



November 20th, 2025

10th Dutch Exploration Day

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Integrity

Reaching out for Success

Michiel Dekker



A sustainable **gas** system



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Reaching out for Success P11-13 Extended Reach Well

Michiel Dekker, Mike Hall, Ed Appleton, Erik Koppe & Hans van Marle

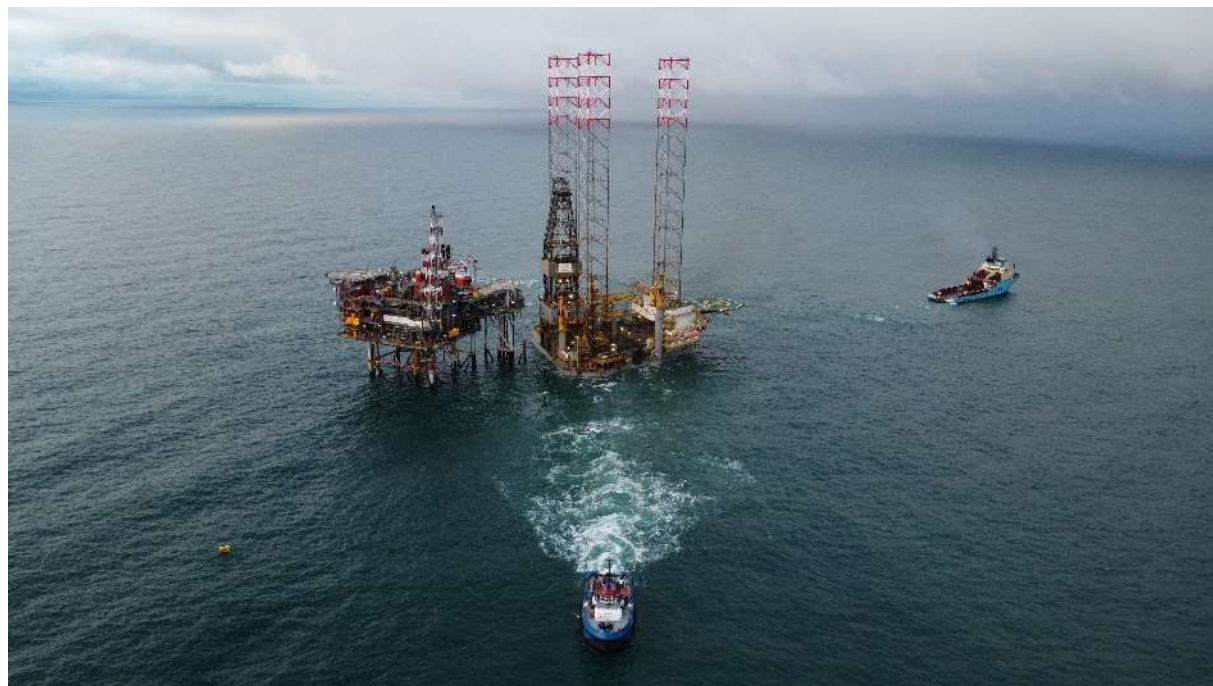


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Content



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- 2 ERD well
- 3 Geological success
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Borr Prospector 1 jack-up rig being positioned at P11 De Ruyter platform



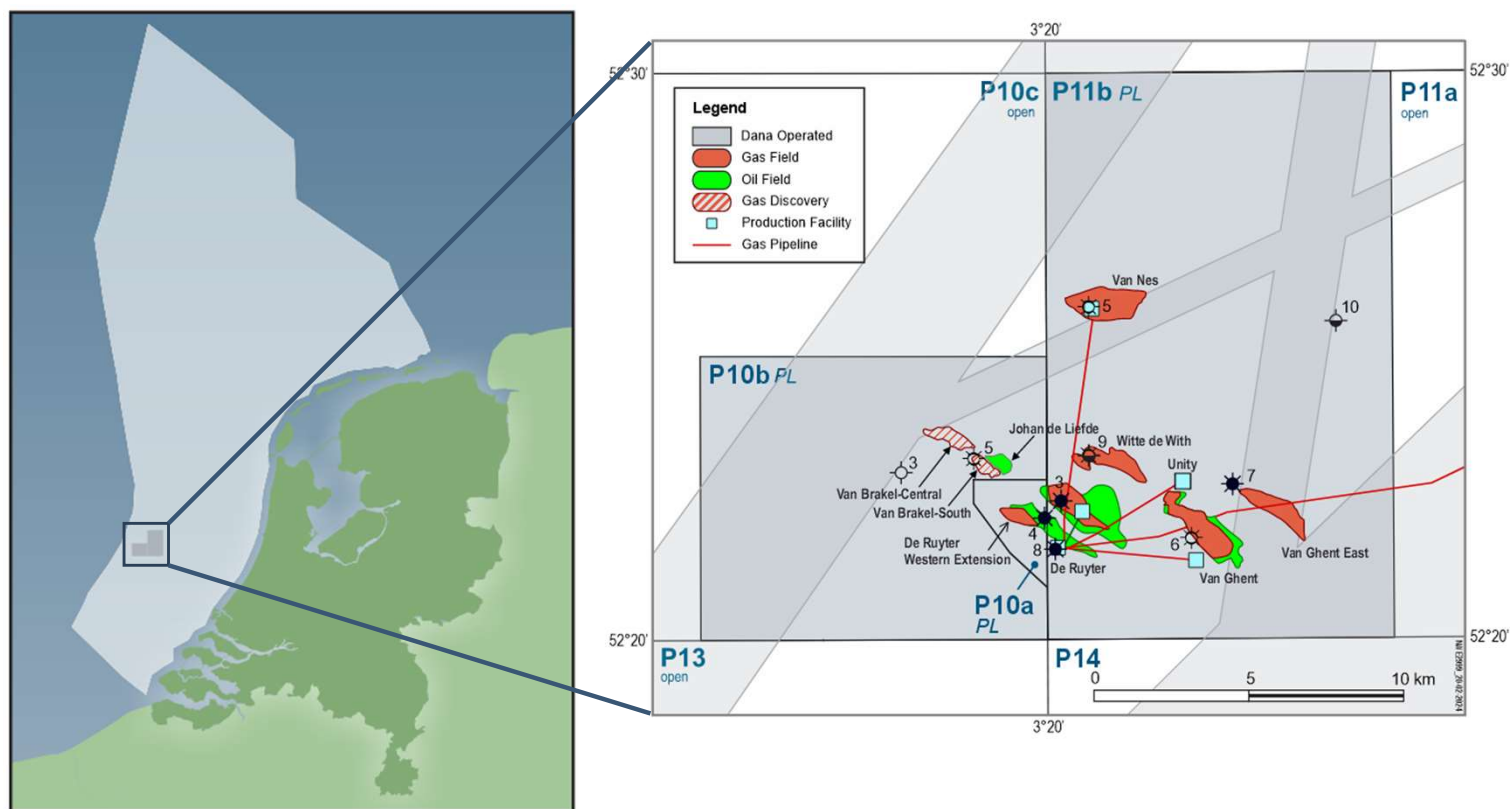
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Setting the Scene

Where are we?

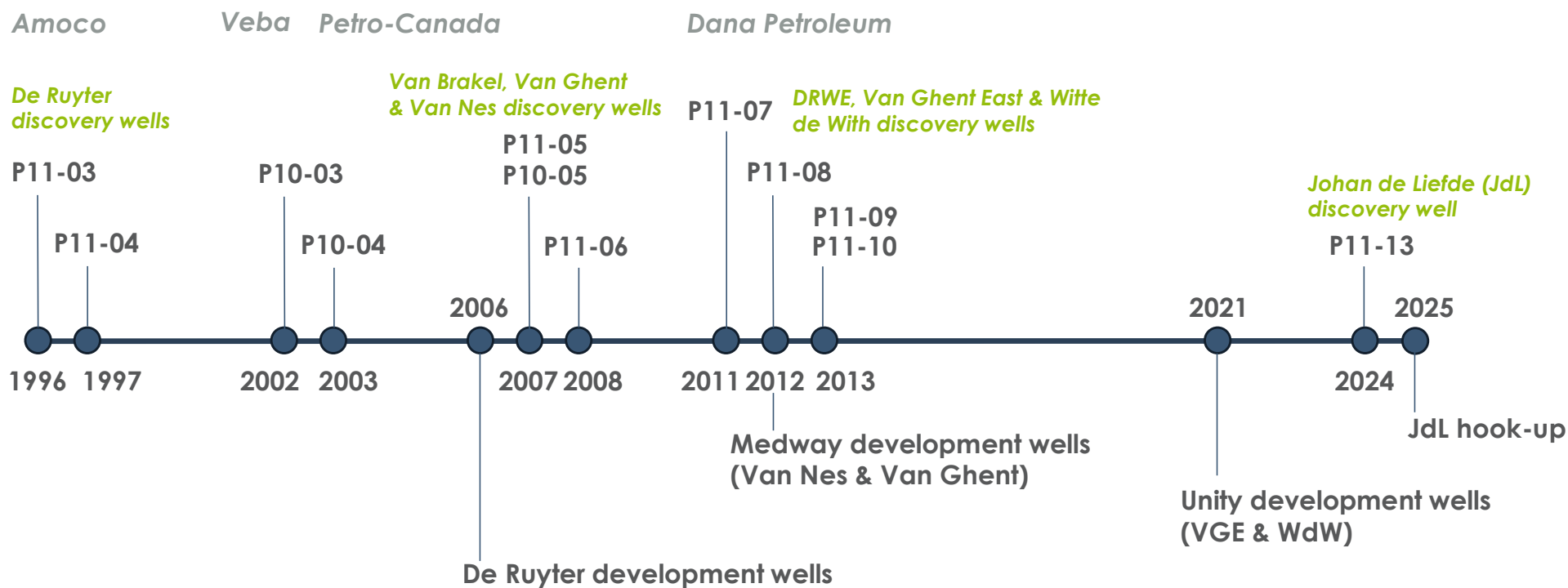
- Southern North Sea
- Offshore Netherlands
- P11B-De Ruyter platform surrounded by several producing and depleted fields and one undeveloped gas discovery



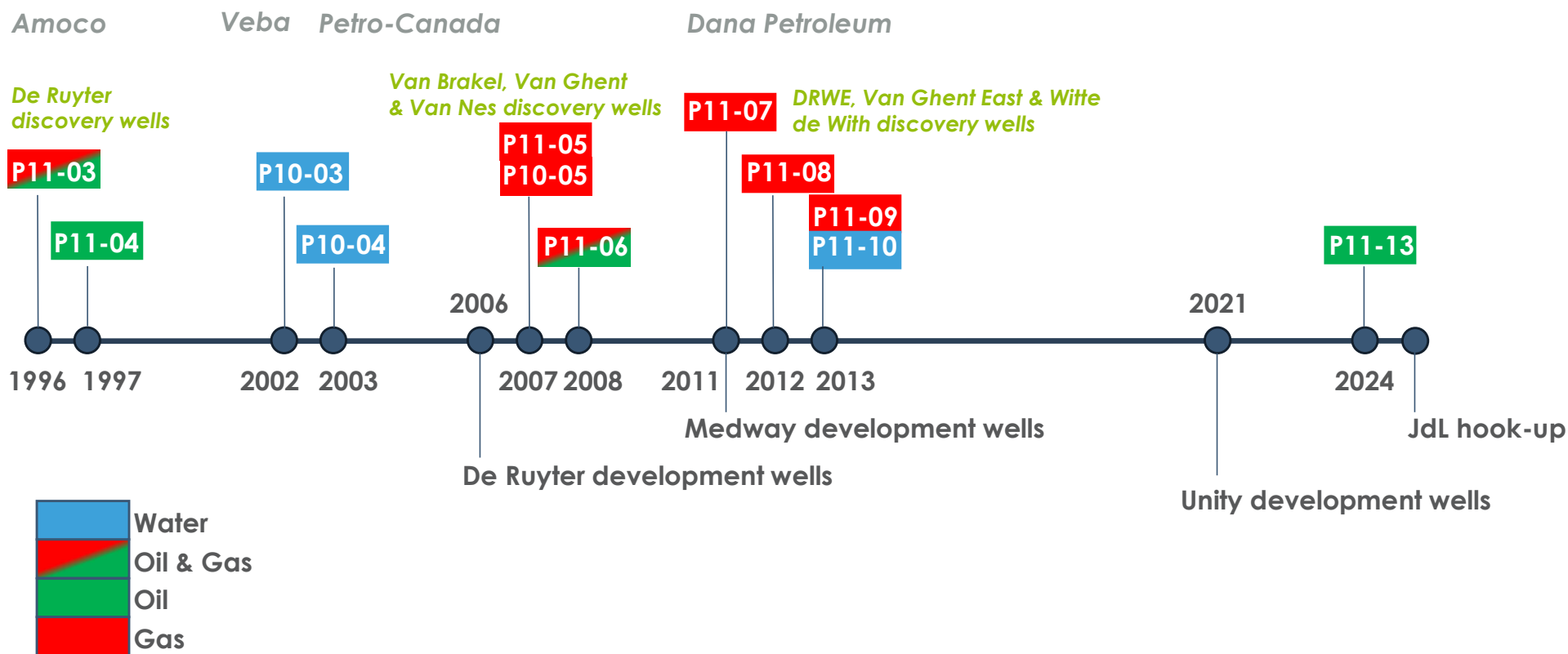
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A bit of history



A bit of history





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Extended Reach

Why extended reach?



Crest of prospect was located 3.7 km away from the De Ruyter facility

Options were (1) to drill from a monopod/subsea location close to the prospect or (2) to drill an ERD well from the De Ruyter platform

ERD well chosen

- ▣ Bruine Bank – Natura 2000 area
- ▣ Fast tie-in to existing facilities – meaning significantly faster first hydrocarbons

Drilled by Borr Prospector 1 jack-up rig from December 2024 to March 2025 from the P11 De Ruyter production platform



Borr Prospector 1 jack-up rig at P11 De Ruyter platform

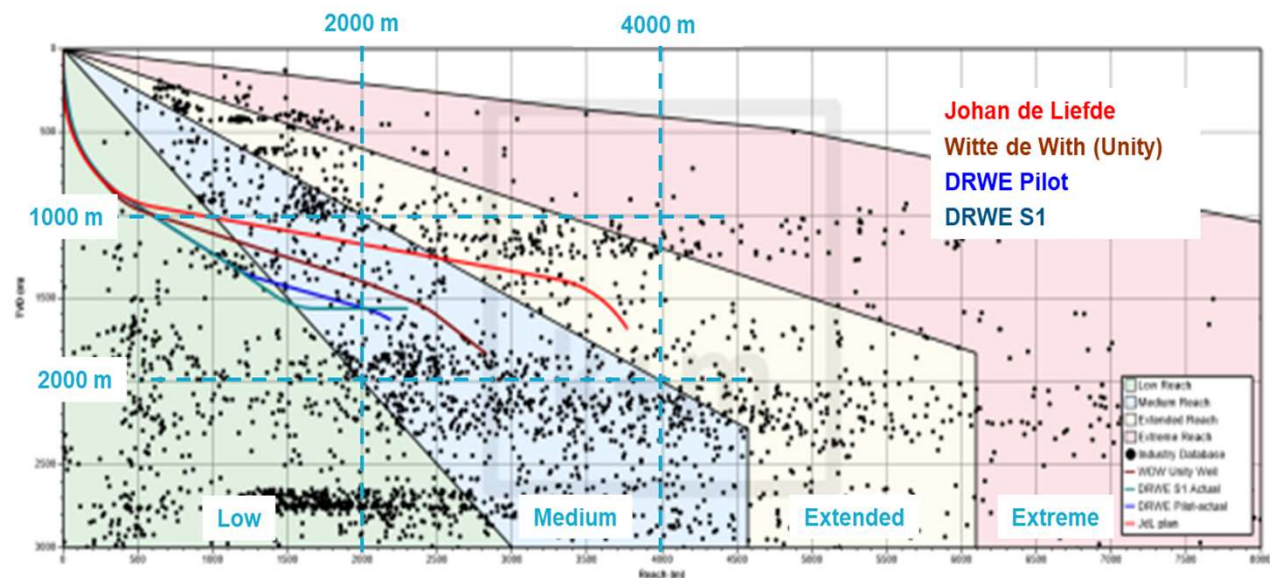
Industry Extended Reach Wells vs P11 Wells



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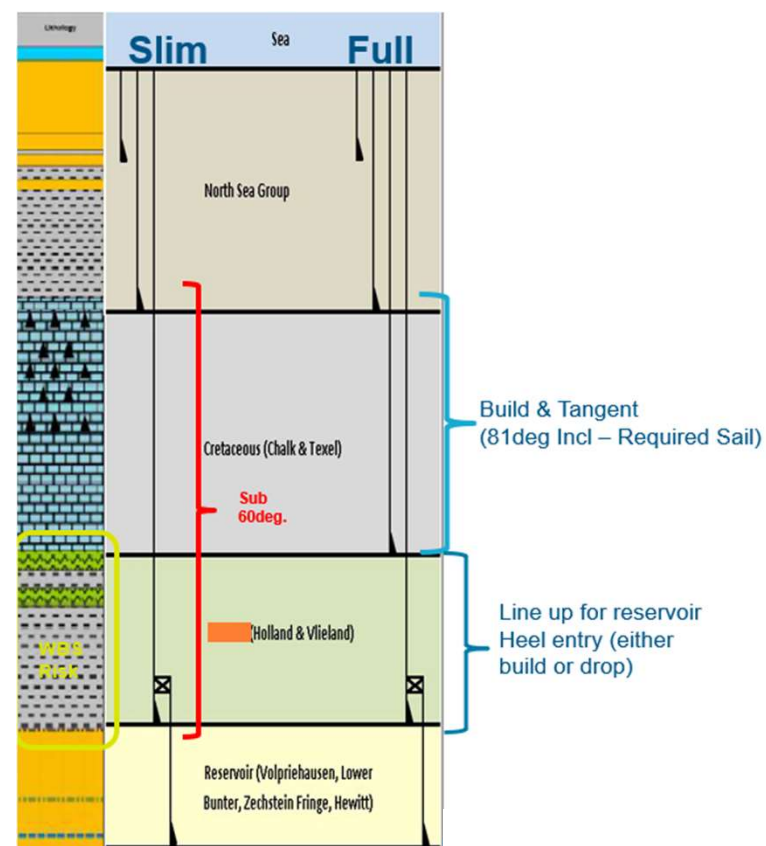
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- ERD Ratio is defined as Horizontal Displacement of a well, divided by its True Vertical Depth
- Used to categorize and compare directional complexity of highly deviated wells in normalized fashion
- ERD Ratio of Johan de Liefde is 2.34
- While highly deviated wells in SNS are not uncommon, most do not classify as ERD wells



Casing Seat Selection

- ❑ Full casing architecture proposed for JdL due to requirements for high sail angle through Cretaceous (82deg) then drop for reservoir entry, (50deg) (i.e. build, hold, drop, hold well path profile)
- ❑ Vertical / Low Step out wells have ability to drill / case off entire Cretaceous / Jurassic Interval. Not the case in JdL
- ❑ Casing design driven by:
 - Well bore stability curves defining drill ahead mud weights not pore pressure
 - T&D Friction factors needed to get shoes to the requisite depths
- ❑ Wellbore Stability of Holland & Vlieland require mud weights that encroach / exceed Cretaceous Chalk's Shmin values at higher sail angle (>1.43 sg static mud weights)



Johan de Liefde ERD Well Characteristics

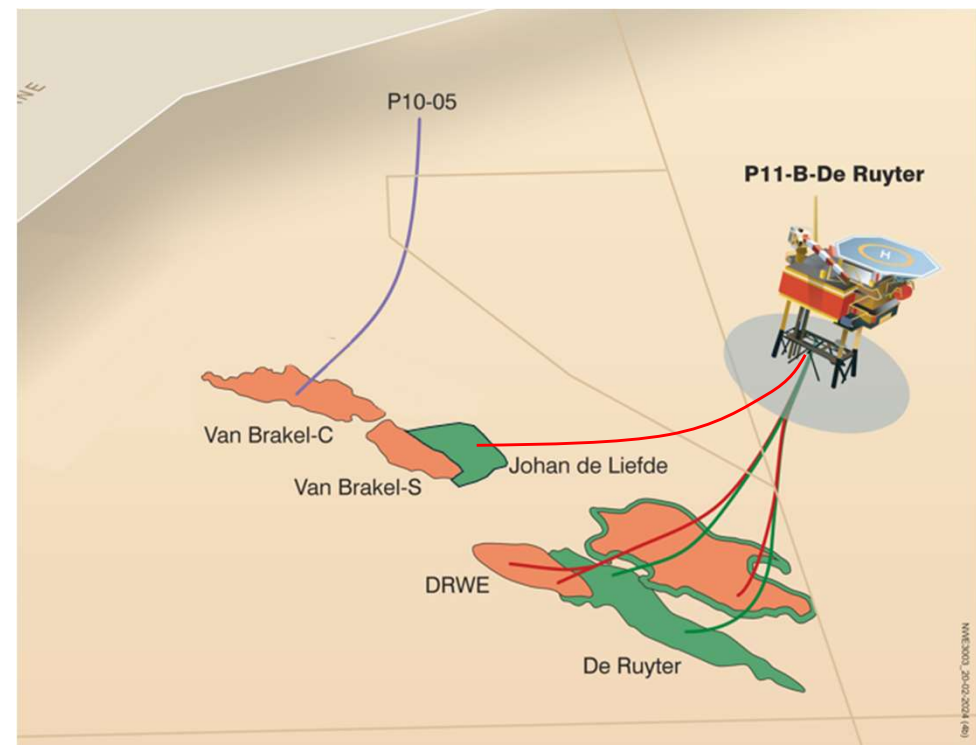


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Main challenges and risks that were successfully overcome:

- Tight rig positioning envelope at De Ruyter platform
 - Congestion by existing wells underneath platform with high risk of well bore collision
 - High torque and drag while drilling long sections at high inclination
 - Building inclination with WBM through soft Chalk
 - Stringent hole cleaning requirements at limits of typical SNS jack-up capabilities
 - Bore hole instability in highly reactive shales
 - Zonal isolation of short 4 ½" liner cement column
- ❑ Penetrated the JdL reservoir within 1m of planned target location, discovered oil
 - ❑ At short notice, successfully reconfigured the completion for the JdL oil discovery
 - ❑ Great cooperation between Dana, Borr, Petrofac, and all others involved





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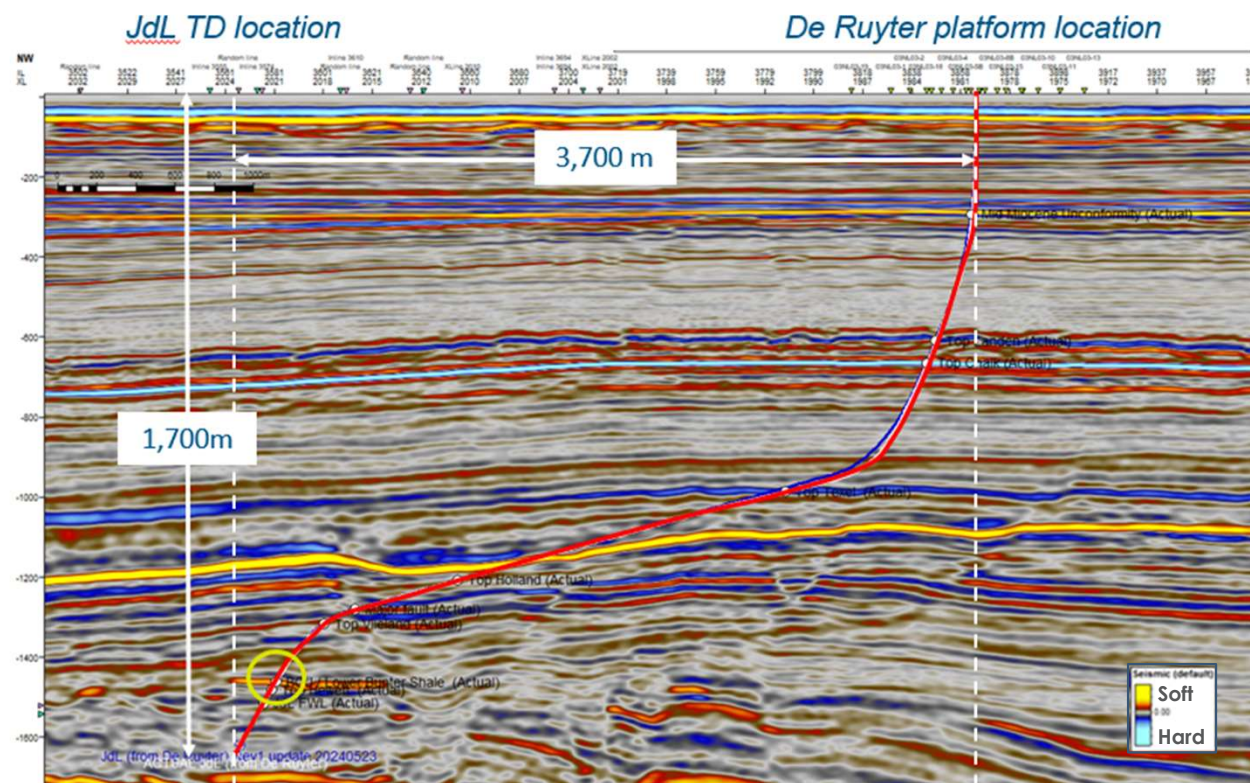
Geological Succes

Well vs seismic

- Shallow tops came in close to prognosis
- Top Holland came in slightly deeper
- Major fault was close to prognosis
- Top Vlieland came in shallower
- Base Cretaceous Unconformity & reservoir came in 11-12m deeper than prognosed



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seismic line along well trajectory

Reservoir



- ❑ Oil filled Upper & Middle Hewett ("Nederweert")
- ❑ Lower Hewett ("Z4 Randzandsteen") & Z3 sandstone water bearing
- ❑ Upper Hewett composed of high porosity, high permeability sand
- ❑ Middle Hewett composed of two shale zones and one high porosity, high permeability sand
- ❑ Pressure data confirmed FWL within 1m of uncertainty

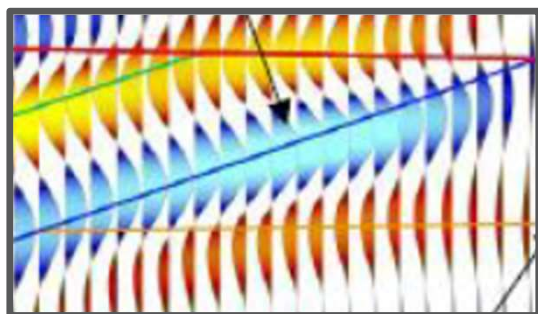
Why was JdL expected to be gas-bearing pre-drill? (1)



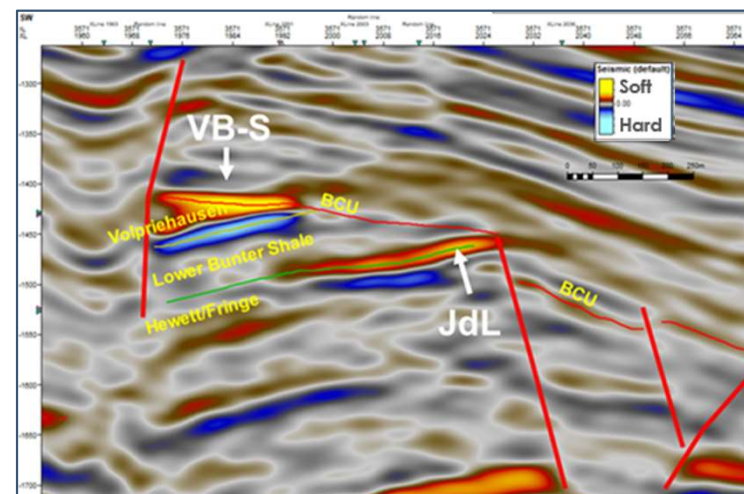
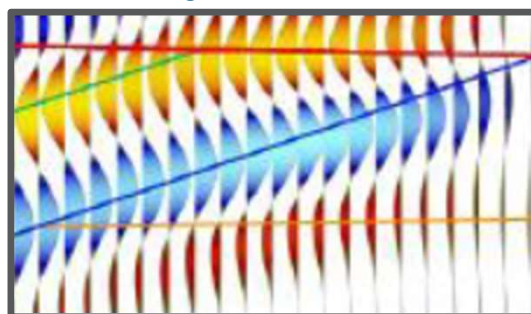
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- Historical “chase” for oil was not successful and encountered mostly gas
- Seismic amplitudes anomalies in De Ruyter area typically suggestive of gas
 - Of 7 drilled anomalies in DR area, 6 were gas discoveries; this includes the Van Nes gas field (Hewett reservoir)
 - De Ruyter oil in P11-04 is the exception: modest amplitude anomaly Top Hewett
- Pre-drill geophysical (QI) study of JdL by DUG could not conclusively distinguish oil from gas on Top Hewett
 - Both gas and oil were modelled as possible outcomes showing brighter reflectivity at Top Hewett level for gas to more moderate for oil

Modelling gas saturated case



Modelling oil saturated case



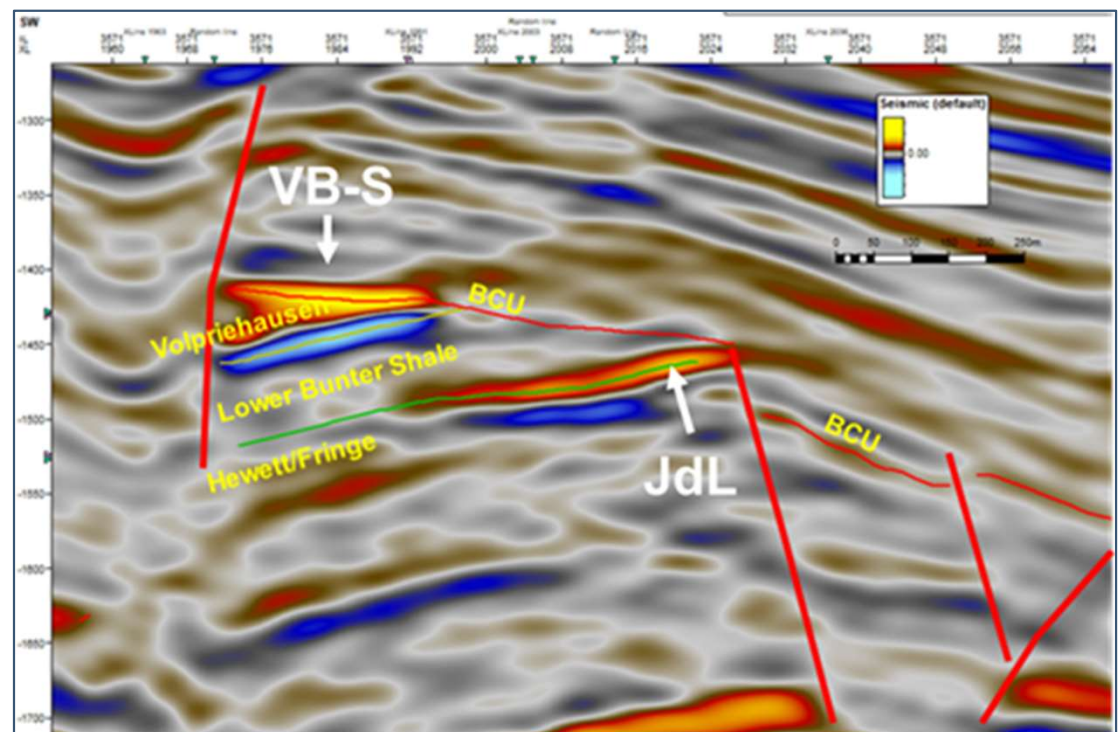
Why was JdL expected to be gas-bearing pre-drill? (2)



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- ❑ Very bright amplitude response at Van Brakel Central & South (Volpriehausen reservoir) – proven gas
- ❑ Nearest down-dip accumulation (Witte de With) is also gas
- ❑ Significant brighter amplitude anomaly compared to known oil in De Ruyter Hewett
- ❑ The oil case wasn't ignored, but given a lower chance of occurrence
- ❑ Well results show LBS sealing for oil, not sealing for gas



Well clean-up



- ❑ Constrained cleanup completed across rig Well quickly cleaned up to 100% light oil – no formation water produced
- ❑ High productivity well with stable pressures
- ❑ Most of 190 Sm³ oil produced taken back to De Ruyter platform
- ❑ Unable to produce well at higher rate due to limitations of well cleanup test spread
- ❑ Surface samples acquired for PVT





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Follow-up

JdL follow-up



Many prospects still present in P10b/P11b

□ Three JdL-look-a-like prospects nearby

- Look-a-like E
 - similar volume to JdL
 - similar distance to De Ruyter as JdL
 - less clear DHI's
- Look-a-like D (JdL North)
 - Bigger than JdL
 - likely part of the same field as JdL, but different compartments
- Look-a-like C
 - significantly bigger than JdL
 - further away from De Ruyter
 - Located below a shipping lane



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