawule ukuqeqesha okuhle, ukuhlolwa nezimiso zokunikeza izitifiketi egameni lesigaba esivivinya futhi sinakekele umkhqizo kawoyela negesi.
Ukuhlola Nokunika Izitifiketi	Izinto zokusebenza ezingaba yingozi zizohlolwa futhi kukhishwe izitifiketi ukuze kuqinisekiswa ukuthi ziyahlanabezana nezimfunelo zomklamo. Ukuklanywa komthombo, ukubhoboza nokuqedwa kwamapulani kuzodlula izigaba eziningi zokuhlolwa ezihlela ongoti bakwa-Eni nezinkontileka ezibhobozayo ngaphambi kokuba kuqale umsebenzi wokubhoboza.
Ukusabela Nokululama (Izenzo Zokunqanda)	
Ipulani Yokuchitheka Kukawoyela Okungavela (Oil Spill Contingency Plan [OSCP])	Naphezu kwezinyathelo zokuvikela nokulawula ezakhelwe emklamweni womsebenzi, kuhlale kunengozi yokuthi uwoyela ungachitheka. Ngenxa yalokho, njengomkhuba oyisisekelo, kulungiselelwa i-OSCP futhi ibekwe ngaso sonke isikhathi lapho kusaqhubeka inqubo yokubhoboza. Nazi izimiso ezintathu okusekelwe kuzo i-OSCP: • Ukulawula izimo eziyingozi (Ukuphuthuma lapho kuvela ingozi Nokulawula isimo esiyingozi); • Ukusabela lapho kuvele ingozi, ukuyilawula nokuhlanya; kanye • Ukulawula kahle. Imininingwane eyengeziwe itholakala kuSahluko 9.
Ukulawula Izimo Eziphuthumayo	UKhomanda osuke esendaweni, ngokuvamile imenenja engekho olwandle yokuxhunyw kwezinto, uzonakekela izimo eziphuthumayo futhi aqinisekise ukufaka konke okwe-OSCP ngendlela efanele, kuhlanganise nesiqinisekiso sendlela yokuxhumana nebhodi Emelele Inkampani Esabela Egumbini Lezimo Eziphuthumayo (ERR) ngokuvumelana ne-OSCP
Ukulawula Umthombo	Njengoba i-OSCP ichaza indlela yokusingatha nezindlela ezifunekayo ukuze kulawulwe ingozi, ukususwa nokuhlazwa ngemva kokuchitheka kukawoyela omningi, ukulawula umthombo kugxile ekuvimbini umthombo ekuconseni (isib. ukuvala umthombo ngokuphelele). Ipulani Yokulawula Ukuchitheka Komthombo (WCCP) izobekwe emthoneni ngamunye.
Amathuluzi Okuvala Nokulawula (ukufakwa kwezimiso zokuvala nezinto zokusekela izimiso ukuze kusekelwe iBOP uma kwenzeka ingasebenzi)	Uma iBOP ingavali ngokuphumelelayo vala umthombo, umkhumbi wokubhoboza kufanele uyeke, futhi uqhele emthonjeni lapho ithimba lixhuma isimiso sokuvala. Isimiso sokuvala sizokwehliselwa kuleyo ndawo bese sixhunyw phezulu neBOP ukuze silawule ukugobhoza komthombo. Lokhu kuzokwehlisa ukuchitheka ngezininga eliphawulekayo. Yonke imithombo yakwa-Eni yakhiwe ngendlela yokuba ikwazi ukuvaleka. Uma kwenzeka kuba khona ukuqhumana, i-Oil Spill Response Limited ² (OSRL) (enamathuluzi okusabela ekuchithekeni kukawoyela) ne-

¹ IWCF: International Well Control Forum <http://www.iwcf.org/>

² Oil Spill Response Limited (OSRL) yi-Nhlangano Yokusabela Ezimweni Eziphuthumayo Ezibizwa NgeTier 3 Zomhlaba Wonke, ephethwe amalungu enkampani yayo kawoyela anamasheya, ukuze kuzuze amalungug ayo. I-OSRL isabela ngokushesha lapho kuvela isimo esiphuthumayo esibizwa ngeTier 3 Event

Izinto Zokuvimbela Nokulawula (Izenzo Zokuvikela Nokulawula)	
	Wild Well Control ¹ (yokulawula umthombo nokuwuvala) kuzoqala ukusebenza ngokushesha. Zombili lezi ziNkampani zisebenza 24/7.
Amathuluzi okulawula nokuhlanza	Imikhumbi eyenza imisebenzi izoba namathuluzi afanelekayo okulawula nokuhlanza ukuchitheka, isibonelo, ama-boom, amadispersant, nezinto zokumunca. Wonke amaqembu asemikhunjini azoqeqeshelwa ukusebenzisa amathuluzi okuhlanza lapho kuchitheke uwoyela baphinde bazilungiselele ukwenza lo msebenzi ngezikhahti ezithile. Kuzoba khona namanye amalungiselelo okunikeza usizo olwengeziwe (isib. kusakela ku-OSRL/SWIS).

¹ Wild Well Control umhlinzeki wezwe lonke wokulawula ukusabela ezimweni eziphuthumayo ogwini nangaphakathi, ulawula izinto eziphuma ngomfutho, umsebenzi wokuhlelela izimo, ubunjiniyela, enzemvelo nezinkonzo zokuqeqesha.

8.3.1

Ingozi Yokuchitheka Kukawoyela Ezintweni Eziphilayo Ezisolwandle Nezisogwini

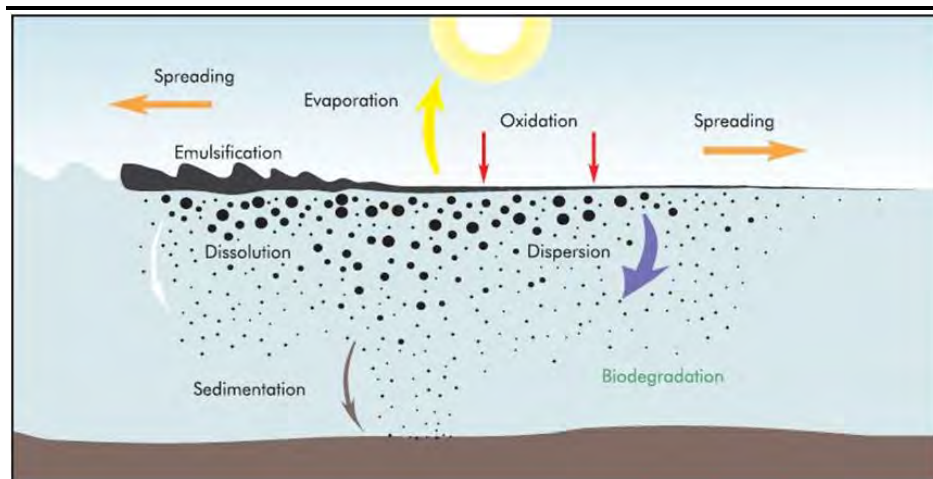
Incazelo Evamile Yegalelo Ezintweni Eziphila Olwandle Ngenxa Yokuchitheka Kwehydrocarbon

Noma yikuphi ukuchitheka kwamahydrocarbon awuketshezi kunomthelela oqondile noma ongaqondile ezintweni eziphila olwandle. Le mithelela ihlanganisa ukuthelwa uwoyela, nobungozi ezilwaneni nasezitshalweni zasolwandle, effects include physical oiling and toxicity impacts to marine fauna and flora, ukufa kweplankton (ikakhulu amacopepods), amaqanda nezinhlanzi ezincane ukufa kwezinye izilwane noma ukungcola kwendawo yazo (CSIR 1998; Perry, 2005).

Ziningi izinto ezinomthelela egalelweni lokuchitheka kukawoyela endalweni esolwandle. Indlela inhlabathi eyakheke ngayo kanye namakhemikhali akuyo, isimo sezulu sendawo nesimo solwandle kanti nemisinga iyalithinta kakhulu izinga uwoyela osabalala ngalo. Izici ezithinta indlela uwoyela ochitheke ngayo olwandle zibaluleke kakhulu, ukujula kwawo, ukuzika kwawo nezinga othululeka ngalo, konke okuxhomeke emakhemikhalini akha uwoyela (isib. inani lama-asphaltene, amaresin namawaxe). Uwoyela ochithekile uyashintsha wona ngokwayo kanye namakhemikhali (kuhlangene kubizwa ngokuthi 'ukushintsha'), okuyinhlanganisela yendlela ohamba ngayo enquma indlela ozongcola ngayo nezinga imvelo ezochayeka ngalo ezintweni eziyingozi zalokho okuyobe kuchithekile.

Ngokushesha nje lapho uwoyela uchitheka, kwenzeka izinguquko eziningi (*Isibonelo 8.1*). Nakuba izinguquko zingenzeke ngazinye, izinga lokwenzeka kwazo liyahluka kuye ngesikhathi (*Isibonelo 8.2*). Kolunye uhlangothi ukusabalala, ukuhwamuka, nokuncipha kwawo kuyizinto ezibaluleke kakhulu phakathi lapho usanda kuchitheka, lokho uwoyela ozogcina uyikho kunqunywa inqubo ende yokugqwala nokwehla kwawo.

Isibonelo 8.1 Inqubo Yokuguquka Kuwoyela



Umthombo: ITOPE, 2002

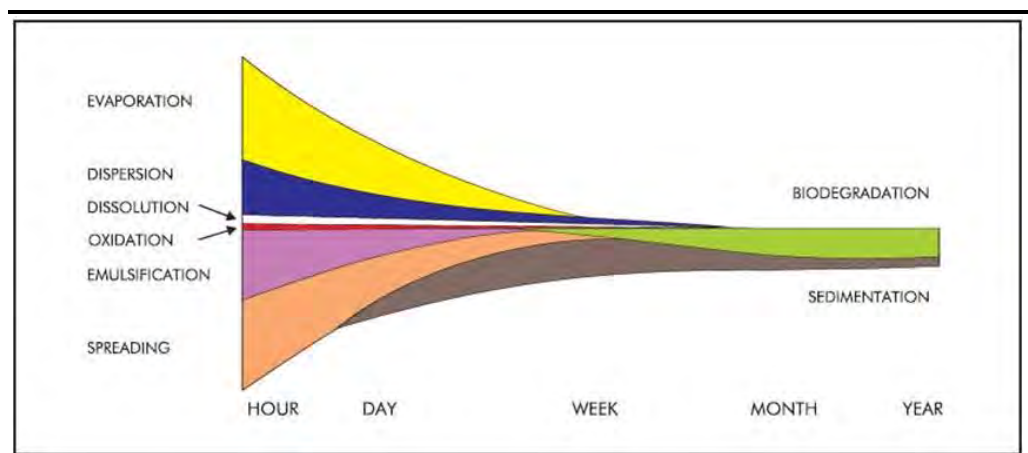
Njengendlela evamile, owoyela oguquguqukayo, As a general rule, oils with a volatile nature, ongazikile awuhlali isikhathi eside futhi uyashesha ukunyamalala olwandle (isib. udizili nowoyela abalula). Ngokuphambene nalokho, uwoyela ozikile onobutyela, uyephuza ukuphela futhi uhlala isikhathi eside, ngokuvamile udinga ukuba kuhlanzwe uma uchithekile (isib. uwoyela ongahluziwe ozikile). I-Eni icabangela ukuba uwoyela ungaziki kakhulu lapho kwenziwa lo msebenzi.

Uwoyela ochithekele olwandle ngokushesha uba nemiphumela engathandeki emanzini. Izici eziyingozi kakhulu zihlanganisa iphunga nesisindo esincane sama-*polycyclic hydrocarbons* (abuye abizwe ngokuthi ama-Dissolved-phase Aromatic Hydrocarbons (DAHs)), njengoba lezi simuncwa kalula amanzi.

Uwoyela uyingozi kakhulu ezinsukwini ezimbalwa zokuqala uchithekile, bese kuyancipha ukuba yingozi njengoba uphelelwa amandla. Isikhathi sonyaka uwoyela ochitheka ngaso kakhulu uzolithinta ngokuphawulekayo izinga legalelo kuyi-*plankton* emaqandeni ezinhlanzi nasezinhlanzini ezincane. Uma kungenzeka ukuchitheka kukawoyela kuqondane nesikhathi sokuzalelwa kwamaqanda, kungaholela ezingeni elikhulu lokufa kwezinhlanzi ezincane okwenza kwehle isibalo sazo (Baker *et al.* 1990). Nokho, ukuzalela nezimo ezinjalo kuthintwa kakhulu izimo zezulu kakhulu kunokuchitheka okukodwa nje kukawoyela (Neff 1991).

Ukuzwela kalula kwamaqanda ezinhlanzi nezinhlanzi ezincane kuhlobene nokuchayeka ekuchithekeni kowoyela omusha (Teal & Howarth 1984), okuba nezinga elincane lokufa uma kuchayeke kuwoyela osusefekile (Neff 1991). Ngenxa yokunyakaza nekhono lazo lokugwema uwoyela ontantayo ohlobene nokungcola kwehydrocarbon, izinhlanzi ezindala zibhekwa njengezingekho engozini enkulu yokuthinteka kuwoyela ochithekile uma ziqhathaniswa nezinye izinto eziphila ogwini lolwandle.

Isibonelo 8.2 Isigcino Sikawoyela Ohluziwe Ovamile Ezimweni Zolwandle Ezivamile



Umthombo: ITOPE, 2002

Phawula: Isithombe esibonisa inqubo yezinguquko ngokuhamba kwesikhathi – ububanzi bengxenywe ngayinye ibonisa ukubaluleka kwale nqubo

Uwoyela ochithekile osogwini ngeke ube nobungozi obuqondile. Nokho, izinsalela zikawoyela, ezibangelwa ukuchitheka ngengozi kukawoyela eduze nogu, noma ukulahleka kweNADFs nezicucu eziphuma lapho kubhotshozwa ezingcoliswe uwoyela okulandelwa ukunqamuka okungalindelekile kwamapayipi, zenza kungcole ogwini. Kuye kwalotshwa izinto eziningi ezibangelwa ukungcola kukawoyela, kwenziwa ucwaningo olunzulu ngezigaba ezihlukahlukene zokuphila kwamapolychaete, amamollusc namacrystfish (Volkman *et al.* 1994). Nokho, njengoba ukuzwela nokwamukela izinto kwalezi zinto kuhlukahluka kakhulu, ngeke kwenziwa iziphetho eziqondile.

Ezinye izinhlanzi ezizingelayo (isib. amapolychaete namacopepod) zibekezela kuwoyela, njengoba ezinye izingxenye zikawoyela osuphela zingafanelekela nokuba umthombo wokudla kuzo.

AmaPolychaetes ngokukhethekile angasizakala ezintweni eziphuma kuwoyela (Scholtz *et al.* 1992). Lokhu kuholela ezinhlanzini esezingolunye uhlobo. Ukudliwa kwamahydrocarbons yizinhlanzi ngenxa yokudla izilwane ezingcoliswe owoyela nezinsalela kuyisimangaliso (CSIR & CIME, 2011).

IVolkman *et al.* (1994) isikisela ukuthi amanye ama-epifauna akhiqiza ukusabela okuyinkimbinkimbi ekungcolisweni amafutha okubangelwa ukuqoqelana kwamapetroleum hydrocarbon angenzeka kalula kwezinye izikhathi. AmaSessile namamotile molluscs (isib. amamussel namacrustacean) avame ukuba yizisulu zikawoyela noma ngenye indlela.

AmaFilter-feeders ngokukhethekile achayeke ekudleni uwoyela unjengoba unjalo, uxubekile noma uyizingxenyan ezincane. Uwoyela oqhubekayo waiwa ngokubangela izingozi ezigabeni ezihlukene zokuphila kwetaxa, okuthinta ngezindlela ezihlukene ukusinda kwayo nokuphinde ibuyele iyohlala ezindaweni ezingcoliswe uwoyela. Ukubekezelela uwoyela kuyahlukahluka kuye ngezigaba zempilo, lapho inhlanzi isachanyiselwa noma isiphumile ngokuvamile izwela kakhulu ezingxenyaneni ezincane ezizikayo emanzini uma kuqhathaniswa nezinhlanzi ezindala (Volkman *et al.* 1994; CSIR & CIME 2011).

Umthelela kawoyela ezinhlanzini ezincane nezindala ungaba ukufa, njengoba izimpephelezi zawo zigcotshwa uwoyela. Umthelela obulalayo nohlala isikhathi eside uhlanganisa ukuphazamiseka kwezinhlanzi, yenza inhlanzi ingakwazi ukubekezelela ukucindezeleka, nokungabambisani okuthile eketangeni lokudla (Thomson *et al.* 2000). Nokho, ngenxa yokuthi ziyahlamba, izinhlanzi ziyakwazi ukugwema ukuchitheka kukawoyela okukhulu.

Ukungcola kukawoyela okukhulu kuwusongo kukho kokubili ezintweni eziphilayo nasezinyonini ezisogwini. Izinyoni ezizingela olwandle yizona ezisesimweni sokuhlangabezana nowoyela ontantayo futhi zizokufa ngoba uwoyela uzilimaza izimpaphe namehlo. Ukufa okuningi kwalezi zinyoni kuhlobene nomonakalo obangelwe uwoyela ezimpapheni zazo.

Lokhu kwenza ukuba amanzi angene ezimpapheni, okwenza zingabe zisakwazi ukundiza kahle futhi zicwile. Ngaphezu kwalokho, liyancipha izinga lokushisa elisemzimbeni wayo okwenza kudingeke isebenzise amandla amaningi ukuze izifudumeze. Lezi zinyoni ziphinde ziwugwinye lo woyela uma zizama ukuzihlanza amaphiko futhi ungalokhu uqhubeka ungena njengoba uphinde utholakala naseketangeni lokudla (Munro 2004).

Ukugula okungabangelwa ukudla uwoyela, i-anaemia, i-pneumonia, amathumbu abuhlungu, ukonakala kwezinsu, izinkinga zegazi, ukukhula okumfimfayo, ukwanda namaqanda ahamba kancane (Scholz *et al.* 1992). Ngaphezu kwalokho, ngisho nesilinganiso esincane sikawoyela esisuka ezinyonini ezindala singabangela ukufa emaqandeni nasemachwaneni ezinhlanzi futhi sehlise kakhulu izinga lokuzalela. Ngakho ukuchitheka kukawoyela kungaba negalelo ezinyonini ezikude nendawo lapho kuchitheke khona uwoyela, okungabangelwa yilokho okudliwa yizinhlanzi ezingabazali. Kucatshangwa ukuthi igalelo likawoyela ochithekile ezimfudwini ulithinta kakhulu izinga lokusinda kwamaphuphu ezinyoni (CSIR & CIME 2011). Kulindeleka ukuthi amachwane ezimfudu azobe ekhona endaweni engase ichithekelwe uwoyela (Agulhas Current), ikakhulu phakathi no-January kuya ku-March. Ngokufanayo, kuncane okuye kwenziwe ngemiphumela ezoba khona kuma-seal asolwandle ngenxa yokuchitheka kukawoyela, kodwa kulindeleke ukuba abe sengozini njengoba uwoyela ungavala izimpaphe zawo futhi afe abulawe yi-hypothermia (noma yindlala, uma ebalekele ezweni elomile).

Ayiqondakali kahle imiphumela eba sezilwaneni zasolwandle ezincelisayo ngenxa yokuchitheka kukawoyela (White *et al.* 2001), okungenzeka igalelo ukuchitheka kukawoyela okuba nalo kuma-cetaceans ingozi yokuhogela izinhlayiya ze-benzene eziyingozi uma ziwuthola usanda kuchitheka (Geraci & St Aubin 1990, cited in Scholz *et al.* 1992). Izingozi ezivamile ezibangelwa ukuhogela lezi zinto zihlanganisa ukuba zingene esimisweni senhliziyo futhi kubangele umonakalo othile noma ohlala njalo ezintwentwesini ezizwela kalula njengezesu umlomo nezemigudu yokuphefumula.

Ukunindwa uwoyela kwamacetaceans akubhekwa njengengozi enkulu ekuzigcineni kwawo efudumele, njengoba isikhumba sawo kuthiwa siyakwazi ukuzivikela ekugodoleni futhi siphinde sibe yihawu lokuvimbela izinto eziyingozi ezikuwoyela zingangeni kuso. Imikhomo yebaleen ingase ithandeleke, okungaholela ekuphazamisekeni isikhashana kwamanzi ukuba angene ephuma ezingwedlweni zawo, okungehlisa ijubane lokuhamba kwawo. Ababheka okwenzeka ngaphandle babika imiphumela emincane, uma iba khona, eba khona kumacetacean ebangelwa ukunindwa uwoyela, ngisho nowoyela ojiyile (Scholz *et al.* 1992) awunamiphumela emingako kuwo.

Nakuba emancane amathuba (ngaphansi kwephesenti elilodwa) okuba kungcole ugu lapho kuqhume uwoyela ongahluziwe, uma kwenzeka uwoyela ufika ogwini ingase iluthinte ngalezi zindlela ezilandelayo:

- Umsinga:
 - o Ukushintsha komphakathi wasolwandle nokwehla kwesibalo sezinto eziphila kulo ezizwela masinyane ekuchithekeni kwehydrocarbon (isib: ukugubha amabivalves namacrustaceans amancane; IOGP, 2015) nokushintsha kwezilwane ezikwazi ukuzivumelanisa nezimo, isib. amapolychaetes, ama-oligochaetes, futhi ngezinye izikhathi ukwanda kwezilwane ezime njengama-algal ngenxa yokwanda kwezakhi endaweni ephotic. (Houghton, *et al*, (1991); Cabioch *et al* (1978); Corredor *et al* (1990); Dauvin (1987); Lee & Page (1997),).
- Ugu olunamadwala:
 - o Ukuchayeka engozini ogwini olunamadwala kwezilwane nezitshalo zasolwandle (amamollusc emadwaleni, i-algae, nama-echinoderm njll.) kuholela ekufeni okuqondile okubangelwa uwoyela noma yilezi zinto zingena esimisweni sezilwanyana sokuphefumula noma sokugaya. Imiphumela eyingozi iba mibi nakakhulu lapho kusetshenziswa amadispersant nakuba isikhathi sokululama senyuka.
 - o Ugu oluvulekile lululama ngokushesha uma kuqhathaniswa noluvulekile ngoba amagagasi amakhulu ayakususa ukungcola ogwini oluvulekile. (Hawkins *et al* (2002); Edgar *et al* (2003); Smith (1968); Brien & Dixon (1976); Chasse (1978); Teal & Howarth (1984); Edgar & Barrett (2000); Kingston (2002); Laffon *et al* (2006); Mariogomez *et al* (2006).
- Amatheku anesihlabathi:
 - o Ukuchayeka engozini ogwini kwezilwane nezitshalo zasolwandle, ikakhulukazi izinhlobo ezizwela kalula ekuchithekeni kwehydrocarbon, njengamacrustacean (izilwane ezisefayo) nama-amphipods, ezingavele zinyamalale ngokushesha ngemva kokuchitheka kukawoyela.
 - o Izinhlobo zezilwane eziphila ogwini oluphakeme ngokuvamile azandi kalula ngakho azisheshi ziphinde zibe khona.
 - o Ugu oluvulekile lululama ngokushesha uma kuqhathaniswa noluvulekile ngoba amagagasi amakhulu ayawususa uwoyela ogwini oluvulekile, futhi izilwane eziphila ogwini olunjalo ziyashesha ukululama kuwoyela.
 - o Ngemva kokuchitheka kukawoyela emathekwini kuhlolwa ukwehla kwesibalo ezilwaneni eziphilayo bese kubonakala ukwahlukana okuncane kumacrustaceans, amapolychaetes, amamolluscs nezilwanyana, kodwa zilulama ngokushesha. (Sanders *et al* (1980); Elmgren *et al* (1983); Dauvin (1987); Gomez Gesteira *et al* (2000); De la Huz *et al* (2005)).
- Emifuleni engenela olwandle:
 - o Ukuphazamiseka okungokwemvelo kwamanzi olwandle ekungeneleni kolwandle kungaholela ekungeneni kukawoyela ophuma emanzini

olwandle okubangela isimo esibucayi lapho kuzalela khona izinhlanzi namaprawn nasezindaweni okuzingela kuzo izinyoni nalapho kuhlala khona ama-estuarine crustacean angavamile njenezinkalankala ezihlala odakeni.

- o Uwoyela ongena ekungeneni komfula olwandle wandisa amahydrocarbon bese kukhuphuka izinga lengozi emanzini kuthntse izilwanyana eziningi zasolwandle (isib. izinhlanzi namaprawn) kunasolwandle oluvulekile.

Ukuzwela

Njengoba uyingozi enkulu, uwoyela ochitheke lapho kuqhuma, ukuphuma kukawoyela kuhlobene nokugqashuka kwepayipi iNADF noma ukuphuma kukadizili olwandle kungaba nomphumela omubi ezilwaneni nasezitshalweni zasolwandle uma zithintana nalowo woyela.

Umsebenzi wokubhoboza uzokwenziwa kude nokuphila okusogwini, uqhele cishe amakhilomitha angu-62 kuya kwangu-65, ukuze kudediselwe kude nokuphila okuzwela kakhulu (isib. izinyoni) noma amaMPA. Nokho, ngenxa yokuthi kucatshangelwa ukuba imithombo ezokwakhiwa ibekwe lapho izosondelana khona nomsinga i-Agulhas Current, amahydrocarbon achithekayo angathutheka ngokuphindaphindiwe aye ezindaweni ezikude eziqondene ngogu lwaseNingizimu Afrika, okungenzeka afike ngisho nasogwini olungaseningizimu-ntshonalanga lwezindawo okucatshangelwa ukuthi kwakhiwe kuzo.

Kuye ngohlobo lokuchithekile, izilwane ezizwela kalula ezisogwini, cishe ziyothinteka ngezinga eliphezulu noma eliphansi ogwini lwase-East London, nasekungeneleni komfula okungakulolo gu.

Izingozi ezilwaneni zasendle ezihlala kwezinye izindawo nasezindaweni ezehlelayo azaziwa kahle, kodwa imithombo ecatsangelwayo kulindeleke ukuba ifane ngezinga elithile, ihluke kuphela ngobungako nangobuningi becontent ezinsaleleni/ noma ngobuningi bomoya mpilo. Lezi zilwane ezihlala ekujuleni kolwandle zivame ukufaka izinhlobo zezilwane ezanda ngokushesha zikwazi ukuhlala ezindaweni ezike zaphazamiseka. Izilwane ezihlala lapho kunezinsalela khona zihlanganisa elinye iqoqo lezilwane elihlala ezindaweni ezingasahlalwa futhi ziphazamiseka kalula. Azikho izilwane ezimbalwa noma ezisengozini.

Ngokuphambela, izilwane ezihlala ekujuleni kolwandle zizwela kalula ekuphazamisekeni. Njengoba i-video izivezile izilwane ezisheshayo ukuzwela okuhlanganisa ama-sponges, amablack coral, amagorgonian, ama-alcyonarian soft coral namastylasterine lace coral (Sink *et al.* 2006) ngaphansi kolwandle ekuphumeni ogwini lwase-KZN, amathuba okuphila kwalezo zilwane ezisendaweni i-ER236, futhi ikakhulu izindawo lapho kungenzeka kubhotshozwe kuzo, ngeke zashiyelwa ngaphandle.

Ezindaweni ezingaphandle kogu, iqoqo lezilwane ezisengozini lapho kuchitheka, amapelagic seabirds, nakuba ziyizimfudu, izinhlanzi ezinkulu okuthiwa amapelagic fish kanye namacetaceans ahlala khona noma afudukayo nawo azothinteka. Eziningi zalezi, emhlabeni jikelele zibhekwa 'Njengezisengozini Enkulu (isib. i-Southern Bluefin tuna, amacoelacanth), 'Ezisengozini (isib. i-whale shark, iFin, iBlue neSei whales) 'Ezichayekile' (isib. iLeatherback turtle short-fin mako, iwhitetip sharks, isperm whale) 'Ezicishe zisongeleke' (isib. iblue shark) kanye 'Nezingekho engozini' (isib.: iHumpback namaSouthern Right Whale).

Nakuba kungakaziwa ukuthi amacoelacanth ayenzeka yini ekujuleni kwamanzi eduze kweBlock ER236, amacoelacanth adume ngokwenzeka ezikhaleni zaseWright naseJesser esikhaleni seSowdana Canyon (Hissman *et al.*, 2006) ekuphumeni kweGreater St Lucia Wetland Park (GSLWP) World Heritage Site, emihumeni engamamitha angu-90 kuya ku-140 ukujula. Emhlabeni wonke, kutholakale amacoelacanth angamamitha asukela ku-120 kuya kwangu-300. I-Tugela canyon iqala ingamamitha acishe abe ngu-600 ukujula iyoma eNatal Valley isijule ngamamitha acishe abe ngu-2,800 (Wiles *et al.*, 2013). ITugela Canyon ihluke kakhulu kuyiWright neJesser Canyon, lapho kubikwe khona amacoelacanth. Nakuba zikhona izindlela zokuhamba ezingase zinikeze isivikelo ngemihume nangokunye, zenzeka ekujuleni (>1,500 m) ngale kakhulu kwalezo eziye zabikwa kuze kube namuhla.

Izilwane okungenzeka zihlale khona ziye zabonakala kude neLake St Lucia (Hissman *et al.* 2006) nasezindaweni ezikude nogu oluphakathi kwePort Shepstone nePort St Johns (Green *et al.* 2006).

Nakuba izindawo okucatshangelwa ukubhoboza kuzo imithombo zingalekelani nezicatshangelwa ukuba ziye amaMarine Protected Areas (MPAs) nama-Ecologically noma amaBiologically Significant marine Areas (EBSAs), kunamaMPAs, amaMPA acatshangelwayo, ama-EBSA namaHope Spots eNdaweni Engathinteki Ngokuqondile. Lezi zihlanganisaAmathole MPA ase-East London, neDwesa-Cwebe, iHluleka namaPondoland MPA aseWild Coast. Izilwane ezivikeleke kulezi zindawo zingathinteka ngenxa kawoyela ophumayo lapho kube nokuqhuma okukhulu.

8.3.2 ***Izingozi Zokuchitheka Kukawoyela (udizili) Olwandle Nasezindaweni Eziseduze Nasezilwaneni Eziphila Khona Ngenxa Yokushayisana Kwemikhumbi***

Phakathi naso sonke isikhathi somsebenzi (ukuhlanganisa, ukubhoboza, nokuya emaphethelweni), awekho amathuba okuba uwoyela ungachitheka futhi uye ezintweni eziphila olwandle. Udizili uyihydrocarbon elula futhi unyamalala ngokushesha emkhathini.

Emiphumeleni *eseSenzakalweni 1*, ukushelela okuwumphumela wokushayisana kwemikhumbi ungasakazekela ngaseningizimu-ntshonalanga (ngenxa yemisinga enamandla ye-Agulhas) futhi kubonakala kungenakwenzeka ukuba ufike ogwini (amathuba okuthi ufike kuzo zontathu izindawo amaphesenti angaphansi kuka-15 %).

Nokho, iphunga lezinto ezicwilile lingaqhubeka likhona izinsuku ezithile, okungaba nomphumela othile ezintweni eziphila olwandle ezithintwa yizo isikhathi esiqhubekayo.

Izinga umphumela ongathinta ngazo lokhu kuphila lixhomeke ekutheni hlobo luni lweqoqo lwezilwane ezithintekile, zibalwa kusukela ezingeni eLiphansi leqoqo lemacrofauna, izilwane zasolwandle ezincelisayo nezimfudu, kuya kweliKhulu lezinyoni zasolwandle nezinye ezithinteka kalula, zithinteka ngezinga elisukela kweliphakathi kuya kwelihlala isikhathi eside.

Amathuba okuba lokho kwenzeke *Mancane*. Imiphumela ibhekwa ngokuthi *Ikahle* ezintweni eziphila olwandle, *Mikhulu* ezinyonini zasolwandle. Lokhu kusekelwe emathubeni amancane okuchitheka okwafinyelela amakhilomitha angaphezu kuka 200 ogwini, kubonaala uwoyela ophawulekayo (100 g/m²).

Ngakho-ke, *ingozi* (Itafula 8.10) ibhekwa ngokuthi *Incane* (kwezinye izilwane zasolwandle) kuya *Kwekahle* (ezinyonini zasolwandle) *ingozi yezinsalela* ngaleyo ndlela *yehliswa yachazwa ngokuthi: yi-As Low As Reasonably Practicable (Iphansi Ngezinga Engaba Phansi Ngalo Ngangokunokwenzeka) (ALARP)*.

Lezi zigaba zihlanganisa izinto ezakhelwe zokuvikela/ ukugwema nokulawula isimo (Itafula 8.9) ezizofakwa uma kwenzeka kuchitheka uwoyela.

Itafula 8.10 Izingozi Zokuchitheka Kukawoyela (udizili) Olwandle Nasezindaweni Eziseduze Nasezilwaneni Eziphila Ogwini Ngenxa Yokushayisana Kwemikhumbi

Izici	Ama-invertebrate, izinhlanzi, izinhlanzi ezincane, izilwane zasolwandle ezincelisayo nezimfudu turtles (kuhlanganise nezinhlalo ezikumaMPA)	Izinyoni zasolwandle
Uhlobo lwegalelo	Oluqondile	Oluqondile
Amathuba	Mancane	Mancane
Umphumela	Akahle	Makhlu
Ingozi	Mancane (ALARP)	Akahle (ALARP)

Nakuba kungavamile, kungenzeka kuqhume umthombo (Ukuphuma kukawoyela okunalawuleki - *Isenzakalo 2a no-2b*) lapho kuhlolwa.

Njengoba kuboniswe *Engxenyeni 8.3.3*, umphumela wezifundo zokuchitheka kukawoyela ubonisa ukuthi uwoyela usakazekela eningizimu-ntshonalanga, ngamathuba amancane kakhulu (ngaphansi kwephesenti elilodwa) okufika ogwini. Uwoyela ophawulekayo ($>100 \text{ g/m}^2$) akubonakali ungaba khona (amathuba angaphansi kwephesenti elilodwa) ukuba ufike ogwini. Uma kungenzeka uwoyela ufike ogwini ungafika emva kwezinsuku ezingu-5 noma 6 ehlobo/ ekwindla ezindaweni eziphakathi kwePort Shepstone nePort St Johns (Imithombo eku-N1 no-S), ezinsukwini ezingu-4 kuya ku-5 eSt Lucia (emthonjeni u-N1) nasePort Edward (emthonjeni u-S) phakathi nobusika/nentwasahlobo. Iphunga lamahydrocarbon asezikile angalokhu ekhona, izinsuku ezimbalwa, amamitha ambalwa ngaphezu kwamanzi. Uma amaphunga anjalo ephakeme eduze nalapho kuqhume khona kungaba nomphumela oyingozi ezilwaneni nasezintweni eziphilayo ezilapho

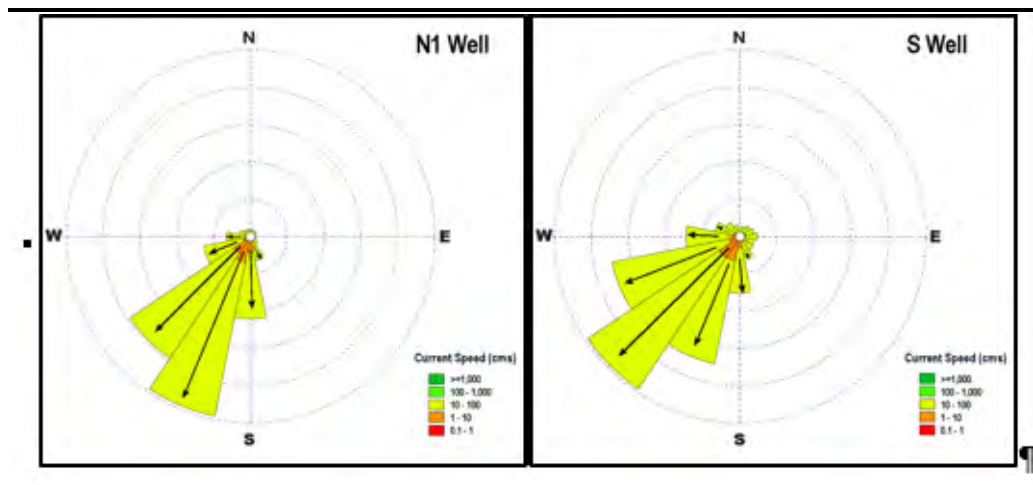
Le miphumela yeDAH iye yabalwa kusetshenzi ukuhlola okwenziwe amahora angaphezu kuka-96, ezilwanyaneni zasendle ukuze kubonakale ukuthi iyiphi ingozi engaba khona. Le DAH 96-hour LC_{50} inenani elisukela ku-100 no-1,000 ppb okuyimiphumela yokusabela kweqoqo lwezilwanyane). Lawa amanani ezifundo eziqhutshiwe ukuze kubonakale ukuthi awukho umonakalo owenzekayo oku-10 kuya ku-100 ppb (ANZECC & ARMCANZ 2000, French 2000). Kulesi sifundo esenzelwe lo msebenzi kutholakale ukuhti inani le-5 ppb, inani elingenabo ubungozi libonisa ukuthi ukuzika kweDAH kusengaphansi kwe-100 ppb onqenqemeni (ERM 2018b).

Ukusabalala kwejubane lomsinga nendawo oya kuyo kubonisa ukuthi emthonjeni ongasenyakatho, umsinga uya ngasentshonalanga, eningizimu-ntshonalanga naseningizimu izikhathi ezingamaphesenti angu-89%, uye eningizimu, eningizimu-ntshonalanga izikhathi ezingamaphesenti amabili kuphela. Emithonjeni eseningizimu-ntshonalanga neseningizimu izikhathi ezingamaphesenti angu-83%, uya enyakatho nasenyakatho-ntshonalanga izikhathi ezingamaphesenti amathathu. Ukuba khona kwamaDAH ogwini kuthinta ingxenye enkulu yamanzi okwenza izilwane ezihlala khona zithinteke isikhathi esengeziwe (*Isibonelo 8.3*,ERM, 2018b).

Imiphumela yesibonelo ibonisa ukuthi uma kungaqhuma umthombo ongasenyakatho ehlobo/ ekwindla, iDAH ingaba ngaphezu kuka-5 ppb ogwini futhi ithambekele ekuyeni ngasohlangothini oluseningizimu amakhilomitha acishe abe ngu-200 km ngaphambi kokujikela entshonalanga. Leli fu lihamba lodwa lishiye nowoyela kungakhathaliseki ukuthi kujule kangakanani, kwalinganiselwa ukuthi kuthinte indawo engu-4,403 km^2 .

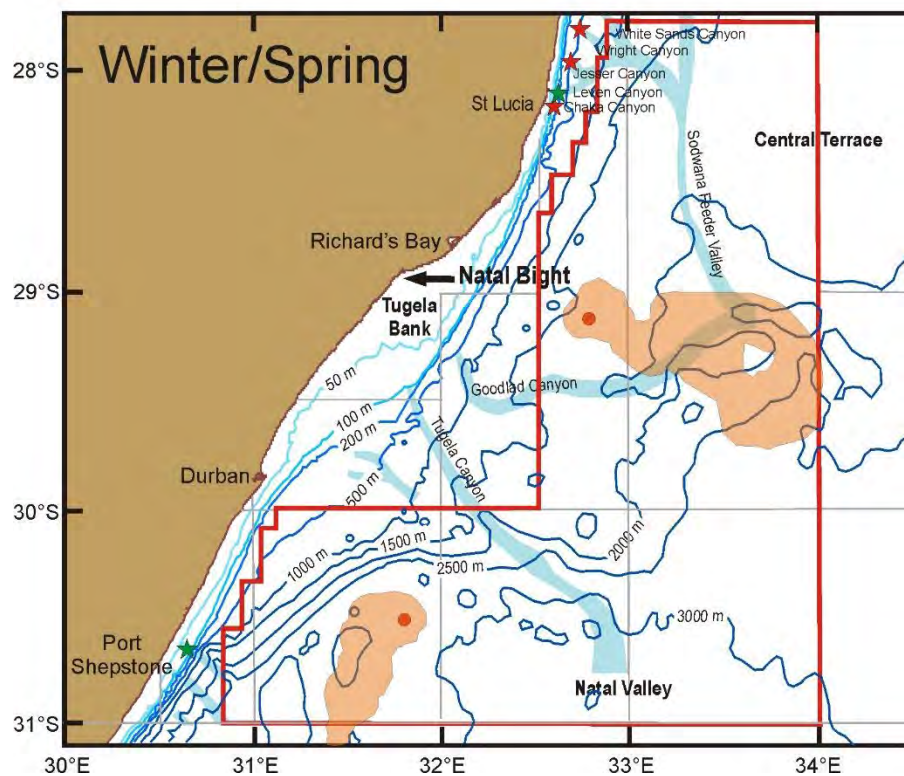
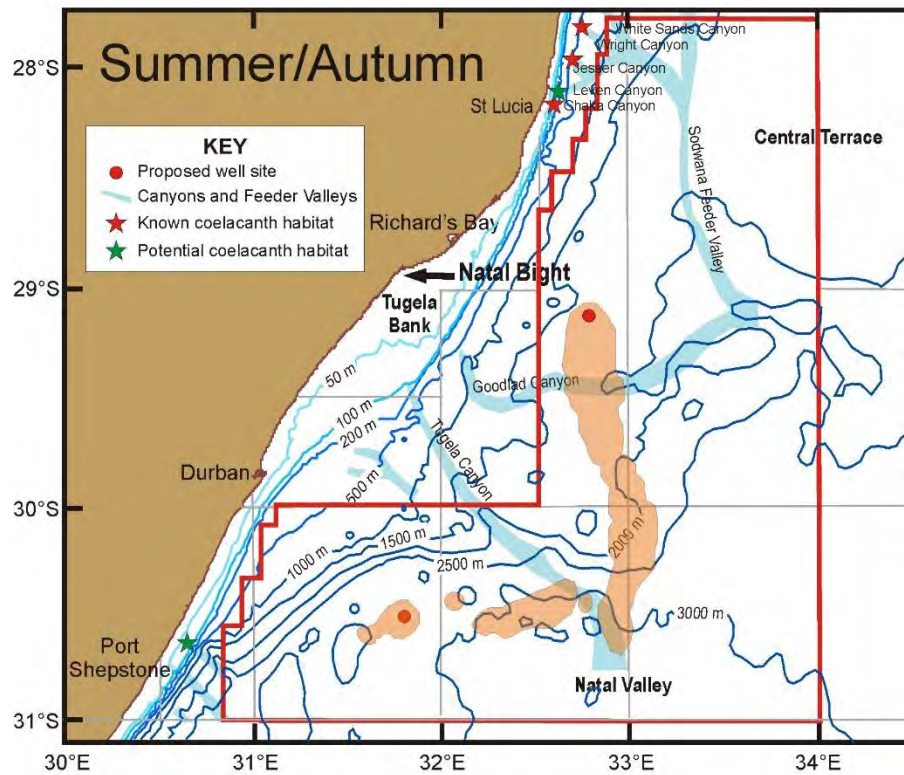
Leli fu linqamula iGoodlad Canyon ngesilinganiso esingamamitha acishe abe ngu-2,000 ukujula neTugela Canyon ngokujula okuphakathi kwamamitha angu-2,500 kuya kwangu-3,000. Amathuba okuba ifu liye enyakatho emihumeni eqhelelene neGSLWP neLake St Lucia ayephansi kakhulu (amaphesenti angu-2 kuya ku-3%). Ngokuphambene, ifu leDAH elibangelwe ukuqhuma emthonjeni ongaseningizim kulinganiselwe emakhilomitheni acishe abe ngu-30 entshonalanga nomthombo, kuthinta kuphela indawo engu-324 km² *Isibonelo 8.4*, phezulu). Imihume eqhelelene nePort Shepstone ngeke ithinteke.

Isibonelo 8.3 Imiklamo Yomsinga (Ijubane Nendawo) kukho konke Ukujula, 2013-2017 e-N1 nase-S. Imicibisholo ibonisa indawo imisinga oya kuyo.



Umthombo: HYCOM

Isibonelo 8.4 Isibonelo sokuhamba kweDAH



Umthombo: Pulfrich, 2018

Phawula: izinyathelo >5 ppb (umbala osawolintshi) ukusuka emithonjeni esenyakatho naseningizimu (amachashaza abomvu) ehlobo /ekwindla (phezulu) nasebusika /entwasahlobo (ezansi) ngokuhlobene nemihume eqhelile ogwini lwakwaKwaZulu-Natal. Ibalazwe libonisa ukuthi ifu aliya ezindaweni ezidume ngokuba necoelacanth.

Imikhondo yokuhamba kweDAH lapho kuqhume emthonjeni ongasenyakatho ungathembekela ekuyeni ezindaweni ezisempumalanga amakhilomitha angaba ngu-100 ngaphambi kokujikela eningizimu, ithinte indawo engaba ngu-5,874 km².

Ifu lingamqamula ezindaweni ezijulile (>2,500 m) zeGoodlad Canyon lihlange nokujula kweSodwana Feeder Valley ejule ngamamitha angaba ngu-2,500. Amathuba okuba liye ngasenyakatho emihumeni eqhelile eGSLWP neLake St Lucia ayemancane kakhulu (amaphesenti amabili kuya kwamathathu). Ifu leDAH elivela ekuqhumeni okusemthonjeni ongaseningizimu lingathambekela ekuhambeni liye kakhulu ngaseningizimi-ntshonalanga ibanga elingamakhilomitha acishe abe ngu-100, lithinta indawo engu-2,033 km² ngaphambi kokuba lihluzeke noma lihambe (*Isibonelo 8.4, ezansi*). Imihume eqhelelene nePort Shepstone ngeke yathinteka. Amathuba okuba ifu liye enyakatho liye eTugela Canyon ayemancane kakhulu. Amafu angaphinde futhi azihambele futhi adlule indawo eshelelayo.

Inani lomphumela ongaba khona ngenxa yengaphezulu elishelelayo liyehluka kuye ngamaqoqo ezilwanyana athintekile ukusukela ezingeni Eliphansi lamaqoqo ezilwane, izinhlanzi, izilwane zasolwandle ezincelisayo nezimfudu kuye ezingeni Eliphezulu lezinyoni zasolwandle nezinye ezizwela kalula ezihlala ogwini (kuhlanganise amaMPA), ungase uhlale isikhathi esilinganiselwe noma eside.

Igalelo lokuchitheka lingabangela ushintsho olukhulu enanini lezilwanyana ezizwela kalula ezizukulwaneni zazo eziningi, ikakhulukazi uma ukuchitheka kwenzeke ngesikhathi sokuchamisela kwezimfudu (izimfudu zejuvenile emsingeni we-Agulhas phakath kuka-January - March) noma phakathi nenkanti yokuhlubula kwezinyoni zasolwandle.

Lapho kucatshangelwa ingozi kawoyela ontantayo kumacoelacanth nasezilwaneni ezihlala kumacoelacanth ngokukhethekile, ifu elingase livezwe ukuqhuma kokubili endaweni yasenyakatho neseningizimu ezicatshangelwayo okungenziwa kuzo ukubhoboza umthombo ngaseningizimu yeGSLWP. Ngaphezu kwalokho ifu alifiki ezilwaneni ezihlala ecoelacanth ogwini lwasePort Shepstone.

Uma kucatshangelwa ingozi yowoyela ontantayo ezilwaneni ezihlala kumacoelacanth ngokukhethekile, ifu elingase livele ekuqhumeni, maningi amathuba okuba liqhamukele ngasendaweni esenyakatho neseningizimu (amaphesenti angu-89 % nangu-83 %) ezilwaneni eziqhelile eGSLWP naseSt Lucia.

Nakuba imikhondo yamafu anqamula iGoodland neTugela Canyon, ukulekelana kwenzeka emamitheni angu-2,000 ukujula nangale kwalokho lapho kuvame ukwenzeka khona amacoelacanth. Ngokusekelwe ejubaneni lokusabalala komsinga nazo zonke izinhlangothi zokujula, imiphumela yesibonelo iveza ukuthi amathuba okuba liye ngasenyakatho emihumeni eqhelile eGSLWP naseLake St Lucia ayemancane kakhulu nengasenyakatho enyakatho-ntshonalanga, isikhathi esingamaphesenti amabili kuphela.

Ngokufanayo, amathuba ezindawo zamacoelacanth asogwini oluphakathi kwePort Shepstone nePort St Johns abonakale kahle ogwini uma kucatshangelwa imikhondo yefu leDAH (*Isibonelo 8.4*).

Kumelwe kukhunjulwe ukuthi uwoyela olula noma igesi elindeleke emithonjeni ($^{\circ}\text{API gravity} > 31.1$) awuhlali isikhathi eside futhi uzika ngokushesha ngokufani nowoyela abajiyile. Uma kungenzeka kube namaconsi kawoyela olwandle ogwini lwase-KZN azoba ngaphansi kongenqema lolwandle.

Amathuba okuqhumana ayoba *Mancane*. Uma kucatshangelwa izilwanyana ezizwela kakhulu imiphumela yokuchitheka ingaba *Elingene* (kwezinye izilwane zasolwandle) ibe *Mikhulu* (ezinyonini zasolwandle). Ngakho-ke, **ingozi** kuwoyela ontantayo ibhekwa ngokuthi ***Incane*** (kwezinye izilwane zasolwandle) kuya ***Kwelingene*** (ezinyonini zasolwandle) (*Itafula 8.11*). Lezi zibalo zicabangela nezinto ezakhelwe khona zokuvikela/ukugwema nokulawula ingozi (*Itafula 8.9*) ezingasetshenziswa uma kwenzeka kuchitheka uwoyela.

Kucatshangelwa izinga lokuchitheka kukawoyela ontantayo (isib. iDAH) nezilwane ezizwela kalula ezingathinteka, umphumela ungaba *Mncane* (ezinyonini ekuphileni kwasolwandle kuhlanganise namacoelacanth). Ngakho-ke, ingozi kuthi ***Incane*** (ezinyonini ekuphileni kwasolwandle kuhlanganise namacoelacanth). (*Itafula 8.11*). Lezi zibalo zicabangela nezinto ezakhelwe khona zokuvikela/ukugwema nokulawula ingozi (*Itafula 8.9*) ezingasetshenziswa uma kwenzeka kuchitheka uwoyela.

Uma kucatshangelwa ukulungiselela kahle, izimiso zokuvala nezokulawula umonakalo, kuhlanganise ne-OSCP, izinga lokuchitheka liyehla futhi ingozi kwawoyela ochithekile yehle ifinyelele izinga okuthiwa yi-As ***Low As Reasonably Practicable (ALARP)***.

Itafula 8.11 Ingozi Yokuchitheka Kukawoyela Olwandle Nasogwini Nasezilwaneni ngenxa Yokuqhuma

Izici	Ingozi kuma-invertebrates, izinhlanzi, amachwane, izilwane zasolwandle ezincelisayo nezimfudu (kuhlanganise izilwane ezingaphakathi kwamaMPA)	Ingozi Ezinyonini zasolwandle	Ingozi kuma-invertebrates, izinhlanzi, amachwane, izilwane zasolwandle ezincelisayo nezimfudu (kuhlanganise izilwane ezingaphakathi kwamaMPA)	Ingozi Ezinyonini zasolwandle
Uhlobo Lwegalelo	Oluqondile	Oluqondile	Oluqondile	Oluqondile
Amathuba	Aphansi	Aphansi	Aphansi	Aphansi
Imiphumela	Ikahle	Mikhulu	Mincane	Mincane
Ingozi	Incane (ALARP)	Ikahle (ALARP)	Incane (ALARP)	Incane (ALARP)

8.3.4 Ingozi Yokuphuma Koketshezi Kubhotshonzwa Nezicucu Zakhona Olwandle Nasezilwaneni Zasogwini Ngenxa Yokunqamuka Kwepayipi Okungalindelekile

Kunoma yisiphi isigaba somsebenzi (ekuhlele, ekubhobozeni nesekeyeni ngasemaphethelweni), kunamathuba oluba kuchitheke iNADF lapho kunqamuka ipayipi kungalindelekile lapho kubhotshozwa. Ngesikhathi kwenziwa isibonelo, umthamo kawoyela osepayipini eliqhumile walinganisela ukuba yi-1,120 bbls, 1,256 bbls, ne-1,991 bbls kawoyela oku-N1, ku-N2 naku-S.

Emiphumeleni *Yesenzakalo 3*, uwoyela ophume ngenxa yokunqamuka kwepayipi usakazekela ezingxenyeni eziseningizimu-ntshonalanga (ngenxa yomsinga onamandla we-Agulhas) futhi awekho amathuba okuba ufike ogwini (amathuba mancane kakhulu kuzo zontathu izindawo (ngaphansi kwamaphesenti angu-15)

Nokho iphunga lezinto ezizikile lingasala izinsuku ezithile, okungaba yingozi ekuphileni okuthintana nalelo phunga isikhathi esengeziwe. Uma liba khona lingathinta imvelo ngokwengxenywe (izinyoni zasolwandle) noma ngezinga eliphelele (amaqoqo ezilwane, izinhlanzi, amachwane, izilwane zasolwandle ezincelisayo nezimfudu)

Amathuba okuba lokhu kwenzeke ayoba *Mancane*, njengoba izinkampani zikawoyela negesi zibika izenzakalo ezimbalwa. Ngokusekelwe ebangeni likawoyela ochithekile nokuzwela kwezilwane ezithintekayo, umphumela ungaba *Olingene* ngaleyo ndlela *ingozi* ibhekwe ngokuthi *Incane* (kwezinye izilwane zasolwandle, kuhlanganise namacoelacanth) ibe *Elingene* (ezinyonini zasolwandle) kanjalo ibe yi-*ALARP* (Itafula 8.10). Lezi zibalo zicabangela

nezinto ezakhelwe khona zokuvikela/ukugwema nokulawula ingozi (Itafula 8.9) ezingasetshenziswa uma kwenzeka kuchitheka uwoyela.

Itafula 8.12 Ingozi Yokuchitheka Kukawoyela Olwandle Nasezilwaneni Ezisogwini Nezinye Uma Kunqamuka Ipayipi Esimweni Esiphuthumayo

Isici	Ama-invertebrate, izinhlanzi, amachwane, izilwane zasolwandle ezincelisayo nezimfudu	Izinyoni zasolwandle
Uhlobo lwegalelo	Liqondile	Liqondile
Amathuba	Mancane	Mancane
Umphumela	Ulingene	Mkhulu
Ingozi	Incane (ALARP)	Ilingene (ALARP)

8.3.5 Ingozi Yokuchitheka Kukawoyela Olwandle Nakubantu (Izivakashi, Abadobi)

Incazelo Yegalelo Lokuchitheka KweHydrocarbon Kubantu Ogwini Nasolwandle

Lapho kwenzeka uwoyela ongahluziwe uchitheka ngengozi ngenxa yokuqhuma, (ukuvuza kukawoyela emathangini okuqhubekayo), lowo woyela uyothathwa umsinga i-Agulhas futhi izimo ezingase zenzeke zenziwe isibonelo, ukuze kubonakale ukuthi yiluphi ugu olungase luthintekwe (Annex D). Ngokusekelwe emiphumeleni yesibonelo, uma kuba nesimo esingavamile sokuqhuma okungalawuleki, awamaningi amathuba okuba uwoyela ufike ogwini olusuka eRichards Bay luya e-East London (esimweni esibi kakhulu).

Amathuba engozi yalokho kuchitheka ogwini nasolwandle ichazwe ngezansi ngokuqondene nezivakashi nabadobi.

Incazelo Ngokuthinteka Kwezokuvakasha

Izinga lemiphumela yokuchitheka liyoxhomeka ebuningini bukawoyela ochithekile nokuthi umsebenzi wokuhlanza uthathe isikhathi eside kangakanani. Umsebenzi wokuhlanza ungabangela ukuba kuvalwe amatheku futhi kwenze izinto ezenziwe ogwini nasolwandle zilinganiselwe, okungabangela ukuba izivakashi zikhansela uhambo lwazo lokuvakasha okungabangela ukwehla kwesibalo sezivakashi.

Lokhu kungaholela ekwehleni kwemali engenayo kulabo abaqashwe ezinkampanini ezinakekela izivakashi. Imiphumela efanayo ingaqhubeka ikhona ngisho nangemva kokuhlanza ngenxa yokuthi abezokuvakasha bengakwazanga ukukhangisa imikhiqizo yabo okungadingeka baphinde bazame ukuthola amakhasimende.

Ukuzwela Kwezivakashi Ezithintekayo

Ezokuvakasha zincike kakhulu emvelweni engonakaliswe yasogwini lwaseKZN nolwase-Eastern Cape, ekhangela abantu kule ndawo area.

Ezokuvakasha yizona ezifaka imali ngokuyinhloko ekuthuthukeni kwezomnotho kulezi zindawo. Ezokuvakasha zithuthukile ogwini oluseKZN kanye nezinye izingqala sizinda njengezindawo zokulala nezitolo zokudla zitholakala kalula.

Imidlalo yezokuvakasha ihlanganisa, ukuntweza olwandle, ukudayiva, ukudoba kokuzilibazisa, ukuhamba ngemikhumbi, ukwehla wenyuka ethekweni nokunye okuningi.

Ngokuphambene nalokho, ezokuvakasha ogwini lwaseWild Coast e-Eastern Cape azikathuthuki kakhulu, futhi okubangela le nselele kuhlanganisa imigwaqo engemihle quality (ikakhulukazi imigwaqo engenela ku-N2 kuya ezindaweni eziningi ze-Wild Coast) nokusweleka kwezindawo zokulala (Fuller Frost & Associates, 2010). Nokho, omasipala abaningi e-Eastern Cape baqokomisa ezokuvakasha njengezinegalelo entuthukweni yabo yama-Integrated Development Plan (IDPs).

Ibhekwa njenge-Area of Direct Influence (ADI) ne-Area of Indirect Influence (AII) lapho ukuvikelwa kwemvela kubalulekile ekuthuthukiseni ezokuvakasha. Kunabantu abaningi abenza izinto zokugqoka emadolobheni aseduze nogu Kwa-Zulu Natal nolwaseWild Coast abathembele ezivakashini ukuze zithenge izinto abazenzayo. Ngaphezu kwalokho, izindawo zokulala nezindawo zokudla zenziwe ukuze zinakekele izinto zezivakashi ezinyukayo. Ezokuvakasha zidala amathuba emisebenzi kubantu abanamakhona ahlukene, kusukela kwabafundile nabangafundile.

Lapho kuchitheke uwoyela bese ugu luba namafutha, abantu abaxhomeke ekufikeni kwezivakashi zizojabulela imvelo engonakalisiwe ukuze baphile bangathinteka kakhulu. Ngaphezu kwalokho, labo abaqashwe ngokuqondile noma ngandlela thile kwezokuvakasha kubonakala bengenayo enye into abayenzayo ukuze baziphilise.

Ukuchazwa Kwegalelo Kubadobi

Izindawo ezisogwini zinegalelo elikhulu ekudobeleni ukuziphilisa noma ukuzijabulisa.

Uma kwenzeka kuchitheka uwoyela ongahluziwe, uwoyela ngeke ufike ezindaweni okuzalela kuzo amahake, amasardine, ama-anchovy anamahorse mackerel aseningizimu ye-Agulhas Bank noma nakumahake okucatshangwa ukuthi angasempumalanga yezwekazi (bheka i-Annex D). Imikhiqizo yezinhlanzi ingathinteka enkundleni enikezwa yiNatal Bight.

Indawo ethintekile ngeke kulindeleke ukuba ihlangane nalapho kuzalela khona izinhlanzi ezisankalankala engaseningizimu nogu. Umphumela kadizili osolwandle nokuphuma kweNADF kungase kuthinte kuphela imikhiqizo yohlobo lwezinhlanzi ilinefish ezithintekayo emsingeni i-Agulhas ezindaweni ezichamisela kuyo.

Imiphumela eyingozi ekuphileni kwasolwandle (nemisebenzi yokudoba) ingaba khona lapho ukujula kukawoyela kungaphezu kuka- 1.0 µm (Njengoba kuchaziwe *Engxenyeni 8.3.1*). Izindawo zokuzalela ziba ngaphakathi (cishe ezijule ngamamitha angu-200 ukusuka ogwini lolwandle).

Imiphumela yesibonelo soketshezi oluphuma ngengozi echazwe *Engxenyeni 8.3.3* ibonisa amathuba okuthi izindawo eziseduze nogu, ezisogwini neziqhelile ogwini empumalanga ye-East London zingathinteka lapho kuphuma amahydrocarbon.

Izindawo ezingaphandle kogu ezibhotshozwayo zilekelana nendawo yokudoba okusemthethweni eyodwa kuphela (indawo ende ewulayini); nokho indawo ethintekayo lapho kube nokuqhuma komthombo (Esenzakalweni 2a – ukuqhuma komthombo okuholela ekvalekeni komgodi neSenzakalo 2b – ukuqhuma komthombo okulandelwa yisimiso sokuvala) ingathatha nezindawo zabanye abadobi zokudoba, indawo ende ewulayini, indawo yokudoba yemvelo namadwala agudle ugu, (isekelwe endaweni ethintekile echazwe *Engxenyeni 8.3.3*).

Imiphumela yesibonelo ibonisa ukuthi ngeke kube nowoyela ozongcolisa ugu, uma uba khona nokho, kubonakala kungenakwenzeka ukuba ukuphuma kwamahydrocarbons (okuhlanganisa abadobela ukudayisa, kokuzijabulisa, ukudoba ngenetha noma ngodobo kokuzijabulisa nezinhlanzi ezisemathekweni anogu olunamadwala).

Naphezu kobungozi obungaba khona ezinhlanzini, abashayeli bemikhumbi yokudoba bayogwema izindawo ezingcolisiwe ezingangcolisa izinhlanzi abazidobayo.

- *Ukuzwela Kwabadobi Abathintekayo*

Uma kwenzeka uwoyela ochithekile ufika lapho kudotshwa khona, abadobi bangase bavinjelwe ukuba badobe okwesikhashana yizikhulu zikahulumeni ukuze kugwenywe ukufika kwenzinhlanzi eziyingozi emakethe. Abadobela izimakethe bangase, okwesikhathi esithile baphoqekele ukuba bamise ukudoba okwesikhashana noma bathuthele ezindaweni ezingenawo uwoyela. Nakuba abadobela izimakethe bekwazi ukuthuthela kwezinye izindawo zokudoba, abadobi abasathuthuka bakwazi ukudoba ezindaweni abahlala kuzo kuphela. Njengoba abadobi abasathuthuka bengeke bakwazi ukuzithola kalula ezinye izindawo abangadoba kuzo ezingathintwanga uwoyela, ngenxa yokungakwazi ukuthola okuzobathuthela khona njengoba lezo zindawo zingaba kude kakhulu ukuba zihanjwe ngezinyawo. Abadobi abasathuthuka bavame ukungakwazi ukuthola imikhumbi enokwethenjelwa, ngakho ngeke bakwazi ukuthola izindawo abangadoba kuzo ezingathintwanga uwoyela.

Uma kubhekwa ukudla okuvunwa minyaka yonke, kulinganiselwa ukuthi ngonyaka kudotshwa izinhlanzi ezingaba ngu-23 t (Mkhize 2010, Kyle 2013c, WIOFish 2013). Ngokusekelwe esilinganisweni seDunlop (2011), kwadotshwa izinhlanzi endaweni engu-16 t ngonyaka.

Uma ugu lungcoliswa uwoyela, laba badobi ababe besakwazi ukwenza ngenye indlela ngaphandle kokuyekela ukudoba.

Imiphakathi ethembele kubadobi abasathuthuka ukuze iphile bayothinteka kakhulu njengoba ukudoba kungukuphila kwabo nendlela abathola ngayo imali futhi kungeke bathole enye indlela kalula.

Abadobi abadobela ezokuzijabulisa baningi eKZN futhi kwalinganiselwa ukuthi kunesilinganiso esiphakathi kuka-8,463 no-13,958 sabantu abavakasha eKZN minyaka yonke bevela kwezinye izifundazwe namazwe (Dunlop & Mann 2012). Ukuyekwa kokudoba ngenxa yokuchitheka kukawoyela kuthinta ezokuvakasha njengoba sekuchaziwe, kubonakala kungenakwenzeka ukuthi abadobi abadobela ezokuzijabulisa bangahlela ukuyodoba kwenye indawo engathintwanga uwoyela. Abanye abadobi banganya kwenye indawo besebenzisa izikebhe, futhi ukuya kuzo kungenza babe sesimweni abangasijwayele kunokuba kusho ukulahlekelwa yisinkwa.

Abadobi bezimakethe abathintek kakhulu ngoba bayakwai ukuyodoba kwezinye izindawo kuze kube yilapho ukuhlanzwa kogu kuphele.

- *Izenzo Zokulawula Umonakalo*

Ngaphezu kwezinto ezakhelwe zokulawula umonakalo ezichazwe *Itafula 8.9*, i-Eni izosungula iFisheries Management Plan (FMP), elingasetshenziswa uma kwenzeka kuchitheka uwoyela. Leli pulani lizochaza izinyathelo zokubuyisela indlela yokuphila kulabo ebalahlekele isikhashana noma unomphela ekuphazamisekeni kokudoba kwabo.

- *Ingozi Yokuchitheka Kukawoyela Ngenxa Yokuqhuma Ogwini Nasolwandle*

Imiphumela etholakale ezifundweni zokuchitheka kukawoyela zibonisa ukuthi uwoyela ungaya ohlangothini oluseningizimu-ntshonalanga, namathuba amancane okufika ogwini (*Imiphumela yesibonelo* (bheka u-Annex D) iphinde ibonise ukuthi uwoyela omningi ovinjiwe ungahamba amakhilomitha ayisithupha ukwehla nolwandle kusukela lapho uchithekele khona uma umsinga ushaya ngamandla, kodwa ukuba kuningi kukawoyela kuhlala kungaphansi kuka-35 mg/l.

Itafula 8.7) futhi uwoyela ofinyelela ugu ungaba negalelo elikhulu ezilwaneni eziphila ogwini ezinsukwini eziyisithupha noma ngaphezulu.

Amathuba okuba kwenzeke lokho ayoba *Mancane*, nokho, imiphumela engase ivele *Mikhulu* kwezokuvakasha nakubadobi abasathuthuka.

Kungaphumela ekulahlekelweni imali, isinkwa nendlela yokuthola ukudla isikhathi esingaziwa. **Ingozi** njengoba ithinta ezokuvakasha, abadobi abasathuthuka, ingachazwa ngokuthi, **Ilinganiselwe** (Itafula 8.11).

Abadobela ezokuzijabulisa bathinteka kabi ngokuchitheka njengoba bengase bathuthule kwenye indawo noma bamise umsebenzi. Umphumela uyoba *Olingene* njengoba kungekho ongalahlekelwa yisinkwa. **Ingozi** ngokuhlobana nokudobela ukuzijabulisa, ibhekwa njengokuthi, **Incane** (Itafula 8.11).

Kwabadobela izimakethe, umphumela uyoba *Olingene*, njengoba laba badobi bekwazi ukuyodoba kwenye indawo futhi bengeke balahlekwelwe yizimali njengabadobi abasathuthuka. **Ingozi** ehlobene nabadobi bezimakethe, ibhekwa njengokuthi **Incane** (Itafula 8.11).

Ngezindlela zokulawula ezichazwa *Etafuleni 8.9* nokusetshenziswa ngokuphumelelayo kwe-Emergency Response Plan ne-OSCP, izinga lokuchitheka lingehla libe ezingeni le-ALARP.

Itafula 8.13 Ingozi Yokuchitheka Kukawoyela Ogwini Nasolwandle Ekuphileni ngenxa Yokuqhuma noma Ukuchitheka Kukadizili

Ingozi Yokuchitheka Kukawoyela Ezivakashini Ngenxa Yokuqhuma Noma Ukuchitheka Kukadizili	
Uhlobo Lwegalelo	Luqondile
Amathuba	Mancane
Umphumela	Mkhulu
Ingozi	Ilingene (ALARP)
Ingozi Yokuchitheka Kukawoyela Kubadobi Abathuthukayo Ngenxa Yokuqhuma Noma Ukuchitheka Kukadizili	
Uhlobo Lwegalelo	Luqondile
Amathuba	Mancane
Umphumela	Mkhulu
Ingozi	Ilingene (ALARP)
Ingozi Yokuchitheka Kukawoyela Kwabadobela Ezokuzijabulisa Ngenxa Yokuqhuma Noma Ukuchitheka Kukadizili	
Uhlobo Lwegalelo	Luqondile
Amathuba	Mancane
Umphumela	Ulingene
Ingozi	Incane (ALARP)
Ingozi Yokuchitheka Kukawoyela Kwabadobela Izimakethe Ngenxa Yokuqhuma Noma Ukuchitheka Kukadizili	
Uhlobo Lwegalelo	Luqondile
Amathuba	Mancane
Umphumela	Ulingene
Ingozi	Incane (ALARP)

Ingozi Yokushayisana Kwemikhumbi Emphakathini Nomsebenzi Wezempilo Nokuphepha

Incazelo Yesibonelo Sabazwela Ngokushesha Abathintekayo

Kunemikhumbi eminingi ehamba e-East Coast njengoba iya emazweni asezwakazini lase-Afrika. Iningi lale mikhumbi lihambela eduze ngogu i-East Coast.

Imikhumbi ethwala izinto ihambisana neminye imikhumbi ephakathi olwande ngoba kuthathwa izinto oGwini lwaseRichards Bay noma lwaseDurban. IDurban neRichards Bay amatheku athuthukile futhi amata, abajwayele ukusebenzisa amatheku bajwayelene nemikhumbi eminingi olwandle. Lapho imikhumbi ishayisana, kuba nengozi yokulimala kwabathile noma yokufa kwabasebenzi abasemikhunjini.

Ithimba lemikhumbi ebhobozayo nemikhumbi ethwala izimpahla bazothola ukuqeqeshwa okunzulu kweHSE futhi imikhumbi izoba nezimiso zokuhamba nokuxwayisa ezizokwenza kugwemeke izingozi zokushayisana. Kuyo yonke imisebenzi eyenziwa lapho kubhotshozwa kuzolandelwa iziqondiso ze-Eni.

Kulindleke ukuba neminye imikhumbi eqhelile ogwini ibe nezimiso zokuhamba nezixwayiso ukuze kugwenywe ukushayisana. Eminye imikhumbi emincane ehambela eduze kogu ingase ingabi nazo izimiso zokuhamba.

Imisebenzi ehleliwe ihlanganisa ukusebenzisa imikhumbi ezosebenzisa izindlela ezifanayo ukuya oGwini lwaseRichards Bay nolwaseDurban. Imikhumbi ebhobozayo iyohlinzekwa ngeminye esebenza ngale ogwini. Imikhumbi ehlinzekayo iyoba khona zinsuku zonke.

Izinyathelo Zokulawula

Izinyathelo ezilandelayo zokulawula ziyothathwa ukuze kulawulwe ingozi yokushayisana kwemikhumbi.

Imikhumbi esebenzayo izokwenza lokhu:

- Iyonikeza iSaziso Kwabasolwandle ngaphambi kokuqala umsebenzi wokubhoboza ukuze ibazise ngomsebenzi ozoqalwa, kuhlenganise nesikhathi nendawo yomsebenzi;
- Iyosebenzisa izinsiza zokubuka indawo nomaka abakhelwe ukuze kulawuleke;
- Iyohlela ukuba imikhumbi yazise eminye kanye nezikebhe ngomsakazo ngokuphathelene nendawo nomsebenzi wokubhoboza;

- Iyosebenzisa izimpawu, izibani nomaka emikhunjini ezosebenza;
- Iyozungenza indawo okusetshenzwa kuyo ngamamitha angu-500 zinhlangothi zonke ukuze kuphephe; futhi
- Iyosebenzisa eminye imikhumbi ukuze iqaphe futhi iqhelise imikhumbi esondela lapho kubhotshozwa khona.

Ezinye izinyathelo zokulawula imikhumbi engahlangene nomsebenzi zihlanganisa lokhu okulandelayo:

- I-Eni izokwazisa izikhulu zendawo, izinhlangano zabadobi nabadobela izimakethe ngomsebenzi wokubhoboza kuhlangukane neminingwane ephethelene nesikhathi, indawo, indawo okungafanele kuhanjwe kuyo okwesikhashana nemvume yemikhumbi edobayo.
- I-Eni izokwenza ipulani lesibonelelo, elizochaza isibonelelo esifanelekayo kunoma yibaphi abangalahlekelwa isikhashana noma isikhathi eside ngokushayisana komkhumbi othile nomkhumbi okulo msebenzi.

Ingozi Ebangelwa Ukushayisana Kwemikhumbi Emphakathini Ngezempilo Nezokuphepha

Amathuba okushayisana kwemikhumbi *Mancane*, ngokombiko wezimboni zikawoyela negesi. Ukushayisana kwemikhumbi kungaholela ekulimaleni kabi, ekulahlekeni kwesikhathi somsebenzi, futhi ezimweni ezimbi kakhulu, ekufeni. Ngaphezu kwalokho, abashayeli bemikhumbi emincane bathembele kuyo ukuze bathole imali (abadobi abasathuthuka noma abahamba ngezikebhe), futhi kulimaze umkhumbi wabo okuyokwenza balahlekelwe ithuba lemisebenzi ebanika imali.

Nokho, ukusebenzisa izinyathelo ezakhelwe, ukubambisana neZiqondiso Ze-Eni Zezempilo Nokuphepha nokucatshangelwa kokwakhiwa kwepulani yesibonelelo, imiphumela yokungase kwenzeke emsebenzini we-Eni kubhekwa njengokuthi *Kulingene*.

Lo msebenzi awukwazi ukulawula ukulandelwa kwezempilo nezokuphepha emikhunjini engahilelekile kuwo. Ngakho imiphumela yokungase kwenzeke emikhunjini engekho kulo msebenzi ingaba *Mikhulu*.

Ingozi yomsebenzi nezempilo ibhekwa ngokuthi **Incane**, bese kuthi **ingozi** ehilela impilo nokuphepha komphakathi ibhekwa ngokuthi **Ilingene (ALARP)**.

Table 8.14 *Ingozi Yokushayisana Kwemikhumbi Emphakathini Nasemsebenzini Ethinta Impilo Nokuphepha*

Ingozi Yokushayisana Kwemikhumbi Emsebenzini Ethinta Impilo Nokuphepha	
Uhlobo Lwegalelo	Luqondile
Amathuba	Mancane
Umpfumela	Ulingene
Ingozi	Incane (ALARP)
Ingozi Yokushayisana Kwemikhumbi Emphakathini Ethinta Impilo Nokuphepha	
Uhlobo Lwegalelo	Luqondile
Amathuba	Mancane
Umpfumela	Mkhulu
Ingozi	Ilingene (ALARP)
Risk Significance	Moderate (ALARP)

9.1 ISETHULO

Inhloso Yohlelo Lokuphathwa Kwemvelo (EMPr) ukunikeza uhlu lweziqondiso ngezinto ezingabeka imvelo engozini nezinto ezihlobene nokuthutha imishini iyiswa endaweni yokusebenza, ukumba imigodi nokubuyisela imishini yokusebenza isuswa endaweni ebekusetshenzelwa kuyo futhi lokhu kuzofakwa encwadini yesivumelwano phakathi kwenkampani yalo msebenzi kanye nezinkontileka. I-EMPr izophinde futhi ikhiphe isiqinisekiso kulabo abalawulayo nabathintekayo ukuthi kuzohlangatshezwana nezimfuno zabo mayelana nemvelo kanye nendlela ezomnotho ezingayo futhi izoveza uhlaka oluvumelana nokubalwa kwezimali nezinhlelo zokuhlola. Lokhu kuba incwadi ebopha ngokomthetho yokuGunyazwa Kwezemvelo Kwalo Msebenzi.

9.2 IZINHLOSO

Imigomo ye-EMPr yilena:

- Ukugcwalisa lokho okudingwa umthetho we-EIA yaseNingizimu Afrika kanye neSivumelwano samazwe;
- Ukuhambisana nezinqubo ezinhle zezimboni zikawoyela negesi kanye nezinqubomgomo/iziqondiso zemisebenzi yenhlangano i-Eni yaseNingizimu Afrika;
- Ukubonisa indlela ekahle yokugwema noma ukunciphisa izinto ezingabanga umonakalo ongaba khona, ukuqiniseka ukuthi liyehliswa izinga lomonakalo, ngemva kokubona kuqala ukuthi umonakalo ngeke yini wagwemeka;
- Ukunikeza indlela yokuqalisa ukunciphisa isilinganiso nokuzibophezela okuphawulwe eMbikweni we-EIA;
- Ukumisa uhlelo lokuqapha nomthetho wokugcina amarekhodi ngokuphathelene nenhlangano i-Eni yaseNingizimu Afrika nendlela yokubheka intuthuko eyenziwa izinkontileka nokuvumela ukuba kuqaliswe ukulungisa nokuthuthukisa uma kudingeka; kanye
- Nokunikeza imithetho yokubhekana nezimo ezingalindelekile ezifana nezenzakalo ezingahleliwe noma izilinganiso zokunciphisa umonakalo

9.3 OKUQUKETHWE YI-EMPR

I-EMPr idinga ukufeza izidingo ezibhalwe engxenyeni 24N yoMthetho Wokuhlola Umonakalo Wemvelo (EIA) yoMthethonqubo ka-2014 (njengoba uchibiyelwe).

Ithebula 9.1 Okuqokethwe yi-EMPr

Okuqokethwe Umthetho	Ingxenye Kulo Mbiko
I-EMPr kudingeka iveze imininingwane elandelayo:	
Uchwepheshe Wokuhlola Kwezemvelo (EAP) ohlele i-EMPr; kanye	Ingxenye 9.4
Nochwepheshe be-EAP ukuze bahlele i-EMPr, kuhlanguke nama-CV;	Isithasiselo A
Imininingwane ecacile yezici zomsebenzi onakekelwa i-EMPr njengoba kuphawulwe incwadi yoMsebenzi;	Ingxenye 9.5
Ibalazwe elinesilinganiso esifanele esibonisa indawo okuhlongozwa ukusetshenzwa kuyo, izakhiwo ezakhelene nayo, nezingqalasizinda zendawo ekhethiwe, kuhlanguke nanoma yiziphi izindawo okudingeka ukuba zigwenywe, kuhlanguke nezilinganiseliwe;	Ingxenye 9.5
Into ebonisa indlela yokulawula umphumela womonakalo, kuhlanguke nezitatimende zokulawula, ukuphawula umonakalo nobungozi okudingeka bugwenywe, bulawulwe futhi buncishiswe njengoba kuboniswe enqubeni yokuhlola umonakalo wemvelo kwazo zonke izigaba zentuthuko, kuhlanguke;	Ingxenye 9.6
Ukuhlela nokuklama;	
Imisebenzi yangaphambi kokwakha;	
Imisebenzi yokwakha;	
Ukuvuselelwa kwemvelo ngemva kokwakha lapho kudingeka khona kufanele kuvalwe; kanye	
Nalapho kufaneleka khona, ukwenza imisebenzi;	
Okubhaliwe okubonisa izinto ezingenziwa ukuze kulawulwe umonakalo, kuboniswe indlela umphumela wokulawula umonakalo ongaphumelela ngayo futhi kufanele uma kudingeka kuhlanguke nezinyathelo zoku:	Ibhokisi 9.8
Gwema, ukushintsha, ukulungisa, ukuqondisa noma ukuyeka noma imiphi imisebenzi noma izinqubo ezingcolisayo noma ukucekela phansi kwemvelo;	
Ukubambisana nanoma iziphi iziqondiso zokuphatha imvelo ezishiwo noma imisebenzi;	
Ukubambisana nanoma iliphi ilungiselelo loMthetho ngokuphathelene nokuvala lapho kudingeka khona; kanye	
Nokubambisana nanoma yimaphi amalungiselelo oMthetho ngokuphathelene nezimali zokuvuselela lapho kudingeka khona;	
Indlela yokunakekela izinyathelo ezizothathwa lapho kuqala umonakalo ophawuliwe;	
Ukuhlola njalo indlela ongaqondisa ngayo komonakalo ophawuliwe;	
Into ebonisa umuntu ozoba nomsebenzi wokuqalisa umsebenzi wokulawula umonakalo;	
Isikhathi esibekiwe sokuba kuqaliswe umsebenzi wokulawula umonakalo;	
Indlela yokuqapha ngokubambisana nomsebenzi wokulawula umonakalo okuphawuliwe;	
Uhlelo lokubika ngokubambisana, kucatshangelwa nalokho okudingekayo njengoba uMthetho ushilo;	
Uhlelo lokuqwashisa mayelana nemvelo kuchazwe indlela —	Ingxenye 9.7.1

• Lowo ofake isicelo ahlose ukwazisa ngayo izisebenzi zakhe nganoma ibuphi ubungozi bemvelo obungabangelwa umsebenzi eziwenzayo; kanye	
• Nobungozi obufanele bulungiswe ukuze kugwenywe ukugcolisa noma ukucekela phansi imvelo; kanye	
• Nanoma imiphi imininingwane engase idingwe umuntu womthetho ofanele.	<i>Ingxenye 9.7, kuya ku-9.11</i>

9.4

IMINININGWANE YOCHWEPHESHE WOKUHLOLWA KWEMVELO

I-ERM yamiswa yi-Eni njengoChwepheshe Bokuhlolwa Kwemvelo (EAP) ukuze bamukele inqubo Yokuhlola Umonakalo Wemvelo kanye nezicelo zemvume yoMsebenzi ohlongozwayo wokumba eduze kogu.

I-ERM nochwepheshe abaqokwe yi-EMR abanazo izibopho ezingokwezimali ne-Eni futhi abalawulwa yiyo ngokomthetho nangokwezimali. Imali ekhokhwa ngenxa yomsebenzi owenziwe yi-Eni ngokoMbiko we-EIA (kuhlanganise ne-EMPr) ayihlobene nokugunyazwa yinoma ubani owenza izinqumo futhi i-ERM ayiyitholi inzuzo entuthukweni.

I-ERM inhlangothi kazwelonke yokuxhumana ngezinto ezingokwemvelo eqashe ochwepheshe abangaphezu kuka-5,000 emahhovisi angaphezu kuka-150 emazweni angaphezu kuka-40. ENingizimu Africa, i-ERM Southern Africa iqasha izisebenzi zemvelo ezingaphezu kuka-150 emahhovisi aseGoli, eThekwini naseKapa.

Imininingwane yokuxhumana ye-EAP mayelana nesicelo ibhalwe e*Bhokisini 9.1* ngezansi.

Ibhokisi 9.1 Imininingwane yokuxhumana ye-EAP

Environmental Resources Management Southern Africa (Pty) Ltd. Postnet Suite 90 Private Bag X12 Tokai 7966 Vicky Stevens 1st Floor Great Westerford 240 Main Road Rondebosch 7700 Cape Town South Africa T +27 21 681 5400 F +27 21 686 0736 E eni.exploration.eia@erm.com
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Amalungu eqembu aqavile nochwepheshe abazibandakanye nalolu hlelo lwe-EIA abalwe e*Bhokisini 1.1* elingezansi.

Ibhokisi 9.2 Ithimba le-EIA

Igama	Inhlangano	Indima	Iziqu, Amava
U-Ingeborg McNicoll	ERM	Umqondisi Womsebenzi	BSc (Hons) Marine Biology. Unamava eminyaka engu-35
UVicky Stevens	ERM	Umpathi Womsebenzi ne-EAP	MSc (oceanography), namava eminyaka engu-12
ULindsey Bungartz	ERM	Uchwepheshe Wezenhlalo Nokuxoxwa Ngamasheke	BSocSc (Hons), namava eminyaka engu-10
Udkt. Andrea Pulfrich	Pisces Environmental Services (Pty) Ltd	Uchwepheshe Wempilo Yasemanzini	PhD (Fisheries Biology), namava eminyaka engu-20
Udkt. David Japp	Capricorn Marine Environmental (Pty) Ltd (CapMarine)	Uchwepheshe Wezokudoba	MSc (Ichthyology and Fisheries Science), namava eminyaka engu-30
USarah Wilkinson			BSc (Hons) Oceanography and Botany, University of Cape Town, namava eminyaka engu-14
Udkt. John Gribble	ACO Associates CC	Uchwepheshe Wokugcinwa Kwamagugu Ezinto Ezisemanzini	BA (Hons), MA Archaeology, namava eminyaka engu-20
UMichael J. Fichera	ERM	Uchwepheshe Wokuchitheka Kukawoyela Nokuhlelwa Kokumba	B.S. in Civil Engineering and an M.E. in Environmental Engineering, namava eminyaka engu-25
UMnu. Stephen Luger	PRDW	Umdloli	MSc Engineering, namava eminyaka engu-24

I-CV neminingwane YoChwepheshe Wemvelo Ozimele kuboniswe Esithasiselweni A.

9.5

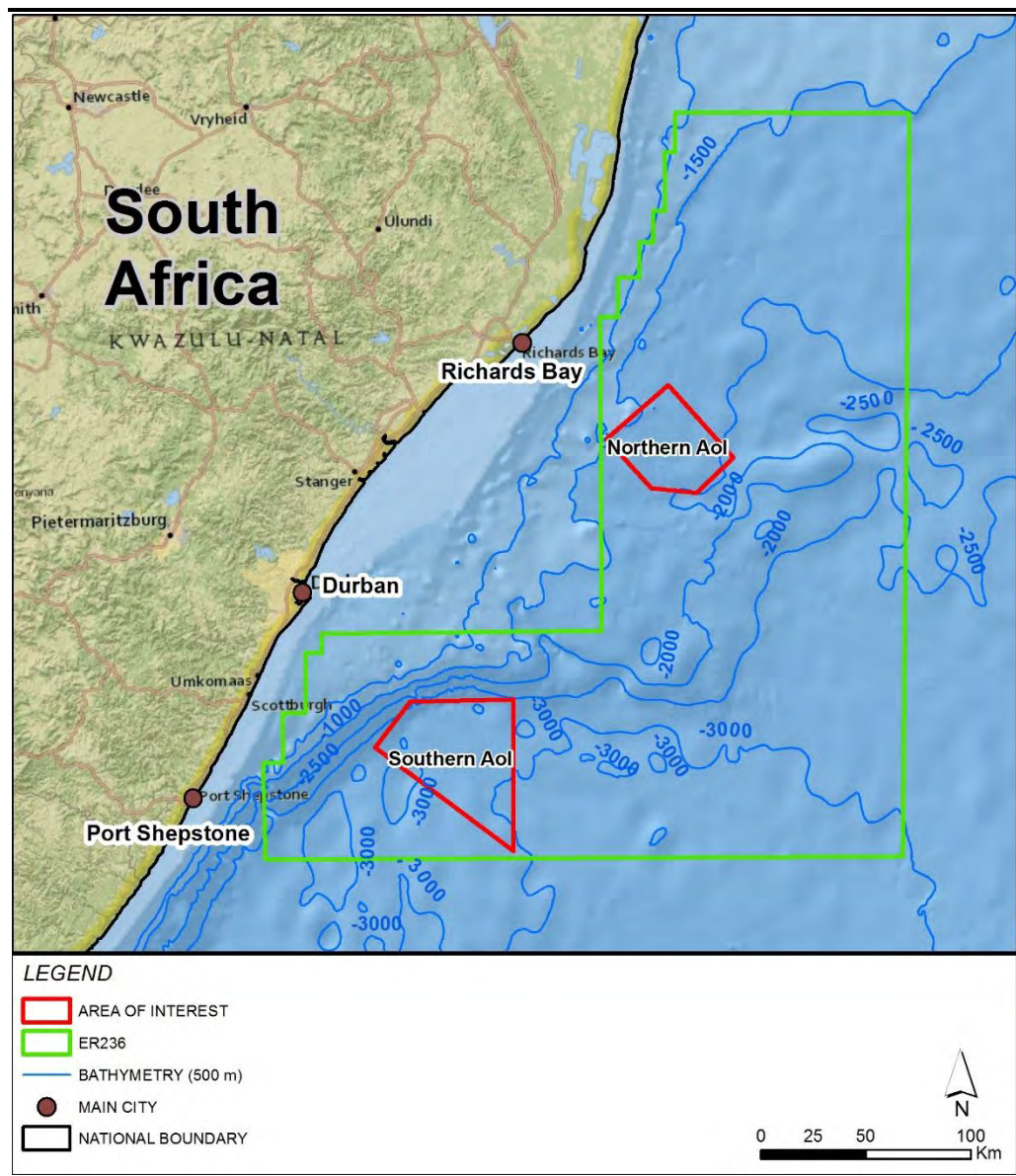
INDAWO NENCAZELO YOMSEBENZI

Inhlangano ye-Eni yaseNingizimu Afrika BV (Eni), neSasol Africa Limited (Sasol) baneLungelo Lokuhlola ngasoGwini LwaseMpumalanga YaseNingizimu. Inhlangano ye-Eni yaseNingizimu Afrika kanye neSasol bacabangela amathuba okuqhuba uhlelo lokumba kuBlock ER236 (12/3/236) ukuze kuhlolwe ukuthi ingatholakala yini imithombo ene-*hydrocarbon* engasetshenziswa entuthukweni yangesikhathi esizayo.

Inhlangano ye-Eni yaseNingizimu Afrika ihlongoza ukumba imithombo engafinyelele kweyisithupha ngaphakathi kukaBlock ER236, phakathi kwezindawo ezimbili le nhlangano ezifisayo ukuze babone isilinganiso esikhona esingatholakala se-*hydrocarbon*.

Ukumbiwa komthombo wokuqala ocwaningwayo, kuhlelwe ukuba kwenziwe phakathi kukaNovember 2019 noMarch 2020, kuye ngokutholakala komshini wokumba, phakathi kwezinto okuhlelwe ukuba zenziwe. Ukumbiwa komunye umthombo kulindeleke ukuba kuthathe isikhathi esingangezinyanga ezimbili ukuze uphothulwe. Ukulandelana kwesikhathi nemithombo eyengeziwe okudingeka ukuba ihlolwe kuzoxhomeka emiphumeleni womthombo wokuqala ozocwaningwa.

Isithombe 9.1 Indawo Okwenziwa Kuyo Umsebenzi- Ngale Kogu LwaseNingizimu Afrika



Ukumba ezindaweni ezisenyakatho nasempumalanga esinesithakazelo kuzo kuzokwenziwa njengemikhankaso ehlukene, ehlanganisa:

- Imithombo engaba mine (ukucwaninga kabili nokuhlola imithombo kabili) endaweni esenyakatho esinesithakazelo kuyo eqhele ogwini cishe ngamakhilomitha angu-62, enamanzi ajule ngamamitha aphakathi kuka-1,500 no-2,100;
- Imithombo engaba mibili (ukucwaninga kanye nokuhlola umthombo kanye) endaweni eseningizimu esinesithakazelo kuyo eqhele ogwini cishe ngamakhilomitha angu-65, enamanzi ajule ngamamitha aphakathi kuka-2,600 no-3,000.
- Ukujula komgodi ozombiwa kulindeleke ukuba ube phakathi kwamamitha alinganiselwa ku-3,800 nangu-4,100 uma kusukwa phezulu, udabule phansi olwandle, uze uyofika ekujuleni okuqondwe kukho endaweni esenyakatho, kodwa abe phakathi kuka-5,100 endaweni esenyakatho.
- Umthombo ungavivinywa lapho kucwaningwa imithombo uma une-*hydrocarbon* engadayiseka.

Izinamba ezikhomba indawo zeSakhiwo ER236 nezindawo okuzogujwa kuzo kuyaboniswa ebhokisini elingezansi.

Ithebula 9.2 Izinamba Ezibonisa Indawo ZeSakhiwo ER236 (WGS84 UTM Zone 36S)

Point	Latitude	Longitude
A	27°48'30"S	32°52'0"E
B	27°48'30"S	34°0'0"E
C	31°0'0"S	34°0'0"E
D	31°0'0"S	30°49'0"E
E	30°35'0"S	30°49'0"E
F	30°35'0"S	30°55'0"E
G	30°22'24,6"S	30°55'0"E
H	30°22'24,72"S	31°2'0"E
I	30°7'0"S	31°2'0"E
L	30°2'0"S	32°30'0"E
M	28°41'18"S	32°30'0"E
N	28°41'18"S	32°35'20"E
O	28°31'4"S	32°35'20"E
P	28°31'4"S	32°41'30"E
Q	28°21'59"S	32°41'30"E
R	28°21'59"S	32°45'40"E
S	28°13'51"S	32°45'40"E
T	28°13'51"S	32°49'0"E
U	27°58'47"S	32°49'0"E
V	27°58'47"S	32°52'0"E

Ithebula 9.3 Izinamba Ezibonisa Indawo Zendawo Okuhloswe Ukugujwa Kuyo Endaweni Esenyakatho (WGS84 UTM Zone 36S)

Point	Latitude	Longitude
A	29° 12' 33,341"S	32° 31' 46.013"E
B	28° 58' 47,34"S	32° 49' 32.73"E
C	29°17'28.529"S	33°8'58.59"E

D	29°26'34.962"S	32°58'11.965"E
E	29°25'22.117"S	32°44'46.372"E

Ithebula 9.4 Izinamba Ezibonisa Indawo Zendawo Okuhloswe Ukugujwa Kuyo Endaweni Eseningizimu (WGS84 UTM Zone 36S)

Point	Latitude	Longitude
A	30°19' 39.588"E	32° 3' 48.518"E
B	30°58' 35.904"E	32° 3' 25.921"E
C	30°31' 35.022"E	31° 22' 26.396"E
D	30°19' 49.794"E	31° 33' 7.656"E

9.5.1 Izingxenye Zalo Msebenzi Neminye Imisebenzi

Izingxenye zoMsebenzi oyinhloko zihlanganisa lokhu okulandelayo:

- Umshini Okwazi Ukumba Ekujuleni Kolwandle: ngenxa yokujula kwamanzi kulezi zindawo ezifiselekayo, kucatshangwa ukuthi ucwaningo lokumba luzokwenziwa kusetsheniswa lo mshini okwazi ukumba ekujuleni kolwandle. Umshini wokumba uzogcinwa usendaweni eyodwa kusetsheniswa isistimu enamandla ezowumisa endaweni eyodwa (DPS) okwenza ukuba izinto ezisolwandle zingaphazamiseki ngenxa yokuthi lo mshini ungasebenza ngaphandle kokubanjwa amahange. Inzuzo ephawulekayo ngalo mshini ukuthi uyakwazi uuhamba ngokukhululekile njengoba ukwazi ukuzimela, futhi ukwazi ukusuka endaweni eyodwa uye kwenye ngaphandle kokuba udinge imishini yokuwuthwala;
- Indawo Engeke Igujwe: Phakathi nesikhathi sokumba, kuzoba nendawo yesikhashana ephephile engamamitha angu-500 eqinisekiswa izikebhe ezigadile. Indawo ephephile izochazwa Kulokho Okufanele Kuphawulwe Abasolwandle njengesixwayiso sokuhamba hamba kulo. Injongo yale ndawo ephephile ukuvimbela ukuba imikhumbi ingashayisani phakathi nesikhathi somsebenzi. Ngaphansi koMthetho we-Marine Traffic, wango-1981 (oka nombolo-2 ka-1981), “indawo yokuhlola” noma “imishini yokuhlola” esetshenziswayo ekufuneni noma yini engena ngaphansi kwencazelo ethi “okuxhunywe olwandle” kuvikelwe yile ndawo ephephile engamamitha angu-500.
- Isikhungo Esisogwini: inkampani esogwini ingase ibe seRichards Bay noma eThekwini njengoba kuboniswe ngokunsundu ebalazweni (izindawo ezithuthukisiwe esikhathini esidlule) phakathi netheku noma Izindawo Zezimboni Ezithuthukiswayo (IDZ). Isinqumo sokugcina sizothathwa ngemva kokuba le nkampani yenze ucwaningo kulezi zindawo ezibonisiwe.

- Imikhumbi esekela umshini ombayo: phakathi nesikhathi somsebenzi wokumba, umshini wokumba uzosekelwa yimikhumbi esekela umshini ombayo ebizwa ngokuthi Imikhumbi Esekela Umkhumbi Ombayo (PSVs), ekhandelwe ukuba ithwale izinto zokusebenza ezihlukahlukene. Le mikhumbi izonakekela umshini ombayo kathathu noma kane ngesonto ngoketshezi olukhipha izinsalela zezinto ezinqunyiwe lapho kugujwa khona, isekele ngosimende neminye imishini kanye namapayipi okumba. Iphinde futhi isuse nodoti okufanele ukuba ulahlwe endaweni eyomile. Izinamba zama-PSV aqinile ayikakavezwa (kulindeleke ukuthi abe mabili noma abe mathathu).
- Abantu abazosebenza: bonke abantu abasogwini bazohlala endaweni eseduze. Iningi lezisebenzi eziqashiwe ezisemanzini ziyobe zingezasendaweni uma inkampani ekhona manje ithe uma ihlolwa yatholakala ukuthi ikufanelekele ukusekelwa ngezidingongqangi nokulandelela. Abantu abazomba baphakathi kuka-150 kuya ku-200. Inani labantu abasemkhumbini wezinto ezilethwayo ezidingekayo liyohlukahluka liye ngobubanzi bomkhumbi nohlobo lomsebenzi abawenzayo. Zonke izisebenzi ziyogeqeshelwa indaba yempilo nokuphepha Nemishini Evikelayo Yomuntu (PPE) efanelekele izinhlobo zemisebenzi.
- Ukuhanjiswa kwezisebenzi: Ukuthuthwa kwabantu besuka futhi beya lapho kugujwa khona kuyonakekelwa abasingethe indiza enophephela emhlane baseRichards Bay noma eThekwini. Abantu abazomba baphakathi kuka-200. Izisebenzi ziyosebenza amahora angu-12 emasontweni amabili kuya kwamane. Kuyoba kancane izisebenzi zishintshwe, uma kuhlanganiswa nezimfuneko zezisebenzi ze-ad hoc. Ngakho ithimba lendiza enophephela emhlane elisuka futhi liye lapho kugujwa khona liyosebenza cishe njalo ngosuku. Ithimba lendiza enophephela emhlane liyosebenza amahora angu-10 emasontweni amabili kuya kwamane ngokuvumelana nebhuku elineziqondiso yezindiza yenhlango i-Eni.

- *Izingqalasizinda kanye nezinto zokusiza:*
- *Amanzi ahlanzekile:* lo msebenzi uzodinga amanzi asolwandle namanzi alinganiselwe avamile ukuze kwenziwe uketshezi lokukhipha izinto ezisalayo emgodini lapho kumbiwa kanye namanzi okuhlanza insimbi yokumba. La manzi azothuthwa esuka ogwini. Amanzi okuphuza (aphathwayo) azoba semkhunjini ombayo azotholakala kusetsheniswa umshini okwazi ukuhlanza amanzi noma kusetshenziswe amanzi angezigubhu;
- *Uphetoli:* umkhumbi onomshini ombayo kanye nemikhumbi enakekelayo izosebenzisa uwoyela wegesi yasolwandle phakathi nokuhamba, ukulinda kanye nokwenza umsebenzi wokumba; kanye
- o *Nokuthola Ukudla Nezinye Izinto Zendawo:* inkampani ephekayo izothumela ukudla neziphuzo emikhumbini esolwandle. Ukukhetha ukudla, isilinganiso nezithako kuzonakekelwa isikhungo esisogwini.

Umsebenzi ohlobene nokumba uhlanganisa izigaba ezilandelayo:

- Ukuhanjiswa kwemishini ngomkhumbi uye eRichards Bay noma eThekwini, ukusebenza kwezikhungo ezisogwini ukuze sinakekele izidingo zomkhumbi onomshini wokumba;
- Ukumba umthombo;
- Okungakhethwa ukuze kwenziwe kahle (umthombo ogudlayo, umsebenzi, ukuphothula);
- Uma bethanda bahlola umthombo;
- Uma ungakhiqizi uyayekwa umthombo; kanye
- Ukubuyisela emuva umkhumbi onomshini wokumba, eminye imikhumbi nesikhungo sendawo esiphawuliwe.

Yonke imisebenzi izobe yenziwa yi-Eni ngokubambisana nemboni yamazwe.

Ithebula 9.5 Umonakalo Ongaba Khona Emsebenzini Ehleliwe

No.	Inkinga	Umonakalo	Isilinganiso Sangaphambi Koknciphisa Amagalelo	Isilinganiso Sangemva Kokunciphisa Amagalelo
1	Umonakalo omkhulu Ophawuliwe ongaba khona Emsebenzini Ehleliwe			
1.1	Ukushintsha kwesimo sezulu	Ukushiswa kukawoyela	Kuwubala	Kuwubala
1.2	Amanzi olwandle nezinto ezizika olwandle ezingalungcolisa / ukungcolisa nomonakalo ongaba khona ezilwaneni ezisolwandle	Amanzi angcollile aphuma emkhunjini onomshini ombayo, imkhumbi enakekelayo nesekeleyo	Kuwubala	Kuwubala
		Ukuphazamiseka ngokoqobo kwendawo engaphansi kolwandle, izinto ezizika olwandle kanye nokuphazamiseka kwezilwane ezisekujuleni kolwandle ngenxa yokuhlola ngaphambi kokumba Ngomshini Oqondiswayo (ROV)	Kuwubala	Kuwubala
		Ukuphazamiseka ngokoqobo kwendawo engaphansi kolwandle, izinto ezizika olwandle kanye nokuphazamiseka kwezilwane ezisekujuleni kwamanzi ngenxa yomsebenzi wokumba	Kuwubala	Kuwubala
		Ukuphazamiseka ngokoqobo kwendawo engaphansi kolwandle, izinto ezizika olwandle kanye nokuphazamiseka kwezilwane ezisekujuleni kwamanzi ngenxa yokulahlwa kukasimende omnigni endaweni engaphansi kwamanzi	Kuwubala	Kuwubala
		Umonakalo obangwa ukulahlwa uketshezi lokumba kanye nezinto ezisikiwe endaweni engaphansi kolwandle ekujuleni	Kuwubala	Kuwubala
		Umonakalo obangwa ukulahlwa uketshezi lokumba kanye nezinto ezisikiwe endaweni engaphansi kolwandle ekujuleni lapho kunezilnhlobo ezithile zezilwane khona	Kulinganiselwe	Kuncane
		Umonakalo ohlobene ne-biochemical ye-NADF ekumbeni nasezintweni ezinqunyiwe noketshezi olusiza ekumbeni kube kukhona nezilwane sazolwandle emanzini	Kuncane	Kuwubala
		Umonakalo ohlobene ne-biochemical ye-WMB ekumbeni nasezintweni ezinqunyiwe noketshezi olusiza ekumbeni kube kukhona nezilwane sazolwandle emanzini	Kuwubala	Kuwubala
		Ukuphazamiseka kwezilwane ezisolwandle ngokwenza banga umsindo ngaphansi kolwandle ngesikhathi sokwenza umsebenzi wokumba	Kuncane	Kuncane
		Ukugwema ukuziphatha kwezilwane zasolwandle ngenxa yokuphazamiswa umsindo ongaphansi kwamanzi ophathelene nomsebenzi wokumba	Kuwubala	Kuwubala
		Umonakalo ongabangwa umsindo wendiza enophephela emhlane ngesikhathi somsebenzi wokumba endaweni enezilwane ezingaphansi kolwandle	Kulinganiselwe	Kuncane

		Umonakalo ongabangelwa ukukhanya kwemikhumbi esizayo ngalapho kunezilwane ezisolwandle ngaphansi	Kuwubala	Kuwubala
1.4	Ukuphazamiseka kokudoba (ukudayisa nokuziphilisa)	Umonakalo ongaba khona ohlobene nokujinjelwa indawo yokudoba nokulimala kwemishini ngenxa yemithombo engaphansi kwamanzi	Kuncane	Kuncane
1.5	Ukushiywa komthombo noma imithombo engaphansi kolwandle	Umonakalo wokuba khona komthombo ongenalutho ngesikhathi ushiywa komunye wemisebenzi yasolwandle	Kuwubala	Kuwubala
1.6	Ayikho indlela yokughubeka	Umonakalo ongenayo enye indlela	Kulinganiselwe	Kulinganiselwe
2	Umonakalo owengeziwe ophawuliwe ngabantu abathintekayo phakathi nesikhathi sokuhlola			
2.1	Amagugu Asolwandle	Ukumba ukuze kuhlolwe	Kuwubala	Kuwubala
2.2	Abantu bendawo abaqashiwe / imali etholakalayo	Ukuqasha abantu abasosebenza nokwabiwa kwemisebenzi Ukuqeqesha/ ukwandisa izinto zokusebenza zabantu bendawo	Kuwubala	Kuwubala

Ithebula 9.6 Ubungozi Obungaba Khona Noma Imisebenzi Engahleliwe Nezinga Ubungozi Obungabangeleka Ngayo

No.	Inkinga	Umonakalo	Post -Mitigation Significance Rating
1	Unplanned Activities		
1.1	Ubungozi obungaba khona bokuchitheka kukawoyela olwandle nasezindaweni ezisogwini kanye nasezilwaneni	Ukuchitheka kwe-Hydrocarbon ngenxa yokushayisana kwemikhumbi esizayo (okuwukulahleka kukadizilli) olwandle nasezindaweni ezisogwini kanye nasezilwaneni (Izilwane ezingenawo umgogodla, izinhlanzi ezihlala ngasogwini nezibungu kanye nezilwane ezincelisayo nezimfudu zasolwandle)	Kuncane (ALARP)
1.2		Ukuchitheka kwe-Hydrocarbon ngenxa yokushayisana kwemikhumbi esizayo kubanga umonakalo olwandle, ezindaweni ezisogwini kanye nasezilwaneni (izinyoni zasolwandle)	Kulinganiselwe (ALARP)
1.3		Ukuchitheka kukawoyela ngenxa yokuqhuma endaweni ephezulu yomthombo kubeka engozini izilwane ezingenawo umgogodla izinhlanzi izilwane zasolwandle ezincelisayo nezimfudu zasolwandle (kuhlanganise nezilwane ezingaphakathi ku-MPA)	Kuncane (ALARP)

1.4		Ukuchitheka kukawoyela ngenxa yokuqhuma endaweni ephezulu yomthombo kubeka engozini ulwandle nezindawo ezingasogwini kanye nezilwane (izinyoni zasolwandle)	Kulinganiselwe (ALARP)
1.5		Ukuchitheka kukawoyela ngenxa yokuqhuma endaweni ephezulu yomthombo kubeka engozini izilwane ezingenawo umgogodla, izinhlanzi, izilwane zasolwandle ezincelisayo kanye nezimfudu zasolwandle(kuhlanganise nezilwane ezingaphakathi ku-MPA)	Kuncane (ALARP)
1.6		Ukuchitheka kukawoyela ngenxa yokuqhuma endaweni ephezulu yomthombo kubeka engozini izinyoni zasolwandle	Kuncane (ALARP)
1.7		Ukuphela koketshezi olusiza ekumbeni nokunqunywe ngenxa yokuqaqwa kwepayipi elisiza ekumbeni olwandle kungaba nomonakalo endaweni ezingasogwini nezilwane ezisolwandle (Izilwane ezingenawo umgogodla, izinhlanzi ezihlala ngasogwini nezibungu kanye nezilwane ezincelisayo nezimfudu zasolwandle)	Kuncane (ALARP)
1.8		Ukuphela koketshezi olusiza ekumbeni nokunqunywe ngenxa yokuqaqwa kwensimbi ebamba phezulu ezimweni eziphuthumayo, kungaba nomonakalo ezinyonini ezisolwandle	Kulinganiselwe (ALARP)
1.9		Ukuphela koketshezi olusiza ekumbeni nokunqunywe ngenxa yokuqaqwa kwensimbi ebamba phezulu ezimweni eziphuthumayo, kungaba nomonakalo ezilwaneni ezingenawo umgogodla, ezinhlanzini, ezilwaneni ezincelisayo ezisolwandle nasezimfudwini zasolwandle (kuhlanganise nezilwane ezingaphakathi ku-MPA)	Kuncane (ALARP)
1.10	Ubungozi obuphawulekayo bokuchitheka kukawoyela	Ukuchitheka kukawoyela ngenxa yokuqhuma noma ukuchitheka kukadizili kungachaphazela izivakashi	Kulinganiselwe (ALARP)
1.11	olwandle nasogwini	Ukuchitheka kukawoyela ngenxa yokuqhuma noma ukuchitheka kukadizili kungaba nomonakalo omncane kulabo abazidobela izinhlanzi	Kulinganiselwe (ALARP)
1.12	kuthinta izinto zokuphilisa	Ukuchitheka kukawoyela ngenxa yokuqhuma noma ukuchitheka kukadizili kungathiya labo abajabulela ukudoba izinhlanzi	Kuncane (ALARP)
1.13		Ukuchitheka kukawoyela ngenxa yokuqhuma noma ukuchitheka kukadizili kungaba nomonakalo kulabo abadoba izinhlanzi ukuze bazidayise	Kuncane (ALARP)
1.14	Ingozi engabangelwa ukushayisana	Ukushayisana kwemikhumbi esiza lapho kumbiwa kungabangela umonakalo empilweni nasekuphepheni kwezisebenzi	Kuncane (ALARP)
1.15	kwemikhumbi esizayo lapho kumbiwa kungabeka ukuphepha nempilo yomphakathi nezisebenzi engozini	Ukushayisana kwemikhumbi esiza lapho kumbiwa kungabangela umonakalo empilweni nasekuphepheni komphakathi	Kulinganiselwe (ALARP)

Ithimba le-EMPr lizonciphisa izilinganiso okufanele kuqaliswe phakathi noMsebenzi ohlongozwayo futhi labe izikhundla zemisebenzi ethile. Inhlango ye-Eni kufanele iqukelele ukuthi ikhophi le-EMPr egunyaziwe inikezwa Inkampani Embayo futhi ihambe nethimba elimbayo nemikhumbi esizayo phakathi nomsebenzi wokumba.

I-EMPr nayo iyasiza kuyo yonke imisebenzi phakathi nesikhathi sokuhlela, sokusebenza nesigaba sokuqeda imisebenzi. Ngokwengxenye 102 ye-Mineral and Petroleum Resources Development Amendment, ka-2008 (okungunombolo 49 ka-2008) (MPRDAA) ayinakushintshwa ngaphandle kwemvume ebhalwe phansi uNgqongqoshe.

I-EMPr kufanele izihlanganise neziqondiso zenhlango ye-Eni Zempilo Ukuphepha Nompakathi (HSE) ukuze bagqugquzele:

- Ubunikazi bepulani elisezingeni eliphezulu;
- Ukwabiwa kwezinto ezifanele ukuze kuqaliswe i-EMPr; kanye
- Nokufeza ngempumelelo i-EMPr.

Umthwalo woMsebenzi wokuthuthukisa imvelo usezandleni zenhlango ye-Eni, ngokuqondile kuMqondisi Ophethe, abaphethe uMsebenzi kanye nabaphathi be-HSE. Lokhu kuzohlangozisa ukuqukelela ukuthi izimfuno ze-HSE ziyanakekelwa nokuthi izinkontileka nezinkontileka ezincane ezenza lo msebenzi ziyahlangabezana nazo zonke izimfuneko; nokugada intuthuko yezinkontileka zazo kanye nawo wonke uMsebenzi. Ukuzinikela ekunakekeleni imvelo, kuzofakwa eziqondisweni zokusebenza, kulokho okwenziwayo uma kusetshenzwa nakuzo zonke iziqondiso zokunakekela. Inhlango ye-Eni yaseNingizimu Afrika kuzodingeka ukuba ihlole futhi inakekele ukuqaliswa kwe-EMPr.

9.7.1

Ukuqeqeshwa Nokuwashiswa Ngemvelo

Inhlango ye-Eni izophawula, ihlele, inakekele futhi ibhale lapho kunezidingo zokuqeqesha abantu abenza umsebenzi ongase ubangele umonakalo emvelweni. Inhlango ye-Eni iyaqaphela ukuthi izisebenzi kuzo zonke izigaba ziqaphele izinqubomgomo zayo ze-HSSE okungase kubangele umonakalo emisebenzini yabo, izindima nemisebenzi endleleni yokuphumelela ekuhambisaneni nezinqubomgomo neziqondiso. Abantu abaqashiwe abanemithwalo ethile emsebenzini oqondile ekunakekeleni imvelo bazokuqeqeshwa ngempela ukuze kuqukelelwe ukuthi kulandelwa iziyalezo neziqondiso ezibekiwe ngokuphathelene nemisebenzi abayenzayo. Lokhu kuqeqeshwa kuzohlangozisa ukuqwashisa nokufaneleka ngokuphathelene:

- Ukuqwashisa okuvamile okuhlobene nomsebenzi wokuhlola ukumbiwa komthombo, kuhlanguke nemvelo nomonakalo ongaba khona kule misebenzi;
- Izimfuneko ezingokomthetho ngokuphathelene nokusebenza kwemvelo;
- Isidingo sokuhambisana nezimfuneko zenhlango ye-EMPr, ngisho nokubika ngezimfuneko (njengokubhala umbiko wengozi eyenzekile);
- Ukuqeqeshelwa umsebenzi othile (njengomsebenzi wokunakekela udoti); kanye
- Nezindima nemisebenzi okufanele kubambiswane nayo kuhlanguke ukushintsha nendlela yokuphatha.

Ukuqeqeshwa kuzosebenzisa ulwazi lwezinga lwemfundo, indawo yokuqeqeshwa noma ulimi abantu abaqashiwe abafisa ukufunda ngalo. Inhlango ye-Eni izophinde idinge ukuba zonke izinkontileka ezigunyaziwe zibe nohlelo lokuqeqesha izisebenzi zazo. Inkontileka ngayinye izoba nomthwalo wokuqikelela ukuthi ibheke Impilo Ukuphepha Nezemvelo (HSSE) nokuqeqesha izisebenzi ezenza uMsebenzi nokuphawula noma yikuphi ukuqeqeshwa okwengeziwe okudingekayo ukuze zikwazi ukugcina izinga elidingekayo. Uhlelo lokuqeqesha lwenkontileka luzogunyazwa yinhlangano ye-Eni futhi kuzohlolwa ukuze kuqinisekise ukuthi:

- Uhlelo lokuqeqesha luyagculisa;
- Bonke abantu abadinga ukuqeqeshwa sebeqeqeshiwe; kanye
- Nokuqinisekisa ukuthi ukuqeqesha kwenziwe ngempumelelo.

9.8 IZINHLELO EZIQONDILE ZOKUQONDISA

9.8.1 Uhlelo Lokuphendula Ngokuphuthumayo

Uhlelo Lokuphendula Ngokuphuthumayo (ERP) idinga ukuba i-International Finance Corporation (IFC) Izinga Lentuthuko neziqondiso ze-EHS. Lolu hlelo luzohlanguke isigaba ngasinye soMsebenzi (wokuhambisa imishini yokumba, wokumba nowokubuyisela imishini yokumba ngemva komsebenzi) futhi luzohambisana nobungozi nokuchaphazeka okuphawulwe uMbiko we-EIA Report.

Injongo ye-ERP ukulungela ukuphendula mayelana nezingozi ezilindelekile, izimo eziphuthumayo ngokuphathelene nobungozi bomsebenzi nokumgwema imiphumela yao engemihle.

9.8.2 Uhlelo Lokuchitheka Kukawoyela Olungaqinisekisele

Umsebenzi othile Wohlelo Lokuchitheka Kukawoyela Okungaqinisekisiwe (OSCP) uzothuthukiswa yinhlangano i-Eni.

Lolu hlelo luzothuthukiswa ngenxa yokulandela kukaZwelonke uHlelo Lokunakekela Okwenzekayo ngokuphathelene nezinto ezichitheke kanye ne-National OSCP. Lolu hlelo luzofundisa abantu abasebenzayo ngeziqondiso abangazilandela noma ukuchitheka kukawoyela okungenzeka phakathi nesikhathi sokuhlola umsebenzi wokumba. Lolu hlelo luzosiza ngokunikeza uhlu lwezimbobo zokuxhumana, iziqondiso zokuhambisa imishini yokusebenza, konke kuzobhalwa ngaphambi kokuqalwa komsebenzi wokumba.

Bonke abasebenzi abathintekayo kulolu hlelo bazoqeqeshwa ngaphambi kokuqalisa umsebenzi wokumba futhi okungenani kuzohlelwa ukuba kube nesivivinyo esisodwa esizokwenziwa phakathi nokumba ukuze kuqinisekise ukuthi abantu nezinto zokusebenza konke kumi ngomumo.

Uhlelo lokuchitheka kukawoyela okungaqinisekise kufanele kuhlangukise noma kukhulume ngezinto ezilandelayo:

- Iziqondiso zokuqapha;
- Ukuqalisa / ukuthatha isinyathelo ngokushesha;
- Izinto Ezingenziwa Lapho Kuchitheka Uwoyela / Amasu;
- Uhlelo Lokuphendula Lapho Uwoyela Uchitheke Indawo Yezilwane;
- Izindima Nemithwalo (kuhlangukise Nohlu Lwabantu Abangathintwa Lapho Kunezimo Eziphuthumayo);
- Izinyathelo Ezingathathwa Ukuze Kuphendulwe;
- Ukuphendula Ngeziqondiso Esisuliwe;
- UMbiko wokuLinganisa Ukuchitheka Kukawoyela;
- Ukuhlola Ubungozi Bokuchitheka Kukawoyela (ukuzwela kwemvelo nokubaluleka okukhulu kokuyivikela);
- Uhlu Lwezinto Zokusebenza Lapho Kuchitheke Uwoyela;
- Iziqondiso zokuphendula zobuchwepheshe nokulinganisela;
- Ukuphendula ngemishini nokunakekelwa kwayo / nohlelo Lokuhlola;
- Izakhiwo (kuhlangukise neminingwane ethile) nemikhiqizo (kuhlangukise nencwadi yeziqondiso ye-MSDS); kanye
- Nokumba nokuqeqesha.

Kufanele kuphinde kuhlolwe i-OSCP futhi kugunyazwe Abaphathi Bezokuphepha Abasolwandle eNingizimu Afrika (SAMSA) ngaphambi kokuqalisa. Ngemva kokugunyaza i-SAMSA izokhipha Isitifiketi Sokuphepha Ekungcoleni. I-Eni kuyodingeka ukuba iveze ikhophi yepulani neSitifiketi Sokuphepha Ekungcoliseni esigunyazwe yi-SAMSA lokhu ikuvezele iNhlangothi i-Petroleum yaseNingizimu Afrika noMnyango Wezemvelo.

9.8.3 *Uhlelo Lokusingatha Udoti*

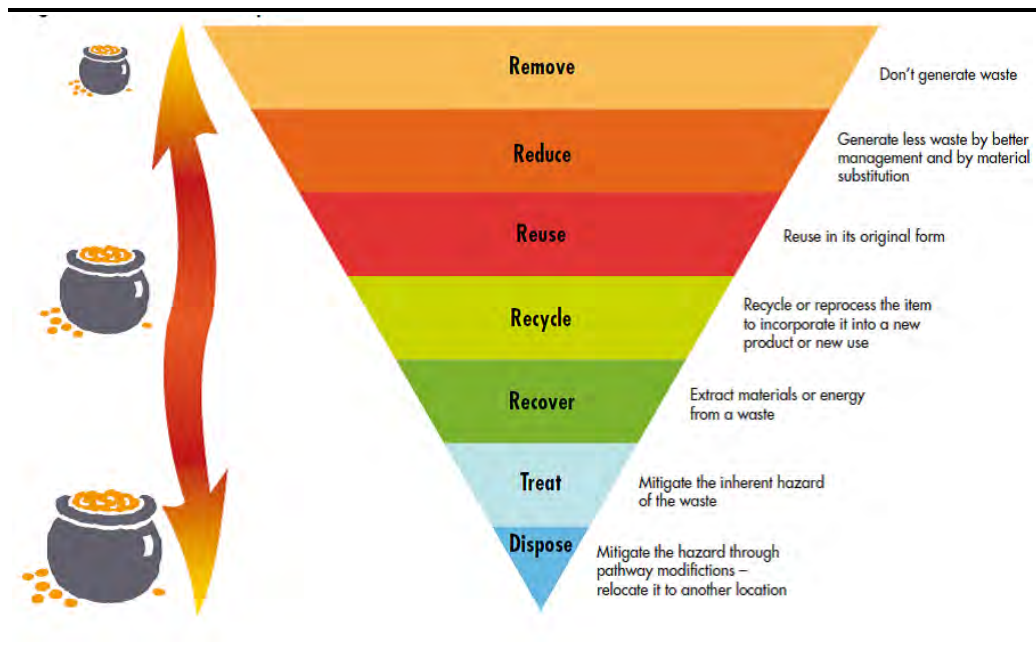
Uhlelo Lokusingatha Udoti (WMP) luyothuthukiswa ngaphambi kokuba umsebenzi uqale phakathi nokuqalisa uMsebenzi.

I-WMP imise isiqondiso kubanakekeli bodoti ukuba usingathwe ngenye indlela phakathi nesikhathi sokusebenza ogwini nasolwande (ukumba, ukuhambahamba kwemikhumbi esizayo, izindawo ezisogwini ezisekelayo). Lokhu kuhlenganisa ukuqoqa, ukugcina, ukunakekela, ukuthutha, ukulahla, ukuthulula ukubika nokunakekela eminye imininingwane. I-WMP izombambisana nesiNqumo SeZizwe ngokuGwema Ukungcolisa Ulwandle ngemiKhumbi (MARPOL 73/78).

Lokhu okulandelayo izinto ezituswayo ukuba zenzelwe Uhlelo Lokuthuthukisa Ukusingatha Udoti:

- Udoti uzonakekelwa yinhlangano ye-Eni yaseNingizimu Afrika ngokuvumelana nezigaba zodoti eziboniswe *Emfanekisweni* oku-9.2 ngezansi;
- Izinkampani ezinezincwadi eziphelele nezithole imvume egculisayo ezizobonisa indlela yokunakekela nokulahla udoti zizokhethwa ngokubuyekeza nokuhlola ngokuvumelana nomsebenzi omuhle wamazwe;
- Iziqondiso zokulandelela udoti zizoboniswa yi-WMP ukuze ibonise ukuthi uyalandeleleka yini udoti kusukela lapho ozokwenziwa khona kuze kube sekugcineni; kanye
- Nodoti ongenabo ubungozi uzohlukaniswa uphinde usetshenziswe uma kungenzeka.

Umfanekiso 9.1 Izigaba Zodoti



Le ngxenye ibonisa ukuzibophezela okuthile okufanele kuqaliswe ukuze kugwenywe kuncishiswe noma kuqondiswe umonakalo ongase ube khona nokwandisa nokukhulisa noma iziphi izinzuzo zoMsebenzi. Lokhu kuzibophezela kuboniswe uMsebenzi onezigaba ezintathu; okungukuhlela, ukusebenza nesigaba sokuhoxa.

Lokhu Kubhalisa Kokuzibophezela kuyi-EMPr (*Ibhokisi 9.8*) kuhlelwe ngendlela elandelayo ukuze izilinganiso ezincane zicace ngokwendlela eziklanywe ngayo, zaqaliswa, zana kekelwa futhi zahlolwa ngayo:

- Imisebenzi;
- Izinhloso;
- Ukunciphisa /Ukuphathwa nokuThuthukisa Ukuzibophezela;
- Imithwalo;
- Isikhathi / Ukuphindaphinda; kanye
- Nezinto ezidingekayo ukuze kuqedelwe uMbiko.

Ithebula 9.7 Ukuzibophezela Kwe-EMPr

Inombolo yesikhombo.	Imisebenzi	Izinhloso	Ukunciphisa / Ukuphathwa nokuThuthukisa Ukuzibophezela	Umthwalo	Isikhathi / Ukuphindaphinda	Izinto ezidingekayo ukuze kuqedelwe uMbiko
A) Isigaba Sokuhlela						
1.	Isikhathi/ukuhlela	Ukumba ngesikhathi isimo sezulu sisihle ukuze kuncishiswe ukuchaphazeleka okungavamile lapho kuqhuma	Njengoba kungase kwenzeke ukuthi ukuqhuma okungalindelekile olwandle kungase kubangelwe isikhathi sonyaka okumbiwa ngaso, kutuswa ukuba ukumba kwenziwe ngesikhathi sasehlobo	Eni	Ngaphambi kokuqala komsebenzi	Ukuqinisekisa isikhathi okuzombiwa ngaso
2.	Amalungiselelo ezinhlelo ezengeziwe	Ukulungiselela noma iziphi izimo eziphuthumayo ezingabangelwa ukuchaphazeleka kwemvelo	Izinhlelo ezilandelayo kumelwe zilungiselelwe futhi zime ngomumo: • UMsebenzi othile we-OSCP ogunyazwe i-SAMSA. • Inhlango ye-Eni izoveza amakhophi okugunyazwa kwepulani neSitifiketi Sokuphepha Ekungcoleni kunikezwe i-PASA noMnyango Wezemvelo (DEA). • I-Shipboard Oil Pollution Emergency Plan (SOPEP) eyemikhumbi ethwele imishini yokumba nemikhumbi esekela umkhumbi ombayo njengoba kudingwa i-MARPOL 73/78. • Ukuphendula Ngohlelo Oluphuthumayo • Incwadi yeziqondiso Yokufuna Nokusindisa YaseNingizimu Afrika (SASAR). • Uhlelo Lokusingatha Udoti (<i>Ingxenye 9.8.3</i>). • Uhlelo Lokusingatha Intilibathwa Yamanzi. Ngezansi kwalokho okungenhla, qiniseka ukuthi: • Ithimba elimbayo lineSitifiketi Sokuphepha Ekungcoleni ezobe isithole kuBaphathi Bezokuphepha Basolwandle ENingizimu Afrika (SAMSA).	I-Eni Nenkontileka Embayo	Ngaphambi kokuqala umsebenzi	Ukuqinisekisa ngokubambisana nokubonisa noma yini ekhishiwe

Inombolo yesikhombo.	Imisebenzi	Izinhloso	Ukunciphisa / Ukuphathwa nokuThuthukisa Ukuzibophezela	Umthwalo	Isikhathi / Ukuphindaphinda	Izinto ezidingekayo ukuze kuqedelwe uMbiko
			- Kunezinto zokuphepha ezamukelekayo nomshwalense omayelana nobungozi bokungcolisa kukawoyela. - Kunerekhodi lesitifiketi sesimo esiphephile sasolwandle sethimba elimbayo kanye nemikhumbi esizayo / noma isitembu sokuhlukanisa. - Indawo ephezulu emthonjeni ne-BOP kuklanywe ngendlela yokuba kufakwe into esasivalo phezulu. Inhlango ye-Eni kufanele yenze izivumelwano nezinkontileka ezingasiza Ezimweni Eziphuthumayo Emthonjeni (isistimu yokuvala, nokusiza emthonjeni lapho kuQhuma) nokusabela lapho kuchitheke khona uwoyela (ngokwesibonelo Inkampani Enciphisa Ukuchitheka Kukawoyela (OSRL) nenkampani Elawula Kahle Indawo Yezilwane) phakathi nesikhathi sohlelo lokumba.			
3.	Ukuxhumana nokwazisa abathintekayo	Isaziso se-PASA ne-DEA	Ukuhlanganisa imininingwane ethile yomsebenzi ngamunye wokumba ube incwadi Yokwazisa Ngokumba bese ihanjiswa kuyi-PASA ne-DEA. Lokhu kuhlanganisa yonke le mininingwane elandelayo: - Uhlelo Lokumba (isikhathi, izinombolo ezibonisa lapho indawo ikhona nesikhathi sesisonke somsebenzi). - Imininingwane YeNkontileka. - Ithimba elimbayo nemikhumbi esekelayo (okuhlanganisa isitifiketi esidingekayo nomshwalense). - Uhlelo Lokuchitheka Kukawoyela (OSCP). (ERP).	I-Eni	Izinsuku ezingu-30 ngaphambi kokuqaliswa komsebenzi noma njengoba kufunwayi-PASA kanye / noma ne-DEA;	Ukuqinisekisa ukuthi isaziso sithunyelwe kuyi-PASA ne-DEA

Inombolo yesikhombo.	Imisebenzi	Izinhloso	Ukunciphisa / Ukuphathwa nokuThuthukisa Ukuzibophezela	Umthwalo	Isikhathi / Ukuphindaphinda	Izinto ezidingekayo ukuze kuqedelwe uMbiko
4.		Ukwazisa abathintekayo	- Ukuthuthukisa uhlelo lokuqondisa abathintekayo abenza umsebenzi wokumba. Lolu hlelo kufanele luhlanganise lokhu: - Ukwazisa mayelana nomnyango kahulumeni nabanye abathintekayo abasemqoka bohlelo lokumba oluhlongozwayo (kuhlanganise nokuthungatha indawo yomthombo kusetshenziswa izinombolo zokuthola indawo, isikhathi nesikhathi esizochithwa kulo msebenzi) nezinye izinto ezingaqaliswa (njengendawo engamamitha angu-500 kanye nemikhumbi esekelayo). Abathintekayo bahlanganisa: - Imboni Yokudoba Izinhlanzi / izinhlangano: - Inhlangano YaseNingizimu Afrika Esebenza Ngezinhlazi Ezinkulu. - I-SAMSA. - Amasosha Asolwandle AseNingizimu Afrika (SAN) ihhovisi Lokuhlola Ulwandle. - UMnyango Wezolimo, Amahlathi Nokudoba (DAFF), - I-Transnet National Ports Authority (esikhumulweni saseRichards Bay noma eThekwini). - Izinto ezingase zenzeke / ukuhlola izimayini / abaphathi abafanele bomkhiqizo. - Ukusakaza isaziso kulabo abasebenza Olwandle ngaphambi kokuqala umsebenzi wokumba, kuhlanganise nesikhathi nendawo. - Noma iyiphi impikiswano engavela ngezinto ezingase zenzeke / abahloli abafanelekayo	I-Eni	Izinsuku ezingu-30 ngaphambi kokuqaliswa komsebenzi	Ukuveza amakhophi azo zonke izincwadi

Inombolo yesikhombo.	Imisebenzi	Izinhloso	Ukunciphisa / Ukuphathwa nokuThuthukisa Ukuzibophezela	Umthwalo	Isikhathi / Ukuphindaphinda	Izinto ezidingekayo ukuze kuqedelwe uMbiko
			kufanele badluliselwe eMnyangweni Wezinsiza Zamaminerali noma kuyi-PASA ukuze inqume.			
5.	Amalungiselelo angokwezimali		Qikelela ukuthi amalungiselelo angokwezimali ami ngomumo ukuze kugcwaliseke izimfuno ze-EMPr. Yinhlango ye-PASA okufanele igunyaze lama lungiselelo.	I-Eni	Ngaphambi kokuqala komsebenzi	Qinisekisa ukuthi amalungiselelo angokwezimali e-EMPr asemini ngomumo
6.	Imvume / inkululeko	Bambisanani nezimfuno zomthetho	- Uma kudingeka fakani isicelo Kubameli Bemithombo Yamagugu ENingizimu Afrika (SAHRA) nicele imvume yokuthikameza noma iziphi izinto zamagugu (ngokwesibonelo imikhumbi efile) ezineminyaka engaphezu kwengu-60. - Bambisana nanoma iziphi izimfuno ezoboniswe yi-SAHRA.	I-Eni	Ngaphambi kokuqala komsebenzi noma uma kuphawuliwe	Veza ikhophi yemvume / inkululeko

Inombolo yesikhombo.	Imisebenzi	Izinhloso	Ukunciphisa / Ukuphathwa nokuThuthukisa Ukuzibophezela	Umthwalo	Isikhathi / Ukuphindaphinda	Izinto ezidingekayo ukuze kuqedelwe uMbiko
7.	Inhlolovo ngaphambi kokumba	Ukuqinisekisa ukuthi lapho kunemithombo khona akunazithiyo / ukufakwa kwezinto kwezinto nezilwane nezitshalo ezizwela kalula	- Ukusetshenziswa Kwento Yokuthutha Elawulwa Kwenye Indawo (ROV) ukuze ihlole ekujuleni kolwandle ngaphambi kokuba kumbiwe ukuze kuqinisekiswa ukuthi zikhona noma azikho yini izici ezithile, izilwane noma izitshalo ezisengozini (ngokwesibonelo amakhorali asemanzini abandayo, iziponji) kanye nezinto eziyigugu zendawo (ngokwesibonelo izinto ezacwila lapho) kuleyo ndawo. - Ukuqalwa kohlelo lwama-ROV oluboiswa ukuthi i-ROV ayihlali noma ime phansi ekujuleni kolwandle njengengxenywe yomsebenzi ovamile we-RVO. - Ukubukwa kwezithombe ze-ROV zenhlolovo ngaphambi kokuba kumbiwe ukuze kubonakale izilwane noma izitshalo zasolwandle ezingase zibe sengozini ezingaqhela ngamamitha angu-50. - Ukuqinisekiswa kokuthi indawo okumbiwa kuyo iqhele ngamamitha angu-500 kunoma iziphi izilwane noma izitshalo ezitholakalayo ezingaba sengozini.	I-Eni/ Ukumba/ izinkontileka zemikhumbi esizayo	Ukuqalisa umsebenzi noma lapho kuphawulwe khona	- Ikhophi yemvume evela kuyi-SAHRA (uma idingeka) - Bonisa ubufakazi bezithombe zesimo sendawo esekujuleni kolwandle nge-ROV

Inombolo yesikhombo.	Imisebenzi	Izinhloso	Ukunciphisa / Ukuphathwa nokuThuthukisa Ukuzibophezela	Umthwalo	Isikhathi / Ukuphindaphinda	Izinto ezidingekayo ukuze kuqedelwe uMbiko
8.	Inhlolovo ngaphambi kokumba	Ukuvikela imikhumbi efile	- Bhekani noma iziphi izinto ngaphambi kokumba nisebenzisa into ekwenza ukwazi ukulawula, ukuze nikwazi ukuhlola ukuthi ngaphansi kolwande ayikho yini imikhumbi efile ekhona. - Uma kwenzeka ukuthi i-ROV iphawula ukuthi kunezinto ezisolwandle endaweni okuzombiwa kuyo noma eduze kwayo kubuka indawo ngezipopolo lapho okuzombiwa khona futhi kungenzeka ukuthi ukuqalisa umsebenzi wokumba endaweni ephephile eduzane nendawo yezinto zemivubukulo kufanele yanele ukuba kungancishiswa ubungozi kuleyo ndawo - Uhlelo lokuthungatha kumelwe lenziwelwe uMsebenzi futhi uma kunezinto zomkhumbi owaphahlazeka ezingatholakalanga ngamathuluzi asebaluliwe phezulu kumelwe zitholakale phakathi nesikhathi somsebenzi wokumba.	I-Eni/ Ukumba/ izinkontileza zemikhumbi esizayo	Ngaphambi kokuqalisa umsebenzi noma lapho kuphawulwe khona	- Ikhophi yemvume evela kuyi-SAHRA (uma idingeka) - Bonisa ubufakazi bezithombe zesimo sendawo esekujuleni kolwandle nge-ROV
B) Isigaba Sokusebenza						
Ukusebenza Okuvamile Kwemikhumbi Esizayo						
9.	Ukumba nemikhumbi esekelayo kuzosetshenziswa kuzo zonke izigaba	Ukunciphisa izimbangela zokungcolisa umoya	- Ukuhambisana noMthetho i-MARPOL 73/78 Annex VI mayelana nokususwa kwe-SOx, i-NOx, i-ODS ne-VOC kanye nokuyekwa kokushiswa kwengaphansi lomkhumbi. - Ukuhambisana noMthetho i-MARPOL 73/78, nokuqinisa i-IMO nokugunyazwa kwezindawo eziyingozi ngokuvumelana ne-EN 60047-10 udoti ongabangela ubungozi ushiswe (iphepha, ikhathoni, ukhuni nokunye) emkhunjini ombayo	Ukumba/ izinkontileka zemikhumbi esizayo	Phakathi nawo wonke umsebenzi owenziwa imikhumbi esizayo	Bonisa ibhuku amarekhodi omkhumbi osizayo
10.			Zonke izimoto zikadizili nezinjini kuzohlolwa kunakekelwe ngokufanele ukuze kuncishiswe			

Inombolo yesikhombo.	Imisebenzi	Izinhloso	Ukunciphisa / Ukuphathwa nokuThuthukisa Ukuzibophezela	Umthwalo	Isikhathi / Ukuphindaphinda	Izinto ezidingekayo ukuze kuqedelwe uMbiko
			ukuba intuthu emnyama nodizili kudedeke emoyeni. - Izithuthi nezimoto ziyahlolwa ukuthi ziyavuzayini futhi nohlelo lokukhanda amapayipi, nezinto ezihlanganisa amapayipi, izinto ezixhumanayo - Ukusetshenziswa kukaphetroli ongangcolisi kakhulu emikhunjini esetshenziswayo, uma ikhona.			
11.		Ukuncishiswa kokonakaliswa kwamanzi asolwandle ngokubambisana nomthetho nezimfuno ze-MARPOL 73/78.	- Ukubekwa kwamakhemikhali, uphetroli nowoyela ezindaweni ezivikelekile emikhunjini ukuze kugwenywe ukuba ivuze futhi ichitheke. - Imishini esiza uma kuchitheke uwoyela izoba khona emkhunjini ombayo kanye nasemikhunjini esekelayo. - Ukuhambisana nezimiso ze-MARPOL 73/78 zonke izinto izindawo nemikhumbi nemishini ezinendawo zokuhlana amanzi ukuze kuhlungwe amanzi asendaweni asetshenziswa kuyo. - Ukuhambisana nezimfuneko zikazwelonke nezakwamanye amazwe zokuhlungwa kwamanzi nokuchithwa kwawo. - Ukulahlwa kwayo yonke imfucumfucu evele ngesikhathi kumbiwa, nevela emikhunjini esekelayo ngaphambi ngokuhlanzwa. Imishini ehlukana uwoyela namanzi ukuze ukumuncwa kwamanzi namanzi aphakathi emkhunjini ngokuvumelana nezimfuneko i-MARPOL 73/78 Annex I okuwukuthi uwoyela osemanzini ube ngaphansi kuka-15 ppm.	Ukumba/ izinkontileka zemikhumbi esizayo	Kuwo wonke umsebenzi wemikhumbi embayo	- Qinisekisa ngokubambi sana futhi kuphawulwe noma yini ekhishiwe - Bonisa ibhuku amarekhodi omkhumbi osizayo - Ukubika izikhathi ezincane lapho kuchitheka khona uwoyela nendawo lapho kuzolahlwa khona udoti
12.			Ukubekwa kohlelo lokusingatha udoti neZiqondiso Zokusingatha Udoti ze-Eni ezikhuluma ngawo	Ukumba/ izinkontileka	Ngaphambi	

Inombolo yesikhombo.	Imisebenzi	Izinhloso	Ukunciphisa / Ukuphathwa nokuThuthukisa Ukuzibophezela	Umthwalo	Isikhathi / Ukuphindaphinda	Izinto ezidingekayo ukuze kuqedelwe uMbiko
			wonke udoti ovela ezindaweni ezihlukahlukene ezingasogwini neziphakathi olwandle	zemikhumbi esizayo	kokuthuthwa kwemishini	
13.			Yonke imikhumbi nemishini emuncayo kumelwe iqondiswe: - Imishini elawula ukukhishwa kukawoyela emishinini nasemathangini kaphetroli, ngokwesibonelo Imishini ehlanza futhi ihluze uwoyela nemitha elibonisa ukuthi uwoyela ungakanani. - Amathange agcina izinsalela zikawoyela. - Uhlelo lokulawula ukuphuma kukawoyela	Ukumba/ izinkontileka zemikhumbi esizayo	Ngaphambi kokuthuthwa kwemishini	
14.	Ukumba nemikhumbi esekelayo kuzosetshenziswa kuzo zonke izigaba	Ukuncishiswa kokonakaliswa kwamanzi asolwandle ngokubambisana nomthetho nezimfuno ze-MARPOL 73/78.	Lezi zitifiketi ezilandelayo kumelwe zibe khona: - Isitifiketi esisebenzayo se-International Sewage Pollution Prevention, njengoba kufunwa abasebenza ngemikhumbi. - Isitifiketi Sokugwema Ukungcolisa Kukawoyela Kwamazwe (IOPP) njengoba kufunwa abasebenza ngemikhumbi .	Ukumba/ izinkontileka zemikhumbi esizayo	Kuwo wonke umsebenzi womkhumbi osekelayo	Ukuqinisekisa ngokubambisana nokubonisa noma yini ekhishiwe
15.			Ukudla okungudoti uma kuchithwa ngemva kokuba sekudlule emshinini ogandayayo nalapho indawo okumbiwa kuyo iqhele ngamakhilomitha angu-5,5 endaweni eyomile.	Ukumba/ izinkontileka zemikhumbi esizayo	Phakathi nawo wonke umsebenzi wemikhumbi esizayo	Nikeza amazwibela encwadi enamarekhodi odoti

Inombolo yesikhombo.	Imisebenzi	Izinhloso	Ukunciphisa / Ukuphathwa nokuThuthukisa Ukuzibophezela	Umthwalo	Isikhathi / Ukuphindaphinda	Izinto ezidingekayo ukuze kuqedelwe uMbiko
16.		Ukulawula ukuba izilwane ezingezona ezakuleyo ndawo zingasakazekeli endaweni engaba ingozi.	Yonke imikhumbi ethwala amanzi asindayo kumelwe iwafake futhi iwathulule ngokuvumelana neziqondiso nezimiso ze-International Maritime Organization (IMO) esingethe ukuchithwa kwamanzi amaningi olwandle.	Ukumba/ izinkontileka zemikhumbi esizayo	Phakathi nesikhathi sokuchithwa kwamanzi amaningi olwandle, phakathi nawo wonke umsebenzi wemikhumbi esizayo	Nikeza ibhuku okubhalwe kulo mayelana namanzi amaningi olwandle
17.	Ukusebenzisa imishini yokumba nemikhumbi esekelayo phakathi nazo zonke izigaba	Ukuvikela izilwane zasolwandle zakuleyo ndawo, izinyoni ezifudukile nezinyoni zolwandle ngokulawula umsindo ovela endaweni okumbiwa kuyo nasemikhunjini ehambayo	Imikhumbi kumelwe ihlale ilungiswa ukuze ingabi nomsindo.	Ukumba/ izinkontileka zemikhumbi esizayo	Phakathi nawo wonke umsebenzi wemikhumbi esizayo	Vezani ibhuku elibukeza amarekhodi emikhumbi esizayo

Inombolo yesikhombo.	Imisebenzi	Izinhloso	Ukunciphisa / Ukuphathwa nokuThuthukisa Ukuzibophezela	Umthwalo	Isikhathi / Ukuphindaphinda	Izinto ezidingekayo ukuze kuqedelwe uMbiko
18.	Ukusebenzisa imishini yokumba nemikhumbi esekelayo phakathi nazo zonke izigaba	Ukuvikela izilwane zasolwandle zakuleyo ndawo, izinyoni ezifudukile nezinyoni zolwandle ngokulawula ukukhanya okuvela endaweni okumbiwa kuyo nasemikhunjini ehambayo	- Makusetshenziswe ukukhanya okusiza ukuba kusetshenzwe ngokuphepha noma nini, noma kuphi uma kungenzeka, umsebenzi wenziwe kalula futhi kuncishiswe ukuba imvelo eseduze ingafi noma ithikamezeke. - Izinyoni zolwandle mazivalelwe ezitsheni ezimnyama kodwa zingalinyazwa ukuze zizodedelwa lapho sekukhanya. Izinyoni ezilimele kufanele zibulawe kodwa hhayi ngesihluku. Izinyoni eziphawuliwe kufanele zibikwe ohlelweni olufanele olubeka izimpawu (imininingwane iyatholakala ezintweni zokuphawula)	Ukumba/ izinkontileka zemikhumbi esizayo	Phakathi nawo wonke umsebenzi wemikhumbi esizayo	Vezani ibhuku elibukeza amarekhodi emikhumbi esizayo
19.	Ukusetshenziswa kwemishini yokumba nemikhumbi esizayo phakathi naso sonke lesi sigaba	Ukuvikela izilwane zasolwandle zakuleyo ndawo nezinto zokuvakasha ezigudle ugu ngokulawula ukusetshenziswa kukawoyela namakhemikhali nolunye uketshezi	- Makube nezinhlelo zokugcwalisa kabusha amathangi kaphetroli. - Makusetshenziswe izinto zokuxhuma ezisezingeni eliphezulu. - Amapayipi agcwalisa uphetroli mawahlolwe njalo. - Yenzani zonke izivivinyo zokusabela lapho kuchitheke khona uwoyela. - Makuqisekise ukuthi zonke izisebenzi ziyaqeqeshwa ukuze zikwazi ukubona futhi zibike izenzakalo ezithile nezimo eziphuthumayo. - Makukhethwe amakhemikhali ukuze kuqinisekise ukuthi izilwane ezisolwandle azithinteki kakhulu uma kuchitheke okuthile ngephutha. - Biyela futhi ukhiphe okusezindaweni sokugcina uma-hydrocarbon namakhemikhali. - Wonke amanzi amuncwayo adlula emshinini ohlola amanzi anamafutha uyanakekelwa	I-Eni Nokumba/ izinkontileka zemikhumbi esizayo	Phakathi nawo wonke umsebenzi wemikhumbi esizayo	- Bhalani zonke izinto ezichithekayo (Ebhuqini Lokubhala Okuchithekile), kuhlangukane nokubika okuchithekile. Umbiko wezimo eziphuthumayo. imibiko yokuhlola - ibhuku okubhalwa kulo izigameko

Inombolo yesikhombo.	Imisebenzi	Izinhloso	Ukunciphisa / Ukuphathwa nokuThuthukisa Ukuzibophezela	Umthwalo	Isikhathi / Ukuphindaphinda	Izinto ezidingekayo ukuze kuqedelwe uMbiko
			ngaphambi kokuba achithwe (amafutha asemanzini angaba amalitha angu-15). • Makuhlolwe futhi kunakekelwe zonke izitsha zamakhemikhali nezikaphetroli kuhlangukise nemikhumbi enamathangi kaphetroli nodaka. • Uma kwenzeka kuba khona okuchithekayo kancane makusetshenziswe i-SOPEP. • Uma kwenzeka kukhona okuchitheka kakhulu makusetshenziswe i-OSCP neqembu lezimo eziphuthumayo elisolwandle			• Ukubhala abasebenzi abaqeqeshwayo
20.	Ukusetshenziswa kwemishini yokumba nemikhumbi esizayo phakathi naso sonke lesi sigaba	Ukuvikela izilwane zasolwandle zakuleyo ndawo nezinto zokuvakasha ezigudle ugu ngokulawula ukusetshenziswa kukawoyela namakhemikhali nolunye uketshezi	YIsho umehluko okhona kuwoyela okuchithekile kuyi-OSCP futhi uhambisane neziphathimandla ezidingekayo mayelana nendlela yokubika umkhakha ngamunye wokuchithekile nokuba kusingathwe. Imininingwane okumelwe inikezwe lapho kubikwa ngokuchitheka, ihlanganisa: • Izimo nohlobo lwesenzakalo, uhlobo lomkhumbi, ichweba nesisebenzi esiseduze esimelele inkampani yemikhumbi. • Indawo ethe ngqo okwenzeke kuyo isenzakalo, ibanga okuqhelelene ngayo nendawo eyomile nokuthi kuchitheke kangakanani okuchithekile. • Izimo zezulu ezibelelaseyo, isimo solwandle endaweni ethintekile (indawo umoya obheke ngakuyo nesivini sawo namagagasi). • Abantu neziphathimandla sebetheliwe kakade ngokuchitheka.	I-Eni Nokumba/ izinkontileka zemikhumbi esizayo	Lapho kube nento echithekile	• Bhalani zonke izinto ezichithekayo (Ebhukwini Lokubhala Okuchithekil ekhulangani se nokubika okuchithekil e. Umbiko wezimo eziphuthumayo. imibiko yokuhlola • ibhuku lokubhala izigameko

Inombolo yesikhombo.	Imisebenzi	Izinhloso	Ukunciphisa / Ukuphathwa nokuThuthukisa Ukuzibophezela	Umthwalo	Isikhathi / Ukuphindaphinda	Izinto ezidingekayo ukuze kuqedelwe uMbiko
21.			- Ukulawula nokunciphisa okuchithekile ukuba kungasakazekeli olwandle ngangokunokwenzeka uma isimo solwandle sivuma ukusetshenziswa kwamasu afanelekayo okubutha okuchithekile ukuze umonakalo ungadaleki kakhulu. - Lapho kuchitheke khona udizili, (cishe ohwamuka ngokushesha) amanzi kufanele anyakaziswe noma kuhlanganiswe kusetshenziswa uphephela womkhumbi ukuze kuhlukaniswe ngokushesha futhi kuhwamuke. - Makusetshenziswe izinto ezihlukanisayo ezingenabo ubungozi obukhulu ngaphandle kwalapho kuqhelelene ngamamayela angu-5 nogu noma kujule ngamamitha angu-30 ukuze kuncishiswe ubunzima bomsebenzi. - Makube nezinsiza ezanele zokulanda nokuthutha izinyoni ezinowoyela noma izimfudu zasolwandle ukuze ziyiswe esiteshini sokuhlana.	Ukumba/ izinkontileka zemikhumbi esizayo	Lapho kube nento echithekile	Bhalani zonke izinto ezichithekayo (Ebhukwini Lokubhala Okuchithekil ekuhlangani se nokubika okuchithekil e. Umbiko wezimo eziphuthum ayo. imibiko yokuhlola ibhuku lokubhala izigameko
22.		Ukuvikela izilwane zasolwandle lapho kuba nengozi yokushayisana	Makusetshenziswe imishini yokuqapha ukuba kungabi khona ukushayisana neziqondiso ezisetshenziswa endaweni okumbiwa kuyo nasemkhunjini eletha izinto.	I-Eni Nokumba/ izinkontileka zemikhumbi esizayo	Phakathi nawo wonke umsebenzi wemikhumbi esizayo	ibhuku lokubhala izigameko
C) Isigaba Sokumba						
23.	Ukusebenzisa umkhumbi wokumba endaweni okumbiwa kuyo	Ukuqikelelela ukuthi kuhanjwa ngokuphepha	Ukuqalisa uhlelo lwalabo abathintekaho emsebenzini wokumba	I-Eni	Izinsuku ezingu-30 ngaphambi kokuba kuqaliswe umsebenzi	Ukuveza ikhophi yezincwadi kanye nabathintekayo

Inombolo yesikhombo.	Imisebenzi	Izinhloso	Ukunciphisa / Ukuphathwa nokuThuthukisa Ukuzibophezela	Umthwalo	Isikhathi / Ukuphindaphinda	Izinto ezidingekayo ukuze kuqedelwe uMbiko
24.	Ukusebenzisa umkhumbi wokumba endaweni okumbiwa kuyo	Ukuqikelelela ukuthi kuhanjwa ngokuphepha	- Ukugwema ukuba kungashayiswana phakathi kwethimba elimbayo nemikhumbi esekelayo kumelwe babonise izimpawu emini kanti ebusuku kumelwe babonakale ngezibani (kuhlanganise nokukhanya kwelanga), ngomshini obonisa izinto ezikukakile neminye imikhumbi egade indawo ephephile. - Ukunakekela indlela yokukhanya emkhunjini nasemkhunjini osekelayo ukuze kuqinisekise ukuthi ikhanyisa ngendlela yokuba ibonakale kulabo emikhunjini edobayo futhi kusebenzeka ngendlela ephaphile. - Gcina izinga lokuqapha kwemikhumbi esizayo. - Akuhlale kugcinwe ibanga lokuphepha elingamamitha angu-500/ indawo egciniwe ezungeze umkhumbi ombayo. - Umkhumbi osekelayo, ufakwe umshini wokubona okukuzungezile okufanelekayo nezinto zokuxhumana zigcinwa zisebenza amahora angu-24. - Ukusebenzisa isibani noma into ebanga umsindo uma kunenkungu kungasetshenziswa uma kudingeka. - Sebenzisana nabanye abasebenzisa ulwandle ngokusemthethweni ukuze kuncishiswe ukuphazamiseka kweminye imisebenzi yasolwandle.	Ukumba/ izinkontileka zemikhumbi esizayo	Kuyo wonke umsebenzi	Bonisa amarekhodi anoma iziphi izigameko nokuxhumana neminye imikhumbi esizayo

Inombolo yesikhombo.	Imisebenzi	Izinhloso	Ukunciphisa / Ukuphathwa nokuThuthukisa Ukuzibophezela	Umthwalo	Isikhathi / Ukuphindaphinda	Izinto ezidingekayo ukuze kuqedelwe uMbiko
25.	Ukusebenzisa imishini yokumba endaweni yokumba nokuhambisa kwemikhumbi esizayo lapho iya noma isuka esikhumulweni	Ukunciphisa umonakalo wamanzi ngokubambisana nezimfuno ze-MARPOL 73/78	• Ukuhlukaniswa kodoti emthonjeni. • Ukuphinde kusetshenziswe udoti lapho kudingeka. • Ukunakekelwa kodoti emthonjeni (ukuthanjiswa kokudla osekungudoti, kwaqoqelwa kahle ndawonye, ukushisa, ukunakekelwa kokuthuthwa kwamanzi nokuhlukaniswa kwamanzi anowoyela). • Ukufaka umshini ozobonisa lapho kuvuza khona nohlelo lokulungisa izinto zokuvala, izinto zokuqinisa nezinto ezihlanganisayo nokunye.	Ukumba / nemikhumbi esekelayo	Phakathi nawo wonke umsebenzi	• Bonisa ibhuku amarekhodi omkhumbi osizayo • Ukubonisa irekhodi lencwadi mayelana nodoti / uhlelo kanye neziliphu
26.	Ukusebenzisa imishini yokumba endaweni yokumba nokuhambisa kwemikhumbi esizayo lapho iya noma isuka esikhumulweni	Indlela efanele yokuqondisa udoti	• Ukuhlukanisa, ukuhlela nokugcina wonke udoti onobungozi endaweni efanele emkhunjini ukuze kuqikelelwe ukuthi kuthwelwe ngokuphepha futhi kuthuthwa ngokuphepha. • Ukuthola indawo yokuhlela udoti ogciniwe nasendaweni ehlukele esikhungweni esisogwini. • Ukulahlwa kukadoti oyingozi esakhiweni esifanelekayo nezingokomtheth • Ukushisa udoti ongenabo ubungozi (iphepha, ukhuni, ikhathoni) kusetshenziswa into yokushisa eqinisekisiwe.	Ukumba / izinkontileka zemikhumbi esekelayo/ I-Eni	Kuwo wonke umsebenzi	• Ukubika izikhathi ezincane lapho kuchitheka khona uwoyela nendawo lapho kuzolahlwa khona udoti

Inombolo yesikhombo.	Imisebenzi	Izinhloso	Ukunciphisa / Ukuphathwa nokuThuthukisa Ukuzibophezela	Umthwalo	Isikhathi / Ukuphindaphinda	Izinto ezidingekayo ukuze kuqedelwe uMbiko
27.	Ukusebenza kwezindiza ezinophephela emhlane	Gcina futhi uqikelele ngokuphathelele nolwandle kanye nezilwane ezihlala ngasogwini	- Ukuphathwa Kwemvelo Kukazwelonke: UMthetho Wendawo Evikelekile (ka-2003) uthi izinga eliphansi elivumelekile ukuba izindiza zilisebenzise lapho zindiza ngaphezu kwemvelo elondiwe, indawo esolwandle evikelwe nezindawo zamagugu omhlaba, amamitha angu-762 . - Umthetho Wezinto Ezihlala Olwandle (ka-1998) wenqabela izindiza ukuba zisondele ngamamitha angu-300 endaweni enemkhoma. Ngaphandle kwalapho indiza izohlala phansi noma isuka emkhunjini wokumba nasesikhungweni esingokomthetho, kufanele ukuphakama kwendiza kube ngaphezu kwamamitha angu-300. - Ukusebenza kwezindiza esebenza ngamaphiko iqondiswa uMthetho Wezindiza (Ongunombolo 13 ka-2009) nemithetho ehlobene nayo.	Umphathi Ongokomthetho We-Eni nezinkontileka zeziNdiza	Zonke izindiza ezifika / ezisuka endaweni yokumba	- Ukuhambisa amakhophi ezindlela ezigunyaziwe zezindiza (kuhlanganiswe nezinga lokuphakama) - Ukubika abaqhelayo kulezi zindlela ezibekiwe zezindiza

Inombolo yesikhombo.	Imisebenzi	Izinhloso	Ukunciphisa / Ukuphathwa nokuThuthukisa Ukuzibophezela	Umthwalo	Isikhathi / Ukuphindaphinda	Izinto ezidingekayo ukuze kuqedelwe uMbiko
28.		Gcina futhi uqikelele ngokuphathelene nolwandle kanye nezilwane ezihlala ngasogwini	• Ukuhlela kusengaphambili indlela amabhanoyi azondiza kuyo ukuze kuqinisekwe ukuthi awekho azondiza ngaphezu kwe-IBA; • Ukugwema ukundizela phansi kakhulu kwezindiza ngasogwini (ukuphakama okungaba amamitha angu-914 ngaphakathi kwamakhilomitha angu-2 ngasogwini). • Kufanele kugcinwe izindiza ziphakeme ngamamitha angu-914 ngaphakathi Kwendawo Evikelekile Yasolwandle; • Bambisana ngokugcwele nenhlango ye-zindiza neziqondiso zabaphathi nemithetho; kanye • Nokwazisa abashayeli bezindiza mayelana nokuphazamiseka kwezilwane mayelana nokundizela phansi eduzane nogu noma ngaphezu kwezilwane ezisolwandle.			
29.		Umpakathi / Umsebenzi Wokuphepha Nempilo	• Ukubambisana nezindinganiso ze-Eni ze-H&S. • Izindiza kufanele zenqatshelwe lapho isimo sezulu sisibi.			
30.	Ukuqalisa ukumba umgodi	Vikela izilwane ezingaphansi kolwandle ezizwelayo	• Ukushintsha indawo yomthombo ukuze kugwenywe ukumba eduze noma lapho kukhona khona izingaba sengozini (ziboniswe kunhlolovo lwangaphambi kokumba lwe-ROV).	I-Eni / inkontileka Embayo	Ngaphambi kokumba	• Bonisa ubufakazi bezithombe zesimo sendawo esekujuleni kolwandle nge-ROV
31.	Ukumba umthombo	Vikela izilwane ezingaphansi kolwandle ezizwelayo	• Ukukhetha ngokucophelela uketshezi oluluthayo ucabangele nokuthi lunamandla kangakanani, ubuthi, isidakamizwa semvelo kanye nokukhiqizwa kwaso. Qikelela ukuthi kusetshenziswa kuphela into enobuthi	I-Eni/ inkontileka Embayo	Ngaphambi kokumba, phakathi nawo wonke	• Veza iphepha elibonisa imininingwan eyokuphepha kwezinto

Inombolo yesikhombo.	Imisebenzi	Izinhloso	Ukunciphisa / Ukuphathwa nokuThuthukisa Ukuzibophezela	Umthwalo	Isikhathi / Ukuphindaphinda	Izinto ezidingekayo ukuze kuqedelwe uMbiko
32.			obungenawo amandla amakhulu nengxenywe ye-biodegradable. - Sebenzisa ithuluzi eliqinile elisebenza kahla ukuze unciphise isidingo sokushintsha uketshezi noma ukunciphisa isilinganiso soketshezi olusele ezincwecweni ezisikiwe. - Kumelwe inakekelwe njalo into yokuphatha eqinile esemkhunjini. - Sebenzisa ithuluzi eliqinile elisebenza kahla ukuze unciphise isidingo sokushintsha uketshezi noma ukunciphisa isilinganiso soketshezi olusele ezincwecweni ezisikiwe. - Uketshezi lokumba kufanele kuthululwe olwandle (ngisho nezinto ezisele ezincwecweni ezisikiwe) kumelwe lusetshenziswe ekuhloleni ukugcola kukawoyela.		umsebenzi wokumba nangemva kwawo	(MSDS) iphepha elizosetshenziswa kumakhemikhali - Nikeza izilinganiso zoketshezi lokumba nokusikiwe nokulahlwa kukasimede - Bonisa ubufakazi bezithombe zesimo sendawo esekujuleni kolwandle nge-ROV
			- Ukunciphisa ukugcwala kukasimende phakathi nokumba ngokugada (kusetshenziswe i-ROV) okuchithekayo phakathi nokufaka usimende. - Sebenzisani kuphela into enobuthi obuncane engenawo amandla nengxenywe kasimende eluthayo ye-biodegradable.		Ngaphambi kokufaka usimende	
33.	Ukumbiwa komthombo	Ukunciphisa umonakalo emanzini asolwandle nasezilwaneni ezizwelayo	- Indlela i-Eni echitha ngayo i-WBM ihlanganisa: - Ukuchithwa kwezinto ezisikiwe ngebhokisi elingaphezu kwamamitha angaba u-15 ukujula. - Ukuchithwa kwezinto ezisikiwe emanzini ajule ngamamitha angu-30.	Inkontileka embayo	Phakathi naso sonke isikhathi sokumba nangemva kokumba	Ukunikeza isilinganiso soketshezi olusiza ekumbeni, izinto ezisikiwe nokulahlwa kukasimende

Inombolo yesikhombo.	Imisebenzi	Izinhloso	Ukunciphisa / Ukuphathwa nokuThuthukisa Ukuzibophezela	Umthwalo	Isikhathi / Ukuphindaphinda	Izinto ezidingekayo ukuze kuqedelwe uMbiko
			- I-Hg: isilinganiso esikhulu esiyikhilogremu elilodwa sesisindo seminerali. - I-Cd: isilinganiso esikhulu esingamakhilogremu angu-3 sesisindo seminerali. - Isilinganiso esikhulu se-chloride kumelwe sibe sincane ngezikhathi ezine zamanzi ahlanzekile noma amanzi anosawoti. - Noma imikhumbi iye ogwini. - Indlela inhlango ye-Eni echitha ngayo i-NADF esale ezincwecweni ezimbiwe ihlanganisa: - Ukuchithwa kwezinto ezisikilwe ngebhokisi elingaphezu kwamamitha angu-15 ukujula. - Ukuchithwa kwezinto ezisikiwe ngamanzi kuphela ngaphezu kwamamitha angu-30 ukujula. - Inhlanganisela ye-Organic Phase Drilling Fluid: isilinganiso esisele soketshezi olungelona amanzi lokumba (NAF) lungamaphesenti angu-5 (C16-C18 ngaphakathi ne-alkene) noma angu-9.4 (C12-C14 ester noma C8 esters) kulokhu okusikiwe okumanzi. - I-Hg: isilinganiso esikhulu esiyikhilogremu elilodwa sesisindo seminerali. - I-Cd: isilinganiso esikhulu esingamakhilogremu angu-3 sesisindo seminerali. - Noma imikhumbi iye ogwini.			

Inombolo yesikhombo.	Imisebenzi	Izinhloso	Ukunciphisa / Ukuphathwa nokuThuthukisa Ukuzibophezela	Umthwalo	Isikhathi / Ukuphindaphinda	Izinto ezidingekayo ukuze kuqedelwe uMbiko
34.	Umshini Okwazi Ukuhlola Phansi (VSP)	Ukuvikela izilwane zasolwandle ezihlala phakathi olwandle	- Qalani ukuhlola kwesikhathi esingangemizuzu engu-30 (ngaphambi kokuqala okulula) ngaphakathi nebanga elingamakhilomitha amathathu ukuze kuqinisekiswa ukuthi izinhlanzi ezinkulu azikhona phakathi nebanga elingamamitha angu-500 alapho kusetshenzwa khona emthonjeni. - Yenzani "isiqalo esilula" esiyimizuzu engu-20 noma ngaphansi phakathi nokuqalisa i-VSP. - Indlela "yokuqala elula" izoqala kuphela uma zingakabonakali izinhlanzi ezinkulu phakathi nesikhathi lapho kusengamiwa khona (okungamamitha angu-500 ukweluleka kwebanga kusukela emsindweni oqhamuka ngakuyi-VSP emthonjeni) phakathi nesikhathi sokuqalisa ukuhlola. - Kufanele kulokhu kuphonswa iso kuhlolwa ukuthi kuleli banga elingamamitha angu-500 zikhona yini izinhlanzi ezinkulu ezibonakalayo. - Cishani umsindo uma inhlanzi ibonakala phakathi nebanga elingamamitha angu-500 kuze kube isikhathi lapho isilwane sesihambe ibanga elingaphezu kwamamitha angu-500 ukusuka emthonjeni.	I-Eni/ Inkontileka embayo	Phakathi nesikhathi se	Vezani amarekhodi anenani lezilwane eziboniwe (kuhlanganise nokuziphatha kwazo okungavamile)
35.	Lapho imbobo yomthombo ikhona endaweni eqinile olwandle	Ukunciphisa ubungozi bokufikelwa izilwane okungezona ezendawo olwandle	- Qikelela ukuthi zonke izingqalasizinda (ngokwesibonelo imbobo yomthombo, i-BOP and guide bases) ezisetshenzisiwe kwezinye izindawo ziyahlanziswa ngaphambi kokuba zisebenze lapha eNingizimu Afrika. - Gwema ukuba khona noma ukugcwala kwezilwane ngalapho kuqaliswa khona uhlelo lokuqondisa amanzi.	Inkontileka	Ngaphambi kokuhambi sa imishini	Ukuqinisekisa ngokubambisana nokubonisa noma yini ekhishiwe

Inombolo yesikhombo.	Imisebenzi	Izinhloso	Ukunciphisa / Ukuphathwa nokuThuthukisa Ukuzibophezela	Umthwalo	Isikhathi / Ukuphindaphinda	Izinto ezidingekayo ukuze kuqedelwe uMbiko
36.	Ukumba Umthombo	Ukuvikela izilwane zasolwandle nezivakashi ezisogwini ngokwenza into yokucine uwoyela, amakhemikhali nezinto eziwuketshezi	- Ngaphambi kokumba, hlolani ngokugcwele i-BOP kulabo abambayo ngokuvumelana nalokho okusetshenziswa yi-American Petroleum Industries (noma elingana nayo) . - Bonke abantu abasebenzayo kumelwe kube ukuthi baqeqeshwe ngokwanele kokubili ekugwemeni ingozi nokuthatha isinyathelo ngokushesha. - Ukuqapha nokuqondisa izilinganiso ngokuvumelana nalokho okumelwe kwenziwe emthonjeni ukuze kulawulwe nokuba kusizwe ekuhloleni nasekulawuleni izinto eziphumayo ezingalawuleki. - Hlolani futhi ninakekele wonke amakhemikhali / izinto ezilondoloza izinto eziwuketshezi kuhlenganise namathangi kaphethroli namathangi oketshezi olusiza ekumbeni okusemkhumbini osizayo. - Ukuthuthukisa Uhlelo Lokulawula Izinto Ezingaqinisekile Emthonjeni (WCCP) umthombo ngamunye.	I-Eni/ inkontileka Embayo	Ngaphambi naphakathi nokumba	Bonisani into eqinisekisa noma efakazela ukuthi ihloliwe i-BOP kwenziwa nalokho okungaqondisa lapho kuba nobungozi
37.	Ukumba Umthombo	Ukuvikela izilwane zasolwandle nezivakashi ezisogwini ngokwenza into yokucine uwoyela, amakhemikhali nezinto eziwuketshezi	- Lapho kuba khona okuchithekile sebenzisani i-OSCP ne-ERP - Uma kwenzeka kuba nokuchitheka kukawoyela okungabanela ingozi enkulu emphakathini, ngokushesha, yazisani abaphathi abafanele nethimba lezimo eziphuthumayo. Nakhu ukwazisa okudingekayo lapho nibika ngokuchithekile: - Uhlobo nesimo sesigameko, uhlobo lomkhumbi, isikhumulo okubhaliswe kuso, ummeli oseduze omele inkampani yomkhumbi.	I-Eni nezinkontileka (kuhlenganise nemikhumbi esekelayo)	Izimo lapho kube khona ukuchitheka okukahle nokukhulu	Amarekhodi akho konke okuchithekile (Ibhujulu LokuBhala Okuchithekile), kuhlenganise umbiko wokuchithekile; umbiko wokwenziw

Inombolo yesikhombo.	Imisebenzi	Izinhloso	Ukunciphisa / Ukuphathwa nokuThuthukisa Ukuzibophezela	Umthwalo	Isikhathi / Ukuphindaphinda	Izinto ezidingekayo ukuze kuqedelwe uMbiko
			- Indawo ethe ngqo leso sigameko esenzeke kuyo, ibanga uma ungena olwandle nokuthi kuchitheke indawo engakanani. - Isimo sezulu ebesikhona, isimo solwandle endaweni ethintekayo (indawo umoya obheke ngakuyo nesivinini sawo namagagasi). - Abantu noma iziphathimandla sezitsheliwe kakade ngalokho okuchithekile. - Ngokushesha sebenzisa futhi nihlele i-OSCP ; ukuqondisa umonakalo nokuthola amathuluzi, imishini nabantu abasebenzayo (ngokwesibonelo into yokuwola uwoyela, izinto ezintantayo ezingathwala uwoyela ochithekile, imishini yokufutha ikhemikhali olwandle, izinto zokuvala) - Nakekela indlela uwoyela ochithekile ohamba ngayo olwandle (usebenzisa ithulusi lobuchwepheshe lokuhlola uwoyela ukuthi ugelezela kuphi nento elinganisa ukuchitheka kukawoyela ukuze kutholakale imininingwane) ukuze kucatshangelwe amathuba okuthinteka kwendawo esogwini futhi kuhlelwe ithimba lezimo eziphuthumayo eduze nogu nendawo ezigudla ugu			- e kuleso simo esiphuthumayo; umbiko wokuhlola izimali - Ibhuku lezigameko
38.	Sebenzisani izinto ezifanele ukuze nikwazi ukubamba izinto eziyingozi	Nciphisani umonakalo endaweni ngokuqala nisebenzise iziqondiso ngokuphumelelayo	- Qalisani i-OSCP ne-ERP. - Faka futhi uqeqeshe (ukusebenzisa kahle, ukuthumela iziqondiso). - Sebenzisa i-ERP ukuze ubhekane namakhemikhali achithekile.	I-Eni Embayo/ inkontileka yomkhumbi osekelayo	Izimo lapho kuchitheke khona kancane nalapho uchitheke khona kakhulu	

Inombolo yesikhombo.	Imisebenzi	Izinhloso	Ukunciphisa / Ukuphathwa nokuThuthukisa Ukuzibophezela	Umthwalo	Isikhathi / Ukuphindaphinda	Izinto ezidingekayo ukuze kuqedelwe uMbiko
39.	UkuHambisa, ukuGcina nokuSebenzisa Umshini Onemisebe Egijima Kakhulu	Gwema ukuchaya abantu nemvelo kulo mshini osebenzisa imisebe egijima kakhulu	Bambisana nemithetho edingekayo nezimfuno zezincwadi zokuhambisa, ukugcina nokusebenzisa lomshini onemisebe egijima kakhulu.	I-Eni Embayo/ inkontileka yomkhumbi osekelayo	Phakathi nawo wonke umsebenzi wokumba	Bonisani ikhophi yezincwadi nemiphumela yokuhlola njalo ithuluzi elikhipha imisebe egijima ngejubane elikhulu ukuze kubonakale izinga lokuvuza
40.	Ukuhlola umthombo	Nciphisa umonakalo ezingeni lomoya	- Ukukhetha ipayipi elikahle elifakwe into ekahle yokushisa ukuze kuncishiswe lokho okungashanga kahle, intuthu emnyama ne-hydrocarbon ewele olwandle. - Bhalani isilinganiso se-hydrocarbon esishile	I-Eni/ Inkontileka embayo	Phakathi nesikhathi sokuhlola umthombo	Veza amarekhodi e-hydrocarbon eshile
41.	Izinto eziwile	Umphakathi/ Umsebenzi WokuPhepha NeMpilo	- Ukubambisana nezindinganiso zenhlangotho ye-Eni ye-H&S - Ukuthola izinto (Uma kwenzeka) eziwele olwandle ngephutha.	I-Eni/ Inkontileka embayo	Phakathi naso sonke isikhathi sokumba nangemva kwaso	Ibhuku lezizameko
D) Ukubuyisela Imishini Emuva/ Nesigaba Sokuhoxa						
42.	Ukushiya umthombo	Ukuhlukanisa izinto ezikwazi ukudlula ne-hydrocarbon enalokho okulungisiwe kanye nokugwema ukuvuza	- Kufanele kuvalwe ngokuba kuthelwe usimende emthonjeni ngamazinga angafani. - Hlolani ukuthi umthombo uvaleke ngempela.	I-Eni/ izinkontileka	Lapho usuqediwe umsebenzi wokuma,	Vezani amaphepha afanele kanye

Inombolo yesikhombo.	Imisebenzi	Izinhloso	Ukunciphisa / Ukuphathwa nokuThuthukisa Ukuzibophezela	Umthwalo	Isikhathi / Ukuphindaphinda	Izinto ezidingekayo ukuze kuqedelwe uMbiko
			• Ekugcineni kufanele kufakwe nento ezovala umthombo nokuhlola kwe-ROV indawo engaphansi kolwandle ngemva kokuvalwa komthombo noma imithombo (“ukuhoxa”). • Indawo lapho kunomthombo khona oye kiwe kufanele ihlolwe bese kuboniswa ebalazweni nesehho visi le-HydroSAN.		ngemva kokuvalwa komthombo nokuwushiya (“ukuhoxa”)	ne-SAN Hydrographer
43.	Ukusuka kwethimba elimbayo nemikhumbi esekelayo endaweni obekumbiwa kuyo	Qiniseka ukuthi kuhanjwa ngendlela ephaphile	Yazisani bonke abathintekayo abasemqoka ukuthi ithimba elimbayo kanye nemikhumbi esekelayo abasekho kuleyo ndawo.	I-Eni	Emasontweni amane nje ngemva kokuqeda ukumba	Amakhophi adingekayo okwazisa
44.	Ukusuka kwethimba elimbayo nemikhumbi esekelayo endaweni obekumbiwa kuyo		Lahlani wonke udoti obusemkhunjini endaweni engokomthetho yokulahla udoti kusetshenziswa inkontileka engokomthetho esebenza ngodoti.	Ukumba/ nemikhumbi esekelayo	Lapho ithimba elimbayo/ nemikhumbi esekelayo sekusogweni	Kudingeka irisidi lodoti kulabo benkontileka

Ukuqapha kuzokwenziwa ukuze kuqinisekise ukuthi kuyahambisana yini nemithetho edingekayo nemisebenzi eboniswe kuyi-EMPr, kanye nokuhlola ukusebenza kwalo msebenzi wokuqondisa nokunciphisa izinyathelo.

Injongo eyinhloko yohlelo lokuqapha kuzoba:

- Ukuhlanganisa, ukubhala nokuhlaziya imininingwane, ukulawulwa nezinhloso ze-EMPr;
- Ukuqinisekisa lokho okubikezelwe neziphetho ezenziwe i-EIA;
- Phawula ushintsho olukhona kuyimvelo nezinto ezisabelayo ekukhanyeni nasekushiseni;
- Bonisa imininingwane yokuhlola indlela imvelo eyenza ngayo njengoba kuboniswe kuyi-EMPr;
- Bonisa imininingwane mayelana nezimo eziphuthumayo ezidinga ukusukunyelwa ngokushesha;
- Thola imininingwane emonakalweni ongaba khona kuyimvelo ngenxa yokwenza imisebenzi yokuhlola;
- Sebenzisa imiphumela yokuqapha njengomthombo wemininingwane kanye nento ezosiza ekwenzeni izinqumo mayelana nokuklama izindlela zokunciphisa ezintsha; kanye
- Nokuchaza ukuthi kuchitheke into engakanani ngesikhathi kuhlolwa, ebangele umonakalo olwandle.

Ukuqapha akuhlanganisa nje kuphela lokhu okulandelayo:

Ithebula 9.8 Imisebenzi Yokuqapha

No.	Izici	Iziqondiso okufanele ziqashelwe	Isikhathi / Nokulandelayo
1	Ukuzwela kwendawo engaphansi kolwandle nezinga lenzika	• Izinto eziqinile ezingaphansi kolwandle namatshe angamadwala • Uhlobo nenani lezilwane ezingaphansi kolwandle • I-Granulometry, i-hydrocarbon, izinsimbi nezinto eziyigugu ezingaphansi kwamanzi ekujuleni	Ngaphambi kokumba nakanye phakathi nomkhankaso
2	Inqwaba yamanzi ngaphambi kokufika kuleyo ndawo	• Isilinganiso esichithiwe, ukunakekela nendawo ngokubambisana nezindinganiso ze-MARPOL 73/78	Ngaphambi/phakathi nokduring first de-ballasting in country
3	Uketshezi lokumba	• Isilinganiso esisemkhunjini • Isilinganiso esisetshenzisiwe	Nsuku zonke phakathi nomsebenzi wokumba

No.	Izici	Iziqondiso okufanele ziqashelwe	Isikhathi / Nokulandelana
		- Isilinganiso esichithiwe - Ubuthi, ukungcolisa kwento enjengekhristali, ukuba namandla kwe-Organic Phase Drilling Fluid (NADF), ukuba namandla kwe-chloride (WBM-brine)	
4	Usimende	- Isilinganiso esisetshenzisiwe nesilinganiso sosimende ochithiwe emkhunjini nasolwandle phakathi nesikhathi sokufakwa kwensimbi ende - Qapha izinsalela zosimende, kuyekwe ukufakwa usimende uma izinsalela zibonakala endaweni engaphansi yolwandle	Phakathi nesikhathi sokufaka usimende
5	Amakhemikhali nenzinto ezinobungozi	- Amakhemikhali kasimende nokuluthayo - Isilinganiso esibekiwe - Isilinganiso sokuchithiwe	Nsuku zonke phakathi nesikhathi sokumba
6	Isinto esisikwe ngesikhathi kumbiwa	- Isilinganiso sokuchithiwe - Uwoyela ezintweni ezisikwe ngesikhathi kumbiwa	Nsuku zonke phakathi nesikhathi sokumba
7	Into yokuchitha amanzi ophahleni /Indawo yemishini /amanzi angcolile	Indlela efanele yokusingatha ukuhlukaniswa kukawoyela nendawo yokugcina uwoyela (ngokubambisana nezindinganiso ze-MARPOL 73/78)	Ngaphambi kokumba nakanye phakathi nomkhankaso
8	Ukuchithwa kwendle	Indlela efanele yokusingatha ukunakekelwa kwendle (ngokubambisana nezindinganiso ze-MARPOL 73/78)	Ekuqaleni nakanye phakathi nomkhankaso
9	Ukudla okudinga ukulahlwa	- Uhlobo nesilinganiso salokho okuzochithwa - Indlela efanele yokukulahla (ngokubambisana nezindinganiso ze-MARPOL 73/78)	Nsuku zonke phakathi nesikhathi sokumba
10	Udoti ovamile	- Uhlobo nesilinganiso sodoti otholakele - Uhlobo nesilinganiso salowo ozohanjiswa ogwini ezindaweni zokulahla - Ngokubambisana noHlelo Lokulawula uDoti	Nsuku zonke phakathi nesikhathi sokumba
11	Udoti oyingozi	- Isilinganiso sodoti otholakele - Isilinganiso sohanjiswa ogwini uyolahlwa - Ngokubambisana noHlelo Lokulawula uDoti	Nsuku zonke phakathi nesikhathi sokumba
12	UPhethroli osetshenzisiwe	- Uhlobo nesilinganiso sokhona emkhunjini - Isilinganiso sogciniwe	Nsuku zonke phakathi nesikhathi sokumba
13	Izingozi zokuchitha kukawoyela namakhemikhali	- Uhlobo - Isilinganiso - Bambisana nenhlango ye-Shipboard Oil Spill Emergency Plan	Nsuku zonke phakathi nesikhathi sokumba
14	Imithombo yomshini okhipha imisebe enejubane	Indlela efanele yokuwugcina emkhunjini phakathi nesikhathi sokuhambisa	Ekuqaleni nakanye phakathi nomkhankaso
15	Umshini Okwazi Ukuhlola Phansi	- Ukuhlola izilwane ezisolwandle bese kubhalwa umbiko - Isicelo se-JNCC njengabasebenza kahle.	Phakathi nesikhathi zokuqala ukubuka siqhubeke naphakathi ne-VSP

No.	Izici	Iziqondiso okufanele ziqashelwe	Isikhathi / Nokulandelana
16	Ukuhlolwa komthombo (ukugeleza kwawo)	Isilinganiso soketshezi lwe-hydrocarbo	Nsuku zonke phakathi nesikhathi sokuhlola umthombo
17	Izinto Eziwile	- Ukuba nohlu lwezinto eziyingozi: - uhlobo lwensimbi olusale ngaphansi kolwandle - usuku lokushiya nolokulahleka - indawo; kanye - nosuku okwatholakala ngalo uma kudingeka	Nsuku zonke phakathi nesikhathi sokumba
18	Ukuphazamiseka/ ungenela kwabadobi/ imikhumbi ethutha izinto	- Ukuxhumana neminye imikhumbi esekelayo (nge-radio) - Inani lezikhalo nebhuku lokubhala izigameko	Nsuku zonke phakathi nesikhathi sokumba
19	Umthelela wezilwane zasolwandle	- Ukulimala noma ukufa kwezinyoni noma izilwane zasolwandle - Izinyoni ezisuka ogwini zizohlala emkhunjini ombayo	Nsuku zonke phakathi nesikhathi sokumba

9.11

UKUHLOLA

Ingxenye 34 YoMthethonqubo Yokuhlolwa Komonakalo Wemvelo (GNR R982/2014) umuntu ogunyazwiwe mayelana nemvelo kumelwe phakathi nesikhathi sokugunyazwa kwakhe mayelana nemvelo ne-EMPr, nohlelo lokuphothula, kumelwe aqhubeke esebenza:

- Ukuhlola ngokubambisana nokugunyazwa kwemvelo, i-EMPr nohlelo lokuphothula; kanye
- Nokuthumela umbiko mayelana nemvelo kubaphathi abadingekayo okuyi-Petroleum Agency yaseNingizimu Afrika (PASA).

Ingxenye 34 yomthethonqubo uphinde uthi umbiko wokuhlolwa kwemvelo kumelwe ulungiswe umuntu ozimele onekhono elidingekayo futhi kufanele ahlole bese ethumela kubaphathi abadingekayo ngesikhathi ezithile njengoba kubonisiwe. Lezi zikhathi akufanele zidlule iminyaka emihlanu.

Umbiko wokuhlola imvelo kufanele ube nayo yonke imininingwane eboniswe Esithasiselweni 7 SoMthethonqubo Wokuhlola Umonakalo Wemvelo.

10.1 ISINGENISO

Inhloso yombiko we-EIA wehlelo lokuhlongozwa kokuhlola okuhlongozwayo eBlock ER236 (12/3/236) ukuhlinzeka ngolwazi ukwazisa izinqumo ezizosiza ekuthuthukiseni imvelo nokuthuthukiswa okusimeme.

Inhloso yalo mbiko ukuhlinzeka ngolwazi nokuhlola okuzimele kwephrojekthi. Ukwenza kanjalo uMnyango WezeMithombo Yamaminerali (DMR) ukuba wenze isinqumo ngokuziphendulela kanye nesinqumo esifanele mayelana nokwazisa noma ukungahambisani nokugunyazwa kwemvelo mayelana nokuthuthukiswa okuhlongozwayo ngokoMthetho Wezokuphathwa Kwezemvelo kaZwelonke (NEMA) (uMthetho No. 107 ka 1998), 2014 (njengoba ichitshiyelwe ngo-2017).

Lo mbiko uzosiza futhi i-DMR ukuthi ichaze ngaphansi kwezimpi izimo ukuthuthukiswa okufanele kuqhubeka uma ukugunyazwa kunikezwa. Ekucubunguleni isimo se-intuthuko ehlongozwayo, akunakugwemeka ukuthi kuyoba nemithelela ethile engalungile yemvelo. Kodwa-ke, izinyathelo zokunciphisa zenzelwe lokhu futhi zingatholakala kwi-Environmental Management Program (EMPr, Isahluko 9).

Inhloso yemisebenzi yokudoba okuhlongozwayo ihlongozwa ukuthi kutholakale ukuthi kukhona ama-hydrocarboni anele ngaphansi kolwandle ukuze aqinisekise ukuthuthukiswa okuqhubekayo. Ukuphumelela kokuhlola kuzobangela izinzuzo zesikhathi eside eNingizimu Afrika, kufaka phakathi ukutholakala kwemithombo yamandla amasha, ukuphepha okuthuthukisiwe kokunikezwa, ukutshalwa kwezimali ezweni ngaphakathi kwiprojekthi yentuthuko (kufaka phakathi ukudala amathuba emisebenzi), ukwandisa izimali zikahulumeni, umnikelo ekukhuleni komnotho nokunciphisa ukuxhomekeka ekungenisweni kwama-hydrocarbons.

Ngenqubo ye-EIA, eyayihlanganisa abathintekayo kanye nokwaziswa okukhethekile, i-ERM iye yabona futhi yahlola impendulo engaba khona ephathelene nemisebenzi ehlongozwayo. Ukubukeza okufushane okutholakele kwenqubo ye-EIA, ikakhulukazi labo abanesilinganiso sokubaluleka okukhulu kunamanyathelo okunciphisa nokunciphisa okukhulunywa ngawo ngezansi.

Ngokuphathelene nezinye izindlela ezihlukahlukene ezicatshangelwa iphrojekthi ehlongozwayo, i-No-Go engenazo ayifaki ushintsho esimweni se-status. Lokhu kusho ukuthi imisebenzi yokuhlola yokudoba ehlongozwayo ayengeke ivele ku-Block ER236.

Inketho yokungaqhubeki nokuhlola ukuhlolwa noma ukuhlolwa kwe-appraisal izoshiya indawo yezindawo zokudoba ezingase zibe khona esimweni sabo samanje esingokwemvelo, kanye namandla okusebenza ngamafutha / negesi awakwaziwa.

Naphezu kwentuthuko eminingi ekuthengeni kwedatha kanye nokuhlaziywa kwedatha, okwamanje azikho ezinye izindlela ezikhona zokwenza ukutholakala kwemithombo ye-hydrocarbon ngokuqiniseka ngaphandle kokuhlola nokuhlola ukuhlolwa. Ngakho-ke ezinye izindlela ezenziwa umsebenzi ziye zahlolwa.

Nakuba izindawo ezinhle zizophothulwa ngokusekelwe eziningana zezici kuhlenganise nokuhlaziya okuqhubekayo kwedatha yesimo sezulu; i-target geological; futhi, izithiyo zasolwandle. Ukuhlolwa komthelela (Isahluko 7) kubheka ukuthi emithonjeni ingahle ikhonjwe kuphi ezindaweni ezingasenyakatho naseningizimu ezithakazelisayo. Imithelela ehambisana nesisekelo sezinto ezinokuthi kungenzeka sibekwa eRichards Bay noma eThekwini.

Umkhumbi wokudoba okhethwayo ka-Eni ungumgogodla webanga lokungena kude ukusuka ogwini, izinkinga zokujula kwamanzi nokutholakala kwawo, ukuguquguquka kwemvelo nokukhululeka kokuhamba. U-Eni uphinde ukhethe ukwelapha nokukhipha ama-cuttings e-offshore ngokuhambisana nezidingo zomhlaba zomhlaba wonke. Okokugcina, lo mbiko uhlola umthelela wokugaywa komthombo owodwa ngaphakathi kwendawo ngayinye yentshisekelo nganoma yisiphi isikhathi sonyaka futhi ngakho-ke ukucutshungulwa kwenkathi kuye kwacatshangelwa.

10.2 *UKWENZISWA KWEMIBUZO EZIQONDILEYO NOKUHLOLA*

Imithelela ehloliwe njengengxenye yalokhu Umbiko we-EIA yilabo kuphela, okwakubhekwa njengabalulekile. Yonke imithelela engeyona emanga yenziwa ngesikhathi sokuhlola.

10.2.1 *Imisebenzi ehleliwe*

Okufingqiwe kulesi sigaba kukhona impembelo emisebenzini ehleliwe ekhonjiswe ukuthi ibaluleke kakhulu ku-Minor nangaphezulu.

Imithelela evela emisebenzini ehleliwe enezinga elibaluleke kakhulu, okungukuthi lezo ezihlobene nokushiswa kwamafutha, ukugubha indawo yokuhlala olwandle kusukela ekukhuculweni kwe-muds kanye nokusika, umsindo owenzelwa izindiza-moya, kanye nokunye okunye okuxoxwa ngakho kuxoxwa ngakho okuqhubekayo.

Ukukhishwa kwamanzi kuzokwenzeka ikakhulukazi ekukhungweni kwamanye amazwe kanye neminye imikhumbi ehambisana nemisebenzi yokudoba. Inani elilingana le-CO₂ elindeleke ukuba likhishwe ngesikhathi sokudoba ngamathani angu-13,076.92. Nakuba ukungcoliswa komoya kwendawo kungenakugwema ngenxa yemvelo yephrojekthi, u-Enihas wazinikela ezinyathelweni ezithile zokuhambisana nokulawulwa okuhambisana nokuhambisana noMthetho we-MARPOL 73/78 we-Annex VI ngokuphathelelene nokunciphisa ukukhishwa kwe-NO_x, SO_x kanye ne-GHG emithonjeni yemishini.

Imithelela eyinhloko ehambisana nokulahlwa kwama-solid solids izobhukuda ngezilwane ze-sessile benthic (njengama-corals, uma ekhona), nokuguqulwa komzimba wendawo ye-benthic endaweni eseduze (<200 m) emthonjeni. Imiphumela yocwaningo lwe-cuttings yokusabalalisa okwenziwe njengengxenywe yale phrojekthi (i-ERM, 2018a) ibonise ukuthi imiphumela ye-cuttings ekhishwe yindawo yangakini. Imiphumela ehlabayo evela ekugayweni okukhishweyo iye yahlolisiswa ukuze ibe nomthelela wokuphakama okuncane kwi-benthic macrofauna yezidumbu ezingaxhunyiwe ezithintekayo.

Lokhu kungenxa yokuthi umthelela wendawo futhi ukutholakala kwemiphakathi ye-benthic kulindeleke phakathi neminyaka embalwa (eminyakeni emibili kuya kwemihlanu). Kodwa-ke, uma amakhorali amanzi ajulile atholakala ukuthi abekhona endaweni yenkampani ukuzwela kwabo ukubhebbhetheka kokuqothulwa kwama-solid is High. Ukuba khona kwabo akungaziwa kulezi zinzulu futhi kuzolinganiswa esigabeni sokuhlela se-ROV sokusebenza.

Kuthatha ukudluliselwa kwamagatsha phakathi kweTheku noma eRichards Bay kanti ukushayela kuyokwenza umsindo wezindiza, ochaphazela izinyoni zasolwandle ekukhuliseni amakoloni kanye nemigodi ogwini olusenyakatho. Izindiza ezisezingeni eliphezulu ezingaphezu kolwandle nazo zingathinta izilwane ezincelisayo zasolwandle namavolumu emanzini aphezulu endaweni yeProjekthi. Ngesikhathi sokudluliselwa, umqhubi wendiza uyodingeka ukuba ahambisane nemithetho edingekayo yaseNingizimu Afrika. Ngaphezu kwalokhu, izinyathelo zokunciphisa ezihambisana nokuphakama kwezindiza nezindlela ezithathiwe zihlongozwa ukunciphisa umthelela ngangokunokwenzeka.

I-No-Go ehlukile izoholela emiphumeleni emihle ehlobene neprojekthi ehlongozwayo engayitholakali. Lezi zimthelela ezinhle zibandakanya, kepha azikhawulelwanga, ukuhlukahluka kokuxuba kwamandla aseNingizimu Afrika, kwehla ukwethembeka kwamanye amazwe ngamafutha negesi kanye nokwakhiwa kwemisebenzi yendawo kanye nokutshalwa kwemali Ngokuyinhloko, ukhetho lokungaqhubeki nemisebenzi yokwenza imisebenzi yokuhlola Ukuvimbela i-ER236 kungaholela ekulahlekeni kwamathuba omnotho waseNingizimu Afrika.

Ithebula 10.1 Ukufingqwa kwemithelela ekhonjiswe emisebenzini ehleliwe (ngenhla i-Minor)

Umthelela	Ukulinganisa Kokubaluleka Kokuqala Kokunciphisa	Ukulinganisa Kokubaluleka Kokulandela Kokunciphisa
Umthelela wokulahla ama-muds kanye nokusika ama-cuttings ogwini olwandle olujulile lwamakhorali	Kusesilinganisweni	Kuncane
Imithelela ye-NADF ye-biochemical ehlobene nokugaya ama-cuttings kanye nama-muds ezilwaneni zasolwandle ezisemkhomeni wamanzi I-Minor Negligible	Kuncane	Ukunganaki
Ukuphazanyiswa kwezilwane zasolwandle ngokubamba imisindo efanelekayo emanzini angaphansi kwamanzi ahlobene nemisebenzi yokudoba	Kuncane	Kuncane
Imithelela yomsindo we-helicopter ehambisana nokugaywa kwezilwanyana zasolwandle ezilinganiselwe	Kusesilinganisweni	Kuncane
Imithelela ehlobene nokufinyelela okuvinjelwe ezindaweni zokudoba kanye nokulimala kwemishini ngenxa yokutholakala kwekhanda lomkhumbi olwandle oluthile Lincane	Kuncane	Kuncane
Imithelela yokuba khona kwekhanda lomthombo ngesikhathi elahliwe kwezinye izinto ezisolwandle	Ukunganaki	Ukunganaki
Umthelela wezinqubo ezihlukile ezingafanele	Kusesilinganisweni	Kusesilinganisweni

10.2.2 Imisebenzi engahleliwe

Okufingqiwe kulesi sigaba kukhona impembelelo emisebenzini engacatshangelwe eboniswe ukuthi inobungozi obuncane obuncane.

Ithebula 10.1 Ukufingqwa Kwezingozi Ezingaba Khona Nemisebenzi Engahleliwe Kanye Nobungako Bako

Umthelela	Ukulinganisa Kokubaluleka Kokulandela Kokunciphisa
Ukuchithwa kwe-hydrocarbon kusuka ekushayweni komkhumbi (ukulahlekelwa idizili) ezindaweni zokulahla olwandle nasogwini kanye nezinhlobo zezilwane (izinambuzane, izinhlanzi ze-pelagic nezibungu, nezilwane ezincelisayo zasolwandle nezifudu)	Kuncane (ALARP)
Ukuchithwa kwe-hydrocarbon kusuka ekushayweni komkhumbi ezindaweni zokudoba zasolwandle nasogwini kanye nezinhlobo zezilwane (izinyoni zasolwandle)	Kusesilinganisweni (ALARP)
Ukuchithwa kweoyela ngenxa yengozi ebusweni obungenazinambuzane, izinhlanzi, izilwane ezincelisayo zasolwandle kanye nezifudu (kufaka phakathi izinhlobo ngaphakathi kwama-MPA)	Kuncane (ALARP)
Ukuchithwa kweoyela ngenxa yengozi ezindaweni zasolwandle nasogwini kanye nezinhlobo zezilwane (izinyoni zasolwandle)	Kusesilinganisweni (ALARP)
Ukuchithwa kweoyela ngenxa yengozi ebusweni obungenazinambuzane, izinhlanzi, izilwane ezincelisayo zasolwandle kanye nezifudu (kufaka phakathi izinhlobo ngaphakathi kwama-MPA)	Kuncane (ALARP)
Ukuchitheka kweoyela ngenxa yengozi kwizinyoni zasolwandle	Kuncane (ALARP)
Ukulahlekelwa kwamanzi wokumba kanye nokusika ngenxa yokukhuphuka kokunqamula ukulahla ezindaweni zasolwandle nezinhlobo zezilwane (izinambuzane, izinhlanzi ze-pelagic nezibungu, nezilwane ezincelisayo zasolwandle nezifudu)	Kuncane (ALARP)
Ukulahlekelwa kwamanzi wokumba kanye nokusika ngenxa yokuphuthuma kokuphakama kokunqamula izinyoni	Kusesilinganisweni (ALARP)

Umthelela	Ukulinganisa Kokubaluleka Kokulandela Kokunciphisa
Ukulahlekelwa kwamanzi wokumba kanye nokusika ngenxa yokuphuthuma kokuphakama kokunqamula izilwane ezingenazinambuzane, izinhlanzi, izilwane ezincelisayo zasolwandle kanye nezifudu (kufaka phakathi izinhlobo ngaphakathi kwama-MPA)	Minor (ALARP)
Ukuchithwa kwamafutha ngenxa yokuqhuma noma ukufafaza idizili ekuhambeni kwezokuvakasha	Kusesilinganisweni (ALARP)
Ukuchithwa kwamafutha ngenxa yokuqhuma noma ukufafaza idizili ezindaweni zokudoba ezincane nezokuhlala	Kusesilinganisweni (ALARP)
Ukuchithwa kwamafutha ngenxa yokuqhuma noma ukufafaza idizili ekudobeni kokuzijabulisa	Kuncane (ALARP)
Ukuchithwa kwamafutha ngenxa yokuqhuma noma ukufafaza idizili ekudobeni kwezohwebo	Kuncane (ALARP)
Ukushayisana komkhumbi kubasebenzi bezempilo nokuphepha	Kuncane (ALARP)
Ukushayisana komkhumbi kwimpilo yomphakathi nokuphepha	Kusesilinganisweni (ALARP)

Ingozi yokuchithwa kwamafutha (kufaka phakathi amafutha angcolile kanye ne-diesel) emanzini omkhumbi ahambisana nawo wonke amaphrojekthi okuhlola amafutha kanye nokuhlola amazwe angaphandle. Amathuba (okungenzeka) okwehla okukhulu kwamafutha (okungukuthi lawo angakwazi ukufinyelela ogwini noma ezinye izindawo ezibucayi) kakhulu kakhulu lapho ukuchithwa kwamafutha amaningi kuncane kakhulu futhi kunemiphumela emkhawulo kuphela yemvelo.

Indlela yokubhekana nokulahleka kwamafutha angase kuthuthukiswe ukuthuthukisa ubuchwepheshe kanye nezinqubo zokusebenza ukunciphisa amathuba okuchithwa okwenzekayo, ngenkathi ngesikhathi esifanayo ehlela izimpendulo ezifanele ekuchithweni kwamafutha ukuze kuncishiswe ubukhulu bemithelela uma kwenzeka ukuchithwa. Izinqubo zokuphendula ziyingxenye yePlani yokuPhepha kwe-Oil Spill Plan (OSCP).

Kunezici eziningi zezici zokuklama nezinyathelo zokulawula eziye zaqalwa njengengxenye yesigaba sokuhlala umklamo wale phrojekthi ukunciphisa amathuba okuba nemicimbi yengozi. Ngaphezu kwalokho, izinyathelo zokuphatha ezikhona ezisetshenziswa ngu-Eni kwezinye izinhlelo zayo zokuhlola ukunciphisa ingozi yemicimbi yengozi izokwamukelwa kule phrojekthi. Lezi zinyathelo zitholakala eSahlukweni 9. Zonke izinyathelo zokunciphisa ezinconywe ezivezwe kulesi Sigaba zifakwe ohlelweni lwezokuphatha kwemvelo kule phrojekthi (Isigaba 9).

10.3

IZIMPENDULO

Phakathi nale nqubo ye-EIA, izinyathelo ezithile zokulawula zinconywe njengengxenye yeprojekthi yokuphatha impikiswano ekulindelwe. Lezi zinyathelo zokulawula ziye zancanywa, ngezinga elingahle lenzeke ku-Eni ngaphandle kokwehlisa ukusebenza komnotho wephrojekthi.

Lezi zinyathelo zokulawula zibuye ziqinisekise ukuthi iphrojekthi ihambisana ngokugcwele neMithethonqubo yaseNingizimu Afrika kanye nezinqubomgomo zomhlaba wonke, izinhlaka kanye nemikhiqizo engcono kakhulu ngesikhathi sokusebenza kwayo.

Ngaphezulu kwezilawuli eziphakanyisiwe, ukunciphisa nokulawulwa kwezinyathelo ziye zabhalwa futhi zakha ingxenye ye-EMPr eyenziwe ngalokhu Umbiko we-EIA.

Zonke izinciphiso ezibalulwe ku-EMPr zinconywa ukuba ziqaliswe ngesikhathi sephrojekthi ukuqinisekisa ukuhambisana nokuthelela okungalungile okuhlobene nokusungulwa kweprojekthi zilandelwa ngokulinganayo ezingeni elibhekwa njengelanele ukuba iphrojekthi iqhubeke.

Ngokufingqiwe, ngokusekelwe ekutholeni kwalokhu kuhlola nokucabangela izinzuzo le misebenzi eyenza umnotho waseNingizimu Afrika, i-ERM inombono wokuthi imisebenzi yokuhlongozwa okuhlongozwayo e-Block ER236 ukucacisa ukuthi kukhona ama-hydrocarboni anele ngaphansi kolwandle ukuqinisa ukuthuthukiswa okuqhubekayo, kufanele kugunyazwe. Nokho, lokhu kuhambisana nokuqaliswa kwezinyathelo zokunciphisa nokuqapha.

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