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Field Development Plan (Winningsplan) P10a/P11b De Ruyter

Revision Info

General update: rebranded; updated production profiles

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Date	20-12-2012	20-12-'12	20-12-2012	20/12/12

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Record of controlled documents issue

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2x	Minister van Economische Zaken	Den Haag	Ministerie van Economische Zaken

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Internal distribution	Via Documentum	Operations	Dana Petroleum Netherlands B.V.

1 General

1.1 Plan details

Item	Details
Name applicant	Dana Petroleum Netherlands B.V.
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Applicant status	Is operator conform article 22 of the mining act and license holder with the following parties: Energie Beheer Nederland B.V. (EBN)
Production area	P10a: 2005/E/EP/5032732, P11b: 2004/ME/EP/UM/4020306

1.2 Introduction

The De Ruyter platform, operated by Dana Petroleum Netherlands B.V. (Dana NL), came on stream in September 2006. The development, which consists of a permanently manned platform and a Tanker Mooring and Loading System (TMLS), is located in block P11b, some 60 kilometres North-West of Den Haag in a water depth of 34 metres.

The field has been developed by Dana Petroleum Netherlands B.V. (Dana NL) on behalf of the De Ruyter field owners, Dana NL and Energie Beheer Nederland B.V.

The facilities on board the platform include oil separation, gas handling, produced water treatment, power generation and oil and gas export (including compression). The gas is exported via an 8” gas export line with a length of approximately 29 km to Wintershall’s P12-SW facility. From there the gas is transported via Wintershall’s P6-A platform into the NGT (Noordgastransportleiding) gas transportation system. The oil is stored in the Gravity Base Structure (GBS) before being exported via the TMLS by shuttle tankers. This TMLS is located at 1.5 kilometres distance from the P11-B-De Ruyter platform.

The De Ruyter oil and gas field lies across Blocks P10a and P11b and was unitised in 2006 (P10a/P11b De Ruyter Unit). The field consists of two fault-separated accumulations and produces from Volpriehausen and Hewett/Zechstein-Fringe reservoir units at depths of approximately 1,500-1,600 m tvdss. The field currently produces 4,000 bbl/d oil and 150,000 Nm3/d gas.

De Ruyter has estimated HCIIP’s of 59.1 MMbbl oil and 1.3 Bcm gas, and gross proven plus probable ultimate recoverable reserves of 30.4 MMbbl oil and 0.5 Bcm gas. Cumulative gross production (1st July 2012) was 28.4 MMboe. The field is expected to produce 750,000 bbl oil and 11.2 MMNm3 gas during 2013. Gross remaining reserves (2P) as of 1st July 2012 are estimated to be 5.3 MMboe.

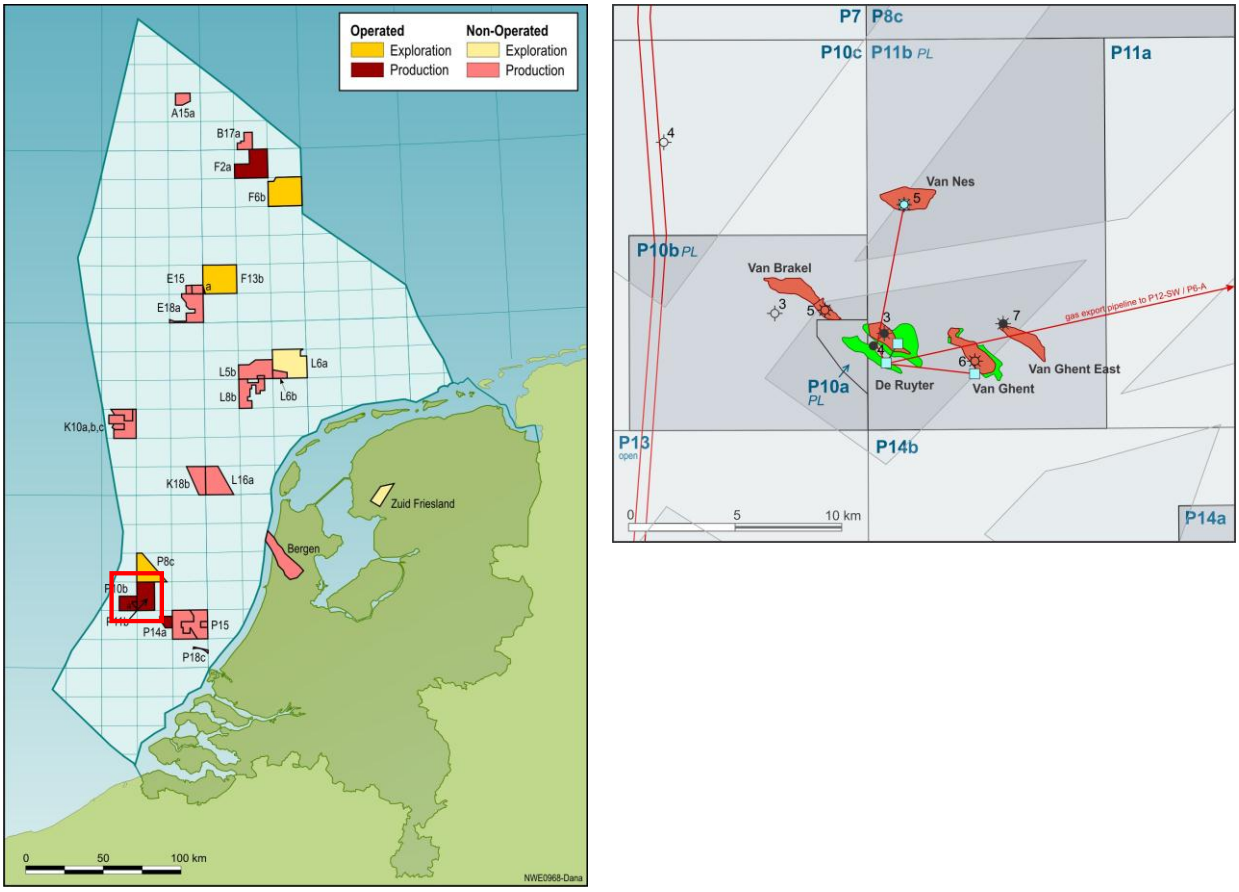


Figure: *De Ruyter Area Location Map*

A number of discoveries have been made in the De Ruyter area, the most significant being the Van Nes (gas) and the Van Ghent (oil and gas) discoveries. These fields have been developed as subsea tie-backs to the De Ruyter platform. Production was started in January 2012 (Van Ghent) and April 2012 (Van Nes). Further detail of these fields are included the in Field Development Plan (Winningsplan) – Van Nes [VNGEN-INT3-PM-PLN-0001] and the Field Development Plan (Winningsplan) – Van Ghent [VGGEN-INT3-PM-PLN-0001], which were submitted to the Ministry of Economic Affairs.

1.3 License overview

License area	:	216 km^2	
Decree	:	P10a: 2005/E/EP/5032732, P11b: 2004/ME/EP/UM/4020306	
License effective	:	P10a: 31 May 2005, P11b: 2 April 2004, Unitization Agreement: 28 August 2006	
Commitments	:	None	
Partner interest	:	Dana Petroleum Netherlands B.V.	54.07%
		Energie Beheer Nederland B.V.	45.93%

A detailed license history is included in Appendix B.

1.4 About this document

Article 34 paragraph 1 of the Mining Act states: 'the production of minerals will be carried out according to a "Field Development Plan". The holder of the production licence or person designated in accordance with Article 22 of the Mining Act is required to submit a Production Plan to the Minister of Economic Affairs. Relevant sections of legislation are included in Appendix C.

This document serves as Field Development Plan (Winningsplan) for the P10a/P11b De Ruyter development. The initial version of this plan was submitted in March 2006. The current revision includes updated production profiles. Revision information is included in Appendix D.

The recoverable resources reported in this document are determined in accordance with the PRMS regulations and the production forecasts are based on these reported recoverable resources.

2 Field development

2.1 Subsurface

The De Ruyter Area is located in the southwestern part of the Dutch Continental Shelf. Tectonically, the De Ruyter field is on a ridge bounded by the London-Brabant High to the south and the Winterton High in the north. The Permo-Triassic Shelf is deepening towards the east into the West and Central Netherlands Basin and to the northwest toward the Sole Pit Basin. Various Pre-Tertiary tectonic phases have given the area a pronounced structural fabric with dominant NW-SE fault trends.

2.1.1 Mining Decree, Article 24 1a

Description of the expected quantity and the composition of the hydrocarbons present, broken down according to reservoir layer and reservoir compartment.

The De Ruyter field consists of two separate accumulations at different stratigraphic levels, separated by a major NW to SE trending fault. The first is known as the P11-03 oil and gas accumulation which consists of a Volpriehausen sandstone reservoir. The second is the P11-04 oil accumulation, which consists of a Hewett and Zechstein Fringe sandstone reservoir. Both accumulations are located at depths of 1,500 – 1,600 m tvdss.

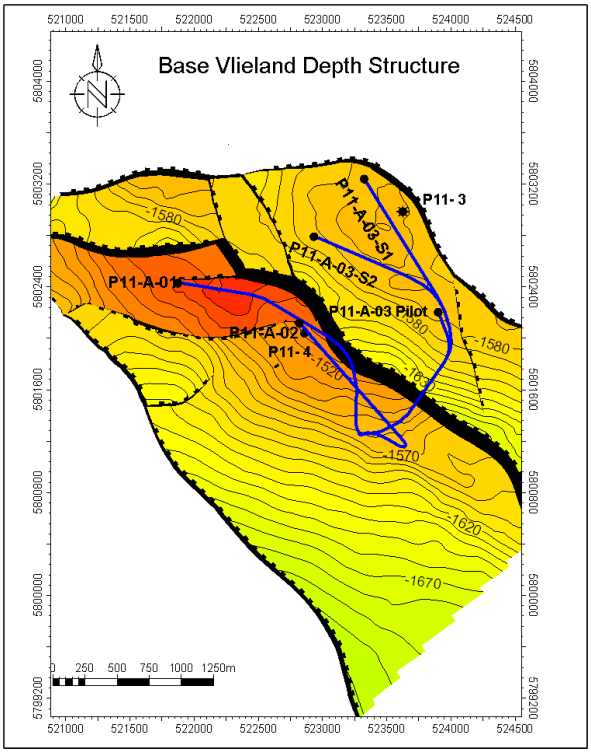


Figure: *De Ruyter Top Structure Map*

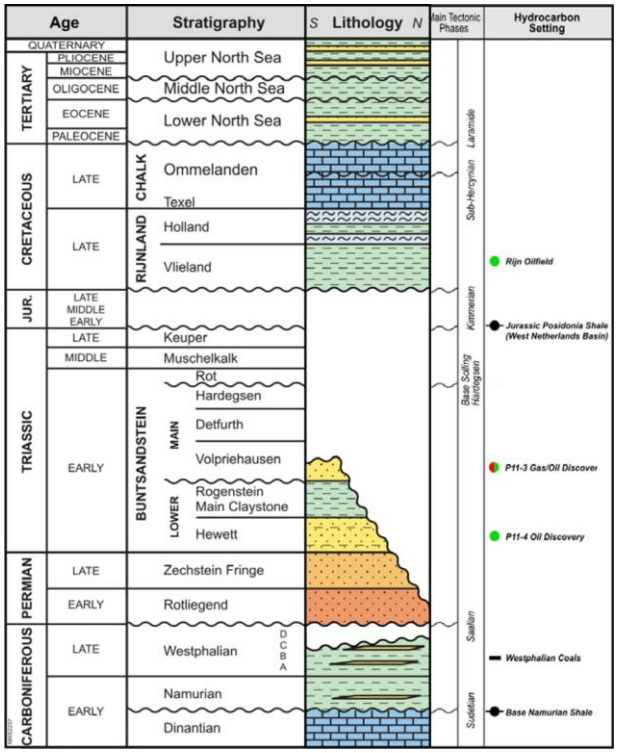


Figure: *De Ruyter Field Stratigraphy*

The P11-03 Volpriehausen Sandstone structure is a gently dipping 4-way dip closure on a fault terrace, limited by major NW-SE trending faults to the east and west and closed by the Vlieland Shale. The

northern part of the closure merges into the P11-04 eastern boundary fault. Along this fault the Bunter Volpriehausen sandstones are juxtaposed against the Hewett and Fringe sands of the P11-04 accumulation.

The P11-04 accumulation is trapped in a NW-SE trending fault block of westerly dipping Lower Triassic-Upper Permian sandstones. The upper Hewett Formation and the overlying Lower Bunter Shale is partly truncated along the NW-SE trending boundary fault, limiting the accumulation in the east. The Vlieland Shale constitutes the vertical seal for both accumulations.

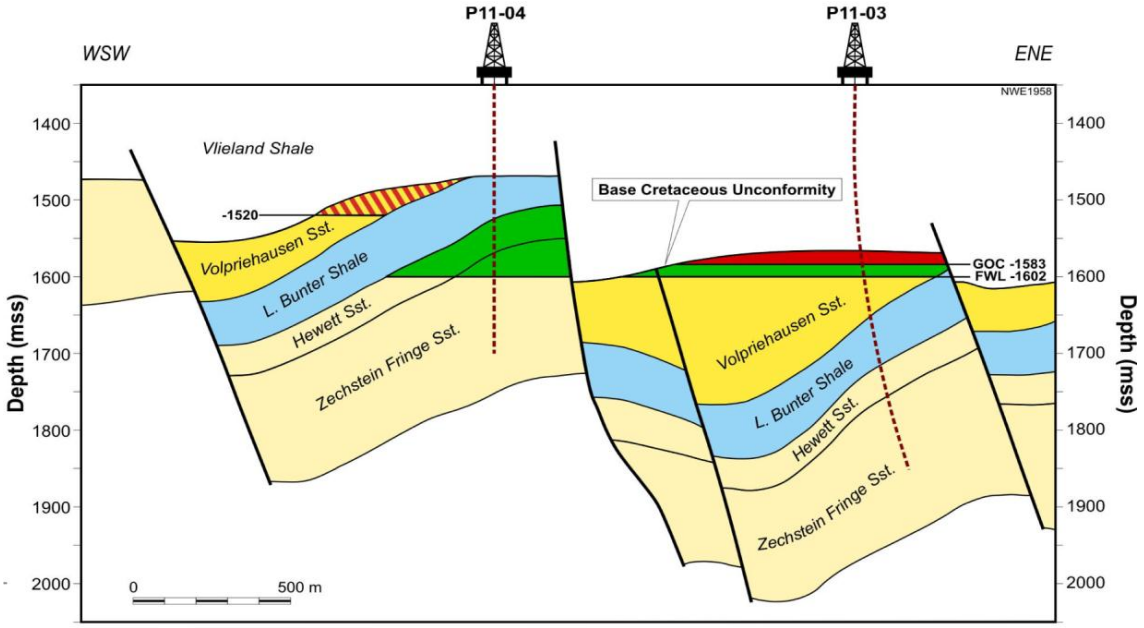


Figure: *De Ruyter Cross-Section*

<u>The Hewett and Zechstein Fringe Reservoirs</u>

Hewett and Zechstein Fringe formations are present in both the P11-03 and P11-04 locations. The Fringe sandstones consist of terrigenous and fluviatile sediments of the Upper Permian Zechstein. The lower section of the Fringe Formation consists of fluvial channel sands intercalated with deltaic playa/overbank siltstones. Shale content is generally low and aeolian intercalations are common (identified in core samples) at the P11-04 location. Petrophysical evaluation of the Fringe formation indicates the reservoir is relatively homogenous and comprises good to excellent quality sands. The sandy development of the Zechstein sequences Z1-Z3 are restricted to the marginal areas of the Zechstein basin and the sandy Fringe formation has been drilled in various wells in the Dutch P blocks. The total thickness of the Fringe formation exceeds 100m. The Hewett sandstones comprise fair to good reservoir sands of fluviatile origin (early Triassic continuation of the fluvatile and terrigenous sedimentation of the Fringe sands). The Hewett exhibits distinctly more heterogeneity than the Fringe and can be lithologically subdivided into three reservoir and five poor quality to non-reservoir zones. Stratigraphically, the Hewett sandstones constitute the earliest sequence of the Lower Germanic Triassic and the 'sandy' development of the earliest Triassic is regarded as a locally restricted event, which extends into the Dutch P quadrant. The average thickness of the Hewett Equivalent is approximately 50 m and appears to be constant over the P11b area. No distinct boundary between Fringe and overlying

Hewett sandstones is seen in the P11-03 & -04 discovery wells, however, the transition defined by a silty-shaly event with high GR readings at the bottom of the Hewett. The top of the Hewett is defined by a massive shaly sequence of the Lower Bunter Shale.

The Volpriehausen Reservoir

The Volpriehausen formation is a collection of Lower Triassic Bunter sand and siltstones and is present only in the P11-03 location. The Triassic sequences dip gently (10-14 deg) towards the west, and sand units thicken towards the western boundary fault of the structure. At the P11-03 location the Volpriehausen reservoir comprises a sequence of sandstones and siltstones/claystones. The reservoir can be subdivided into seven reservoir zones based on average porosities derived from log interpretation. The overlying Early Cretaceous Vlieland shale provides top seal for the accumulation and the Lower Bunter Shale constitutes the base of the reservoir. Authigenic clays are present in the reservoir but are believed to be restricted to low-porosity sandy-silty intervals. The petrographic analysis of sidewall cores from the Volpriehausen describes the presence of authigenic clays as coating the sand grains and in the pores. For these intervals higher than expected water saturations and reduced reservoir permeability are observed.

Fluid Properties

PVT data are derived from fluid samples taken during P11-04 DST-1 (surface and bottomhole samples), P11-03 DST-1 (surface and bottomhole samples), and P11-03 DST-2 (surface samples only). A summary of the fluid properties is shown in Table 2.1.

Item	P11-03	P11-04
Oil gravity (^{o} API)	42.6	42.3
Oil viscosity @ Pi (cP)	0.5	0.6
Oil FVF @ Pi (rb/stb)	1.37	1.26
Initial reservoir pressure (bara)	165	165
Bubble point pressure (bara)	159	125
Solution GOR (Sm^3/Sm^3)	118	80

Table: *De Ruyter Fluid Properties*

Hydrocarbons Initially In Place

HCIIP volumes are derived from the De Ruyter 2011 Petrel static model. An independent evaluation was done in 2009 by means of a probabilistic methodology. The results support the initial HCIIP values being within +/- 1% for oil and +/- 0.5% for gas in the P50 case.

Item	Base Case (P50)
De Ruyter combined free gas ($MMNm^3$)	379
De Ruyter combined associated gas ($MMNm^3$)	839
P11-03 Accumulation – Oil rim (MMbbl)	20.7
P11-04 Accumulation – Oil (MMbbl)	38.4

Table: *De Ruyter Field HCIIP*

2.1.2 Mining Decree, Article 24 1b

Specification of the data with regard to the structure of the reservoir, broken down according to reservoir layer and reservoir compartment, with pertaining geological, geophysical and petrophysical studies and the uncertainty analyses used thereby.

The De Ruyter field area is covered by two 3D seismic surveys:

- Z3AMC1993A 3D survey acquired for Amoco in 1993 over the P11 licence (re-processed in 2003 by Petro-Canada).
- Z3PGS1999C 3D survey acquired in 1999 by PGS over the P10 licence – this survey covers block P10 entirely and extends across the De Ruyter field (P11-03, -4) area.

Some 90 km2 of the 1993 3D data over De Ruyter was re-processed by Veritas during 2003. The processing was aimed specifically at reducing noise, attenuating multiples and improving fault definition. The application of Pre-Stack Time Migration and Radon de-multiple, particular attention to the velocity field, and zero-phase correction using wells, achieved these objectives. Re-processing of the P11 data resulted in a more accurate three-dimensional description of the field through improved horizon and fault interpretation. The new data was processed to the same polarity as the 1993 seismic. The older seismic data matches the 2003 re-processing with time shifts of -14 ms (P10) and -19 ms (P11) respectively.

<u>De Ruyter Field Seismic Interpretation</u>
The current interpretation is based on the 2003 re-processing of the 1993 3D survey over the P11 licence. Interpretation of horizons was done by identifying horizon picks from synthetic seismograms in wells P11-03 and P11-04 and interpreting these over the 3D area. Picking was done on the original reflection seismic data, while for quality control and fault picking additional data volumes were used i.e. 60-degrees phase shifted, near and far offset, dip, azimuth, coherency, fault, chimney and acoustic impedance.

The interpreted horizons and picking conventions are as follows:

- Base Tertiary – peak
- Base Chalk – Trough
- Base Vlieland Shale (Base Cretaceous Unconformity) – Peak (most of the area)
- Base Vlieland Shale (Base Cretaceous Unconformity) – Zero crossing +/- (locally)
- Base Volpriehausen (Top Lower Bunter Shale) – Peak
- Top Hewett – Trough
- Top Rotliegendes – Trough

Base Tertiary, Base Chalk and Top Rotliegendes are strong reflections that were interpreted with confidence over the area. These horizons form the reference framework for the interpretation.
Base Volpriehausen and Top Hewett are horizons with only fair reflection strength. However, due to good well ties, they can be picked with confidence in the P11-03, -04 area. Both horizons were eroded locally at the unconformity; where missing, they were merged with the Base Vlieland Shale horizon before time to depth migration.

The Base Vlieland Shale (Base Cretaceous Unconformity) is more difficult to pick, as its amplitude is variable with underlying lithology. Due to its erosional nature, the acoustic impedance contrast across this

interface is highly variable and can be expressed on seismic as a peak as well as a trough. This is demonstrated by the synthetic seismograms. In P11-04 the horizon is expressed as a weak peak with the Lower Bunter Shales underlying the unconformity. In P11-03 the same horizon is expressed as a strong trough. Fluid substitution of wedge models confirms that the seismic character change in P11-03 is caused by the presence of gas in the Volpriehausen sandstones.

In recent years, the Base Cretaceous Unconformity has been picked as a peak at the base of the Vlieland Shale. For the current evaluation, this approach was adapted to incorporate the local evidence from synthetics. The pick is now taken at the zero crossing in areas where high amplitudes indicate the presence of gas, such as around P11-03. Horizon interpretation was performed on every inline for the Base Cretaceous Unconformity and Top Hewett. Other Horizons were interpreted on a seed grid and interpolated.

Fault interpretation was performed by picking fault segments on vertical seismic sections and assignment to fault planes. A total of 15 fault planes were defined to provide the framework for horizon interpretation. The velocity model for Time-to-Depth conversion is constructed from a data set comprising seven wells located on the 3D surveys that image the De Ruyter field (i.e. the P10 and P11 data sets only).
Direct Hydrocarbon Indicators. The seismic data in the P11-03, -04 area displays several Direct Hydrocarbon Indicators (DHI). The current understanding of these DHI's can be summarised as follows:

- Strong amplitude anomalies indicate the presence of gas in the reservoir
- AVO behaviour of hydrocarbon-filled reservoir may vary between Class III and IV
- Oil-filled reservoirs cannot be distinguished from brine-filled reservoirs with current techniques
- Flat events in the area are genuine reflections generated by hydrocarbon contacts
- Continuation of the flat event into the Lower Bunter Shale indicates that porous zones within this unit may be filled with hydrocarbons

<u>2008/9 Inversion Study</u>
Fugro-Jason conducted a Simultaneous AVO Inversion of the De Ruyter Area for the 1999 P10 and 1993 P11 surveys. The work was carried out primarily for the Medway project, in an attempt to improve lateral porosity mapping from seismic through simultaneous inversion. The study was completed in early 2009. An earlier attempt to do this during 2004 produced a P-impedance volume. Conversion of this volume to porosity was unsuccessful due to a strong fluid effect.

The 2009 simultaneous inversion by Fugro-Jason was able to remove the fluid effect and produce a porosity volume based on wells and seismic data. The inversion derived porosity matches the well porosities in a general sense. Shales and sand units thicker than ca. 20 m can be distinguished clearly. However, within each sand unit the correlation between well and seismic porosity is poor, with correlation coefficients below 0.5. Based on such low correlation coefficients it is concluded that the inversion cubes are not a predictive tool for the intra-reservoir property distributions.

For the Medway project, the inversion results are considered to add no value to the existing reservoir models. The reservoir units of Volpriehausen, Lower Bunter Shale, Hewett and Fringe have been mapped from seismic and are already part of the current models. Porosity distribution within the units is currently based on well data only and cannot reliably be improved further by including the inversion porosities. For

the Van Ghent East and Witte de With prospects, the inversion results should be studied to see if any hydrocarbon indications can be seen (e.g. on Vp/Vs).

Petrophysical Parameters

Both the P11-03 and P11-04 wells were logged with the Schlumberger Platform Express density/neutron and array induction tools, as well as dipole sonic and wireline pressure tools. LWD data is also available from the development wells; P11-A01, P11-A02, P11-A03 Pilot, P11-A03 S1 and P11-A03 S2. P11-04 was cored across the entire oil bearing interval and both conventional and special core analyses are available for these cores. Core and SCAL data has been used for calibration of the Hewett and Zechstein Fringe porosities. Core and SCAL data from a Volpriehausen analogue (well P10-05, gas discovery 3.25 km NW of De Ruyter) has been used to calibrate Volpriehausen porosities.

Static and dynamic modelling

A new static model for the entire de Ruyter Field was built during 2011-2012. Based on updated seismic interpretation of top effective reservoir (based on Medway project learnings) a new structural model with updated zonation was put in place. Petrophysical analysis of all surrounding wells (De Ruyter, Van Nes, Van Brakel, Van Ghent) resulted in a consistent parameter analysis for porosity, permeability and saturation height functions. This applies for both the Volpriehausen reservoir as well as the Hewett-Fringe reservoir. Emphasis was given to undrilled adjacent fault blocks in order to be able to establish future infill opportunities as well as near field exploration. A full field history matching exercise is currently ongoing, based on the updated static model. This will lead to better insight of above mentioned opportunities.

2.2 Well construction

The field produces via three production wells. Two are horizontals located in the P11-04 oil accumulation and are completed with ESP's. The third well is a dual-lateral completed in the P11-03 accumulation.

2.2.1 Mining Decree, Article 24 1e

Specification of the number of boreholes used in the production.

Well code	Operator	Drill year	Goal	Status
P11-A-01	Dana Petroleum	2006	Hewett Fringe	Oil production
P11-A-02	Dana Petroleum	2006	Hewett Fringe	Oil production
P11-A-03	Dana Petroleum	2006	Volpriehausen	Oil production

2.2.2 Mining Decree, Article 24 1f

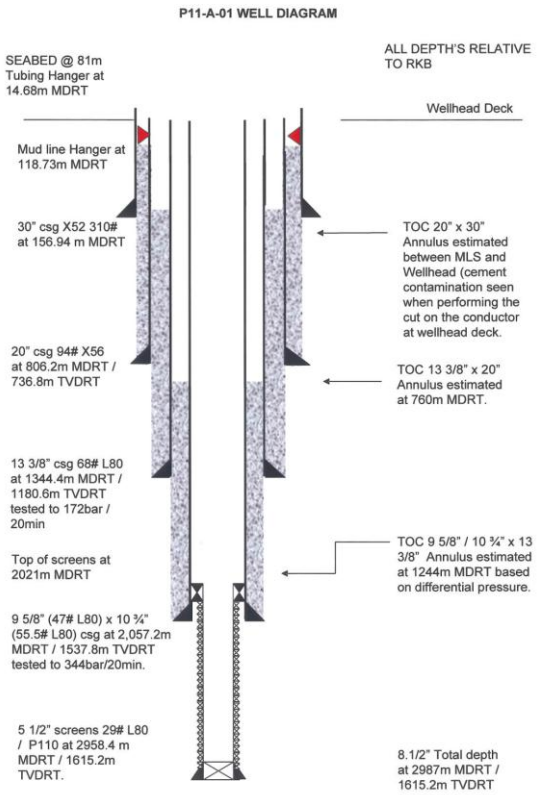
Specification of the sequence and timeframe involved in the making boreholes.

Well code	Operator	Drill year	Goal	Status
P11-01	Amoco	1989	M. Bunter/Rotliegend	Dry
P11-02	Amoco	1996	Rijnland/M. Bunter	Dry
P11-03	Amoco	1996	M. Bunter	Gas/Oil
P11-04	Amoco	1997	Hewett/Zechstein	Oil

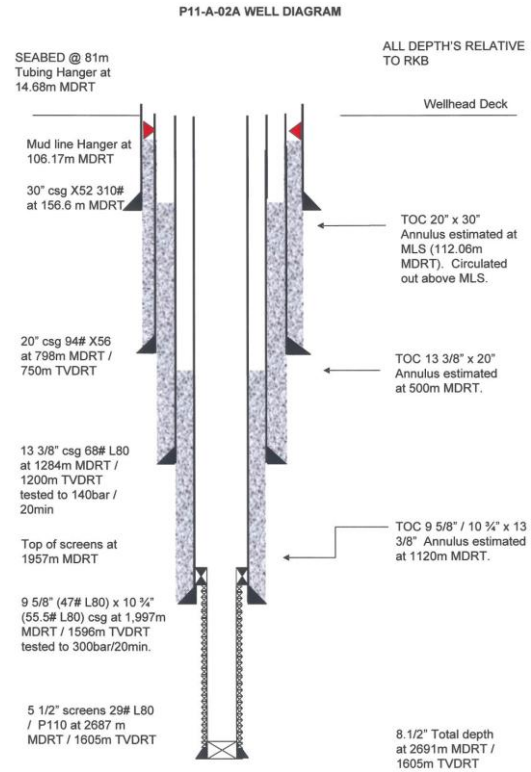
2.2.3 Mining Decree, Article 24 1g

Specification of the location, length and diameter of the casing-plan of the boreholes.

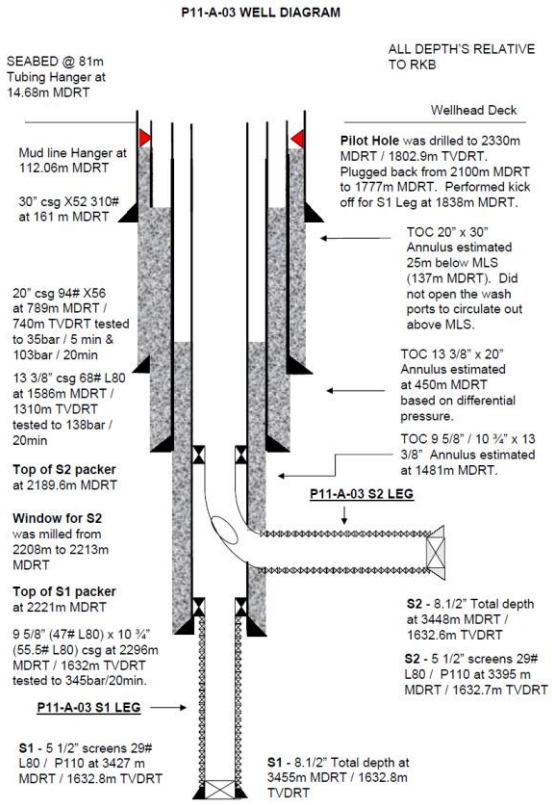
Well P11-A-01, Casing plan
From P11-A-01 Final Well Report
[RTWEC-INT3-DR-RPT-0002]



Well P11-A-02, Casing plan
From P11-A-02 Final Well Report
[RTWEC-INT3-DR-RPT-0001]



Well P11-A-03, Casing plan
From P11-A-04 Final Well Report
[RTWEC-INT3-DR-RPT-0003]



2.2.4 Mining Decree, Article 24 1h

Specification of the location and the manner in which the hydrocarbons enter into the tubing.

All three development wells are completed with Schlumberger Reslink Inflow Control Devices (ICDs), with wire wrapped screens. These devices control the inflow along the reservoir section, and ensure that the entire wellbore is contributing to flow, minimises the heel-toe effect and prevents sand from entering the wellbore.

2.3 Production strategy

The De Ruyter field has been developed with stand-alone oil facilities providing an infrastructure hub for future developments in the area. The production facilities include a steel Gravity Base Structure (GBS) with crude oil storage, an Integrated Production Deck (IPD), and a Tanker Mooring Loading System (TLMS). Access for a jack-up drilling rig is also possible. Oil is stored in the GBS and exported via the TMLS in dedicated shuttle tankers. Gas is exported by a 29 km 8" pipeline via the Wintershall operated P12-SW platform to the P6-A processing platform for treatment and compression. Gas is then exported to shore at Uithuizen via the NGT pipeline system.

2.3.1 Mining Decree, Article 24 1c

Description of the production method.

The field produces via three development wells. Two are horizontals located in the P11-04 oil accumulation and are completed with ESP's. The third well is a dual-lateral completed in the P11-03 oil and gas accumulation and currently produces under natural flow after kick-off with gas lift. There is currently no artificial pressure maintenance in the field as the regional aquifer provides sufficient pressure support. Produced water is treated at surface and discharged to sea.

The De Ruyter field is one of the early adopters of the ICD technology. The wells have performed above expectation and show incremental recovery in the order of 0.5 MMbbl.

De Ruyter came on stream in September 2006 with production from the P11-04 accumulation. Development drilling in the P11-03 accumulation was completed and production commenced in January 2007. Subsequently, the field produced on plateau at a rate of 27,700 bbl/d oil and 400,000 Nm3/d gas for the remainder of the year. Initial water breakthrough occurred in March 2007 and water cut has developed steadily since. The field started going into production decline in March 2008.

The P11-04 accumulation produced under natural flow initially and then via ESP's as water cut developed. ESP's were activated in wells P11-A-02 and P11-A-01 in October 2007 and September 2008 respectively, as per original plan. Since implementation both wells have produced steadily and are currently operating on minimum BHP (determined by reservoir bubble point pressure). Production performance from the P11-03 accumulation indicates good aquifer support. Less gas is being produced from the accumulation than initially expected due to slower gas breakthrough in well P11-A-03. Watercut is steadily increasing in well P11-A-03 and it is likely that the well will require artificial lift to maintain optimum production rates in the future and to recover the remaining reserves.

2.3.2 Mining Decree, Article 24 1d

Description of the mining work and its location.

The De Ruyter production platform is located in block P11b. Water depth at the platform location is approximately 34 m. The main components of the platform are:

- A single steel Gravity Based Structure (GBS) with wellhead and lattice towers to support an Integrated Production Deck and 150,000 bbl integrated crude oil storage (tank dimensions: 72m x 63 m x 12 m high)
- An Integrated Production Deck (IPD) with processing facilities (maximum capacity: 27,000 bbl/d oil, 650,000 Nm3/d gas, and 50,000 bbl/d water), helideck, and living quarters (max POB: 39)
- A Tanker Mooring and Loading System (TMLS) located approximately 1.5 km from the platform
- A 29km 8" gas export pipeline to P12-SW platform

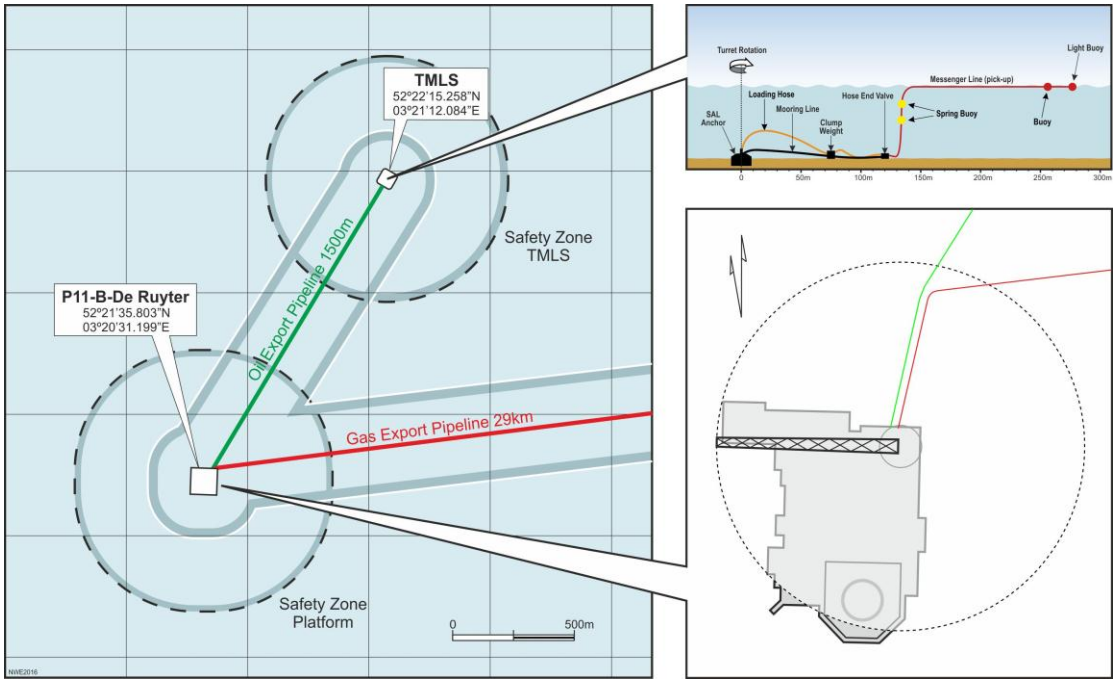


Figure: *De Ruyter Field Layout*

The IPD consists of three main decks which house the process equipment, which includes: oil, gas and water separation and treatment, gas handling equipment, and power generation. The figure below summarises the main processing system on the platform.

The Tanker Mooring and Loading System (TMLS) comprises a seabed suction anchor with combined mooring and production swivel leading to an integrated polyester mooring line with a central clump weight and connection loading hose. The mooring line and loading hose connect to North Sea industry standard couplings at the tanker bow. During lifting, oil is pumped at a nominal rate of 1500 m^3/h.

Picture: *De Ruyter Platform*

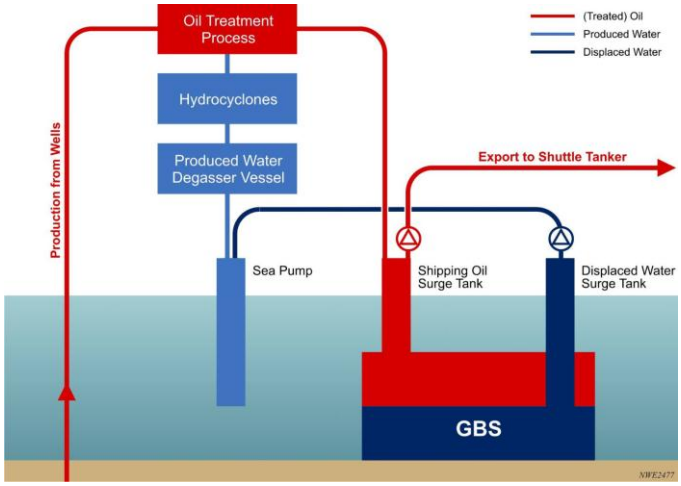


Figure: *De Ruyter Process Overview*

The topside facilities accept and process the fluids from the wells. The oil is separated and the off-gas compressed prior to export. Produced water collected in the process is treated and discharged overboard. The wet gas is compressed to the required pressure, metered and sent to Wintershall's P12-SW facilities via a gas export pipeline. The oil is transferred to the integrated storage facilities. The oil is periodically offloaded via the Tanker Mooring & Loading System (TMLS) to shuttle tankers.

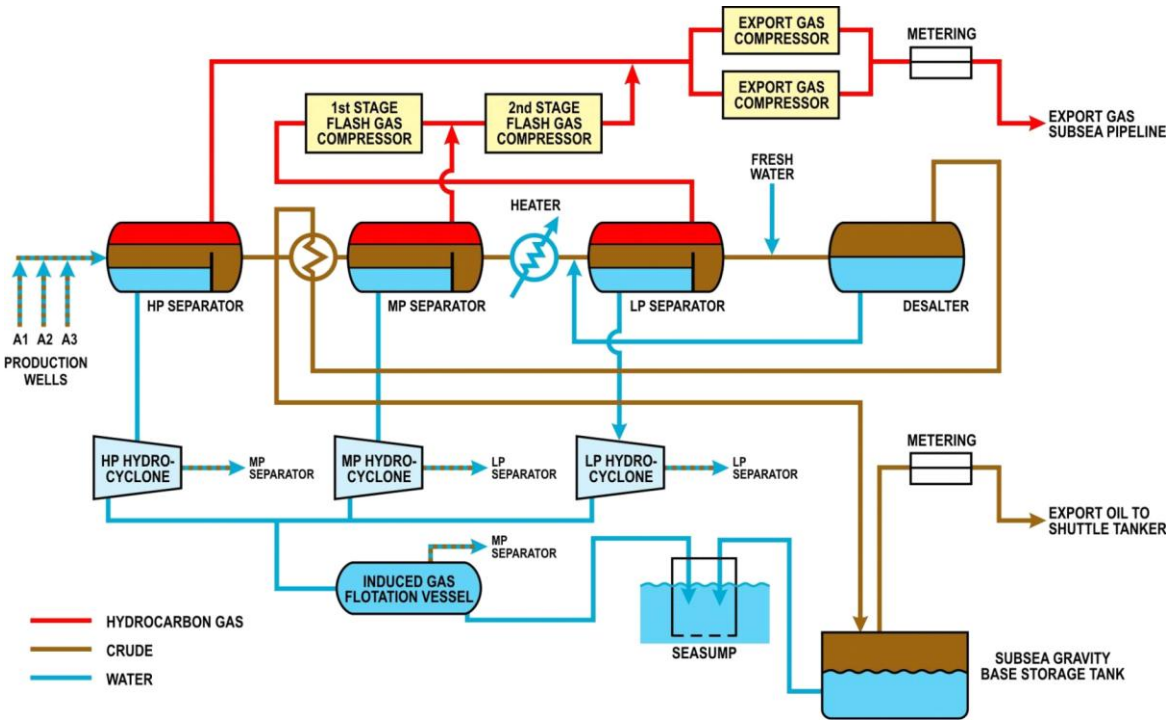


Figure: *De Ruyter Processing Facilities Schematic*

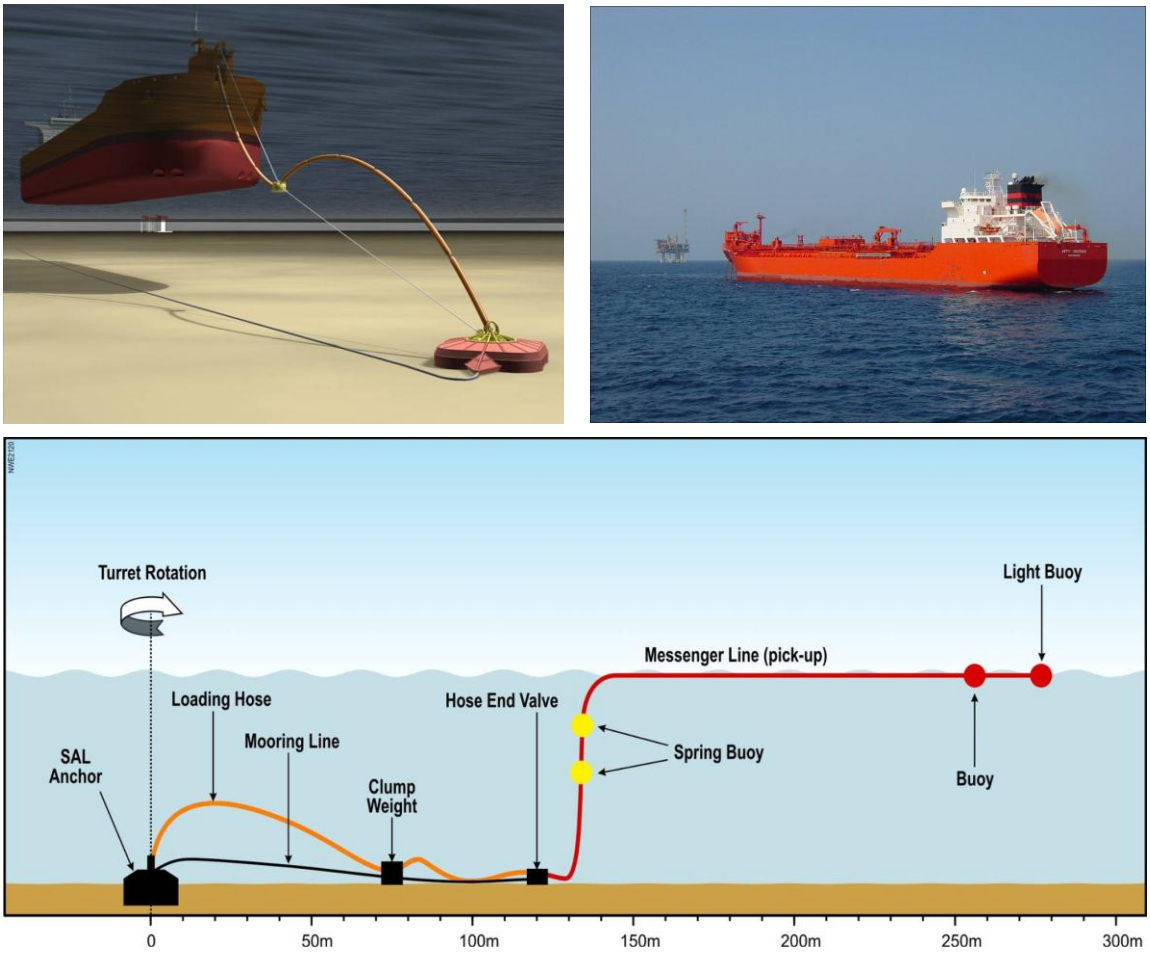


Figure: *De Ruyter Tanker Mooring & Loading System (TMLS)*

In 2007 and 2008, two explorations wells were drilled in the area (block P11b), which resulted in the discoveries of the Van Ghent and Van Nes fields. These fields are located relatively close to the existing De Ruyter platform (4-8 kilometres distance). The joint development of these reservoirs was called the Medway Project. The fields have been developed as subsea wells tied-back to the De Ruyter platform and production commenced in January 2012 (Van Ghent) and April 2012 (Van Nes).

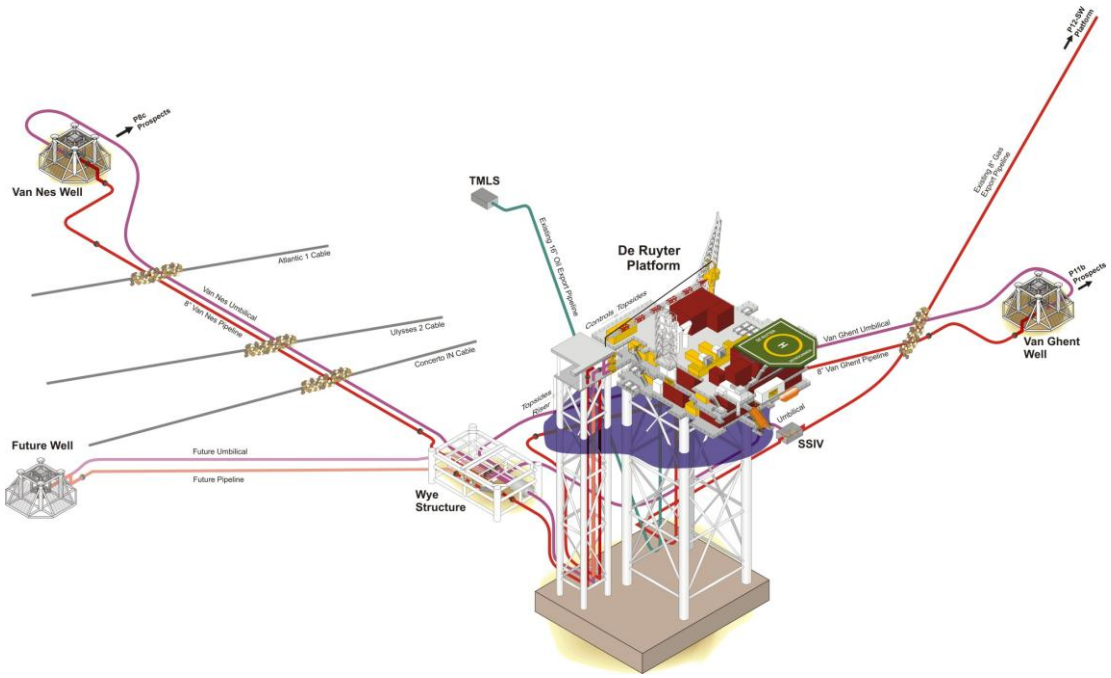


Figure: *Van Ghent and Van Nes subsea tie-backs to De Ruyter (Medway Project)*

4 Related documents

4.1 Internal references

Document Title		*Document Number*
1	Field Development Plan (Winningsplan) – Van Nes	VNGEN-INT3-PM-PLN-0001
2	Field Development Plan (Winningsplan) – Van Ghent	VGGEN-INT3-PM-PLN-0001
3	P11-B-De Ruyter Safety & Health Document	RTHSE-INT3-HE-RPT-0001
4	P11-A-01 Final Well Report	RTWEC-INT3-DR-RPT-0002
5	P11-A-02 Final Well Report	RTWEC-INT3-DR-RPT-0001
6	P11-A-04 Final Well Report	RTWEC-INT3-DR-RPT-0003

4.2 External references

Document Title		*Reference Number*
1	Mijnwet	
2	Mijnbouwbesluit	

Appendices

Appendix Title	
A	List of Abbreviations and Definitions
B	License History P11b
C	Relevant sections of legislation
D	Document revision log

A List of Abbreviations and Definitions

Term	Explanation
AVO	Amplitude vs. Offset
BCM	Billion Cubic Meters.
BBL	Barrels
BHP	Bottom Hole Pressure
BOE	Barrels of Oil Equivalent
mD	mili Darcy, a unit of measurement for permeability
DHI	Direct Hydrocarbon Indicators
DST	Drill Stem Test
EBN	Energie Beheer Nederland
ESP	Electrical Submersible Pump
FWL	Free Water Level
GBS	Gravity Based Structure
GOR	Gas Oil Ratio
HCIIP	Hydrocarbons Initially in Place
ICD	Inflow Control Device
IPD	Integrated Production Deck
LWD	Logging While Drilling
MD RKB	Measured Depth from Rotor Kelly Bushing
MDT	Modular Dynamic Test
MSL	Mean sea Level
OWC	Oil Water Contact
P&A	Plugged and Abandoned
PLA	Production License Application
POB	Persons on Board
PSI completions	Perforate, Stimulate, Isolate completions
RFT	Repeat Formation Test
SCAL	Special Core Analysis
STOIIP	Stock Tank Oil Initially In Place
TMLS	Tanker Mooring and Loading System
TOC	Top of Cement
TVD	True Vertical Depth
TVDss	True Vertical Depth subsea, TVD minus the elevation above mean sea level of the depth reference point of the well.
TVD RKB	True Vertical Depth from Rotor Kelly Bushing
Vp/Vs	The compressional to shear wave velocity ratio

B License History P11b

09-04-1968	Exploration licence for P11 granted to Union Oil Co of the Netherlands (First Round)
09-04-1978	Relinquishment of the P11 exploration licence
10-07-1979	Exploration licence for P11 granted to Amoco Netherlands Petroleum Co (Fourth Round)
10-07-1985	Partial relinquishment of the P11 exploration licence; P11b becomes open block
01-02-1989	Dry well P11-01 drilled by Amoco, TD: 3226m AHBRT in Maurits formation (Carboniferous)
10-07-1989	Exploration licence P11a expired
11-05-1992	Production licence for P11a granted to Wintershall Noordzee B.V. as part of the P14a production licence
16-12-1992	Exploration licence for P11b granted to Amoco Netherlands Petroleum Company and Veba Oil Nederland B.V. (Eight Round)
29-12-1995	Dry well P11-02 drilled by Amoco, TD: 3460m AHBRT in Ruurlo formation (Carboniferous)
03-10-1996	Oil and gas well P11-03 drilled by Amoco, TD: 1974m AHBRT in Zechstein
22-07-1977	Oil well P11-04 drilled by Amoco, TD: 1760m AHBRT in Zechstein
07-05-1998	Partial relinquishment of the P11b exploration licence; P11c becomes open block
20-12-2002	Transfer of BP (former Amoco) share and operatorship of the P11b exploration licence to Petro-Canada Netherlands B.V. (former Veba Oil Netherlands B.V.)
02-04-2004	Production licence for P11b granted to Petro-Canada Netherlands B.V. for development of De Ruyter oil and gas field
30-06-2002	Exploration licence for P11c granted to Petro-Canada Netherlands B.V.
14-07-2006	Oil production well P11-A-01 drilled by Petro-Canada Netherlands B.V. from the P11b-A-De Ruyter platform
13-09-2006	Oil production well P11-A-02A drilled by Petro-Canada Netherlands B.V. from the P11b-A-De Ruyter platform
30-09-2006	First oil from De Ruyter field
26-10-2006	Multi-lateral oil production well P11-A-03 drilled by Petro-Canada Netherlands B.V. from the P11b-A-De Ruyter platform
28-12-2006	Partial relinquishment of the P11c exploration licence; P11d becomes open block
20-01-2007	Gas well P11-05 Van Nes drilled by Petro-Canada Netherlands B.V., TD: 2093m AHBRT in Rotliegend
19-08-2007	Relinquishment of the P11c exploration licence; former P11c and P11d blocks merge into new P11c open block
01-04-2008	Gas well P11-06 Van Ghent drilled by Petro-Canada Netherlands B.V., TD: 1892m AHBRT in Zechstein
31-12-2008	Relinquishment of the P11a production licence; former P11a and P11c blocks merge info new P11a open block
01-09-2010	Medway Project approved by Ministry of Economic Affairs
15-08-2011	Trilateral development well P11-C-01 for Van Ghent oil & gas field drilled by Dana NL
21-10-2011	Tie-back P11-B-01 (P11-05) van Nes to the Ruyter platform
17-12-2011	Gas and oil well P11-07 van Ghent East drilled by Dana Petroleum Netherlands B.V., TD: 2900m AHBRT in Volpriehausen
11-01-2012	First oil P11 Van Ghent
30-04-2012	First gas P11 Van Nes

C Relevant sections of legislation

Mining Act

Article 34

- The production of minerals from a reservoir will be carried out according to a production plan.
- The holder of a production licence or the person designated in accordance with Article 22 shall submit a production plan to Our Minister.
- The production plan needs the approval of Our Minister.
- Section 3.4 of the Algemene wet bestuursrecht applies to a decision with respect to the approval of a production plan, to the extent the production of minerals does not occur in the continental shelf or under the territorial sea from a reservoir that is located on the seaward side of the line established in the attachment to this Mijnbouwwet. Points of view may be submitted by anybody. Section 3.4 of the Algemene wet bestuursrecht does not apply if it concerns a decision with respect to an amendment of a decision with respect to approval of a production plan.
- Article 34.1 does not apply to the production of minerals within the scope of the search for data for pure scientific research or for the central government policies to be implemented.

Article 35

1. The production plan sets forth in respect of each reservoir within the licence area at least a description of:
   a. the anticipated volume of minerals present and the location thereof;
   b. the commencement and duration of the production;
   c. the method of production and the activities relating thereto;
   d. the volume of minerals to be produced annually;
   e. the cost on an annual basis of the production of the minerals;
   f. the soil movement as a result of the production and the measures to prevent damages as a result of soil movement, to the extent the production of minerals does not take place in the continental shelf or under the territorial sea from a reservoir that is located on the seaward side of the line established in the attachment to this Mijnbouwwet, unless our Minister has decided otherwise.
2. The Technical committee soil movement provides advice to Our Minister with respect to Article 35.1.f.
3. By or by virtue of an order in council further rules can be set with respect to the production plan.

Mining Decree

Article 24

1. The production plan as meant in Article 34.1 of the Mijnbouwwet, for the production of hydrocarbons shall contain:
   a. a description of the expected quantity and the composition of the hydrocarbons present, broken down according to reservoir layer and reservoir compartment;
   b. a specification of the data with regard to the structure of the reservoir, broken down according to reservoir layer and reservoir compartment, with pertaining

geological, geophysical and petrophysical studies and the uncertainty analyses used thereby;
c. a description of the production method;
d. a description of the mining work and its location;
e. a specification of the number of boreholes used in the production;
f. a specification of the sequence and timeframe involved in the making boreholes;
g. a specification of the location, length and diameter of the tubing of the boreholes;
h. a specification of the location and the manner in which the hydrocarbons enter into the tubing;
i. a specification of the composition and quantities of the substances that annually inevitably are co-produced with the production of hydrocarbons;
j. a specification of the quantities of hydrocarbons produced which are annually used, vented or flared;
k. a specification of the composition and quantities of minerals and other substances that are annually re-introduced into the subsoil during production;
l. a specification of the annual costs of production, broken down into costs for investment, maintenance, operational management and the costs of abandonment and removal of mining works;
m. a map indicating the contours of the expected final extent of soil subsidence;
n. an overview indicating the course of the expected extent of soil subsidence over time;
o. an indication of uncertainty concerning the expected extent of soil subsidence as referred to in m and n here above;
p. a risk analysis concerning soil tremor as a result of the production;
q. a description of the possible extent and expected nature of damage caused by soil movement;
r. a description of the measures taken to prevent or reduce soil movement, and
s. a description of the measures taken to prevent or reduce damage by soil movement.

The above items m. up to and including s. do not apply to deposits located on the seaward side of the line laid down in the Annex to the Mijnbouwwet.

2. In the production plan as meant in Article 24.1 the considerations will be explained that were important in the choices made for each subsection, to the extent relevant.

Article 113

1. The operator shall annually, before 15 March, provide Our Minister with the following data for each reservoir in which hydrocarbons have been found:
   a. the name adopted by the operator for the reservoir;
   b. the exploration or production licence or exploration or production licences under which the reservoir is located;
   c. a structure map;
   d. the probable year of commencement of production, if production does not take place yet;

e. the quantity of producible minerals found as at 1st January of the year under review;
f. the expected quantities to be produced annually up to the moment in time that production ceases;
g. possible use of the reservoir for storage;
h. the reservoir pressure, to the extent;
i. the actual use of the boreholes present in the reservoir, and
j. the data referred to in Articles 24.1.b and 24.1.k, to the extent the data differ materially from the submitted production plan.

2. The operator shall also provide Our Minister annually with the data concerning the expected quantities of producible minerals per probable reservoir in the licence area that have not been proven by means of exploration, and also the associated structure maps.

D Document revision log

Revision	Date	Changes	Details
0	10-MAR-2006	NA	First issued version: Winningsplan P10a/P11b De Ruyter HADV3-INT3-PD-RPT-0001.
0	19-DEC-2012	1	New document number: RTPOM-INT3-PD-PLN-0007.
		2	Updated to new format, including rebranding.
		3	Updated reserves estimates in Chapter 2.1.
		4	Updated production profile in Chapter 3.1.
		5	Updated overview of operational costs in Chapter 3.2.