Atlantic Margin Exploration Opportunity
Jameson Land
Onshore East Greenland
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Greenland Gas & Oil – Opportunity profile

• Early stage Greenland/Atlantic Margin exploration pure play;
  – Play opening opportunity in undrilled Atlantic Margin basin
  – Proven geology; analogous to the prolific Norwegian Haltenbanken and Barents Sea provinces, working hydrocarbon play system
  – FTG and 2D Seismic data over licence
  – Potential for multi-billion barrel prospective resource volumes within the licence area
  – Onshore licences offer significant benefits over offshore licences;
    • More favorable cost basis and operating conditions
    • Less environmental exposure (ready access and ease of containment)
  – Stable geopolitics, supportive government and attractive fiscal terms

• Low cost, low commitment, potentially high impact hydrocarbon exploration opportunity
  – Drilling operations planned to commence winter season 2020/21
Jameson Land location
Jameson Land exploration context

A Current Atlantic margin structural elements and oil and gas fields

B Permo-Triassic sediment distribution on the Atlantic margins

C Pre Atlantic spreading - reconstruction of Permo-Triassic deposition
Licence Terms and Commitments

Greenland Gas & Oil has three licences in Jameson Land:
- 2015/13 (Area 2) 2,572 km²
- 2015/14 (Area 3) 2,923 km²
- 2018/40 (Area 1) 2,622 km²

All licences are 93.75% owned and operated by Greenland Gas & Oil A/S

Fiscal terms
- Terms reflect desire to attract exploration activity;
  - The national oil company of Greenland, NunaOil has a carried 6.25% interest in each licence for exploration activities
  - Sales Royalty at 2.5%
  - Surplus Royalty at 7.5 to 30.0%
  - Corporation Tax at 30%

Licence Commitments
- Each licence is broken into three sub periods;
  - Sub-period 1 (ending 31 December, 2020)
    - Review existing data Completed
    - Reprocess Existing 2D Completed
    - New data FTG acquired 2017
  - Sub-period 2 (3 years)
    - Acquire new seismic (2D or 3D) as required or drill exploration well on each licence
  - Sub-period 3 (4 years)
    - Drill exploration well on each licence
    - Development studies
**Jameson Land exploration history**

- ARCO acquired 1,800 line km of 2D data between 1986 and 1989
- On behalf of GGO, GEUS reprocessed four lines in 2015/16, completing the balance in 2017
  - Improved noise attenuation and seismic imaging
- Reprocessing and reinterpretation of the seismic data has led to a reassessment of the Jameson Land Basin:
  - Identification of Triassic rift event trending NE-SW
  - Thicker Mesozoic section (up to 8 km vs 4.5 km)
  - Improved detail on development of Jurassic depocentre and depositional trends
- FTG survey acquired summer 2017
  - Processing underway
  - Confirms depth to base Permian unconformity
  - Suggests potential for further structural plays in the southern part of the licence
- GGO picked up licence 2018/40 through Greenland’s “Open Door” licensing process
  - Increased exposure to the area to the north of existing licences
- Basin modelling studies suggest:
  - At least three working source rock systems
  - Predominantly oil generated to date
Excellent progress in understanding the basin

• Geophysical and geological studies conducted over the past three years have included;
  – 2D reprocessing of existing seismic
  – Acquisition of FTG and Lidar data
  – Source rock and reservoir potential from field data and analogues
  – Basin modelling studies
  – Prospect characterization and mapping

• Key conclusions;
  – With each phase of processing/reprocessing of 2D seismic, detail has improved
  – FTG modelling confirms depth to basement and basement structure
  – Previously unrecognized NE-SW Triassic rifting event provides improved structural opportunity
  – Basin modelling suggests all source rocks are oil prone and mature

  – Significant hydrocarbon potential in structural and stratigraphic plays across multiple horizons
Progress in 2D seismic definition

1991 version
Paper-based interpretation

2016 version
Based on digital data but reprocessing of key lines only

2018 version
Fully reprocessed dataset
Base Permian depth of ~3km in north, increasing to 7km in south
iFTG survey reveals basement structure

Profile 4 2D Model
Struturally simple basin ~3km depth overlying crystalline magmatic basement

Profile 8 2D Model
Deeper basin, increased structural activity, depth ~7km overlying non-magmatic basement
Improved structural interpretation
Play analogues

- **East Greenland - Mid Norway / Barents Sea**

  • **Upper Permian**
    - Carbonate build-ups on local highs (Loppa High, Barents Sea)
    - Inter-high platform carbonates and clastics (Loppa High, Barents Sea)
    - Deeper basinal shales

  • **Triassic – Jurassic**
    - Transition from fluvial playa to lacustrine delta to shoreline marine clastics
      • Goliat, Johan Castberg, Skalle - Barents Sea
      • Heidrun, Skuld - Mid Norway,
      • Strathmore - East Solan Basin, UKCS

NPD 2016 Yet to find Resource Report
To the north and east of the licences, potential reservoir and source rock horizons are exposed at outcrop;

Wegener Halvø section – Upper Permian carbonate “reservoir” draped by coeval Ravnefjeld source rocks.

Lower and Upper Jurassic – massive sandstones demonstrating excellent reservoir characteristics
Direct hydrocarbon observations

Similarity of biomarker “fingerprints”
East Greenland and Mid-Norway

Haltenbanken, Norway

Jameson Land, East Greenland

Stratigraphic distribution of Jurassic rocks (based on the compilation of Stoker et al. 2014)
Substantial prospective resources identified

- Provisional mapping identifies 50+ leads
  - Leads/Prospects mapped at multiple levels
    - Upper Permian reefal carbonates
    - Permian/Lower Triassic early rift sandstones
    - Upper Triassic/Jurassic late rift sandstones
- Gross un-risked recoverable resource range;
  - ~2.5 billion boe P50 recoverable resource
  - P90 ~210 million boe, P10 ~23 billion boe
- A number of potential well locations identified, each location targeting
  - multiple plays/leads
  - Initially targeting leads down to 3,000m depth
  - Multiple 100+ mmbbl targets

Prospective Resource figures are in-house estimates, which should be taken to reflect the potential scale of the opportunity, but which require further work to mature to drillable prospects.
Possible drilling targets – example OPW-1

OPW1 lies just to the NE of the intersection of lines 86-05V and 88-08V.
Future Operations Programme

- Completed in 2018;
  - Integrate and interpret FTG and reprocessed 2D seismic data
  - Fine tune Basin Modelling to match reinterpreted dataset
  - Review play analogues
  - Complete Lead and Prospect Inventory

- 2019 onwards;
  - Review case for drilling vs seismic
  - Prepare EIA and SIA
  - Operational planning for wells and/or seismic
  - Operations planned over two winter seasons
    - 2020/21 two wells
    - 2021/22 two or more wells, possible infill seismic
Corporate structure / financing

• Greenland Gas & Oil Limited (GGO) is a private company, registered in England
  – Local wholly owned subsidiary Greenland Gas & Oil A/S is signatory to the licences

• GGO has raised £5.0 million since December 2013
  – Predominantly by management and associates
  – Phase 1 work programme and G&A costs financed through to end 2019
  – Shares in issue 137,250,000
  – Market Cap ~£12.5 million including £1.0 million cash, no debt

• Following decision on future work programme, further equity funding and/or farm-out for seismic/drilling programme estimated at ~$50 to $75 million
  – Phase 2 work programme likely spread over several winter seasons starting winter 2020/21
**Take away**

- **Greenland/Atlantic Margin exploration pure play:**
  - Play opening opportunity in highly prospective undrilled Atlantic Margin basin
  - Proven geology; analogous to the prolific Norwegian Haltenbanken and Barents Sea provinces, working hydrocarbon play systems
  - FTG and 2D Seismic data over licence
  - Potential for multi-billion barrel prospective resource volumes within the licence area
  - Onshore licences offer significant benefits over offshore licences;
    - More favorable cost basis and operating conditions
    - Less environmental exposure (ready access and ease of containment)
  - Stable geopolitics and attractive fiscal terms

- Evaluating future funding options, any combination of:
  - Equity raise
  - Farm-out before seismic/drilling (strategic partnership)
  - Public listing/RTO/merger

- **Low cost, low commitment, potentially high impact hydrocarbon exploration opportunity**
Exploration

Triassic

Permian

Atlantic Margin

Frontier

FTG

Source Rock

Play fairway mapping

Reservoirs

Triassic

Jurassic

Seismic reprocessing

Prospective

Resources

Onshore

FTG

field work

Bitumen seeps

North Sea geology

Structural

Stratigraphic

Propective

Resources

Reservoirs

Play fairway mapping

Reservoirs

Basin modelling

Barents Sea analogues

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