



REPORT TITLE/ TITTEL APPENDIX I - IV Northern North Sea Basin: An Organic Geochemical Source Rock Study on Wells: 30/10-5, 33/12-6, 33/12-5, 33/12-2, 33/9-4, 33/9-5 and 36/1-2.			
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Vitrinite Reflectance Data

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APPENDIX I

EXAMINATION IN REFLECTED LIGHT
DETAILED DESCRIPTION OF
EACH ANALYSED SAMPLE

Well 30/10-5

K 4501, 2460 m: Mixed Sandstone, Shale and Limestone, Ro=0,40(20)

The sample has a low to moderate organic content. It has an overall bitumen staining and wisps in shale. Inertinite and reworked particles are dominant but there are some vitrinite wisps and particles present. UV light shows yellow/orange fluorescence from spores and variable carbonate and only a trace of exinite.

K 4511, 2560 m: Shale and Carbonate, Ro=0,40(9)

The sample has bitumen wisps and light staining and it has a low content of inertinite and reworked particles with a trace only of true vitrinite particles. UV light shows yellow/orange and light orange fluorescence from spores and carbonate and a low to moderate exinite content.

K 4520, 2650 m: Shale and Limestone, Ro=0,41(12)

The sample has a moderate organic content with small particles of inertinite and reworked particles with a trace only of true vitrinite particles. It has bitumen wisps. UV light shows yellow/orange and light orange fluorescence from spores and a low exinite content.

K 4533, 2770 m: Limestone and Shale

The sample consists of barren limestone. It has bitumen wisps and reworked and inertinite particles in shale but no vitrinite. UV light shows variable carbonate fluorescence and no definite organic material, the exinite content is nil.

K 4544, 2880 m: Limestone and Marl, Ro=0,31(8)

The sample contains interstitial bitumen wisps and a trace of loose lignite particles (all readings from these particles). It has a few reworked and inertinite particles. UV light shows a variable carbonate fluorescence and the exinite content is nil.

K 4596, 3400 m: Calcareous Shale, $R_o=0,35(8)$ and $0,64(2)$

The sample contains bitumen wisps. It has a few lignite fragments with low R_o values - possibly additive? Otherwise, it has a low content of corroded, reworked and inertinite particles. A couple of the lowest R_o particles were measured. UV light shows light orange fluorescence from spores and a low exinite content.

K 4606, 3500 m: Shale, $R_o=0,47(7)$

The sample has a low to moderate organic content with inertinite and reworked particles which are gnarled and a few vitrinite wisps. It has bitumen wisps. UV light shows yellow/orange and light orange fluorescence from spore specks and a trace only of exinite.

K 4616, 3600 m: Shale, $R_o=0,88(2)$

The sample has variable bitumen staining and a low organic content. It has small gnarled and corroded inertinite and reworked particles. The lowest R_o vitrinite particles measured are possibly reworked.

K 4625, 3690 m: Shale, $R_o=0,77(1)$, $1,02(3)$ and $1,42(2)$

The sample has a low organic content with bitumen wisps. It contains some particles of inertinite and vitrinite with high R_o values. The lowest particles measured are possibly reworked. UV light shows yellow/orange and light orange fluorescence from spores and a low exinite content.

K 4635, 3790 m: Turbo-drilled, Shale and Lignite, $R_o=0,35(9)$, $0,76(1)$ and $1,25(2)$

The organic material is restricted to a few lignite cuttings. It has lower R_o values and occasional particles of vitrinite in a few shale cuttings. UV light shows light orange fluorescence from spores and a trace only of exinite.

K 4668, 4120 m: Shale, $R_o=0,81(5)$

The sample has a variable bitumen staining which are strong in some cuttings. It has a low content of inertinite and reworked particles with a few vitrinite wisps and particles - probably o.k. UV light shows light orange fluorescence from spore specks and a trace only of exinite.

K 4672, 4160 m: Shale, $R_o=0,90(4)$

The sample has an overall bitumen staining and wisps. It has a low to moderate content of inertinite and reworked particles. The lowest R_o vitrinite particles measured are possibly true values. UV light shows no fluorescence and the exinite content is nil.

K 4673, 4168 m: Shale, $R_o=0,35(2)$ and $0,88(7)$

The sample has a moderate organic content. It has a few loose lignite cuttings with low R_o readings. The shale contains gnarled inertinite and reworked particles. The lowest R_o vitrinite particles measured are possibly true values. UV light shows yellow/orange and light orange fluorescence from spores and a trace only of exinite.

K 4676, 4200 m: Shale, $R_o=0,93(20)$

The sample has an overall moderate to strong bitumen staining and wisps. It is moderate to rich in inertinite and reworked particles with a trace of vitrinite wispy particles and particles. UV light shows mid orange fluorescence from spores and a trace only of exinite.

K 4686, 4300 m: Shale, $R_o=0,26(4)$ and $0,91(10)$

The sample has a few lignite cuttings with low R_o readings. It has an overall bitumen staining and wisps and a moderate organic content. There are inertinite and reworked particles with a trace of possibly true vitrinite particles. UV light shows no organic fluorescence and the exinite content is nil.

K 8692, 4770 m: Drilling Mud, Coal and Shale, Ro=1,58(21)

The sample contains coal with high Ro values and fragments of highly brecciated coal. There are only a few shale cuttings. The readings are on coal. UV light shows fluorescence from wanut shell only and the exinite content is nil.

K 8705, 4900 m: Shale and Coal, Ro=1,38(21)

The sample consists of shale containing inertinite and reworked particles with an overall bitumen staining. It also contains coal with high Ro values and which are rich in vitrinite with some brecciation. The readings are on coal. UV light shows no fluorescence and the exinite content is nil.

K 8715, 4975 m: Shale and Coal, Ro=1,40(21)

The sample has a variable strong bitumen staining and a moderate content of inertinite and vitrinite particles and wisps. The coal is vitrinitic and structureless. The readings are on both shale and coal. UV light shows no fluorescence and the exinite content is nil.

K 8730, 5100 m: Mixed Shale, Carbonate and Coal, Ro=1,52(21)

The sample has a variable bitumen staining and a low content of inertinite and some vitrinite wisps and particles with high Ro values. There are a few coal fragments. UV light shows no definite organic fluorescence and the exinite content is nil.

K 8739, 5185 m: Mixed Shale Lithologies and Coal traces, Ro=1,59(21)

The sample has a variable bitumen staining and a low to moderate content of vitrinite wispy particles and inertinite particles. There are a few coal and carbargillite cuttings. UV light shows no fluorescence and the exinite content is nil.

K 4796, 2352 m: Shale and Carbonate traces, $R_o=0,22(1)$ and $0,55(2)$

The sample has a low organic content. It consists of gnarled particles of inertinite and reworked material with only a couple of vitrinite particles. UV light shows yellow/orange fluorescence from spores and a trace only of exinite.

K 4803, 2448 m: Shale, Siltstone and Carbonate traces, $R_o=0,34(6)$

The sample has a very low organic content. It consists of a few inertinite and reworked particles with occasional bitumen wisps and vitrinite particles. UV light shows light orange fluorescence from spores and a low exinite content.

K 4808, 2508 m: Shale and Siltstone, $R_o=0,44(7)$

The sample has bitumen wisps and a low content of inertinite and reworked particles. There are a handful only of vitrinite particles and some bitumen wisps. UV light shows yellow/orange and light orange fluorescence from spores and a low exinite content.

K 4814, 2574 m: Shale, $R_o=0,42(7)$

The sample contains bitumen wisps and has a low organic content. Inertinite and reworked particles are rather gnarled and there are traces only of vitrinite particles. UV light shows yellow and light orange fluorescence from spores and a low exinite content.

K 4821, 2658 m: Shale, $R_o=0,32(2)$

The sample has a low organic content and a few bitumen wisps. Inertinite and reworked particles are gnarled and a couple of vitrinite particles are located only. UV light shows yellow/orange and light orange fluorescence from spores and a low exinite content.

K 4845, 2946 m: Shale, Siltstone and Carbonate, Ro=0,39(21)

The sample consists of bitumen wisps and a moderate content of inertinite and reworked particles. There are traces only of vitrinite particles. UV light shows light orange fluorescence from spores and a moderate exinite content.

K 4847, 2970 m: Shale, Ro=0,36(21)

The sample contains bitumen wisps and a low to moderate organic content. It has inertinite and reworked particles with a trace of poor vitrinite particles which are rather corroded. UV light shows a light orange fluorescence from spores and a moderate to rich exinite content.

K 4851, 3018 m: Coal and Shale, Ro=0,48(25)

The sample contains coal which are vitrinitic with a few other macerals. It is rather dirty and brecciated. UV light shows light orange fluorescence from spores and a low exinite content.

K 4854, 3054 m: Shale and Coal, Ro=0,52(22)

The sample contains bitumen wisps. The shale is moderate to rich in inertinite and has reworked particles with some vitrinite wisps. The coal is vitrinitic but has plentiful of inertinite but is rather dirty and brecciated. UV light shows light orange fluorescence from spores and a low exinite content.

K 4859, 3114 m: Shale, Siltstone and Coal, Ro=0,51(23)

The sample consists of coal which is normal, rather dirty and brecciated. It also contains shale and siltstone which is rich in organic material and has vitrinite wisps with inertinite particles. UV light shows yellow/orange and light orange fluorescence from spores and cuticle and a low to moderate exinite content.

K 4900, 3603 m: Turbo-drilled material and mixed shale lithologies, $R_o=0,44(20)$

A few of the coal cuttings in the sample have lower R_o results. It has a moderate content of organic material in shale but almost wholly reworked and inertinite. There is a trace only of gnarled vitrinite particles. UV light shows light orange fluorescence from spores and a moderate exinite content.

K 4907, 3690 m: Shale and Siltstone, $R_o=0,54(21)$

The sample has bitumen wisps and an overall light staining. It has a moderate organic content and inertinite and reworked particles with about equal proportions of good vitrinite wisps and particles. UV light shows light and mid orange fluorescence from spores and a moderate to rich exinite content.

K 5988, 3894 m: Shale and Sandstone, $R_o=0,58(22)$

The sample has a very variable organic content in shale and some loose coal fragments. It has coal and vitrinite of very variable R_o . Inertinite and reworked material is dominant. There are some vitrinite wisps and particles. UV light shows light and mid orange fluorescence from spores and a rich exinite content.

K 5994, 3966 m: Sandstone and Shale traces, $R_o=0,35(2)$ and $0,58(10)$

The sample contains barren sandstone. The organics are restricted to a few shale cuttings. It has bitumen wisps and a moderate content of inertinite particles with a trace only of poor vitrinite particles. UV light shows light to mid orange fluorescence from spores and a low exinite content.

2046m: Shale, $R_o=0,79(2)$ and $0,93(12)$

The sample has a low content of organic material, almost exclusively inertinite and reworked material. Some vitrinite particles were recorded but are probably all reworked. UV light does not show any organic fluorescence.

K 6091, 2094 m: Shale, $R_o=0,44(17)$

The sample has a low organic content. Inertinite and reworked particles are dominant. There is a trace only of vitrinite wispy particles. It has an overall light bitumen staining. UV light shows yellow/orange fluorescence from spores and a trace only of exinite.

2235m: Shale, $R_o=0,84(6)$

The sample has a low content of organic material, inertinite and reworked material. No true vitrinite was recorded. UV light does not show any organic fluorescence.

2334m: Shale, $R_o=0,47(1)$, $0,58(2)$ and $1,04(5)$

The sample has a low content of organic material, mainly inertinite and reworked material. One convincing particle of vitrinite was recorded (0,47%). The rest is probably reworked. UV light shows a light to mid-orange fluorescence from spores and a low content of exinite.

K 6127, 2478 m: Shale and Siltstone, $R_o=0,43(11)$

The sample contains bitumen wisps. It has a low to moderate phytoclast content. There are a few particles of inertinite and reworked material with a trace of vitrinite particles. UV light shows yellow and yellow/orange fluorescence from spore specks and a trace only of exinite.

Well 33/12-2

K 5291, 1719 m: Marl and Carbonate, Ro=0,42(1)

The sample is barren with a few bitumen wisps. One vitrinite and one inertinite particle is located only. UV light shows yellow and light orange fluorescence from spores and a low exinite content.

K 5306, 1823 m: Marl, Ro=0,50(3)

The sample has a trace only of organic material. It has small, gnarled particles of inertinite and reworked material. The lowest Ro particles measured are possibly true. UV light shows yellow to light orange fluorescence from spores and hydrocarbon specks and a trace only of exinite.

K 5336, 1939 m: Marl, Ro=0,34(4) and 0,56(1)

The sample has a trace only of organic material with a few small particles of inertinite and reworked material. The lowest Ro particles measured are possibly true. There are bitumen wisps. UV light shows yellow/orange fluorescence from spores and a low to moderate exinite content.

K 5344, 2012 m: Marl, Ro=0,34(17)

The sample has a very low organic content. It consists of a few particles of vitrinite but inertinite and reworked particles are dominant. There are bitumen wisps present. UV light shows yellow/orange fluorescence from spores and hydrocarbon specks and a low exinite content.

K 5348, 2042 m: Shale and Carbonate, Ro=0,41(10)

The sample has a very low organic content with a few particles of inertinite and reworked material with about an equal proportion of vitrinite. UV light shows yellow and yellow/orange fluorescence from spores and low exinite content.

K 5388, 2365 m: Mica additive and Shale, Ro=0,39(12)

The sample has a few shale cuttings only containing bitumen wisps with a low content of inertinite and reworked particles. It has a trace only of vitrinite particles. UV light shows yellow/orange fluorescence from spores and a low exinite content.

K 5396, 2429 m: Shale, Carbonate and Sandstone, Ro=0,45(6)

The sample has a low organic content. It consists of gnarled particles of inertinite and reworked particles with only a handful of vitrinite particles. It has bitumen wisps. UV light shows yellow/orange fluorescence from spores and a low exinite content.

K 5397, 2435 m: Shale and Carbonate, Ro=0,44(20)

The sample has a low organic content. Inertinite and reworked particles are dominant. There is a trace only of vitrinite-wispy particles and particles. It has bitumen wisps. UV light shows yellow/orange fluorescence from spores and a low to moderate exinite content.

K 5405, 2518 m: Shale and Calcareous Shale, Ro=0,38(19)

The sample has a variable bitumen staining and wisps. It has a low content of inertinite and reworked particles with a trace only of vitrinite particles. There are a couple of coal fragments. UV light shows yellow/orange fluorescence from spores and hydrocarbon specks and a trace only of exinite.

K 5411, 2566 m: Shale, Ro=0,37(20)

The sample has an overall bitumen staining and wisps which are strong in some cuttings. It has a low to moderate content of inertinite and reworked material with a trace of vitrinite wispy particles. UV light shows yellow/orange fluorescence from spores and hydrocarbon specks and a low to moderate exinite content.

K 5441, 2832 m: Shale full of Haematite, Ro=0,40(3)

The sample is barren with a couple of vitrinite wisps and a few inertinite particles in one shale cutting. UV light shows yellow/orange and light orange fluorescence from spores and a trace only of exinite.

K 5451, 2923 m: Drilling Mud, Red Shale and Sandstone

There is no organic material located in the sample. UV light shows no organic fluorescence and the exinite content is nil.

K 6380, 2405 m: Shale, Carbonate and Siltstone, $R_o=0,43(15)$ and $0,72(1)$

The sample has bitumen wisps and localised staining. It has a low content of inertinite and reworked particles with a few vitrinite particles. UV light shows yellow/orange and light orange fluorescence from spores and a moderate exinite content.

K 6390, 2537 m: Shale and Carbonate, $R_o=0,47(4)$

The sample has a very low organic content. It consists of gnarled and corroded particles of inertinite and reworked material. There are only four possibly true vitrinite particles located. UV light shows yellow/orange and light orange fluorescence from spores which is rather dull and a moderate exinite content.

K 6392, 2564 m: Shale and Carbonate, $R_o=0,49(20)$

The sample has a moderate organic content restricted to the shale. A few of the cuttings show bitumen staining and has a good content of inertinite particles with subordinate vitrinite wispy particles. UV light shows yellow/orange and light orange fluorescence from spores and a low exinite content.

K 6394, 2591 m: Mixed Lithologies, $R_o=0,46(20)$

The sample has a moderate organic content in the shale. Inertinite and reworked particles are dominant with subordinate vitrinite particles and wispy particles. It has bitumen wisps. UV light shows yellow/orange and light orange fluorescence from spores and a low to moderate exinite content.

K 6397, 2648 m: Coal and Shale, $R_o=0,41(23)$

The sample consists of coal which is dirty and it is rich in inertinite and liptinite. It has only wisps of vitrinite which are possibly detrital. UV light shows yellow/orange and light orange fluorescence from spores and algae and a moderate to rich exinite content.

Well 33/9-5

K 5660, 2004 m: Shale and Siltstone, $R_o=0,64(4)$

The sample has a low organic content. Inertinite and reworked particles are dominant. There is a trace only of vitrinite particles. It has light bitumen staining and wisps. UV light shows yellow/orange fluorescence from spores and a trace only of exinite.

K 5661, 2016 m: Mixed lithologies - Shale and Carbonate, $R_o=0,40(14)$

The sample has a low organic content. It has a few coal particles, otherwise inertinite particles. There are only a few specks of vitrinite. UV light shows yellow/orange fluorescence from spores and a trace only of exinite.

K 5668, 2100 m: Shale and Carbonate, $R_o=0,50(3)$

The sample has a low organic content. It has a few inertinite particles and only two particles of vitrinite are located. UV light shows yellow/orange and light orange fluorescence from spores and a trace of exinite.

K 5676, 2196 m: Limestone and Shale, $R_o=0,36(6)$ and $0,52(1)$

The sample has a very low organic content. There are only a few inertinite particles and a handful only of vitrinite wispy particles. It has bitumen wisps in shale. UV light shows light orange fluorescence from spores and a trace only of exinite.

K 5685, 2304 m: Limestone, $R_o=0,28(1)$ and $0,43(3)$

The sample has a trace only of organic material with a few inertinite particles and four vitrinite particles. There are some occasional bitumen wisps. UV light shows yellow and yellow/orange fluorescence from spores and a low exinite content.

K 5711, 2616 m: Shale and Sandstone, $R_o=0,47(21)$

The sample has an overall bitumen staining and wisps which are strong in some cuttings. It has a moderate content of inertinite and reworked particles with subordinate vitrinite particles and wispy particles. UV light shows yellow/orange fluorescence from spores and a moderate exinite content.

K 5715, 2688 m: Shale, Carbonate and Coal traces, $R_o=0,47(20)$ and $0,75(1)$

The sample has a moderate content of inertinite and reworked particles with a trace of vitrinite particles. It has bitumen wisps and localised staining. There are some coal particles. UV light shows yellow/orange to mid orange fluorescence from spores and a low exinite content.

K 5721, 2766 m: Shale, Siltstone and Carbonate and Coal, $R_o=0,41(22)$

The sample has bitumen wisps and staining in a few shale cuttings. Inertinite and reworked particles are dominant in the shale. It has plentiful loose coal fragments of rather variable R_o . UV light shows yellow and yellow/orange fluorescence from spores and a low exinite content.

K 5723, 2796 m: Shale, $R_o=0,44(22)$

The sample has a moderate content of inertinite and reworked particles with a subordinate content of vitrinite wisps and some particles with some loose coal fragments. It has bitumen wisps and blebs. UV light shows yellow/orange fluorescence from spores and a moderate exinite content.

K 5725, 2856 m: Shale and Carbonate, $R_o=0,47(22)$

The sample has bitumen wisps and localised staining. It has a low content of inertinite and reworked particles. There is a trace only of

Well 36/1-2

*Lignosulfonate fra 2880 og
redover*

K 5750, 950 m: Shale, Ro=0,34(22)

The sample has light bitumen staining and wisps. It has a low content of vitrinite wisps with a couple of low Ro on reworked vitrinite particles. UV light shows yellow/orange and mid orange fluorescence from spores and a trace only of exinite.

K 5776, 1260 m: Shale, Ro=0,42(21)

The sample has an overall bitumen staining and wisps. It has a low content of inertinite and reworked particles and a few wispy particles. UV light shows yellow and mid orange fluorescence from spores and a trace only of exinite.

K 5784, 1340 m: Sand and Shale, Ro=0,37(9)

The sample has a very low organic content with a few vitrinite particles and wispy particles but inertinite and reworked material are dominant. It has an overall bitumen staining and wisps. UV light shows no organic fluorescence and the exinite content is nil.

K 5800, 1500 m: Shale and Carbonate, Ro=0,41(8)

The sample has a very low organic content. Inertinite and reworked particles are dominant. There is a trace only of true vitrinite. It has an overall bitumen staining. UV light shows yellow and yellow/orange fluorescence from spores and a trace only of exinite.

K 5810, 1600 m: Carbonate, Subordinate Shale and Lignite, Ro=0,30(21)

The shale has bitumen wisps, and reworked and inertinite particles. Readings on lignite. UV light shows yellow fluorescence from spores and resin and a trace only of exinite.

K 5819, 1690 m: Lignite and Carbonate, Ro=0,30(22)

The organic material in the sample is restricted to lignite cuttings - all readings. UV light shows yellow and yellow/orange fluorescence from spores and resin and a low exinite content.

K 5883, 2305 m: Shale, $R_o=0,58(9)$

The sample has a moderate content of gnarled and corroded vitrinite and inertinite particles. The lowest R_o vitrinite particles measured are possibly true values. UV light shows yellow and yellow/orange fluorescence from spores and a low exinite content.

K 5894, 2410 m: Shale, Siltstone and Carbonate, $R_o=0,55(21)$

The sample has a moderate organic content with gnarled particles of vitrinite and inertinite. The lowest R_o vitrinite particles measured are probably true material. It has bitumen wisps. UV light shows yellow and yellow/orange fluorescence from spores and a low exinite content.

K 5899, 2460 m: Siltstone and Carbonate, $R_o=0,34(15)$ and $0,60(3)$

The sample has a low organic content, apart from in loose lignite cuttings with low readings. There are inertinite and vitrinite particles in the shale - 4 lowest R_o particles measured give higher readings than the lignite. UV light shows yellow fluorescence from spores and hydrocarbon specks and a trace only of exinite.

K 5903, 2500 m: Siltstone and Carbonate, $R_o=0,38(13)$ and $0,78(1)$

The sample has a few lignite cuttings with low readings. Otherwise, it has a low content of corroded particles. The two lowest vitrinite particles measured are probably reworked. UV light shows yellow and yellow/orange fluorescence from spores and a trace only of exinite.

K 5913, 2600 m: Shale, Siltstone, $R_o=0,45(5)$ and $0,77(6)$

The sample has a low organic content with a few lignite cuttings of two levels of R_o . There is a trace only of vitrinite particles in shale which are mostly inertinite and reworked material. UV light shows yellow and yellow/orange fluorescence from spores and a low exinite content.

K 5946, 2930 m: Shale and Lignite, Ro=0,34(21)

The sample consists of shale with heavy bitumen staining and wisps. It has a moderate content of inertinite particles and vitrinite wisps (higher Ro). It also contains lignite which is vitrinitic with lower Ro readings (additive?). UV light shows yellow and yellow/orange fluorescence from spores and a moderate exinite content.

K 5951, 3030 m: Siltstone and Carbonate, Ro=0,40(22)

The sample has an overall strong bitumen staining and wisps in siltstone. It has a low content of vitrinite wisps and particles with about an equal proportion of inertinite. UV light shows yellow and yellow/orange fluorescence from spores and hydrocarbon wisps and a low to moderate exinite content.

K 5955, 3070 m: Shale and Carbonate, Ro=0,43(22)

The sample has an overall heavy bitumen staining and wisps. It has a moderate content of inertinite particles with subordinate vitrinite wisps and particles. UV light shows yellow and yellow/orange fluorescence from spores and hydrocarbon wisps and a low exinite content.

K 5960, 3120 m: Calcareous Siltstone, Ro=0,44(21)

The sample shows strong bitumen wisps and staining. It has a moderate content of inertinite particles and subordinate vitrinite wisps and wispy particles. UV light shows yellow and yellow/orange fluorescence from spores and a low to moderate exinite content.

K 5970, 3220 m: Limestone, Shale traces, Ro=0,48(21)

The sample has an overall bitumen staining and wisps with phytoclasts restricted to shale. It has a moderate content of inertinite and reworked particles with subordinate vitrinite wisps. UV light shows yellow and light orange fluorescence from spores and a trace only of exinite.