

# **Todd Energy**

## **North Taranaki Graben farm-in opportunity**

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**April 2019**

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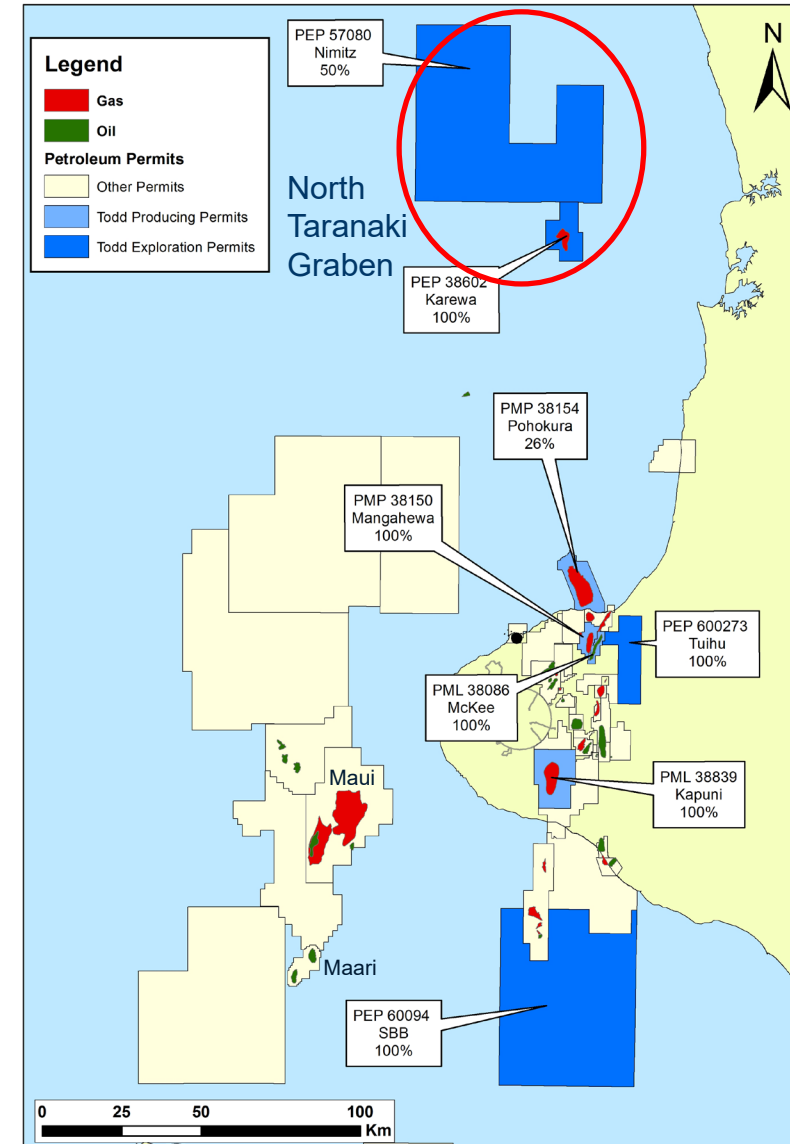
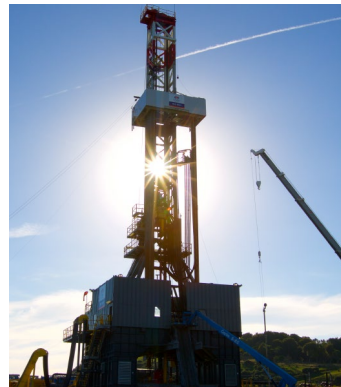
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# Todd Energy – natural gas producer in New Zealand

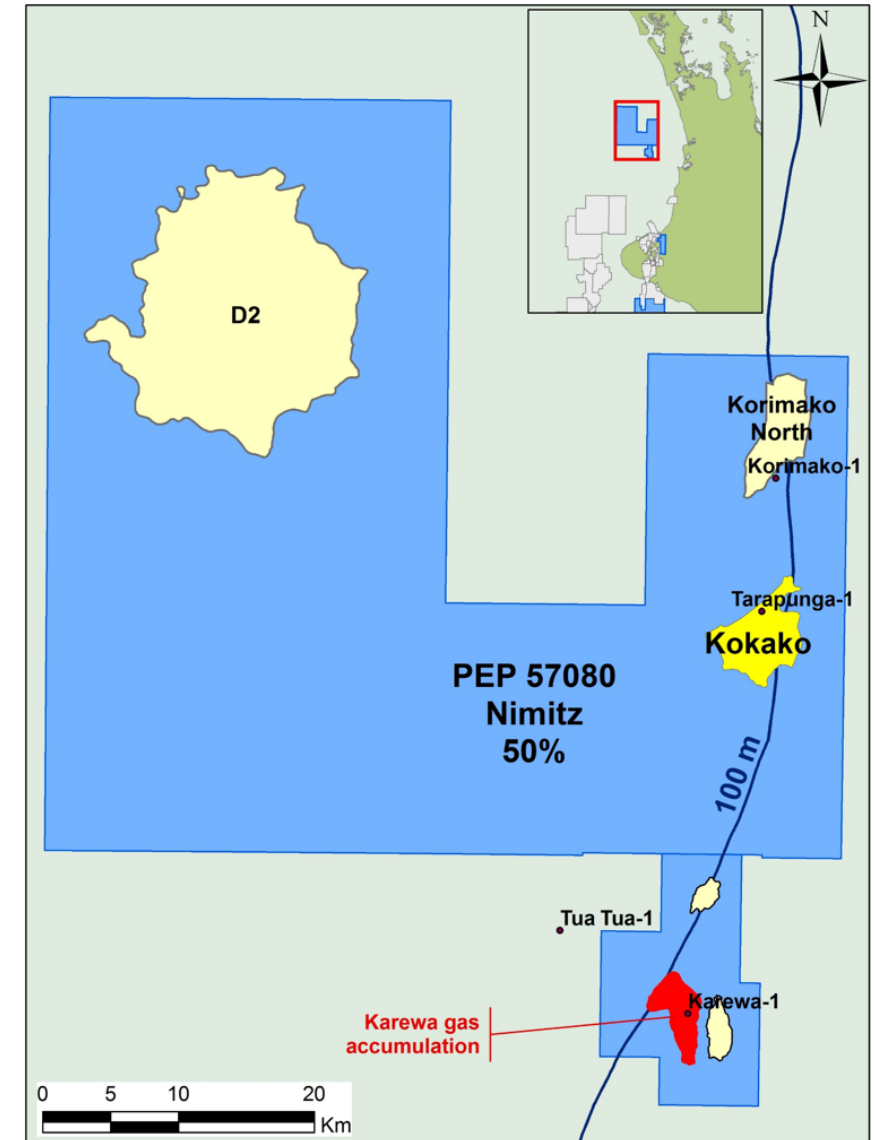
- Generates ~30% of NZ's hydrocarbons
- 3 Operated and 1 non-operated fields :
  - McKee 100%
  - Mangahewa 100% - currently drilling phase 2 of Field Redevelopment
  - Kapuni 100%
  - Pohokura 26% (Offshore)
- Recently divested minority interests in the offshore Maui and Maari fields
- 4 Exploration permits
- The *North Taranaki Graben* is the focus of this presentation



# North Taranaki Graben farm-in opportunity

## Opportunity to invest in a potential cluster development in the North Taranaki Basin:

- The Nimitz permit has two shelfal prospects with a P50 0.5 Tcf of gas condensate in each. Todd 50% and Beach 50%
- Karewa is P50 210 Bcf of discovered gas. 100% Todd. The discovery is very attractive as a tie back to any Nimitz development
- Todd and Beach are looking to farm down 1/3rd of an exploration well in Nimitz at realistic terms
- Todd is considering farming-down a portion of the Karewa discovery to help progress exploration and appraisal of the North Taranaki Graben
- With the April 2017 NZ ban on new offshore exploration permits, this is a good opportunity to provide gas to a future supply-constrained market

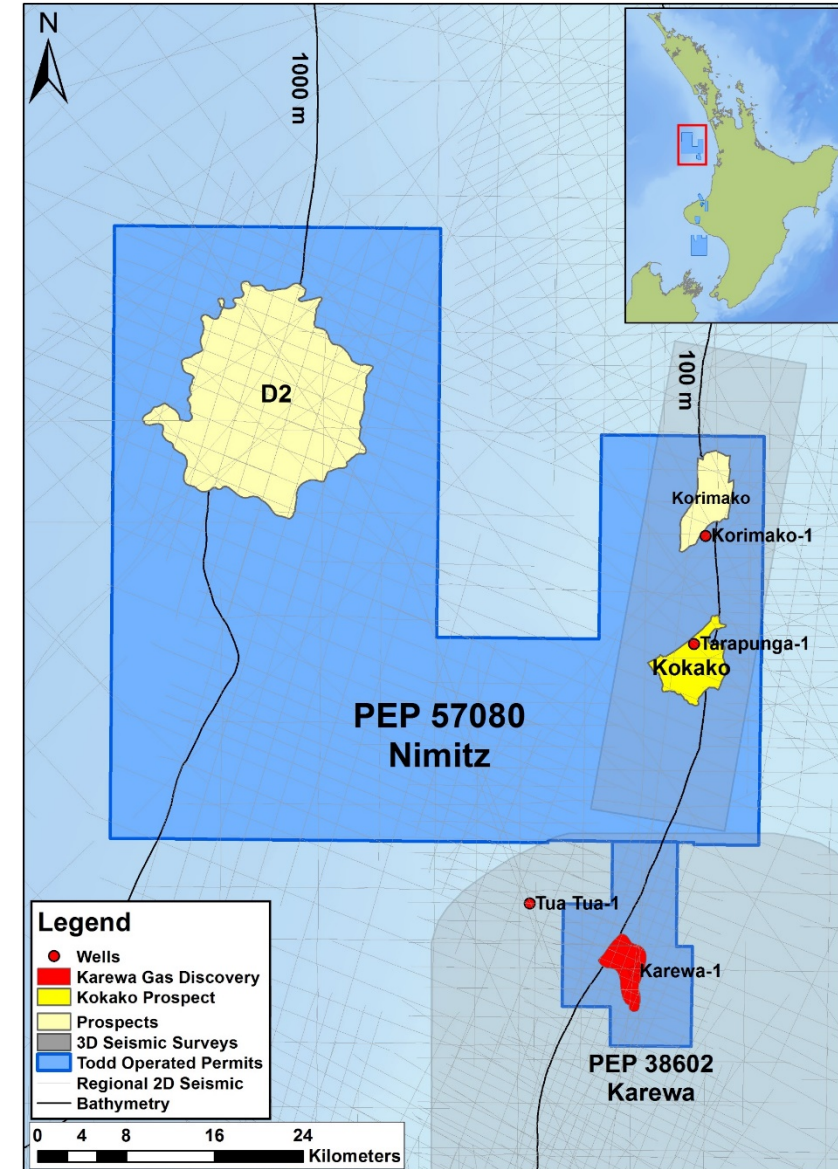


# Nimitz Permit

- Todd 50% (Operator) and Beach 50%
- Commit to well by April 2020
- Drill well by April 2021 in current Work Programme
- Two prospects with material volumes at shelf water depths
- Pg 15% - 17%
- Evaluated as gas condensate, but could be oil

Prospect	Recoverable Gas (Bcf)		Recoverable Condensate (MMbbl)	
	Mean	P10	Mean	P10
Kokako	500	960	25	51
Korimako	684	1,341	34	70

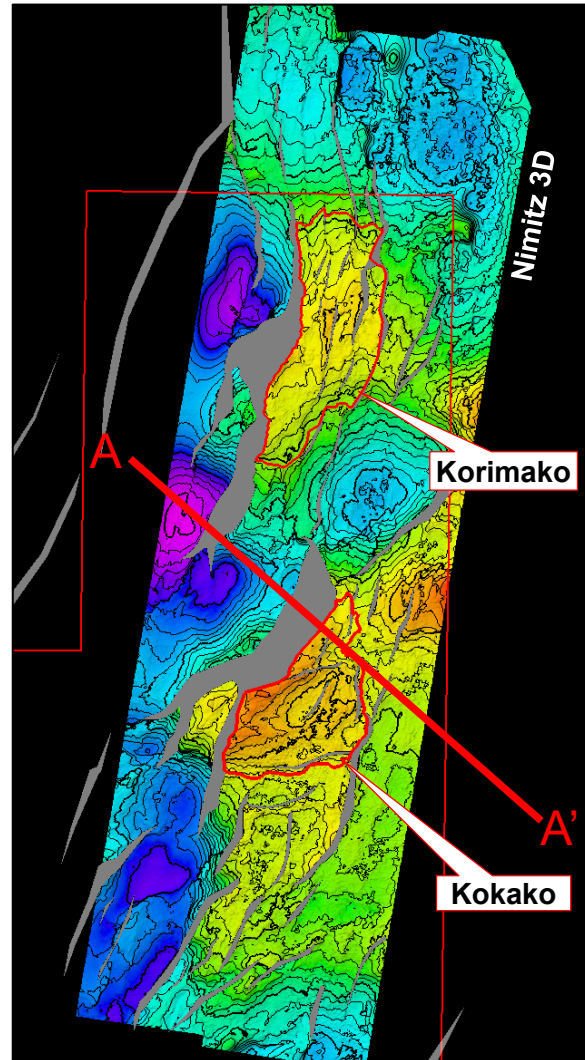
- Prior wells are “shallow commitment wells” but have thermogenic shows



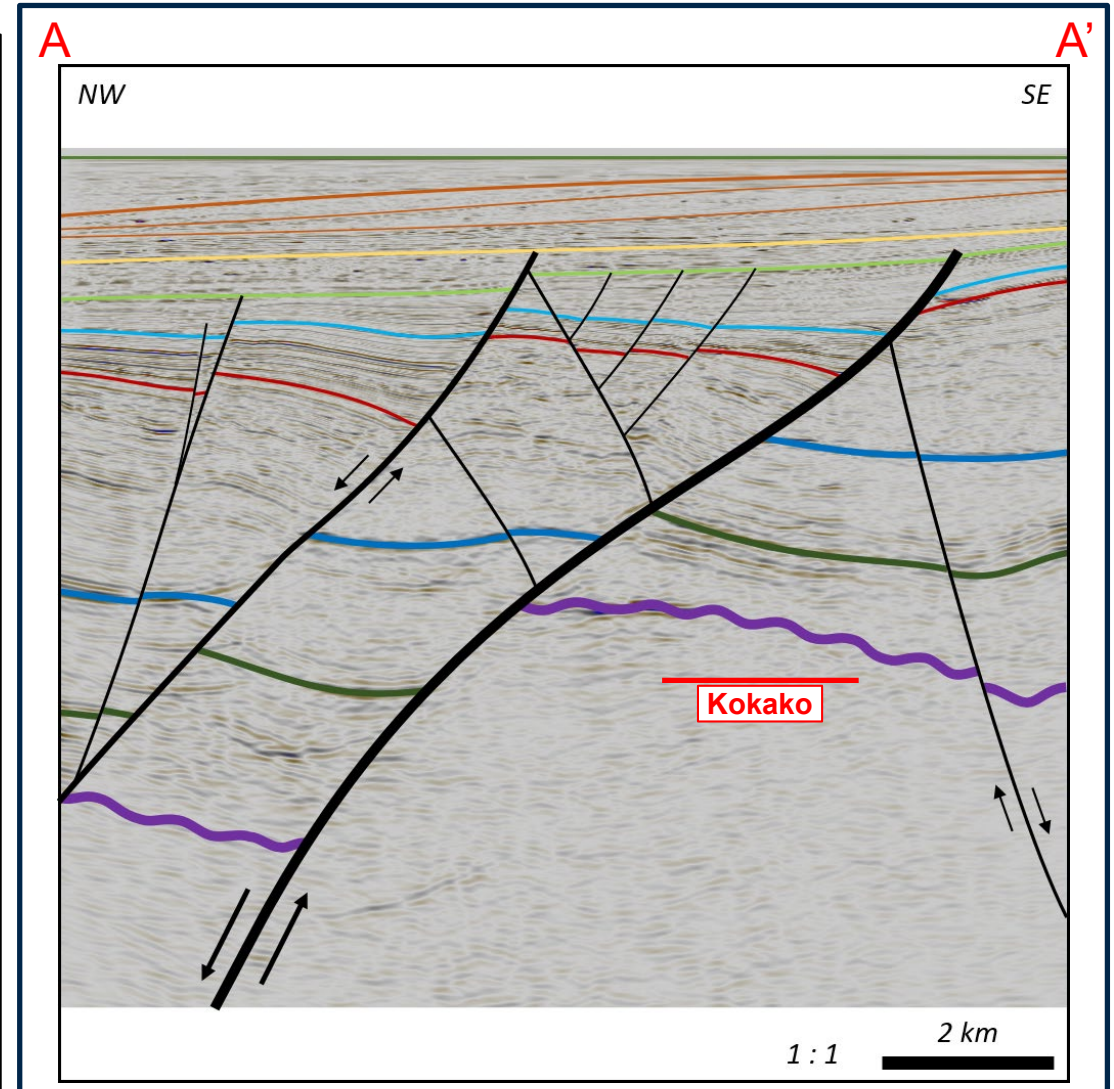


# Structural setting

- Kokako prospect is three-way dip and fault bounded trap

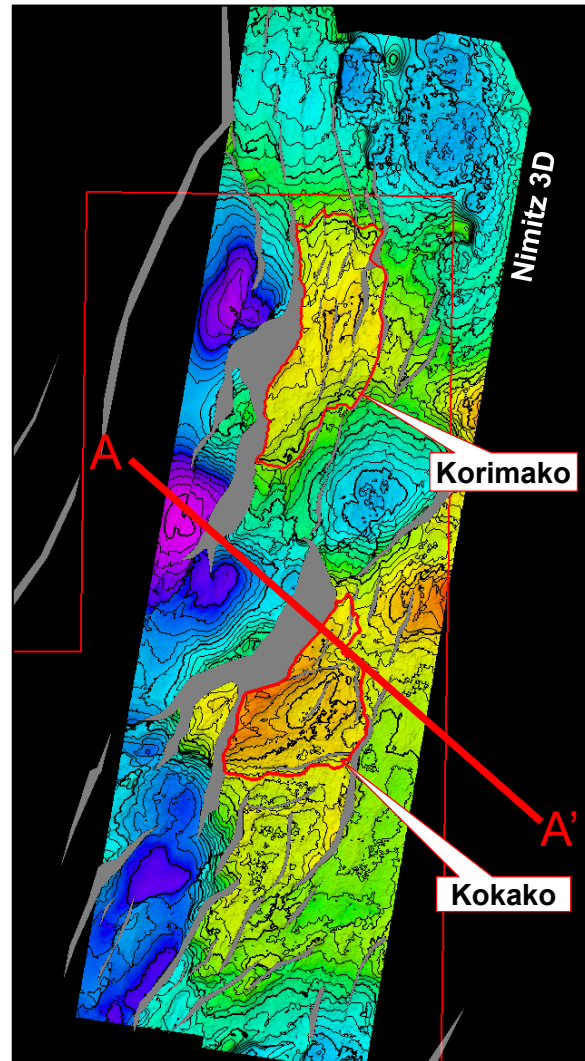


Base Oligocene (depth)

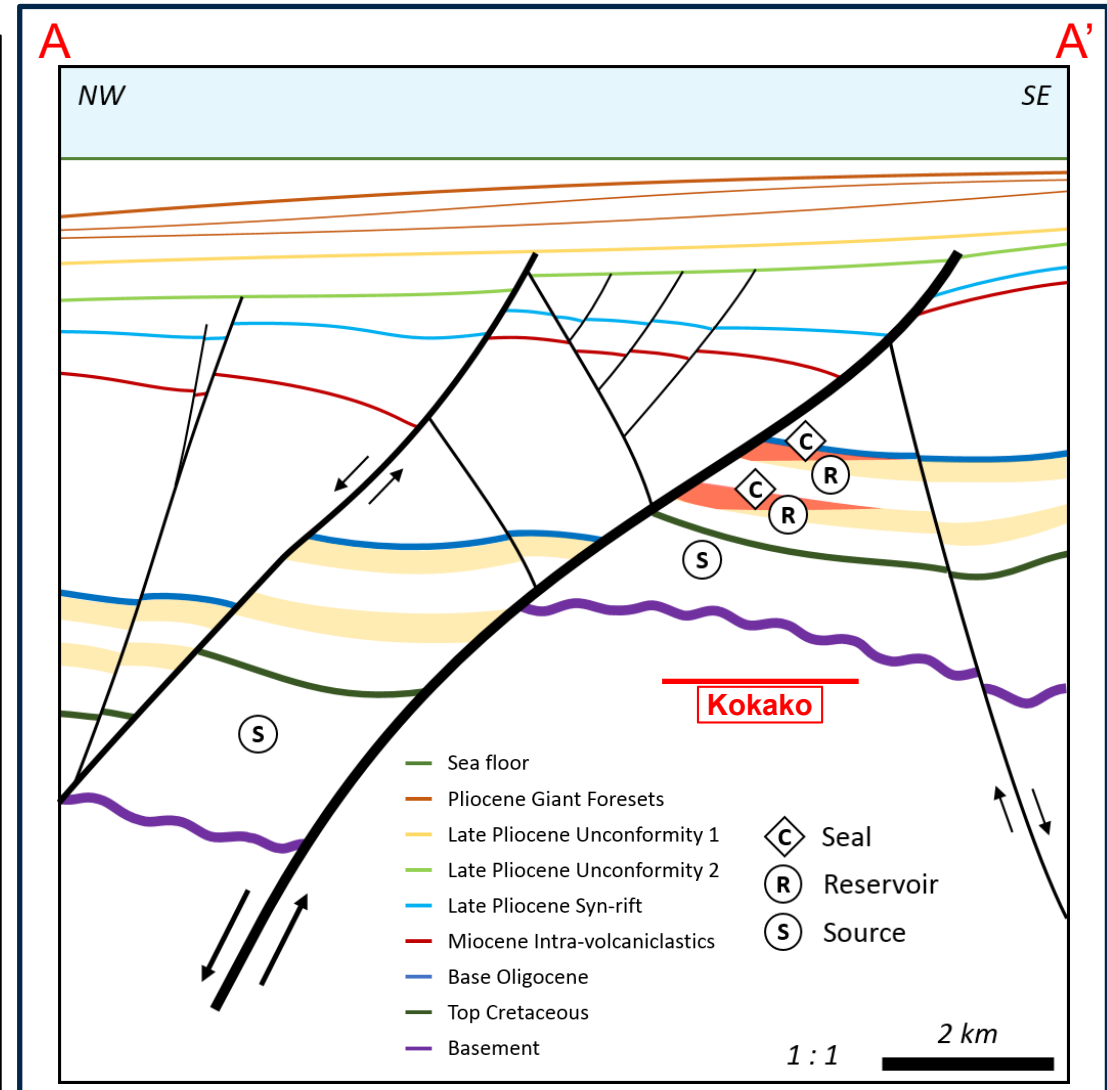


# Structural setting

- Kokako prospect is three-way dip and fault bounded trap
- Trap formed by large offset normal fault
- 3100 m bml with 360 m of closure
- Covered by 3D seismic
- Korimako is similar and provides running room along structural strike to the north



Base Oligocene (depth)

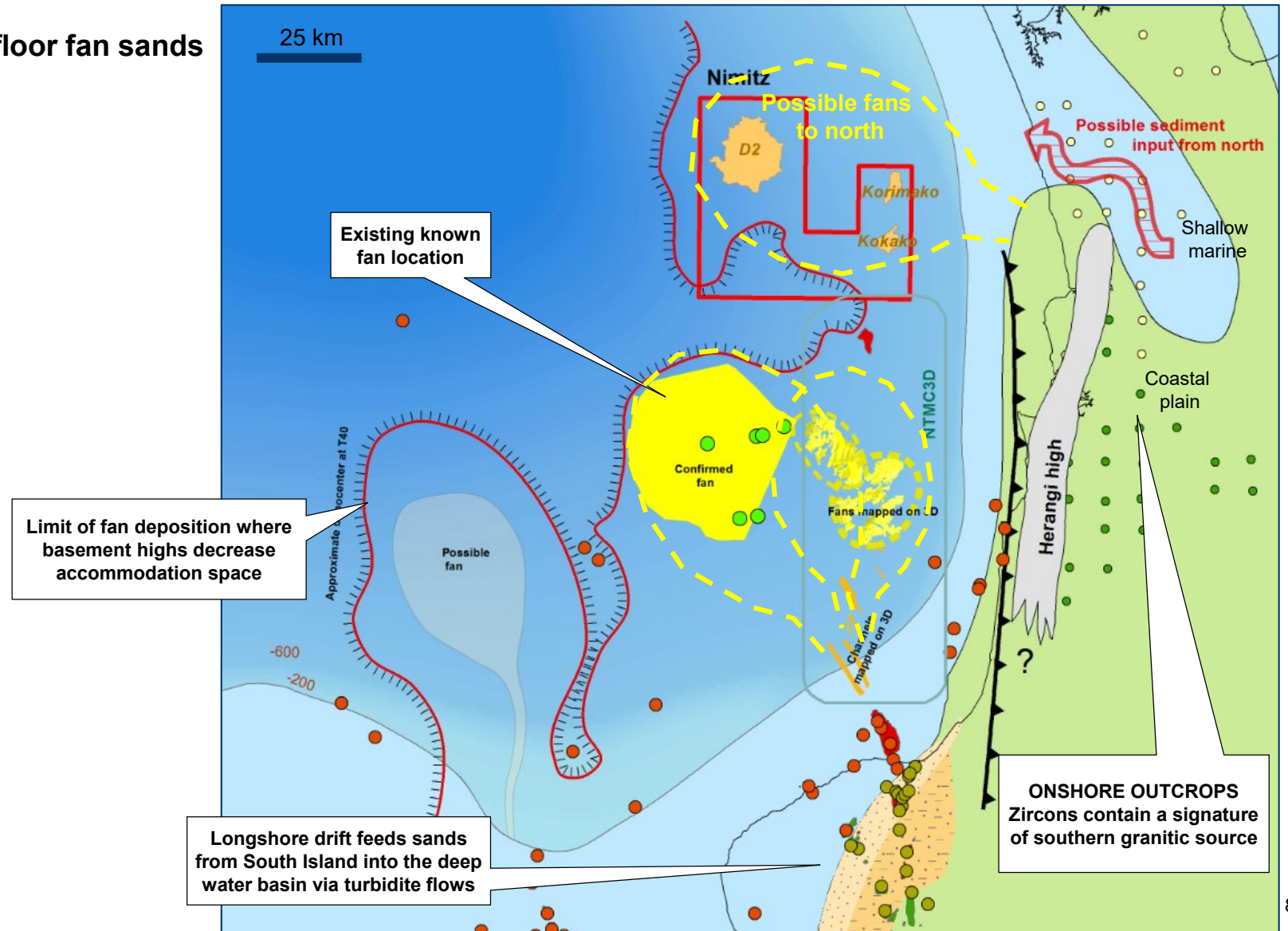




# Reservoir – basin floor fan sands

- Tangaroa Formation: Late Eocene basin-floor fan sands
- ~200 m thickness
- Clean, quartzose sandstone
- Porosities 13 - 22%
- Average permeabilities 83 mD
- Net:Gross 50 to 85%

-  Fan sands
-  Shale
-  Shoreface
-  Ariki fan

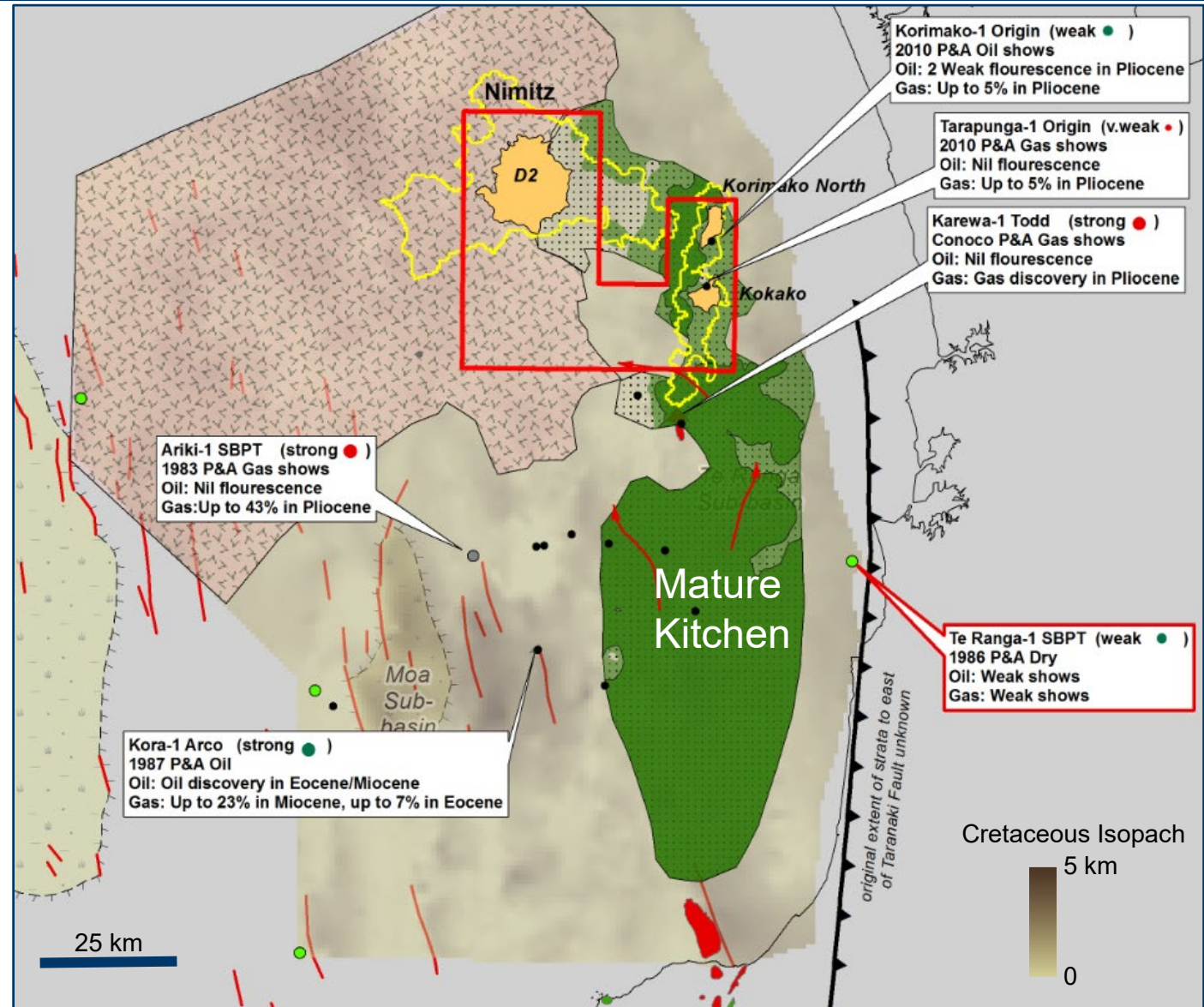




# Charge – thermogenic shows in shallow wells

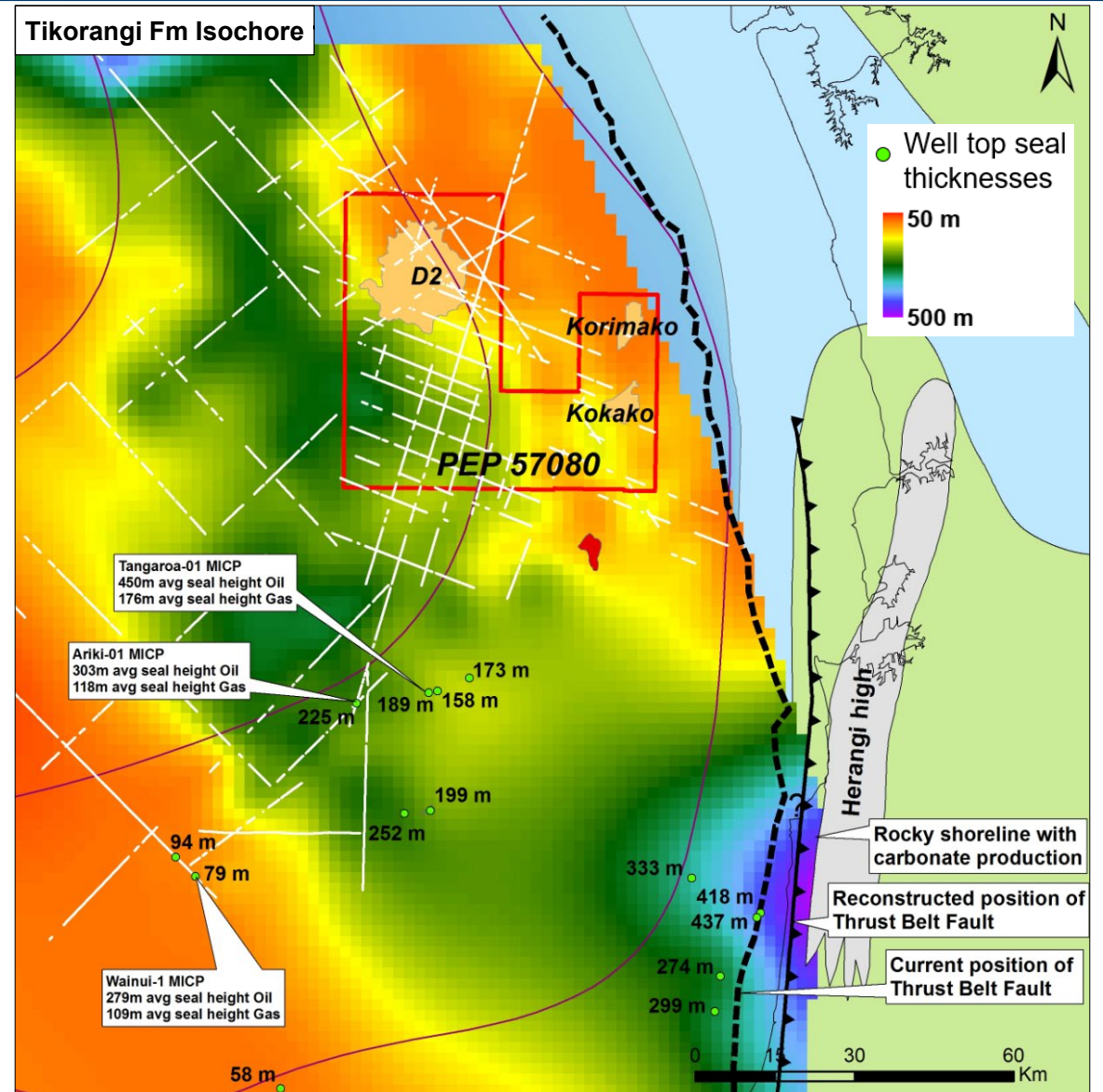
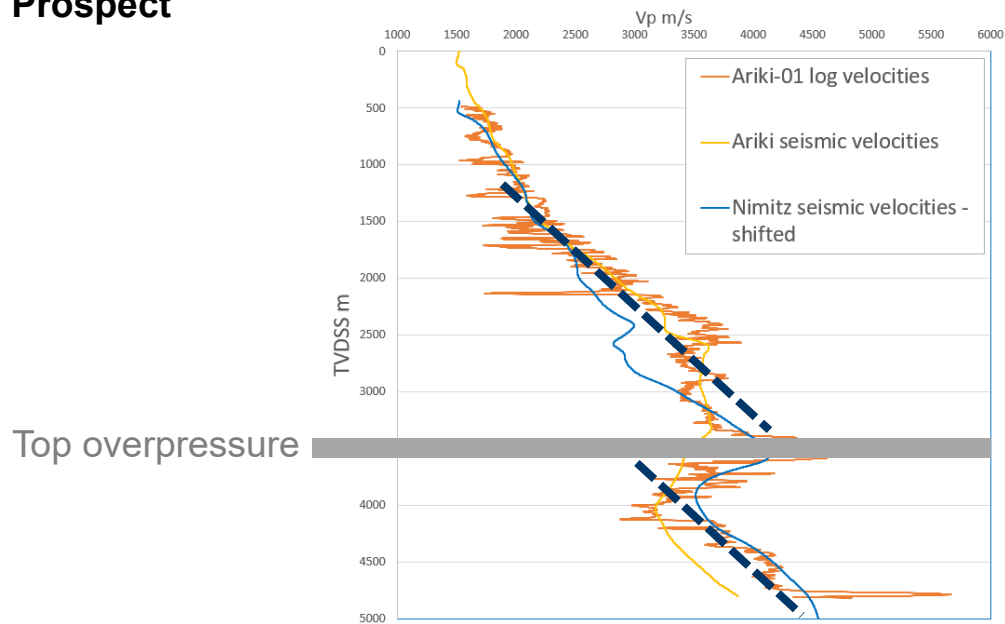
- Mid Cretaceous Taniwha Formation coastal plain coals and coaly mudstones deposited in syn-rift setting
- ~1000 m thick sequence underlies prospects
- Co-expulsion of oil and gas: most likely gas-condensate but could be oil
- Charge modelling indicates late stage burial and maturity
- Fetch area includes large kitchen to south
- Oil and gas shows in shallow wells in the permit

- Cret. penetration no coal
- Cret. Coals
- Prospects
- Cretaceous Volcaniclastic & possible coals
- Upper Source Rock Interval Mature for Expulsion
- Lower Source Rock Interval Mature for Expulsion



# Seal – well developed marine marls

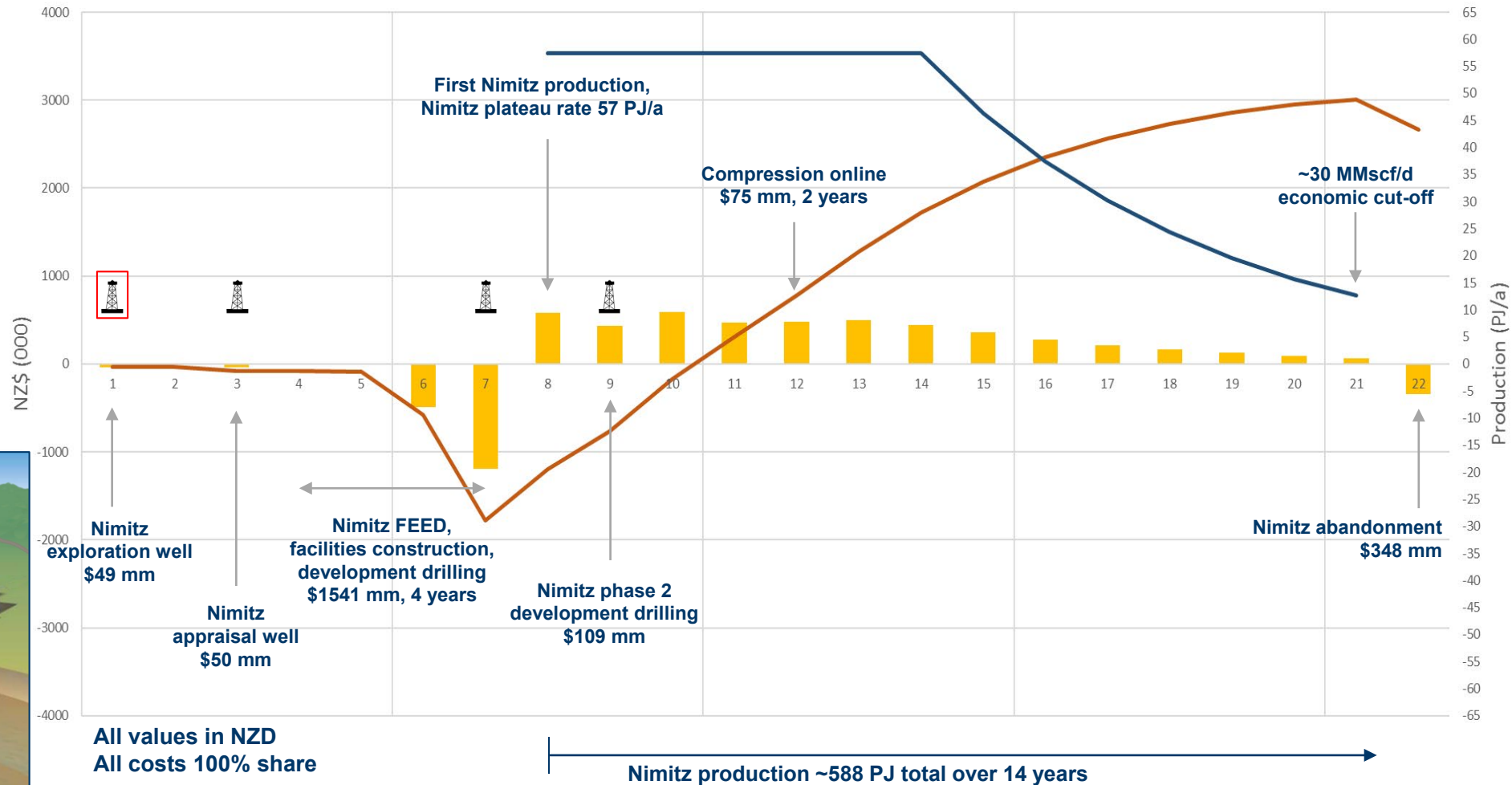
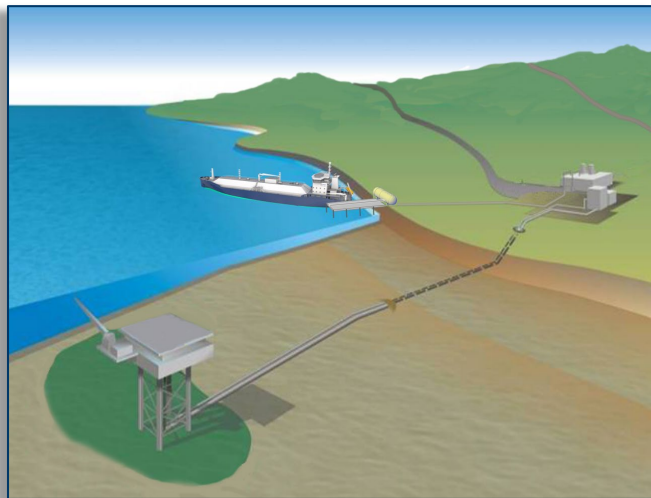
- Tikorangi Formation Oligocene carbonates and marls
- Seal unit > 50 m thick across basin
- Gas column height potential 80 - 250 m from MICP
- Seal considered low risk
- Overpressures across northern Taranaki Basin below Oligocene
- Velocity analysis indicates overpressure at Kokako Prospect





# Mid case Nimitz Gas Condensate Development - NPV10

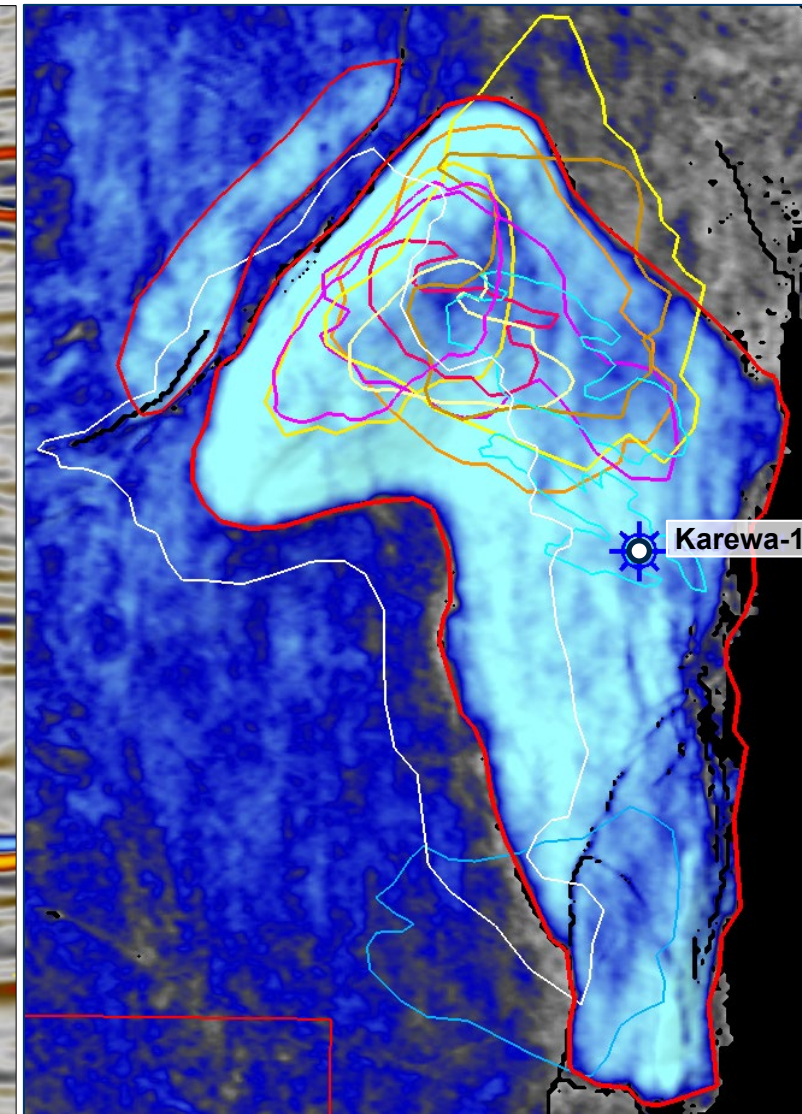
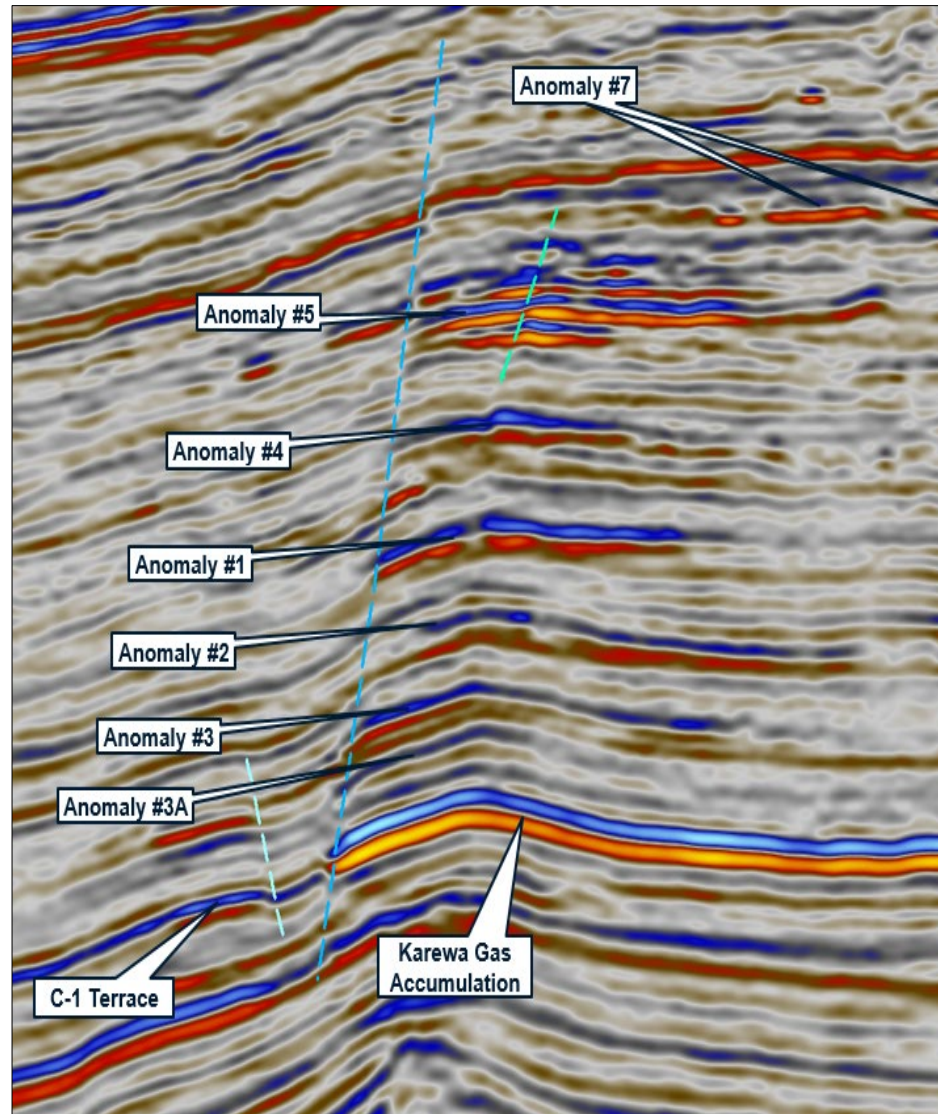
- With a NZ\$6 /GJ gas price assumption the P50 NPV10 = NZ\$0.5 bln



■ Annual Cash Flow (NZ\$ mm)    
 — Cumulative Cash Flow (NZ\$ mm)    
 — Production (PJ/annum)

# Undeveloped Karewa gas discovery ~ 25 km south of Kokako

- Todd 100%
- Discovered by Karewa-1
- Recoverable P50 ~207 Bcf
- NPV<sub>10</sub> = 0 gas price of NZ \$8 – 10 /GJ required for stand-alone conventional platform development
- Worth incremental cashflow of > NZ \$390 mm in Nimitz success case as a tie back development
- Requires appraisal well to establish flow rates and test overlying NFE

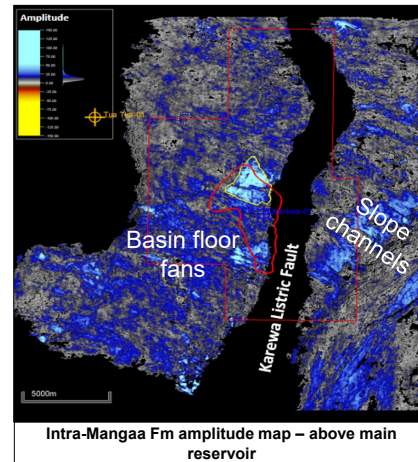




# Karewa Discovery - geological elements

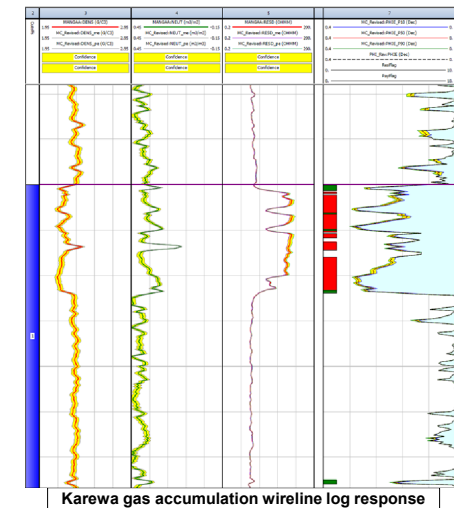
## Reservoir

- Pliocene Mangaa Fm basin-floor fan sand sequence
- 10 - 30 m reservoir thickness within structural closure
- Clean, quartzose sandstone:
  - Porosities 20 - 25%
  - Permeability 30 - 200 mD
  - Net:Gross 86 - 96%



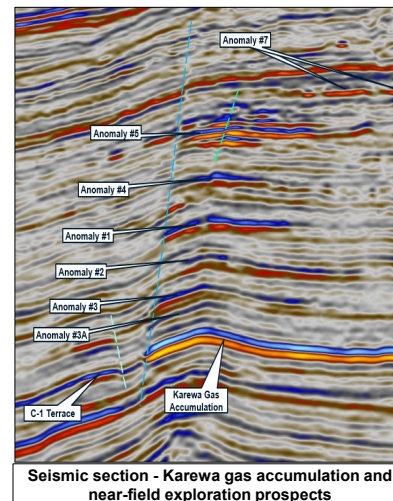
## Charge

- Biogenically-derived
- Dry gas > 97% methane
- Structurally conformable amplitude anomaly delineates main gas accumulation
- Nine overlying NFE prospects defined by structurally-conformable seismic amplitudes



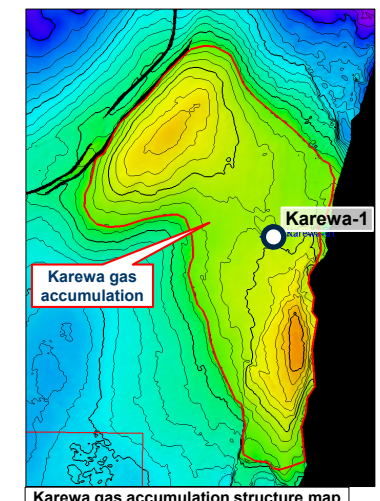
## Seal

- Intra-formational Mangaa Fm shale seals
- Seal overlying Karewa gas accumulation retains 95 m gas column
- Additional NFE prospects < 50 m column height



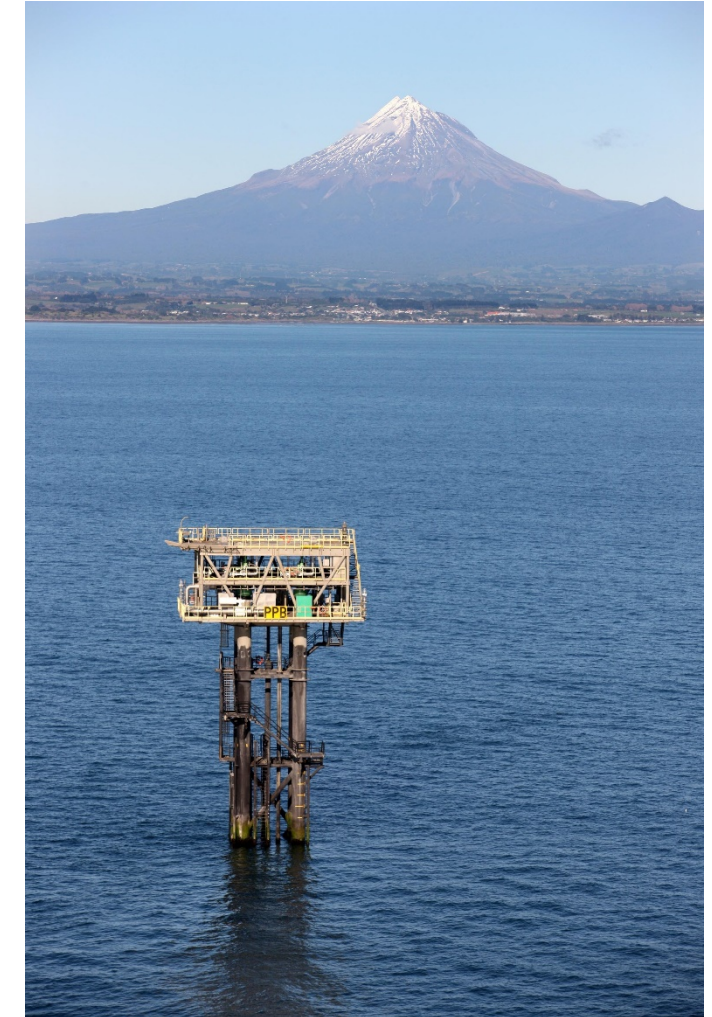
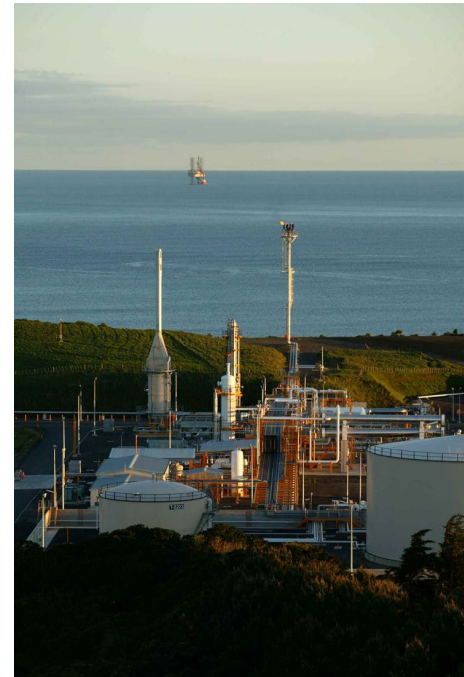
## Structure

- Four-way dip trap on 3D seismic
- Crests in NW and south require two wells for drainage
- 95 metres of structural closure
- Spill point at 1930 mSS



## Summary – North Taranaki Graben

- **Todd and Beach are looking to jointly farm down 1/3rd of an exploration well in Nimitz at realistic terms**
- **Todd is considering farming-down a portion of the Karewa discovery to help progress exploration and appraisal of the North Taranaki Graben**
- **Interested parties should visit the Todd poster presentation for more information**
- **Seeking offers by 4Q 2019**



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