



INVICTUS
ENERGY LIMITED

Invictus Energy Ltd (ASX: IVZ)

Overview Petroleum Exploration – Zimbabwe Perspective

December 2019

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COMPETENT PERSON'S STATEMENT The information in this document relating to petroleum resources and exploration results is based on information compiled by Mr Scott Macmillan. Mr Macmillan is a Reservoir Engineer and has a Bachelor of Chemical Engineering and an MSc in Petroleum Engineering from Curtin University. He is a member of the Society of Petroleum Engineers (SPE) and has over 12 years experience in the industry in exploration, field development planning, reserves and resources assessment, reservoir simulation, commercial valuations and business development. Estimated resources are unrisks and it is not certain that these resources will be commercially viable to produce.

HYDROCARBON RESOURCE ESTIMATES The Prospective Resource estimates for Invictus' SG 4571 permit presented in this report are prepared as at 26 June 2019. The estimates have been prepared by the Company in accordance with the definitions and guidelines set forth in the Petroleum Resources Management System, 2018, approved by the Society of Petroleum Engineer and have been prepared using probabilistic methods. The Prospective Resource estimates are unrisks and have not been adjusted for both an associated chance of discovery and a chance of development. The Company confirms that there have not been any material changes to the resource estimate since the release of the updated Prospective Resource Estimate on 1 July 2019. For further details on the Prospective Resource refer to the 1 July 2019 ASX announcement the Company is not aware of any new information and that all material assumptions and technical parameters underpinning prospective resource estimate continue to apply and have not materially changed



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Oil & Gas Industry Overview



Petroleum Industry Chain



Upstream



- Exploration & production
- Companies explore for oil and gas fields
- Discovered fields developed and petroleum produced

Midstream



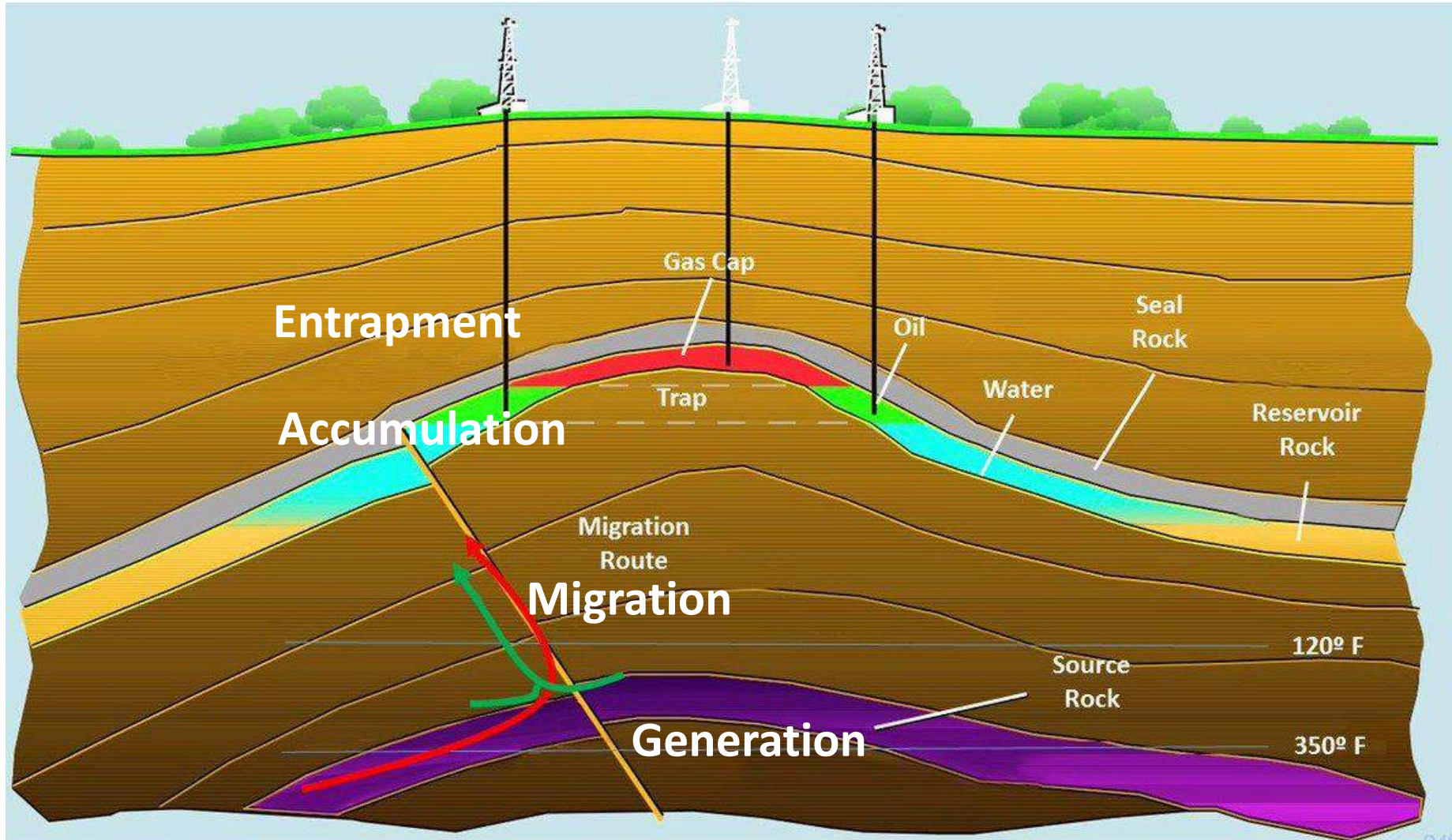
- Transportation of oil and natural gas
- Shipping
- Pipelines
- LNG terminals

Downstream



- Refinery processes crude oil to produce different products
- Petrochemical plants, gas to liquids, gas to power, fertiliser
- Petrol, diesel, jet fuel, gas, polymers, plastics and other products

Petroleum System Overview



Petroleum System Fundamentals

Timing – Synchronised

Seal – Impermeable layer prevent leak surface

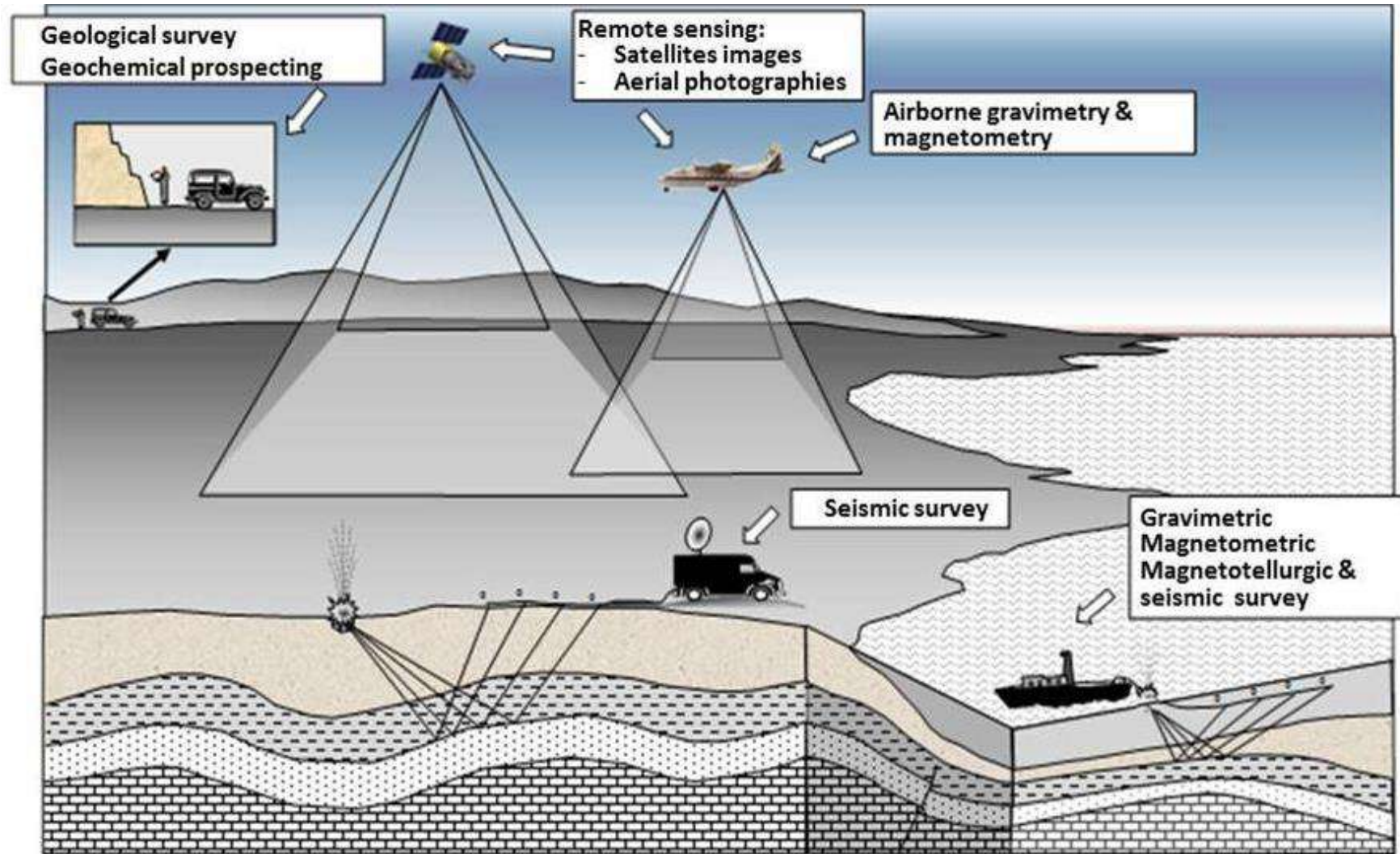
Trap – Structure oil / gas accumulation

Reservoirs – Perm / Porosity

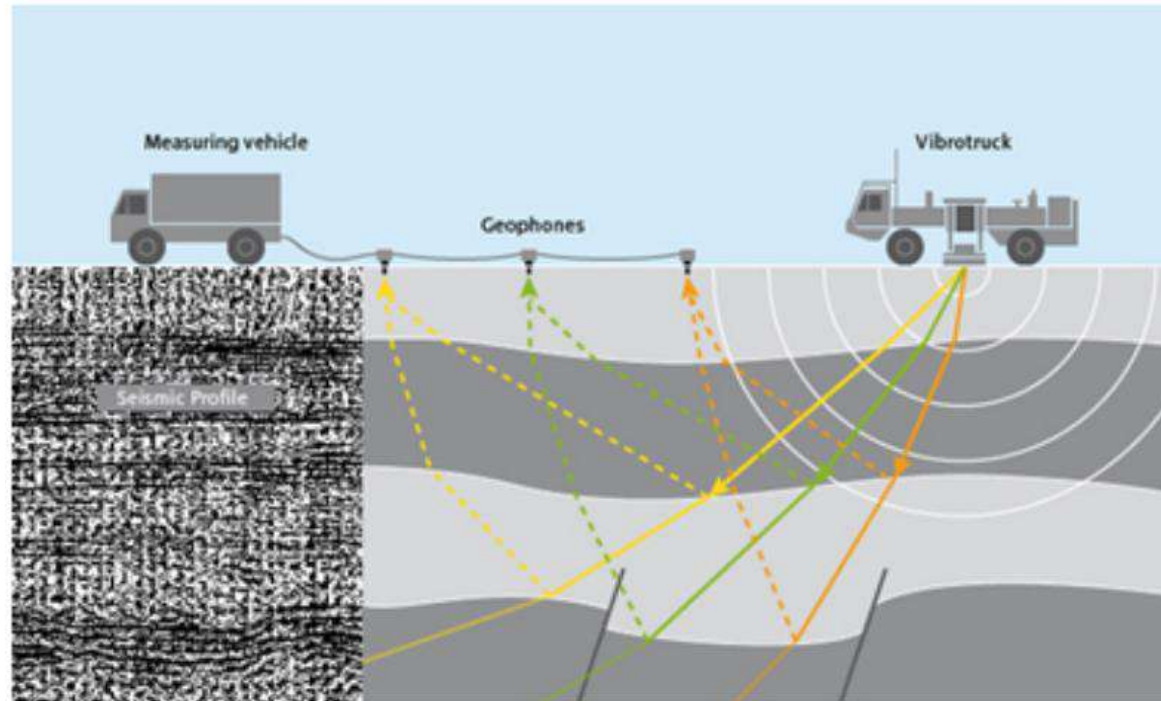
Migration - Pathways

Source – Organic matter generate Oil / Gas

Main Petroleum Exploration Techniques



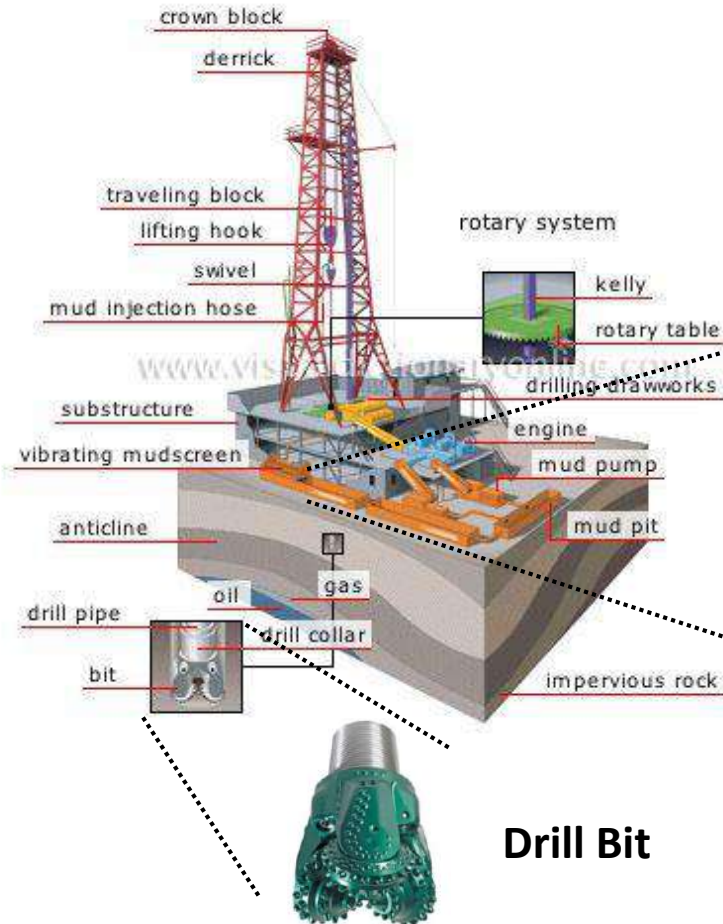
Seismic Acquisition



Well Drilling & Construction



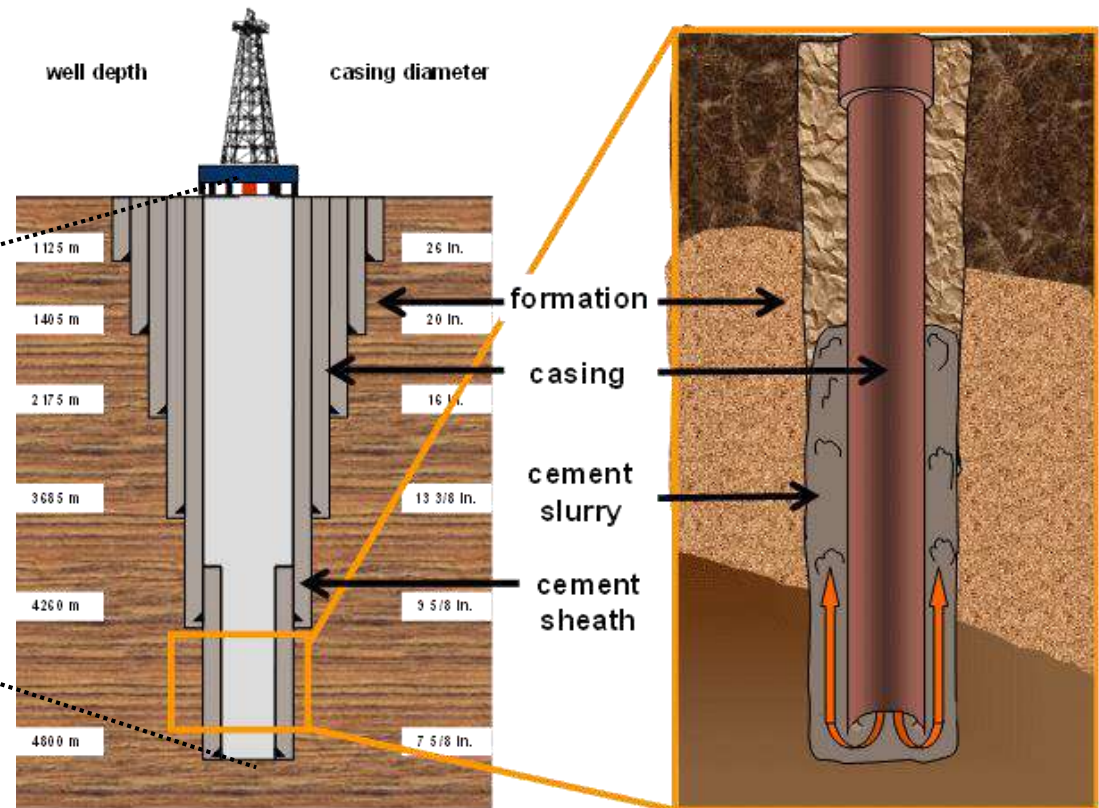
Drilling Rig Schematic



Drill Bit



Well Construction



Drilling Overview

Senecio-3 Well, Perth Basin Australia



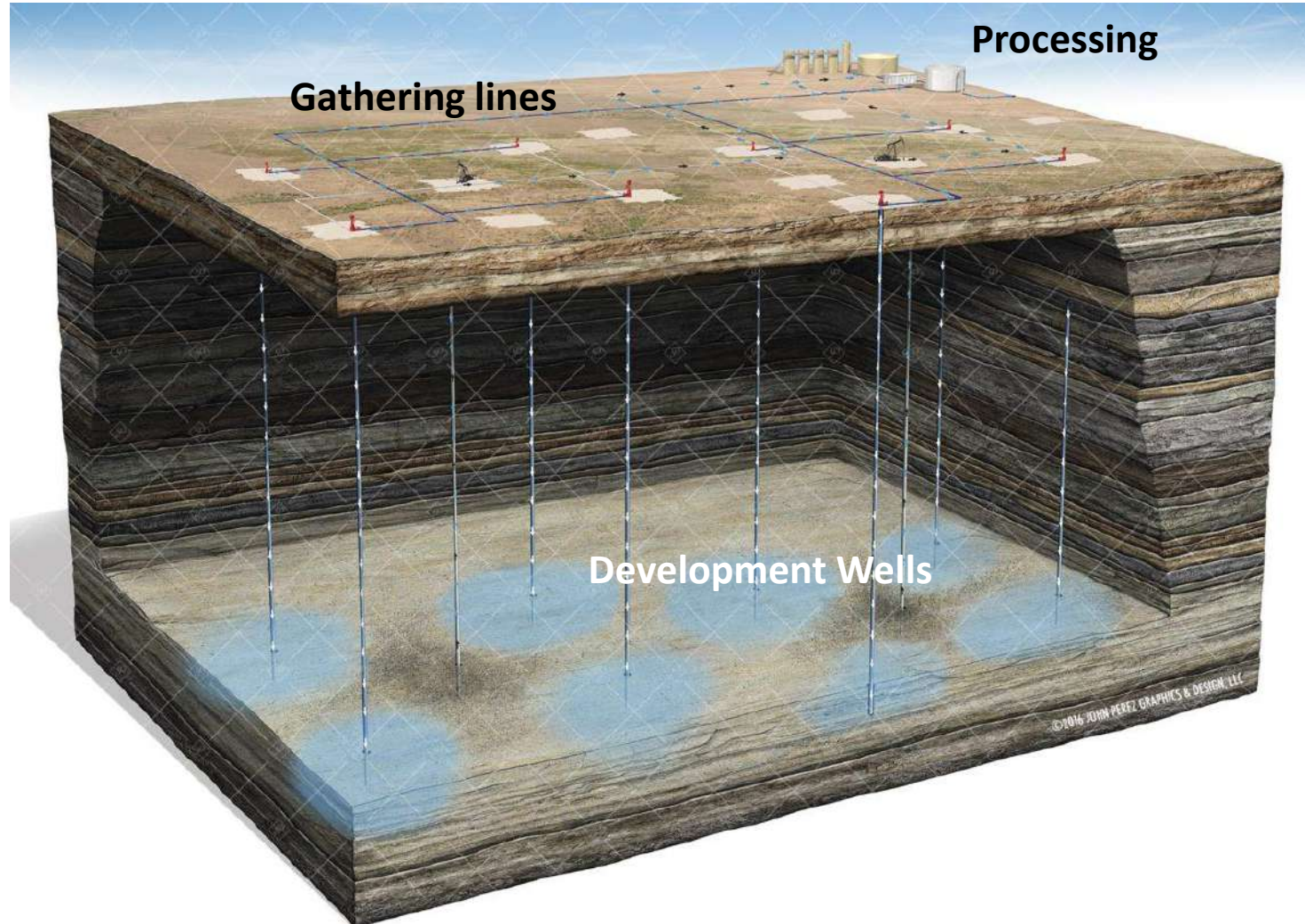
Senecio-03 well drilling operation

Perth Basin
Western Australia

August – September 2014

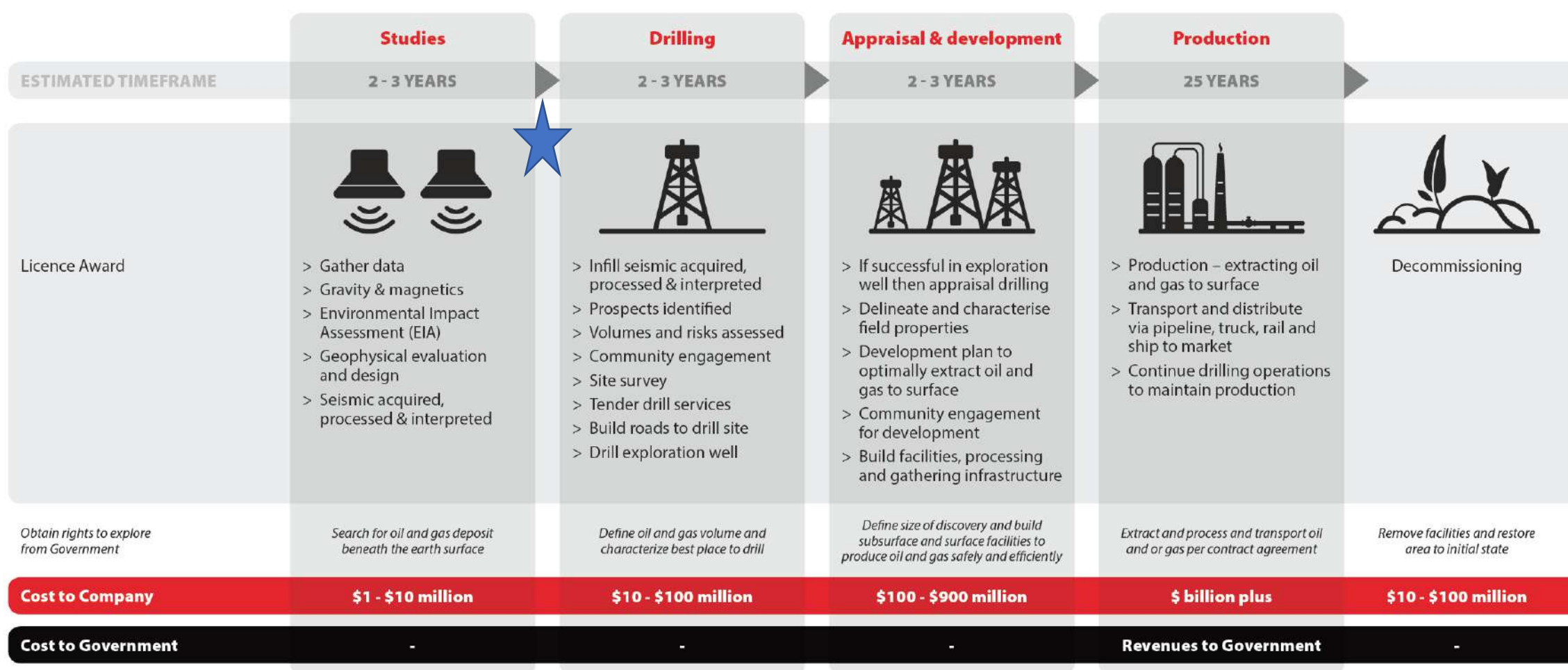


Onshore Field Development Schematic





Oil & Gas Exploration & Production





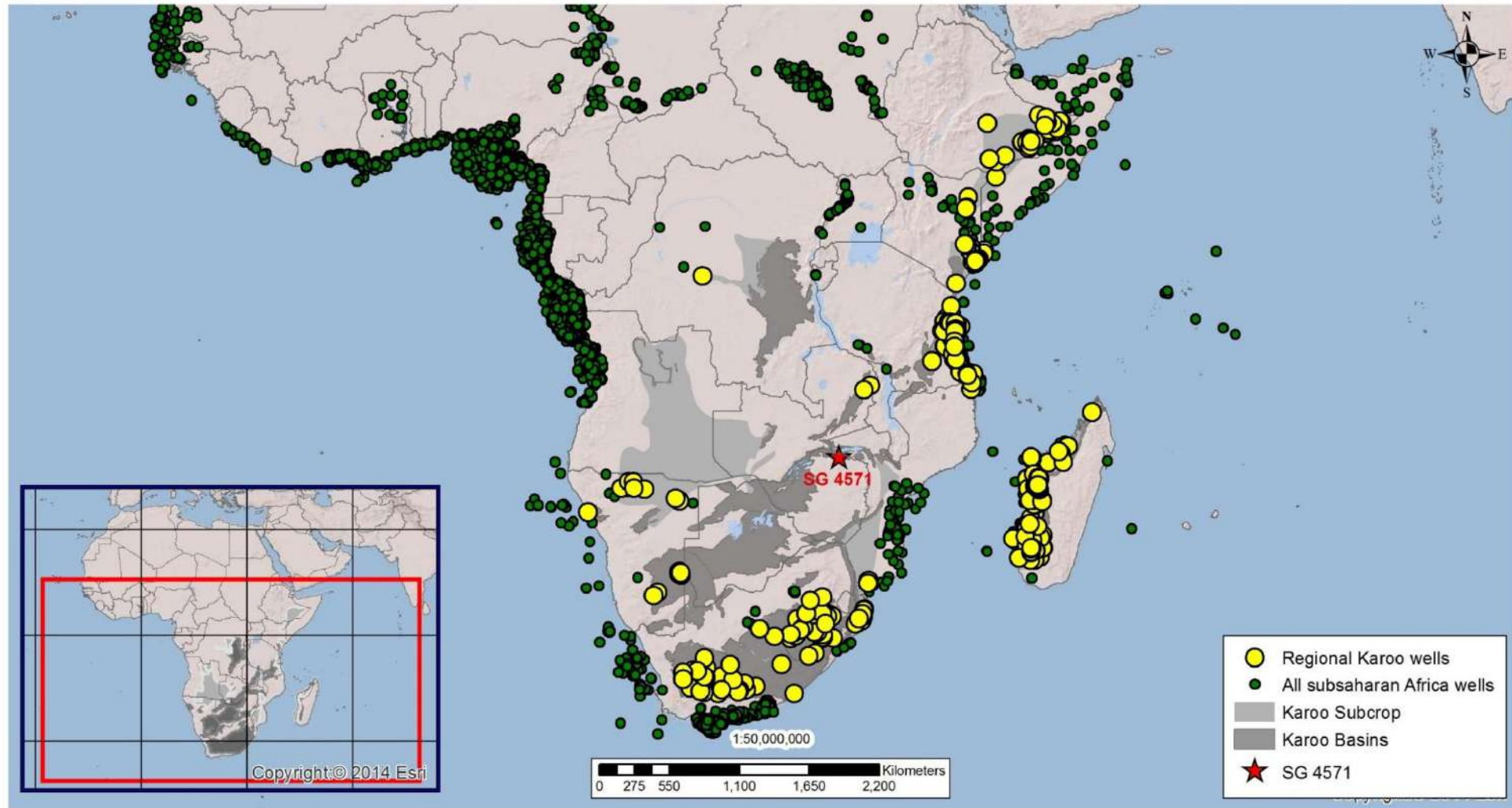
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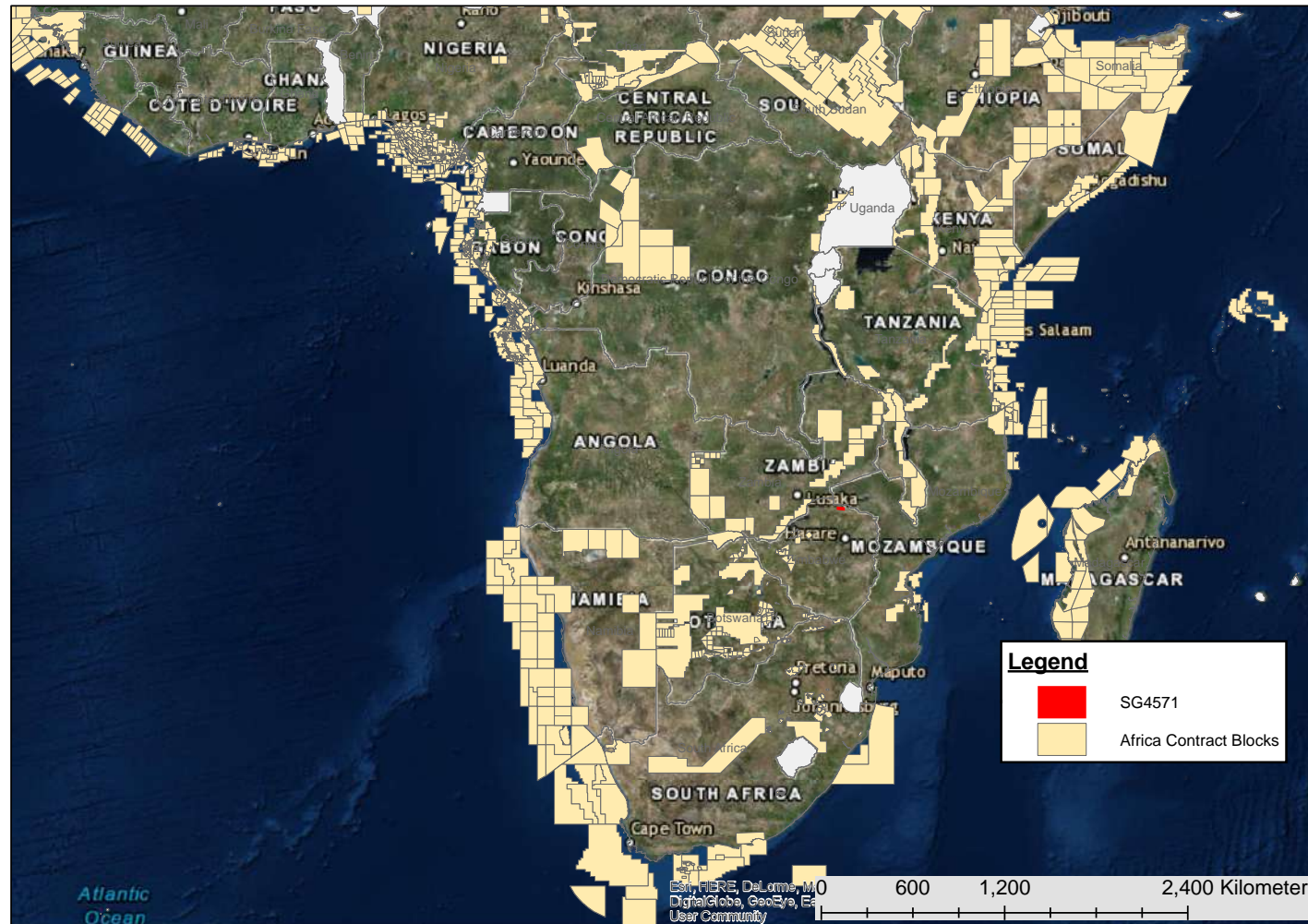
Regional Activity



Regional Drilling Density - Karoo



Africa Exploration Activity Map & Block Sizes





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SG 4571 - Exploration Summary



Available Exploration Data - Zimbabwe



Modest data set:

- Seismic (2D) - 1,600 line kilometres.
- Aeromagnetic and Gravity Surveys - various vintages.
- Source and Reservoir Rock Sampling.
- Stratigraphic Data - Geological Mapping and Coal and CBM.
- Two known Oil Seeps and a number of potential Petroleum Source Rock Exposures.

Cabora Bassa & SG 4571 Work Program To Date



Enhanced Modelling Geotechnical Data – Entire Cabora Bassa Basin

- Aeromagnetic and Gravity Data Reprocessed
 - Geo Associates presented enhanced reprocessed gravity and magnetic datasets MMMD to further geoscientific interpretation and mineral exploration.
- Seismic Tape Transcribed and Reprocessed – 610km Entire Cabora Bassa Basin.
- Seismic Interpretation within SG 4571 – Enhanced Subsurface Imagery.
- Field Outcrop Sampling (source and reservoir) – Selected Exposures
- Basin Remodelled using regional analogue data and enhanced understanding geology African Rift Systems
- Independent Prospective Resource Assessments – NSAI & Getech

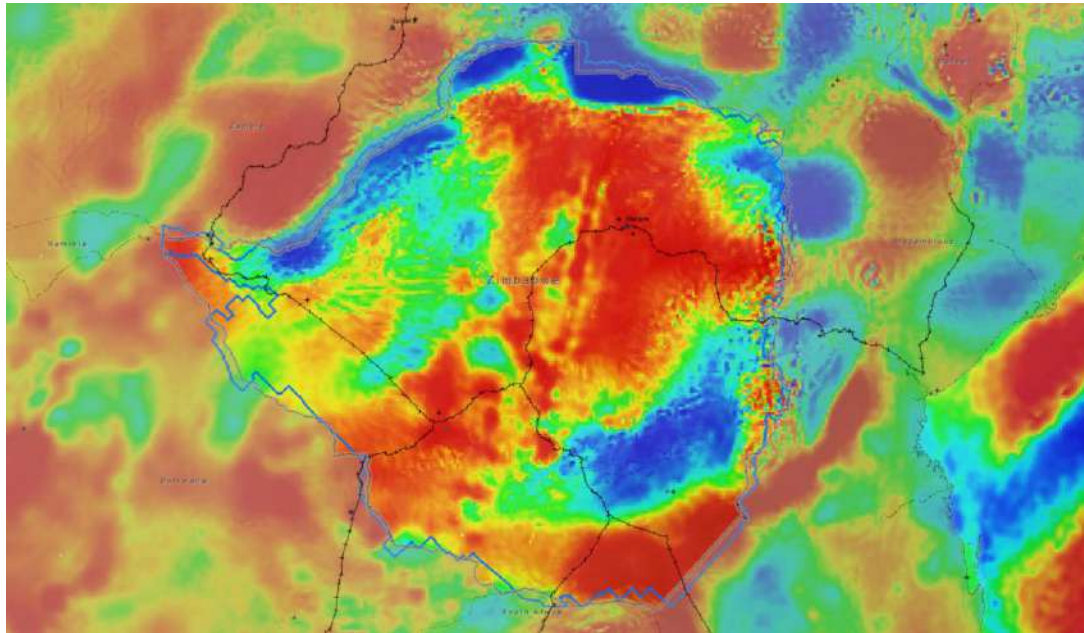
Production Sharing Agreement drafted

Hydrocarbon Policy drafted

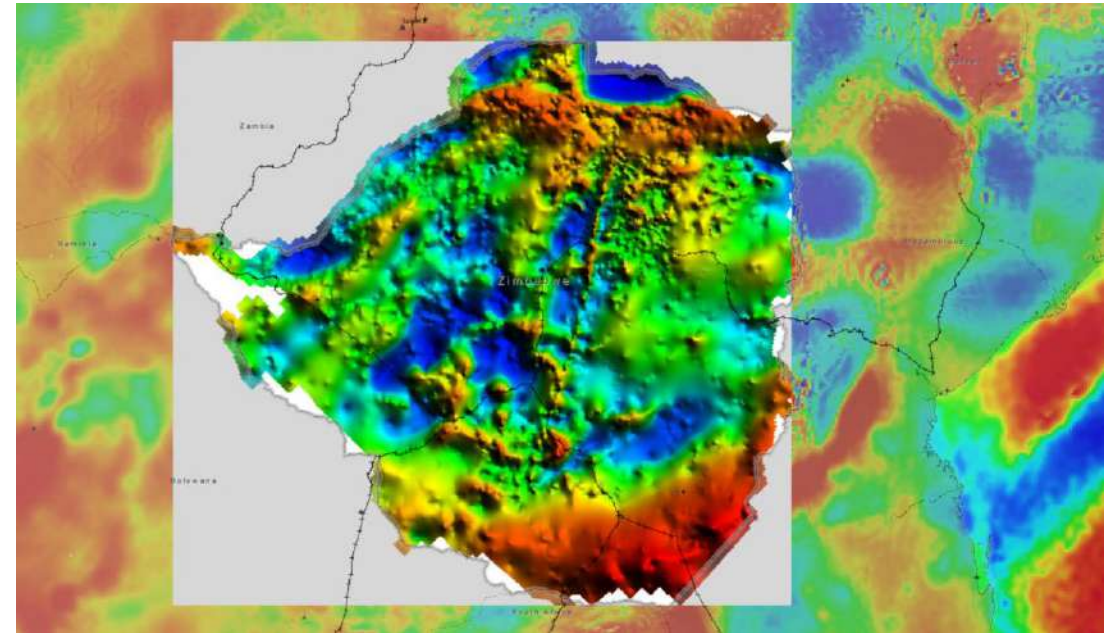
Gravity Data Reprocessing



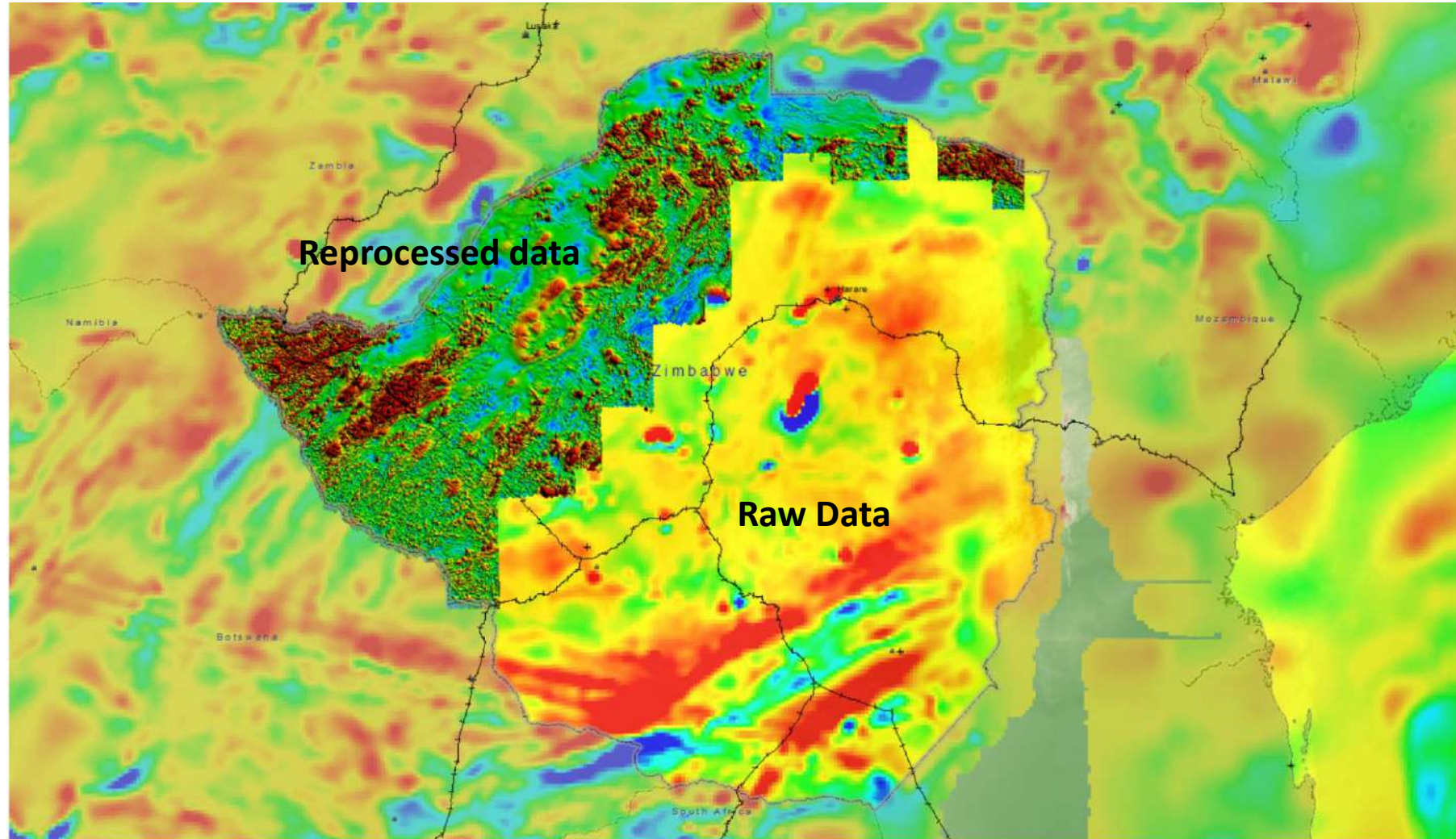
Raw Data



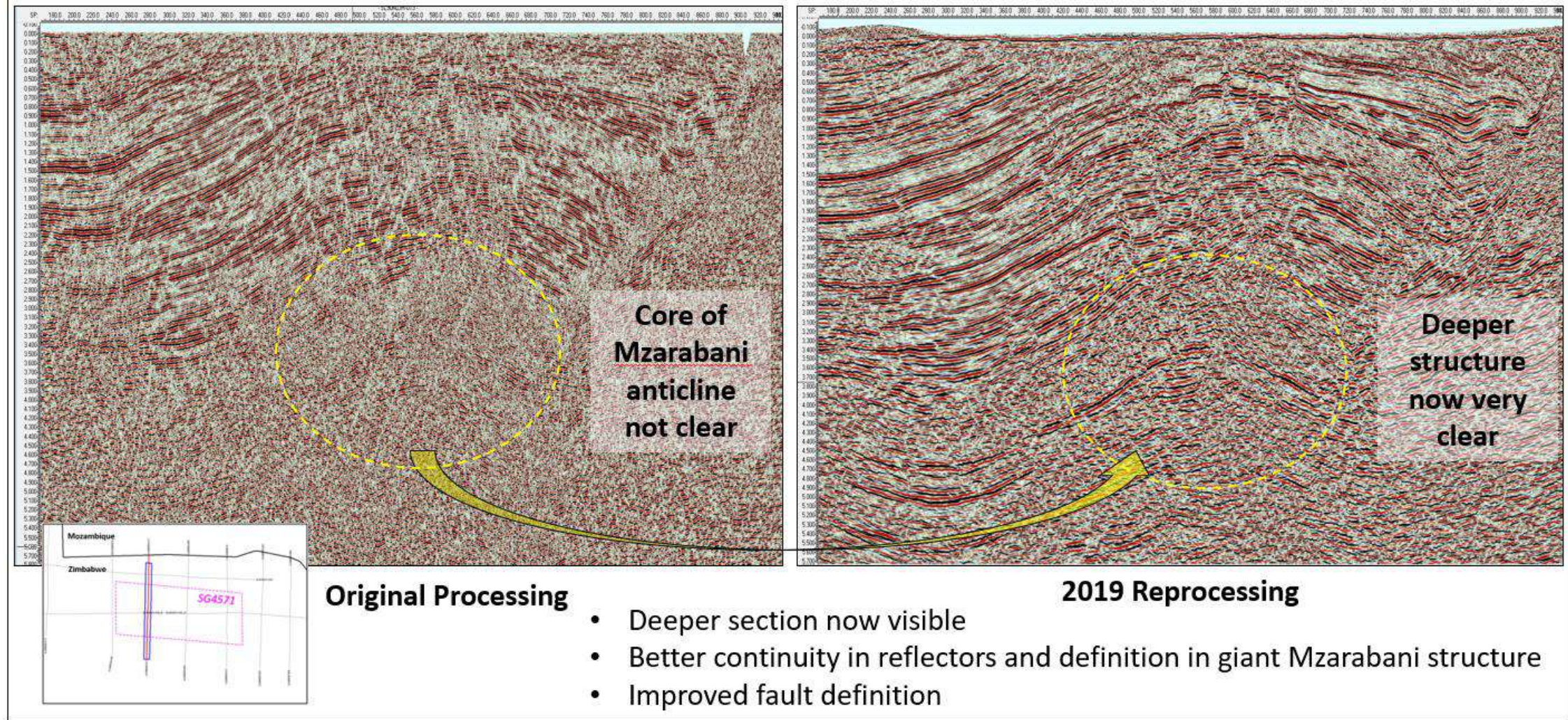
Reprocessed data



Magnetic Reprocessing Example



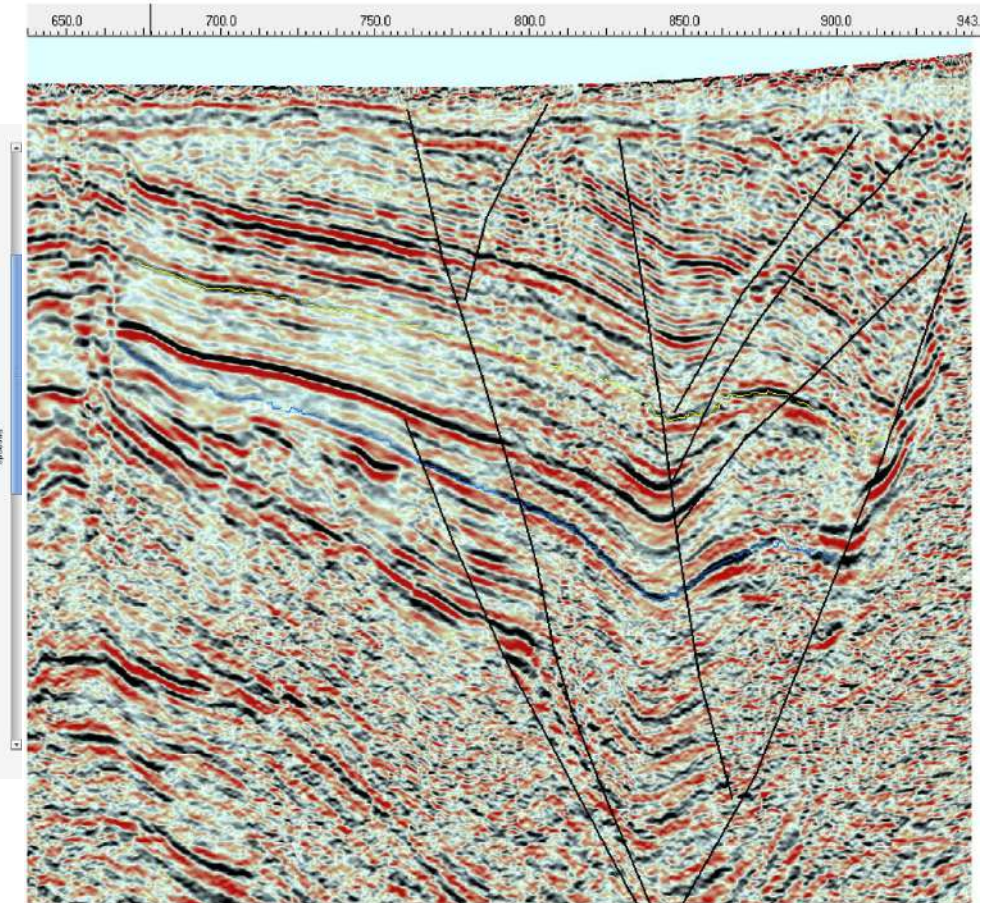
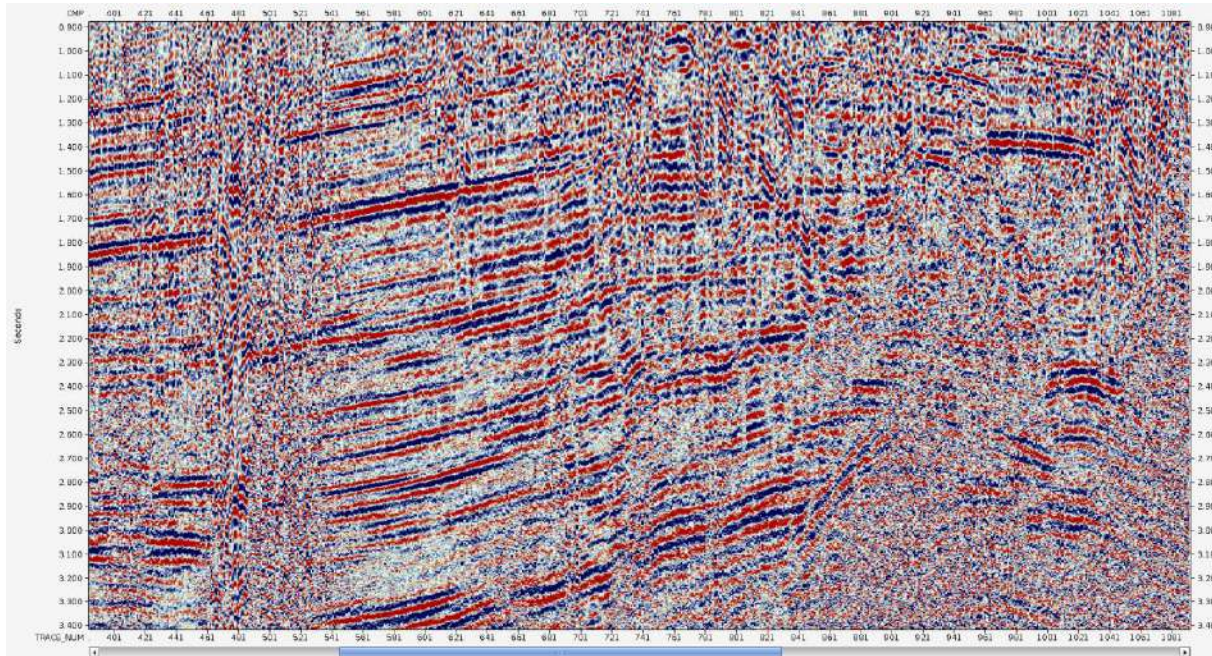
Seismic Reprocessing Results – Line 013



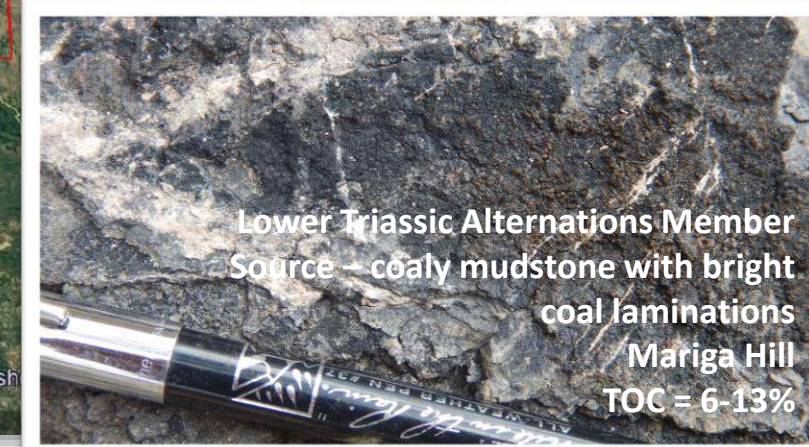
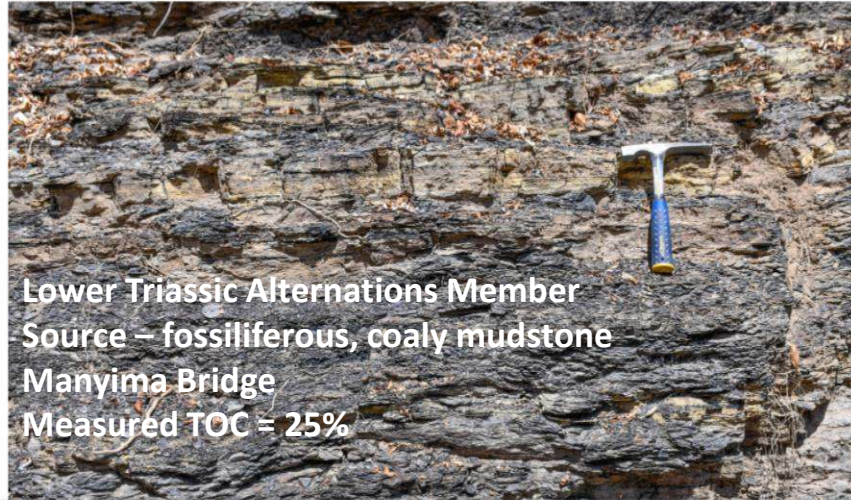
Seismic Processing & Interpretation



Seismic interpretation of faults, horizons and amplitudes, etc.



Source and Reservoir Rock Sampling Field Photos



Cabora Bassa Basin Source Rocks



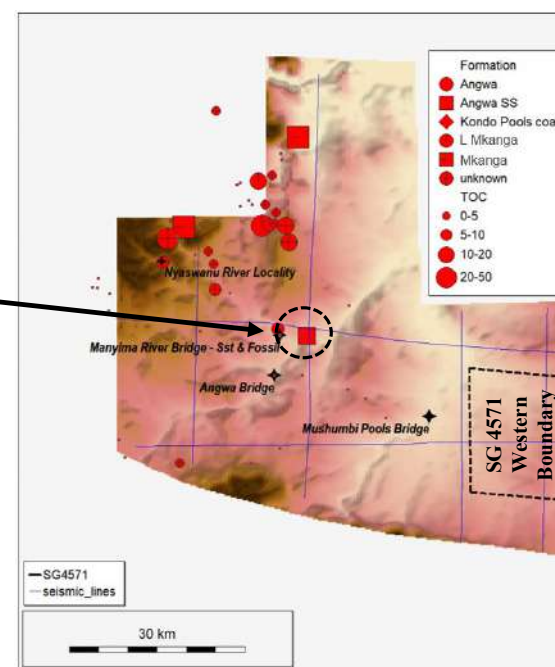
- Key differentiator of Cabora Bassa Basin compared majority Karoo aged plays presence source and reservoir rocks Upper Angwa, Lower Triassic section, favourable depths petroleum generation: Good to Excellent source rocks coupled with high reservoir qualities.



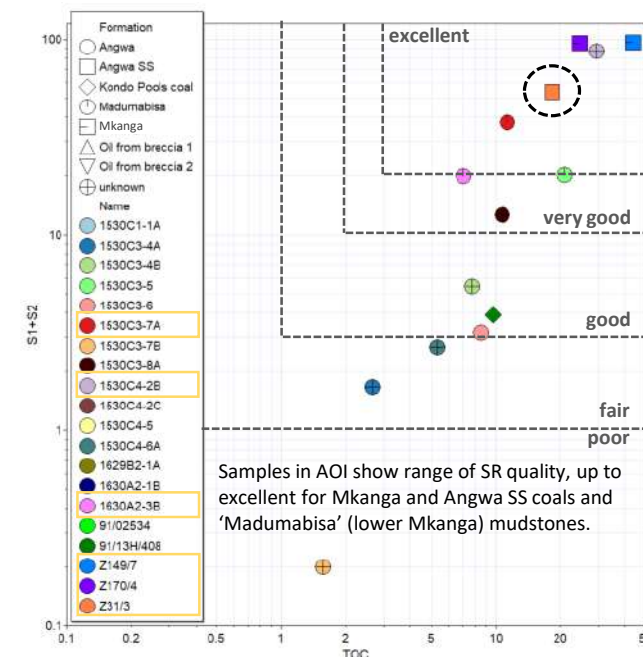
Close up of Manyima Bridge outcrop organic matter in Upper Alternations Member of Angwa



Plate 4 Oil-prone Shales of Upper Alternations Member, Angwa Sandstone Formation; Manyima River-Cabora Bassa Basin



Source Rock Sample Outcrop Locations



Source Rock Quality – S1+S2 vs. TOC

Muzarabani & Msasa Prospects



- **Independent Prospective Resource Estimate completed by Getech**
 - Results 12 months evaluation Cabora Bassa Basin.
 - **Pre-drilled estimate Prospective Resource 9.25 trillion cubic feet gas + 294 million barrels condensate.**
 - Large target by global standards but high risk.
 - Chance of Success (CoS) in Muzarabani 10 - 15%.
 - Further data required to de-risk prospects or delineate alternative targets with greater CoS.
 - Discovery will risk remaining prospects.

#Cautionary Statement: The estimated quantities of petroleum that may be potentially recovered by the application of a future development project relate to undiscovered accumulations. These estimates have both an associated risk of discovery and a risk of development. Further exploration, appraisal and evaluation are required to determine the existence of a significant quantity of potentially movable hydrocarbons. Prospective Resource assessments in this release were estimated using probabilistic methods in accordance with SPE-PRMS standards.

SG 4571		Gross Unrisked Estimated Prospective Resources [#]							
Cabora Bassa Project		Source: Getech Group plc as at 26 June 2019							
Prospect		Gas (Bcf) – 100% Gross				Condensate (mmbbl) – 100% Gross			
Stratigraphic Level		Low	Best	High	Mean	Low	Best	High	Mean
Mzarabani	Dande	51	230	950	411	-	-	-	-
	Forest	301	1,215	3,359	1,584	-	-	-	-
	Pebbly Arkose	271	1,037	2,973	1,404	7	38	136	60
	Upper Angwa	721	2,902	9,657	4,414	18	107	434	187
	Lower Angwa	95	317	775	391	0	2	6	3
	Total*	1,439	5,701	17,714	8,204	26	147	576	249
Msasa	Pebbly Arkose	49	93	156	99	1	4	8	4
	Upper Angwa	107	198	327	210	2	8	17	9
	Lower Angwa	71	351	1,738	743	2	13	74	31
	Total*	228	642	2,221	1,052	5	24	99	44
SG 4571 Licence		Total* Gross (100%)	1,666	6,343	19,935	9,256	31	171	676
								294	

Resource Volumes - Rules of Thumb



Muzarabani Prospect Potential Estimate: 8.2 trillion cubic feet + 247 million barrels of condensate

Natural Gas

1 trillion cubic feet of natural gas can provide:

- **800 MW Gas to Power for 20 years**
 - **Generation facility can be built in 18 months vs. 4 years for coal fired power**
- **36,000 barrels per day of petrol/diesel for 20 years from Gas to Liquids**
 - **Zim consumption 40,000 bpd (6.3 million litres per day)**
- **Gross value at \$4 per thousand cubic feet = US\$4 billion (gas value lower than oil)**

Crude Oil / Condensate

100 million barrels of crude oil/condensate can provide:

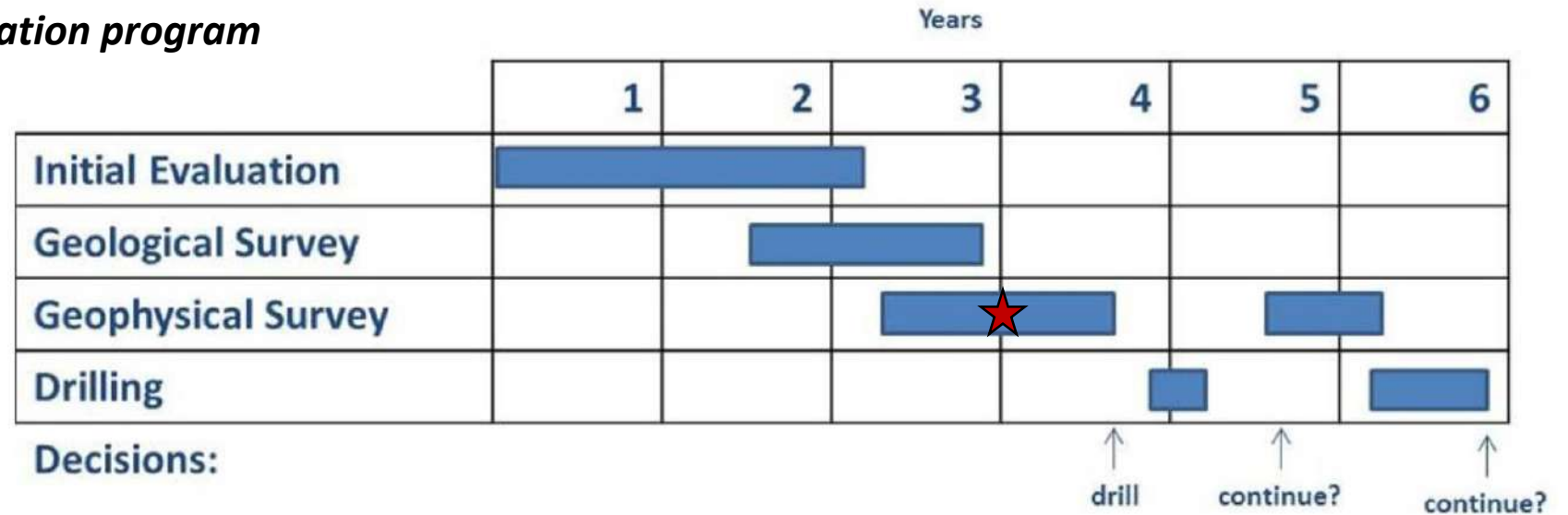
- **36,000 barrels per day of petrol/diesel (6 million litres per day) for 7.5 years**
- **Gross value at \$60/barrel = US\$6 billion**

Exploration Process



The sequence of activities covered by a petroleum exploration permit include:

Stages of a typical exploration program



SG 4571 Indicative Future Work Programme

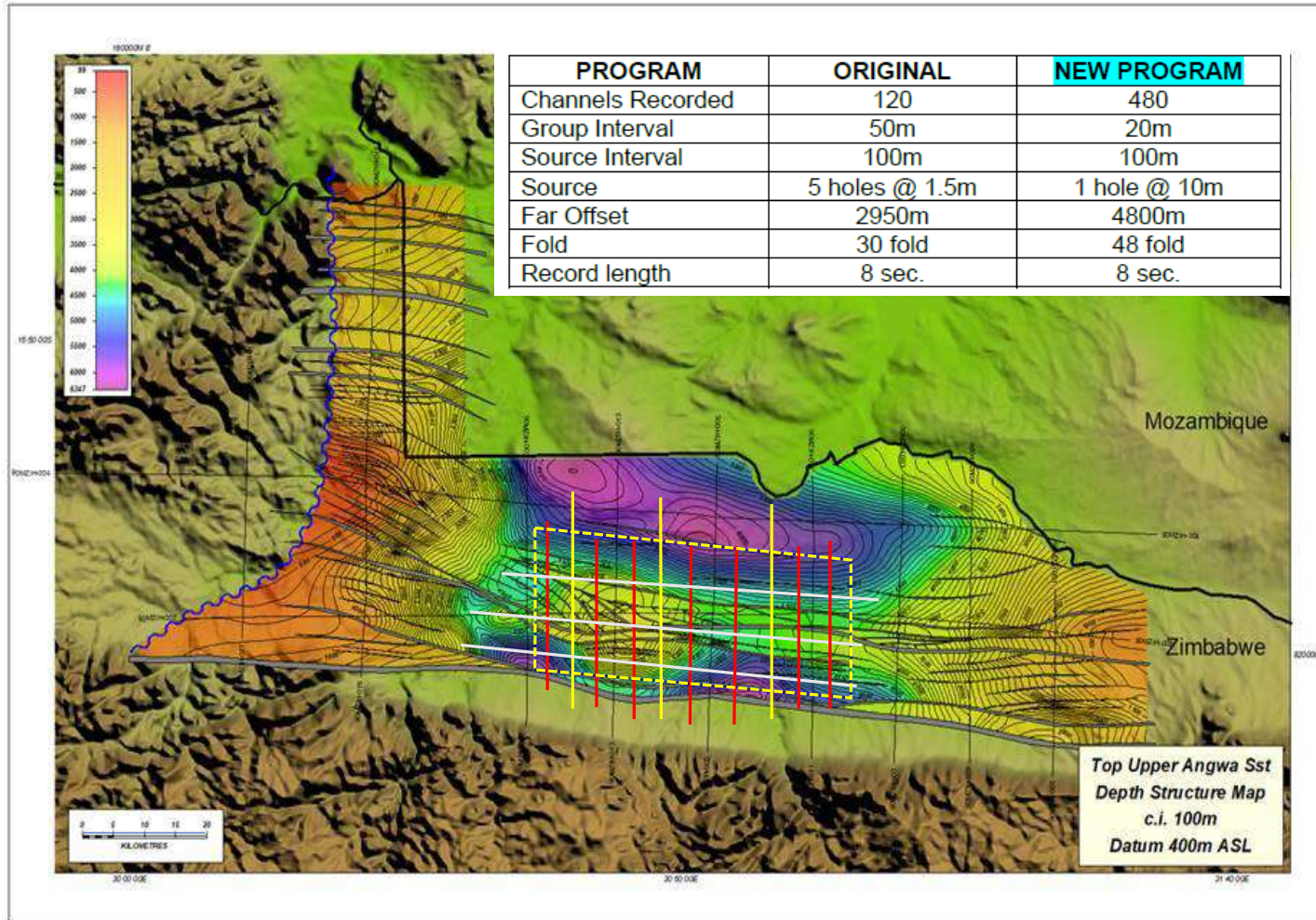


Proposed forward work program provides the best chance of making a commercial discovery:

- New 2D seismic acquisition - Q2 2020 post-rains
- Seismic processing, interpretation and evaluation to identify high CoS targets
- Relinquish 25% of total area post-evaluation
- Select best target(s) for drilling
- Drill exploration well(s) - Q4 2020 dependent rig availability
- Evaluate results (Q4 2020 – Q1 2021)
- Subject to commercial success:
 - Further appraisal drilling
 - Field development planning
 - Facility and pipeline construction
 - Commence production

** Subject to finalisation of Production Sharing Agreement framework*

Proposed Seismic Program Q2 2020



Proposed Infill Seismic Program

- Mobil seismic reconnaissance scale investigate basin structure – wide line spacing - 16km.
- Only 4 of 13 lines shot in SG 4571.
- Most petroleum fields smaller than 16km line spacing - prospects “hiding” between lines?
- Additional seismic improve imaging and potentially identify new targets.
- Estimates acquired from seismic suppliers

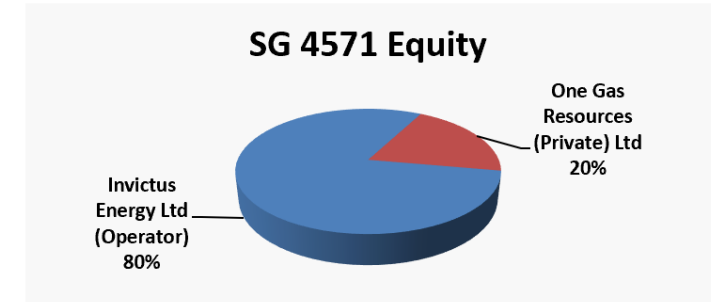
SG 4571 Proposed Work Program



SG 4571 - Cabora Bassa Basin Zimbabwe: Proposed Work Program

Gazetted:	3 August 2017
First Period Ends:	3 August 2020
Second Period Ends:	3 August 2023
Third Period Ends:	3 August 2025

Work Commitment	Exploration Plan
Fulfilled	Firm
Outstanding	Contingent



SG 4571 Licence Overview		2017	2018	2019	2020	2021	2022	2023	2024	2025
		A S O N D	J F M A M J J A S O N D	J F M A M J J A S O N D	J F M A M J J A S O N D	J F M A M J J A S O N D	J F M A M J J A S O N D	J F M A M J J A S O N D	J F M A M J J A S O N D	J F M A M J J
		First Exploration Period			Second Exploration Period			Third Exploration Period		
Permit Term		Year 1		Year 2	Year 3	Year 4	Year 5	Year 6	Year 5	Year 6
Work Commitments		Geotechnical Studies		Reprocess gravity, magnetic, seismic data and interpret		Interpret reprocessed seismic data		300 line km seismic acquisition; Drill 1 (one) exploration well to 1,500m or basement; Geotechnical Studies		Drill 1 (one) exploration well to minimum 1,500m or basement; Geotechnical Studies
Exploration Programme		Geotechnical Studies		Reprocess gravity, magnetic, seismic data and interpret		800 line km seismic acquisition		Drill 1-2 (one-two) Exploration Well(s)		Geotechnical Studies
Expenditure (US\$ 100%)		Indicative		\$1.0m		\$1.5m		\$6.0m		\$ 10 - 15m
Key Milestones						Renwal ♦				Renwal ♦

Oil & Gas Exploration High Risk



- Exploration period typically 5-8 years from acquisition to drilling.
- Petroleum exploration characterised low success rates: **10 – 20% CoS commercial discovery**.
 - Kenya drilled 32 wells between 1940s until first discovery in 2012.
 - South Africa drilled nearly 200 wells and made <20 commercial discoveries.
- Due high cost & low success rates companies spread risk across multiple assets.
 - Typically exploration JVs have ≤ 5 companies involved depending cost and maturity.



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Production Sharing Agreement



Production Sharing Agreements



- Production Sharing Agreements (PSAs) governing hydrocarbon industry can provide both the Government and investors with a fair return.
- Mobil PSA signed both Zambia and Zimbabwe – adopted Zambia in 2008.
- Geo Associates have updated Mobil PSA to include gas terms and simplified the production sharing.
- The essentials of a PSA are that the state retains ownership resources and the contractor receives a share of production for services performed.
- State not required contribute capital expenditure and assumes no risk.
- PSAs also govern minimum work program contractor required fulfil.
- PSAs are commonly open file and transparent.

Fiscal Benchmarking



- The PSA proposed has been benchmarked with countries in the region:

Country	Estimated Govt. Take of Profits/Product
South Africa	40%
Namibia	50%
Malawi	50%
Zambia	53%

- South Africa and Namibia have attracted a significant amount of oil and gas exploration companies due to a combination of geology AND attractive fiscal terms.
- Geo Associates believes the proposed terms offer a win-win scenario for the Government of Zimbabwe and oil and gas investors.



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Oil & Gas Markets

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Domestic and Regional Gas Market Overview



- **Southern Africa desperately short of gas.**
- Zimbabwe serves as the gateway and import/export corridor for Zambia, Botswana, DRC and Malawi to the port of Beira in Mozambique.
- South Africa gas supply from offshore Mossel Bay and onshore Mozambique is dwindling coupled with a lack of supply alternatives.
- **South Africa's aging coal fired power plants are being retired:**
 - **>10,000 MW of power supply (~20%) will be lost in next few years**
 - **Short-medium term gap filled diesel power generation - 750 MW diesel plant uses 5 million litres of diesel per day.**
- Rovuma gas fields in northern Mozambique unlikely to service regional market in near to mid-term due:
 - Long distance to market (>2600km)
 - Lack of consumers along potential pipeline routes
 - Committed LNG export volumes to 2030+, so unlikely to supply gas into the region beforehand
- In addition to Zimbabwe and South Africa, markets in Zambia and the DRC can be serviced through small scale LNG trucked to large off-grid mining operations to replace diesel fired power generation

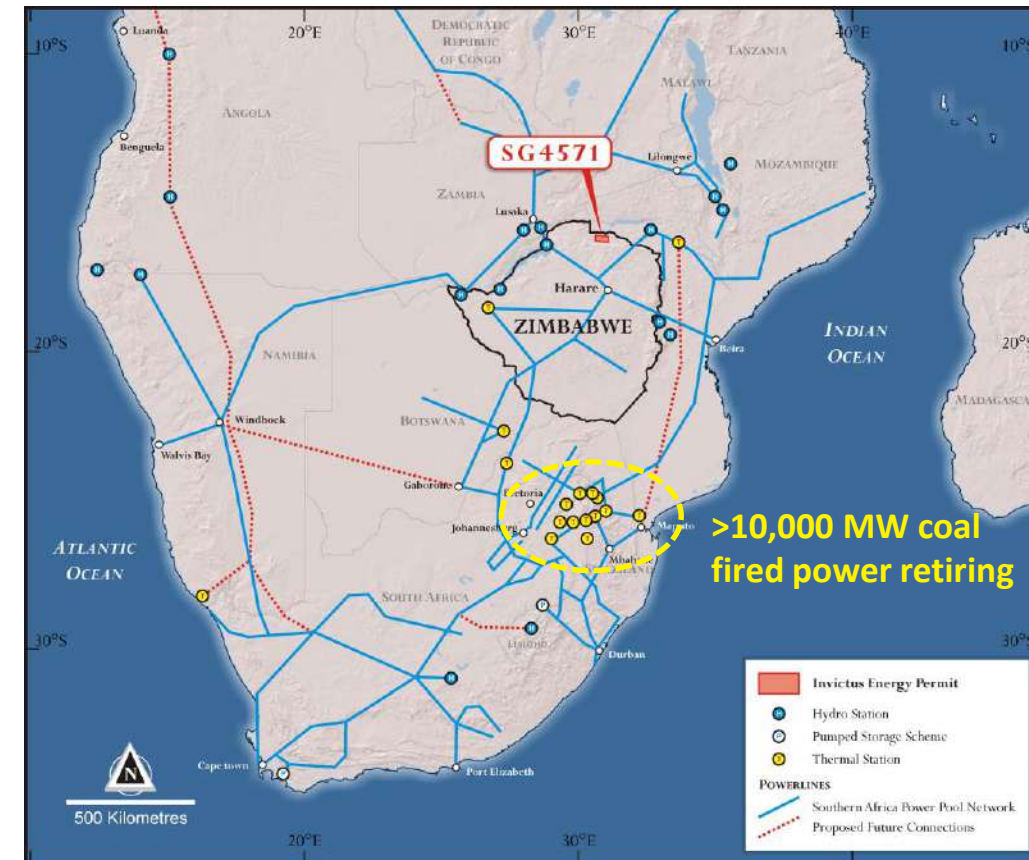
Southern Africa's Energy Crisis



Zimbabwe: Strategic Location

- Southern Africa facing energy crisis - increasing shortages electricity.
- Southern African Power Pool (SAPP) enables cross-border electricity trading 12 states.
- Electricity trading SAPP based in Harare.
- Spine SAPP transmission network runs through Zimbabwe.
- SAPP provides pipeline route monetise Gas to Power Projects

Zimbabwe can become a regional energy supplier




Source: Southern Africa Power Pool

Sable Chemical Gas Sale MOU



- Gas Sale MOU with Sable Chemicals signed May 2019
- Sable Chemicals is sole manufacturer of ammonium nitrate fertiliser in Zimbabwe and has operated since 1966
- Supply up to 70 mmscf/d x 20 years
- Total Contract ~510 billion cubic feet
- Current ammonia feedstock imported by rail from South Africa
- Facility operating below capacity
- Sable located ~400km from SG 4571
 - Either new build facility closer to SG 4571
 - Construction of ammonia plant closer to SG 4571 and then rail to existing facility

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ASX ANNOUNCEMENT
ASX: IVZ

ABOUT INVICTUS ENERGY LTD
Invictus Energy Ltd is an independent oil and gas exploration company focused on high impact energy resources in sub-Saharan Africa. Our asset portfolio consists of a highly prospective 250,000 acres within the Cabora Bassa Basin in Zimbabwe. Special Grant 4571 contains the world class multi-TCF and liquids rich Mozambican conventional gas-condensate prospect.

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Country Manager
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Non-Executive Director
Eric de Mori
Non-Executive Director
Gabriel Chiappini
Non-Executive Director and Company Secretary
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7 MAY 2019
INVICTUS & SABLE CHEMICAL INDUSTRIES LIMITED SIGN GAS SALES MOU
Highlights

- Invictus & Sable Chemical Industries Limited sign MOU to progress gas supply from Cabora Bassa Project
- MOU signed for the supply of up to 26 billion cubic feet of gas per year (bcf) for 20 years (70 million cubic feet per day)
- Major step towards underpinning the development of the Cabora Bassa Project subject to a commercial discovery being made

Invictus Energy Limited ("Invictus" or "the Company"), is pleased to announce that the Cabora Bassa Project partners, comprising Invictus (80%) and One-Gas Resources (Pvt) Limited (20%), have entered into a non-binding Memorandum of Understanding (MOU) with Sable Chemical Industries Limited ("Sable") to progress gas supply from the Cabora Bassa Project subject to a commercial gas discovery being made from SG 4571.

Sable is the sole manufacturer of agriculture grade ammonium nitrate fertiliser in Zimbabwe and a potentially large gas consumer.

Under the MOU, Invictus and Sable have agreed to jointly work together and cooperate with regards to investigating the economic and commercial viability of supplying natural gas from the Cabora Bassa Project to the Sable fertilizer plant located in Kwekwe, Zimbabwe.

Key Terms

The key terms of the MOU are as follows:

- Minimum Daily Contract Quantity (DCQ) of 35 mmscf/d (~13 bcf per year)
- Sable can elect to increase DCQ to 70 mmscf/d (~26 bcf per year)
- Minimum Total Contract Quantity of 255 bcf
- Maximum Total Contract Quantity of 510 bcf
- Supply term of twenty (20) years from the date of first Commercial Gas Production
- Gas sales price commercial in confidence

Conditions Precedent

The conditions precedent in the MOU include:

- Confirmation of a commercial hydrocarbon discovery in SG 4571
- Completion of a Gas Sales and Purchase Agreement (GSPA) by 30 June 2021
- Completion of feasibility studies to upgrade Sable's existing process and replace the feedstock with natural gas

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Summary

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Summary



- **Petroleum Legislation required urgently enable Zimbabwe capitalise exploration investment and promote medium term success.**
- **Zimbabwe stands benefit petroleum exploration in upstream, midstream and downstream sectors.**
- **A commercial oil or gas discovery would be a game changer for the country:**
 - **Secure Zimbabwe's energy independence.**
 - **Reduce reliance expensive imports of electricity, crude oil and refined products.**
 - **Provide a new source of revenue, industry and employment.**
- **Early exploration success is required to encourage ongoing investment.**



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