Reconnaissance Energy Namibia (Pty) Ltd

Proposed Petroleum (Oil and Gas) Exploration, Stratigraphic Well Drilling Operations in Petroleum Exploration License (PEL) No. 73

Project Presentation, ECC and Other Permits Requirements Stakeholders Meetings

Nkurenkuru, Kavango West Region
Thursday 9th May 2019

Rundu, Kavango East Region
Friday 10th May 2019

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Presentation Overview

1. Purposes and aims of the Meeting
2. Background to oil and gas origin, formation, exploration and production opportunities (evolution of our planet and the Etosha Basin)
3. Petroleum Systems of Namibia today covering Etosha Basin, PEL 73;
4. Description of the Proposed Petroleum Exploration
5. The Natural Environment
6. Assessment of Positive Environmental Impacts
7. Assessment of Negative Environmental Impacts
8. Conclusions and Recommendations
9. Open Discussions / Comments, Inputs / Objections
10. Way Forward and Meeting Closure

Purposes and Aims of the Meeting

- To inform and create awareness at regional, local and traditional leadership level, business community and general local community about the proposed petroleum exploration and in particular the drilling of two (2) key priority sites and subsequent activities that may follow;

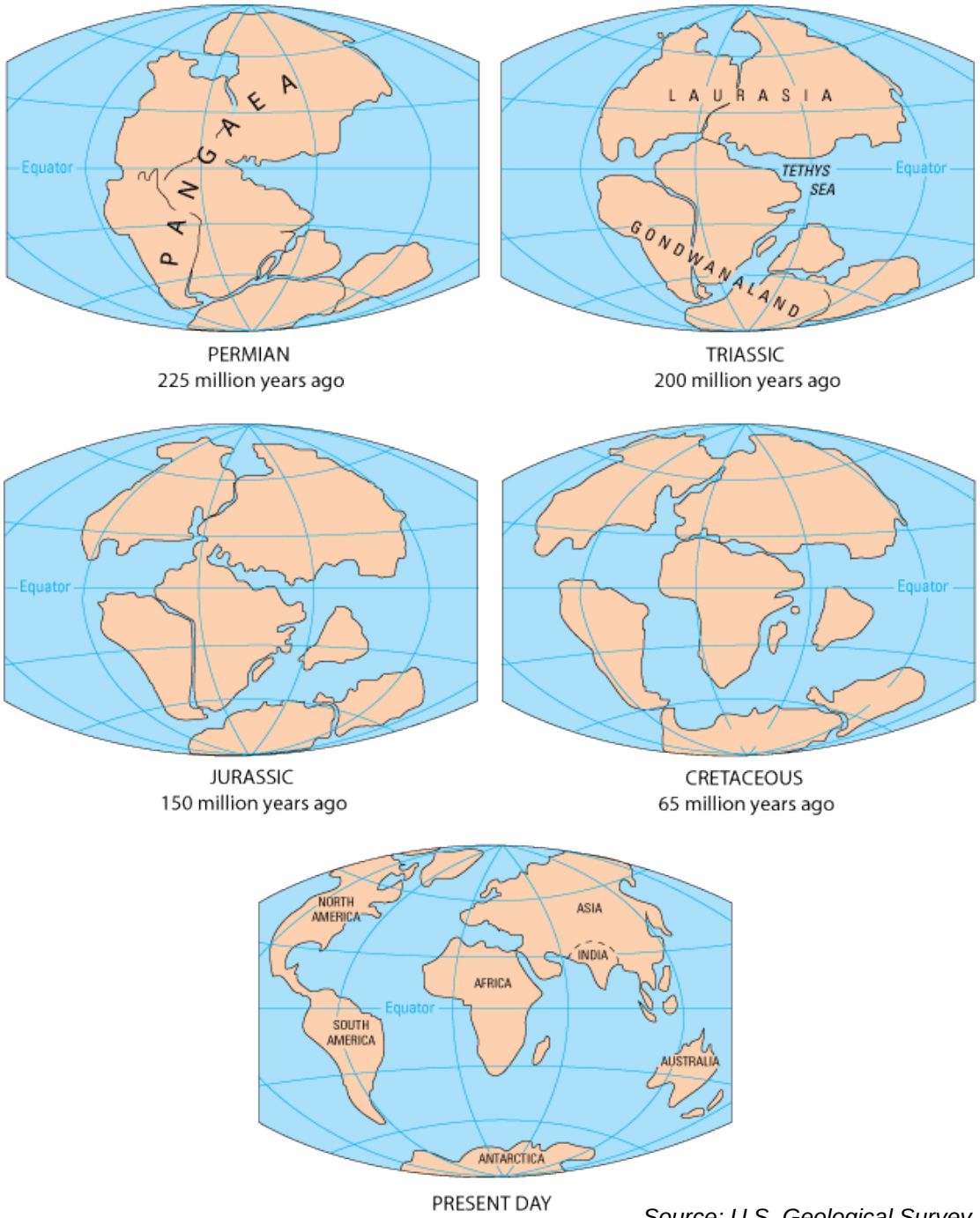
- To obtain inputs, comments or objections to the proposed exploration as part of the requirements for application for Environmental Clearance Certificate (ECC);

- The overall aim has been to make sure that local community are aware of the proposed activities in the region and local area.

Background to Petroleum (Oil and Gas) Formation, Exploration and Production) in Namibia

- 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.

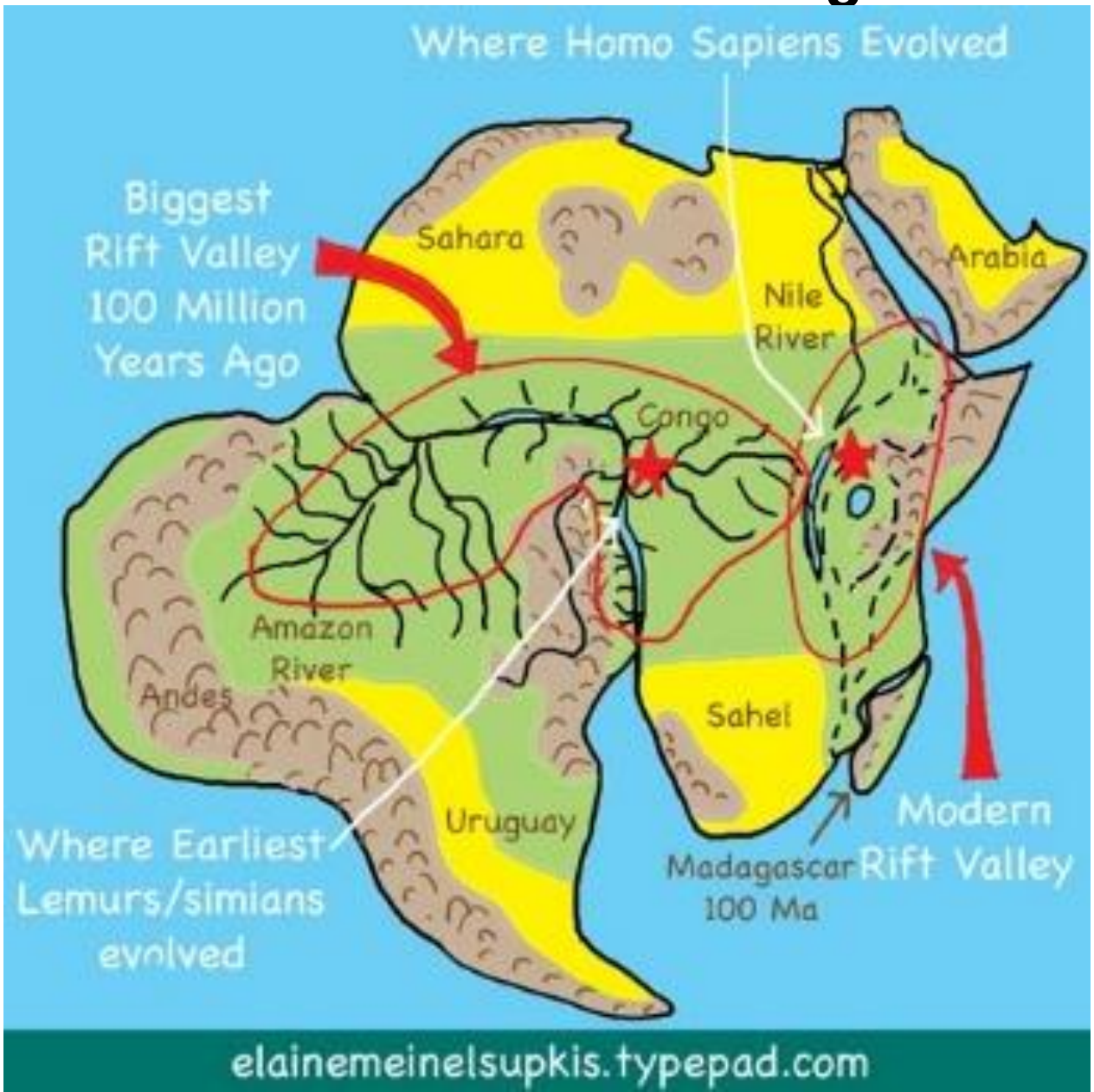


Source: U.S. Geological Survey

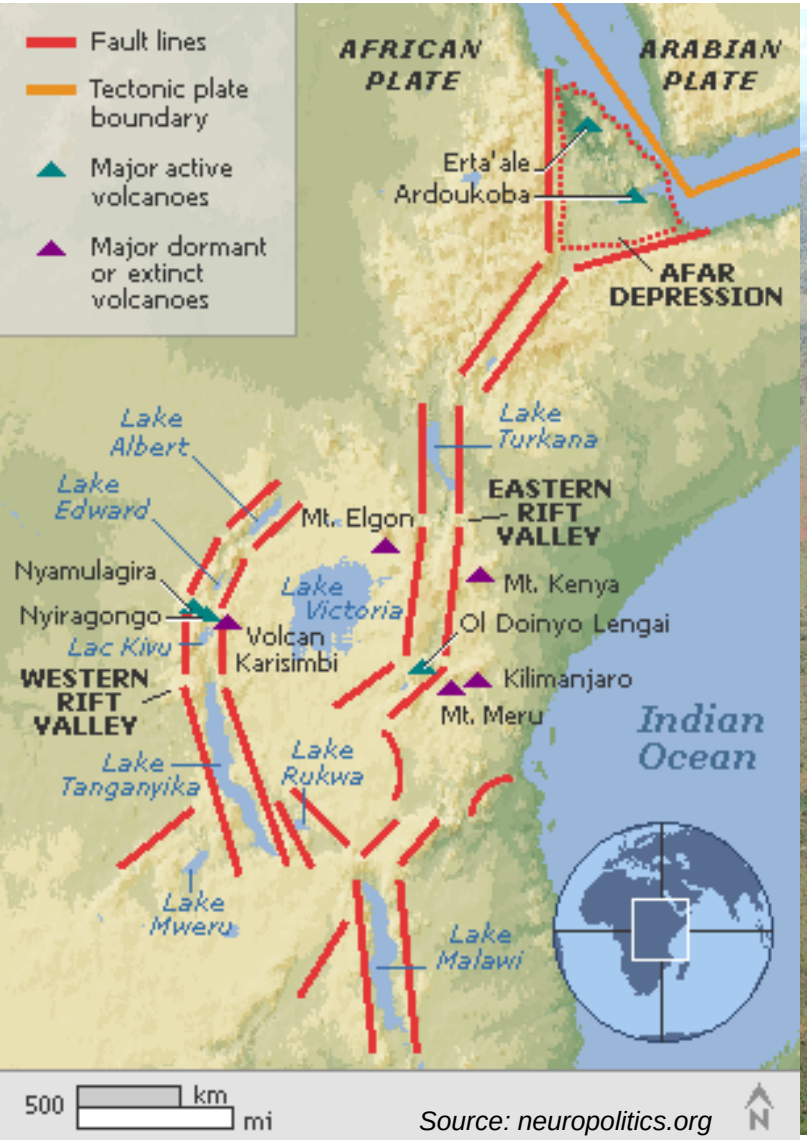
http://apexevolution.blogspot.com/2013/08/pangea-maps-eatrionet.html

MASSIMO PIETROBON - mas.pietrobon@gmail.com

Evolution of the African Continent Over Millions of Years Ago



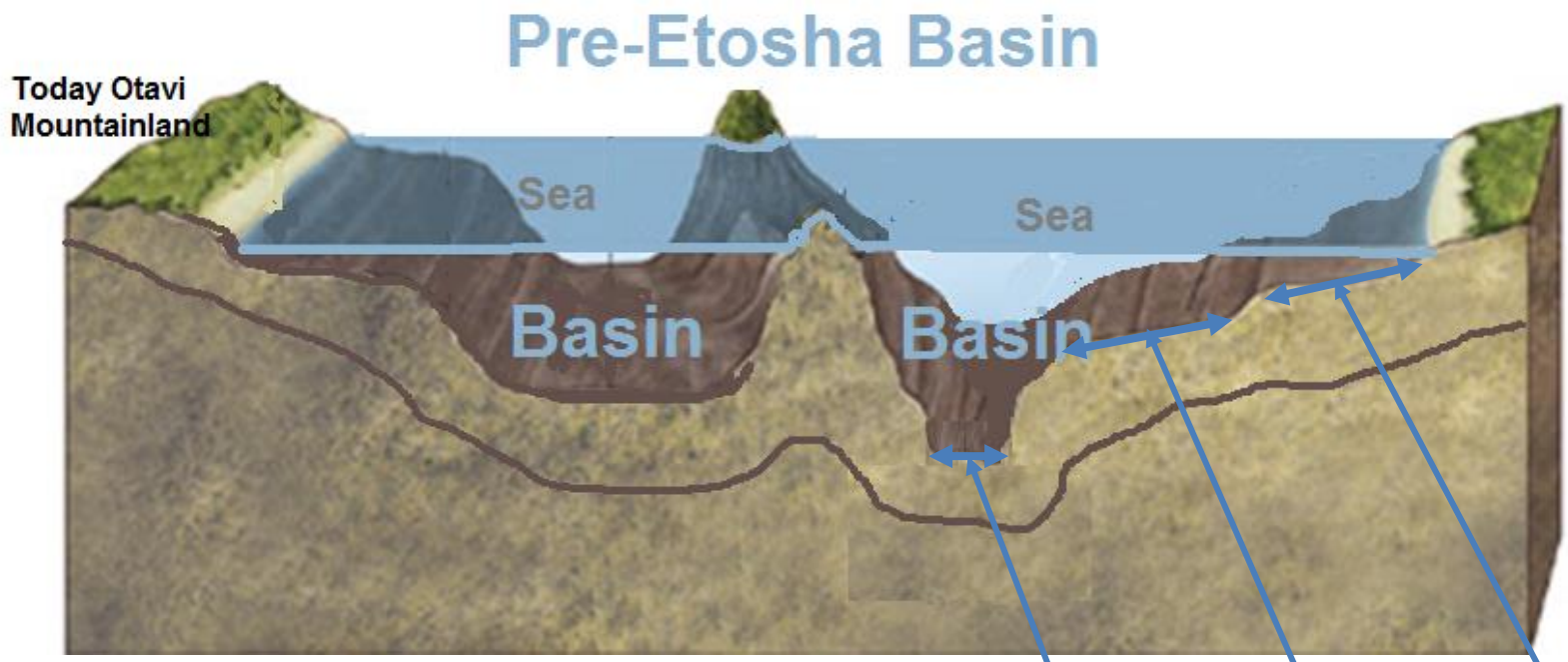
Evolution of the African Continent - Today

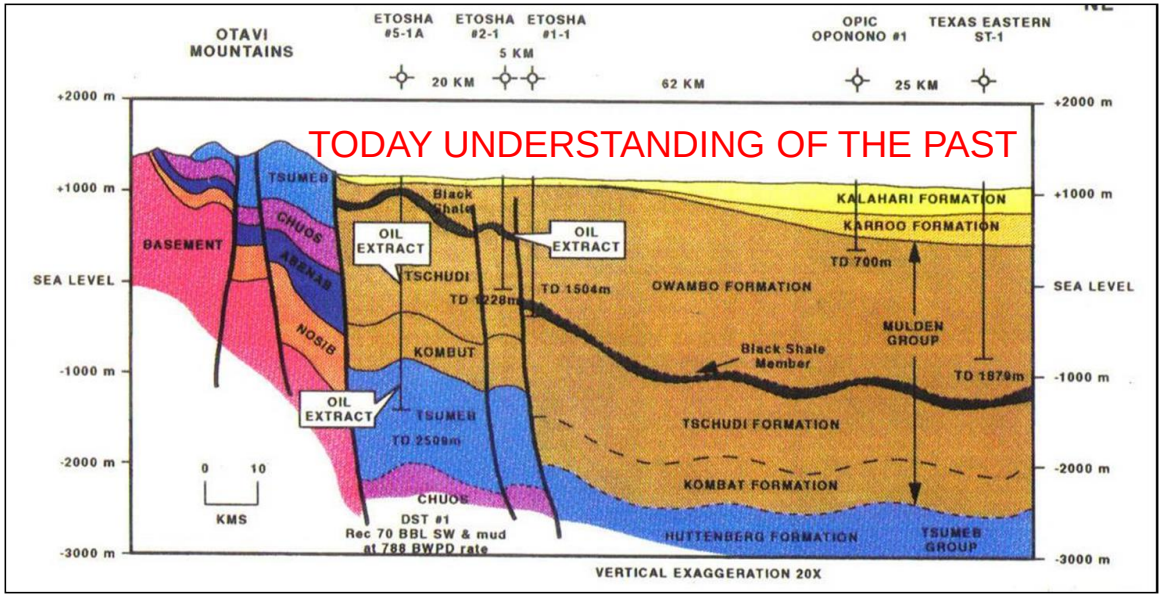


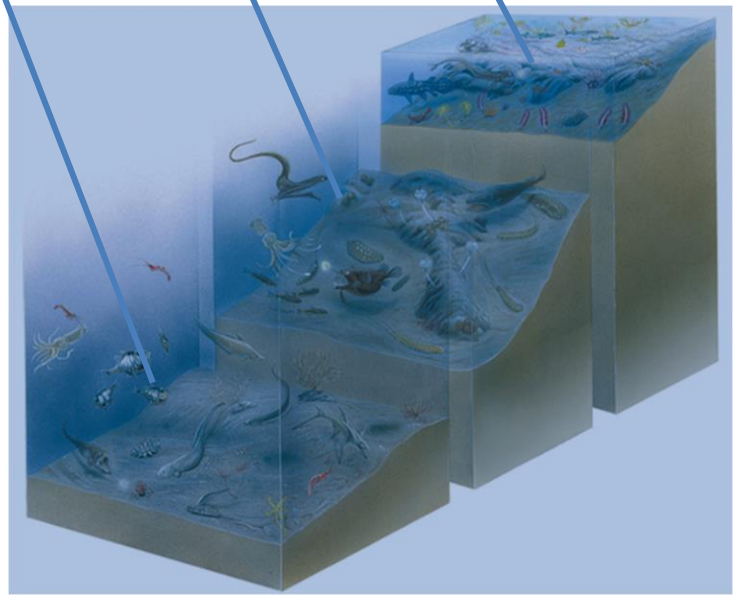
Source: neuropolitics.org

Source: galleryhip.c

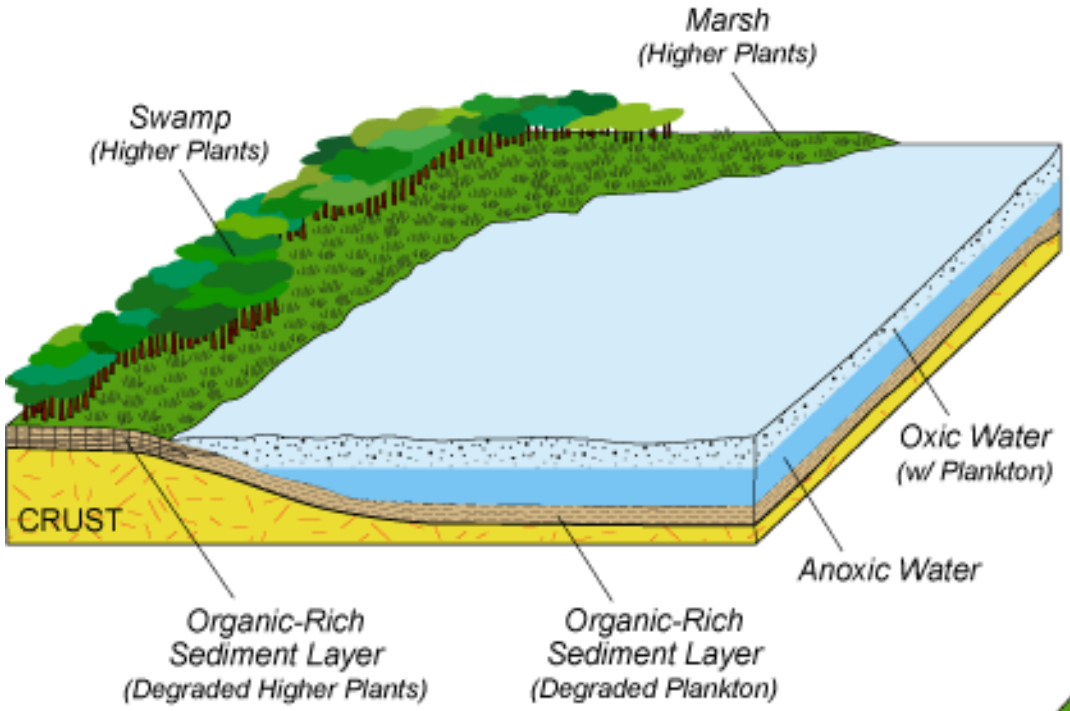
Namibia and the Etosha Basin-Million of Years Ago

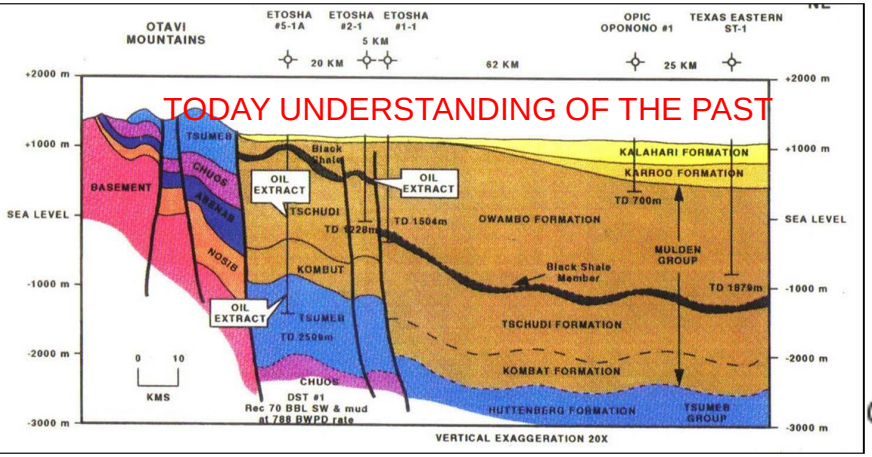


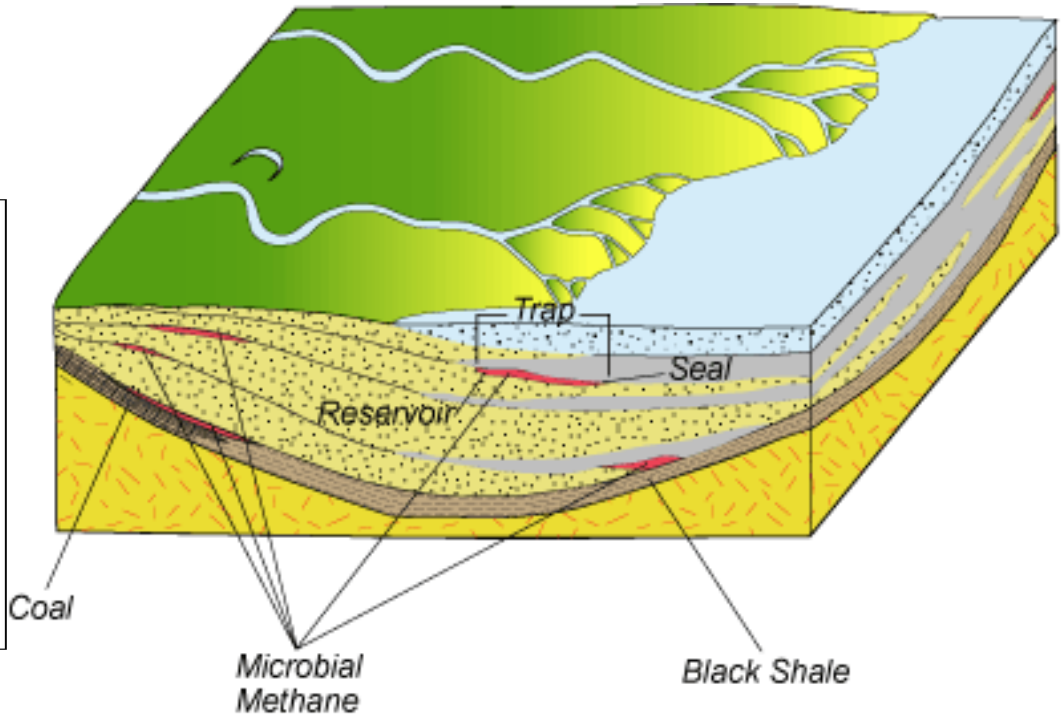




Namibia and the Etosha Basin-Million of Years Ago – *Cont.*

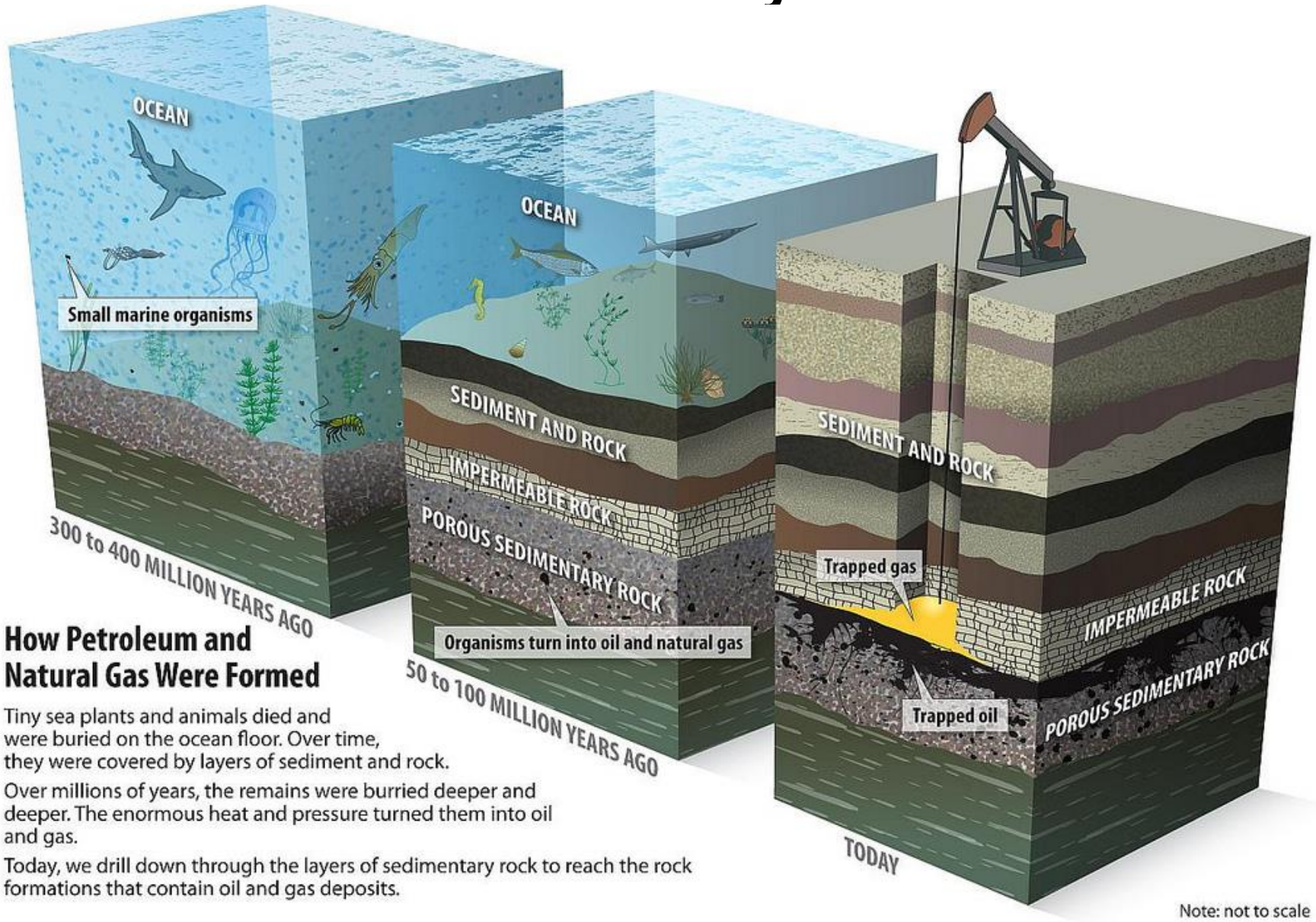






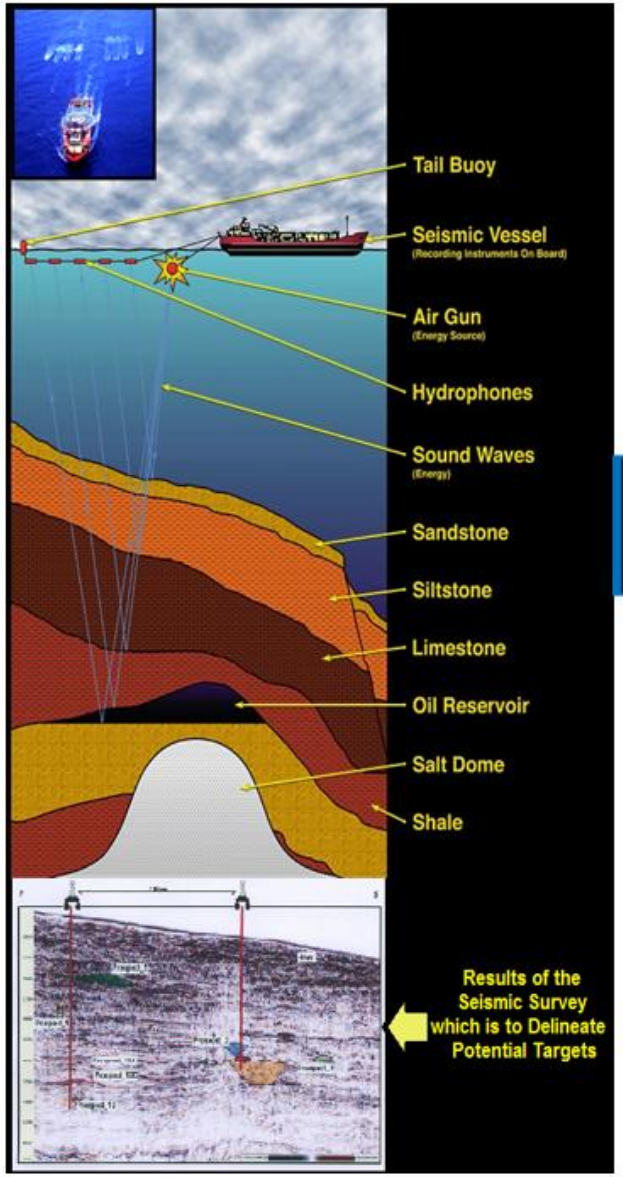
Source: energy.usgs.gov

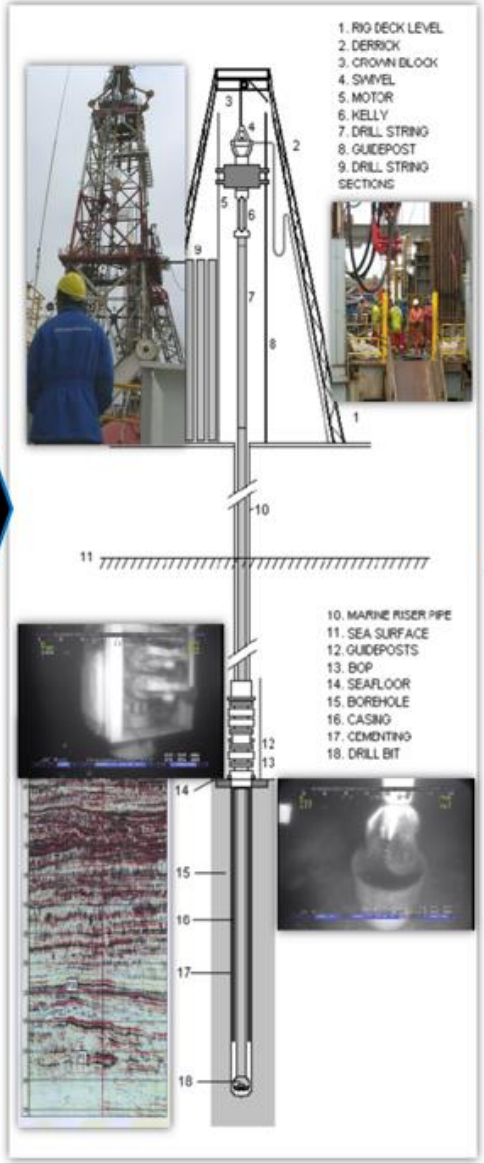
What Happened Under the Prehistoric Sea / Ocean that Covered much of Today's Namibia Basins

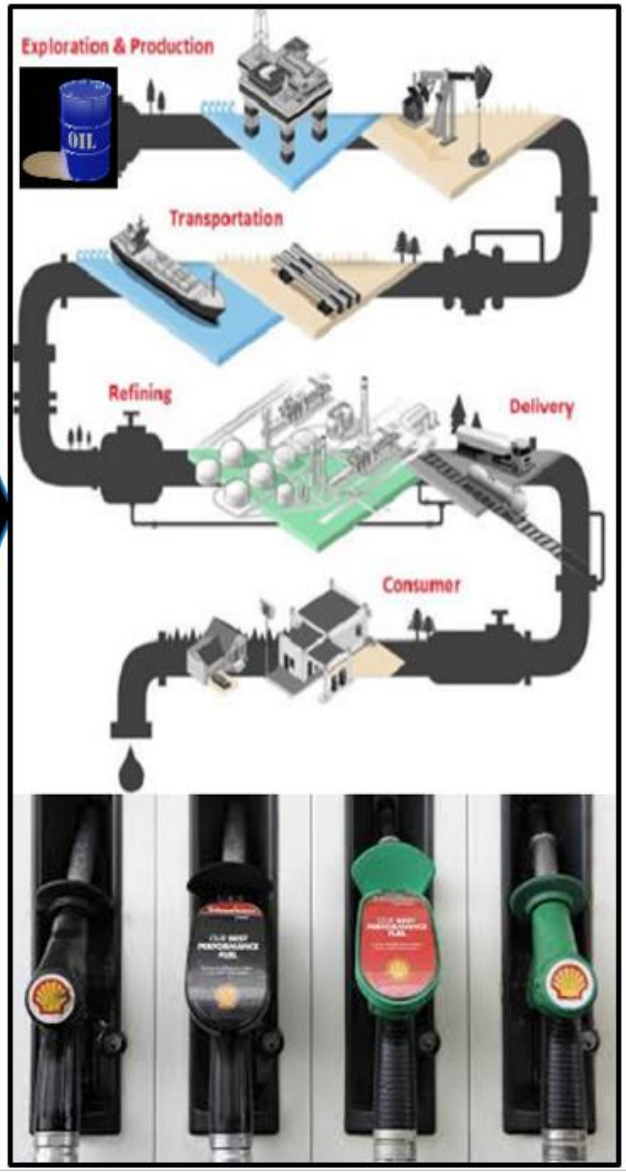


Source: letslearngeology.com

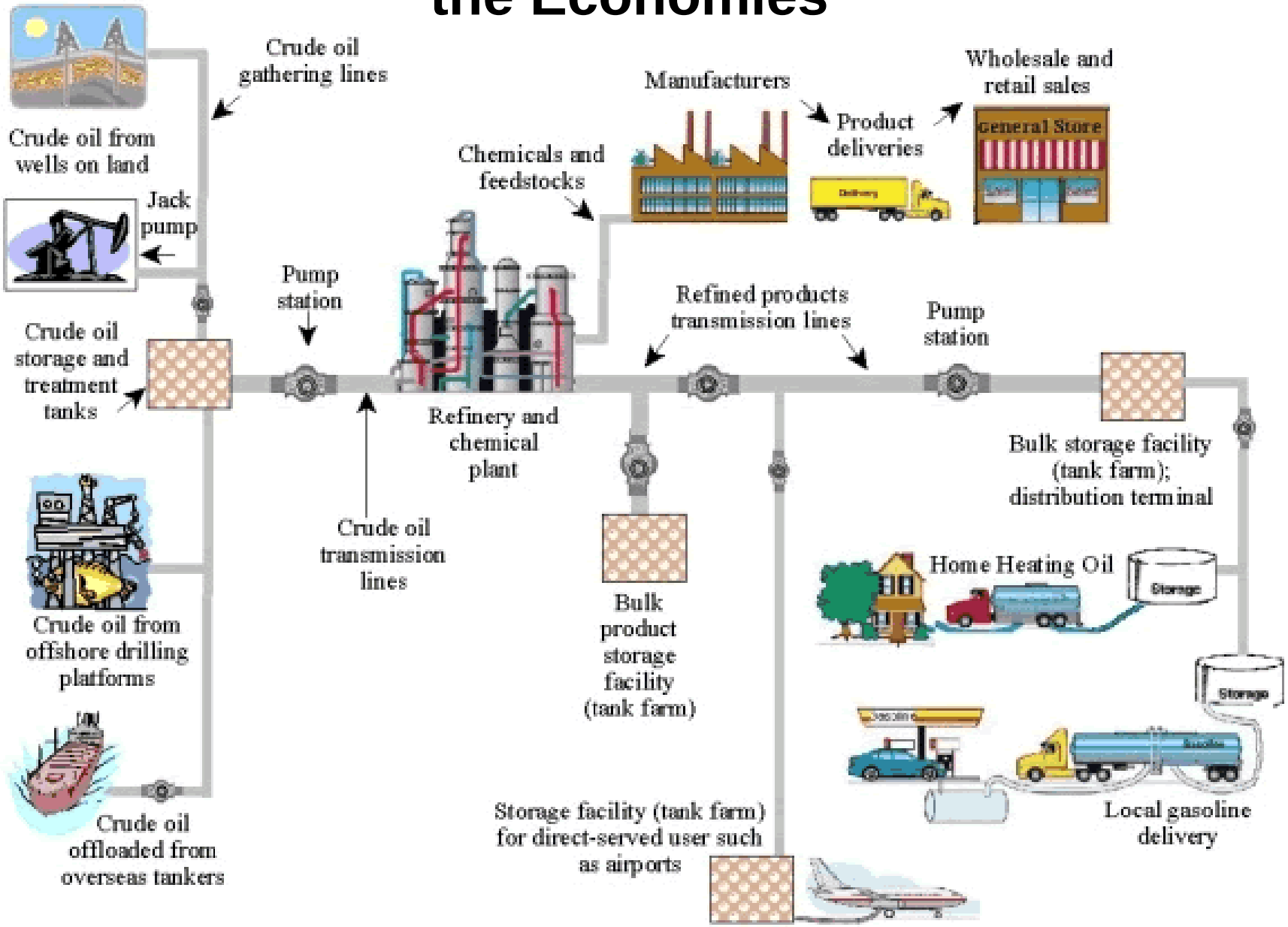
Petroleum: From Exploration to Driving the Economies



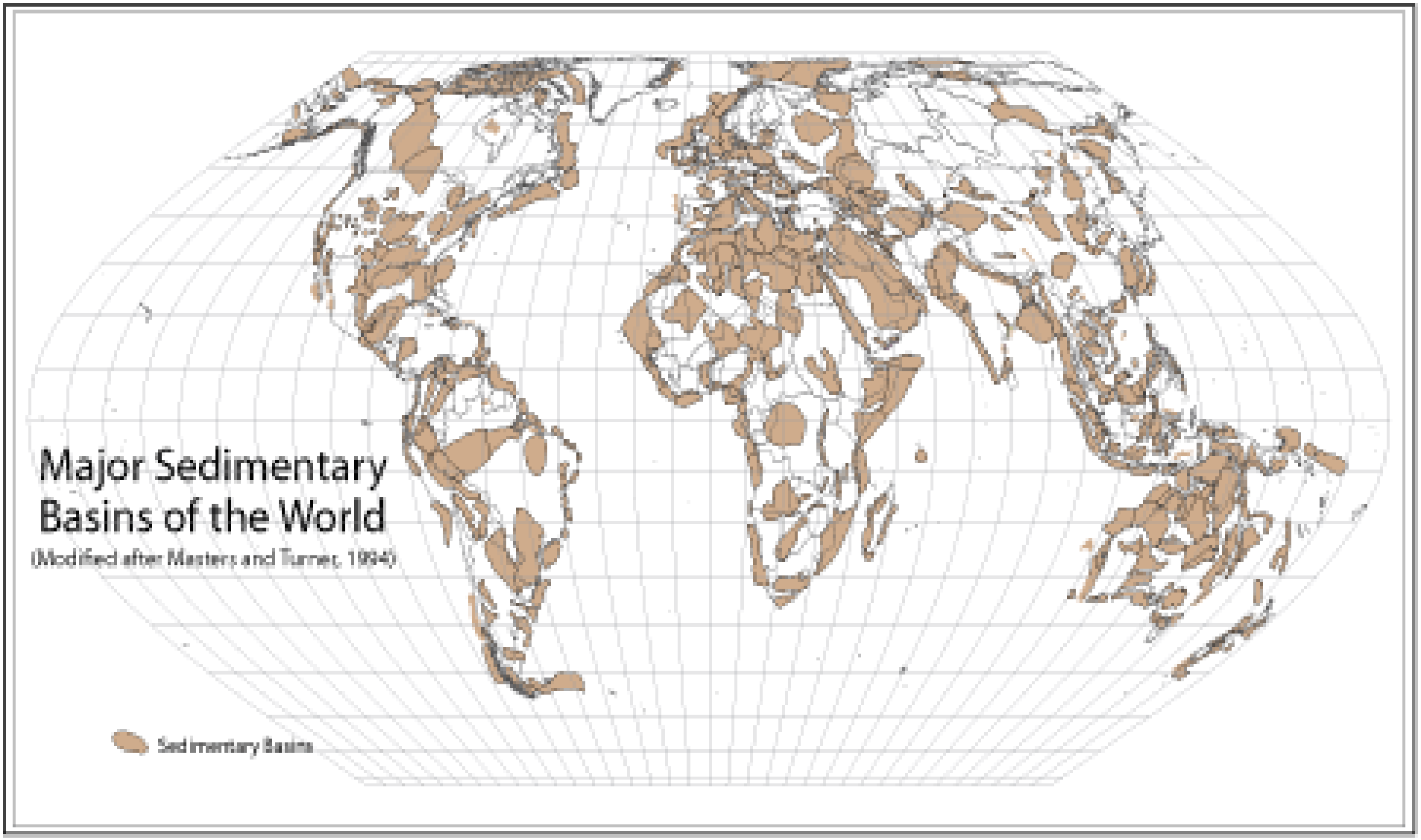




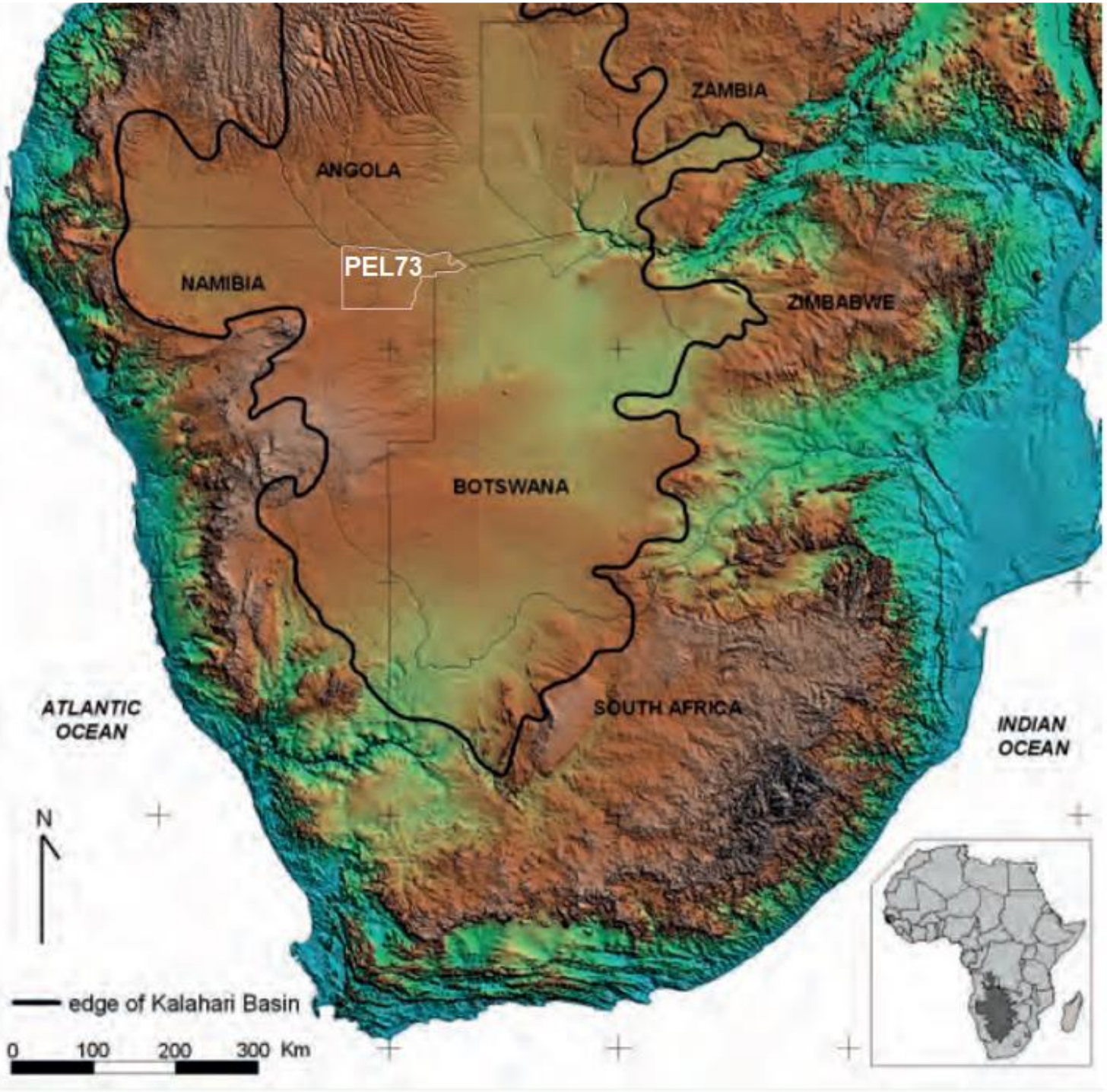
Petroleum: From Exploration to Driving the Economies



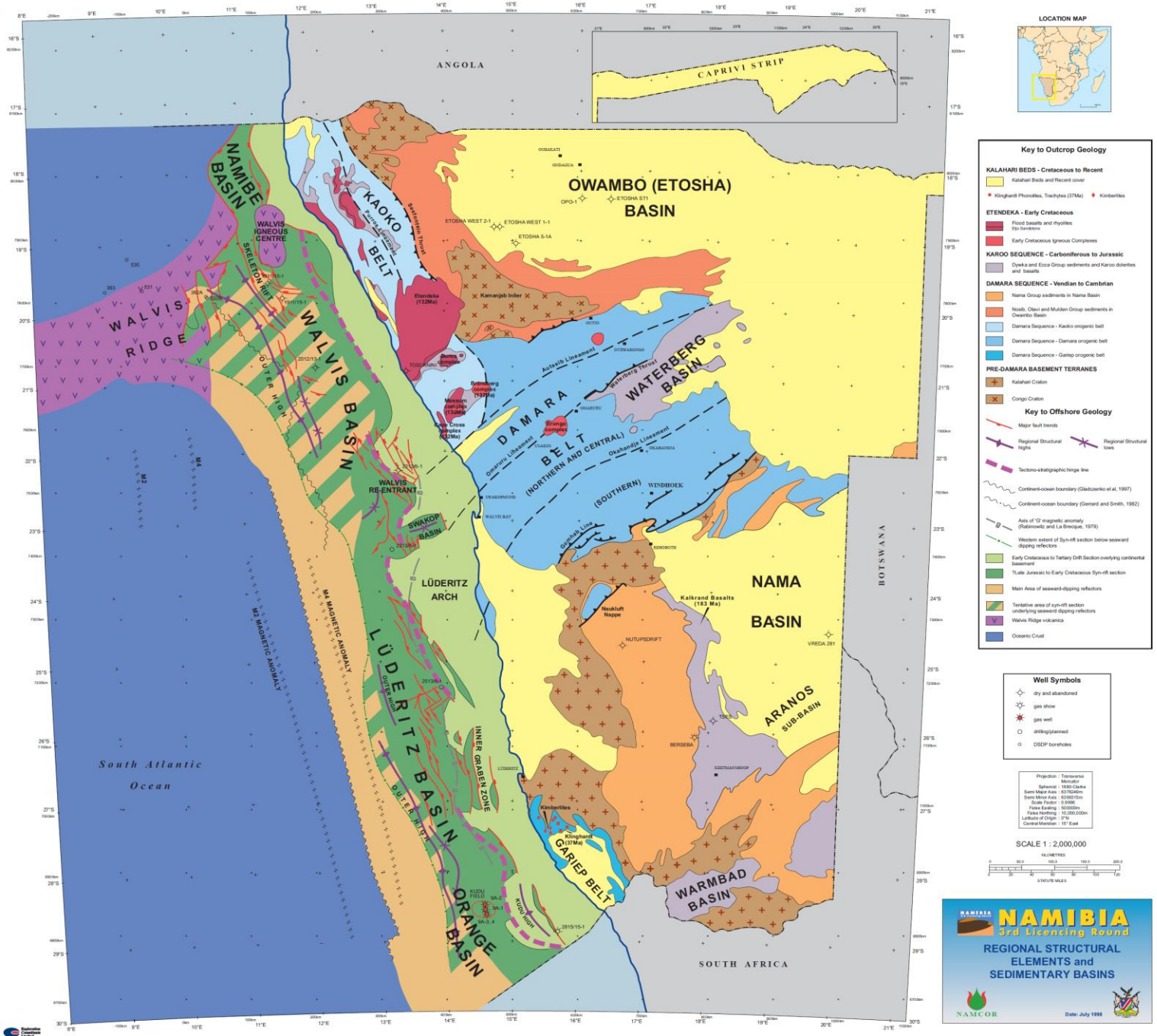
Source: U.S. Dept. of Transportation


Major Sedimentary Basins of the World
(Modified after Masters and Turner, 1994)
Sedimentary Basins

The Greater Kalahari Basin

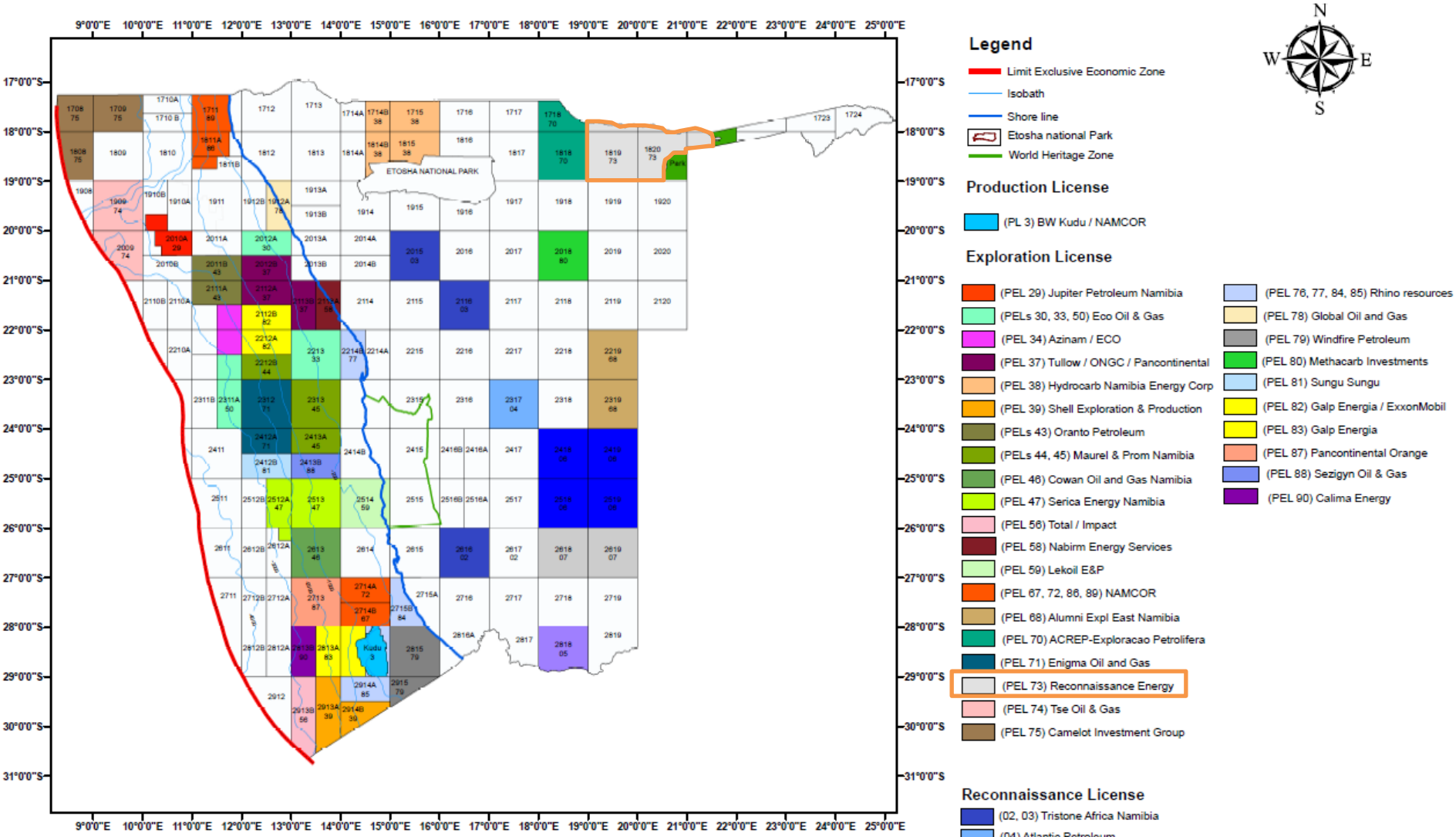


Sedimentary Basins of Namibia: Offshore & Onshore Basins



Etosha Basin PEL 73

Hydrocarbons Map of Namibia



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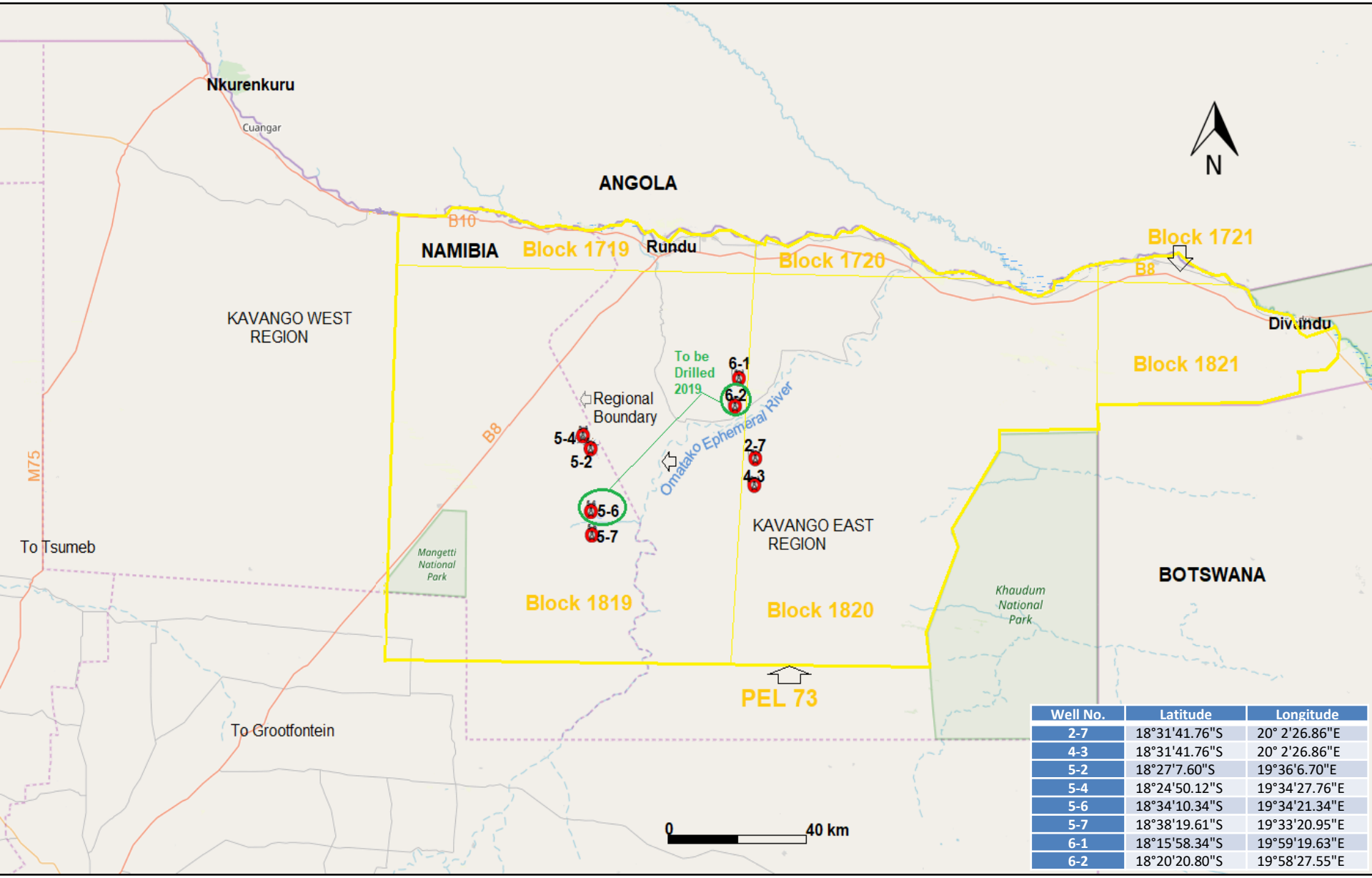
www.namcor.com.na
www.mme.gov.na

Updated: 09 August 2018

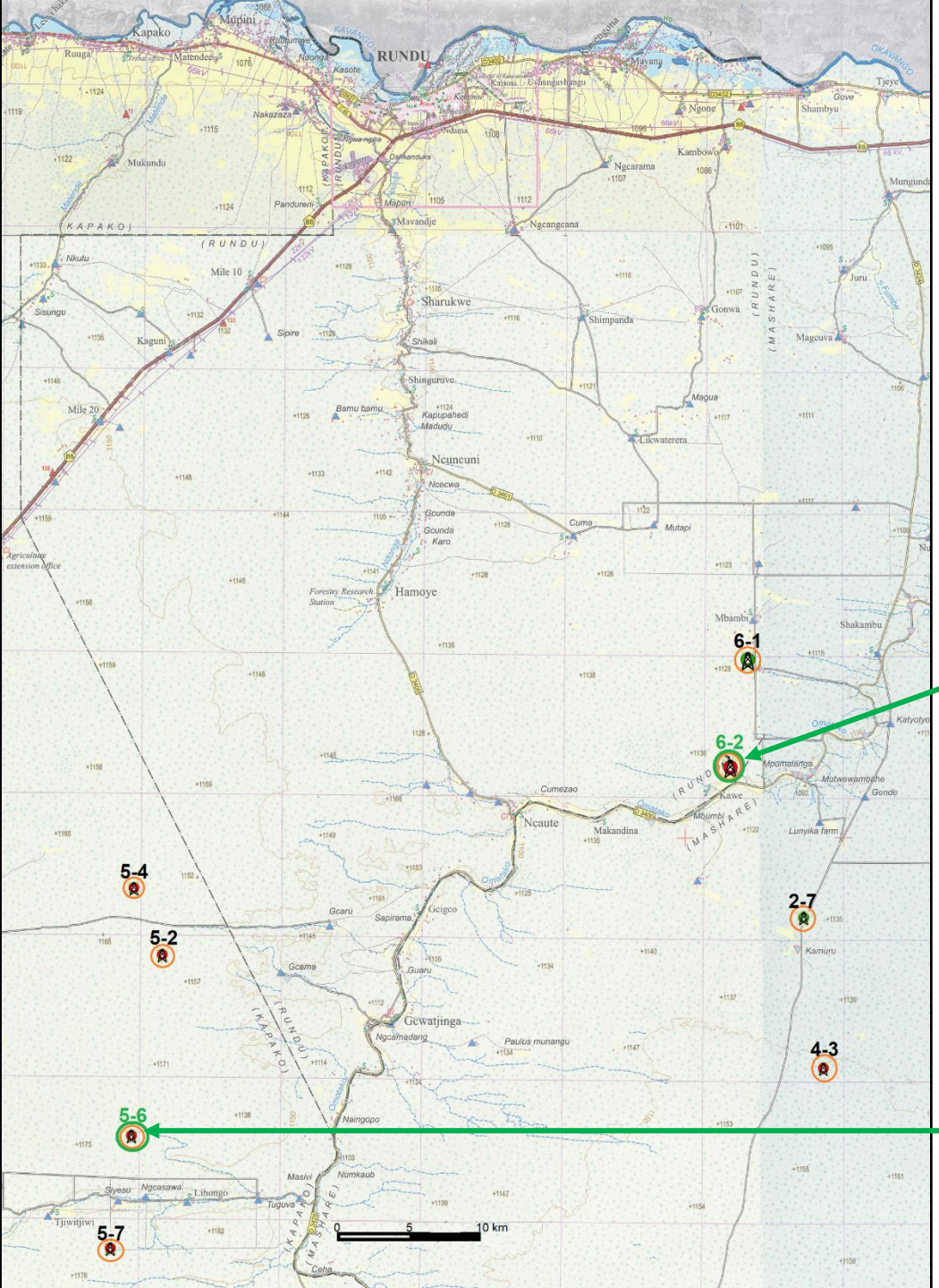
Regional Location of PEL 73 and Drilling Locations

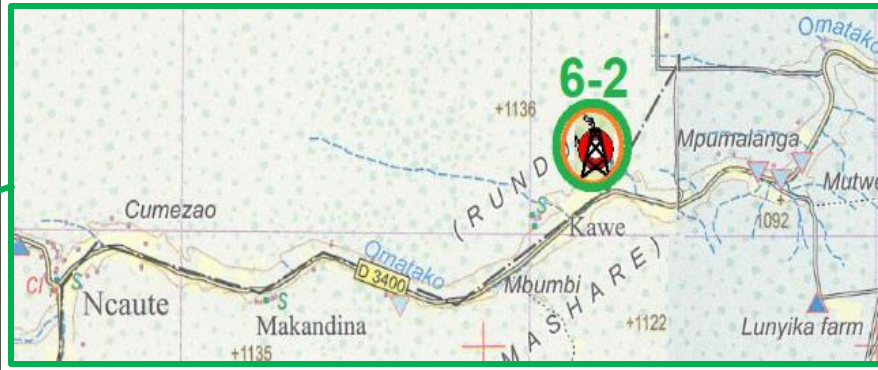


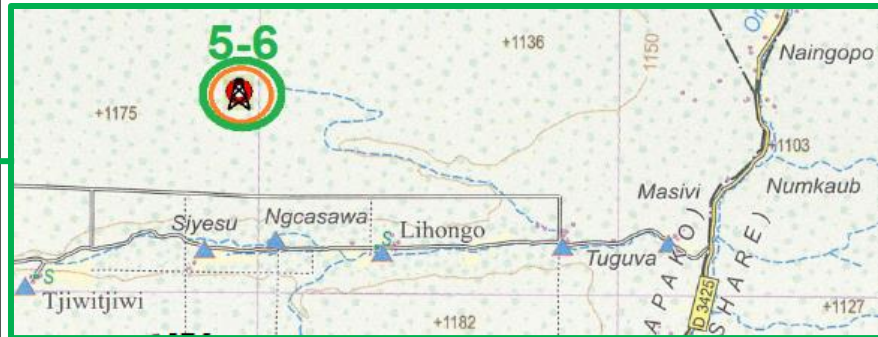
Well No.	Latitude	Longitude
2-7	18°31'41.76"S	20° 2'26.86"E
4-3	18°31'41.76"S	20° 2'26.86"E
5-2	18°27'7.60"S	19°36'6.70"E
5-4	18°24'50.12"S	19°34'27.76"E
5-6	18°34'10.34"S	19°34'21.34"E
5-7	18°38'19.61"S	19°33'20.95"E
6-1	18°15'58.34"S	19°59'19.63"E
6-2	18°20'20.80"S	19°58'27.55"E

Detailed Location of the Key Priority Selected Two (2) Drilling Sites

The current two (2) priority drilling locations 5-6 (just north of Siyesu and Ngcasawa Areas) and 6-2 (around Kawe Area along the D3400 road)







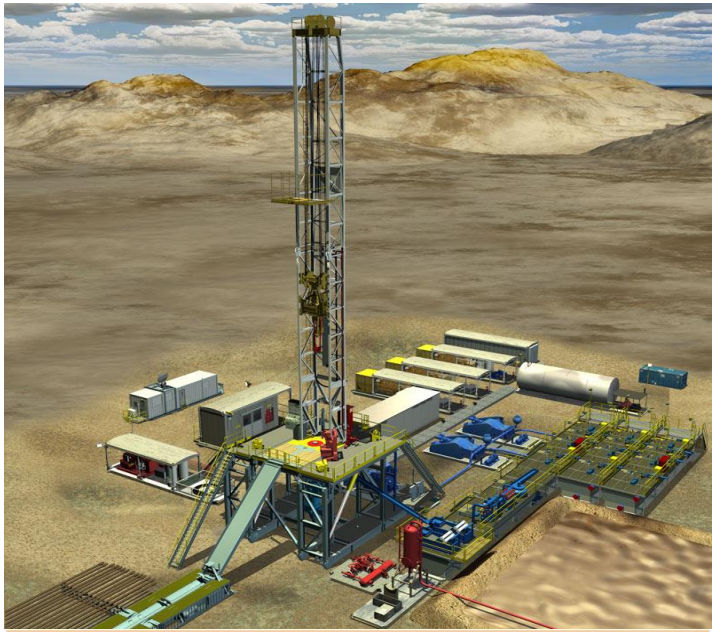
Summary of Drilling Activities

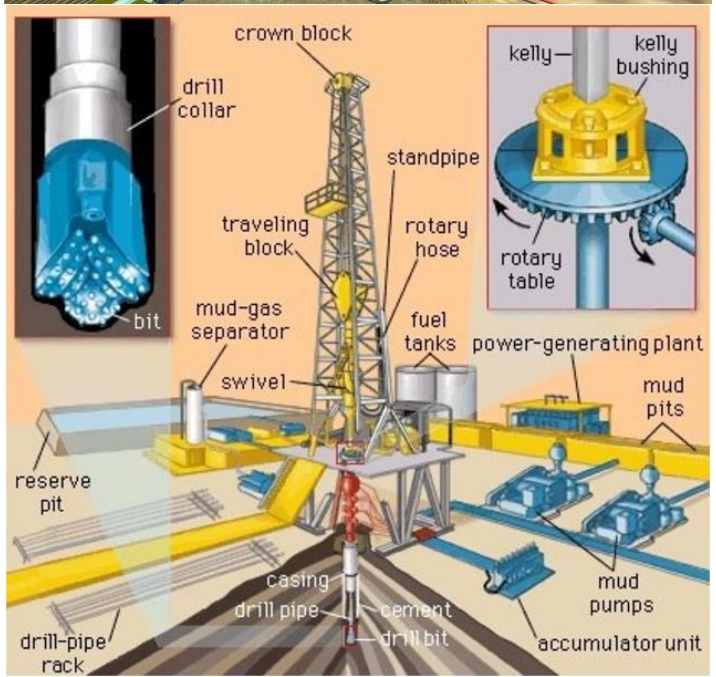
Routine and physical presence operational activities:

- Pre-construction and drilling requirements;
- Construction;
- Mobilisation;
- Spudding and Conductor casing;
- Drilling surface / intermediate and setting casing and cementing process through up 900 m;
- Drilling and continuous coring from 900 meters (2953’) to 1900 meters (6234’);
- Drilling below 1900 meters to total depth, estimated at 2500 meters (+/-8202’);
- Plug and abandon hole;
- Rehabilitate all surface disturbances and clear the site of any debris, and;
- Camp removal, site closure / abandonment.

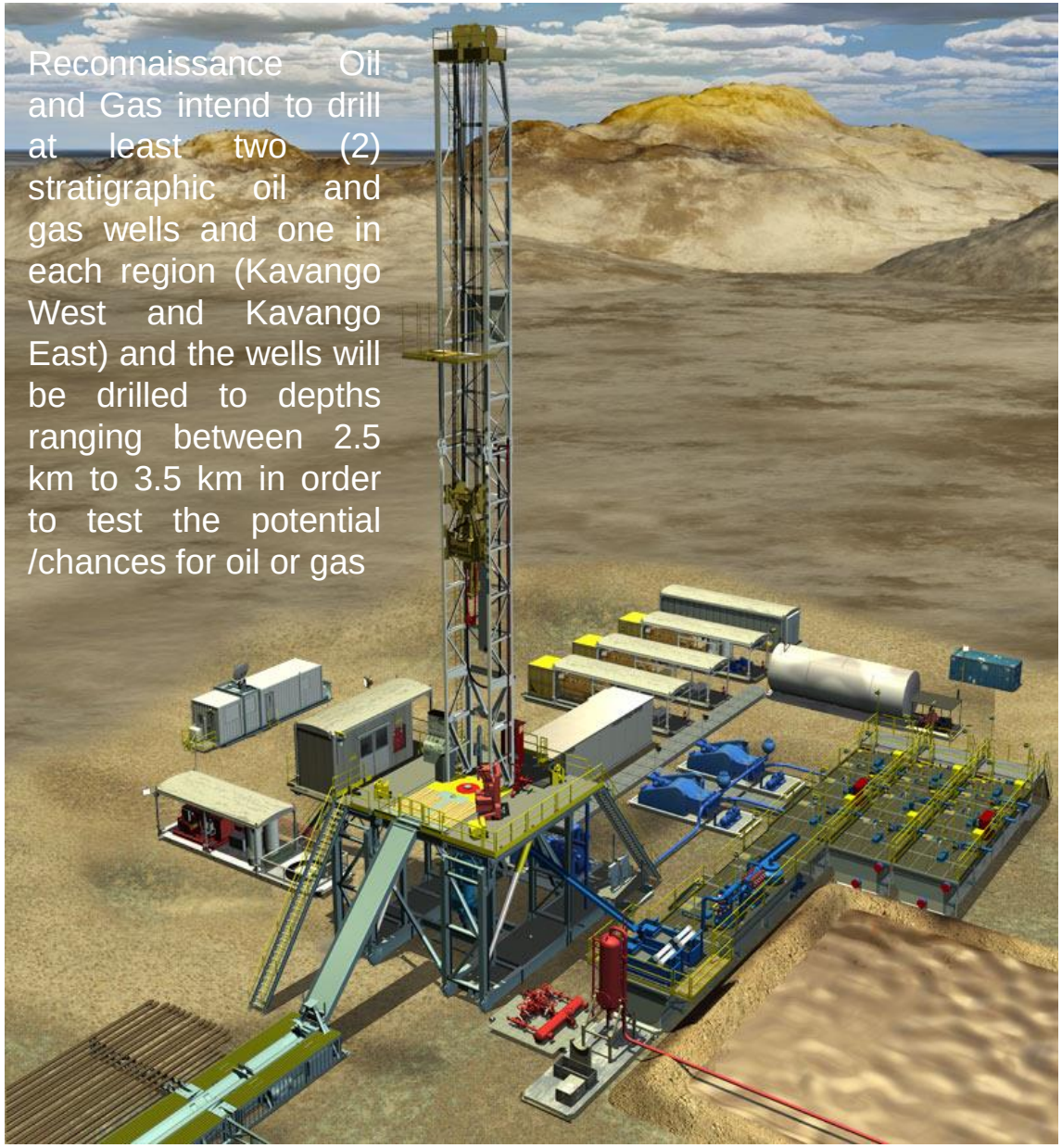
Unplanned accidental events:

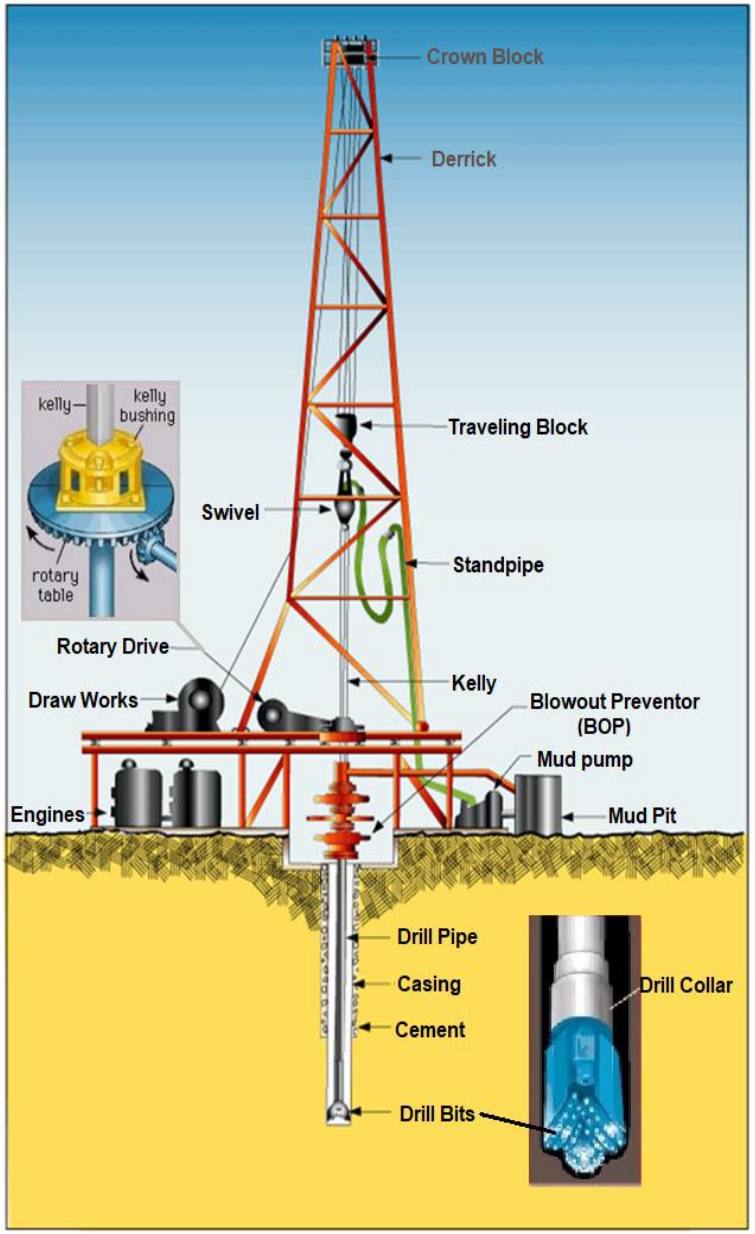
- Major land accidental incidence such as diesel / oil spill / fire / explosion.





Drilling Operations Layout and Specifications





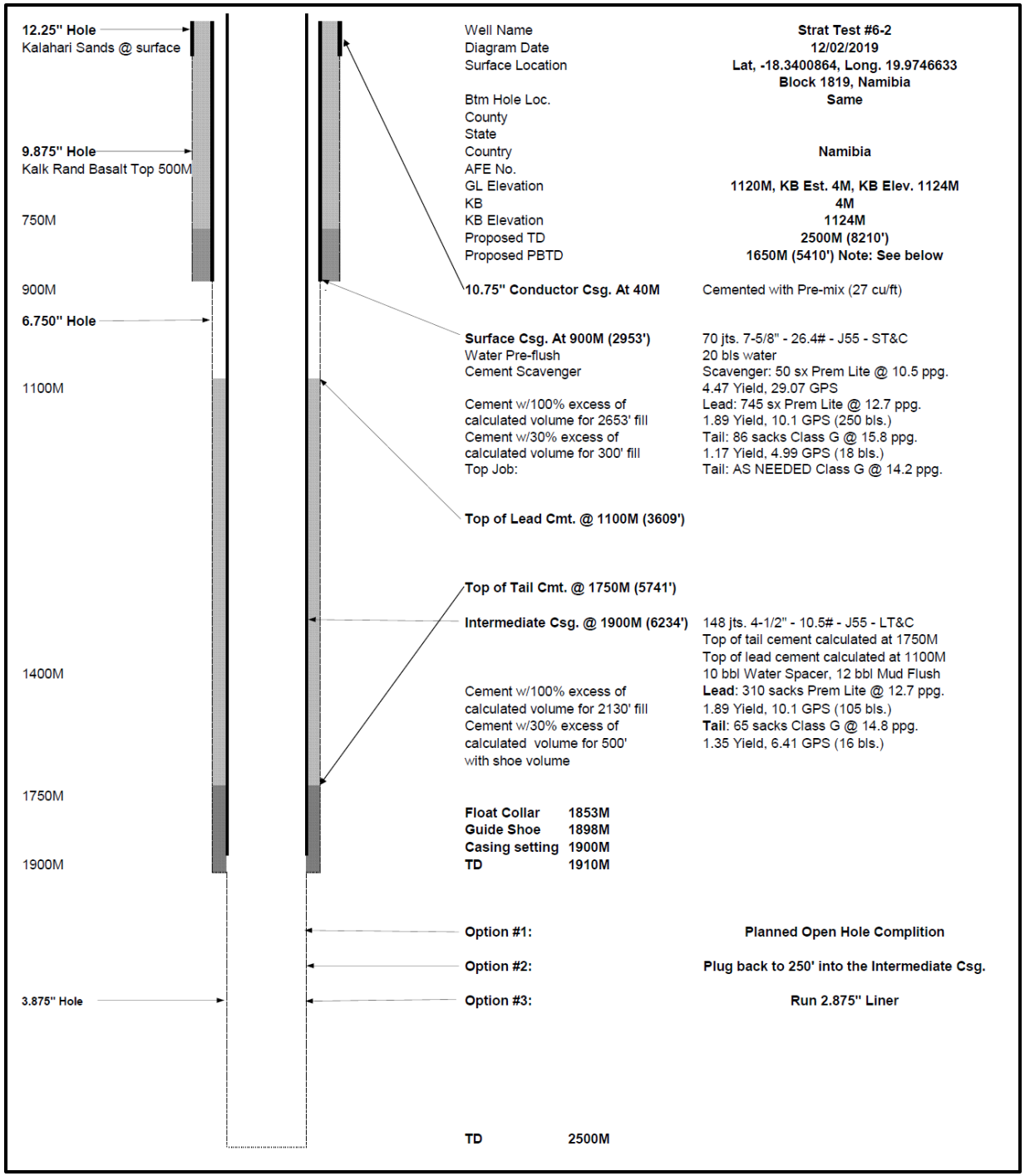
Drilling Rig Specifications

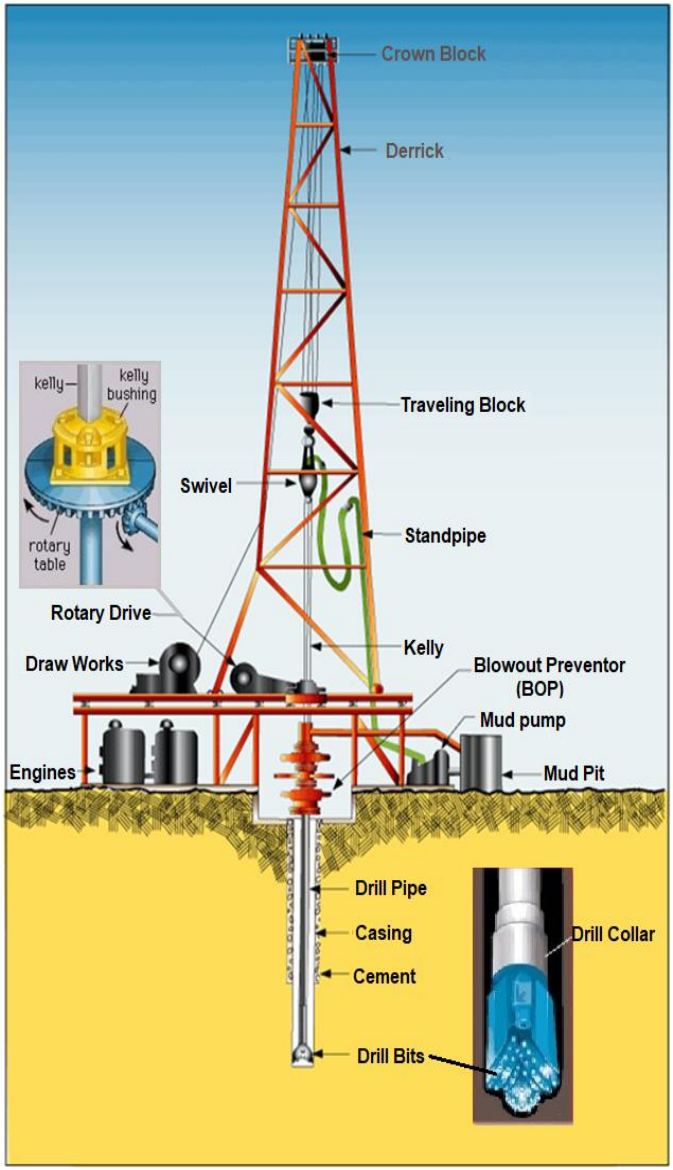
EQUIPMENT SPECIFICATIONS	
WEIGHT	
Total full weight	46 Tonne (excluding truck)
Load per rear axle	8,5 Tonne (approx.)
Tyres	Super single off road or double highway tyres
TRANSPORTING DIMENSIONS	
Length (excluding truck)	17.2 m
Height retracted	4.2 m
Width	2.5 m
OPERATING DIMENTIONS	
Length (excluding truck)	17.2 m
Height retracted	14.0 m
Height extended	23.4 m
Width	2.5 m
Clearance under table	From 1.5 m to 4,1 m with fully extended Outriggers
ENGINE	
1 x Caterpillar C27 ACERT 708kW IND C @ 1800 rpm	
Fuel tank capacity	1450 L
COOLING	
3 x Horizontal cooler for hydraulic system	
1 x Horizontal combined water, after cooler and diesel overflow	
-10° C/14° F to 50° C/122° F design temperature	
TOP DRIVE	
Drive type	Hydraulic
Maximum torque	36 kNm (intermittent)
Rotation brake	For directional drilling
Hydraulic pull-down	200 kN
Hydraulic pull-up	900 kN
Rotary Speed	Variable step less control with torque limiter
Torque & Speed at Gear 3	5 220 Nm (320) bar @ 330 rpm (360 l/min) – nominal
Torque & Speed at Gear 2	20 870 Nm (320) bar @ 82 rpm (360 l/min) – nominal
Torque & Speed at Gear 1	536 000 Nm (320) bar @ 43 rpm (360 l/min) – nominal
Drive through hole	5"
Float Sub & Sub Saver	100mm float
FEED SYSTEM	
Cylinder size	280/200mm
Feed cylinder stroke	2 x 4100mm
Max pressure	350 bar
Pull up	900 kN
Pull down	200 kN
Pullback feed speed	Cylinder 0,4 m/sec, Top Drive 0,8 m/sec
Pull-down feed speed	52 m/min
Working clearance to table	15.9 m (including Floating Sub)

DRILL ROD AND CASING	
Drill rod	Up to range III
Casing	Up to range III
Angle drilling	Up to range II
MAST	
External Mast	Multiple closed cell rectangular sections
Internal Mast	Large diameter central section and rails
Hydraulic Mast erection	Hydraulic Cylinder
Table opening	27,5" (697 mm)
Mast slide	2500 mm
HYDRAULIC SYSTEM	
System type	Full variable flow hydraulic system with load sensing
Hydraulic tank	2400 L AUX tank plus 1000 L operating = 3400 L
Filters	On suction and pressure lines
PIPE HANDLING SYSTEM	
Rotation Angle	0° (parallel to Mast) - 130°
Mounted	2 Axle Trailer with super tyres
Operating Cabin	Also remote control of all hydraulic function
Self alignment and attached to drill Rig with hands off make and brake system	
Full range of screw and welded casings up to Range III and 24 "	

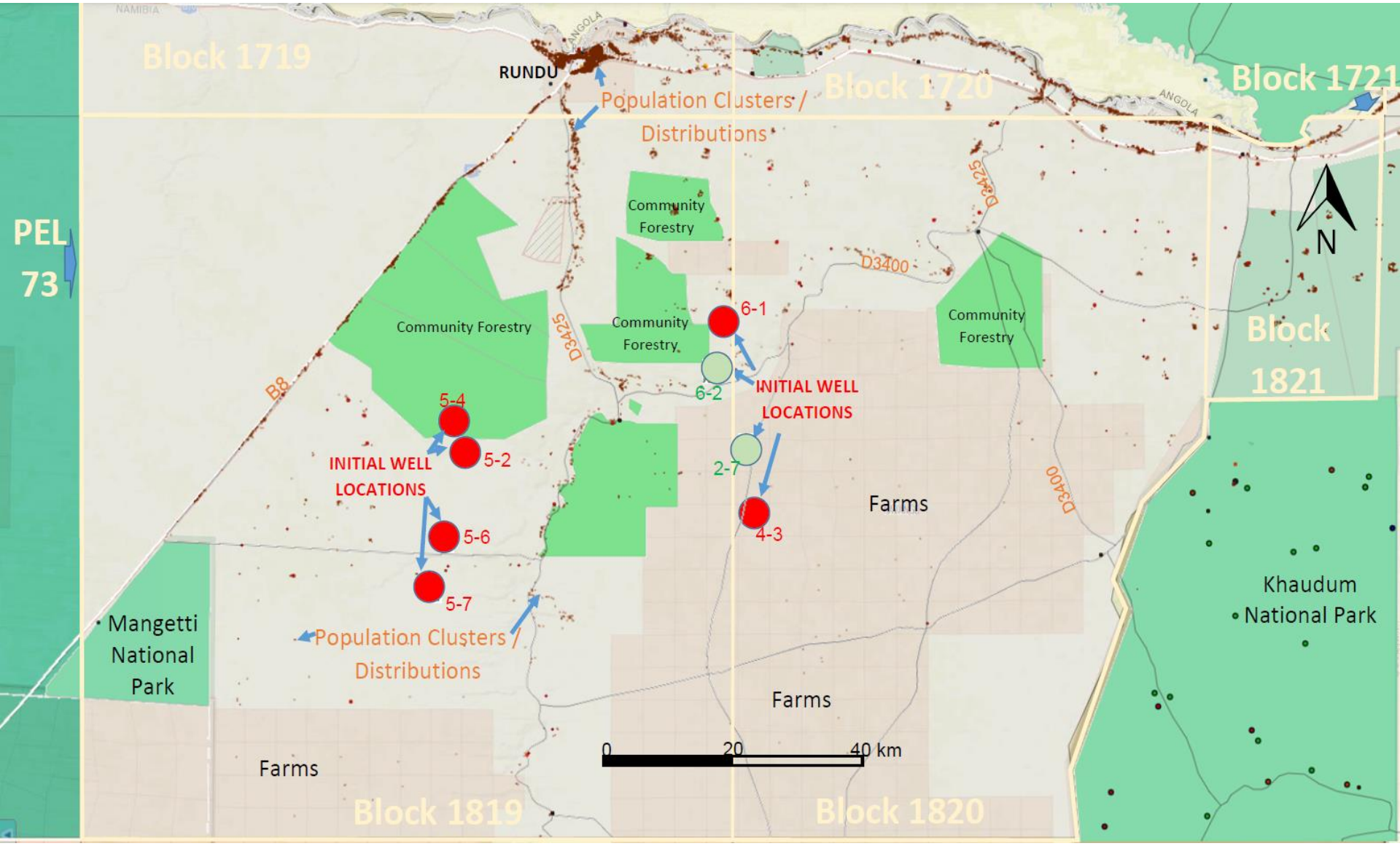
FLUID INJECTION SYSTEM	
Mission Magnum mud pump	4 x 3 x 13
FMC piston pump	220 L per min
Service winch	4 t – 24 m
Wire line winch	2 t – 1800 m of wire rope at 60 m/min
Tool lubrication for DTH	
Power break out for breaking hammer and drill collars	
Power slips	
CONTROL CABIN	
Rotating Cabin for optimal view of Mast top and Mast table	
Air-conditioning and sound abatement for operators comfort	
Ergonomic layout of controls and panels	
PAINT SPESIFICATIONS	
Three coat marine standard system with total of 400 microns DFT	

Well Specification





The Natural Environment Setting of PEL 73



The sandy track road access to Well 5-6 from the turn-off after Mangetti National Park along the tarred B8 Road to Rundu

Turn-off from the sandy track road access to Well 5-6 Location

Well 5-6 Location General Overview


The D3400 main Access Road to Well 6-2 Location After Kawe Settlement

Sandy Access to Well 6-2 Location coming Off the D3400 main Access Road After Kawe Settlement

Well 6-2 Location General Overview

Summary of Natural Environment of PEL 73

COMPONENT	CHARACTERISTICS	DESCRIPTION
PHYSICAL	Climate	588 mm with up to 700 mm around the northeaster portion of along the Okavango River. Averages 23°C with highest on average in November, at above 26°Cand lowest average temperatures in the year occur in July, when it is around 18 °C.
	Land Ownership	The proposed project falls within the Kavango West and Kavango East Regions land falling under communal land ownership (State land)
	Air Quality	With limited industrial base, the local air quality is good
	Water	Water supply for drilling operations will be from groundwater resources
	Geology	Local geology comprises carbonates with calcretes, sands and gravels locally covering the rock outcrops in some places
BIOLOGICAL	Fauna	It is estimated that at least 73 species of reptile, 24 amphibian, 119 mammal, 365 bird species (breeding residents), 131 larger trees and shrubs (>1m in height) and 119 species of grasses occur in the general area of which a large proportion are threatened by over utilization and habitat destruction. If herbs and “lower” plants (e.g. algae, lichens, etc.) were to be included, this would undoubtedly increase the floral composition of the area tremendously.
	Flora	
	Sensitive Habitats	The area along the Okavango River (north part of the license) is regarded as the most sensitive zone with respect to fauna, flora and socioeconomic setting of the license area.
SOCIAL AND ECONOMIC	Socioeconomic	Overall, subsistence agriculture comprising animal husbandry (cattle and goats) and cultivation of millet and maize are an integral part of the day to day survival of the rural population. Dense pollution is along the Kavango River while the rest of the area cover by PEL 73 is sparsely populated.

Assessment of Positive Environmental Impacts

The following is the summary of the key positive impacts:

- ✓ Increased earnings to the State Revenue through rental fees as well as contributions to the training fund held by National Petroleum Corporation of Namibia, NAMCOR;
- ✓ Increased temporal contracts and employment opportunities for local services providers and local revenue circulation from ancillary (industrial support) service demands;
- ✓ Improved knowledge and understanding on the subsurface and potential natural resources
- ✓ Demand for some public services may increase;
- ✓ Unemployment may decrease;
- ✓ Utility payment increase and infrastructure may be expanded.

Assessment of Negative Environmental Impacts

1. **Fauna and Flora:** Campsite and drilling site physical disturbances, vehicles movements and actual drilling operations may affect the local fauna and the flora ***(Assessment of negative Impacts localised Low, Significant Impact: Negligible)***;

2. **Water Pollutions**: In the context of the impact assessment of the risk posed by the proposed oil and gas exploration drilling in the study area, it is concluded that most of the risk categories are ***moderate to negligible*** if proposed measures are adhered to. However, the risks associated with: aquifer pollution vulnerability, impacts due to contaminated water discharge, impacts due to tank bursts or/and pipe breaks and that associated with impacts due to backwash water have **high to moderate impacts** with regard to water resources negative impacts in the study area. **The exploration hole will be materially isolated from the rest of its immediate surrounding by cement casing/grouting and properly closed on top; else total plugging of the exploration hole is recommended**.

3. **Noise and Dusts Generation** – The proposed operations are likely to generate noise and dust from the campsite and drilling site physical disturbances, vehicles movements and actual drilling operations. Vehicle and other related noise will be limited around the operations based with no existing background noises ***(Assessment of negative Impacts localised Low, Significant Impact: Negligible)***;

Assessment of Negative Environmental Impacts – *Cont.*

4. **Air Emissions:** The main sources of air emissions are likely to be from combustion fuels from the vehicles, generators, and other equipment, vehicles and fugitive emissions (**Assessment of negative Impacts Localised Low, Significant Impact: Negligible).**

5. **Solid Waste management**: Although very limited for a very short period of time, various types of wastes are likely to be generated mainly around the proposed campsite and drilling locations. Waste management will not be an issue because necessary facilities and containers for waste management will be provided (***Assessment of negative Impacts Low, Significant Impact: Negligible)***;

6. **Liquid Waste management**: Generated mainly around the proposed campsite and drilling locations. Liquid waste management will not be an issue because chemical toilets will be provided (***Assessment of negative Impacts Low, Significant Impact: Negligible)***;

7. **General Disturbances / Cultural and Social:** Cultural Social issues will need to be considered seriously because the proposed survey area fall largely in communal land with different traditional authorities. However, the actually drilling locations do not have villages close nearby and the actual drilling locations are not fixed and can be shifted as maybe required ***(Assessment of negative Impacts Localised Low, Significant Impact: Negligible).***

Conclusions and Recommendations

- It's hereby recommended that (the proponent) be issued with the Environmental Clearance Certificate and all associated permits for the proposed petroleum exploration operations inclusive of the proposed drilling of stratigraphic wells in PEL 73.
- The local community are hereby requested to support the proposed project activities because:
  a) The data from the proposed drilling will immensely improve our knowledge and understanding on the subsurface and potential natural resources such as hydrocarbons, regional geology with minerals and groundwater resources;
  b) in an event of a discovery of an active petroleum system, the socioeconomic landscape of the two (2) Kavango regions and Namibia as a whole will be immensely and positively transformed for the benefit of all Namibians. We further request that any form of suspected oil seepages or gas smells in the areas must be reported to the Proponent or Risk-Based Solutions (RBS) CC or Office of the Hon. Governor for further investigations;
- Mitigation measures that will enhance the positive impacts and minimise the negative impacts have also been developed and management strategies are provided in the Environmental Management Plan (EMP) for implementation by the developer.

Way Forward

1. The proposed drilling is scheduled to start in November / December 2019;

2. Risk-Based Solutions will incorporate all the inputs / comments received from today's meeting in the final EIA and EMP Reports;

3. In addition to our meeting of today, additional advertisements will be published in the local newspapers in order to inform other interested and affected parties about the proposed project activities;

4. Written comments / feedback can still be send to us before **Thursday 30th May 2019;**

5. The Final EIA and EMP Reports will then be submitted to the Environmental Commissioner, Department of Environmental Affirms, Ministry of Environment and Tourism for application of Environmental Clearance Certificate on the **Friday 31st May 2019** in order to start the proposed activities;

6. Once the Environmental Clearance Certificate (ECC) and other permits such as freshwater and waste water permits, explosive imports permits and radiation sources permits have been issued, the proponent will mobilise to start the drilling operations;

7. Reconnaissance or Risk-Based Solution will inform all the stakeholders through the Offices of the Hon. Governor on the actual project start date;

8. Regular updates on the development and progress made on this project will be provided regularly all the stakeholders through the Office of the Hon Governor.

THANK YOU: OPEN DISCUSSIONS / QUESTIONS

"From the dark seafloors to the deep and even darker subsurface environments, the search for oil in Namibia continues and we at Risk-Based Solutions (RBS) will always be there delivering the solutions to the day when oil is discovered in Namibia - Dr. S. Mwiya 2014"

Risk – Based Solutions (RBS) CC

Consulting Arm of Foresight Group Namibia (Pty) Ltd

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Risk-Based Solutions (RBS) – *Delivering the Solutions*

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