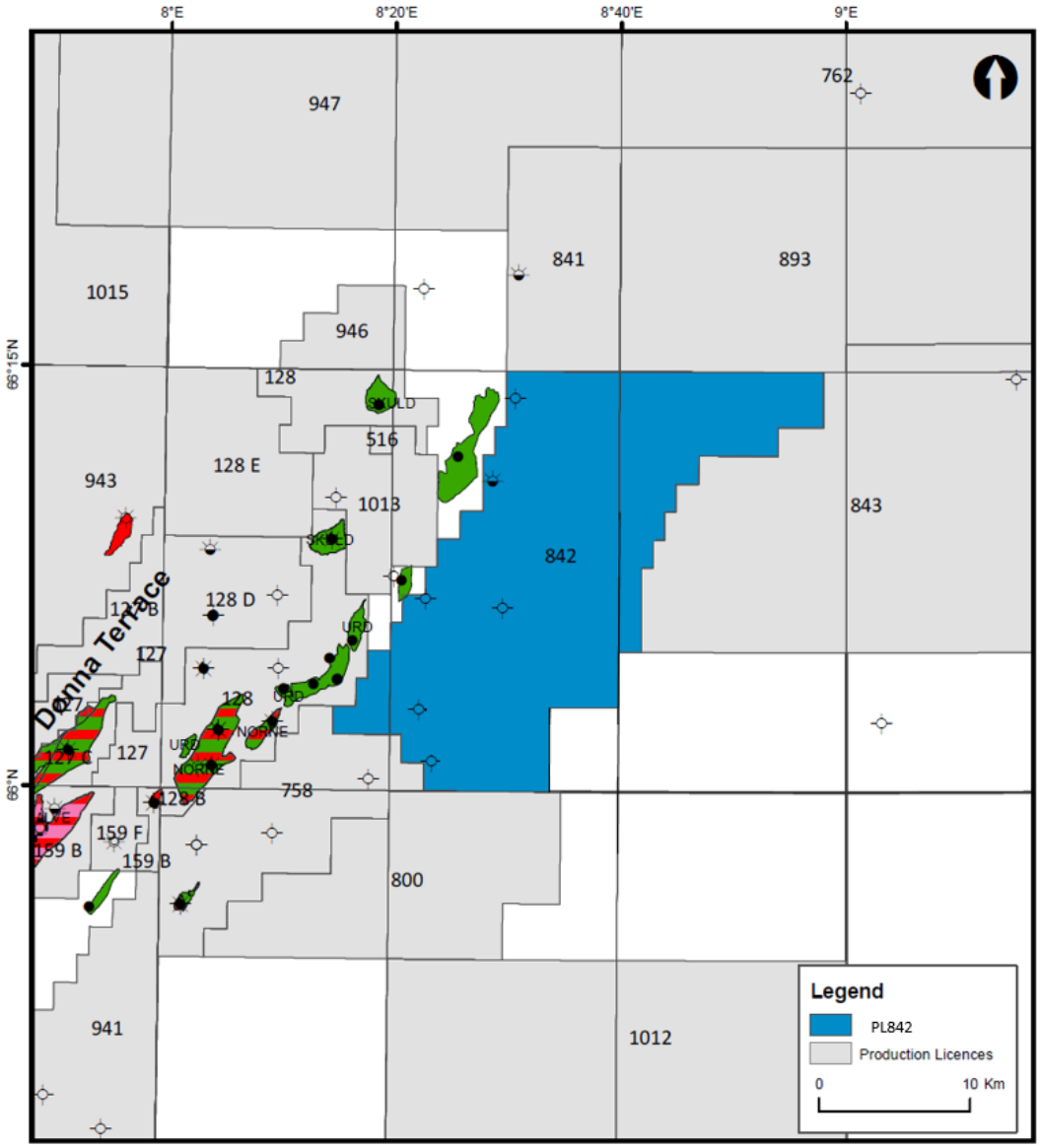
PL842

Full Relinquishment Status Report



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1. History of the Production Licence

PL842, covering part of blocks 6608/10, 6608/11 and 6608/12, is located on the Sør High part of the Nordland Ridge approximately 200 km west of Brønnøysund (Figure 1.1). The licence area is c. 425 km^2 and the water depth around 400 m.

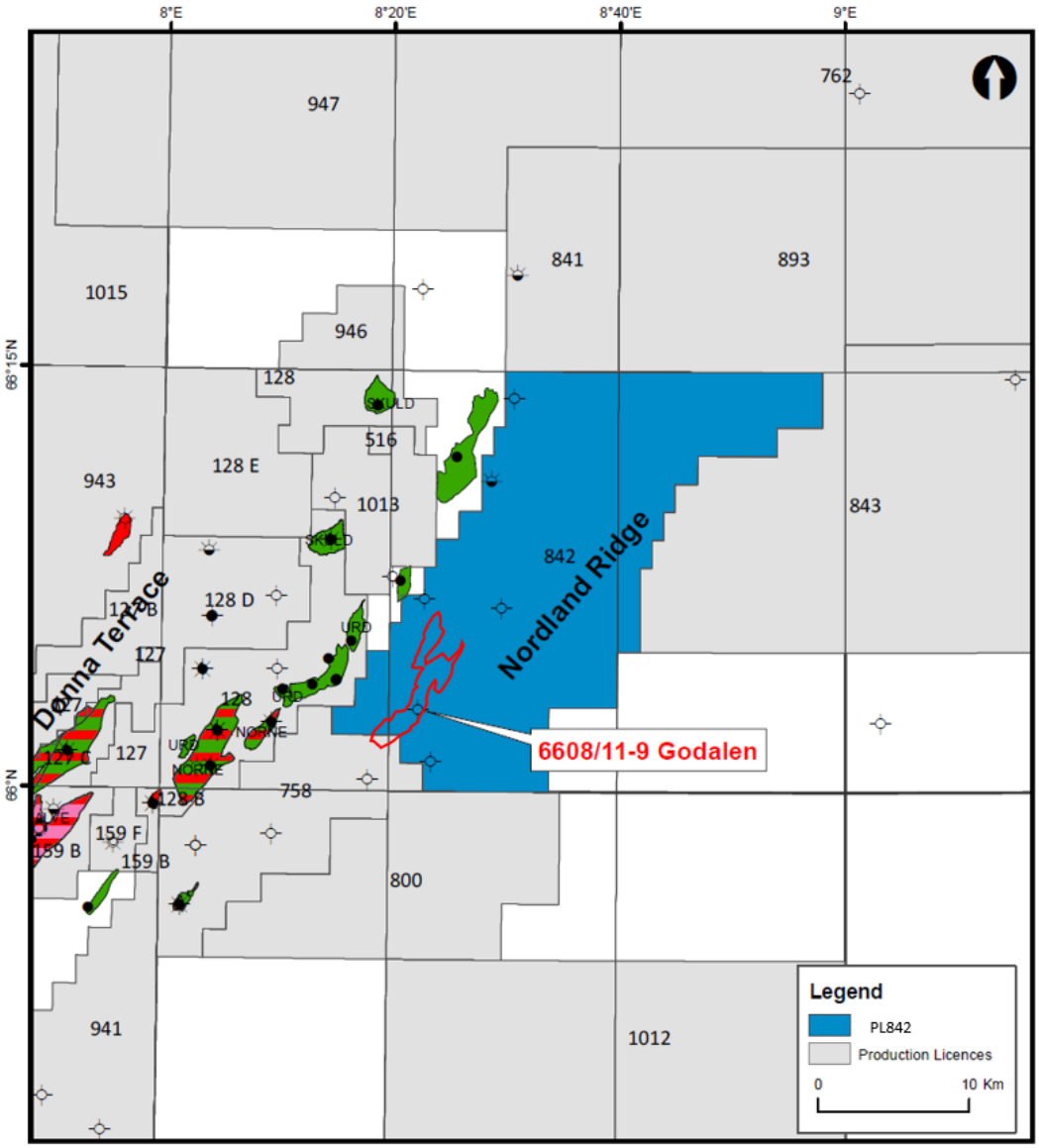

Figure 1.1: PL842 location map. The Godalen prospect is indicated with a red outline.

The licence was awarded as part of the 2015 APA Licensing Round (Award date: 5th February 2016) with Capricorn Norge AS as operator. The first 2-year term (leading to a drill or drop decision), due to expire on 5th February 2018, was subsequently extended until 5th November 2018. The firm work programme was to acquire and/or reprocess 3D seismic data. The licence opted to reprocess existing 3D seismic datasets to fulfil this commitment. The original partnership consisted of Capricorn Norge AS (40% and operator), Skagen44 AS (30%) and Det norske oljeselskap ASA (later renamed to Aker BP AS) (30%). Pandion Energy AS later farmed in to the licence with an effective date of 14th June 2019, acquiring Aker BP's 30% share.

A drill decision was notified 2nd October 2018 and the 6608/11-9 well on the Godalen prospect was subsequently drilled summer 2019. The well found no Rogn Fm. reservoir and showed no signs of migrated hydrocarbons at any level.

A total of five management committee, fourteen exploration committee and five work meetings were held in the licence. The date and main subjects for discussion are found in the table below.

Meeting Title	Date	Description
MC Meeting#1 EC Meeting #1	15/03/2016	Establishment of the licence, agree common database, 2016 work programme and budget, partner presentation of licence prospectivity.
MC Meeting #2 EC Meeting#2	22/11/2016	Scope of reprocessing, initial prospect mapping, objective of basin modelling, 2017 work programme and budget.
Work Meeting #1	28/09/2017	Seismic reprocessing results and PreStackPro analysis, semi-regional seismic mapping, Triassic Red Beds correlation and reservoir quality study, rock physics.
MC Meeting #3 EC Meeting #3	23/11/2017	Results of 2017 work programme, semi-regional mapping, basin modelling, review of Storhaug West prospect and EDDA CSEM anomaly, presentation by Skagen44 including new Godalen prospect, proposed 2018 work program and budget.
Work Meeting #2	16/03/2018	Review of Godalen and Revelberget prospects, Godalen rock physics, EDDA-EM presentation by Aker BP (response unlikely to be HC-related).
Work Meeting #3	29/06/2018	Full review of Godalen prospect, marginal economics due to most likely viscous oil.
EC Meeting #4	03/08/2018	Review of Storhaug, Storhaug West, Revelberget and Godalen prospects, Intra Melke Formation Sandstone downgraded as reservoir target, Godalen prospect reservoir engineering and economy.
Work Meeting #4	22/08/2018	Godalen update by Capricorn, Skagen44 presentation of their more positive view on Godalen.
Work Meeting #5	07/09/2018	Selected well location for 6608/11-9 targeting the Godalen prospect.
EC Meeting #5	25/10/2018	Presentation of Godalen formation evaluation programme.
MC Meeting #4 EC Meeting #6	22/11/2018	Godalen well planning, objectives, management system and emergency preparedness, results of Godalen site-survey and pore pressure prediction, high level well design, proposed 2019 work programme and budget.
EC Meeting #7	30/11/2018	Rig selection.
EC Meeting #8	08/02/2019	6608/11-9 basis of well design.
EC Meeting #9	25/04/2019	Status of well planning, approval of formation evaluation plan and revised well location (well moved due to low gas warning by third party investigation).
EC Meeting #10	08/05/2019	Combined Lynghaug (PL758) and Godalen “Drill well on paper”.
EC Meeting #11	15/05/2019	Well specific risk assessment.
EC Meeting #12	21/06/2019	Pre-spud meeting well 6608/11-9.
EC Meeting #13	01/10/2019	6608/11-9 post-well review, drilling and HSE performance, prognosis vs. actual and reason for failure (no reservoir, AVO Class II/III artefact in reprocessed survey).
MC Meeting #5 EC Meeting #14	27/11/2019	Review of remaining prospectivity, full relinquishment recommended, proposed 2020 work programme and budget.

Table 1.1: Meetings held in licence.

Following the last EC/MC Meeting, the JV partners decided to surrender PL842 based on the following points:

- The Godalen prospect was drilled dry.
- Remaining prospectivity is too small, too high risk, or both.
- Migration is the key risk in the licence and this risk has only increased following dry wells on Godalen (PL842) and Lynghaug (PL758).

2. Database Overview

2.1 Seismic data

The first exploration phase work commitment was fulfilled by reprocessing existing 3D surveys covering the licence and resulting in the CAP17M01 survey (755 km^2 full fold). The main underlying data is the RS1002 3D (533 km^2) acquired in 2010 as a conventional survey. 223 km^2 of the NNE2000 survey was added to cover the remaining PL842, whereas minor parts of three Equinor surveys were added in the west to enable well ties to existing oil and gas discoveries. An overview of the 3D seismic surveys is presented in Figure 2.1.

The entire RS1002 survey was "broadband reprocessed" in 2016 by Geokinetics, overseen by Lundin for licence PL758 and PL800 just to the south of PL842 (RS1002LNR16). The northern 533 km^2 of the survey was included in the PL842 common database and formed the foundation for the CAP17M01 reprocessing, also performed by Geokinetics. Shot gathers processed up to migration in RS1002LNR16 was used as input for CAP17M01. Data from the other surveys were processed through a similar pre-migration sequence and matched to RS1002LNR16 prior to binning and migration into the final CAP17M01. The main objective of the reprocessing was to improve multiple and noise attenuation particularly around BCU-level. In particular, the level around 1500 ms was targeted as this had a suspicious flat event over large parts of the survey.

Subsequent calibration to the recently drilled Godalen well, 6608/11-9, revealed that the CAP17M01 data has issues with amplitude balancing and cannot be relied upon for AVO work.

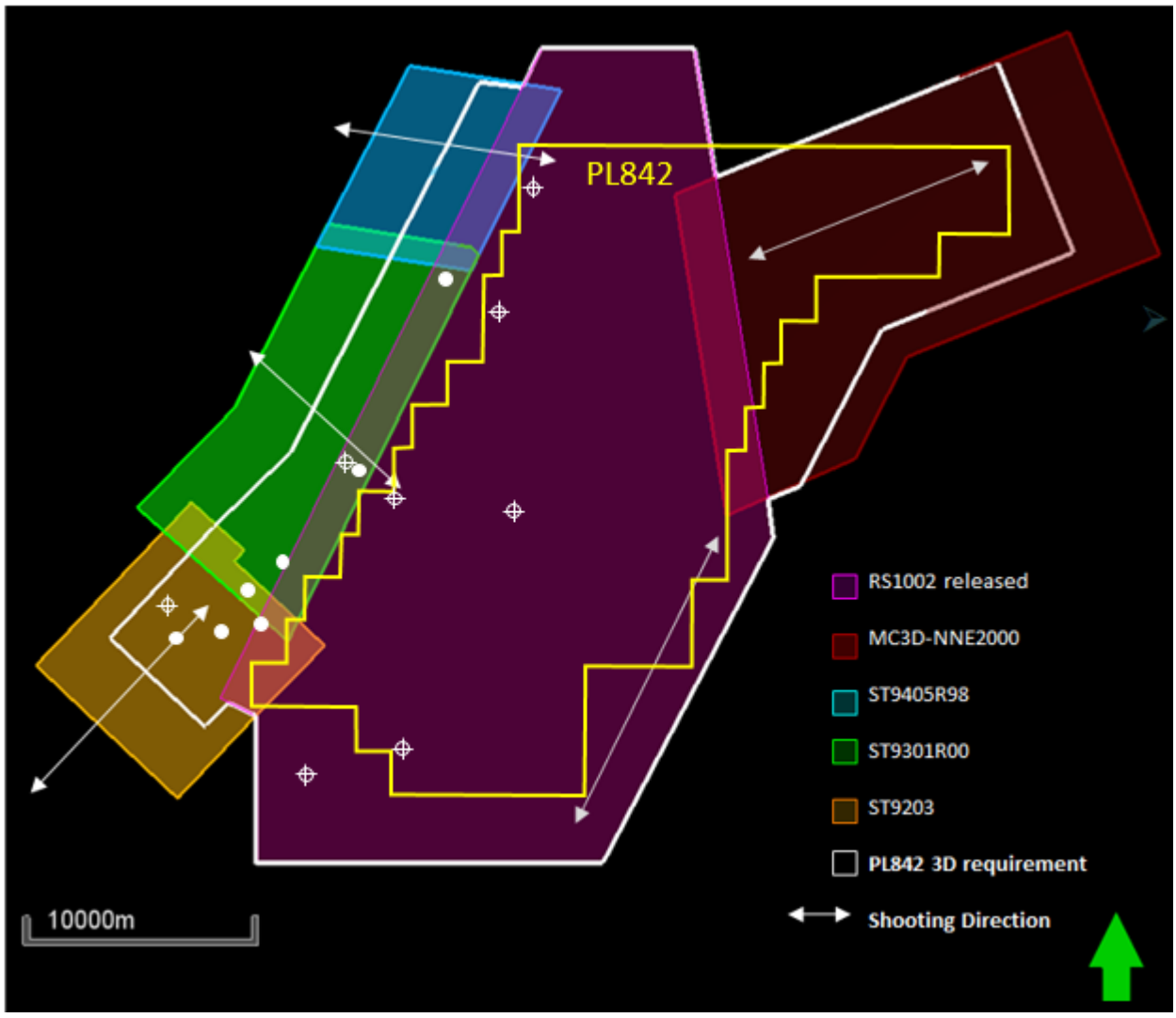

Figure 2.1: PL842 key seismic datasets. The CAP17M01 3D seismic survey is a reprocessing merge of several underlying surveys.

Survey Name	Type Data: 2D/3D	Acq year	Proc Year	Public/Multiclient	NPDID
RS1002	*3D seismic*	*2010*	*2011*	*Released*	*7188*
RS1002LNR16	*3D seismic*	*2010*	*2016*	*PL 758/PL 800*	-
CAP17M01	*3D seismic*	*2010*	*2017*	*PL 842*	-

Table 2.1: PL842 Seismic Common Database.

2.2 Well data

Well Name	Year	Key points of interest to PL842
6608/11-1	1986	Pore pressure study, shallow section prediction, Triassic Red Beds study.
6608/11-2	2000	Falk discovery, oil quality, pore-pressure study, Intra Melke Formation Sandstone CPI, rock physics.
6608/11-3	2002	Pore pressure study, shallow section prediction, Intra Melke Formation Sandstone CPI, well tie.
6608/11-4	2004	Linerle discovery, oil quality.
6608/11-5	2006	Poorly defined “fresh oil shows” in support of late migration model, Triassic Red Beds study.
6608/11-6	2008	Hauk well, downdip of Revelberget Central prospect, Intra Melke Formation Sandstone CPI, well tie.
6608/11-7 S	2011	Phoenix well, just outside CSEM anomaly, relevant for Storhaug W prospect.
6608/11-8	2013	Intra Melke Formation Sandstone CPI.
6608/10-1	1989	Intra Melke Formation Sandstone CPI, Rogn Fm. sandstone, rock physics.
6608/10-2	1992	Intra Melke Formation Sandstone CPI.
6608/10-3	1993	Intra Melke Formation Sandstone CPI.
6608/10-4	1994	Intra Melke Formation Sandstone CPI.
6608/10-5	1995	Intra Melke Formation Sandstone CPI.
6608/10-6	2000	Intra Melke Formation Sandstone CPI, well-tie.
6608/10-8	2002	Intra Melke Formation Sandstone CPI, rock physics.
6608/10-9	2003	Lerke discovery, pore pressure study, Intra Melke Formation Sandstone CPI.
6608/10-12	2008	Intra Melke Formation Sandstone CPI.
6608/10-13	2009	Pore pressure study, shallow section prediction.
6608/10-15	2013	Intra Melke Formation Sandstone CPI, rock physics.
6609/5-1	1985	Triassic Red Beds study.
6610/7-2	1984	Triassic Red Beds study.
6510/2-1 R	1997	Triassic Red Beds study.
6507/12-2	1981	Triassic Red Beds study.

Table 2.2: PL842 Well Database.

3. Results from Geological and Geophysical Studies

A brief overview of the geological and geophysical studies performed and the main results are listed below:

1. Purchase, reprocess and map 3D seismic data across the PL 842 area as per commitment

- Objectives:
  - Improve imaging to enable better prospect and lead definition within the licence.
  - Improve multiple attenuation (validate or disprove 1500 ms "flat event").
  - Optimise AVO response
- Results:
  - Reprocessing removed 1500 ms "flat event"
  - New prospects Godalen, Stokka and Revelberget identified
  - Better structural definition and ability to perform AVO studies from gathers and angle stacks (unfortunately a false AVO Class II/III signature was introduced at the Godalen prospect)

2. Petroleum System Modelling (Torena study)

- Objectives:
  - Model hydrocarbon migration toward the Storhaug prospect.
  - Quantify the amount of hydrocarbon generated in the kitchen areas adjacent to the licence.
- Results:
  - Model showed that charge onto the Nordland Ridge is possible, but high risk. A competent top seal (minimum 200 m burial) formed late and only charge the last few million years is likely to have been trapped. The migration route is complicated and relies on leakage through faults.

3. Correlation and reservoir quality prediction for Triassic Red Beds (CGG Robertson and Capricorn)

- Objectives:
  - Enable correlation of Triassic Red Beds through automated mineralogy (QEMSCAN), biostratigraphy, palynology and XRF.
  - Remap Red Beds to improve reservoir prediction for Storhaug prospect based on the above.

- Results:
  - Section is largely barren so limited information from biostratigraphy/palynology that can be used with confidence. Only broad chemical changes seen. No high-resolution correlation possible. Facies trends suggested by CGG Robertson not supported by dataset.
  - Remapping largely confirmed earlier work. Risk on reservoir quality increased as closest well (6608/11-5) only shows poor sandstone development below the Ladinian evaporite top seal. Combined with removal of the 1500 ms "flat event" and the basin modelling study, this effectively killed the Storhaug prospect.

4. Reservoir characterisation and Petrophysical Studies of Intra Melke Fm. Sandstone (Capricorn study)

- Objectives:
  - Understand the reservoir potential of the Intra Melke Formation Sandstone in the licence through CPI analysis of all relevant offset wells.

- Results:
  - A proximal to distal west to east trend is suggested by reservoir thickness and Vclay trends. This puts PL842 in a less favourable position with regards to Intra Mellke Formation Sandstone reservoir potential (this model was augmented by the 6608/11-9 well which encountered poorly developed reservoir with a high Vclay).

5. Rock Physics and Seismic Modelling Study for the Godalen Prospect (Capricorn study)

- Objectives:
  - Model the seismic response of Rogn Formation sandstone with brine, oil and gas fill for different reservoir qualities, thicknesses and overburden variations. Model the seismic response of Spekk Formation source rock.
  - Validate observed AVO anomaly by QC of seismic data and attributes.

- Results:
  - Oil in good quality sandstone gives the best match to seismic response (AVO Class II/III). Amplitude shut off expected at an oil water contact. Seismic amplitude tuning can only partly explain the bright anomaly.
  - Spekk Formation source rock facies are characterised by a consistent Class IV AVO response whatever the overburden.
  - Investigation of seismic gathers indicated issues with offset amplitude balancing. The mid-angle traces have higher amplitude energy than nears and fars displaying a “bell-shape” response with offset. Sensitivity checks showed that the Class II/III anomaly did not disappear if nears were scaled with up to 20% (any more scaling would be unrealistic).
  - Godalen is different from the Zumba prospect (6507/11-11) where refractions from overlying hard Lyr Formation gave a false AVO Class III response.

[redacted]

7. Geomechanical and Pore Pressure Study (Capricorn/Schlumberger Study)

- Objectives:
  - Obtain an independent geo-mechanical model and pore pressure prognosis for the Godalen prospect ahead of drilling well 6608/11-9.
- Results:
  - The pore pressure prognosis is well constrained by offset wells 6608/11-1, 6608/11-2, 6608/11-3, 6608/10-9 and 6608/10-13.
  - A hydrostatic pressure gradient was predicted down to the top of the Kai Formation where pressure would start to increase, reaching 1.16 sg in the Tare Formation before dropping back to hydrostatic in the Jurassic section.

8. VSP and Seismic Multiples (Schlumberger/Capricorn Study)

- Objectives:
  - Obtain seismic well tie and identification of interbed multiples by aid of VSP survey.
- Results:
  - Excellent seismic to well tie achieved for well 6608/11-9 using the combination of LWD and VSP data.
  - The VSP multiple analysis highlights severe issues with interbed multiples in the seismic.
  - An interbed multiple at the base of the Spekk Formation is highlighted in the well. Modelling this multiple in 3D shows that it closely follows the Godalen inferred pre-drill OWC contact.

9. Biostratigraphic Study (RPS Energy)

- Objectives:
  - Dating of stratigraphy penetrated by well 6608/11-9.
  - Confirmation of seismic horizons interpreted, and formation tops picked on the well logs.
- Results:
  - Presence of a Paleocene section ascribed to the Tang Formation identified.
  - Possible presence of 4 m Springar Formation identified.

4. Prospect Update

The main prospect identified in the APA 2015 application, Storhaug, was based on a flat event at 1500 ms (Figure 4.1). With reservoir in the lower Red Beds, an Intra Red Beds evaporite top seal, a complicated migration route and dry wells updip it was seen as high risk with a chance of success estimated to 15% for a volume potential of 30 – 57 – 89 MSm^3 (P90 – Mean – P10).

In addition to Storhaug, the area applied for held three Jurassic leads; Ullandhaug, Ullandhaug West and Storhaug West plus the extension of the Varhaug prospect, mainly within PL800, all indicated by the 1500 ms flat event. Seismic reprocessing to validate/invalidate the event therefore constituted the main part of the work programme.

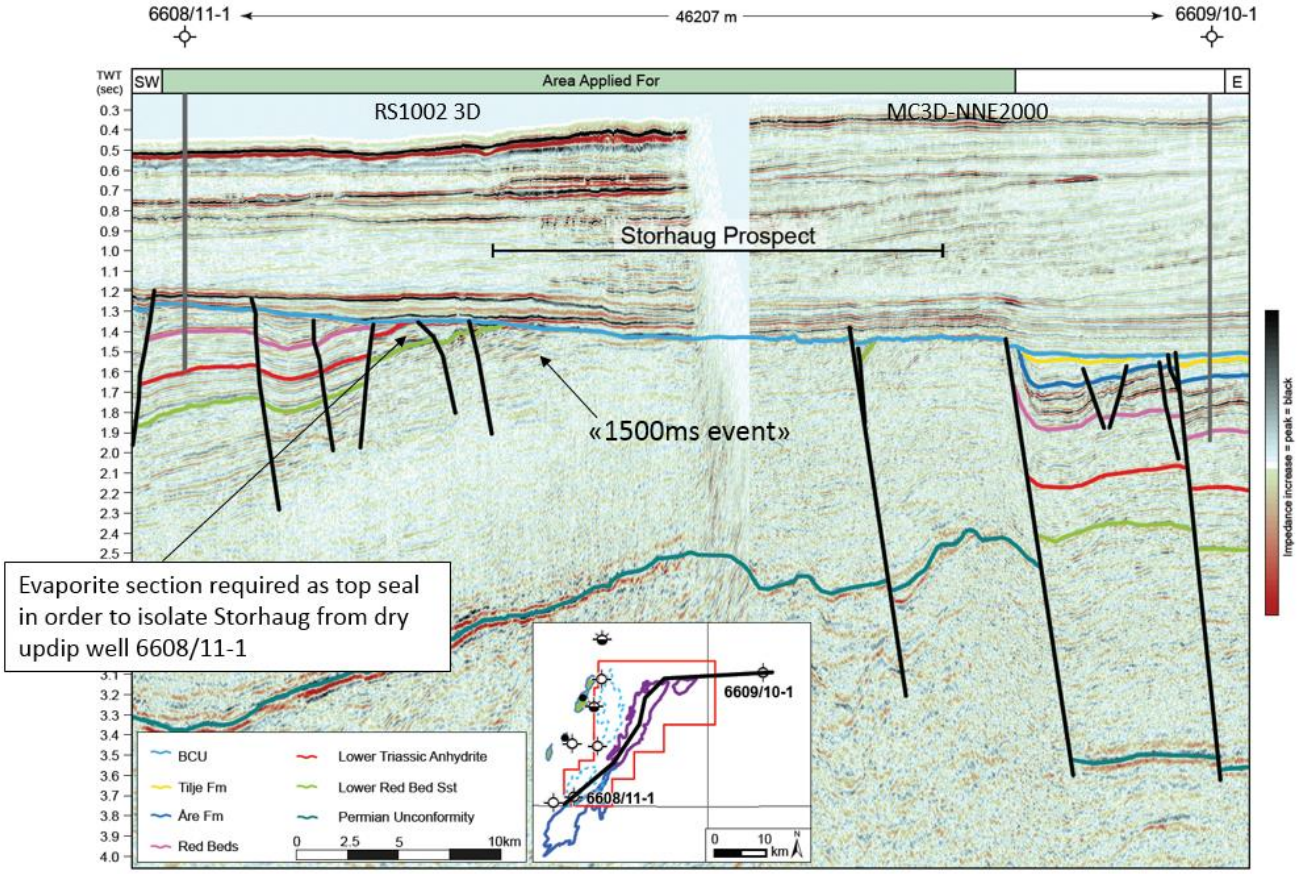

Figure 4.1: Storhaug prospect in APA 2015 application.

The seismic reprocessing removed the 1500 ms flat event, which was caused by an interbed multiple, and effectively killed the Ullandhaug and Ullandhaug West leads. The leads require an unrealistic combination of open and closed faults to allow migration into the traps and to separate them from dry updip wells. Without the flat event in support the leads were assessed to have a very low probability of success.

Without the flat event also the Storhaug prospect was demoted with reservoir effectiveness and charge as the key risk elements.

A more comprehensive discussion of Storhaug, Ullandhaug and Ullandhaug West is found in Chapter 6.

A new prospect, Godalen, was identified by partner Skagen44 on the reprocessed CAP17M01 volume as an AVO Class II/III anomaly at the BCU with good depth conformance (Figure 4.3). The prospect is located on the western

flank of the Sør High, in a down-faulted terrace largely protected from Cretaceous erosion. Downdip in the Bremstein Fault Complex, towards the Norne field, an AVO Class IV response, as expected for the Spekk Formation source rock, was observed. An Upper Jurassic Rogn Formation reservoir with sand sourced by local erosion of the Nordland Ridge was proposed. Godalen comprises three segments where the main segment is a hanging wall trap with the Rogn Formation reservoir juxtaposed against sandstones, shales and coals of the Båt Group along the fault (i.e. fault seal required). To the north the Upper Jurassic section is truncated below the BCU (i.e. continued uplift and erosion of the Nordland Ridge post Rogn Formation deposition). Reservoir presence was seen as the main geological risk as most of the erosion took place in the Early Cretaceous with sand redeposited as the Lange and Lysing formations on the Dønna Terrace. Charge was also seen as a key risk as any migration in the pre-rift Jurassic section would be diverted to the north before reaching Godalen. Without the DHI (AVO Class II/III with depth conformance) the prospect was therefore not seen as viable. Considerable effort was then put into modelling the cause of the AVO Class II/III seismic anomaly (tuning, overburden variations, reservoir and fluid variations). This work concluded that an oil filled, 28% porosity sandstone best fitted the seismic response. The most likely geological model of Spekk Formation source rock rather than Rogn Formation sandstone at the prospect, was modelled to always display an AVO Class IV response, as seen downflank to the west.

A bell-shaped seismic AVA response (weaker near and far angle-stacks compared to the mid angle-stack) indicating an issue with the amplitude balancing was, however, observed. Further investigation and correction of the nears suggested the Class II/II AVO was robust. Given the mismatch between the geological understanding (reservoir presence) and the seismic response, the processing steps were investigated to see if any artefacts had been introduced. No clear evidence of this was identified and Godalen was given a DHI uplift in the risking from an initial 10% chance of success to 26% based on AVO Class II/III, deviation from the background trend and amplitude depth conformance (Figure 4.4).

With the input parameters in Table 4.1 the recoverable volumes of oil for the three Godalen segments combined were estimated to: 4.7 – 14.2 – 21.0 MSm^3.

Reservoir parameters	P90	Mean	P10
Crest of the prospect (m SS)		1400	
GRV (10^9 Sm^3)	0.20	0.25	0.29
Oil Water contact (OWC) (m SS)	1510	1530	1550
Net to Gross	0.55	0.67	0.80
Porosity	0.24	0.28	0.32
Oil saturation	0.70	0.78	0.85
1/Bo	0.88	0.91	0.94
Oil Recovery factor	0.23	0.35	0.45

Table 4.1: Volumetric parameters for the Godalen prospect.

Prospect Name	Godalen
Area / Block Name	Nordland Ridge (Sør High), Norwegian Sea / 6608/11
Distance to infrastructure	6 km to Urd, 13 km to Norne
Water Depth	379 m
Reservoir	Rogn Fm (shallow marine)
Trap	Hanging-wall trap (fault seal to the ESE and SSW) and truncation edge to the NNE, dip closed to the WNW
Source Rock	Spekk Fm (and Åre Fm?)
Top Seal	Lyr Fm marls & shales
Top Reservoir depth	1400 m TVDSS
Rec. Resources (OIL) (P90 – Mean – P10)	4.7 – 14.2 – 21.0 MSm³
POSg	26%
Main Risks	Migration and reservoir presence

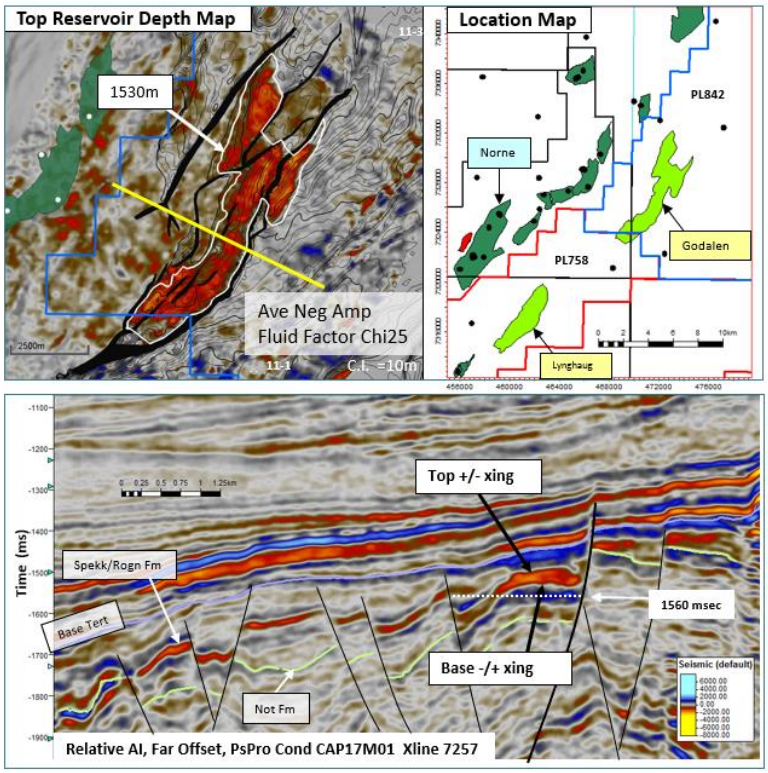

Figure 4.2: Godalen prospect assessment at the drill or drop stage.

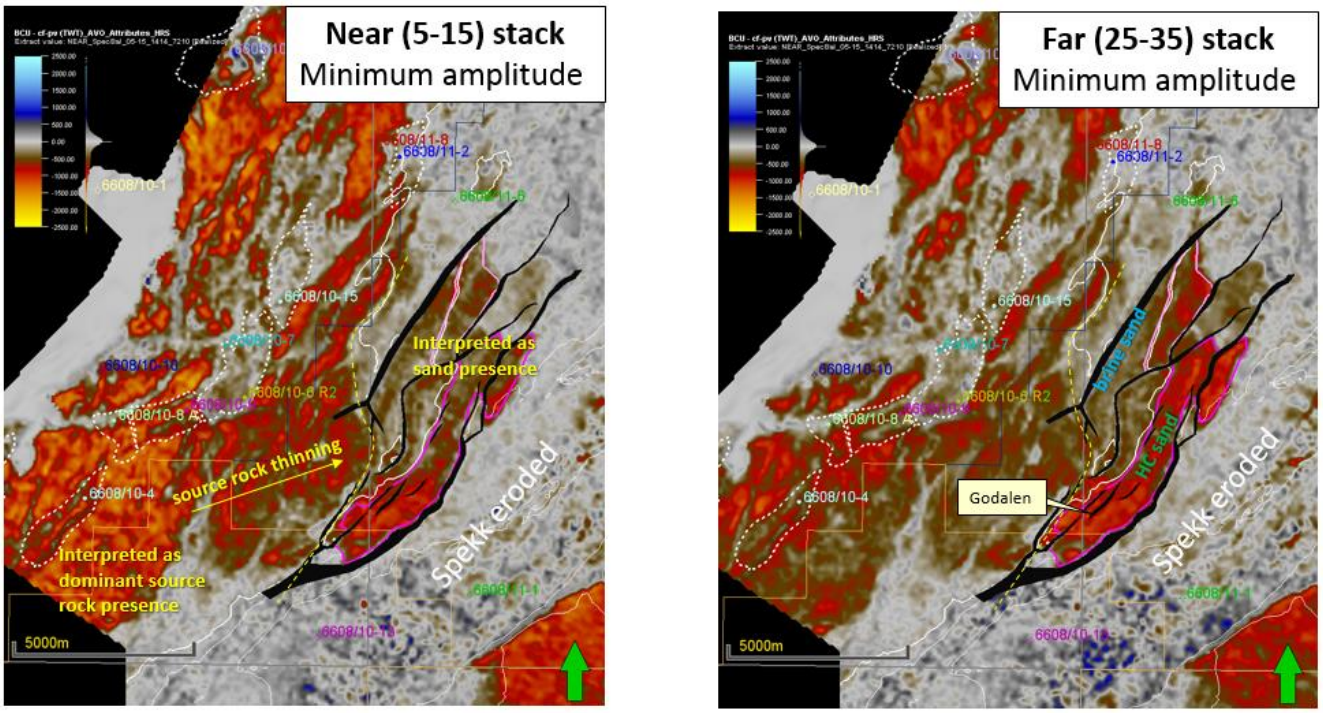

Figure 4.3: CAP17M01 PreStackPro conditioned angle stacks. Amplitude brightening from Near to Far (AVO Class II/III) is observed on Godalen while dimming (Class IV) as expected for the Spekk Formation source rock is seen downdip to the west.

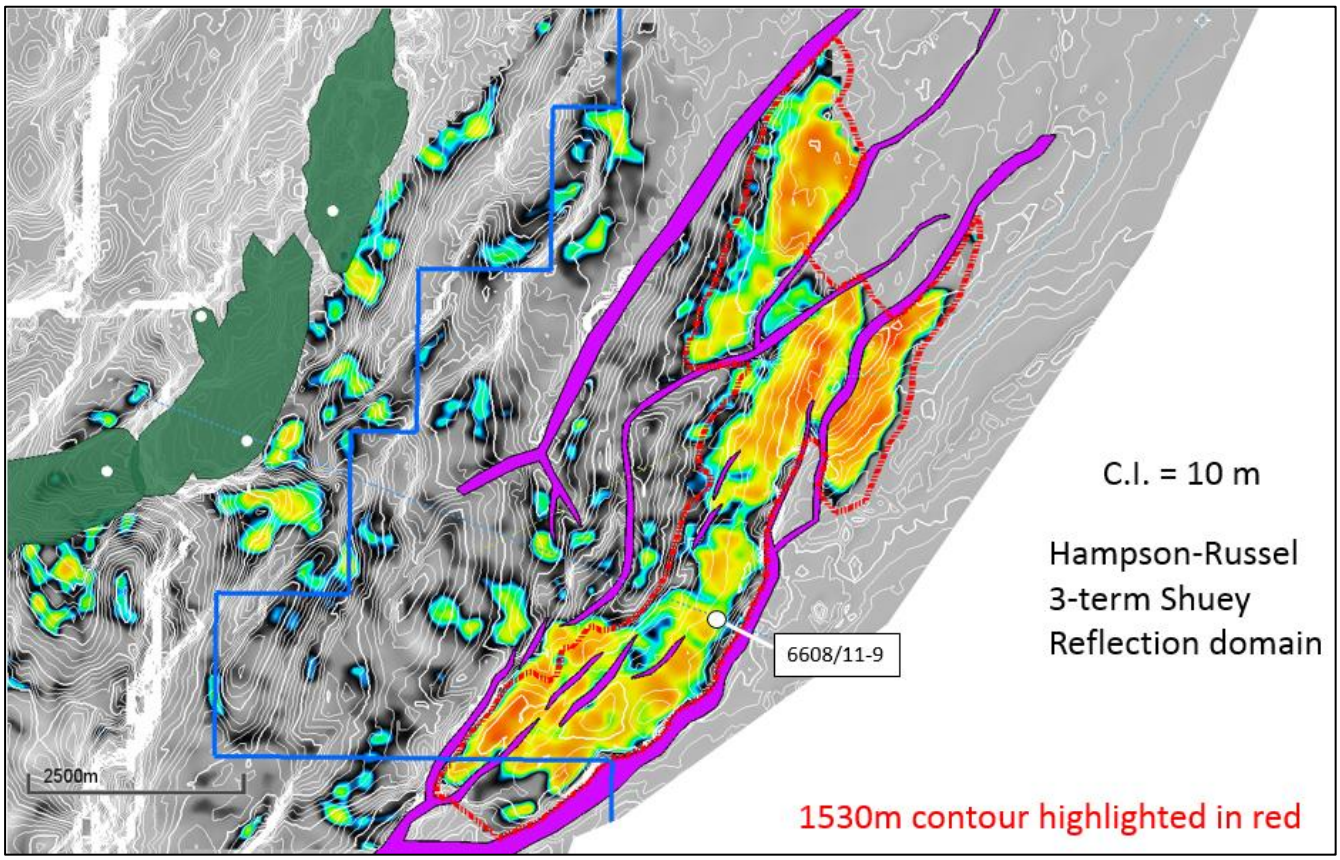

Figure 4.4: Godalen Chi25 Fluid Factor map. Deviation from the background and good depth conformance at 1530 mSS is observed.

5. Godalen Well Results

Well 6608/11-9 targeting the Godalen Main segment was spudded July 13th, 2019 and reached a Total Depth of 1700 m TVDRT in Middle Jurassic Not Formation shales on July 30th. The well was dry with no shows. Spekk Formation hot shale and no Rogn Formation reservoir was encountered at the target level (Figure 5.1). Formation tops were close to prognosis and within the uncertainty ranges given. Advanced Gas Analysis and Isotope studies were conducted in real time through the 12 ¼" and 8 ½" sections with only very low quantities of Methane being recorded. Isotope analysis showed a biogenic origin for the Methane.

A detailed assessment of the well operations, data acquisition, and results can be found in: 6608/11-9 Geological End of Well Report.

AVA modelling based on the LWD logs shows an AVO Class IV response as expected for the Spekk Formation at the well location (Figure 5.2). Post well, considerable effort has been put into understanding what caused the false Class II/III AVO response in the CAP17M01 survey. It should also be added that the underlying original RS1002 survey appears to show correct AVO Class IV (post well investigation by Pandion), while the more recent PGS16005 broadband survey shows a similar anomaly at Godalen on EEI25 fluid projection data (AkerBP presentation pre-DoD). Capricorn do not have access to RS1002 offset cubes or the PGS1605 survey to investigate this further. It seems that several processing steps conspired to give the Class II/III artefact in the CAP17M01 survey, with no single culprit identified:

- Processes which are suspected to have contributed to the **general loss of near trace energy** are:
  - High-res radon applied on CMP gathers pre-migration (RS1002LNR16 processing)
  - Radon cut at 100 ms post-migration (CAP17M01 processing)
  - SNIP, coherency filter on offset planes (CAP17M01 processing)
  - TMA, 20 ms below BCU (CAP17M01 processing)
  - Radon in PsP for final gather conditioning (CAP17M01 conditioning)
- Processes which are suspected to have contributed to the **localised loss of near trace amplitude at Godalen**:
  - 2D SRME (RS1002LNR16 processing)

Based on the post-well VSP multiple investigation, it is concluded that the amplitude conformance on the western side of Godalen can be explained by a cross-cutting interbed multiple affecting the amplitude response at this depth.

The well was drilled into the Not Formation in order to investigate the quality Intra Melke Formation Sandstone which could form a play in the area (Stokka leads). In line with the Operator's prediction the sandstone was of poor reservoir quality with a high Vclay of 40% indicating a distal rather than proximal depositional setting. The Intra Melke Formation Sandstone is therefore not seen as a viable reservoir in the licence, especially when combined with most likely viscous oil.

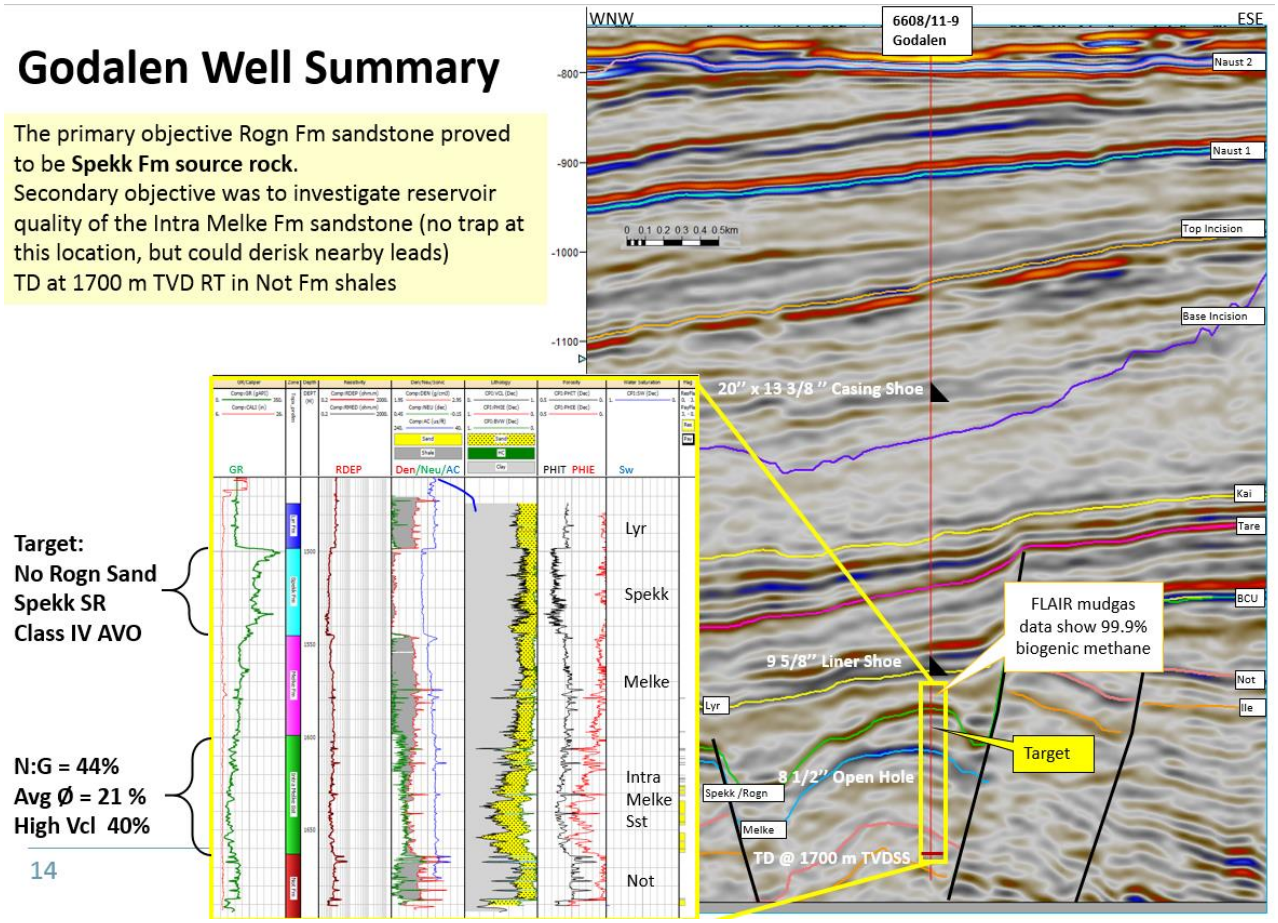

Figure 5.1: 6608/11-9 well summary.

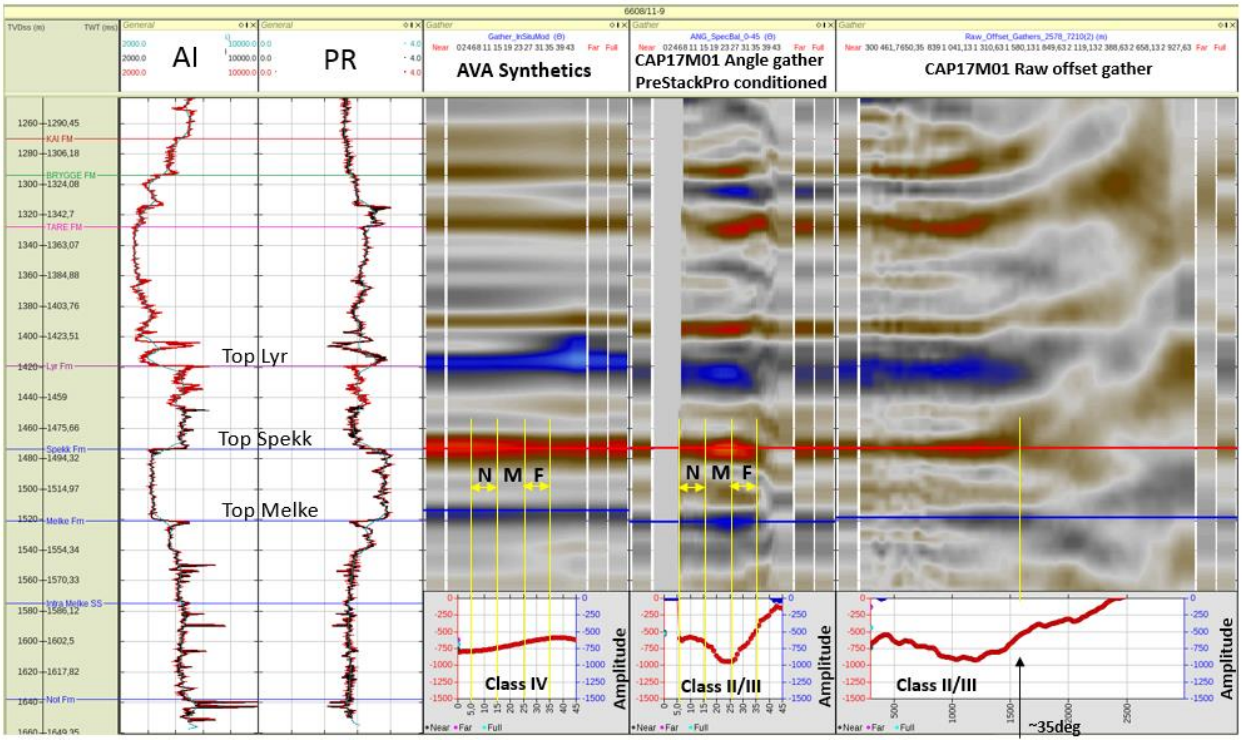

Figure 5.2: AVA synthetic gather based on 6608/11-9 LWD logs compared to CAP17M01 angle gather. The synthetic angle gather shows a Top Spekk Fm. amplitude dimming with angle (AVO Class IV) as expected for a source rock, whereas the real seismic, CAP17M01, shows brightening with angle (AVO Class II/III).

6. Remaining Prospectivity

Several prospects and leads are identified at Triassic and Jurassic levels: Storhaug (Red Beds), Storhaug West and Revelberget (Båt and Fangst groups), Stokka and Stokka North (Intra Melke Formation Sandstone) (Figure 6.1).

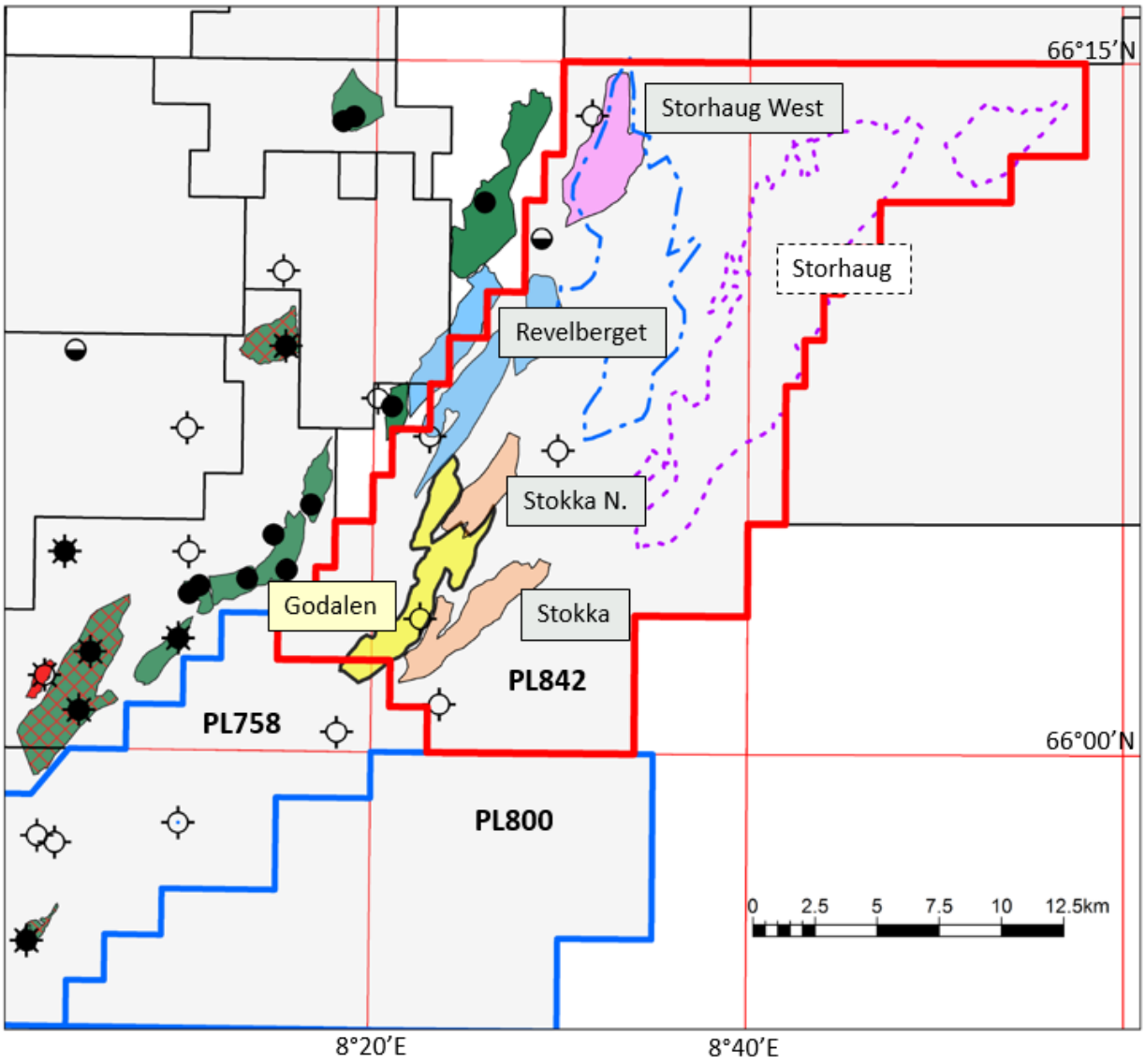

Figure 6.1: PL842 Prospects and leads.

Storhaug Prospect

The Storhaug prospect comprises lower Red Bed reservoir within a large rotated fault block. Top seal is required by Ladinian evaporites and Tang Formation tuffaceous shales, the latter where the trap is truncated at the BCU (Figure 6.2). The prospect is no longer seen as viable. Charge was seen as the main risk at the time of application with migration through the Varhaug prospect to the south as the more likely route. Well 6508/1-3 on the Lynghaug prospect in PL758 showed no evidence of migrated hydrocarbons. As this is the only viable migration route to the Varhaug prospect charge to Storhaug from this direction is now considered highly unlikely. Chance of success of charge, originally 0.45, is therefore demoted to 0.2. Given this, and a highly questionable reservoir quality of the lower Red Beds as evidenced by 6608/11-5, the prospect is regarded too high risk to merit drilling.

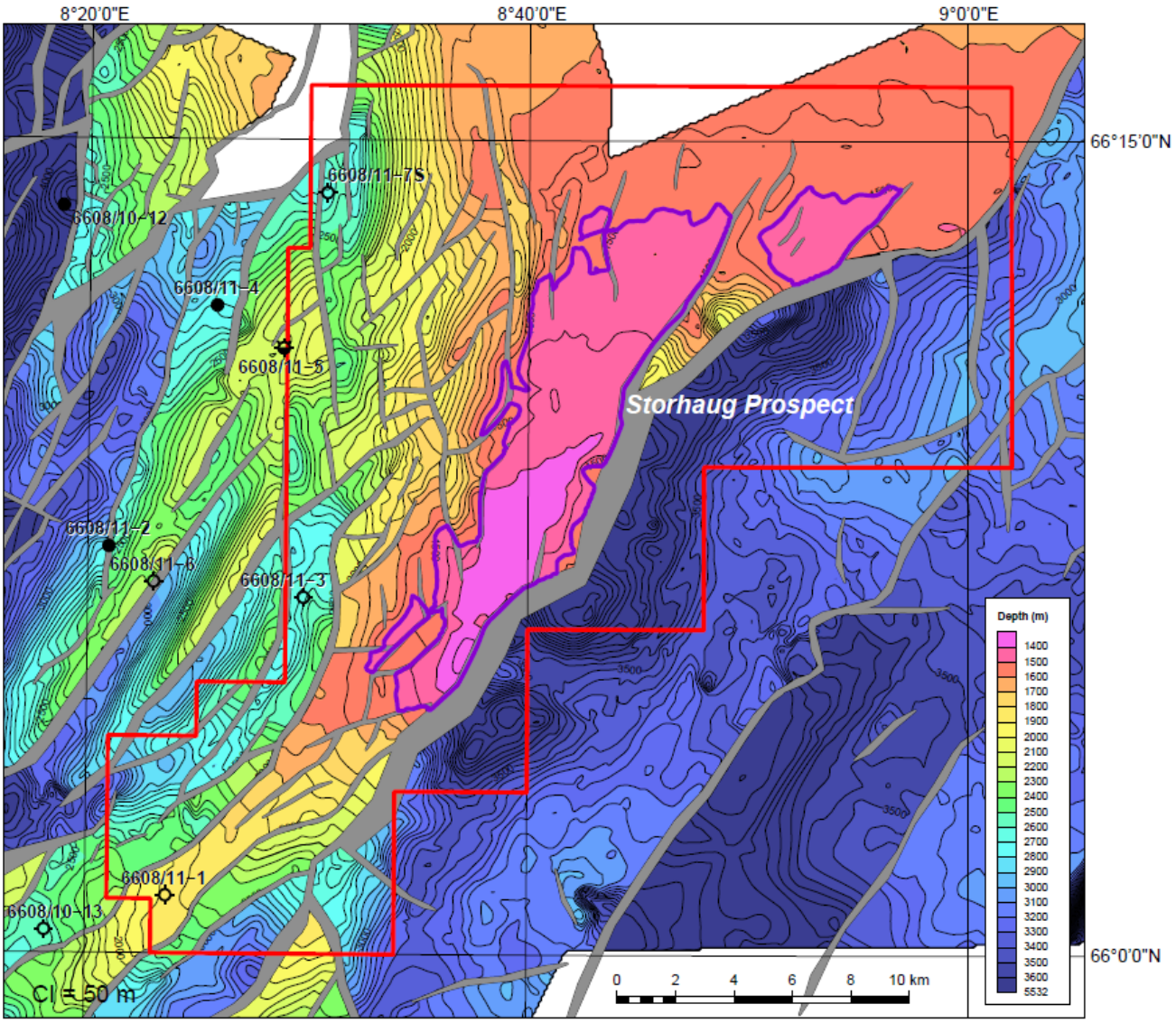

Figure 6.2: Top seal depth map for the Storhaug Prospect. The map is a combination of Top Ladinian evaporites and BCU. Contour Interval 50 m.

Revelberget Prospect

The Revelberget prospect comprises Ile, Tilje and upper Åre Formation reservoir in three fault block segments; Central, North and West (Figure 6.3). The West segment is largely outside PL842. All three segments rely on the Intra-Åre Formation shale and coal unit to provide a bottom seal. Well 6608/11-6, drilled by Statoil in 2008, sits within closure in the Central segment. It found dry Intra Melke Formation Sandstones above dry Ile and Tilje formations. Shows were however recorded in the Not Formation. In order to separate the Central segment from the dry Intra Melke Formation Sandstone in 6608/11-6, a Not Formation top seal is required (Figure 6.4).

Migration to the West segment would be through the 6608/11-4 Linerle discovery (could be one accumulation) while the Central segment could be charged from the SW. Biodegradation is expected to be severe, as in Linerle or worse, due to shallow burial, short columns and large areal exposure to water below.

Mean volumes are around 4 MSm^3 which is below the estimated minimum economic field size of 6.4 MSm^3 for a Norne tie-back. Combined with a high trap risk, and most likely severe biodegradation of any oil, the prospect is not seen as a viable drilling candidate.

Prospect Name	Revelberget
Area / Block Name	Norwegian Sea, PL842 Nordland Ridge,
Distance to infrastructure	9 km to Urd, 19 km to Norne
Water Depth	350 m
Reservoir	Ile, Tilje, Upper Åre Fm (fluvial to shallow marine)
Trap	Truncation edge towards NE
Source Rock	Spekk Fm,
Top Seal	Not and Tare Fm shales
Hydrocarbon phase	Oil
Top Reservoir depth	1460 m TVDSS
Rec. Resources (OIL) (P90 – mean – P10)	W: 2.4 – 3.2 – 5.6 MSm^3 C: 1.9 – 4.3 – 7.0 MSm^3 E: 1.9 – 4.1 – 6.4 MSm^3
POSg	W: 20%, C: 13%, E: 8%
Main Risks	Bottom seal and migration

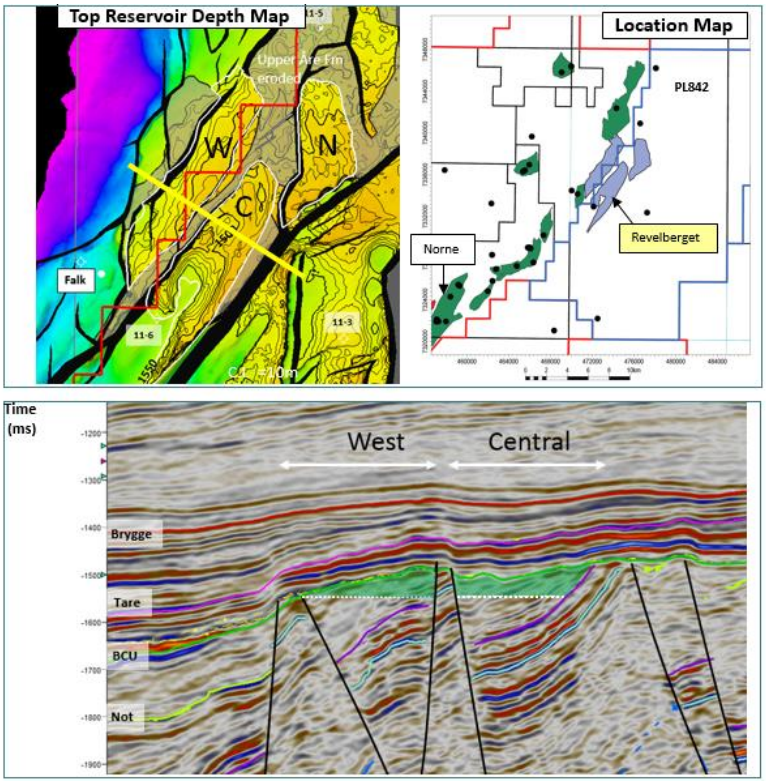

Figure 6.3: Revelberget prospect summary.

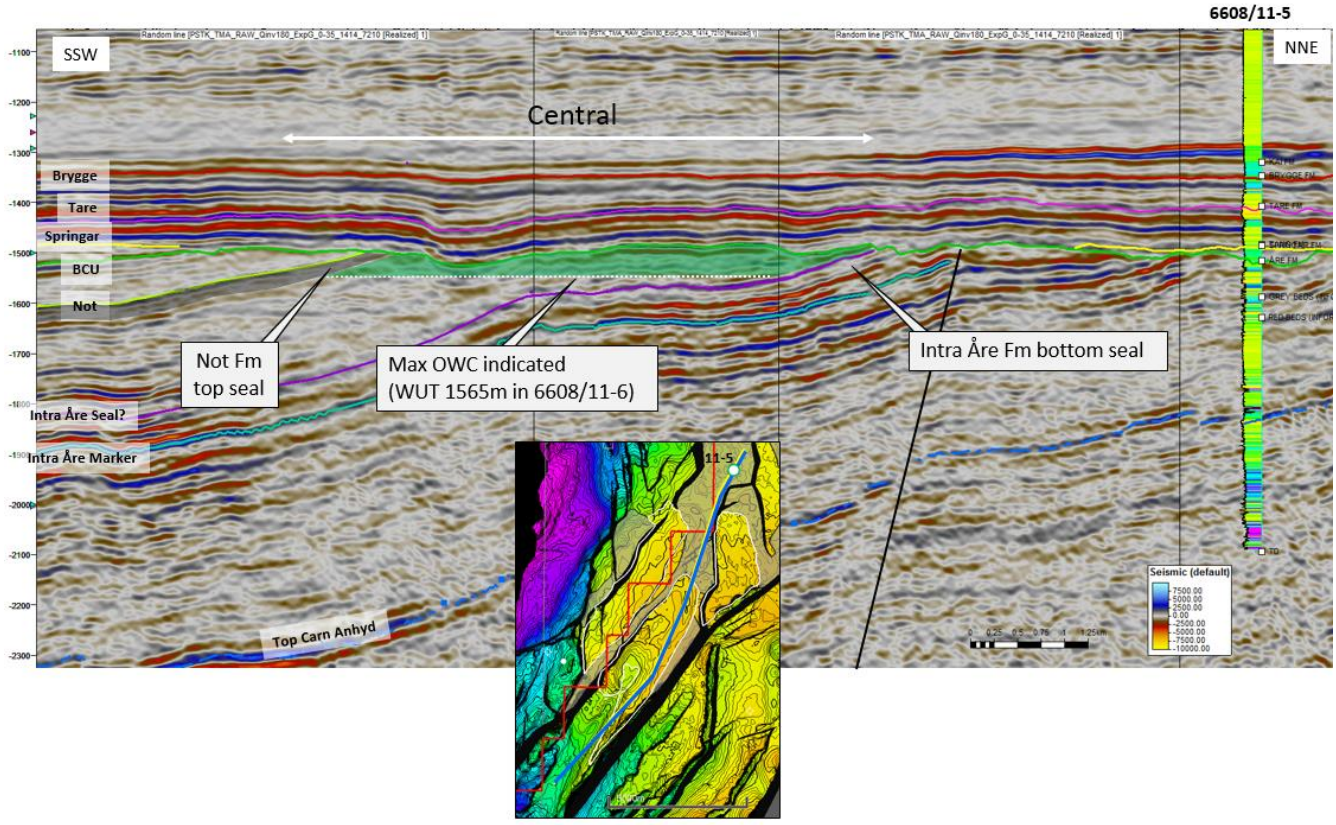

Figure 6.4: Arbitrary seismic line through Revelberget prospect.

Storhaug West Prospect

The Storhaug West prospect is a truncation trap comprising lower Åre Formation and Grey Bed reservoir. It is located up-dip and south-east of the Phoenix well 6608/11-7 S, which recorded traces of fluorescence just below the BCU (Figure 6.5). Top seal is required by a combination of the Intra-Åre Formation shale/coal unit and Springar Formation shales, while the Red Beds provide bottom seal. A strong EM-anomaly is located over the north-eastern part of the prospect. To honour the EM-anomaly the prospect has to be limited to the south. A fault zone that may serve this case is observed on the seismic (Figure 6.5). The faults within the zone are, however, interpreted to be disconnected and thus unlikely to form the required seal.

At more detailed scale the EM-anomaly does not fit the trap geometry or the potential gross hydrocarbon column as the strongest anomaly is seen where the column would be very thin or absent (Figures 6.5 and 6.6). The study conducted by AkerBP concluded that the anomaly in general is too strong to be caused by presence of hydrocarbons.

If the southern fault zone is not sealing and the EM-anomaly is not a hydrocarbon indicator, then an extended Storhaug West lead might be considered (Figure 6.1 dashed line). The extended trap is viewed as very complex/unrealistic (crossing many fault zones) and too high risk to merit any volume calculation (Figure 6.7).

Prospect Name	Storhaug West
Area / Block Name	Nordland Ridge / 6608/11
Distance to infrastructure	10 km to Skuld, 30 km to Norne
Water Depth	335 m
Reservoir	Lower Åre Fm and Greybeds (fluvial)
Trap	Truncation
Source Rock	Spekk Fm
Top Seal	Intra Åre and Tare Fm shales
Hydrocarbon phase	Oil
Top Reservoir depth	1480 m TVDSS
Rec. Resources (OIL) (P90 – mean – P10)	4.3 – 7.2 – 10.3 MSm^3
POSg	9 %
Main Risks	Trap and Charge

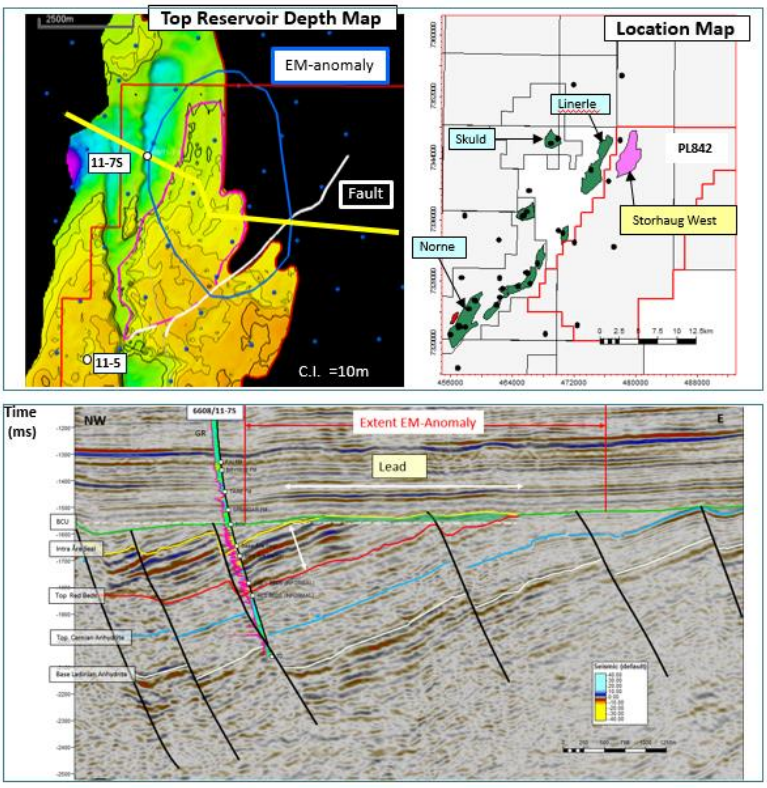

Figure 6.5: Storhaug West prospect summary.

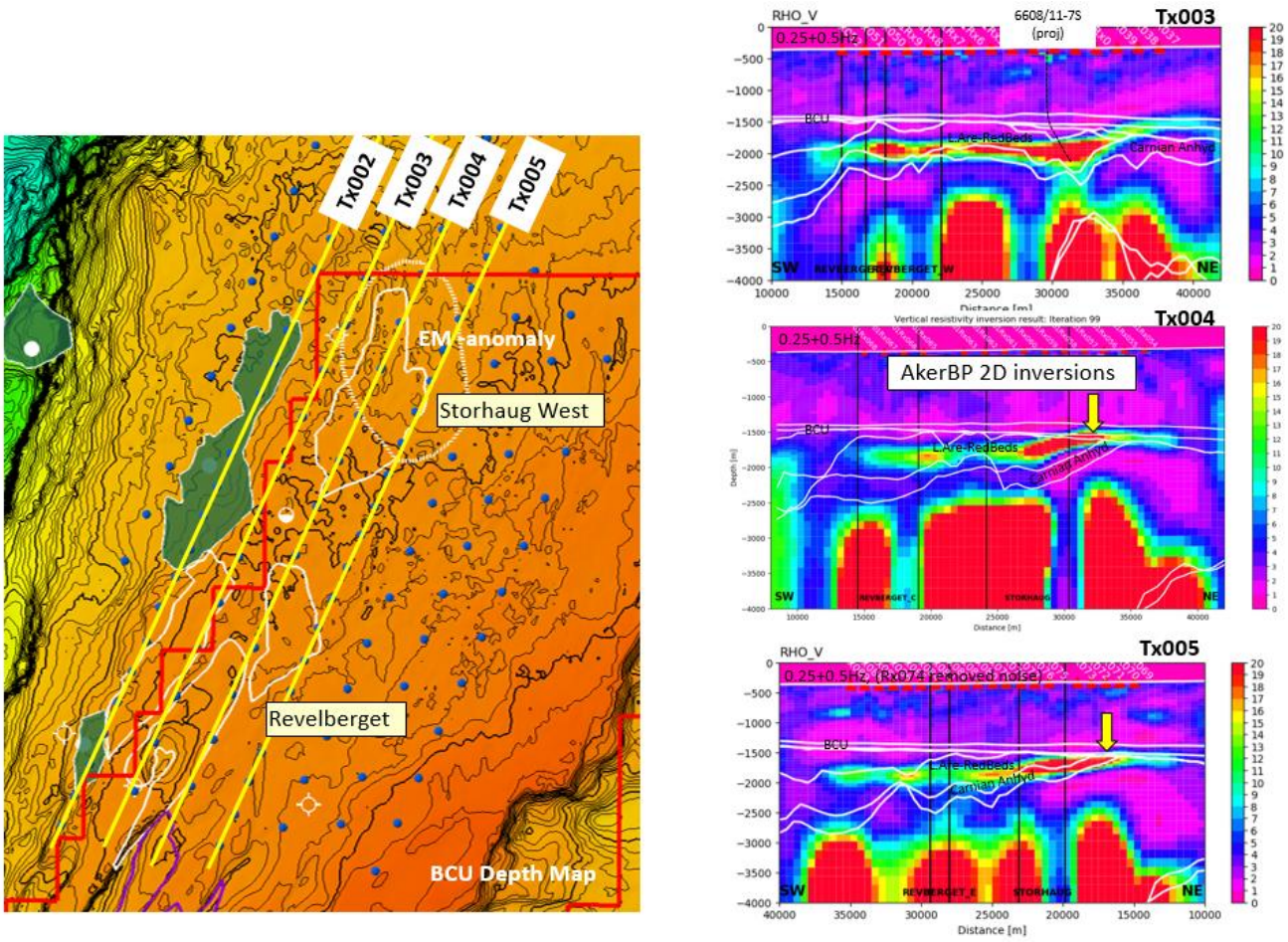

Figure 6.6: AkerBP 2D inversion of EDDA/Valkyrie CSEM survey. An inconsistent truncation of the EM anomaly within the stratigraphic layers is observed (Tx004 versus Tx005 – yellow arrow).

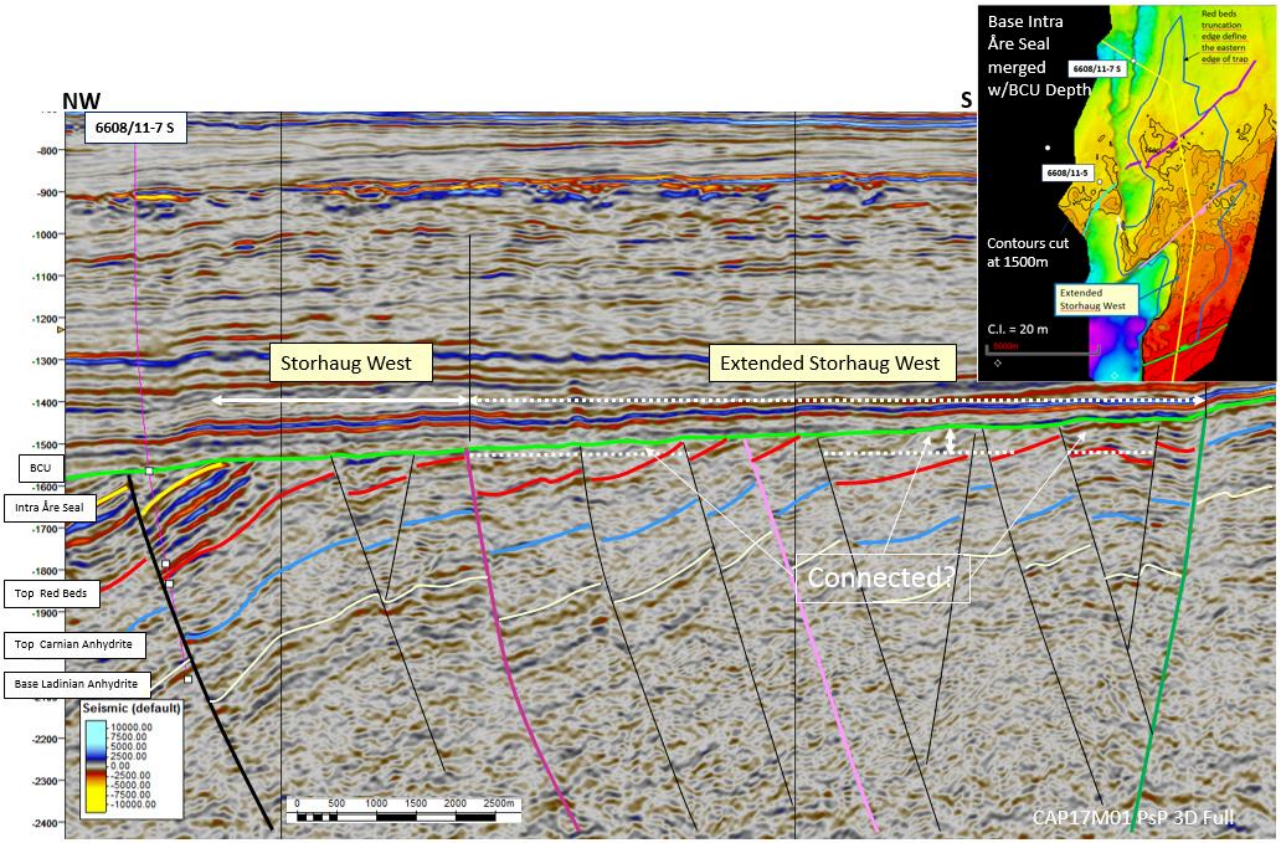

Figure 6.7: Seismic traverse illustrating the very complex Extended Storhaug West lead.

Stokka and Stokka North leads

The Stokka and Stokka North leads comprise Intra Melke Formation Sandstone reservoir in a hanging-wall and a horst fault block trap respectively, immediately up-dip of the dry Godalen well (Figure 6.8). Both traps have an element of truncation at the BCU. The leads rely on top seal by Melke Formation shales, and in the minor truncation areas, shales of the Tang/Tare formations. Bottom seal is required by Not Formation shale. Reservoir quality is seen as high risk following the Godalen well where the Intra Melke Formation Sandstone was found to be of poor quality with high Vclay, and hence low permeability, indicative of a distal depositional setting. Further there were no hydrocarbon shows in the well, inferring very high risk on hydrocarbon migration.

The Stokka and Stokka North mean recoverable volumes are very small at 2.5 and 1.7 MSm^3 respectively. The chance of success is very low at 5% with hydrocarbon migration (including biodegradation) and reservoir effectiveness as the principle risks.

Prospect Name	Storhaug West
Area / Block Name	Nordland Ridge / 6608/11
Distance to infrastructure	8 km to Urd, 18 km to Norne
Water Depth	370 m
Reservoir	Intra Melke Sandstone (shallow marine)
Trap	Combined structural and stratigraphic
Source Rock	Spekk Fm
Top Seal	Lyr and Tare Fm shales
Hydrocarbon phase	Oil
Top Reservoir depth	1285 and 1430 m TVDSS
Rec. Resources (OIL) (P90 – mean – P10)	1.0 – 2.5 – 4.5 MSm^3 (Stokka) 0.8 – 1.7 – 3.0 MSm^3 (Stokka N)
POSg	5 %
Main Risks	Charge and Reservoir effectiveness

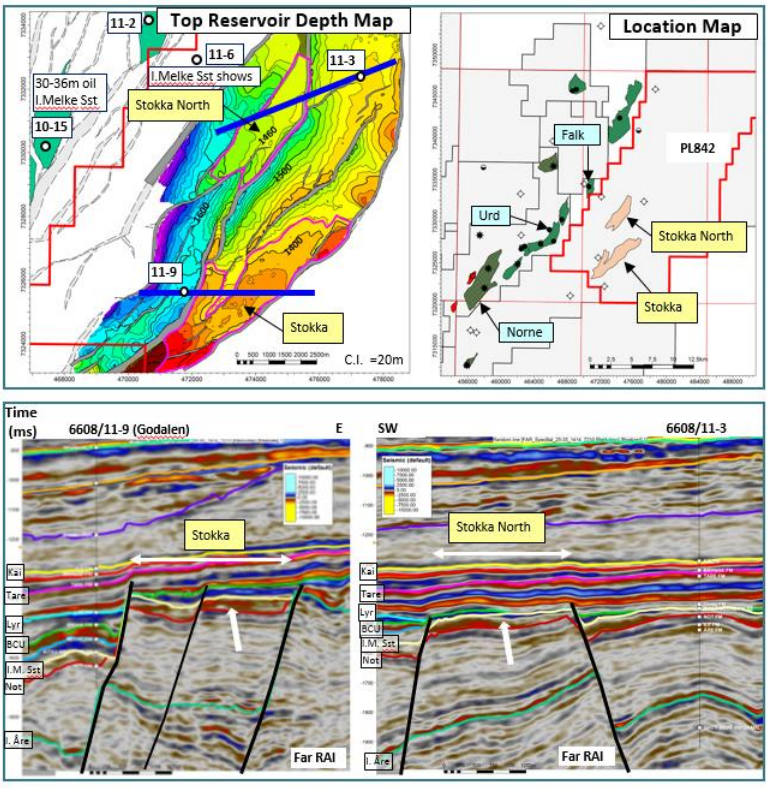

Figure 6.8: Stokka and Stokka North leads summary.

7. Conclusion

Only two prospects, Storhaug and Storhaug West, meet the Minimum Economic Field Size estimated to 6 MSm^3 for a tie-back to the Norne Field. The dry wells in PL842 and PL758, 6608/11-9 (Godalen) and 6508/1-3 (Lynghaug) respectively, together with the geological and geophysical work performed in PL842 demonstrate that the prospects and leads all have a high charge risk. Any migrated oil is further likely to have undergone severe biodegradation resulting in poor flow characteristics and low recovery factors.

Based on this the PL842 JV partners have decided to relinquish the licence.

	Recoverable oil (MSm^3)			Risk				
	P90	Mean	P10	Reservoir	Trap	Charge	Retention	POSg
Storhaug	29.8	56.8	88.8	0.6	0.6	0.2	0.8	0.06
Storhaug West	4.3	7.6	10.3	1	0.3	0.36	0.8	0.09
Revelberget Central	1.9	4.3	7.0	1	0.7	0.3	0.6	0.13
Revelberget East	1.9	4.1	6.4	1	0.7	0.2	0.6	0.08
Revelberget West	2.4	3.2	5.6	1	0.7	0.5	0.6	0.21
Stokka	1.0	2.5	4.5	0.4	0.7	0.2	0.9	0.05
Stokka North	0.8	1.7	4.6	0.4	0.7	0.2	0.9	0.05

Table 7.1: Volume and risk summary for PL842 prospects and leads.