Fix infrastructure instead of social spending

LONDIWE BUTHELEZI

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"The municipal roads were bad. Their trucks experienced tyre bursts all the time. The municipality overcharged them for rates and taxes," said Mboweni. He added that Clover was ready to close its business if it could not relocate to Durban. If he were president, Mboweni said, his priority would be fixing bad roads and infrastructure, and cleaning up municipalities.

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While there are several structural reforms the country needs - including reconfiguring the country's energy mix because "Eskom is a major constraint to economic performance" - there are also simple things government is failing on.

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Refocus

He said there are many other "basic factors" that government needs to refocus its attention on, including actually investing in infrastructure again rather than just talking about it.

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Mboweni said given South Africa's unemployment time bomb, the country needs to invest in infrastructure, which is a huge creator of jobs in the construction sector.

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Tourism & Agriculture Conservation

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Africa's tourism operators need local visitors

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Supporting the domestic market in African countries is now more important than ever, according to Hermione Nevill, a tourism expert with the International Finance Corporation (IFC), a World Bank Group partner organization.

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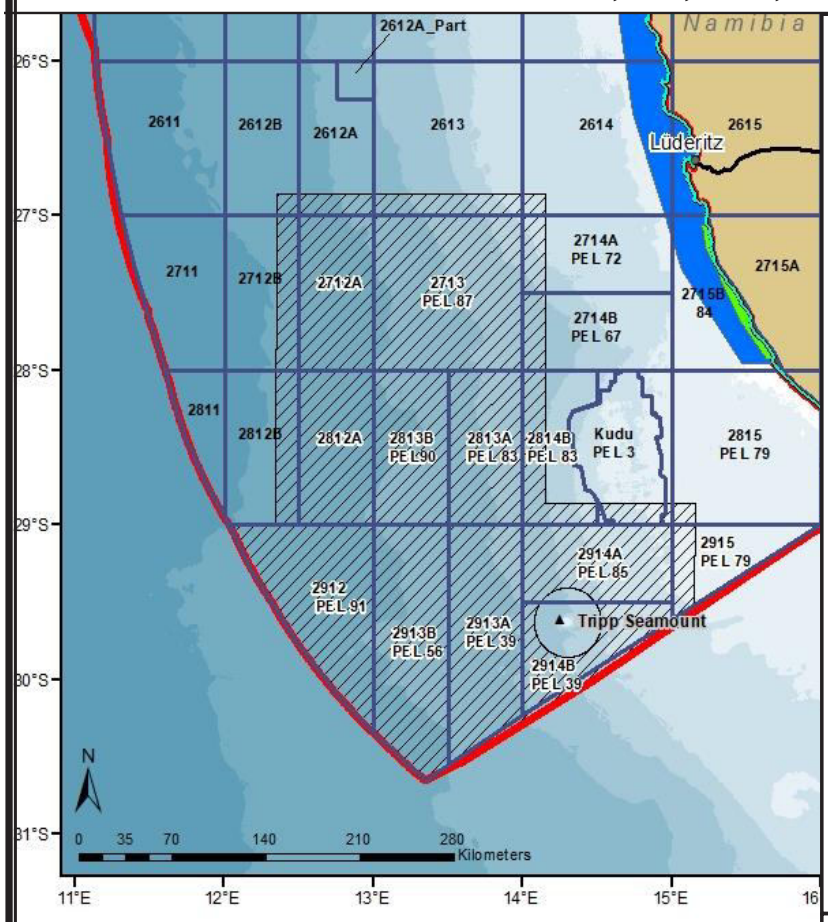
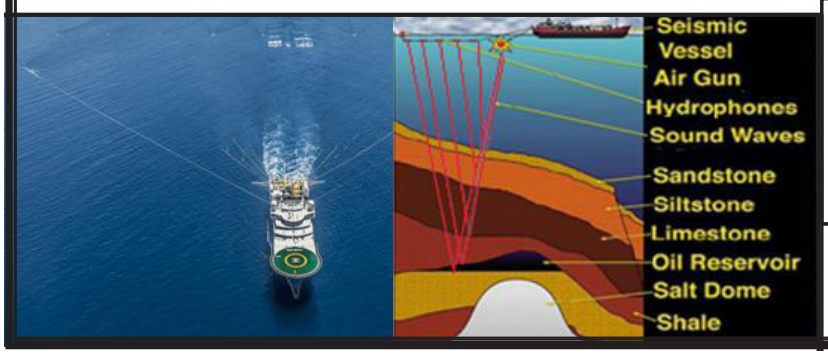
Searcher

PUBLIC NOTICE FOR APPLICATION FOR ENVIRONMENTAL CLEARANCE CERTIFICATE (ECC)

Searcher Geodata UK Ltd (the Proponent) - Application for Environmental Clearance Certificate (ECC) for the Proposed Multiclient 3D Seismic Survey Operations Area covering Blocks 2614, 2613, 2612A, 2612B, 2714A, 2714B, 2713, 2712A, 2712B, 2812B, 2813A, 2814B, 2814A, 2912, 2913B, 2914B, 2914A and 2915, Orange Basin, Southern Offshore Namibia





Searcher Geodata UK Ltd is proposing to conduct Multiclient 3D offshore seismic survey covering approximately 77270 km^2 of operational area over Blocks 2614, 2613, 2612A, 2612B, 2714A, 2714B, 2713, 2712A, 2712B, 2812B, 2813A, 2814B, 2814A, 2912, 2913B, 2914B, 2914A and 2915 (excluding Tripp Seamount), with water depth ranging from ca-200m to ca-4000m from east to west respectively. The overall aim of the proposed 3D seismic survey operations is to map the subsurface of the targeted areas as shown on the map in support of the ongoing petroleum exploration activities in the Orange Basin, offshore southern Namibia. Although offshore seismic surveys operations in Namibia began as far back as 1968, a lot more still need to be done to have a full understanding of the petroleum systems offshore Namibia. The datasets from the proposed multiclient 3D seismic survey operations will provide critical insight into the subsurface geological evolution, offshore basin architecture, depositional, structural history and delineate potential drill-ready subsurface geological structures.

Seismic survey is a key tool that resources companies exploring for hydrocarbons (oil and natural gas) uses to map the subsurface and kilometres below the ground either on land (onshore) in the marine (offshore) environments and reduce the risk of drilling dry wells and improve the chances for commercial discovery. In offshore environment, the vessel towed airguns (energy source) release compressed air to generate seismic acoustic signals at regular intervals. The controlled generated acoustic waves that travel deep into the earth is reflected by the various rock formations of the subsurface below the seafloor, and returns to the surface where it is recorded and measured by receiving devices called hydrophones. By analysing the time, it takes for the seismic waves to travel between the rock formations and the surface, geophysicists, geologists, and petroleum engineers use sophisticated software to create subsurface images /maps showing potential drill-ready subsurface geological structures called reservoirs that may contain commercial hydrocarbons resources.

The proposed multiclient 3D seismic survey will be conducted using MARPOL / Namibian Maritimes Laws compliant vessels and adopt international best practices such as seasonality and survey implementation timing, establishment of buffer zones, use of Marine Mammal Observers (MMOs) &Fisheries Liaison Officers (FLOs), use of Passive Acoustic Monitoring (PAM) technology, soft starts' and 'pre-firing' observations, termination of firing in the 500m exclusion zone and use of turtle friendly tail buoys. The proposed 3D seismic survey activities cannot be undertaken without an Environmental Clearance Certificate (ECC) as required by the Environmental Management Act, 2007, (Act No. 7 of 2007) and the Environmental Impact Assessment (EIA) Regulations 30 of 2012. In fulfilment of the environmental requirements, the Proponent has appointed Risk-Based Solutions (RBS) CC as the Environmental Consultant, led by Dr Sindila Mwiya as the Environmental Assessment Practitioner (EAP) to prepare EIA and EMP Reports to support the application for ECC. All Interested and Affected Parties (I&APs) are hereby invited to register and submit written comments / objections / inputs with respect to the proposed multiclient 3D seismic survey operations covering the Orange Basin, offshore southern Namibia. A Background Information Document (BID) is available on request upon registration as a stakeholder / Interested and Affected Party (I&AP).

REGISTER BY EMAIL:emerita.ashipala@gmail.com, **Atte: Ms Emerita Ashipala**, RBS Senior Consultant
For more Information Contact Dr Sindila Mwiya Email: smwiya@rbs.com.na

THE FOLLOWING PUBLIC MEETINGS ARE PLANNED

1. Lüderitz-Wednesday 11th May 2022 14hrs30-17hrs30, Venue: Lüderitz Benguela Community Hall
2. Oranjemund-Friday, 13th May 2022, 10hrs-13hrs00, Venue: Zakaria Lewala Hall

DEADLINE FOR REGISTRATION & SUBMITTING WRITTEN SUBMISSIONS IS: FRIDAY, 27th MAY 2022

Risk-Based Solutions (RBS) CC (URL: www.rbs.com.na)
Your De-risking, Permitting and Environmental Assessments & Management (SEA, EIA, EMP, EMS, ESG)
Specialist Consultants in Resources (Oil, Gas, Minerals & Energy Exploration, Production & Mining)

New Era Rukwangali

50 000 kugwana mauwa moOshikoto melikwamo lyokugwana nondja kosure

■ **Festus Hamalwa**

Nosuredokusikako203 konosure do junior omu avagwana usura momukunda gwaOshikoto mukurona gerongo, nositambo sakahurako mokugava nondja kovanona mezuva.

Elikwamo eli lyokugava mauwa aga, konyara vanona vana kugwanenamo mauwa 51706vakara asi momukunda horowero gwina.

Mukurona gerongo momukunda gwina Aletta Eises kayinkondopekere asi vanona ngesi kuna kugwana nondja dawo, eyi yina kuninkisa asi vanona tavagwana nondja vakapurakene unene omu vana kuvaronga ntani kuna kuwiza kosure nkenye ezuva.

Age katente asi nkenye sineme sosure, mberewa zendi kugavera nonsako dousura konosure dakara kutamekera ntambo dunge zimwe dogoro ntambo ndunge zomuyu.

Petameko tupu lyosinema sosure, nomukunda horowere gona nadinye kwagwene nonsako dousura ou navakapa vanona ndi asi varongwa.

''Ose ngesi kuna kara tupu nosure zimwe tupu zina pilire kugwana usura wazo, morwa sure ozo kapi zina kara nevango oku nakapungura usura wawo ou. Ntani sure oso kapi zina kara yokuterekesa," yimo ana kutanta Eises.

AgekagwederekoasiOniipa primere school kwakara novanona 500 kuhetakanesa nonosure dimwe.

Makura kuninkisa nye asi usura ou ava gwana unzi kupitakana nosure nonkwawo.

'' Imboto primere School kwazipa nonsako 30 dousura morwa vanona vakara posure ozo sisesu. Kuna kumoneka nawa nawa asi egavero nonsako kukwama sivaro sovanona vakara posure ozo," Eises yimo ana kuyizeresa ngoso.

Nosure dimwe ngwendi Oshinamumwe primere School kuna kara ngesi nosikuninogona savene omu ava zangura nondja, omu yakara asi kuvatera mberewa zendi morwa vanona kuzangura nondja davene vagwederereko.

'' Vana farama vakara asi momudingonoko gwaTsumeb nawo kuvatera unene omu ava gava nondja konosure doku lisiga siga pwavene, yimo ana kutanta Eises.

Age katente asi udigu ou vana kumona unene konosure kapi vana kara nomavango gokutura nondja, nye ngesi kuna kara nelikwamo lyokutunga nonkondwa rongero vatureko dimwe asi omu navadiruganesa.

''Ame kuna kuhundira vanangesefa nonokampani peke omu nava vatera nosure mokugavera ntani kudikako nonkondwa rongero dimwe eyi yina kara asi udigu wakauhurako posiruwo esi tuna kara ngesi una kara konosure detu," yimo ana kuhuyunga ngoso mugendesi gerongo momukunda.

Kira zomoOkahandja zazonauka kutunda mwa Murongagona

■ **Rose-Mary Haufiku**

Kira zepangero zomodoropa zaOkahandja kuna kara ngeso makwedi gane zahana kurugana, mukaro nye ogu guna twaredere vanekoro varuganese kira ezi zakara asi zopaumwene, ezi vana kutanta asi kuvapura yimaliwa yoyinzi unene.

Mokukumbururako komasivano aga govatungimo morwa kuna kufuta yimaliwa yoyinzi, nguuru gomukunda Otjiwarongo James Uerikua katente asi siruwo esi soCovid mavango ogo gopaumwene kapi gana kupura yimaliwa ntudi nsene asi vanekoro kuna hara asi tavakaruganesa evango lyoolyo pokutwara simpu komayendo. Uerikua katente asi age kapi ana divako Yuma asi kira ozo kapi zina kurugana morwa kwato ogu gayimutantera.

Poopo nye ana kupura ntani ana kuzuvha asi kansela gomukunda nare gagwanekere noministeli zoyirugana ntani vagendesi womukunda woukanguki vagwana mbudi ezi.

'' Mberewa zange nazigusa udigu ou pangenderera omu vanahamenemo navenye vahepa kugenderera tuwapukurure mukaro ogo, nkenye gumwe ana hamenemo gahepa kutara asi yirugana eyi yahepa kuwapa ntani ntani yahepa kuwapa nkenye ezuva yivatere vantu vetu.

Mokukwama mwendi age Uerikua kuna kutanta asi kira ezi kapi zina kurugana morwa udigu woumakeninga ntani kuna kara asi zina kurupa makura asi ruha rumwe kapi runa kurugana eyi yina twaredere dogoro nazinye sipire kurugana.

Age simpe katente asi mukunda horowero ogu kuna kurugana asi nokira nadinye dahepa kurugana ntani, nsene kuvhura twahepa kudikako dimwe donompe monomukunda ngwendi Grootfontein na Okakarara.

'' Ame simpe kuna kuhundira asi nokira edi dahepa kuwapa ntani, ntani dahepa kuvatera vantu vana dihepa. Ntani owo vana kara nye nonokira davene vahepa nawo kuvatera epangero, yipo nye asi morwa mukaro gwangoso, kuna kuhundira venya nokira odo vavatere epangero moomu ava yirugana gana, yimo ana kutanta Uerikua.

Age simpe kazire komeho nokutanta asi evango lyokutendeka lyokuvhura kuturamo vantu 40 nare valihunditra mvhura zina puko, morwa kambumburu aka ko Delta Variant so Covid -19 esi sagumine unene mukunda gwina.

Mokupuragera mukurona gendesi pamberewa zoukanguki Ben Nangombe katanterere sayitunga za *New Era* asi ministeli kazigwene mbudi zangesi sivike kasipwire, nye nangesi tuna kuhunga nare twagwana kampani ezi naziyarugana yirugana oyo, mokugusapo udigu wangesi pangenderera.

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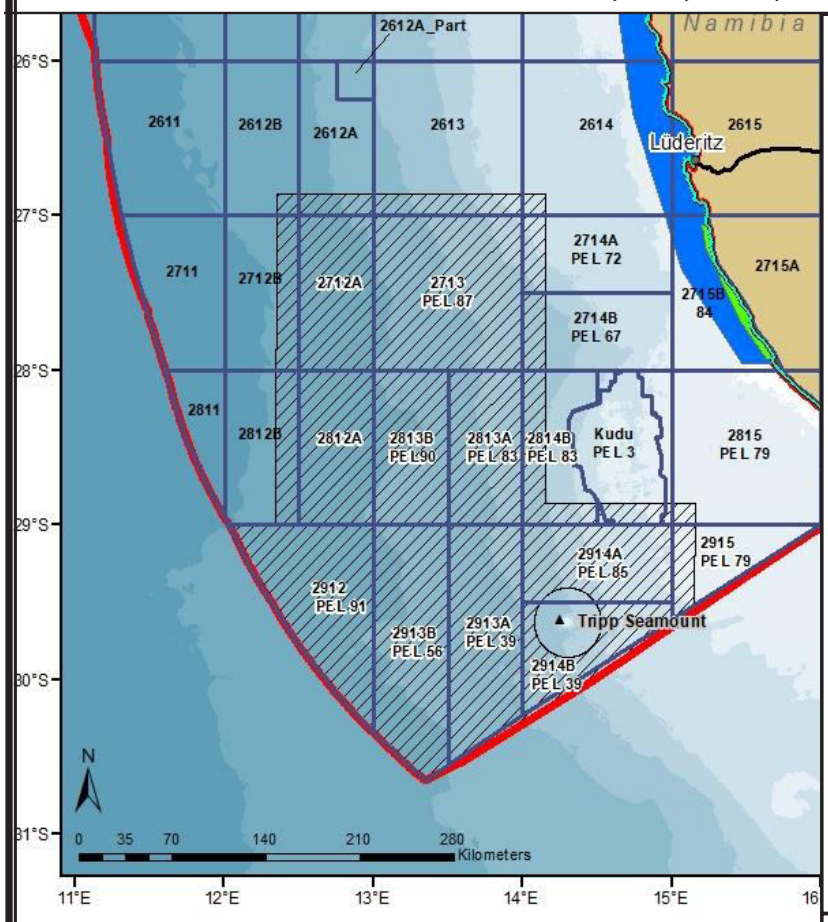
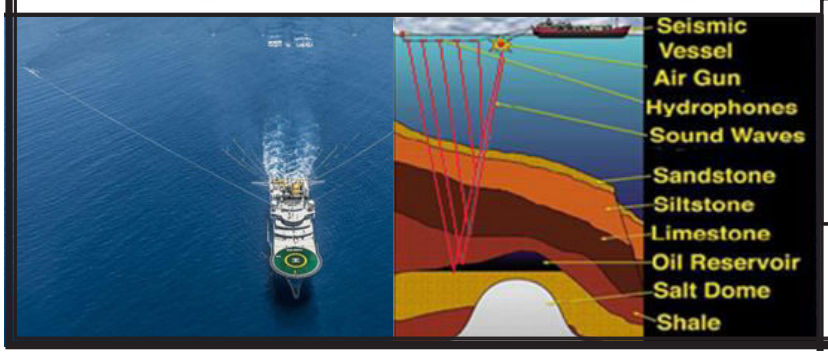
PUBLIC NOTICE FOR APPLICATION FOR ENVIRONMENTAL CLEARANCE CERTIFICATE (ECC)

Searcher Geodata UK Ltd (the Proponent) - Application for Environmental Clearance Certificate (ECC) for the Proposed Multiclient 3D Seismic Survey Operations Area covering Blocks 2614, 2613, 2612A, 2612B, 2714A, 2714B, 2713, 2712A, 2712B, 2812B, 2813A, 2814B, 2814A, 2912, 2913B, 2914B, 2914A and 2915, Orange Basin, Southern Offshore Namibia





Searcher Geodata UK Ltd is proposing to conduct Multiclient 3D offshore seismic survey covering approximately 77270 km^2 of operational area over Blocks 2614, 2613, 2612A, 2612B, 2714A, 2714B, 2713, 2712A, 2712B, 2812B, 2813A, 2814B, 2814A, 2912, 2913B, 2914B, 2914A and 2915 (excluding Tripp Seamount), with water depth ranging from ca-200m to ca-4000m from east to west respectively. The overall aim of the proposed 3D seismic survey operations is to map the subsurface of the targeted areas as shown on the map in support of the ongoing petroleum exploration activities in the Orange Basin, offshore southern Namibia. Although offshore seismic surveys operations in Namibia began as far back as 1968, a lot more still need to be done to have a full understanding of the petroleum systems offshore Namibia. The datasets from the proposed multiclient 3D seismic survey operations will provide critical insight into the subsurface geological evolution, offshore basin architecture, depositional, structural history and delineate potential drill-ready subsurface geological structures.

Seismic survey is a key tool that resources companies exploring for hydrocarbons (oil and natural gas) uses to map the subsurface and kilometres below the ground either on land (onshore) in the marine (offshore) environments and reduce the risk of drilling dry wells and improve the chances for commercial discovery. In offshore environment, the vessel towed airguns (energy source) release compressed air to generate seismic acoustic signals at regular intervals. The controlled generated acoustic waves that travel deep into the earth is reflected by the various rock formations of the subsurface below the seafloor, and returns to the surface where it is recorded and measured by receiving devices called hydrophones. By analysing the time, it takes for the seismic waves to travel between the rock formations and the surface, geophysicists, geologists, and petroleum engineers use sophisticated software to create subsurface images /maps showing potential drill-ready subsurface geological structures called reservoirs that may contain commercial hydrocarbons resources.

The proposed multiclient 3D seismic survey will be conducted using MARPOL / Namibian Maritimes Laws compliant vessels and adopt international best practices such as seasonality and survey implementation timing, establishment of buffer zones, use of Marine Mammal Observers (MMOs) &Fisheries Liaison Officers (FLOs), use of Passive Acoustic Monitoring (PAM) technology, soft starts' and 'pre-firing' observations, termination of firing in the 500m exclusion zone and use of turtle friendly tail buoys. The proposed 3D seismic survey activities cannot be undertaken without an Environmental Clearance Certificate (ECC) as required by the Environmental Management Act, 2007, (Act No. 7 of 2007) and the Environmental Impact Assessment (EIA) Regulations 30 of 2012. In fulfilment of the environmental requirements, the Proponent has appointed Risk-Based Solutions (RBS) CC as the Environmental Consultant, led by Dr Sindila Mwiya as the Environmental Assessment Practitioner (EAP) to prepare EIA and EMP Reports to support the application for ECC. All Interested and Affected Parties (I&APs) are hereby invited to register and submit written comments / objections / inputs with respect to the proposed multiclient 3D seismic survey operations covering the Orange Basin, offshore southern Namibia. A Background Information Document (BID) is available on request upon registration as a stakeholder / Interested and Affected Party (I&AP).

REGISTER BY EMAIL:emerita.ashipala@gmail.com, **Atte: Ms Emerita Ashipala**, RBS Senior Consultant
For more Information Contact Dr Sindila Mwiya Email: smwiya@rbs.com.na

THE FOLLOWING PUBLIC MEETINGS ARE PLANNED

1. Lüderitz-Wednesday 11th May 2022 14hrs30-17hrs30, Venue: Lüderitz Benguela Community Hall
2. Oranjemund-Friday, 13th May 2022, 10hrs-13hrs00, Venue: Zakaria Lewala Hall

DEADLINE FOR REGISTRATION & SUBMITTING WRITTEN SUBMISSIONS IS: FRIDAY, 27th MAY 2022

Risk-Based Solutions (RBS) CC (URL: www.rbs.com.na)
Your De-risking, Permitting and Environmental Assessments & Management (SEA, EIA, EMP, EMS, ESG)
Specialist Consultants in Resources (Oil, Gas, Minerals & Energy Exploration, Production & Mining)

MINUTES FOR MEETING FOR THE PROPOSED MULTICLIENT 3D SEISMIC SURVEYS BY SEARCHER GEODATA UK LTD, IN LUDERITZ, KHARAS REGION

Date: **Wednesday, 11th May 2022, 14h30**
Venue: **Benguela Community Hall, Lüderitz Town.**
Subject: **Proposed Multiclient 3D Seismic Surveys by Searcher Geodata UK Ltd (Proponent) Operational Area covering Blocks 2614, 2613, 2612A, 2612B, 2714A, 2714B, 2713, 2712B, 2712A, 2812B, 2813A, 2814B, 2714A, 2912, 2913B, 2914B, 2914A and 2915 (Excluding Tripp Seamount) with water depths ranging from ca-200m to -400m from East to West, Respectively, Deepwater Orange Basin, Offshore Southern Namibia.**

Meeting Commenced:	14:58
Meeting purpose:	1. The purpose of the meeting was to share information regarding the proposed Multiclient 3D Seismic Surveys by Searcher Geodata UK Ltd (Proponent) Operational Area of interest, (Excluding Tripp Seamount) with water depths ranging from ca-200m to -400m from East to West, Respectively, Deepwater Orange Basin, Offshore Southern Namibia. 2. Encourage community support, inputs and recommendations for proposed Multiclient 3D Seismic Surveys.
Attendance: Community/ stakeholders	See attached attendance register (Appendix A)
Key discussion:	After the acknowledgment of all present and the introduction of the delegation present, Dr. Sindila Mwiya gave a presentation on the proposed Multiclient 3D Seismic surveys (see attached Appendix B). The presentation included the following points of discussion: • Background review of Searcher Geodata UK Ltd Company. • Display and explanation of tenants on subsurface resources with different types of explorations and reconnaissance license on a Hydrocarbons Map of Namibia. • Background on petroleum (Oil and Gas) formation, and exploration.

	• Highlighted sedimentary basins around the globe and emphasized the basins in central and southern Africa and thereof further explained sedimentary basins in Namibia. • An overview of the historical perspective of seismic surveys in Namibia. • Brief explanation of the seismic survey, exploration, and Key AOI (Area of Interest). • Brief explanation of the offshore 3D Seismic Surveys and Compliance Requirements. • Brief explanation on the Environmental Assessment Process, EMA, 2007 and EIA Regulations 2012. • Brief explanation of the overview of marine Seismic Surveys, proposed 3D seismic survey, and energy source. • Well detailed explanation of the marine receiving environment, the sensitivity of the receiving environment, and the overlap between seismic coverage and other resources. • Explanation of potential positive and negative Impacts Assessment, the opportunity for coexistence. • Presented a video on seismic survey and mitigation measures • Summary of the offshore seismic survey mitigation measures. • Conclusions and recommendations.
Questions/concerns:	<u>The following are the questions posed by the community members and addressed by Dr. Sindila Mwiya.</u> **<u>Question 1: How many vessels are conducting the survey?</u>** The exploration area of interest is about 77270km^2, multiple vessels may be used depending on the demand for the survey data. **<u>Question 2: What are some of the negative effects of seismic surveys on the disturbance of fish species e.g., crayfish, hake, etc. We receive very low catches during minor vibrations/disturbances.</u>** It is important to note that 80% of the survey area fall in the deeper water with no crayfish or hake, etc. The potential negative impacts assessment is rated from major, moderate, minor, and none on the significance of impact severity and receptor characteristics (sensitivity). 1. The sources of the potential impact such as the physical presence of survey, support vessel, planned and unplanned marine discharges, accidents events e.g., loss of the vessel, collision with marine wildlife during vessel operations, and loss of marine gasoline oil (MGO), etc.,

	have been rated to have minor negative impacts on the biological environment. 2. The sound generated from the proposed 3D seismic survey airgun including the sound of the survey and support vessels have moderate impacts on the biological environment. 3. Overall, an Environmental Management Plan is complied with, which the government approves, and the company uses to mitigate the potential significant impacts of the proposed project. Overall, the proposed survey will coexist with other marine activities with no major negative impacts. **Question 4: How far does the sound travel?** Seismic airgun surveys penetrate hundreds of kilometres into the ocean floor, even after going through thousands of meters of ocean. **Question 5: Are the food availability/locations also considered as part of the potential impacts? It may be important to also consider getting information on the species distribution in the area, food for species, and breeding sites.** They could be considered however, there is limited information, especially in deep water where much for the survey area of interest is concentrated. Some mitigation measures may include the exclusion of key sensitive such as the trip seamount and the survey implementation window also considers both weather and environmental sensitivities such as key fishing seasons. For example, during the tuna fishing season around Tripp Seamount which take place from October to April, the survey activities will move to west in the Deepwater excluding the key fishing areas around Trip Seamount. **Question 6: What is the nearest distance to shore from a license block to be surveyed?** The nearest distance is estimated to be approximately 100-125 km from the shore. **Question 5: What is the allowed frequency for the seismic survey?** Most of the energy produced is in the range of between 0 - 120 Hz bandwidth, although energy at much higher frequencies is also produced and recorded. High-resolution surveys and shallow penetration surveys require relatively high frequencies of between 100 – 1, 000 Hz, while the optimum wavelength for deep seismic work is in the 10 - 80 Hz range. Marine species

	operate in different frequency ranges, with most being on the lower band. However, sound collision is mitigated by either having Marine Mammal Observer (MMOs) that keep watch on any mammals within a radius of 500m around the survey vessel. If marine mammals are sighted, the seismic survey may stop until such a time that the animals are further away. Another way is called the soft stater, where the airgun shoots by starting softly to allow momentum to be built, and for species to move away. **Question 6: What happens to the well after exploration drilling, do they leave it open or close it off?** This is very far from the seismic survey however wells are plugged/ sealed and handed over to the government as these are state assets. **Question 7: If there are any job opportunities available, could the people of the Lüderitz town be the first to be considered for these jobs either than recruiting people from elsewhere?** The proposed seismic survey will not provide direct employment opportunities to the people of Lüderitz. Indirect opportunities may be available for very limited highly skilled people / companies with respect to permitting and actual survey operations. The recruitment process is often done at international or national levels. However, the results and data from the proposed survey are likely to increase the interest by multinational oil and gas companies in conducting oil and gas exploration activities in Namibia. The increase in exploration activities could lead to additional commercial discovery of economic petroleum reserves. Recent discovery of light oil by TotalEnergies Venus prospect in Petroleum Exploration License (PEL) 56 and Shell Upstream Namibia BV Graff-1 in PEL 39 are likely to propel Namibia into an oil and gas producing country in the next six (6) – ten (10) years. **Comments** - Tuna season sometimes goes up to May not April. This should be updated accordingly.
Official Meeting Adjourned	17:40

APPENDIX A– ATTENDANCE REGISTER

ATTENDANCE REGISTER

DATE: 13 May 2022 **TIME:** 10:30 end 13-30

VENUE: oranjemund

Proposed Multiclient 3D Seismic Surveys by Searcher over the Area of Interest (AOI) covering Blocks 2713, 2712A, 2812A, 2813B, 2912, 2913B and 2914A Orange Basin, OFFSHORE SOUTHERN NAMIBIA

NAME AND SURNAME	ORGANISATION	~~SIGNATURE~~ EMAIL
LUKE GARLICK	NAMDEB	0818236486
Reinhardt Kaufmann	NAMDEB	0818077684
FLORIAN PALLIS	OTC	0811400422
Miller Mwashindunge	NAMDEB	0817757113
Joyce Katjirua	"	0812430534
CLARENCE KAMATAKO	MEFT	0812230938
		Nirinaka.ek@gmail.com
luke.garlicke namdeb.com		
Gideon T Nantinda	OTC	0811242095
Elmoranscha Bert	Committee	0812588809
Priscilla nutilifa	Namdeb Hospital	0812977299
Hanna Amadhila	Committee	0813117479
Julius Moongo	Namdeb	0813406800
gideon.nantinda@ormdte.com.na		

APPENDIX B – IMAGES FROM THE MEETING

APPENDIX C – POSTER PRESENTATION

Searcher

Public Meeting on the Application for Environmental Clearance Certificate (ECC)

Lüderitz Public Meeting, Wednesday, 11th [illegible]
Benguela Community Hall, Lüderitz Town.

Proposed Multiclient 3D Seismic Surveys by Searcher Geodata UK Ltd [illegible]
Operational Area covering Blocks 2614, 2613, [illegible] and 2615 (including Tripp Seamount) with water depths ranging from ca [illegible] in the Deepwater Orange Basin, Offshore Southern Namibia

Dr Sindila Mwiya *(PhD, PG Cert, MPhil, BEng (Hons), Pr Eng)*
EAP/Risk-Based Solutions (RBS) Technical Permitting Advisor / International Resources Consultant
Email: smwiya@rbs.com.na, Mobile: +264811413229

Ms Emerita Ashipala *(MSc Env. Mag, BSc (Hons) Envi Bio),*
EAP/ Risk-Based Solutions (RBS) Independent Senior Consultant
Email: emerita.ashipala@gmail.com, Mobile: +264-817016851

Based Solutions (RBS) CC
[illegible] Risking, and Environmental Consultants

[illegible]

Risk – Based Solutions (RBS) CC

Searcher

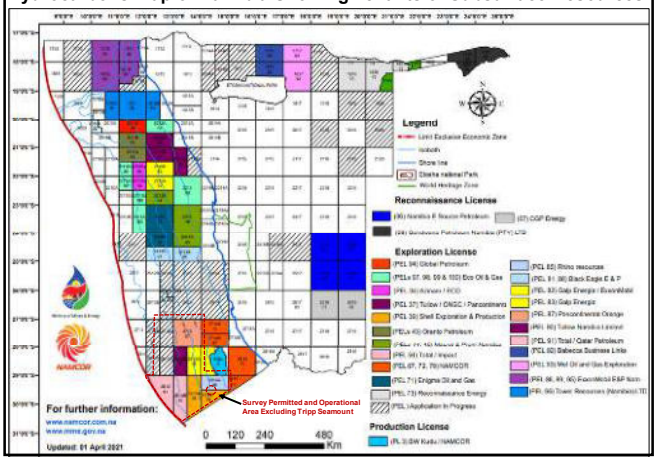
- Dr Sindila Mwiya
- Dr Vita Stankevica
- Ms Emerita Ashipala
- Mr Samison Mulonga
- Mr. Percy Rinquest
- Ms. Ilta Velasia Asser
- Ms. Meriam Kauyama
- Ms. Christine Links
- Marine Team (Here Represented by Ms. Naemi Nelumbu – Fisheries Biologists / Consultant)

Searcher

Global Data Library

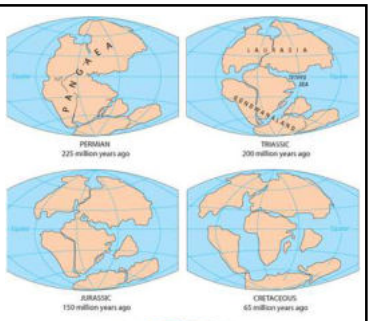
- Searcher Geodata UK Ltd ('Searcher') is the largest Privately owned Multi-Client (MC) company in the world, with HQ in Perth, Australia (www.searcherseismic.com).
- Provides high quality exploration data and leading-edge tech to the global exploration industries.
- In existence for 17) years, with its committed team exploring and working globally.

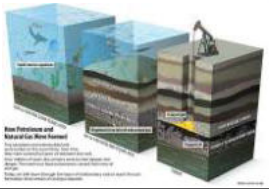
Hydrocarbons Map of Namibia Showing Tenants of Subsurface Resources



Background to Petroleum (Oil and Gas) Formation and Exploration

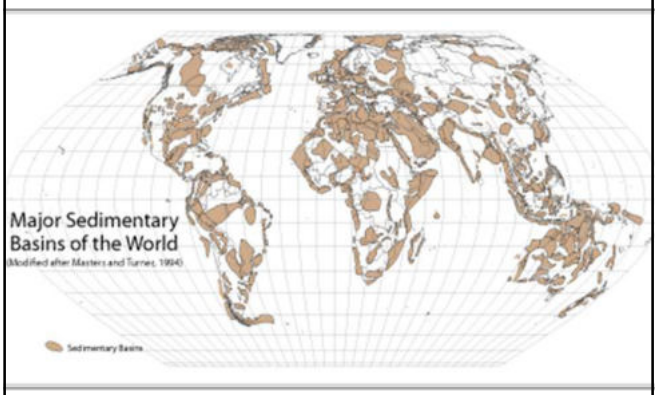
- The Origin of Petroleum (Oil and Gas) is very much linked to the continuous evolution of our planet Earth over billions of years
- Today, the Evolution of the Earth is still ongoing and will continues for billion of years to come, at some places land will continue to be created while at other places destroyed.





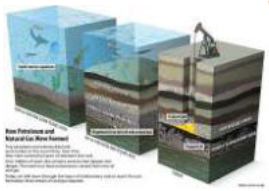
Source: U.S. Geological Survey

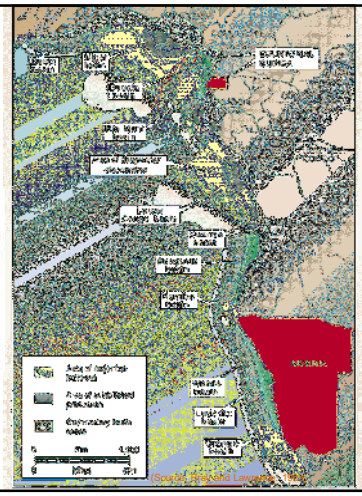
Sedimentary Basins of the World



A Sedimentary Basin is basically a functional modern house with a kitchen and a dining room and often food is cooked in the kitchen and consumed in the dining room

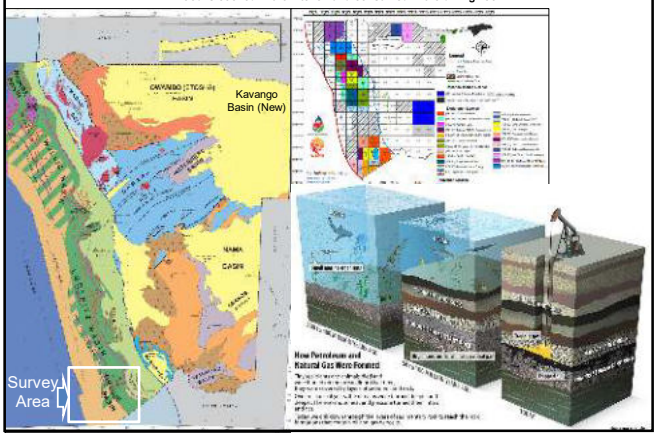
Basins of Central and Southern Africa





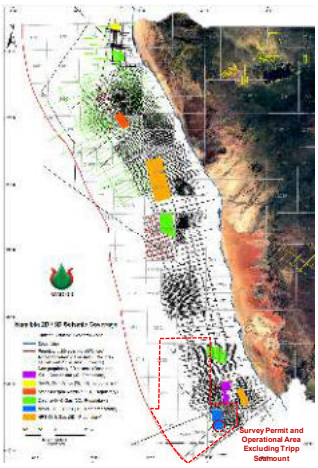
Sedimentary Basins Namibia

A Sedimentary Basin is basically a functional modern house with a kitchen and a dining room and often food is cooked in the kitchen and consumed in the dining room

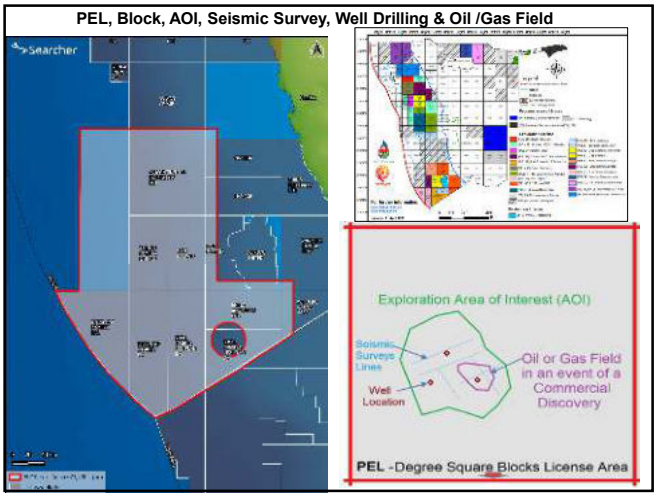


Historical Perspective

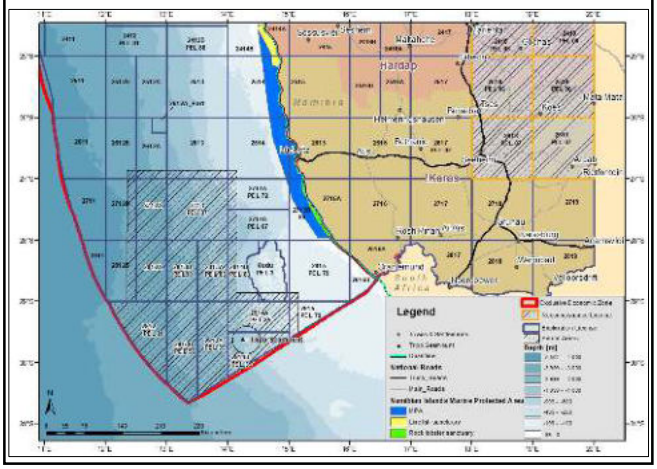
- Seismic survey has also been undertaken offshore and onshore Namibia. A number of wells have been drilled offshore and onshore Namibia.



PEL, Block, AOI, Seismic Survey, Well Drilling & Oil /Gas Field



Key AOI for Proposed Offshore 3D Seismic Survey



Offshore 3D Seismic Survey and Compliance Requirements

- Environmental Management, 2007, (Act No. 7 of 2007) and the EIA Regulations, 2012
- Petroleum (Exploration and Production) Act 1991 (Act 2 of 1991)
- Marine Resources Act, 2000 (Act 27 of 2000) and all associated regulations
- Merchant Shipping Act, (Act 57 of 1951)
- Marine Traffic Act, (Act 2 of 1981) (As amended by Act 15 of 1991)
- Prevention and Combating of Pollution of the Sea by Oil Act, (Act 6 of 1981) (as amended by Act 24 of 1991)
- Dumping at Sea Control Act 73 of 1980)

MME

MEFT

MHISS

MFMR

MWT

Environmental Assessment Process, EMA, 2007 and EIA Regulations 2012

Step 1: Screening

Step 2: Draft Environmental Scoping

Step 3: Submission of Notification with Draft Scoping Report and Stakeholders Consultations

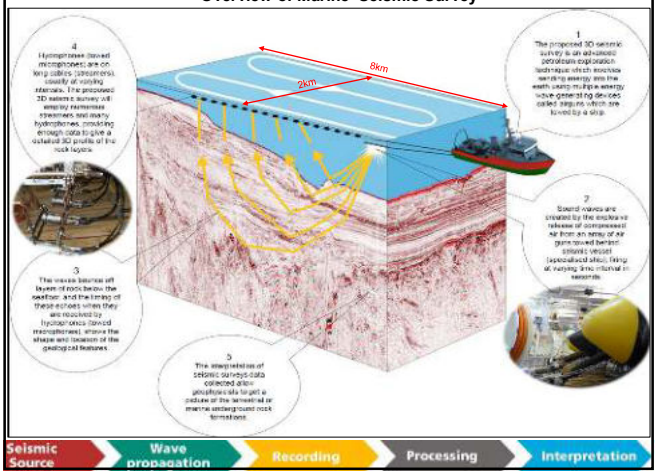
Step 4: Environmental Impact Assessment (EIA) and Development of Environmental Management Plan (EMP)

Step 5: Stakeholders Consultation

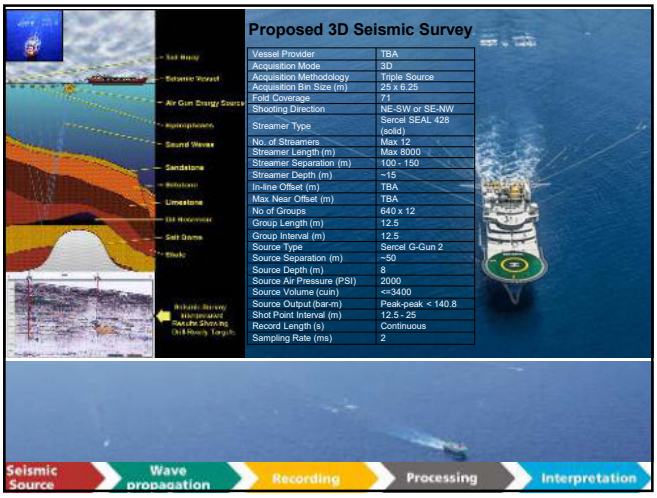
Step 6: Submission of the Final EIA and EMP to the Authorities (**MEFT via MME**)

Step 7: Authorities review and Records of Decisions

Overview of Marine Seismic Survey



Proposed 3D Seismic Survey

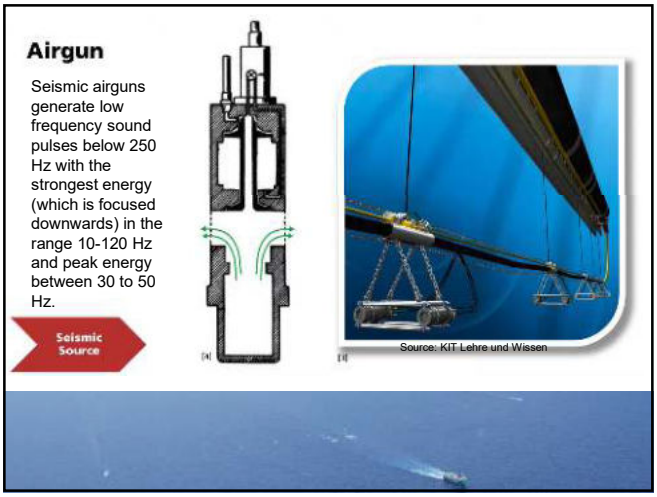


Vessel Provider	TBA
Acquisition Mode	3D
Acquisition Methodology	Triple Source
Acquisition Bin Size (m)	25 x 6.25
Fold Coverage	71
Shooting Direction	NE-SW or SE-NW
Streamer Type	Sercel SEAL 428 (solid)
No. of Streamers	Max 12
Streamer Length (m)	Max 8000
Streamer Separation (m)	100 - 150
Streamer Depth (m)	~15
In-line Offset (m)	TBA
Max Near Offset (m)	TBA
No of Groups	640 x 12
Group Length (m)	12.5
Group Interval (m)	12.5
Source Type	Sercel G-Gun 2
Source Separation (m)	~50
Source Depth (m)	8
Source Air Pressure (PSI)	2000
Source Volume (cuin)	<=3400
Source Output (bar-m)	Peak-peak < 140.8
Shot Point Interval (m)	12.5 - 25
Record Length (s)	Continuous
Sampling Rate (ms)	2

Hydrophone

Airgun

Seismic airguns generate low frequency sound pulses below 250 Hz with the strongest energy (which is focused downwards) in the range 10-120 Hz and peak energy between 30 to 50 Hz.

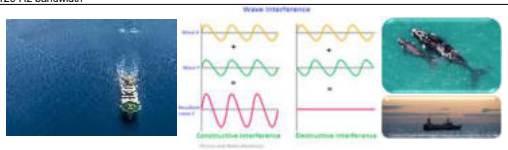


Likely Sources of Negative Marine Receiving Environment

- Port including Onshore support operations and waste management
- Physical presence of survey and support vessels
- Physical disturbance of the survey operations
- Sound generation from the proposed 3D seismic survey airguns including sound of the survey and support vessels
- Increased light levels from routine vessels operations
- Atmospheric emissions from routine operations of the survey and support vessels
- Planned marine discharges
- Unplanned marine discharges (e.g. minor spillages of fuel, lubricants / maintenance oils
- Accidental event: Loss of vessel, equipment, or material
- Accidental event: Collision with marine wildlife during vessel operations.
- Accidental Event: Loss of Marine Gasoline Oil (MGO) containment on the survey or support vessels due to ship collision or another major event.

Understanding Destructive Interference, Seismic Survey and Earthquake Created Seismic Waves

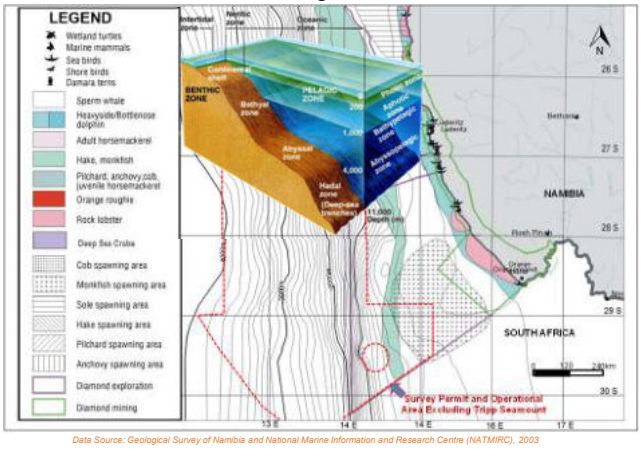
MARINE MAMMALS	BEHAVIOURAL RESPONSE THRESHOLD
Low-frequency Cetaceans: Humpback, Southern Right Whales	<= 160 dB re 1 µPa
Mid-frequency Cetaceans: Killer Whales, Bottlenose, Dusky, Long-beaked Common, Risso's, Rough-toothed Dolphins	167 - >170 dB re 1 µPa
High-frequency Cetaceans: Harbour Porpoise, Koiga species	90 - 140 dB re 1 µPa
California Sea Lions	165-170 dB re 1 µPa
Phocid Seals	<= 190 dB re 1 µPa
Nominal Source Level of an Airgun 250 dB re 1 µPa @ 1 m but can reach up to 260-262 dB. Most of the energy produced is in the 0 - 120 Hz bandwidth	



1. **Interference is defined as the effect produced when two waves of the same frequency, amplitude and wavelengths travelling in the same direction in a medium are superposed (i.e as they simultaneously pass-through a given point). When the crests of two waves of equal wavelength are together, the waves are said to be in phase, that is, they have a phase difference of zero. In this case, according to the principle of linear superposition, the waves will reinforce each other, or add up and will undergo constructive interference and thus affect marine life vocalisations. On the other hand, if two waves superimpose with each other in opposite phase, the amplitude of the resultant is equal to the difference in amplitude of individual waves, resulting in the minimum intensity of the wave. This is known as destructive interference and thus will produce a negligible effect on marine life vocalisations.**

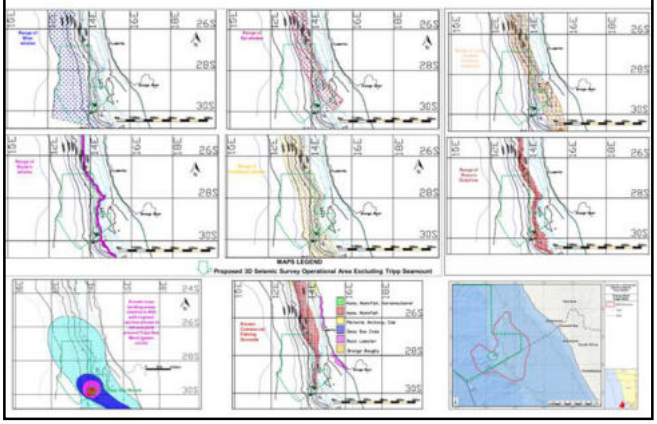
2. **It is very important to note that the waves generated by a seismic survey are different from the earthquake created seismic waves. Earthquake generated seismic waves have periods, and wavelength that are in minutes and kilometres, respectively, while the seismic survey operations produces waves with periods, and wavelength of tenths of a second and tens of a meter respectively.**

Marine Receiving Environment

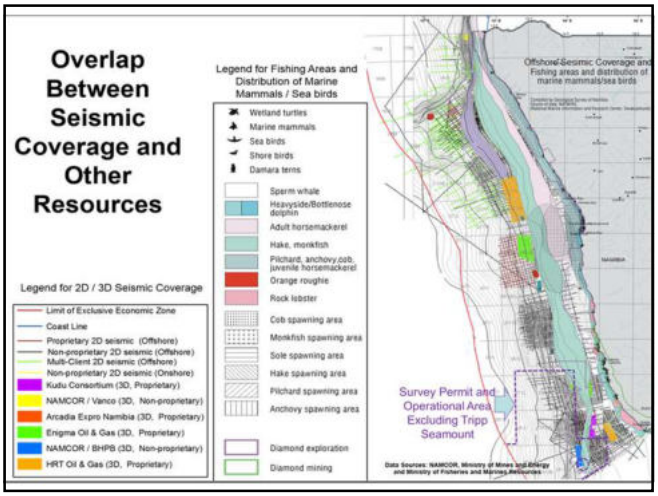


Data Source: Geological Survey of Namibia and National Marine Information and Research Centre (NATMIRC), 2003

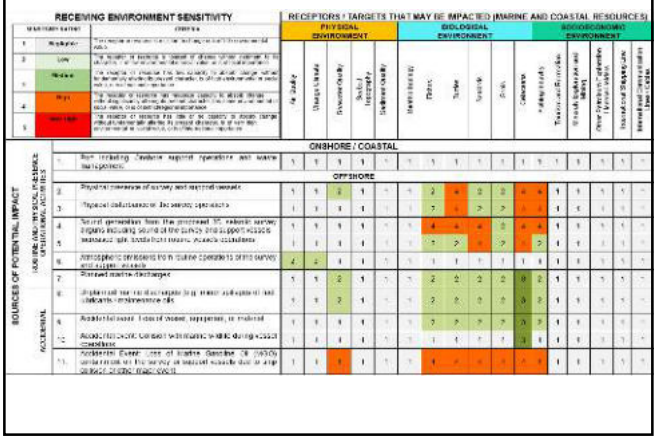
Marine Receiving Environment.. *Cont.*



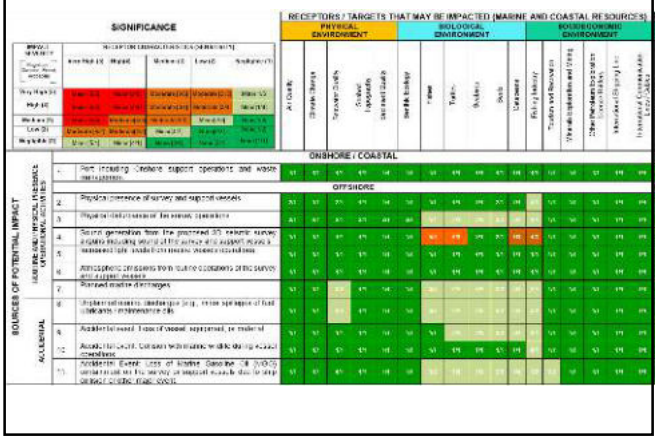
Overlap Between Seismic Coverage and Other Resources



Sensitivity of the Receiving Environment



Potential Negative Impacts Assessment



Potential Positive Impacts Assessment

The data sets from the proposed multiclient 3D seismic survey operations will provide critical insight into the subsurface geological evolution, offshore basin architecture, depositional and structural history of the southern Offshore Namibia resulting in the following positive socioeconomic landscape of Namibia:

- ❖ Increased earnings by the State through increased rights' rentals and payment of taxes.
- ❖ Contributions to the short and long-term strategies of attracting investments and promote the coexistence of petroleum operations with other marine users
- ❖ Direct contributions to the training of young Namibians through PetroFund which is currently offering up to seventy (70) scholarship annually to Namibians.
- ❖ Contributions to economic growth through ongoing exploration investments and potential future oil and gas discovery.
- ❖ Contribution to the development of local infrastructures and businesses, and.
- ❖ Contribution to the creation of the much need knowledge (data) base that could also be used for other future offshore / marine / seafloor related studies.

Opportunity for Coexistence

AREA OF INTEREST (AOI) IN THE ORANGE BASIN, SOUTHERN OFFSHORE NAMIBIA

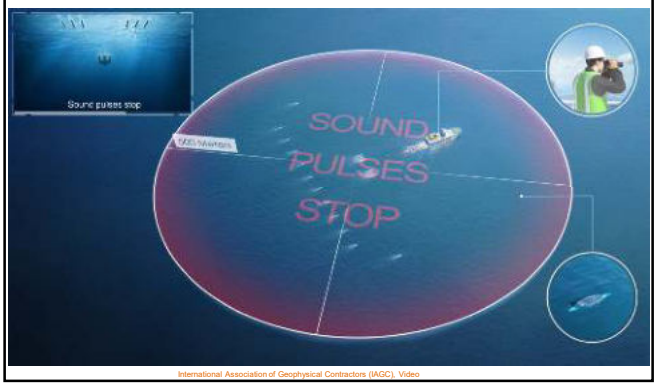
MONTH OF YEAR SOUTHERN OFFSHORE NAMIBIA	KEY FISHING SEASON (KEY SPECIES)	MAIN SPAWNING ACTIVITIES (KEY SPECIES)	KEY CETACEOUS PRESENCES / MIGRATORY TIMES	OTHER KEY USERS SUCH AS MINERALS AND PETROLEUM OPERATIONS	WEATHER WINDOW	OFFSHORE SEISMIC SURVEY OPPORTUNITY WINDOW
January	Tuna at Tripp Sea Mount (Excluded from the Proposed Survey Areas)				Good	Favorable Weather Window Option 1
February						
March						
April					Moderate Mixed	Favorable Weather Window Option 2
May						
June					Very Poor	NOT Weather Window Favorable
July						
August			Documented Inshore			
September					Poor	
October					Moderate Mixed	Favorable Weather Window Option 2
November	Tuna at Tripp Sea Mount (Excluded from the Proposed Survey Areas)				Good	Favorable Weather Window Option 1
December						

Offshore Seismic Survey Mitigation Measures

The following are the example summary of some of key mitigation measures that shall be included in the EMP report and to be implemented by the Proponent with respect to the proposed seismic survey:

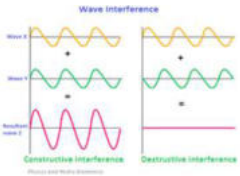
1. Seasonality and survey implementation timing.
2. Establishment of buffer zones.
3. Use of Marine Mammal Observer (MMO).
4. Use of Fisheries Liaison Officers (FLOs).
5. Use of Passive Acoustic Monitoring (PAM) Technology.
6. Soft starts' and 'pre-firing' observations.
7. Termination of firing in the 500m exclusion zone.
8. Marine Animal Monitoring and Mitigation Plan aboard the Survey Vessel.
9. The use of Turtle friendly tail buoys, and.
10. Compliance to all MARPOL (Marine Pollution) Regulations and Waste Disposal Procedures.

Illustration of Offshore Seismic Survey Mitigation Measures



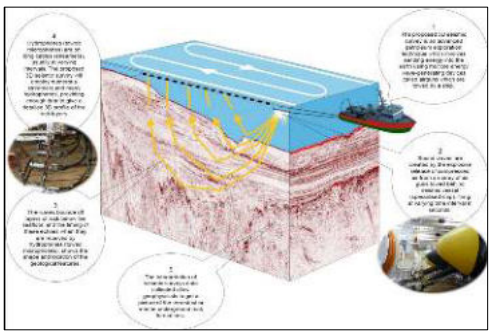
International Association of Geophysical Contractors (IAGC), Video

Understanding Destructive Interference, 2D Seismic Survey and Earthquake Created Seismic Waves



1. **Offshoe generate acoustics or sound waves with frequency of between 150 to 300 Hz depending on peak force used. Interference is defined as the effect produced when two waves of the same frequency, amplitude and wavelengths travelling in the same direction in a medium are superposed (i.e as they simultaneously pass-through a given point). When the crests of two waves of equal wavelength are together, the waves are said to be in phase, that is, they have a phase difference of zero. In this case, according to the principle of linear superposition, the waves will reinforce each other, or add up and will undergo constructive interference and thus affect elephant vocalisation. On the other hand, if two waves superimpose with each other in opposite phase, the amplitude of the resultant is equal to the difference in amplitude of individual waves, resulting in the minimum intensity of the wave. This is known as destructive interference and thus will produce a negligible effect on elephant vocalisations.**
2. **It is very important to note that the waves generated by a 2D seismic survey are different from the earthquake created seismic waves. Earthquake generated seismic waves have periods, and wavelength that are in minutes and kilometres, respectively, while the 2D seismic survey operations produces waves with periods, and wavelength of tenths of a second and tens of a meter respectively.**

Video Illustration



https://www.youtube.com/watch?v=iNHE6A1Y38U

Conclusions and Recommendations

The following is a summary of the key assessments that shall be undertaken as part of the EIA and EMP Processes:

1. Assessment of the fishing industry activities including fish, fishing seasons and socioeconomic associated activities found in and around the proposed survey area, and.

2. Assessment of the marine environment covering marine birds, mammals, and related ecosystem variability.

- ❖ As part of the ongoing environmental assessment process leading to the preparation of the EIA and EMP Report in support of the application for the ECC, all Interested and Affected Parties (I&APs) are invited to register and submit written comments / objections / inputs with respect to the proposed 3D seismic survey operations on or before the **Friday, 27th May 2022**.

- ❖ The Proponent intends to submit the application for ECC during the **week Starting 30th May 2022 / June 2022.**

Searcher

End!
Many Thanks, Questions, Discussions and
Way forward

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Risk – Based Solutions (RBS) CC

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Email: smwiya@rbs.com.na
Global Office / URL : www.rbs.com.na

1. Register and submit written comments / objections / inputs with respect to the proposed 3D seismic survey operations on or before the **Friday, 27th May 2022**.

2. The Proponent intends to submit the application for ECC during the **week Starting 30th May 2022.**

MINUTES FOR MEETING FOR THE PROPOSED MULTICLIENT 3D SEISMIC SURVEYS BY SEARCHER GEODATA UK LTD, IN ORANJEMUND, KARAS REGION

Date: **Friday, 13th May 2022, 10h30**
Venue: **Zacharia Lewala Community Hall, Oranjemund.**
Subject: **Proposed Multiclient 3D Seismic Surveys by Searcher Geodata UK Ltd (Proponent) Operational Area covering Blocks 2614, 2613, 2612A, 2612B, 2714A, 2714B, 2713, 2712B, 2712A, 2812B, 2813A, 2814B, 2714A, 2912, 2913B, 2914B, 2914A and 2915 (Excluding Tripp Seamount) with water depths ranging from ca-200m to -400m from East to West, Respectively, Deepwater Orange Basin, Offshore Southern Namibia**

Meeting Commenced:	11:20
Meeting purpose:	1. The purpose of the meeting was to share information regarding the proposed Multiclient 3D Seismic Surveys by Searcher Geodata UK Ltd (Proponent) Operational Area of interest, (Excluding Tripp Seamount) with water depths ranging from ca-200m to -400m from East to West, Respectively, Deepwater Orange Basin, Offshore Southern Namibia. 2. Encourage community support, inputs, and recommendations for proposed Multiclient 3D Seismic Surveys.
Attendance: Community/ stakeholders	See attached attendance register (Appendix A)
Key discussion:	After the acknowledgment of all present and the introduction of the delegation present, Dr. Sindila Mwiya gave a presentation on the proposed Multiclient 3D Seismic surveys (see attached Appendix C). The presentation included the following points of discussion: • Background review of Searcher Geodata UK Ltd Company. • Display and explanation of tenants on subsurface resources with different types of explorations and reconnaissance license on a Hydrocarbons Map of Namibia. • Background on petroleum (Oil and Gas) formation, and exploration.

	• Highlighted sedimentary basins around the globe and emphasized the basins in central and southern Africa and thereof further explained sedimentary basins in Namibia. • An overview of the historical perspective of seismic surveys in Namibia. • Brief explanation of the seismic survey, exploration, and Key AOI (Area of Interest). • Brief explanation of the offshore 3D Seismic Surveys and Compliance Requirements. • Brief explanation on the Environmental Assessment Process, EMA, 2007 and EIA Regulations 2012. • Brief explanation of the overview of marine Seismic Surveys, proposed 3D seismic survey, and energy source. • Well detailed explanation of the marine receiving environment, the sensitivity of the receiving environment, and the overlap between seismic coverage and other resources. • Explanation of potential positive and negative Impacts Assessment, the opportunity for coexistence. • Summary of the offshore seismic survey mitigation measures. • Conclusions and recommendations
Questions/concerns:	<u>The following are the questions posed by the community members and addressed by Dr Sindila Mwiya.</u> **<u>Comment/Question1: The heritage council is normally not involved in the projects from the start; however, it may be necessary to contact them should anything be encountered as a chance find, from my experience they sometimes delay the project as they need to mobilise the necessary equipment and staff.</u>** They are normally notified during the drilling operations which has a small footprint on the seafloor. Seismic survey will have no effect on seafloor heritage resources such as shipwreck. Seismic data can be beneficial to the heritage council. As it may show buried seafloor structures including heritage resources. Yes, consideration will be made to include them on the stakeholder register.

	Question 2: Have we considered the implication of accident oil spill on vessels. There are spills that travel far from the source becoming difficult to account for. Are there spill clean-up mitigation measures? Yes, mitigation measures for any likely sources of an oil spill during the seismic survey have been provided in the EMP for implementation by the Proponent. Seismic survey is not associated with a very high risk for a major oil spill compared to the drilling operations. Seismic survey sources of oil spills may include: Refuelling, maintenance, or accidental collisions of vessels. An oil spill Contingency Plan linked to the survey vessels is one of the key requirements for foreign vessels to be allowed in the Namibian waters. Therefore, the vessel/s to be used for the proposed survey will all have approved oil spill contingency plans and fully compliant to the International Convention for the Prevention of Pollution from Ships (MARPOL) is the main international convention covering prevention of pollution of the marine environment by ships from operational or accidental causes. **Question 3: What are some of the positive socio-economic impacts should the project continue?** The discovery of economic hydrocarbons reserves and the development of a successful oil and gas industry will greatly and positively transform the economic landscape of Namibia and will have direct and indirect benefits to Namibia and its people. The following is summary of the other key direct and indirect positive impacts that the proposed 3D seismic survey activities will have on socioeconomic landscape of Namibia: ❖ Increased earnings by the State through increased rights' rentals and payment of taxes. ❖ Increased understanding and knowledge of the offshore petroleum systems of Namibia that could lead to more discovery of economic oil or gas resources. ❖ Contributions to the national geosciences' skills development and knowledge transfer through on job training and short-term job attachments of Namibians. ❖ Contributions to the short and long-term strategies of attracting investments in the petroleum exploration sector in Namibia through new data acquisition, research, monitoring, and management. ❖ Contribution to the long-term strategy that will promote the

	coexistence of petroleum operations with other marine users in Namibia. ❖ Direct contributions to the training of young Namibians through increased contributions to the national PetroFund which is currently offering up to seventy (70) scholarship annually to Namibians to be able to study at foreign universities. ❖ Contributions to economic growth through ongoing exploration investments and potential future oil and gas discovery. ❖ Contribution to the development of local infrastructures and new businesses to support the ongoing oil and gas exploration opportunities particularly around the Port of Walvis Bay, and. ❖ Contribution to the creation of the much need knowledge (data) base that could also be used for other future offshore / marine / seafloor related studies and research in Namibia **Question 4: Where will oil be transported after discovery?** Although the question is not related to the seismic survey but drilling operations. However, when operating far in deep waters where oil and gas has been discovered in Namibia, following the development of the field, no oil is normally stored onshore. All the oil produced will be stored and managed offshore. **Question 5: After storage, will it be transported straight to consumers?** Crude is a mixture of other substances. Crude will therefore need to be refined before use by various consumers. Therefore, produced oil will be send to suitable refineries that will produced refined produce such as jet fuel, petrol and diesel. **Question 6: Is the refinery going to be in Namibia?** Refineries are very expensive, with a total cost of approximately 12billion USD. Therefore, to build one, there must be a big enough market to recoup the investments made. It highly unlikely that once Namibia start to produce oil a refinery will also be built. **Question 7: The estimated time for the survey activities is 3 months, yet the area is very large, is there any indication of how many phases there will be?** Each survey event may last up to three (3) months and multiple survey will be conducted over the years. What will determine the length of

	the survey will be conducted is dependent on – (i) Other economic activities, (ii) the interests of the holders of the blocks. (iii) It also depends on the permits that are required to conduct the survey. (iv) Other factors could be the season, weather, etc. (v) the demand for the data by companies that may be interested. Overall, the operations are time demand-based, other activities, and environmental constraints. **Question 8: History is what we built on, what comments do you have on the social security of Namibia, and the implications of the oil find in the country?** The discovery and development of a successful oil and gas industry in in Namibia will have greater positive socioeconomic impacts. With our good political stability, favourable microeconomic environment, and great legal instruments, the social security of the country will be guaranteed for the great benefits of all Namibians. **Comment:** Namdeb has surveys on monthly basis and the activities are sound sensitive and should be notified as to when and where the seismic will starts within overlapping eastern areas of the proposed survey (area of interest) to ensure there are no interferences with the operations.
Official Meeting Adjourned	13:00

APPENDIX A – ATTENDANCE REGISTER

ATTENDANCE REGISTER

DATE: 11-May 2022 **TIME:** 2-30 end 17:07

VENUE: Luderitz

Proposed Multiclient 3D Seismic Surveys by Searcher over the Area of Interest (AOI) covering Blocks 2713, 2712A, 2812A, 2813B, 2912, 2913B and 2914A Orange Basin, OFFSHORE SOUTHERN NAMIBIA

	NAME AND SURNAME	ORGANISATION	SIGNATURE
1	Atteus Shivolo	Community member	0816695963
2	Erastus Angula	Community member	0814535112
3	Petrus Hanyela	Community member	0817569169
4	Iawa Josef	Community member	0813483344
5	A.W.E. KAKORO	NAMMAA INV. FISH	+264 816033333
6	O. Fresa	Local	
7	FREDAY DORS	Community	0813922192
8	R.M. Sinvula	MEFT	
9	CALVIN MUSIYA	Community member	0812367275
10	Willem G. Gamelde	Community member	0812571825
11	Johnny Kapofi	Community member	0813588172
12	Yazeel Muiy	Community member	0817527474
13	Salmon Haimbodi	Community member	0813373540
14	Dina Mwaala	MFMR	0813179168
15	KALERI Nefinguo	MFMR	0818855387
16	Geoffry Williams	Community mem	0817504963
17	Rufus Penda	Community member	0814697794
18	Rebekka Bengela	Community	0814319089
19	Alina Victor	Community m	081-2730231
20	Shifengula Fillemon	community member	0813705882
21	FERESTA NANAE	COMMUNITY MEMBER	0816517435
22	Tonny Marselino	Community member	08163 80182
23	Silvanus Lewis	Community member	0812401166

APPENDIX B – IMAGES FROM THE MEETING

APPENDIX C – POSTER PRESENTATION

Searcher

Public Meeting on the Application for Environmental Clearance Certificate (ECC)

[redacted]

Proposed Multiclient 3D Seismic Surveys by Searcher Geodata UK Ltd ([redacted])
Operational Area covering Blocks 2614, 2613, [redacted]
[redacted] Seamount) with water depths ranging from ca [redacted]
Deepwater Orange Basin, Offshore Southern Namibia

Dr Sindila Mwiya *(PhD, PG Cert, MPhil, BEng (Hons), Pr Eng)*
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Risk – Based Solutions (RBS) CC

[redacted]

Risk – Based Solutions (RBS) CC

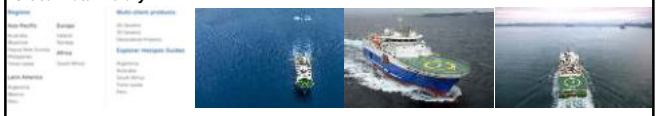
Searcher

- Dr Sindila Mwiya
- Dr Vita Stankevica
- Ms Emerita Ashipala
- Mr Samison Mulonga
- Mr. Percy Rinquest
- Ms. Ilta Velasia Asser
- Ms. Meriam Kauyama
- Ms. Christine Links
- Marine Team (Here Represented by Ms. Naemi Nelumbu – Fisheries Biologists / Consultant)

Interested and Affected Parties (I&AP) – Stakeholders

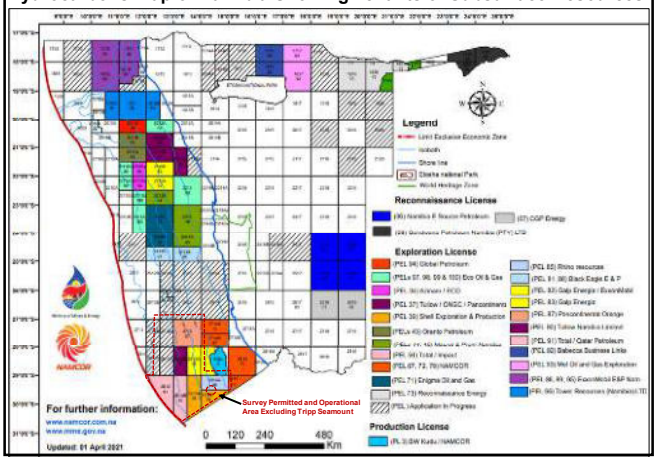
Searcher

Global Data Library



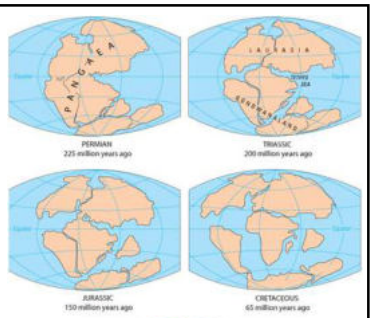
- Searcher Geodata UK Ltd ('Searcher') is the largest Privately owned Multi-Client (MC) company in the world, with HQ in Perth, Australia (www.searcherseismic.com).
- Provides high quality exploration data and leading-edge tech to the global exploration industries.
- In existence for 17) years, with its committed team exploring and working globally.

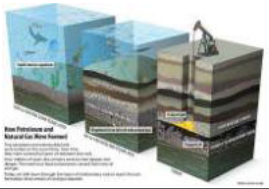
Hydrocarbons Map of Namibia Showing Tenants of Subsurface Resources



Background to Petroleum (Oil and Gas) Formation and Exploration

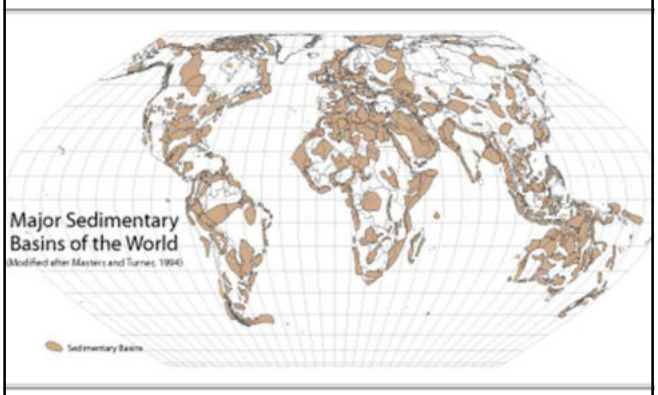
- The Origin of Petroleum (Oil and Gas) is very much linked to the continuous evolution of our planet Earth over billions of years
- Today, the Evolution of the Earth is still ongoing and will continues for billion of years to come, at some places land will continue to be created while at other places destroyed.





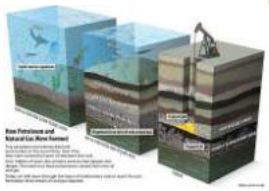
Source: U.S. Geological Survey

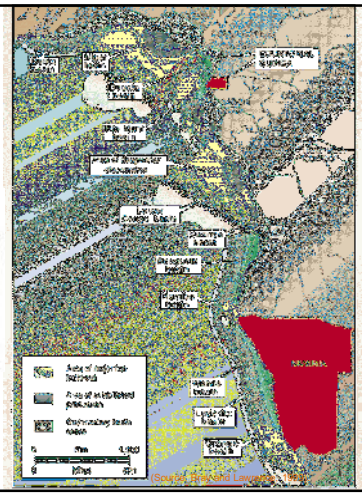
Sedimentary Basins of the World



A Sedimentary Basin is basically a functional modern house with a kitchen and a dining room and often food is cooked in the kitchen and consumed in the dining room

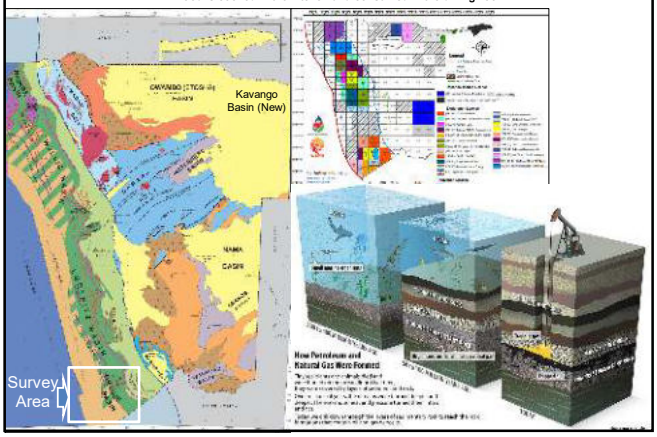
Basins of Central and Southern Africa





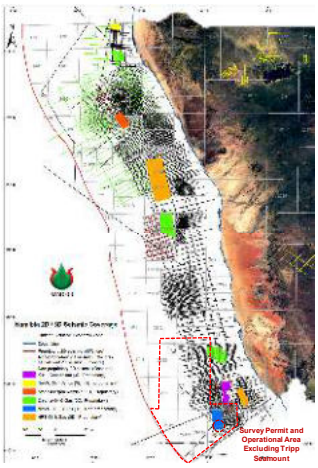
Sedimentary Basins Namibia

A Sedimentary Basin is basically a functional modern house with a kitchen and a dining room and often food is cooked in the kitchen and consumed in the dining room

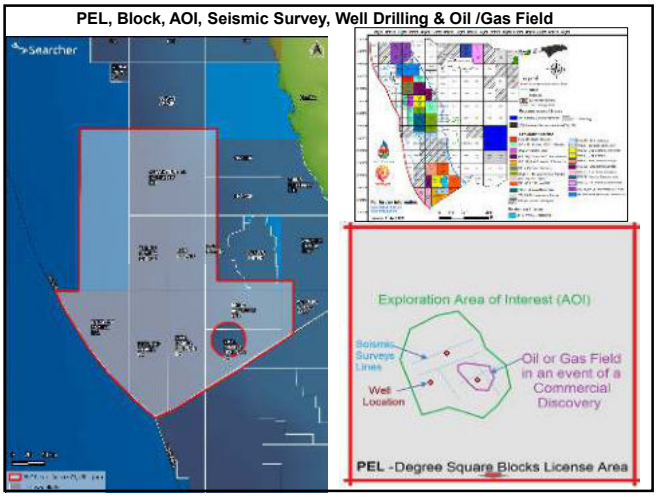


Historical Perspective

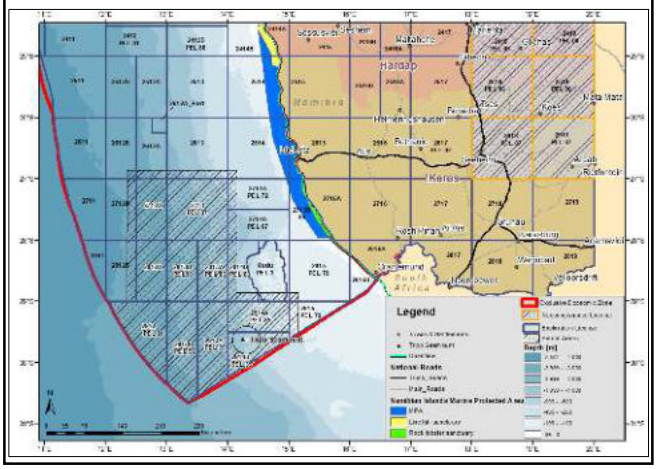
- Seismic survey has also been undertaken offshore and onshore Namibia. A number of wells have been drilled offshore and onshore Namibia.



PEL, Block, AOI, Seismic Survey, Well Drilling & Oil /Gas Field



Key AOI for Proposed Offshore 3D Seismic Survey



Offshore 3D Seismic Survey and Compliance Requirements

- Environmental Management, 2007, (Act No. 7 of 2007) and the EIA Regulations, 2012
- Petroleum (Exploration and Production) Act 1991 (Act 2 of 1991)
- Marine Resources Act, 2000 (Act 27 of 2000) and all associated regulations
- Merchant Shipping Act, (Act 57 of 1951)
- Marine Traffic Act, (Act 2 of 1981) (As amended by Act 15 of 1991)
- Prevention and Combating of Pollution of the Sea by Oil Act, (Act 6 of 1981) (as amended by Act 24 of 1991)
- Dumping at Sea Control Act 73 of 1980)

MME

MEFT

MHISS

MFMR

MWT

Environmental Assessment Process, EMA, 2007 and EIA Regulations 2012

Step 1: Screening

Step 2: Draft Environmental Scoping

Step 3: Submission of Notification with Draft Scoping Report and Stakeholders Consultations

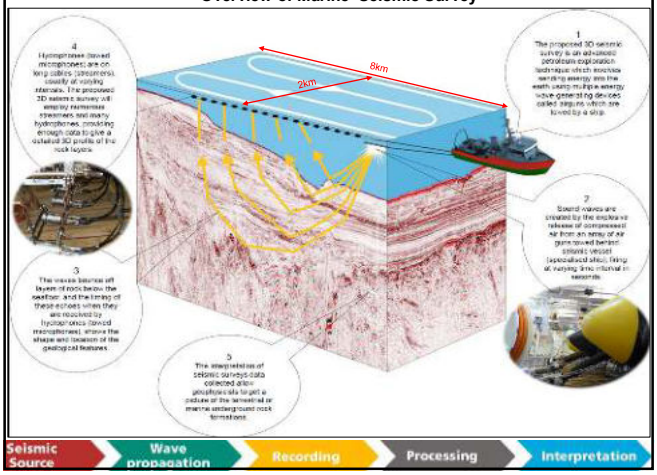
Step 4: Environmental Impact Assessment (EIA) and Development of Environmental Management Plan (EMP)

Step 5: Stakeholders Consultation

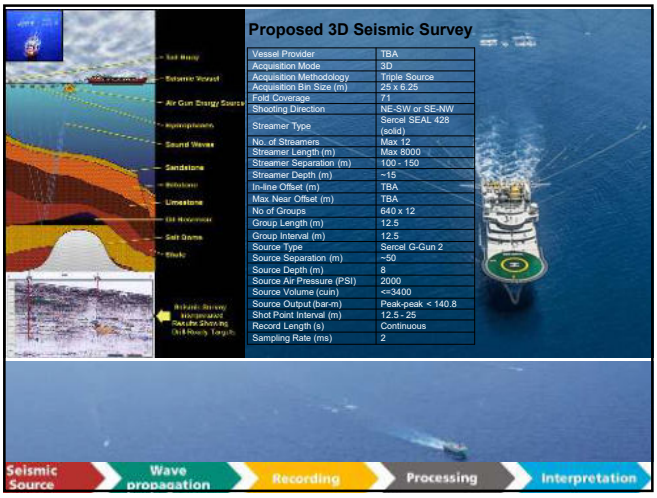
Step 6: Submission of the Final EIA and EMP to the Authorities (**MEFT via MME**)

Step 7: Authorities review and Records of Decisions

Overview of Marine Seismic Survey



Proposed 3D Seismic Survey

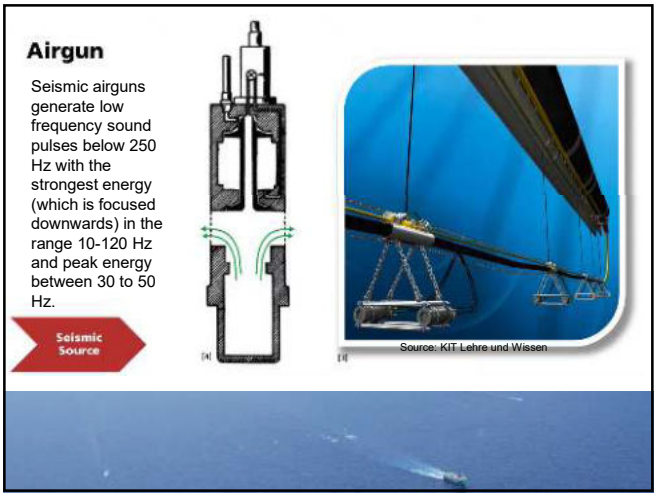


Vessel Provider	TBA
Acquisition Mode	3D
Acquisition Methodology	Triple Source
Acquisition Bin Size (m)	25 x 6.25
Fold Coverage	71
Shooting Direction	NE-SW or SE-NW
Streamer Type	Sercel SEAL 428 (solid)
No. of Streamers	Max 12
Streamer Length (m)	Max 8000
Streamer Separation (m)	100 - 150
Streamer Depth (m)	~15
In-line Offset (m)	TBA
Max Near Offset (m)	TBA
No of Groups	640 x 12
Group Length (m)	12.5
Group Interval (m)	12.5
Source Type	Sercel G-Gun 2
Source Separation (m)	~50
Source Depth (m)	8
Source Air Pressure (PSI)	2000
Source Volume (cuin)	<=3400
Source Output (bar-m)	Peak-peak < 140.8
Shot Point Interval (m)	12.5 - 25
Record Length (s)	Continuous
Sampling Rate (ms)	2

Hydrophone

Airgun

Seismic airguns generate low frequency sound pulses below 250 Hz with the strongest energy (which is focused downwards) in the range 10-120 Hz and peak energy between 30 to 50 Hz.

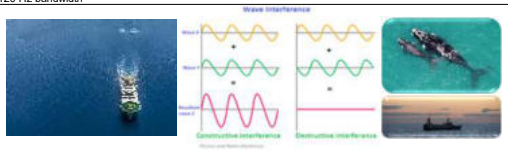


Likely Sources of Negative Marine Receiving Environment

- Port including Onshore support operations and waste management
- Physical presence of survey and support vessels
- Physical disturbance of the survey operations
- Sound generation from the proposed 3D seismic survey airguns including sound of the survey and support vessels
- Increased light levels from routine vessels operations
- Atmospheric emissions from routine operations of the survey and support vessels
- Planned marine discharges
- Unplanned marine discharges (e.g. minor spillages of fuel, lubricants / maintenance oils
- Accidental event: Loss of vessel, equipment, or material
- Accidental event: Collision with marine wildlife during vessel operations.
- Accidental Event: Loss of Marine Gasoline Oil (MGO) containment on the survey or support vessels due to ship collision or another major event.

Understanding Destructive Interference, Seismic Survey and Earthquake Created Seismic Waves

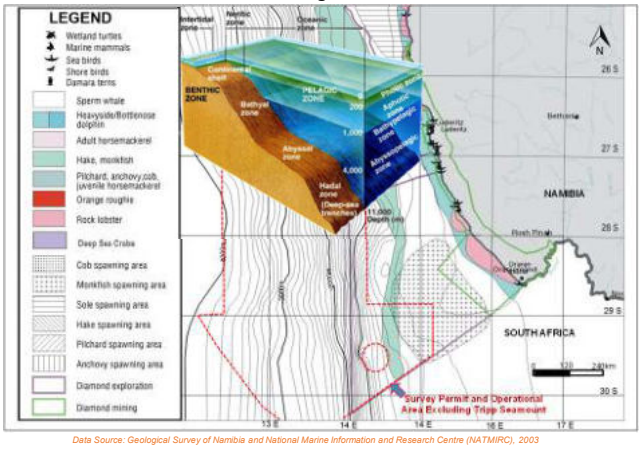
MARINE MAMMALS	BEHAVIOURAL RESPONSE THRESHOLD
Low-frequency Cetaceans: Humpback, Southern Right Whales	<= 160 dB re 1 µPa
Mid-frequency Cetaceans: Killer Whales, Bottlenose, Dusky, Long-beaked Common, Risso's, Rough-toothed Dolphins	167 - >170 dB re 1 µPa
High-frequency Cetaceans: Harbour Porpoise, Koiga species	90 - 140 dB re 1 µPa
California Sea Lions	165-170 dB re 1 µPa
Phocid Seals	<= 190 dB re 1 µPa
Nominal Source Level of an Airgun 250 dB re 1 µPa @ 1 m but can reach up to 260-262 dB. Most of the energy produced is in the 0 - 120 Hz bandwidth	



1. **Interference is defined as the effect produced when two waves of the same frequency, amplitude and wavelengths travelling in the same direction in a medium are superposed (i.e as they simultaneously pass-through a given point). When the crests of two waves of equal wavelength are together, the waves are said to be in phase, that is, they have a phase difference of zero. In this case, according to the principle of linear superposition, the waves will reinforce each other, or add up and will undergo constructive interference and thus affect marine life vocalisations. On the other hand, if two waves superimpose with each other in opposite phase, the amplitude of the resultant is equal to the difference in amplitude of individual waves, resulting in the minimum intensity of the wave. This is known as destructive interference and thus will produce a negligible effect on marine life vocalisations.**

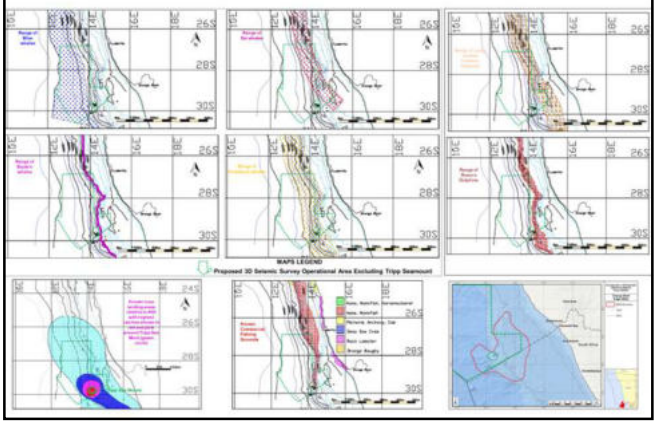
2. **It is very important to note that the waves generated by a seismic survey are different from the earthquake created seismic waves. Earthquake generated seismic waves have periods, and wavelength that are in minutes and kilometres, respectively, while the seismic survey operations produces waves with periods, and wavelength of tenths of a second and tens of a meter respectively.**

Marine Receiving Environment

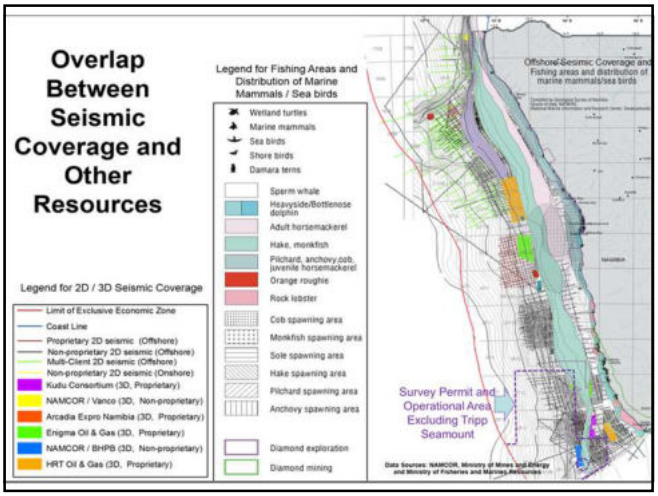


Data Source: Geological Survey of Namibia and National Marine Information and Research Centre (NATMIRC), 2003

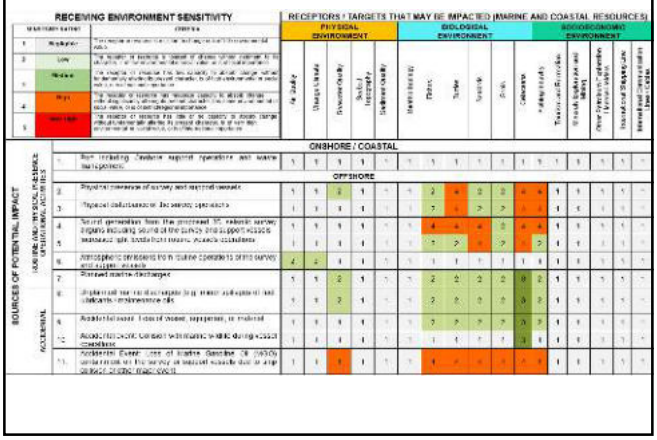
Marine Receiving Environment.. *Cont.*



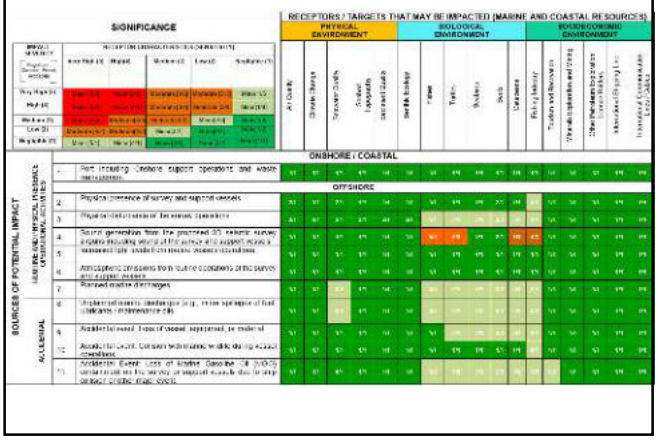
Overlap Between Seismic Coverage and Other Resources



Sensitivity of the Receiving Environment



Potential Negative Impacts Assessment



Potential Positive Impacts Assessment

The data sets from the proposed multiclient 3D seismic survey operations will provide critical insight into the subsurface geological evolution, offshore basin architecture, depositional and structural history of the southern Offshore Namibia resulting in the following positive socioeconomic landscape of Namibia:

- ❖ Increased earnings by the State through increased rights' rentals and payment of taxes.
- ❖ Contributions to the short and long-term strategies of attracting investments and promote the coexistence of petroleum operations with other marine users
- ❖ Direct contributions to the training of young Namibians through PetroFund which is currently offering up to seventy (70) scholarship annually to Namibians.
- ❖ Contributions to economic growth through ongoing exploration investments and potential future oil and gas discovery.
- ❖ Contribution to the development of local infrastructures and businesses, and.
- ❖ Contribution to the creation of the much need knowledge (data) base that could also be used for other future offshore / marine / seafloor related studies.

Opportunity for Coexistence

AREA OF INTEREST (AOI) IN THE ORANGE BASIN, SOUTHERN OFFSHORE NAMIBIA

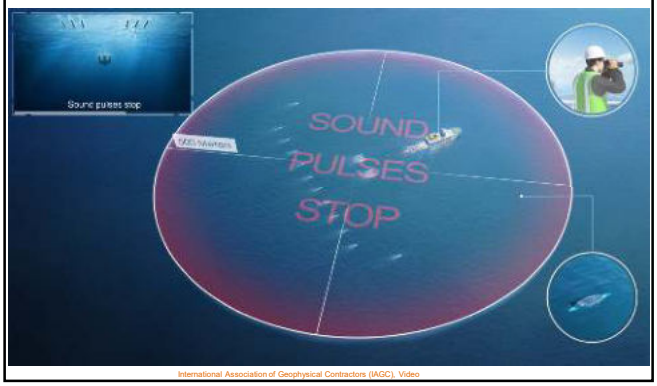
MONTH OF YEAR SOUTHERN OFFSHORE NAMIBIA	KEY FISHING SEASON (KEY SPECIES)	MAIN SPAWNING ACTIVITIES (KEY SPECIES)	KEY CETACEOUS PRESENCES / MIGRATORY TIMES	OTHER KEY USERS SUCH AS MINERALS AND PETROLEUM OPERATIONS	WEATHER WINDOW	OFFSHORE SEISMIC SURVEY OPPORTUNITY WINDOW
January	Tuna at Tripp Sea Mount (Excluded from the Proposed Survey Areas)				Good	Favorable Weather Window Option 1
February						
March						
April					Moderate Mixed	Favorable Weather Window Option 2
May						
June					Very Poor	NOT Weather Window Favorable
July						
August			Documented Inshore			
September					Poor	
October					Moderate Mixed	Favorable Weather Window Option 2
November	Tuna at Tripp Sea Mount (Excluded from the Proposed Survey Areas)				Good	Favorable Weather Window Option 1
December						

Offshore Seismic Survey Mitigation Measures

The following are the example summary of some of key mitigation measures that shall be included in the EMP report and to be implemented by the Proponent with respect to the proposed seismic survey:

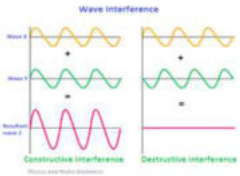
1. Seasonality and survey implementation timing.
2. Establishment of buffer zones.
3. Use of Marine Mammal Observer (MMO).
4. Use of Fisheries Liaison Officers (FLOs).
5. Use of Passive Acoustic Monitoring (PAM) Technology.
6. Soft starts' and 'pre-firing' observations.
7. Termination of firing in the 500m exclusion zone.
8. Marine Animal Monitoring and Mitigation Plan aboard the Survey Vessel.
9. The use of Turtle friendly tail buoys, and.
10. Compliance to all MARPOL (Marine Pollution) Regulations and Waste Disposal Procedures.

Illustration of Offshore Seismic Survey Mitigation Measures



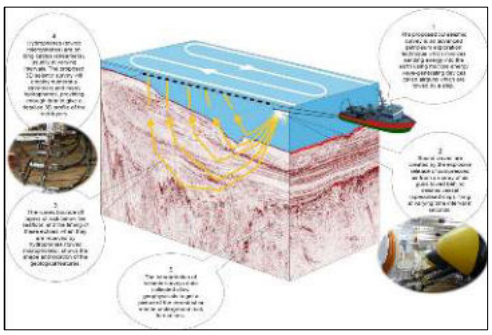
International Association of Geophysical Contractors (IAGC), Video

Understanding Destructive Interference, 2D Seismic Survey and Earthquake Created Seismic Waves



1. **Offshoe generate acoustics or sound waves with frequency of between 150 to 300 Hz depending on peak force used. Interference is defined as the effect produced when two waves of the same frequency, amplitude and wavelengths travelling in the same direction in a medium are superposed (i.e as they simultaneously pass-through a given point). When the crests of two waves of equal wavelength are together, the waves are said to be in phase, that is, they have a phase difference of zero. In this case, according to the principle of linear superposition, the waves will reinforce each other, or add up and will undergo constructive interference and thus affect elephant vocalisation. On the other hand, if two waves superimpose with each other in opposite phase, the amplitude of the resultant is equal to the difference in amplitude of individual waves, resulting in the minimum intensity of the wave. This is known as destructive interference and thus will produce a negligible effect on elephant vocalisations.**
2. **It is very important to note that the waves generated by a 2D seismic survey are different from the earthquake created seismic waves. Earthquake generated seismic waves have periods, and wavelength that are in minutes and kilometres, respectively, while the 2D seismic survey operations produces waves with periods, and wavelength of tenths of a second and tens of a meter respectively.**

Video Illustration



https://www.youtube.com/watch?v=iNHE6A1Y38U

Conclusions and Recommendations

The following is a summary of the key assessments that shall be undertaken as part of the EIA and EMP Processes:

1. Assessment of the fishing industry activities including fish, fishing seasons and socioeconomic associated activities found in and around the proposed survey area, and.

2. Assessment of the marine environment covering marine birds, mammals, and related ecosystem variability.

- ❖ As part of the ongoing environmental assessment process leading to the preparation of the EIA and EMP Report in support of the application for the ECC, all Interested and Affected Parties (I&APs) are invited to register and submit written comments / objections / inputs with respect to the proposed 3D seismic survey operations on or before the **Friday, 27th May 2022**.

- ❖ The Proponent intends to submit the application for ECC during the **week Starting 30th May 2022 / June 2022.**

Searcher

End!
Many Thanks, Questions, Discussions and
Way forward

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Email: smwiya@rbs.com.na
Global Office / URL : www.rbs.com.na

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