Appendix A: Results of XRF analyses of shale samples from boreholes KL 1/56, QU 1/65 and LA 1/68 boreholes

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Borehole** | **Depth (m)** | **Major Elements** | | | | | | | | | | | | **Minor Elements** | | | | | | | | | | |
| **SiO2 (%)** | **TiO2 (%)** | **Al2O3  (%)** | **Fe2O3 (%)** | **MnO (%)** | **MgO (%)** | **CaO (%)** | **Na2O (%)** | **K2O (%)** | **P2O5 (%)** | **Loi (Tiegel) (%)** | **Summe (%)** | **Ba (ppm)** | **Cr (ppm)** | **Ga (ppm)** | **Nb (ppm)** | **Ni (ppm)** | **Rb (ppm)** | **Sr (ppm)** | **V (ppm)** | **Y (ppm)** | **Zn (ppm)** | **Zr (ppm)** |
| LA 1/68 | 1617 | 58.2 | 0.8 | 16.9 | 7.4 | 0.1 | 2 | 0.6 | 1.2 | 3 | 0.1 | 9.1 | 99.4 | 809 | 73 | 23 | 18 | 33 | 183 | 170 | 97 | 36 | 108 | 232 |
| LA 1/68 | 1618 | 60.4 | 0.8 | 16.9 | 6.2 | 0.1 | 2 | 0.6 | 1.3 | 3.1 | 0.1 | 7.9 | 99.4 | 819 | 71 | 24 | 19 | 37 | 189 | 187 | 95 | 37 | 130 | 255 |
| LA 1/68 | 1619 | 59.8 | 0.8 | 16.9 | 6.4 | 0.1 | 1.9 | 0.6 | 1.3 | 3 | 0.1 | 8.7 | 99.4 | 812 | 72 | 23 | 18 | 40 | 181 | 180 | 89 | 36 | 127 | 232 |
| LA 1/68 | 1620 | 57 | 0.9 | 20.2 | 6.9 | 0.1 | 2.4 | 0.5 | 1.3 | 5.2 | 0.2 | 5 | 99.6 | 669 | 73 | 32 | 19 | 28 | 242 | 100 | 137 | 34 | 89 | 169 |
| LA 1/68 | 1622 | 60.1 | 0.8 | 17.5 | 6.2 | 0 | 1.9 | 0.5 | 1.2 | 3.1 | 0.1 | 7.7 | 99.2 | 826 | 80 | 25 | 18 | 36 | 193 | 183 | 103 | 37 | 112 | 230 |
| LA 1/68 | 1622 | 60.8 | 0.8 | 17.3 | 5.6 | 0 | 1.8 | 0.5 | 1.3 | 3.1 | 0.1 | 7.9 | 99.2 | 850 | 69 | 25 | 18 | 39 | 196 | 186 | 93 | 32 | 115 | 228 |
| LA 1/68 | 1624 | 60 | 0.9 | 17.9 | 5.8 | 0 | 1.8 | 0.5 | 1.2 | 2.9 | 0.1 | 8.4 | 99.4 | 784 | 69 | 26 | 19 | 46 | 174 | 170 | 100 | 38 | 110 | 232 |
| LA 1/68 | 1625 | 58.6 | 0.9 | 19.1 | 5.9 | 0.1 | 1.6 | 0.4 | 1.1 | 2.8 | 0.1 | 8.9 | 99.4 | 762 | 79 | 25 | 20 | 47 | 162 | 157 | 108 | 39 | 105 | 233 |
| LA 1/68 | 1632 | 59.5 | 0.8 | 17.1 | 6.2 | 0.1 | 1.8 | 0.7 | 1.4 | 2.6 | 0.2 | 9.2 | 99.6 | 686 | 67 | 23 | 20 | 34 | 151 | 164 | 94 | 30 | 110 | 240 |
| LA 1/68 | 1635 | 61.3 | 0.8 | 17.7 | 5.6 | 0 | 1.8 | 0.6 | 1.4 | 2.8 | 0.1 | 7.6 | 99.5 | 719 | 74 | 24 | 21 | 40 | 168 | 168 | 95 | 33 | 113 | 253 |
| LA 1/68 | 1638 | 61 | 0.9 | 17.9 | 4.7 | 0 | 1.5 | 0.5 | 1.4 | 2.6 | 0.1 | 8.9 | 99.5 | 735 | 82 | 24 | 19 | 48 | 146 | 166 | 97 | 32 | 112 | 284 |
| LA 1/68 | 1645 | 59.8 | 0.9 | 18.3 | 6.1 | 0.1 | 1.7 | 0.5 | 1.5 | 2.8 | 0.1 | 8 | 99.6 | 705 | 76 | 24 | 22 | 43 | 159 | 168 | 94 | 32 | 125 | 225 |
| LA 1/68 | 1674 | 26 | 0.4 | 8 | 13.3 | 0.3 | 1.7 | 21.2 | 0.5 | 0.5 | 15.1 | 11.3 | 98.2 | 864 | 35 | <10 | <10 | 23 | 41 | 822 | 60 | 309 | 89 | 135 |
| LA 1/68 | 1679 | 58.5 | 0.8 | 17.6 | 7.9 | 0.1 | 1.8 | 0.4 | 1.2 | 2.3 | 0.1 | 8.8 | 99.4 | 885 | 73 | 23 | 19 | 47 | 141 | 204 | 100 | 34 | 151 | 210 |
| LA 1/68 | 1690 | 61.3 | 0.9 | 18.5 | 6.1 | 0 | 1.7 | 0.4 | 1.4 | 2.2 | 0.1 | 7.1 | 99.7 | 778 | 106 | 24 | 19 | 63 | 127 | 187 | 109 | 35 | 122 | 215 |
| QU 1/65 | 1559 | 60.9 | 0.6 | 18.7 | 6.8 | 0.1 | 1.8 | 0.5 | 1.3 | 4.1 | 0.1 | 4.8 | 99.6 | 841 | 56 | 27 | 13 | 23 | 204 | 185 | 122 | 29 | 100 | 145 |
| QU 1/65 | 1540 | 49.6 | 0.5 | 14.9 | 18 | 0.8 | 2.8 | 3.5 | 0.5 | 1.9 | 0.3 | 6.8 | 99.7 | 439 | 59 | 22 | 12 | 18 | 127 | 518 | 96 | 48 | 86 | 131 |
| QU 1/65 | 1514 | 60.9 | 0.6 | 18 | 7.3 | 0.1 | 2.1 | 0.5 | 2 | 3.4 | 0.1 | 4.5 | 99.6 | 595 | 57 | 25 | 15 | 29 | 179 | 207 | 117 | 32 | 143 | 140 |
| QU 1/65 | 1510 | 24.5 | 0.3 | 7.2 | 2.2 | 0 | 0.8 | 0.2 | 0.7 | 1.5 | 0 | 62.5 | 99.8 | 248 | 21 | 10 | <10 | <10 | 65 | 89 | 50 | 12 | 42 | 64 |
| QU 1/65 | 1497 | 59.3 | 0.6 | 18.5 | 8.5 | 0.2 | 2.3 | 0.7 | 1.9 | 3.5 | 0.1 | 4.2 | 99.6 | 722 | 53 | 26 | 16 | 24 | 179 | 230 | 112 | 29 | 118 | 122 |
| QU 1/65 | 1523 | 63.8 | 0.5 | 16 | 7.2 | 0.1 | 1.8 | 0.4 | 1.5 | 3.2 | 0.1 | 5 | 99.7 | 688 | 44 | 22 | 11 | 20 | 162 | 197 | 93 | 21 | 105 | 131 |
| QU 1/65 | 1481 | 64.5 | 0.6 | 16.8 | 5.7 | 0.1 | 2.1 | 0.5 | 1.8 | 3.7 | 0.1 | 3.8 | 99.7 | 676 | 42 | 24 | 13 | 28 | 184 | 195 | 83 | 21 | 99 | 114 |
| QU 1/65 | 1469 | 58.5 | 0.7 | 18.8 | 8.1 | 0.1 | 2.5 | 0.3 | 1.1 | 4.5 | 0.1 | 4.9 | 99.6 | 618 | 74 | 30 | 15 | 30 | 227 | 95 | 127 | 22 | 120 | 123 |
| QU 1/65 | 1455 | 59.9 | 0.6 | 20.1 | 4.7 | 0.1 | 1.7 | 1.3 | 2.3 | 4.7 | 0.1 | 4 | 99.5 | 1188 | 42 | 25 | 17 | 31 | 219 | 381 | 101 | 52 | 175 | 198 |
| QU 1/65 | 1445 | 53.8 | 0.6 | 23.3 | 4.7 | 0.2 | 2 | 2.4 | 2 | 7 | 0.1 | 3.6 | 99.5 | 1419 | 22 | 27 | 18 | 17 | 322 | 374 | 74 | 46 | 90 | 183 |
| QU 1/65 | 1430 | 60.5 | 0.9 | 17.8 | 6.6 | 0.1 | 2.4 | 0.7 | 1.9 | 4.1 | 0.2 | 4.3 | 99.5 | 633 | 67 | 29 | 18 | 32 | 196 | 109 | 116 | 35 | 124 | 197 |
| QU 1/65 | 1420 | 57.7 | 0.9 | 20.5 | 7 | 0.1 | 2.5 | 0.5 | 1.3 | 5.3 | 0.2 | 3.8 | 99.7 | 679 | 71 | 33 | 16 | 26 | 252 | 102 | 129 | 35 | 93 | 175 |
| QU 1/65 | 1333 | 58 | 0.7 | 19.7 | 7.3 | 0.1 | 2 | 0.7 | 0.9 | 4.9 | 0.2 | 5.2 | 99.6 | 837 | 75 | 28 | 14 | 32 | 228 | 102 | 128 | 31 | 142 | 141 |
| QU 1/65 | 1317 | 59.7 | 0.6 | 18.7 | 6.9 | 0.1 | 2.1 | 0.5 | 1.4 | 4.5 | 0.1 | 4.8 | 99.5 | 678 | 57 | 27 | 13 | 52 | 236 | 162 | 111 | 29 | 127 | 168 |
| QU 1/65 | 1302 | 62.5 | 0.6 | 17.2 | 6.7 | 0.1 | 2 | 0.7 | 1.3 | 3.9 | 0.2 | 4.6 | 99.7 | 634 | 53 | 26 | 12 | 26 | 195 | 159 | 115 | 31 | 106 | 115 |
| QU 1/65 | 1286 | 57.8 | 0.7 | 19.3 | 8.3 | 0.1 | 2.4 | 0.6 | 1.4 | 4.3 | 0.2 | 4.6 | 99.6 | 644 | 62 | 27 | 14 | 24 | 221 | 113 | 129 | 25 | 148 | 116 |
| QU 1/65 | 1160 | 54.6 | 0.7 | 17.5 | 6.4 | 0.1 | 2 | 0.5 | 1.3 | 3.8 | 0.2 | 12.7 | 99.7 | 548 | 62 | 25 | 13 | 28 | 180 | 144 | 110 | 30 | 116 | 134 |
| QU 1/65 | 1159 | 65.4 | 0.7 | 16.1 | 5.6 | 0.1 | 1.7 | 1.6 | 2.1 | 3.1 | 0.2 | 3.1 | 99.6 | 664 | 54 | 22 | 16 | 23 | 163 | 221 | 83 | 37 | 81 | 167 |
| QU 1/65 | 1158 | 62.3 | 0.7 | 17.5 | 6.9 | 0.1 | 1.9 | 0.6 | 1.5 | 3.8 | 0.2 | 4.1 | 99.6 | 699 | 63 | 26 | 14 | 27 | 189 | 147 | 112 | 29 | 110 | 145 |
| KL 1/65 | 1407 | 64.9 | 0.5 | 15.3 | 7.4 | 0.1 | 1.4 | 0.6 | 0.8 | 2.3 | 0.1 | 6.3 | 99.7 | 670 | 26 | 22 | 14 | 14 | 138 | 134 | 76 | 25 | 103 | 180 |
| KL 1/65 | 1402 | 69.9 | 0.4 | 13.5 | 7 | 0.1 | 1.5 | 0.1 | 0.8 | 2 | 0.1 | 4.5 | 99.8 | 598 | 28 | 19 | 12 | 16 | 125 | 97 | 56 | 28 | 71 | 161 |
| KL 1/65 | 1324 | 38 | 0.4 | 9.7 | 4.1 | 0.4 | 6.5 | 12.7 | 0.1 | 2.4 | 0.4 | 24.1 | 98.7 | 640 | 22 | 14 | 10 | 13 | 116 | 447 | 63 | 49 | 93 | 109 |
| KL 1/65 | 1387 | 50 | 0.4 | 12 | 6.4 | 0.4 | 3.3 | 5.7 | 1.3 | 2.6 | 0.2 | 12.9 | 95.2 | 697 | 38 | 17 | 10 | 17 | 131 | 554 | 75 | 45 | 77 | 146 |
| KL 1/65 | 1384 | 52.8 | 0.2 | 9.7 | 1.4 | 0.1 | 0.8 | 4.1 | 0.2 | 2.2 | 0.1 | 28.1 | 99.6 | 588 | 10 | 14 | 13 | 12 | 98 | 538 | 34 | 62 | 65 | 161 |
| KL 1/65 | 1381 | 59.3 | 0.5 | 15.6 | 5.2 | 0.1 | 2.1 | 1.5 | 1.6 | 3 | 0.2 | 10.4 | 99.4 | 660 | 31 | 23 | 18 | 24 | 164 | 239 | 75 | 45 | 141 | 218 |
| KL 1/65 | 1378 | 4.9 | 0.1 | 1.3 | 2.5 | 0.1 | 17.2 | 24 | <0.01 | 0.3 | 0 | 49.4 | 99.7 | 91 | 11 | <10 | <10 | 20 | 23 | 1952 | 44 | 136 | <10 | 105 |
| KL 1/65 | 1373 | 42.4 | 0.4 | 10.4 | 11.9 | 0.1 | 1.5 | 1.5 | 1.2 | 2 | 0.1 | 27.9 | 99.5 | 414 | 38 | 14 | <10 | 25 | 103 | 186 | 83 | 28 | 77 | 94 |
| KL 1/65 | 1372 | 6.5 | 0.1 | 1.8 | 2.6 | 0.1 | 16.9 | 24.2 | 0.5 | 0.2 | 0.1 | 46.7 | 99.5 | 58 | <10 | <10 | <10 | 20 | 18 | 2096 | 41 | 148 | 19 | 115 |
| KL 1/65 | 1361 | 52 | 0.5 | 13.9 | 10.4 | 0 | 1.3 | 0.8 | 2.2 | 2.5 | 0.2 | 8.3 | 92.2 | 516 | 48 | 20 | 12 | 46 | 137 | 147 | 93 | 31 | 235 | 130 |
| KL 1/65 | 1358 | 54.2 | 0.6 | 14.5 | 7.3 | 0.1 | 1.5 | 1.6 | 2.4 | 2.6 | 0.2 | 12.4 | 97.3 | 567 | 44 | 20 | 13 | 30 | 137 | 203 | 106 | 40 | 145 | 136 |
| KL 1/65 | 1353 | 65.8 | 0.6 | 13.2 | 6.6 | 0.1 | 1.2 | 0.9 | 2.3 | 2 | 0.1 | 4.5 | 97.3 | 531 | 41 | 19 | 14 | 39 | 109 | 165 | 104 | 24 | 71 | 129 |
| KL 1/65 | 1348 | 66.2 | 0.6 | 13.8 | 6.4 | 0.2 | 1.2 | 0.7 | 2.1 | 2.3 | 0.2 | 6 | 99.6 | 601 | 38 | 19 | 13 | <10 | 121 | 163 | 99 | 31 | 69 | 142 |
| KL 1/65 | 1331 | 45.4 | 0.4 | 10.5 | 6.6 | 0.2 | 1 | 0.9 | 1.7 | 1.8 | 0.2 | 31.1 | 99.7 | 428 | 26 | 14 | 10 | 11 | 82 | 118 | 88 | 23 | 78 | 113 |
| KL 1/65 | 1325 | 65.5 | 0.5 | 14.1 | 6.4 | 0.1 | 1.2 | 0.6 | 2.3 | 2.5 | 0.1 | 5.8 | 99.2 | 589 | 42 | 19 | 10 | 20 | 126 | 145 | 128 | 32 | 103 | 141 |
| KL 1/65 | 1298 | 64.1 | 0.5 | 14.1 | 7.7 | 0.2 | 1.2 | 0.5 | 1.6 | 2.8 | 0.1 | 5.2 | 98 | 632 | 30 | 19 | 11 | 31 | 144 | 134 | 120 | 28 | 82 | 150 |