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The Directors
Interfox Resources AB
Karlavägen 84
115 22 Stockholm
Sweden

14th January 2014

Dear Sirs

RE: Competent Person's Report Block 71-1 Tomsk, Siberia, Russia

In response to your request, we have carried out a technical review on the petroleum exploration resources of Block 71-1, Tomsk Region, Siberia, Russia.

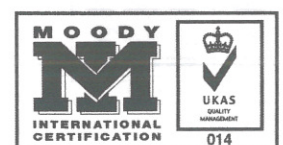
We have estimated the prospective resources of Block 71-1 based on data and information up to and including 10th January 2014.

1. PROFESSIONAL QUALIFICATIONS

Oilfield Production Consultants (OPC) Ltd. (hereinafter "OPC") is an independent consultancy providing expertise to the energy industry part of which is involved in evaluation, assessment and review of hydrocarbon interests and economic analysis. OPC has offices located at 1-2 Apollo Studios, Charlton Kings Road, London, NW5 2SB and Aberdeen in the United Kingdom. The review has been carried out by OPC which has previously carried out similar evaluations in the Former Soviet Union, and other parts of the world.

Jim Ayton, the person overseeing this evaluation, is the Technical Director of OPC and has been a Reservoir Engineer for 30 years in the upstream oil and gas industry. He holds an honours degree (BSc Hons) from Imperial College, London. He is a member of the Society of Petroleum Engineers and the Energy Institute. He has been involved in the estimation of oil and gas reserves for 30 years, as well as reservoir simulation and evaluation studies during this time.

Other than the payment of fees for the preparation of the Competent Person's Report by Interfox Resources AB, neither Jim Ayton, the directors of OPC, nor any of the technical specialists involved in the preparation of it, have any involvement in the management of Interfox Resources AB or OOO Bakcharneftegaz, and are independent of these companies.



Additionally the determination of the reserves, the classification system used and the technical definitions comply with the SPE approved PRMS (Petroleum Resources Management System).

This CPR report has been prepared within the context of OPC's understanding of the effects of the relevant petroleum legislation, taxation and other regulations that currently apply to the BNG Exploration Licence for Block 71-1.

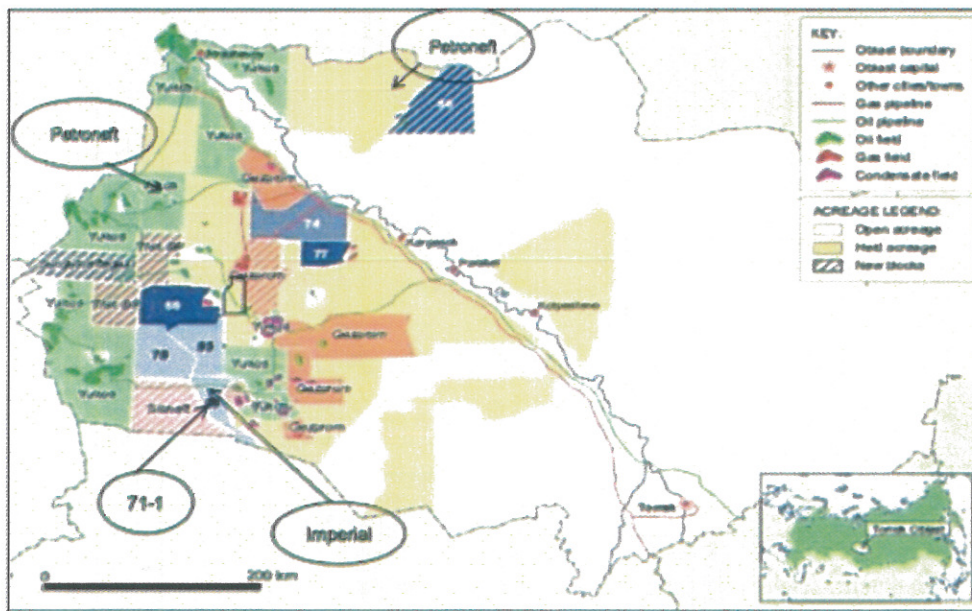
4. REPORT SUMMARY

OPC were requested by Interfox Resources AB of Sweden, to complete a competent persons report (CPR) during December 2013 and January 2014. To this end, three OPC specialists visited the offices of OOO Bakcharneftegaz (BNG) in Tomsk, Siberia. BNG are the holder of the exploration licence for Block 71-1. The visit took place between 17th and 19th December 2013.

The CPR is required to help raise funds for a well programme that includes re-entry of Well EI-4, and the drilling of a further well on the crest of the structure.

The data that were provided consisted of the following:-

- Geoprime Report on Block 71-1 Resources (paper copy only)
- Well logs for Wells EI2 and EI4 including LAS files
- Seismic line data, paper and electronic
- Written core reports
- Written reports on well tests
- Drilling reports and final well reports
- Information from nearby field analogues



Source: Petroneft

The location of Block 71-1 relative to Tomsk is shown in the Figure above.



Two wells have been drilled in the Ellei Igaiskaya (EI) structure, both of which were recorded to have flowed some hydrocarbons from the Devonian Carbonates. No testing has been completed to date on the prospective Jurassic sandstones.

OPC have evaluated the Prospective Recoverable Resources, as per the guidelines set out in the PRMS system adopted by the Society of Petroleum Engineers (SPE). The resources were calculated statistically using a Monte Carlo simulation method and are summarized in the table below.

Reservoir	Prospective Oil-in-place (million bbls)			GOR (scf/bbl)	Prospective Gas-in-place (Bcf)		
	P90	P50	P10		P90	P50	P10
Jurassic	10.6	18.1	29.3	1080	11.4	19.5	31.6
Weathering Crust	0.7	2.1	4.6	1335	0.9	2.8	6.1
Devonian Limestone	2.1	7.8	28.3	501	1.1	3.9	14.2
TOTAL	13.4	28	62.2		13.4	26.3	52.0

Reservoir	Prospective Recoverable Resources (million bbls)			GOR (scf/bbl)	Prospective Recoverable Resources (Bcf)		
	P90	P50	P10		P90	P50	P10
Jurassic	2.1	4	7	1080	2.3	4.3	7.6
Weathering Crust	0.2	0.5	1.1	1335	0.3	0.7	1.5
Devonian Limestone	0.4	1.7	6.4	501	0.2	0.9	3.2
TOTAL	2.7	6.2	14.5		2.7	5.8	12.2

Yours Faithfully

Jim Ayton

Technical Services Director





**Evaluation of Block 71-1 Tomsk Region,
Siberia, Russia
Competent Persons Report**

for

Interfox Resources AB

Oilfield Production Consultants (OPC) Ltd

14th January 2014

Document Control Record

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03	14/01/14	Final Version	Jim Ayton	Jim Ayton	Jim Ayton
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01	12/01/14	First Draft	Peter Ellwood Brendan Keating	Jim Ayton	Jim Ayton

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<p>Title: Evaluation of Block 71-1 Tomsk Region, Siberia, Russia Competent Persons Report</p> <p>For: Interfox Resources AB</p>	<p>QA Verified:</p> <p style="text-align: center;"><i>J. Ayton.</i></p>
	<p>Date:</p> <p>14th January 2014</p>

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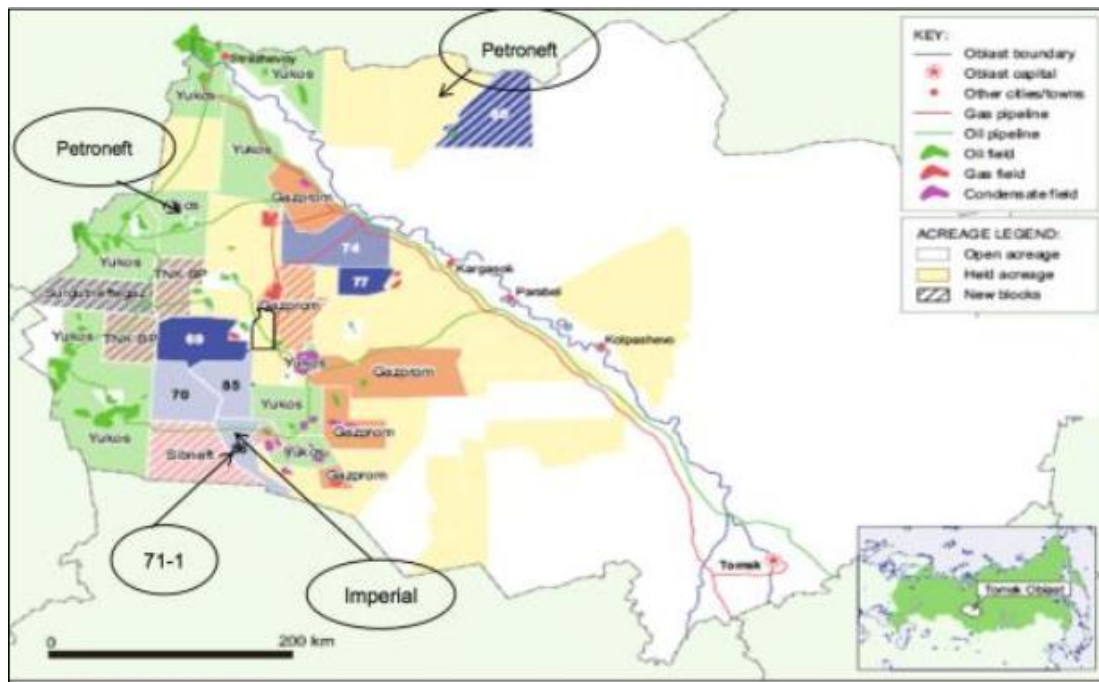
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- Drilling reports and final well reports
- Information from nearby field analogues



Source: Petroneft

The location of Block 71-1 relative to Tomsk is shown in the Figure above.

Two wells have been drilled in the Ellei Igaiskaya (EI) structure, both of which were recorded to have flowed some hydrocarbons from the Devonian Carbonates. No testing has been completed to date on the prospective Jurassic sandstones.

OPC have evaluated the Prospective Recoverable Resources, as per the guidelines set out in the PRMS system adopted by the Society of Petroleum Engineers (SPE). The resources were calculated statistically using a Monte Carlo simulation method and are summarized in the table below.

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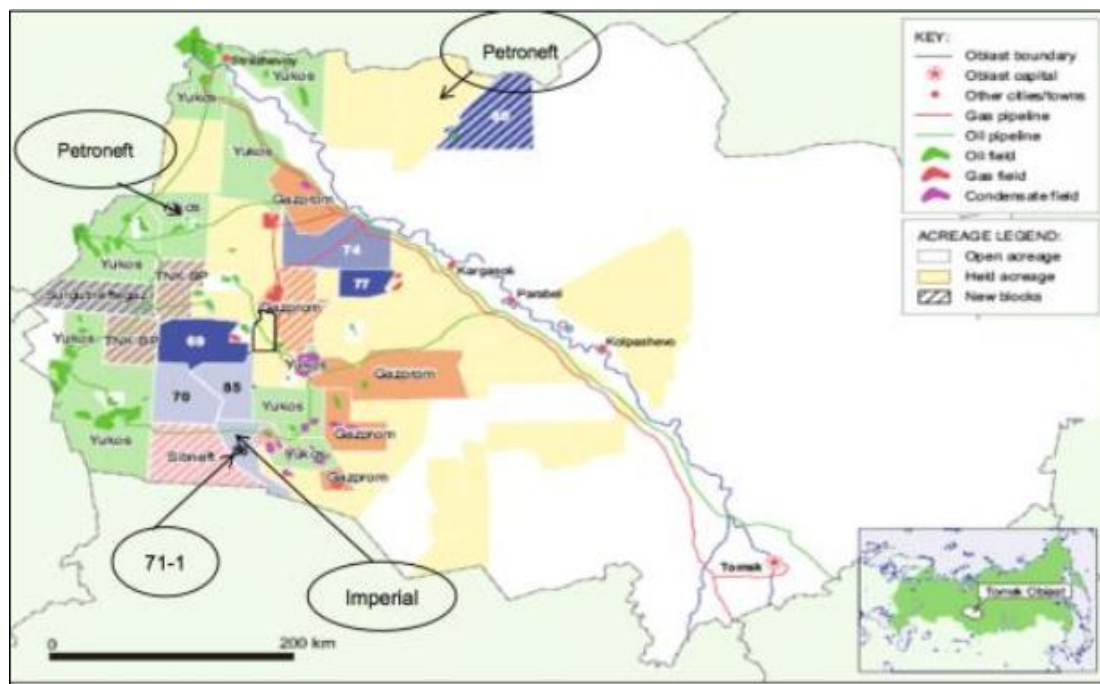
1 INTRODUCTION

OPC were requested by Interfox Resources AB of Sweden, to complete a competent persons report (CPR) during December 2013 and January 2014. To this end, three OPC specialists visited the offices of OOO Bakcharneftegaz (BNG) in Tomsk, Siberia. BNG are the holder of the exploration licence for Block 71-1. The visit took place between 17th and 19th December 2013.

The CPR is required to help raise funds for a well programme that includes re-entry of Well EI-4 with a full formation evaluation and testing programme, and the drilling of a further well on the crest of the structure. It is hoped that this will delineate both the Jurassic and Devonian formations.

The data that were provided consisted of the following :-

- Geoprime Report on Block 71-1 Resources (paper copy only)
- Well logs for Wells EI2 and EI4 including LAS files
- Seismic line data, paper and electronic
- Written core reports
- Written reports on well tests
- Drilling reports and final well reports
- Information from nearby field analogues



Source: Petroneft

The location of Block 71-1 is approximately 300km North-West of Tomsk and is shown in the Figure above.

Two wells have been drilled in the Ellei Igaiskaya (EI) structure, both of which were recorded to have flowed some hydrocarbons from the Devonian Carbonates. No testing has been completed to date on the prospective Jurassic sandstones.

2 GEOPHYSICS

2.1 Seismic Data

The information on the 2D seismic data in Ellei Igaiskaya Block 71-1 was obtained from paper and scanned copies of the Geoprime Report (a Schlumberger Company) which was generated in 2013 and from a Seismic Acquisition Report (by the Tomsk GEOPHYSICAL COMPANY) dated 2009. However there were no workstations in the data room and therefore it was not possible to view or interpret the digital 2D seismic data interactively. (Note that no 3D seismic data has been acquired over Block 71-1. All interpretation work has been based upon 2D seismic data only.)

Block 71-1 is covered by an orthogonal grid of mixed-vintage wide-spaced NW-SE and NE-SW oriented 2D seismic lines plus three E-W trending lines. There are 16 lines in total and the majority are spaced approximately 3 km x 2.5 km apart. However all 16 lines were truncated from their original lengths to fit within a rectangular area around Block 71-1 (Figures 1 & 2) and only these truncated portions were shown in the data room.

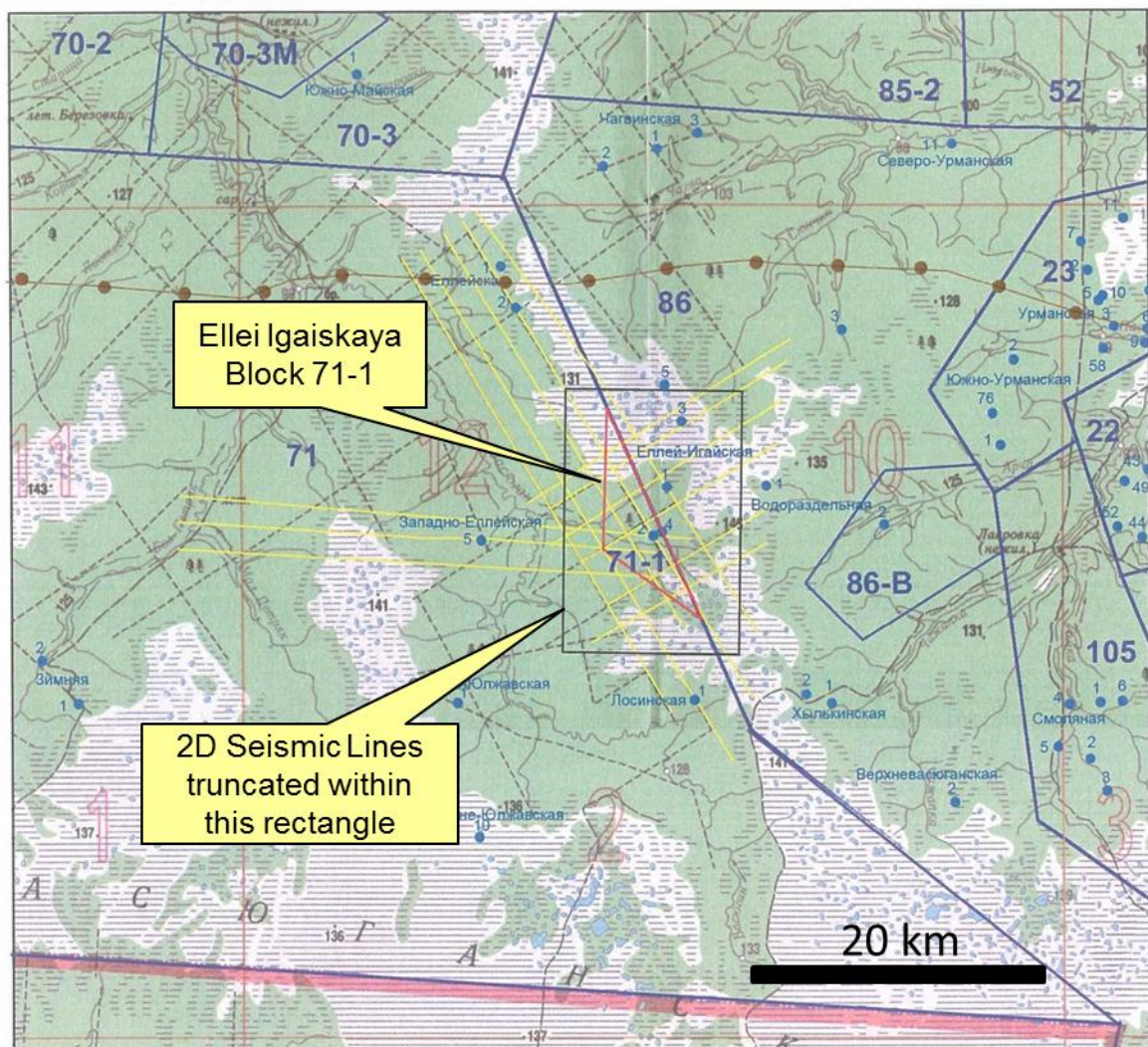


Figure 1 Regional seismic map showing the 2D seismic lines covering Block 71-1. (Note that the majority of the seismic lines available in the data room were truncated to the rectangular area immediately around Block 71-1.)

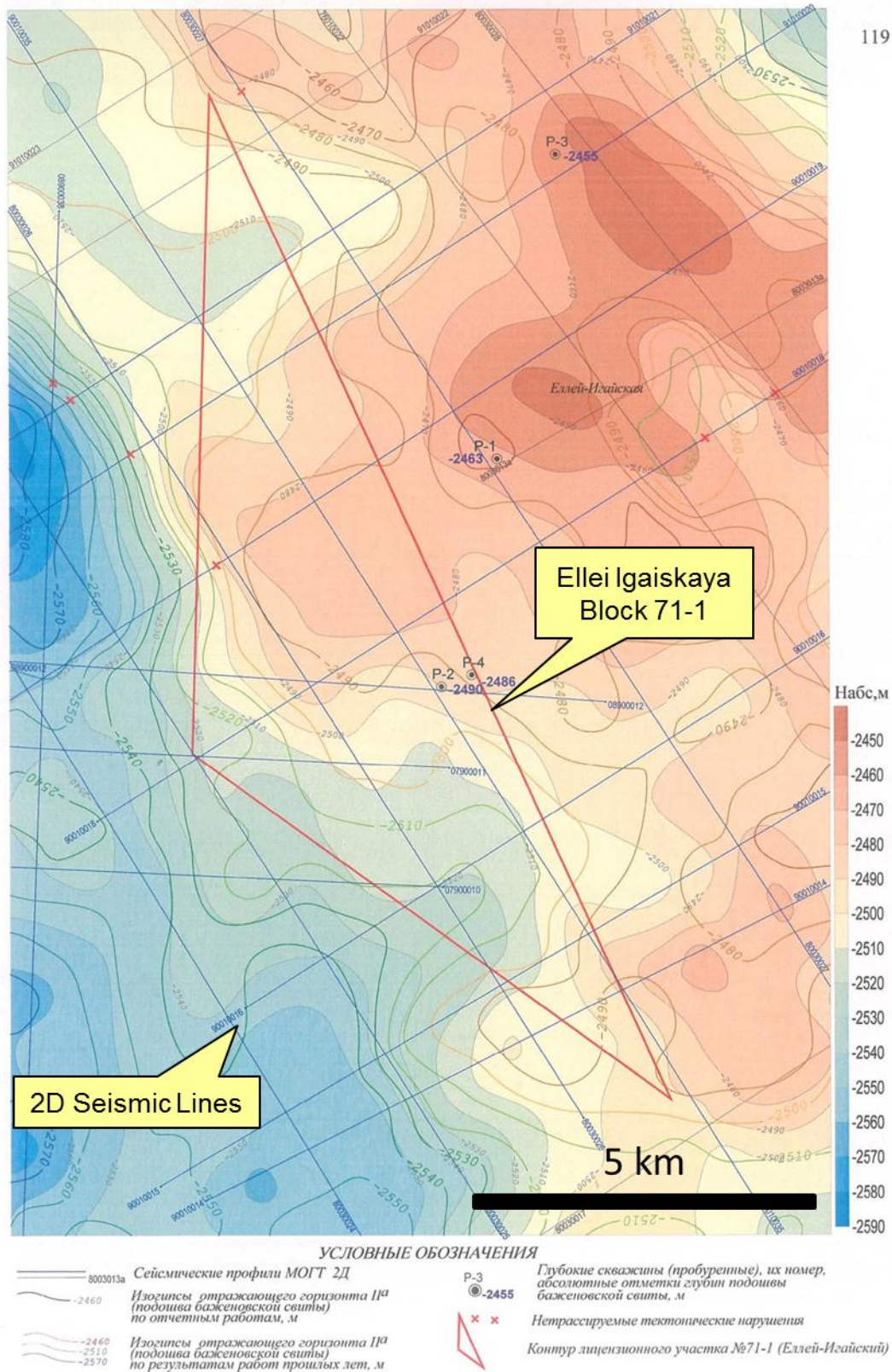


Рис.4.2 Сравнение структурных планов по отражающему горизонту II^a (подошва баженовской свиты)

Figure 2 Detailed seismic map showing the locations of the truncated 2D seismic lines covering Block 71-1.

The lines were acquired in three separate surveys in the years 1980-1982, 1990-1992 and 2007-2008. The line names and survey acquisition parameters are shown in Table S1. All three surveys were acquired using an explosive source. However there was a considerable range in the fold of coverage. The fold is the number of traces stacked together at each shot point. By stacking the traces the strength of the signals from the reflectors is increased by constructive interference. At the same time the noise on the traces is suppressed by destructive interference. Therefore the higher the fold, the greater the signal-to-noise ratio and thus the better the imaging of the reflectors.

The fold was low (12 and 24) for the two older surveys whereas the 2007-2008 survey was acquired with a high fold of 64. This means that the quality of the seismic imaging varies significantly amongst the three different surveys, with the best quality being obtained from the 2007-2008 survey.

The 16 lines from the three different surveys were reprocessed in a similar manner by Geoprime in 2012/2013. The processing appears to have been a conventional Post-Stack Time Migration. This has produced reasonable imaging results down into the Upper Palaeozoic section. (Prior to the reprocessing it was reported that it was difficult to image the deep Palaeozoic structure on the seismic data.) However it is noticeable that the fault breaks are mostly smeared. It is likely that the data would have benefited from Pre-Stack Time Migration processing because this would have positioned the reflectors more accurately and would have sharpened the fault breaks considerably.

Interpreted truncated portions of the lines were displayed on paper sections in the data room. The data appeared to have been displayed in SEG Normal Polarity for acquisition (where an increase in acoustic impedance is recorded as a negative number and displayed as a trough on the seismic data.) The Projection System used was Pulkovo 1942. The interpretations appear to have been performed using Petrel software at Geoprime.

Table 1 List of 2D Seismic Lines available in data room

Reprocessed Line Name	Original Line Name	Survey Number / Year	Receiver Spacings (m)	Shot Point Interval (m)	Near Offset (m)	Far Offset (m)	Fold	Sample Rate (msecs)
07900011	79.90.11	86,90/07-08	25	50	12.5	3187.5	64	2
80030024	80.03.24	3/80-82	60	120	600	3420	12	2
80030025	80.03.25	3/80-82	60	120	600	3420	12	2
80030026	80.03.26	3/80-82	60	120	600	3420	12	2
80030027	80.03.27	3/80-82	60	120	600	3420	12	2
08900012	08.90.12	86,90/07-08	25	50	12.5	3187.5	64	2
08900038	08.90.38	86,90/07-08	25	50	12.5	3187.5	64	2
90010014	90.01.14	1,3/90-92	30	60	120	2970	24	2
90010015	90.01.15	1,3/90-92	30	60	120	2970	24	2
90010016	90.01.16	1,3/90-92	30	60	120	2970	24	2
90010018	90.01.18	1,3/90-92	30	60	120	2970	24	2
90010035	90.01.35	1,3/90-92	30	60	120	2970	24	2
91010019	91.01.19	1,3/90-92	30	60	120	2970	24	2

91010020	91.01.20	1,3/90-92	30	60	120	2970	24	2
91010021	91.01.21	1,3/90-92	30	60	120	2970	24	2
07900010	79.90.10	86,90/07-08	25	50	12.5	3187.5	64	2

The truncated seismic lines were displayed on paper sections vertically from 100 msec to 3600 msec TWT and with a horizontal scale of 1:50,000. (Figures 3 & 4.) The data quality appeared to be good down to about 2400 msec TWT (which covers the Jurassic and Uppermost Palaeozoic sections) on the two older surveys and good down to around 2600 msec on the 2007-2008 data. However the data quality degraded quickly below these TWTs on all three surveys and appeared to be mostly noise below 3000 msec TWT. (This may represent Basement Formations.)

Table 2 List of Horizons picked on the 2D Seismic Data

Horizon Name	Seismic Pick	Approximate TWT on 2D Seismic Line 07900011 (msec)	Formation
V	Strong Peak	320	Jurassic
IVb	Zero crossing	480	Jurassic
III	Strong Trough	1250	Jurassic
IIb	Weak Zero crossing	1750	Jurassic
IIa	Zero crossing	1950	Jurassic
F2	Variable	2200	Base Jurassic / Top Palaeozoic Unconformity
D3	Strong Peak	2220	Devonian
D2-2V	Zero crossing	2250	Devonian
D2-2	Variable	2400	Devonian
D2-1	Weak Variable	2480	Devonian
D1	Weak Variable	2650	Devonian

Eleven separate seismic horizons had been picked on the 2D seismic data. Five horizons were picked within the Jurassic section, five within the Devonian section and one horizon at the Base Jurassic / Top Palaeozoic Unconformity. These are listed in Table S2.

The picked seismic horizons were reasonably strong and clear from Horizon V down to Horizon D2-2V (Jurassic to Uppermost Palaeozoic) and could be mapped with confidence across the different vintages of seismic data. However the strength of the mapped horizons weakened quickly from D2-2 down to D1 (Devonian.) This occurred on all three vintages of data with the oldest surveys having the poorest quality imaging.

Horizons shallower than 2000 msec TWT appeared to be unfaulted. However from 2000 to 2600 msec TWT there was clear evidence of faulting. (This corresponds with the interval from IIa (Jurassic) to D1 (Devonian.)) An attempt had been made by Geoprime to pick faults on the seismic data. However no attempt had been made to correlate the faults across adjacent seismic lines and hence none of Geoprime's structural maps showed fault patterns. In addition, because no attempt had been made to correlate them, some of the faults marked on the seismic sections may have been oriented incorrectly. The faults are very important in

Table 3 List of Maps in the Geoprime Report

Label Number	Horizon	Scale	Time or Depth
1	IIa	50,000	Depth
2	F2	50,000	Depth
3	Ia	50,000	Depth
4	Ib	50,000	Depth
5	IIb	50,000	Depth
6	III	50,000	Depth
7	IVb	50,000	Depth
8	V	50,000	Depth
9	IIa	50,000	Time
10	F2	50,000	Time
11	Ia	50,000	Time
12	Ib	50,000	Time
13	IIb	50,000	Time
14	III	50,000	Time
15	IVb	50,000	Time
16	V	50,000	Time
17	D1	50,000	Depth
18	D2-1	50,000	Depth
19	D2-2	50,000	Depth
20	Summary of Depth Maps	133,500	Depth
21	Play Map (Jurassic)	50,000	Depth
22	Play Map (Palaeozoic)	50,000	Depth
23	Well Correlation (P1, P2, P3 & P4) Jurassic	n/a	Depth
24	Well Correlation (P1, P2, P3 & P4) Jurassic / Palaeozoic Boundary	n/a	Depth
25	Well Correlation (P1, P2, P3 & P4) Deep Palaeozoic	n/a	Depth
26	Play Summary Map	50,000	Depth

The maps generated by Geoprime are listed in Table 3. Time structure maps had been generated for Horizons Ia & Ib. However these horizons were not marked on the paper sections of seismic data so it was not clear as to which events were picked. No time maps were generated for Horizons D1, D2-1, D2-2 or D3. However depth maps were generated for these horizons except D3.

2.2 VSP / Checkshot Data

VSP surveys appear to have been acquired in Wells P-2 and P-4 located within the concession. However no actual VSP displays were available in the data room, only the time/depth listings from each survey. Geoprime had crossplotted these together with time/depth data from five additional nearby wells. (Figure 5.)

The crossplot shows a smooth increase in velocity with depth down to the Base Jurassic / Top Palaeozoic Unconformity at around 3000 m TVD (2200 msec TWT) at which point there is an abrupt increase in velocity into the Palaeozoic section.

The following time/depth function was derived from the data by Geoprime.

$$\text{Depth} = 27.86173 - 1.08544 \times T + 0.00017 \times T^2 - 1.5671E-7 \times T^3$$

It is understood that Geoprime used this depth conversion function to depth convert the time structure maps. This was probably sufficiently accurate for the current exploration purposes. However future detailed depth mapping would probably benefit from a two-layer depth conversion approach, with one function from surface to the unconformity and a second function from the unconformity to the deep Palaeozoic.

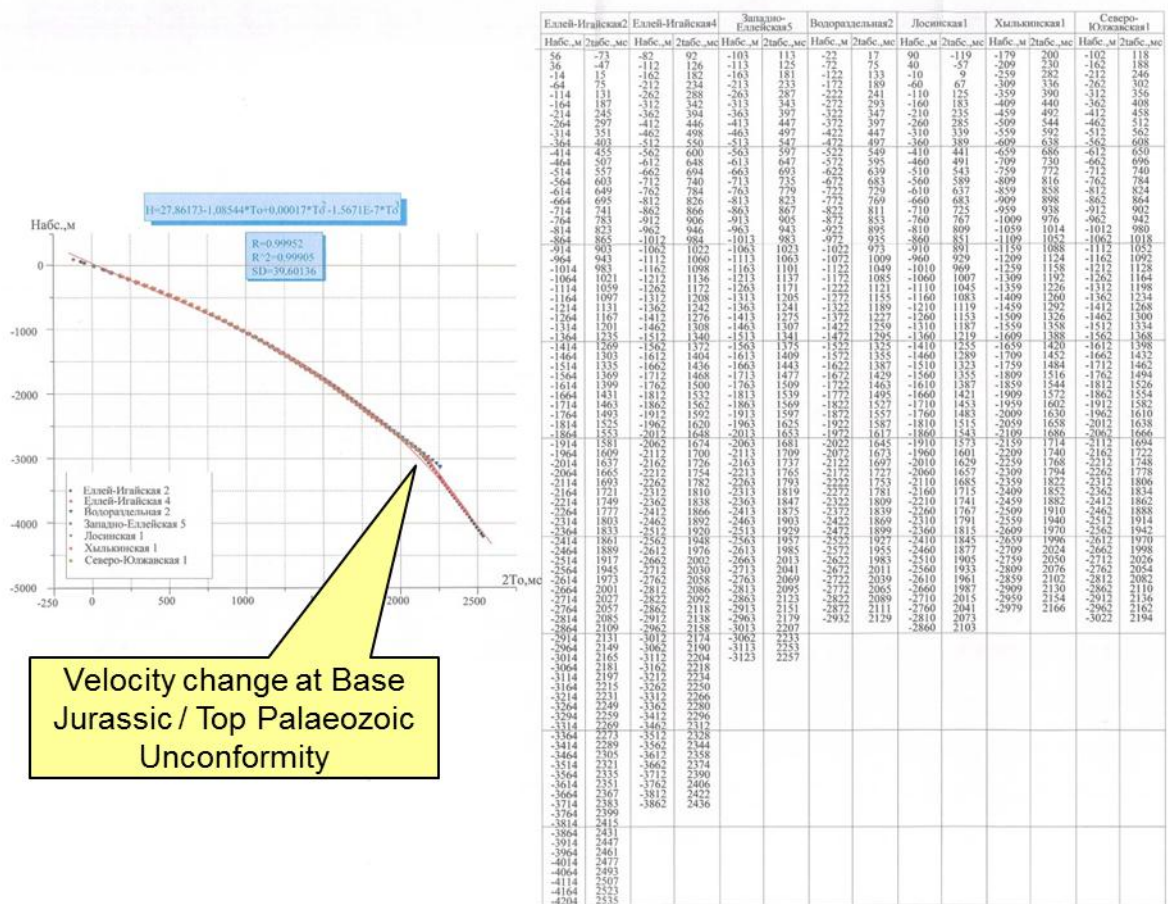


Рис.3.16 График зависимости Набс. от T(д.п.=0) по данным сейсмических каротажей. Лицензионный участок № 71-1 (Еллей-Итайский)

Figure 5 Crossplot of time/depth data recorded in Wells P-2 and P-4 and five nearby wells. The pronounced kink in the plot at 3000 m TVD (2200 msec TWT) corresponds with the Base Jurassic / Top Palaeozoic Unconformity.

2.3 Structural Maps in Block 71-1

There are five key maps which highlight both the structure and the hydrocarbon trapping potential of Block 71-1. These are as follows:

Horizon D1 (Devonian)

Horizon D1 is the deepest horizon mapped by Geoprime (Figure 6.) It shows a broad NE-SW trending anticline which climbs from around -4400 m TVDss in the SW to around -4000 m TVDss in the NE. Wells P-2 and P-4 are positioned on a localised high, the crest of which appears to be within the triangular boundary of Block 71-1 (at the proposed location for Well P-7.)

Horizon D2-1 (Devonian)

Horizon D2-1 (Figure 7) also shows the same broad NE-SW trending anticline which climbs from around -3900 m TVDss in the SW to around -3700 m TVDss in the NE. At this level Wells P-2 and P-4 are located within a NW-SE trending saddle. However there appears to be closure at the proposed location for Well P-7.

Horizon D2-2 (Devonian)

Horizon D2-2 (Figure 8) differs from the two deeper horizons because it suggests that the NE-SW trending anticline is really part of a much larger NW-SE trending horst block. This becomes more apparent when the fault trends are mapped. (This was done in the data room using the paper sections of 2D seismic data.) The main fault trend is NW-SE. However some of the structural highs appear to be offset in a NE-SW direction suggesting that there is a secondary (orthogonal) fault trend which is not being picked up on the 2D seismic data.

Horizon D2-2 is the closest in depth to the Devonian hydrocarbon-bearing zones encountered in the wells. It is likely that the two intersecting fault trends govern the formation of the structural traps in the area. At this level Wells P-2 and P-4 appear to be within a small graben located in an area where two major faults meet. Therefore, in the low case, the hydrocarbons present in the wells maybe restricted to within this small downfaulted area. However in the high case they may be present throughout the entire area of Block 71-1 within fractured Devonian Limestones. The ultimate closure is not defined on the current mapping but would probably be in the area to the NE, updip from Block 71-1.

Horizon F2 (Base Jurassic / Top Palaeozoic Unconformity)

Horizon F2 (Figure 9) shows a NE-SW trending low relief anticline structure which climbs from around -2900 m TVDss (within Block 71-1) to around -2820 m TVDss in the area to the East of well P-1. The map suggests that much of the faulting observed within the Devonian does not permeate into the overlying Jurassic section and therefore must pre-date it.

However seismic lines 90010018 and 90010019 both show a small NW-SE trending fault, located close to the Eastern boundary of Block 71-1, and which downthrows to the SW. The throw of this fault maybe sufficient to form a closure within the nose located in the area of proposed Wells P-6 and P-7.

Horizon IIa (Jurassic, near Base Kimmeridge Formation)

Horizon IIa is close to the base of the Kimmeridge Formation. The structure at Horizon IIa (Figure 10) is very similar to the structure within the underlying unconformity surface. There is a nose with closure down to -2490 m TVDss around proposed Wells P-6 and P-7. This would rely on seal from the NW-SE trending fault which runs just to the East of the Block 71-1 boundary. The throw of this fault could be sufficient to trap hydrocarbons within thin Jurassic sands at this level, possibly as far as Wells P-2 and P-4.

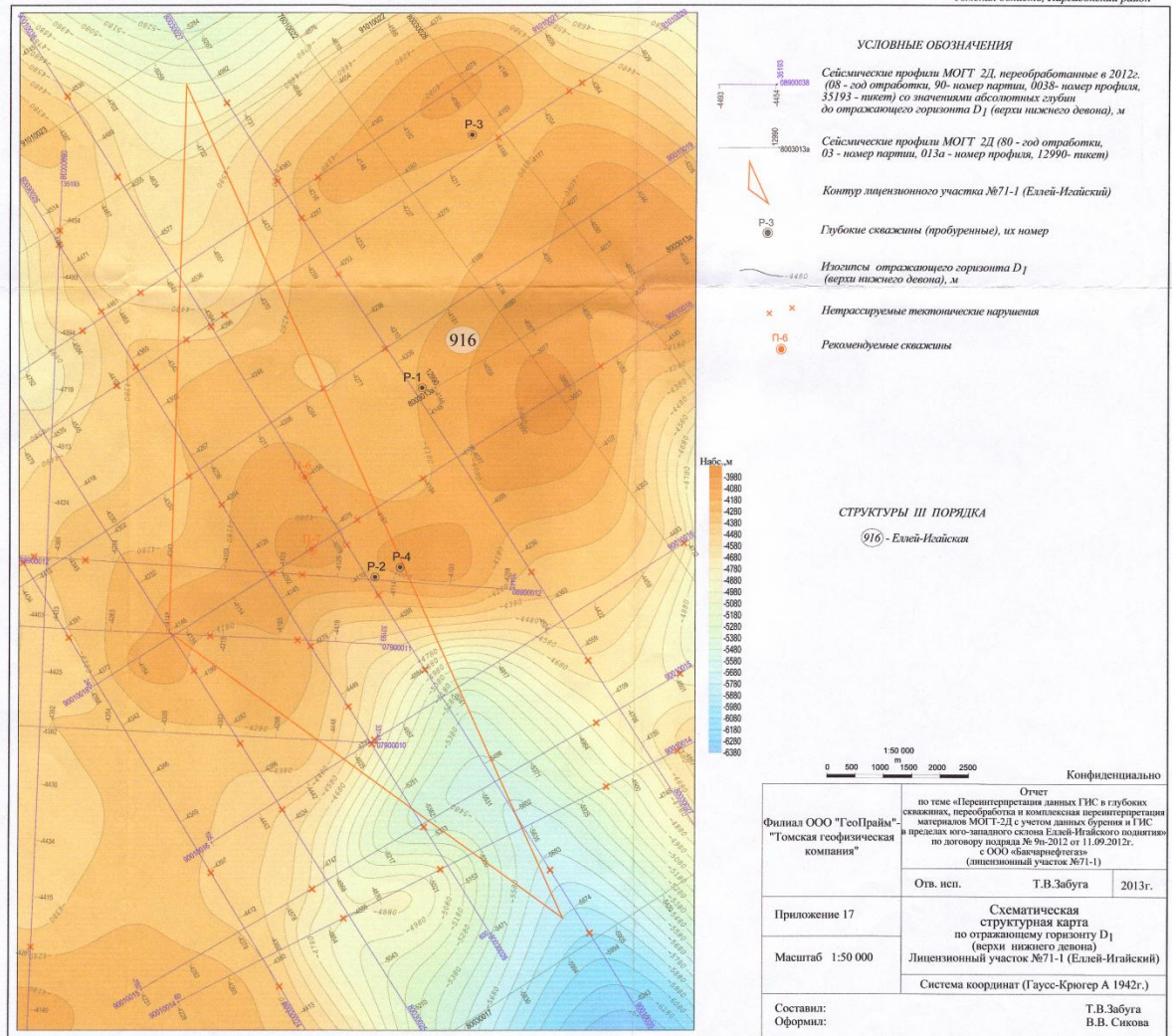


Figure 6 Depth Structure Map for Devonian Horizon D1. This was the deepest horizon mapped by Geoprime and shows a broad NE-SW oriented anticlinal structure.

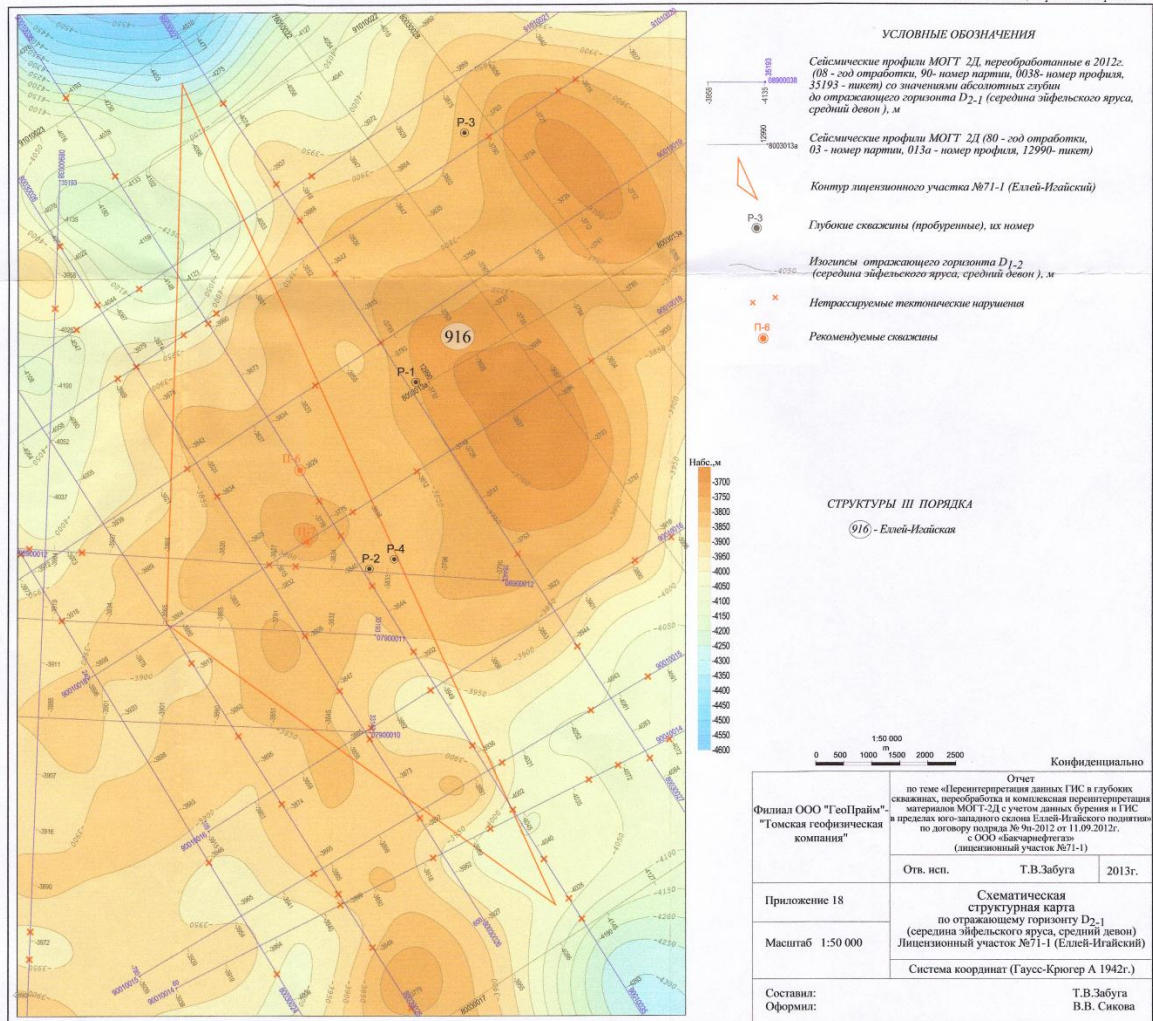


Figure 7 Depth Structure Map for Devonian Horizon D₂₋₁. The NE-SW oriented anticlinal structure seen in underlying Horizon D₁ is visible at this level.

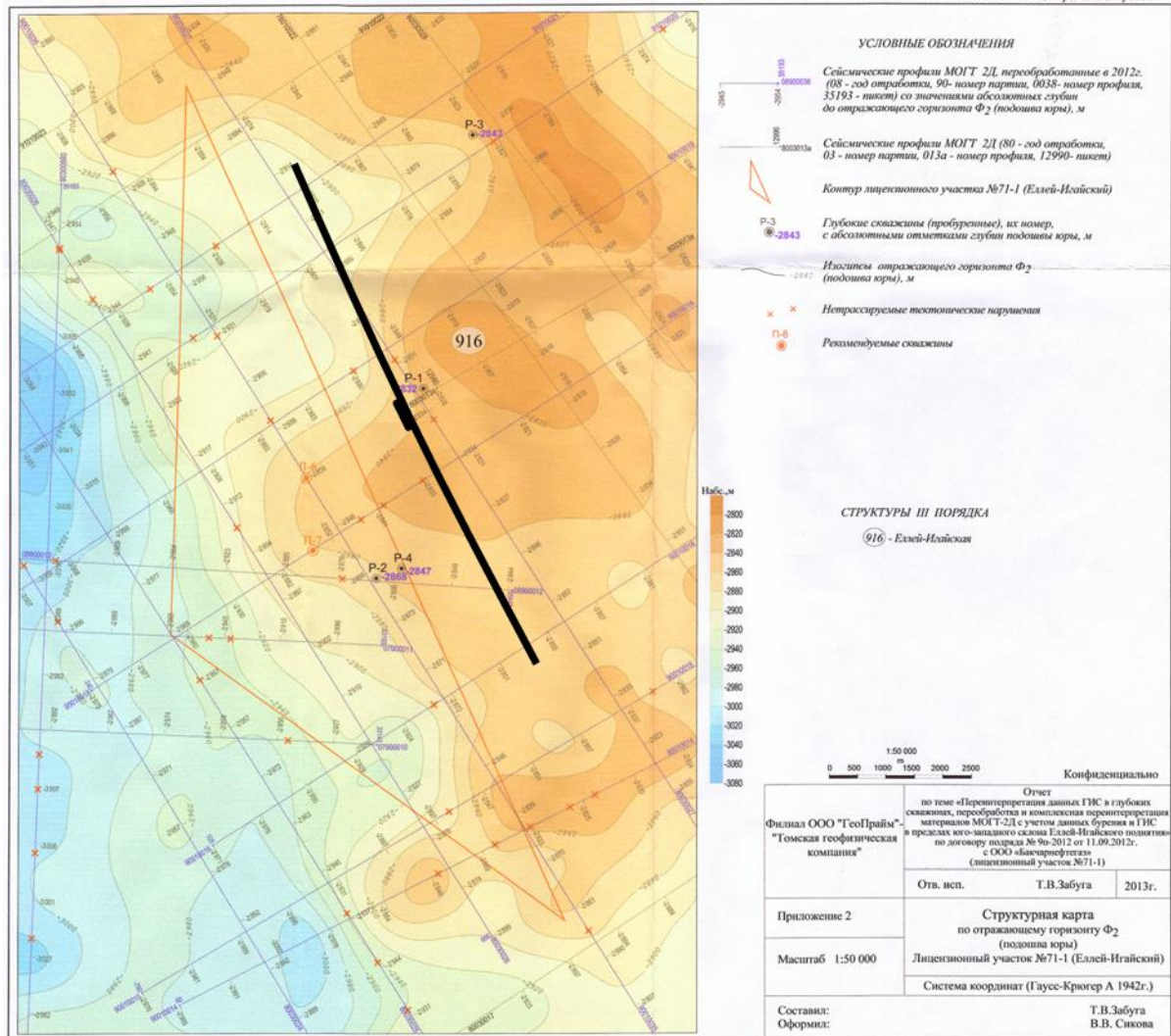


Figure 9 Depth Structure Map for Horizon F2. This is the Base Jurassic / Top Palaeozoic Unconformity. The extensive faulting visible in the underlying Devonian section is much reduced at this level although there is a NW-SE trending fault located to the NE of Block

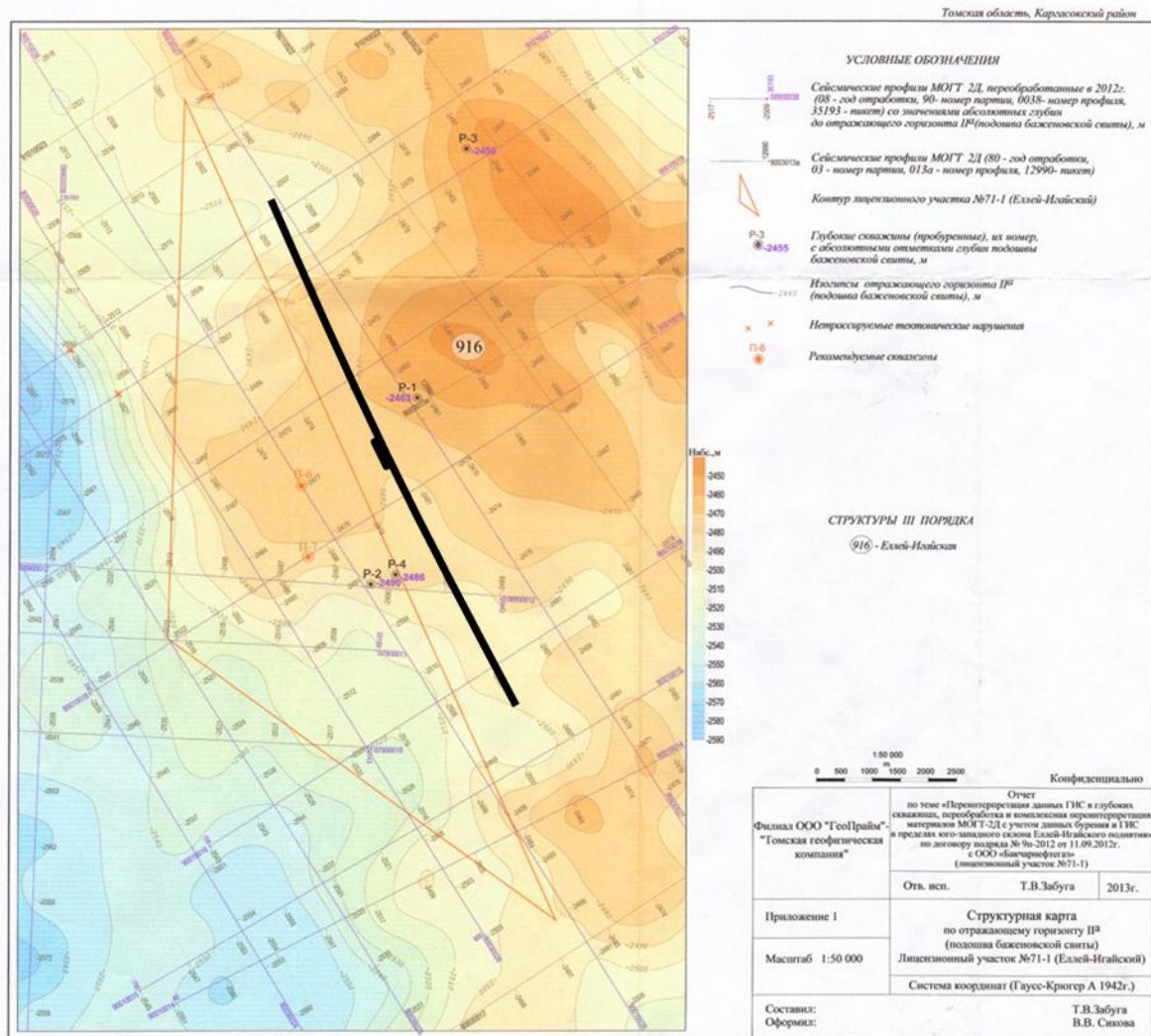


Figure 10 Depth Structure Map for Jurassic Horizon IIa. This horizon, which is just below the Base Kimmeridge Formation, is the closest in depth to the Jurassic hydrocarbon-bearing zones encountered in the wells and therefore is probably representative of the structural distribution of the Jurassic trap

2.4 Geobodies

The Geoprime Report includes a resource estimate of hydrocarbon volumes in Block 71-1 based upon the supposed identification of intra-Devonian stratigraphic structures which, in this report, are referred to as geobodies. Four main geobodies were identified by Geoprime and labelled I, II, III & IV. Their locations are shown in the map in Figure 11.

1. Geobody I: This is the deepest body and is located around wells P-2 and P-4 on the isopach map between horizons D1 and D2-1. The reservoir is the permeable zone at the bottom of the Devonian Eifel Formation.
2. Geobody II: Located on the isopach map between horizons D2-2 and D2-1. The reservoir is the permeable zone in the middle of the Devonian Eifel Formation.
3. Geobody III: Located on the isopach map between horizons D2-2 and D2-1. The reservoir is the permeable zone at the top of the Devonian Eifel Formation.
4. Geobody IV: This is the shallowest body. It is located on the isopach map between horizons D2-2V and D2-2. The reservoir is the Zhivetsky suite of the Middle Devonian rocks plus the Francian suite of the Upper Devonian rocks.

The exact nature of these geobodies and how they were mapped is unclear. The report states that they were identified by seismic facies on the seismic data and mapped out accordingly. In the data room this issue was discussed with the Chief Geologist and it was stated that Geoprime had been trying to use variations in seismic character to identify reefs and inter-reef zones on the seismic data.

It is possible that Geoprime may have attempted to use the Geobody imaging software in Petrel to identify them. However this software was designed primarily for use on 3D seismic data only. It would be difficult to use on mixed-vintage 2D seismic data partly because of the wide separation of the lines and partly because the stratigraphic structures would be imaged with different levels of quality (due to fold differences) and with slightly different characteristics for each of the surveys. (For example the amplitudes of the same horizon would be different on each survey and therefore it would not be possible to generate contour maps based upon seismic amplitude.)

There was no evidence of seismic facies mapping in the Geoprime Report. Line 90010035 is the only seismic line on which the geobodies have been marked. However it is not convincing because the highlighted geobodies are shown on the conventional seismic data and they do not show any distinguishing seismic characteristics. If the outlines were removed it would not be possible to differentiate the geobodies from the surrounding seismic character and thus it would be difficult to identify them on the seismic line.

There was separate report in the data room on Biohermal Traps by V. A. Benenson et al which appears to have been an earlier attempt to use seismic data to identify facies variations within both the Jurassic and Devonian sections. The report states that "*Seismostratigraphic analysis was performed on time and depth sections, taking into account variations in the intensity of seismic phases, the specificity pattern of seismic records and dynamic characteristics.*"

An example from the report of 2D seismic line 90010019 is shown in Figure 12. The interpreted geological facies variations based upon supposed seismic character are shown below. However close inspection of the seismic data suggests that the relationship between seismic character and interpreted facies is not convincing.

In order to obtain information on facies and rock properties from seismic data (and to highlight geobodies) it would be normal practice to perform inversion processing of the seismic data. This would involve taking the impedance strengths of seismic traces at the wells and (using the well data) calibrating them to a parameter such as porosity. (For example an increase in seismic amplitude might be found to correspond with increase in porosity.) The processing would then be run in reverse (or inverted) whereby the calibrated porosity would be used to convert all the seismic traces in the 2D line back to porosity. In this way the seismic impedance will have been converted into porosity values. The porosities would be displayed by superimposing them as colour variations over the seismic traces. If significant variations were present then they would be highlighted.

However there is no evidence of inversion processing of the seismic data in the report. Furthermore the inversion processing works best when there are significant variations in porosity. The wells data suggests that the porosity of the Devonian limestones in this area is low (around 4%.) Coupled with their depth (3000 m) it would be difficult for the 2D seismic imaging method to detect reliably any porosity variations within a formation with such tight parameters.

The only evidence of any special processing is an Instantaneous Phase plot of 2D Seismic Line 089000012 (made using a Hilbert Transform) through Wells P-2 and P-4. (Figure 13.) Instantaneous Phase plots are independent of seismic amplitude and thus are used to highlight continuity and

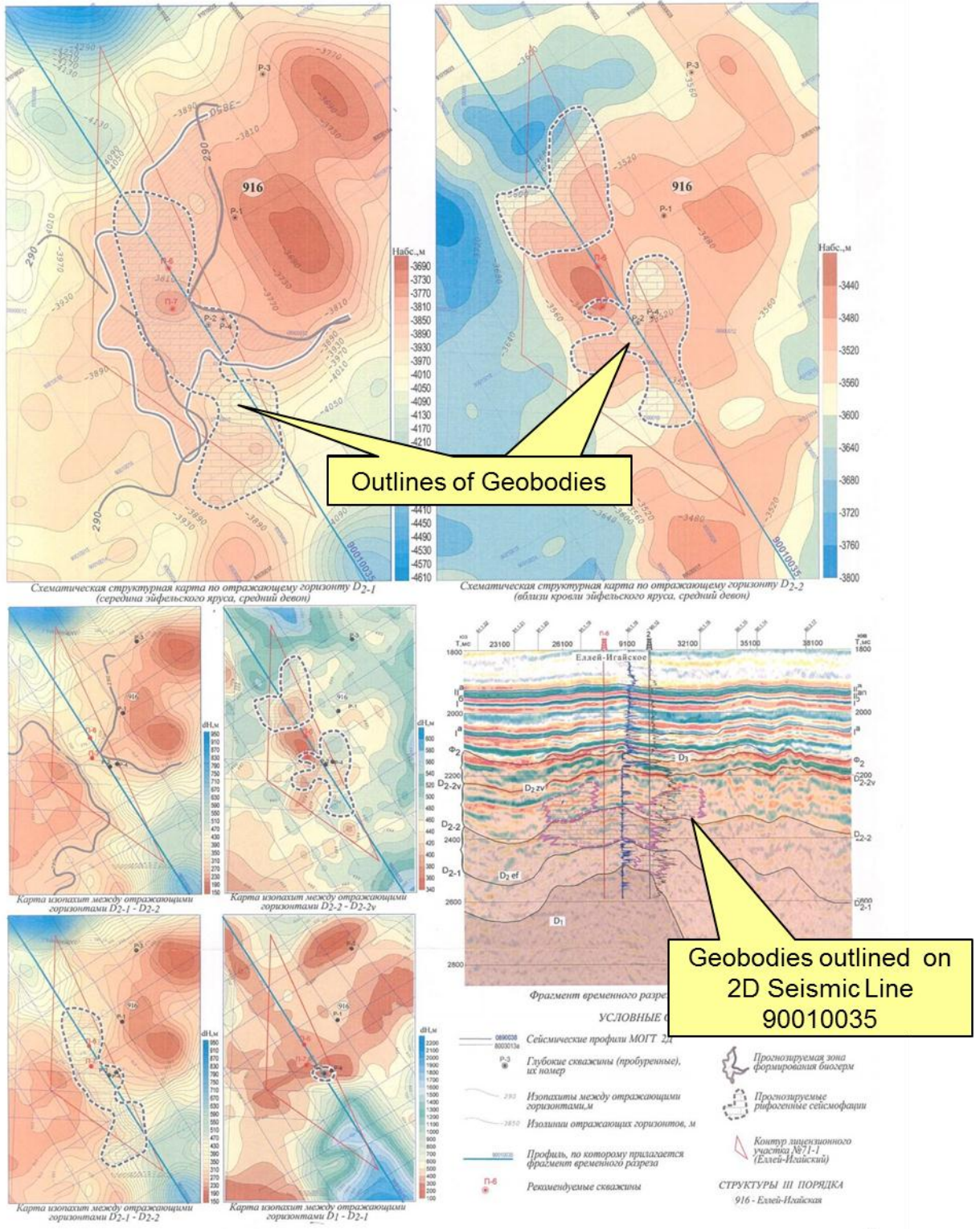


Рис. 4.15 Прогноз распространения коллектора в доюрских образованиях (герасимовская свита, средний девон)

Figure 11 Summary Maps and 2D Seismic Line 90010035 showing the locations and seismic expression of the stratigraphic closures (Geobodies) which were used by Geoprime to calculate hydrocarbon volumes.

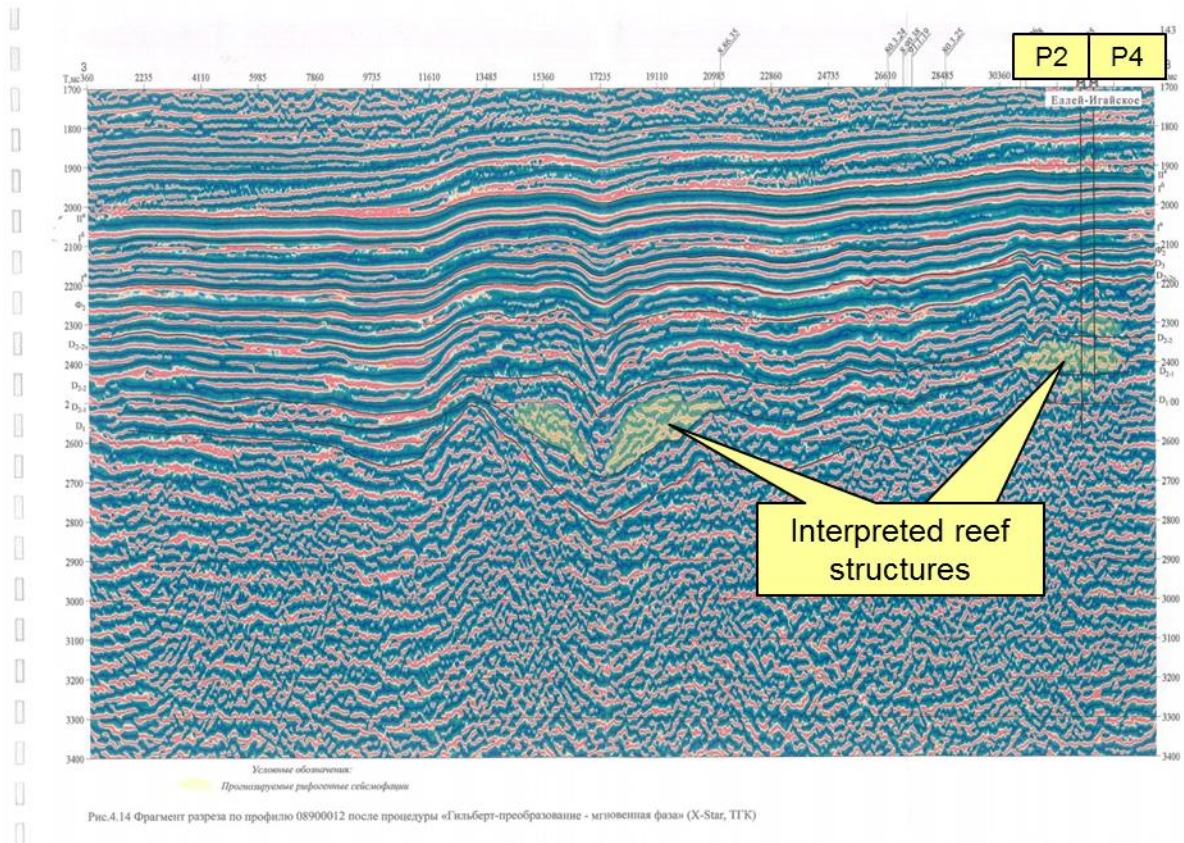


Figure 13 Instantaneous Phase plot of long version of 2D Seismic Line 089000012 through Wells P-2 and P-4. Geoprime have highlighted in yellow potential Devonian reefs.

discontinuities in surfaces. For these reasons they are good at highlighting both continuous bedding surfaces and fault breaks.

Geoprime have highlighted potential Devonian reefs in a yellow colour on the Instantaneous Phase plot. However we consider this interpretation might be subjective because it is not made clear which seismic characteristics are being used to define Devonian limestone reefs. If the yellow colour is removed there is not much on the seismic data to distinguish these areas from any other areas.

The overall conclusion that can be drawn is that the identification of Devonian limestone reefs on seismic data has not been proven in the Geoprime Report. This does not mean that the reefs do not exist, but only that the current 2D seismic data does not have the quality to demonstrate their presence. In addition Geoprime appear to have ignored the faults within the Palaeozoic section. The reefs, if they exist, would be faulted and this would have a major effect on hydrocarbon resource estimates. Therefore it is recommended that revised hydrocarbon resource estimates for Block 71-1 should be based upon structural maps rather than stratigraphic geobodies.

3 GEOLOGY

3.1 Structure

Block 71-1 is located in the south of the West Siberian Basin (WSB) which is a prolific oil and gas producing province. It is situated in the Nyurolski Sub-basin which is somewhat unusual in that:

- the Palaeozoic has the lowest level of thermal maturity for the WSB (Fomin, 2004, quoted in Blackburn report), and
- a biomarker study indicates that many of the oils hosted by fractured Palaeozoic reservoirs have been generated from Palaeozoic marine source rocks (Kostyreva, 2004, quoted in Blackburn report) in contrast to the predominantly Jurassic sourced oils found in most of the WSB.

The Devonian in block 71-1 appears to be shallowly dipping on seismic sections although some major faults are present and some of these appear to have been active during sedimentation. The dominant fault trend in the Devonian is NNW. A subsidiary NE fault trend is also found in this region (Figure 14) and the interaction between these two fault sets may be responsible for the main structural feature of block 71-1, a structural nose plunging to the SW. This feature is also seen in the overlying Jurassic.

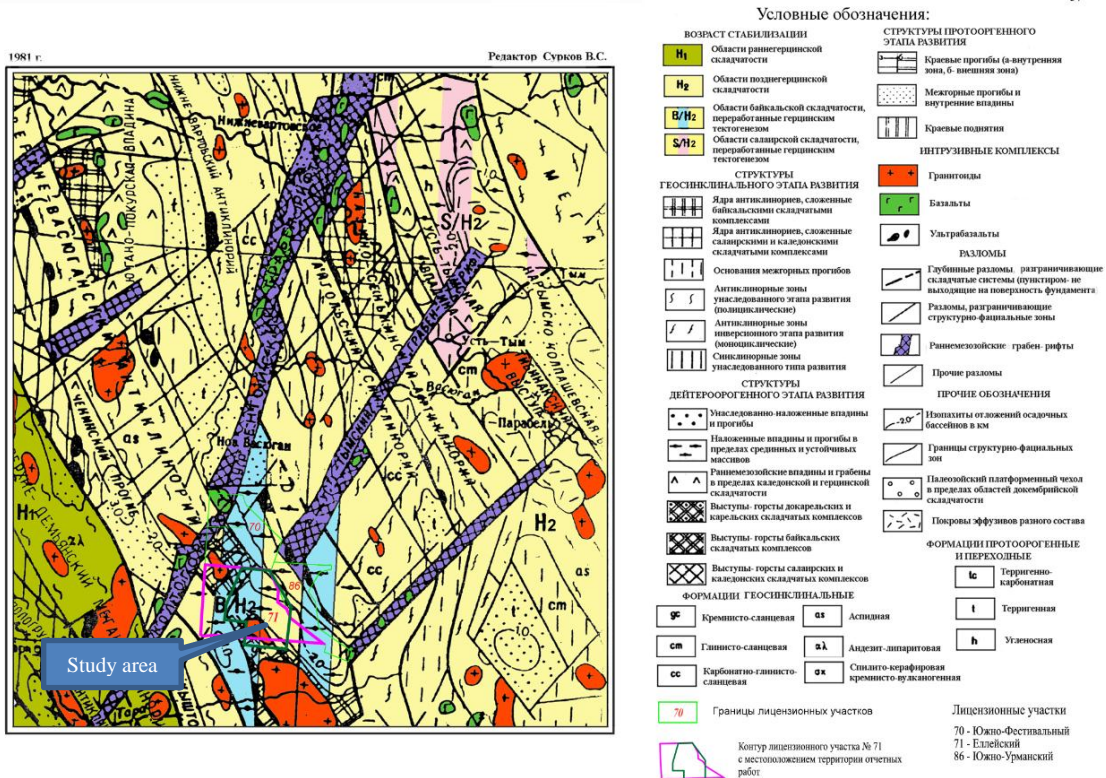


Figure 14 Structural elements map

Low angle truncations of intra-Devonian horizons are apparent at the base Jurassic unconformity in block 71-1 but much more complex structuring, including thrust faults and recumbent folds, has been indicated in the Palaeozoic on structural cross sections of the Ostaninsk, Urmansk, Lower Tabagan and Maloichsk Fields by Danilkin (2005, also shown in Blackburn report). These indicate that a major tectonic event occurred in the late

Palaeozoic but it is possible that the most intense deformation is localised, may be on major shear zones. Carboniferous to Permian strata are absent from the study area.

Following the late Palaeozoic deformation, uplift and erosion a major episode of rifting and volcanism began in the latest Permian and continued during the Early and Middle Triassic. These Triassic grabens have a predominantly NNE trend in the southern WSB but none is present in the study area. By the Late Triassic, deposition had largely overstepped the rift margins and was taking place over a wide area of the northern WSB (Blackbourn report).

Jurassic and younger horizons are gently dipping and largely unfaulted in the study area. A major structural high exists to the NE of block 71-1 which is not fully defined on the maps supplied by the operator. This extends into a structural nose that plunges to the SW through the centre of the block. A NNW trending fault cuts the coaly Jurassic sediments just to the NE of the block.

Although the EI discovery lies on the structural nose and the Jurassic shales are likely to provide the top seal for the Weathering Crust and the Devonian carbonates, the trapping mechanism for the hydrocarbons in the latter has not been defined either by the operator or during this evaluation. Therefore the gross rock volume of the Devonian accumulation is very uncertain and we have dealt with this by using wide ranges for both the area and pay thickness in our volumetric estimates.

3.2 Stratigraphy and Lithologies

The stratigraphy is based mainly on information posted on summary logs. No supporting biostratigraphic data was supplied and no detailed regional review or correlation has been carried out during this study. A stratigraphic summary chart is provided by Figure 15

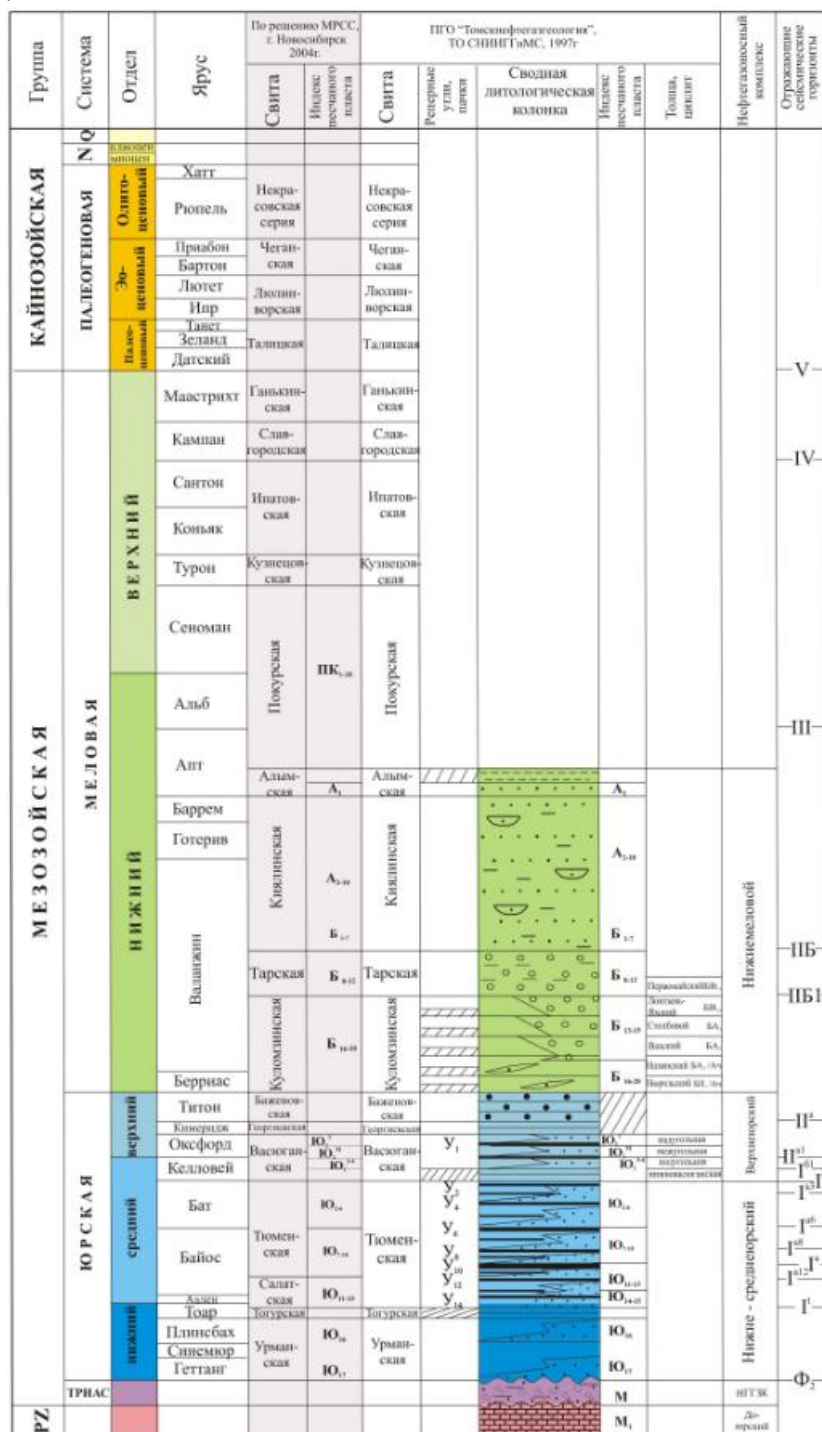


Figure 15 Stratigraphic summary chart with seismic horizons

A large number of short cores were taken from the wells and brief descriptions (as text only) of cores and thin sections were available from the final well reports but the actual samples have been lost. It is unclear whether the depths of core samples have been adjusted to log depths but this seems unlikely.

Jurassic

The studied Jurassic interval in the two wells is over 360 m thick and consists mainly of shale interbedded with lesser amounts of sandstone and coal. Sandstones are most easily identified by their low SP response and it should be noted that their GR response is only slightly lower than that of the interbedded shales. The high GR response of the sandstones may be due to an abundance of detrital K-feldspar, mica and/or clay but this issue could not be fully investigated because of the lack of drilled cores. Coals were identified by their long interval transit times, $DTC > 300 \mu\text{s/m}$ and low GR responses. The thickest sandstones, at 2758-2798 m MD in EI-2, occur towards the top of a "cleaning-upward" SP log profile and have blocky SP log profile. The thickest is 22 m but is water bearing.

Thinner, apparently oil bearing sandstones according to the operator's evaluation, labelled J1-2 and J1-(3+4) on summary logs, occur towards the top of the studied Jurassic interval, between 2640 m and 2670 m in both wells. They are typically 1-3 m thick. These sandstones are quite close to the seismic horizon IIa which corresponds to the contact between the shales, coals and sandstones and the overlying radioactive, low velocity, Jurassic shale and source rock.

The presence of coals in this interval suggests a low lying, non-marine to marginal marine, possibly deltaic depositional environment.

Triassic

A "weathering crust" occurs between the Jurassic shales and the Palaeozoic carbonates. This is 15 m thick in EI-2 and 6 m in EI-4. There is some uncertainty about:

- How the interval is recognised lithologically and on downhole logs
- What lithologies it contains
- What its reservoir potential is

However, it is clear that:

- there is a major unconformity, representing a time gap of ~175 Ma, between the Jurassic and the Devonian,
- the base Jurassic seismic horizon, Φ_2 , is rugose, suggesting that the Devonian was not planed off at the surf zone during a marine transgression immediately prior to Jurassic sedimentation,
- lower part of the Jurassic interval was deposited in a non-marine or marginal marine environment.

Cores from EI-2 give some indication of the range of lithologies that may be present in the weathering crust, however, note that it is uncertain whether the core depths have been corrected to log depth or not, i.e. these samples may actually come partly or wholly from the Jurassic.

Core from 3006-3011 m in EI-2 contains variably textured gravel and greywacke, with clay and silt matrix. Thin sections from the same interval indicate:

1. heavily fractured, cherty sandstone with up to 90% cherty cement,
2. shale,
3. effusive volcanic rock, i.e. lava,
4. sideritic siltstone, siderite forms rosettes 2 mm in diameter

Core from 3011-3012 m in EI-2 contains sandstone and medium grained greywacke, with clay and silt matrix. A thin section from the same depth was described as a cherty, sideritic siltstone with some quartz grains.

These data suggest that the weathering crust in EI-2 consists of a wide range of rock types, most of which have little reservoir potential, apart from the gravel. The local occurrence of gravels in this interval is one possible explanation for the blow-out from this interval in EI-4. No sample or description was available for the weathering crust in EI-4 and the downhole log responses over the relevant interval are unreliable because a large cavity produced during the blow-out was filled with cement.

It seems likely that irregular karstic topography is preserved at the top of the Palaeozoic carbonates. The weathering crust includes a diverse assemblage of rock types and it may thicken into depressions and possible sink-holes in the top Palaeozoic unconformity, however, the prediction of potential reservoirs in this zone is problematic.

Devonian

Both wells reached total depth in Devonian carbonates. EI-2 penetrated ~1477 m of Upper, Middle and Lower Devonian rocks whereas EI-4 penetrated ~1099 m of the Middle Devonian only. A correlation (Pril_22) appears to correlate D3 (=Frasnian=Upper Devonian) in EI-2 with D2 (=Givetian=Middle Devonian) in EI-4, suggesting that there is some uncertainty in the biostratigraphic zonation of these wells. The radioactive carbonates found at ~3200-3350 m MD in EI-2 do not appear to be present in EI-4 and there is evidence of truncation of intra-Devonian horizons on the seismic lines. However, it was not possible to produce a convincing correlation and subdivision of the Devonian interval during this brief study.

Cores, thin sections and logs from the Devonian indicate that it consists mainly of limestones, with subordinate amounts of spilite (i.e. altered basic lava), dolomite, shale and siltstone. The distinction of lithologies based on log responses is difficult, partly because of the limited range of available logs, e.g. there is no PEF log to distinguish the dolomites from the limestones and locally because of poor hole condition. Cleaning upward sequences, 50-100 m thick, can be seen on the GR log. In EI-2 the limestones are described as:

- fine to medium grained,
- locally recrystallised,
- locally dolomitic, in some cases associated with brecciated zones. It is difficult to estimate the proportion of dolomite in the formation because no PEF log is available.
- locally brecciated, fractures are commonly cemented by bitumen and calcite. Open fractures were reported at 3419.1-3422.5 m and 3255-3258 m.
- locally siliceous,
- locally black and bituminous, the bitumen commonly occurs in fractures,
- locally bioclastic with algae, foraminifera, corals and stromatoporoids. Stromatoporoids and corals were only recorded between 3370 m and 3871.4 m (Middle Devonian, D2, Givetian and Eifellian),
- locally weathered and associated with a red substance (e.g. 3756.9-3764.5 m, 4287-4294 m, 4089.5-4095 m).

Note that no open pores, apart from a few open fractures, were reported from the cores and thin sections in EI-2.

In the same well the spilite is described as:

- greenish brown, greenish grey,
- commonly carbonaceous, which suggests that it has been impregnated with bitumen,
- locally bituminous, locally occurring in cavities,
- locally fractured,
- pyritic, with other ore minerals, "luminous" clays and chlorite

- porphyritic and with plagioclase phenocrysts locally.

Shales and siltstones in EI-2 are:

- commonly flaky,
- locally sideritic (e.g. 3118.3-3121.2 m),
- locally black and carbonaceous (e.g. 3370-3374 m),
- locally greenish grey in a weathered zone, with a dip of $\sim 30^\circ$ (3118.8-3121 m).
- commonly “washed-out”, i.e. the caliper indicates an overgauge hole.

Lithologies were not thoroughly reviewed in EI-4 because of time constraints; however, the following observations were made:

- Fewer comments about the fossil content of the limestones than in EI-2,
- Open fractures seem to be more common than in EI-2,
- More oil odour recorded on fractures than in EI-2, deepest at 3955 m MD, -3816 m TVDSS,
- Red calcite and red clays in fractures occur down to 3955 m MD.

Depositional model for Devonian

A possible depositional model for the Middle Devonian envisages:

- A location near the edge of a carbonate platform, with the margin being defined by active faults. Seismic sections indicate a major fault ~ 2 km SE of the wells that seems to have been active during the Middle Devonian. Extensional faults may have also provided conduits for the extrusion of basic lavas (spilites) onto the sea floor.
- There is at least a possibility of reefal developments, given the presence of abundant stromatoporoids and corals in the Middle Devonian, previous interpretations of seismic sections (ref. Geoprime report and an unseen report published in the Russian oil and gas journal in 2001) and the globally widespread occurrence of reefs in shallow marine environments during the Middle Devonian. However, no convincing evidence for large (tens of metres thick) reefal build-ups has been seen during our evaluation and it possible that only small patch reefs were developed. Note that we have not been able to precisely correlate the reefs or geobodies, as identified by previous workers on seismic sections, with the well logs, i.e. we do not know where the top and base of each geobody is in each well therefore we cannot comment on whether the log responses of the proposed reefs differs from non-reefal rocks.
- The dark coloured shales and siltstones were deposited during transgressions of the platform.

Karstification and fracturing of the Devonian carbonates

There is evidence for karstification and several phases of fracturing in the Devonian carbonates although we cannot be precise regarding the timing of the events, for example. The presence of red clays and red calcite cements both indicate deposition/precipitation in oxygenated conditions but it is uncertain whether these occurred during pauses in deposition in the Devonian and/or during the long phase of non-deposition and erosion that predated Jurassic deposition. Note that in the descriptions of the cores from EI-4 the lowest record of

red calcite cement and red clay on fractures corresponds with the deepest record of oil odour, suggesting that top down karstification is important in generating the open pore system.

The red and green shales and siltstones, locally showing anomalously steep dips, may well represent internal sediments, i.e. sediments that were washed into the lithified carbonates via open fractures and caves. The collapse of caves is one possible mechanism for the generation of fractures and porous zones in the carbonates. The operator's staff did not report any bit drops while drilling that would indicate currently open caves in the two wells.

3.3 Reservoir Quality

A quick evaluation of the prospective formations was performed following this procedure:

1. Splice the logs from the two wells. Preference was given to the shallower log run in overlapping intervals. No attempt was made to normalize the responses even though there are differences in calibration between some log runs. No depth shifts were applied to the logs,
2. Import the spliced logs into Petrel,
3. Make lithology logs using the log responses, core descriptions and the client's formation evaluation logs. The following rock types were identified: sandstone, shale, coal, limestone, dolomite, argillaceous carbonate and spilite,
4. Calculate total porosity (SPOR), including bitumen, using the DTC (compressional sonic interval transit time log) for the sandstones, limestones, dolomites and spilites. If the initially calculated SPOR was less than zero, it was replaced by zero values. For the Jurassic and Triassic intervals SPOR was capped at 0.21 because the available information suggests that porosities are unlikely to be greater than 0.21,
5. For the Jurassic, a net sand cut-off of $SPOR=0.08$ was applied. This value is somewhat arbitrary and should be checked when further data, for example from core analysis, becomes available. For the Triassic and Devonian no net sand cut-off was applied,
6. Average SPOR for zones of interest were calculated.

A thorough petrophysical evaluation of the wells was beyond the scope of this study.

Jurassic Sandstones

Logs from the interval are shown in Figures 16. and 17 below.

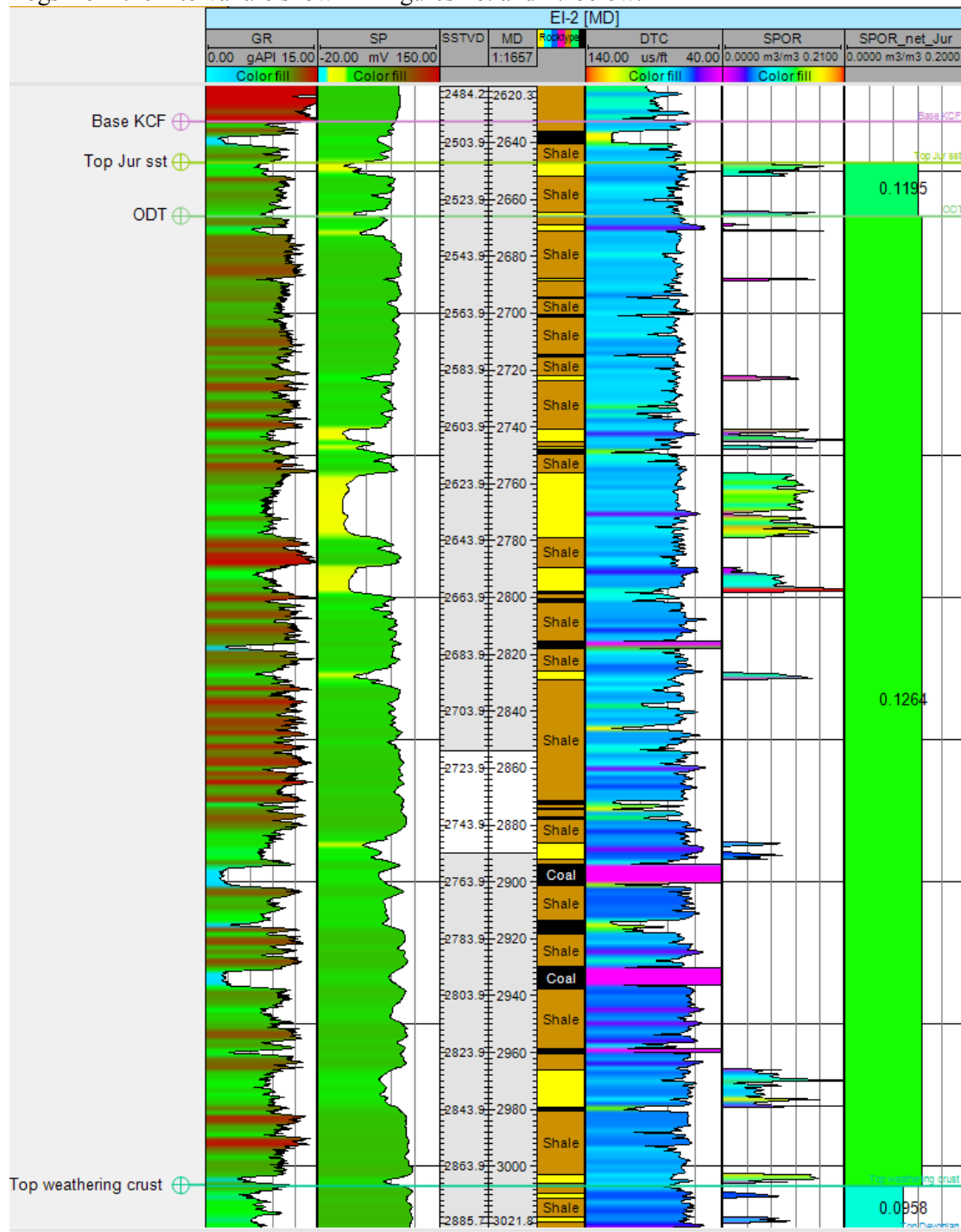


Figure 16 Logs, lithologies and SPOR (sonic derived porosities) for well EI-2

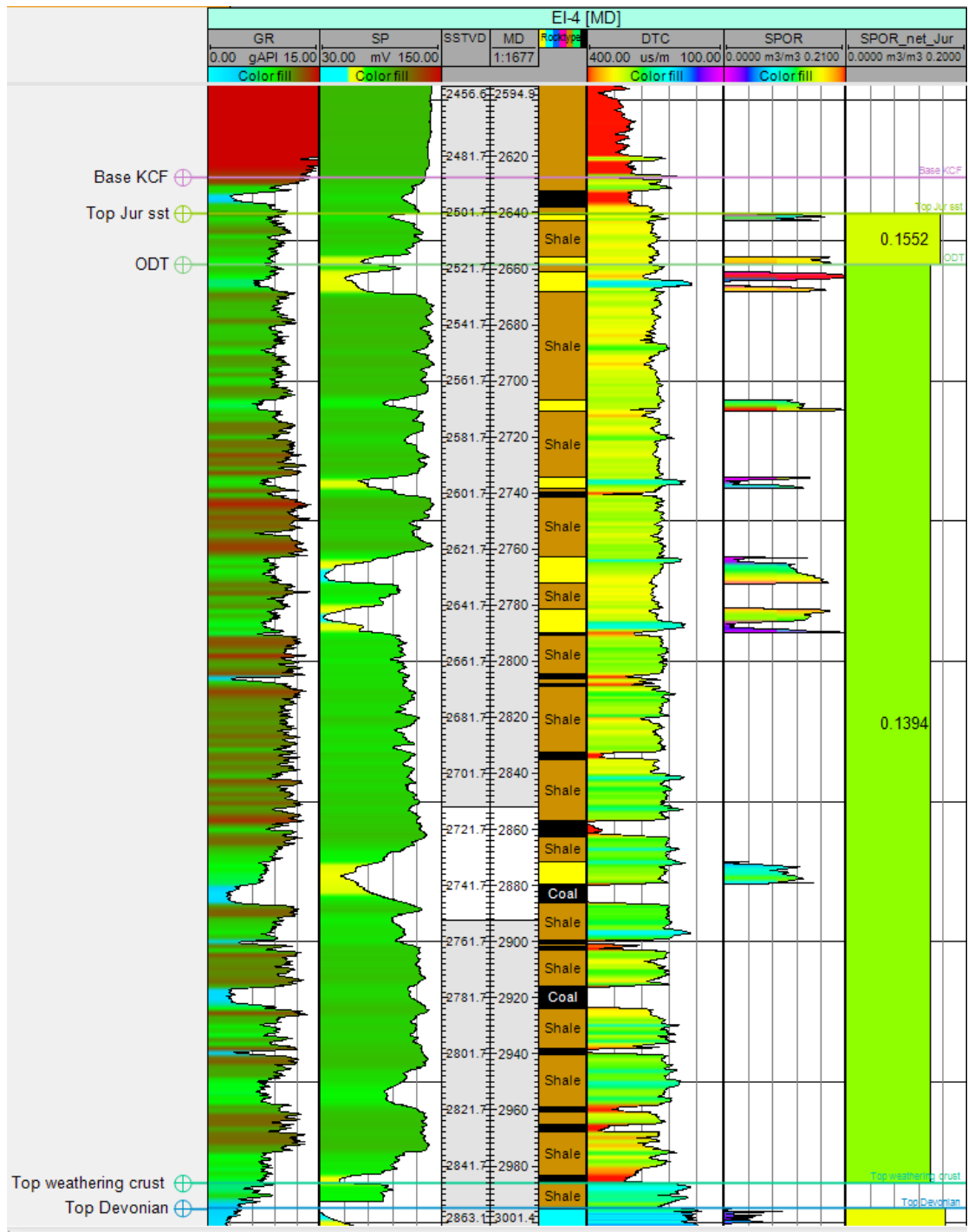


Figure 17 Logs, lithologies and SPOR (sonic derived porosities) for well EI-4

	EI-2	EI-4
Average SPOR of net pay	0.119	0.155
NTG of pay zone	0.221	0.286
Thickness of pay (m)	5.75	5.20
Average SPOR of net sand in aquifer	0.127	0.139
NTG of aquifer	0.130	0.093

For the oil saturation of the Jurassic sandstones, we have relied on the petrophysical evaluation supplied by the operator. These are in the range 53-64% but it should also be noted that:

- The sandstones could lie in the transition zone,
- Oil saturations of up to 39% have been calculated in deeper sandstones that are also recorded to be water saturated calling into question the accuracy of the evaluation,
- The permeability of the sandstones is unknown but their high GR may be caused by a high mica and or clay content,
- The distribution of hydrocarbon and oil bearing zones in wells outside the block to the NE suggests that the trapping mechanism could be stratigraphic and the sandstones may be lenticular,
- We have not seen documentary evidence for oil shows or samples from the studied block although the operator assured us verbally that oil shows are present.

Weathering crust

Cores from this zone in EI-2 indicate a variety of rock types, most of which have no reservoir potential. No petrophysical evaluation of this interval was supplied by BNG. Porous gravel is the most likely reservoir lithology in the zone based on the core descriptions from EI-2. The thickness and lateral extent of the gravels is uncertain and the DTC log for the least radioactive interval in EI-2 suggests that the porosity is ~10%. Net to gross is uncertain but is likely to be low, ~10%.

Devonian

Descriptions of cores and thin sections, core analysis data, DT and NGK all indicate that most of the carbonates, ~90% of the thickness penetrated by the wells, have minimal matrix porosities and average SPOR of 0.3-2.1% (including bitumen) (Figures 18 to 20). Of the 96 core analysis samples from EI-2, 77 have porosities <1% and 13 have porosities in the range 1-5% and it is suspected that the more porous rocks contain vugs (carbonates) and vesicles (spilites). There is some correlation between the more porous samples indicated by core analysis and the more porous intervals indicated by sonic logs:

- Seven of the plugs with >1% core porosity come from intervals with erratic but locally high SPOR (sonic derived porosity), but
- Six samples plugs with >1% core porosity come from intervals with very low SPOR.

The porous zones are not clearly correlatable between the two wells which are only ~500 m apart and this suggests that they are more likely to be related to fracture zones and/or collapsed caves than to particular stratigraphic zones or facies. Vuggy porosity may have been enhanced in the fracture zones by dissolution caused acidic pore waters percolating down during phases of subaerial exposure and/or migrating up from maturing source rocks. Therefore we consider that porosities are likely to be highest along fracture zones and this model is the basis for the most likely area used in our volumetric evaluation of this reservoir. For the low area input we have assumed that fracturing is concentrated in an area around the wells in a transfer zone between two NNW trending faults that can be seen on the seismic lines. For the high area input we assumed that a pervasive joint system developed during uplift and erosion in the late Palaeozoic.

The highest porosity (20.5%) measured during core analysis of EI-2 (at 3798.5-3802.5 m) was in a spilite which has cavities filled with bitumen; we suggest that some open vesicles were also present in this plug. The spilites cannot be dismissed as non-reservoir based on the available data and note that productive fractured volcanic reservoirs are known from elsewhere in the WSB (see Blackburn report), Georgia and Japan.

Descriptions of cores and thin sections indicate that bitumen is common, particularly in fractures. Bitumen (and brown/black organic material etc.) is commonly reported to be present in fractures in the cores from EI-2 whereas open fractures were only recorded in a few core samples from the same well (e.g. 3419.1-3422.5 m, 3255-3258 m), suggesting that bitumen-filled fractures are much more common than open ones. However, it can be argued that recovery of rock types with common open fractures is likely to have been poor, with the fragments of rock being converted to rubble during the coring process. It is also much easier to identify fractures in cores where they are partly or fully filled by bitumen (or cement) than where they are open. Open natural fractures may be overlooked completely or dismissed as fractures caused by the coring process or during rough handling of the cores during transport. The bitumen content was accounted for during the probabilistic volumetric calculation by using a triangular distribution and a range of 10% to 90% for the proportion of porosity filled by bitumen.

One of the final well reports indicates that the area of open fractures per unit volume averages over $60 \text{ m}^2/\text{m}^3$ and ranges from 18 to $242.5 \text{ m}^2/\text{m}^3$. In addition, based on the cores from EI-2, it has been reported that “the permeability in the open fractures varies from 48 mD up to more than 1,000 mD.” The original source of the latter information is uncertain.

Whether or not the carbonates accumulated on reefs may have some control on the abundance of open fractures in the reservoirs because reefal carbonates would be expected to be less argillaceous than those deposited in deeper water, non-reefal areas. Consequently there would be less clay available in reefal carbonates to be smeared on fractures, which are therefore more likely to be open than in more argillaceous carbonates. However, given the probable occurrence of karstification and internal argillaceous sediments, this control on reservoir quality is judged to be of minor significance. In addition, we have not seen any convincing evidence that open matrix porosity will be any more abundant in the putative reefs or geobodies than in the carbonates sampled by wells EI-2 and EI-4.

Porosities estimated from the NGK log by the operator are typically in the range 2-4% in the Devonian. Higher values are generally associated with interval where the hole has been washed out and the porosity estimates from NGK are known to be sensitive to hole diameter therefore this log has not been used in this evaluation.

The accuracy and relevance of the porosities derived from the sonic log (SPOR) is also open to question because:

- The log runs have been calibrated differently and it is not clear which, if any, of the runs are the more reliable,
- Lithologies are somewhat uncertain; it is difficult to differentiate the limestones, dolomites and spilites based on the available information and therefore the estimation of matrix density is uncertain. Grain densities measured during the core analysis of the carbonates in EI-2 are unrealistically low, $\sim 2.65 \text{ g/cc}$, so cannot be used,
- What proportion of SPOR is filled by bitumen?
- Why was there no matrix porosity reported in the cores and thin sections from the porous zones in EI-2?

After weighing up all the available data including information from fractured carbonate reservoirs elsewhere, we have come to the following conclusions about the porosity types, abundances and distribution in the Devonian carbonates:

- Fracture pores are likely the most voluminous type of open pores in 90% of the reservoir,
- Vugs associated with fracture zones are likely to be the main type of open pores in the more porous 10% of the reservoir,
- The data from the two wells are insufficient to estimate the abundance of open fracture pores in the reservoir therefore we have to rely on data from analogues for our volumetric inputs,
- The input porosity values for the volumetric calculation, 0.6%, 1% and 2% account for the variation in the abundance of porosity between the two reservoir types.

In stark contrast to our estimates, Geoprime used a porosity of 21% for their volumetric estimate of their geobodies. However, as far as we could ascertain from the operator, this is an average porosity quoted by Gaspromneft for the **Weathering Crust** in nearby Archinsky Field, not the Devonian carbonates, and was probably measured using kerosene injection. This kerosene injection method appears to very imprecise because porosities are quoted to the nearest 10%. Note also that 21% approximates the maximum porosity measured during core analysis.

Water saturations are expected to be low in the open fractures and vugs.

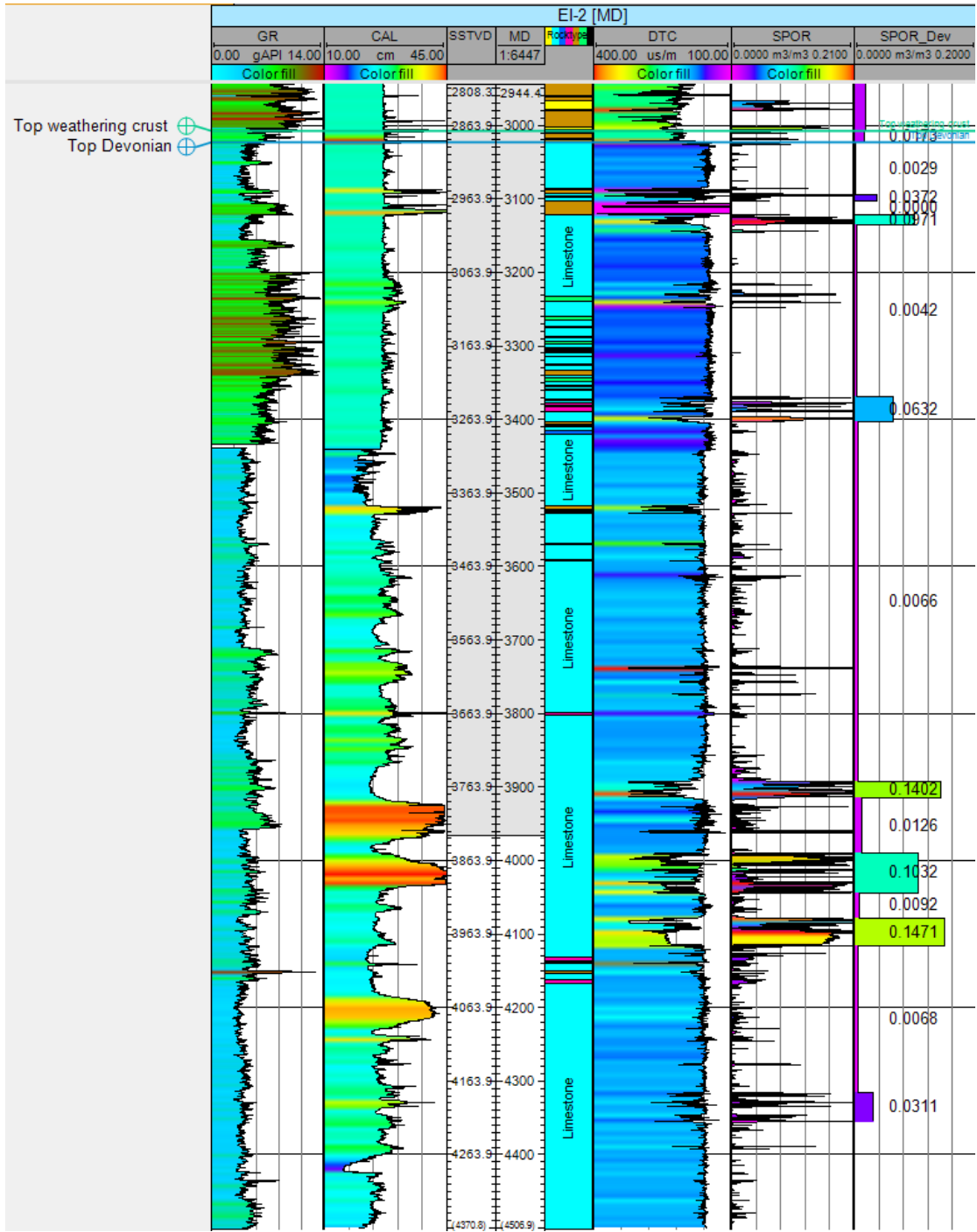


Figure 18 Logs, lithologies and SPOR (sonic derived porosities) for well EI-2

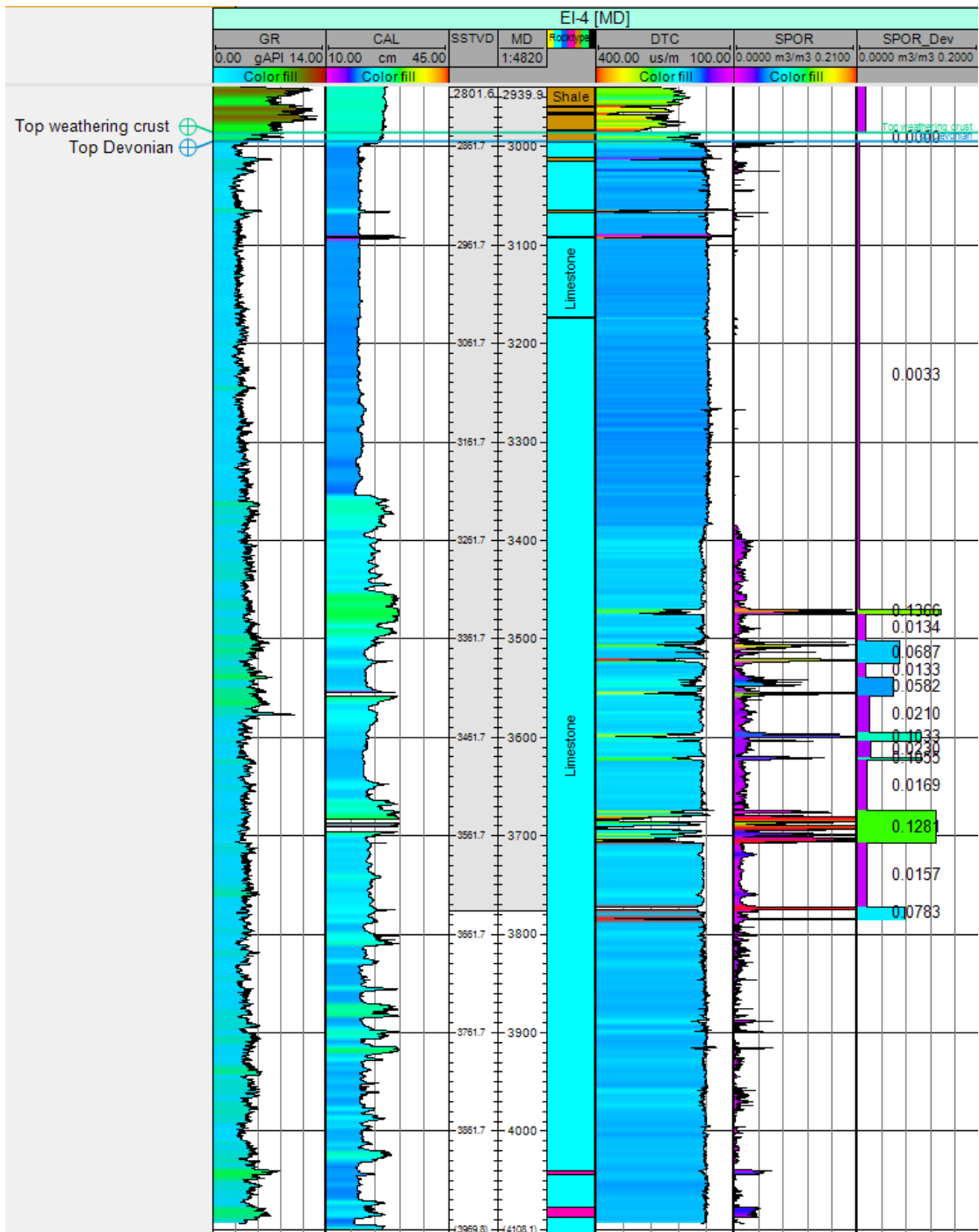


Figure 19 Logs, lithologies and SPOR (sonic derived porosities) for well EI-4.

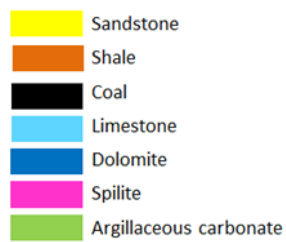


Figure 20 Key to lithologies

4 RESERVOIR ENGINEERING

Flows were recorded from two wells drilled in Block 71-1, Well EI-1 and Well EI-4. The flow from Well EI-2 was from an uncontrolled flow from the well during a cement squeeze operation, and from the information provided it is not clear exactly where this flow came from. However, once the well was brought under control and the cement squeeze operation completed, a number of tests were carried out. These are summarized in Figure 21 below.

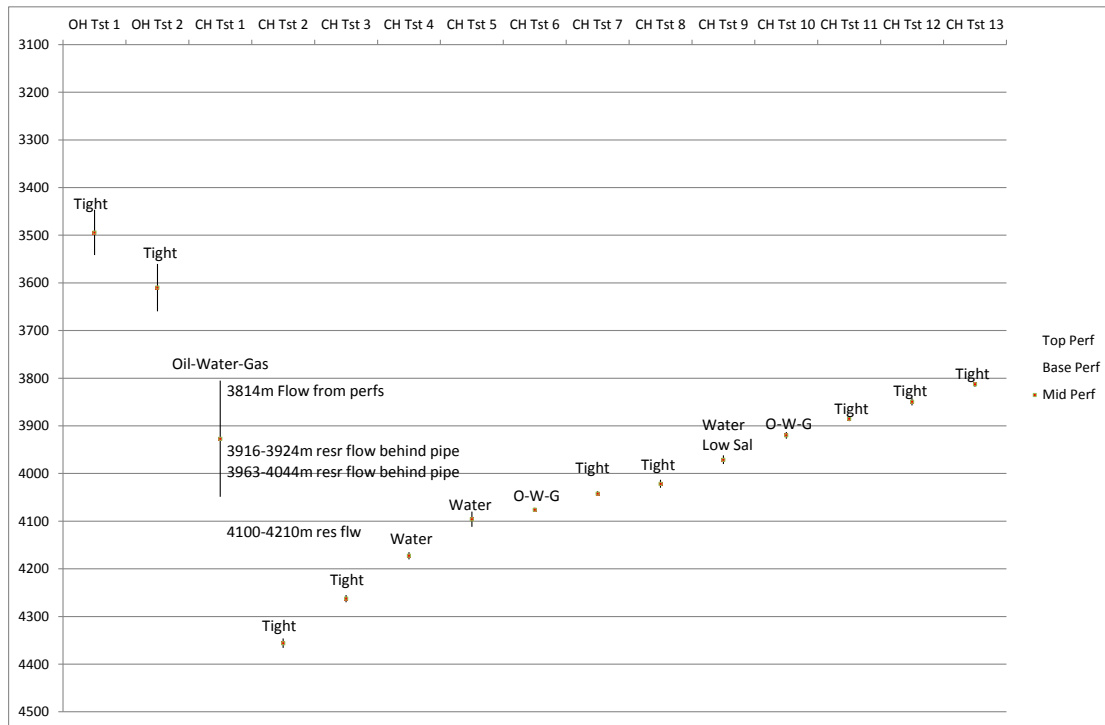


Figure 21 Summary of Well Tests For Well EI-2

Although a number of tests are identified in the drilling reports for Well EI-4, the only test where production was reported is for an uncontrolled flow of hydrocarbons (essentially a blow-out) when the well was drilled into the Weathering Crust at the top of the Devonian Carbonate interval. The well blew out until the production died as a consequence of the well caving in downhole. Apparently stones and rocks came out of the top of the well, as well as the hydrocarbon fluids. The flow of rock would indicate that the weathering crust was unconsolidated in that location.

From the well test reports, three measurements of hydrocarbon were made. Two were of low GOR black oil, and one was of what could be a high GOR oil-rich gas-condensate. The nearby field analogues were reviewed for oil type also, and were found to be mostly black oil. Given that volatile oil and rich gas-condensate recovery factors can be quite similar, we treated all the hydrocarbons as oils. Furthermore, given the reported poor cement job, it is not clear where the fluids were coming from in the well. The analogues used were the Urmanskoje and the Maloichsk fields.

The reservoir pressure in the formation was measured at 5524 psia at a depth of 3793 mTVDSS from a well test pressure build-up. The reservoir temperature at the same depth was 259 Deg.F.

5 VOLUMETRIC ESTIMATES

Areas used in Prospective Resources Volume Calculations

Jurassic Areas

The prospective resource volumes estimates for the Jurassic reservoir were calculated using the Low Case and High Case areas of closure identified on the depth structure map for Horizon IIa (Figure 22.) Wells P-2 and P-4 indicates that Horizon IIa marks the base of the Kimmeridge Formation. This is probably acting as the ultimate seal to the underlying Jurassic Sands, which are located approximately 10 m below Horizon IIa.

The Low Case was taken to be the area of closure down to -2480 m TVDss. The High Case was the area of closure down to -2510 m TVDss within Block 71-1. In both cases it was assumed that the ultimate structural closure was a NW-SE trending fault (identified in the data room on the 2D seismic data) which was located just outside the NE boundary of Block 71-1. The trap would be a downfaulted nose structure.

Weathering Crust Areas

The prospective resource volumes estimates for the Weathering Crust reservoir were calculated using the Low Case and High Case areas of closure identified on the depth structure map for unconformity Horizon F2. (Figure 23.) The Weathering Crust is a porous layer approximately 10 m thick which is assumed to be present across the whole of Block 71-1.

The Low Case was taken to be the area of closure down to -2860 m TVDss. The High Case was the total area of closure within Block 71-1. As in the overlying Jurassic both cases relied on the NW-SE trending fault for ultimate closure within a downfaulted nose structure.

Devonian Limestone Areas

The prospective resource volumes estimates for the Devonian Limestone reservoir were calculated using the Low, Mid and High Case areas of closure identified on the depth structure map for Horizon D2-2. (Figure 24.) This horizon was chosen because it shows the intra-Devonian fault patterns, which are not visible in the overlying unconformity surface.

The volume calculations for the Devonian are based on the assumption that there is fracture porosity present within the limestones. It is believed that the fracturing is related to the intersecting NW-SE and NE-SW trending fault patterns observed on the structural map.

The Low Case closure (0.95 sq km) was taken to be the small area around Wells P-2 and P-4 where two large faults intersect. In the Low Case it is assumed that the oil is present within fractures in the area immediately around Wells P-2 and P-4.

The Mid Case area was determined by taking the Low Case area and adding to it an estimate of the area of a 100 m wide fracture zone around the three main faults within the block. (In the Mid Case it was assumed that the fractures were local to the main faults and therefore the width of the fracture zone was limited to 100m.) Each fault is at least 5 km long so the total area of the fault zone would be around 1.5 sq km. If this is added to the Low Case area it gives a Mid Case area of around 2.5 sq km.

The High Case was the total area of closure within Block 71-1 (=34.59 sq km.) In this case it was assumed that the fractures were extensive throughout the entire Devonian Limestone section. It was not possible to identify the ultimate limit of closure for the Devonian Limestones using the data presented in the data room. It is possible that the ultimate closure may be within the structural high located to the NE. The presence of tested hydrocarbons in the wells indicates that the Devonian Limestones are capable of trapping hydrocarbons within the area of Block 71-1. However whether these are trapped within local stratigraphic traps or part of a larger structural trap could not be determined with any certainty from the information presented in the data room.

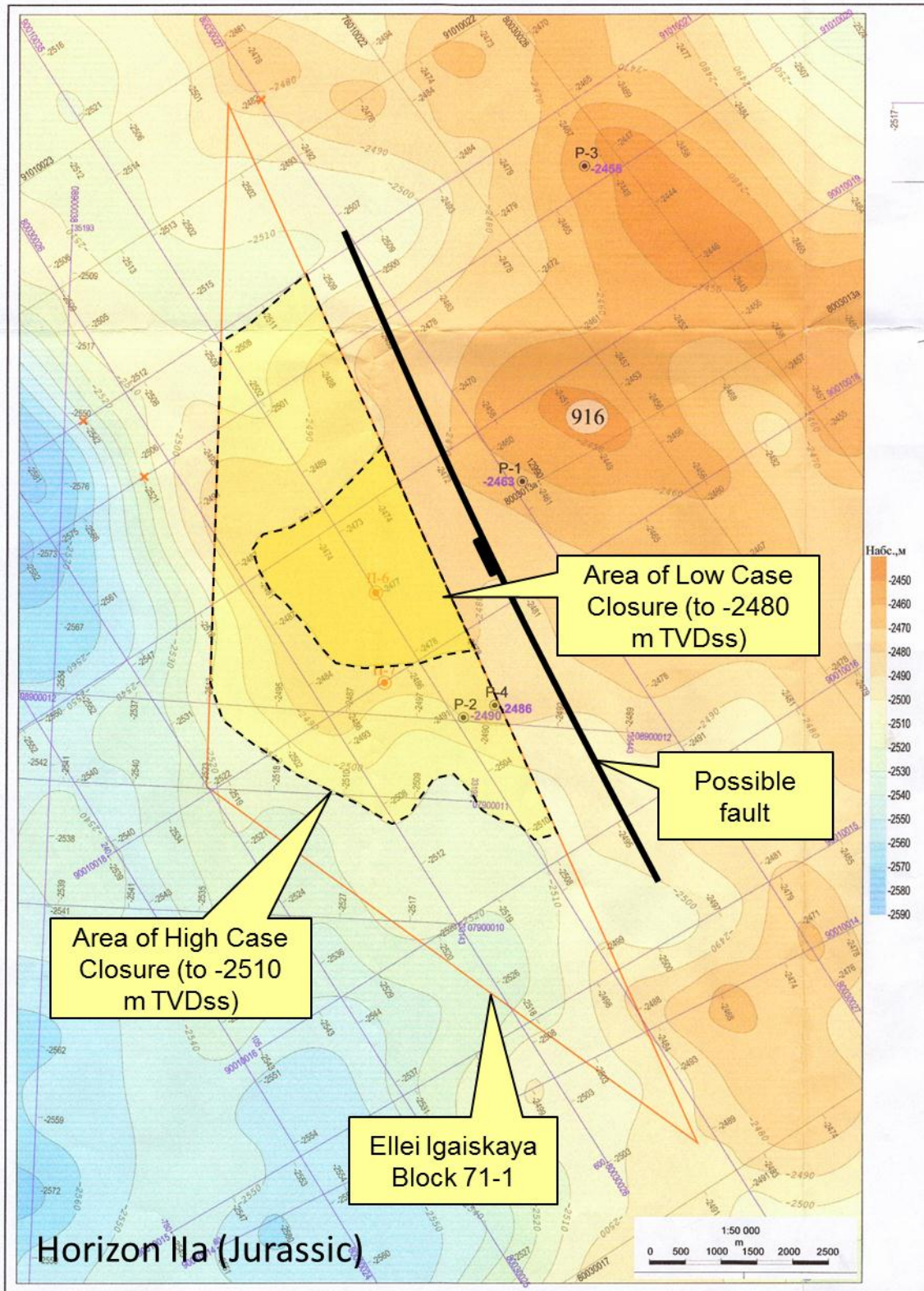


Figure 22 Horizon IIa (Jurassic, near base Kimmeridge Formation) showing the areas of Low Case and High Case closure used in the hydrocarbon resource calculations for the Jurassic

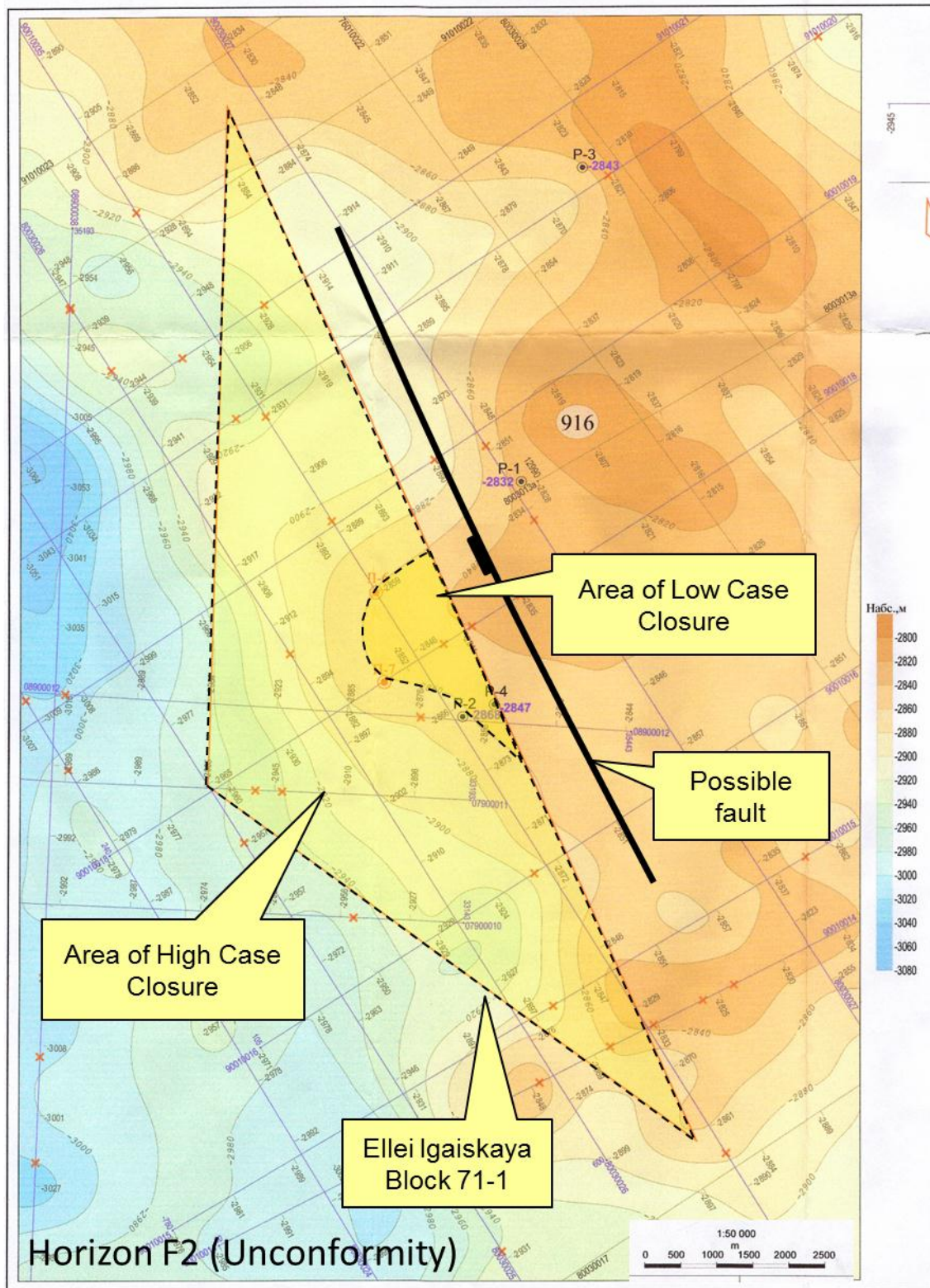


Figure 23 Horizon F2 (Base Jurassic / Top Palaeozoic Unconformity) showing the areas of Low Case and High Case closure used in the hydrocarbon resource calculations for the Weathering Crust

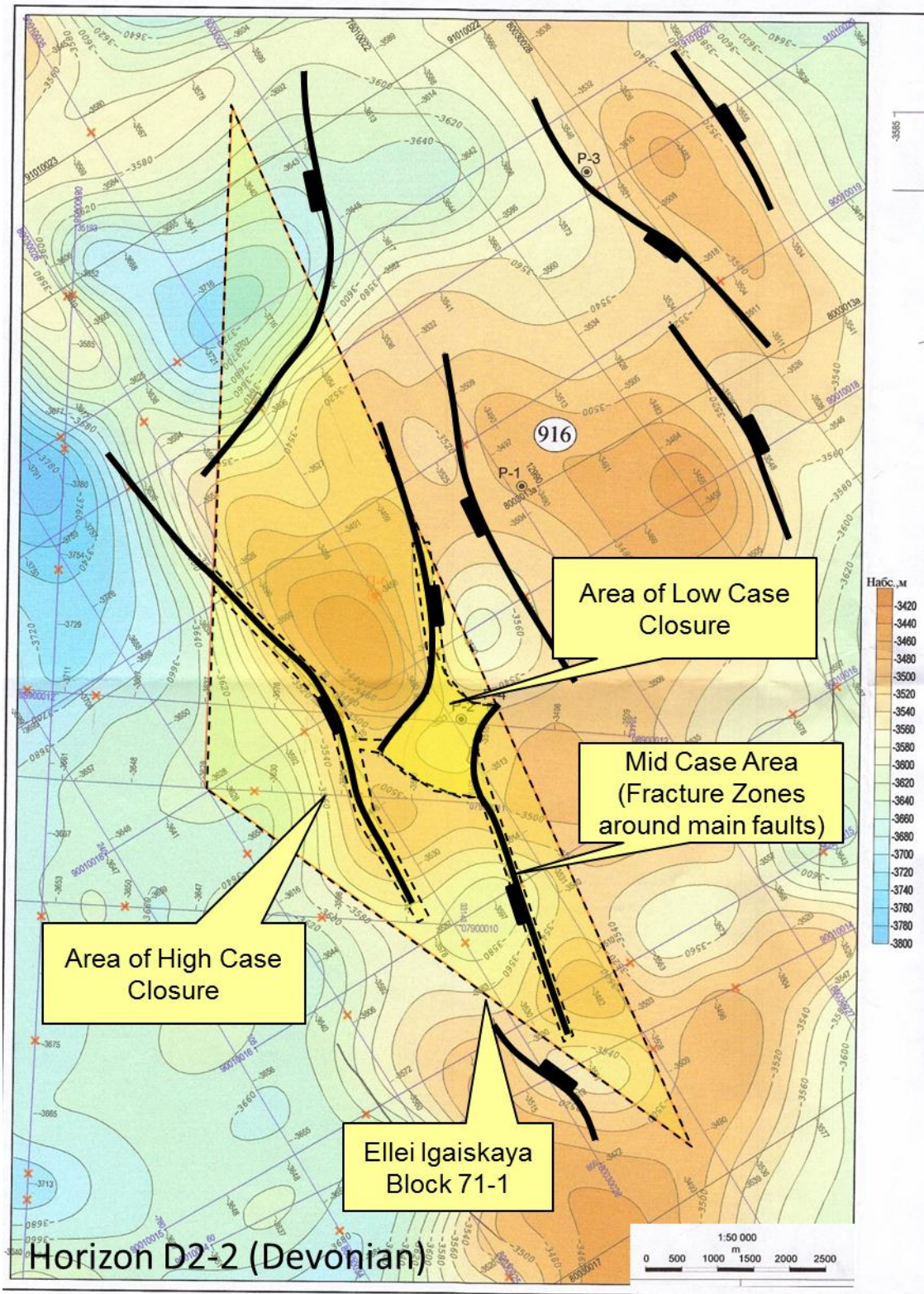


Figure 24 Horizon D2-2 (Devonian) showing the areas of Low, Mid and High Case closure used in the hydrocarbon resource calculations for the Devonian Limestone. The Mid Case area is the fracture zone immediately around the main faults.

Input Parameters for the Volume Calculations

The input parameters for the prospective resource volume calculations are shown in Table 4

JURASSIC	Area (sq km)	Net Pay (m)	Porosity %	Oil Saturation	Oil Density (tonnes / m ³)	1/Bo	Recovery Factor	
Low Case	5.28	3	9	0.41	0.8	0.6	0.1	
Mid Case	11.45	5.5	13	0.53	0.81	0.7	0.23	
High Case	20.53	8	17	0.65	0.82	0.8	0.35	
WEATHERING CRUST	Area (sq km)	Gross Reservoir Thickness (m)	Net to Gross	Porosity %	Oil Saturation (frac)	Oil Density (tonnes/m ³)	1/Bo	Recovery Factor
Low Case	0.38	4	0.05	8	0.12	0.8	0.4	0.1
Mid Case	17	12.5	0.1	10	0.53	0.81	0.45	0.23
High Case	34.59	20	0.15	12	0.65	0.82	0.5	0.35
DEVONIAN LIMESTONE	Area (sq km)	Net Pay (m)	Bitumen Factor	Porosity %	Oil Saturation -Fractured Reservoir (frac)	Oil Density (tonnes/m ³)	1/Bo	Recovery Factor
Low Case	0.95	50	0.1	0.6	0.9	0.8	0.4	0.1
Mid Case	2.5	150	0.5	1	0.95	0.81	0.45	0.23
High Case	34.59	921	0.9	2	1	0.82	0.5	0.35

Table 4 Input Parameters for the prospective resource volume calculations

The input parameters were entered into a Crystal Ball simulation model in order to calculate a range of probabilistic oil volumes. This software uses the Monte Carlo simulation method to calculate the probabilities. Most of the parameters were entered into the model in a triangular distribution. However the areas and net pay for the Devonian Limestone were entered in a log normal distribution. This is because there was great uncertainty in defining the area and thickness of the high end trapping mechanism for the Devonian Limestone. The log normal method compensates for this by biasing the data towards the lower values which have the greater certainty.

The probabilistic resource estimates are summarised in Table 5, together with an estimate of gas-in-place based upon GORs from the nearby Archinskoye Field. Prospective recoverable reserves estimates have also been included based upon typical recovery factors for oil fields.

Reservoir	Prospective Oil-in-place (million bbls)			GOR (scf/bbl)	Prospective Gas-in-place (Bcf)		
	P90	P50	P10		P90	P50	P10
Jurassic	10.6	18.1	29.3	1080	11.4	19.5	31.6
Weathering Crust	0.7	2.1	4.6	1335	0.9	2.8	6.1
Devonian Limestone	2.1	7.8	28.3	501	1.1	3.9	14.2
TOTAL	13.4	28	62.2		13.4	26.3	52.0
Reservoir	Prospective Recoverable Resources (million bbls)			GOR (scf/bbl)	Prospective Recoverable Resources (Bcf)		
	P90	P50	P10		P90	P50	P10
Jurassic	2.1	4	7	1080	2.3	4.3	7.6
Weathering Crust	0.2	0.5	1.1	1335	0.3	0.7	1.5
Devonian Limestone	0.4	1.7	6.4	501	0.2	0.9	3.2
TOTAL	2.7	6.2	14.5		2.7	5.8	12.2

Table 5 Summary of Prospective Hydrocarbon Resources in Block 71-1

6 REFERENCES

Blackbourn, G. Petroleum geology of West Siberia. Blackbourn Geoconsulting Ltd.

7 **BLOCK 71-1 EXPLORATION LICENCE**