

## ABDP-9: Lower Hamersley Group

Hole azimuth 186°, dip 89° S. 0543586, 7568167

Collared in nose of E-W anticline ~ 50 m N of axis, limb dips ~5°, maybe slight W plunge of 1-2°. Maybe rear crest of slight domical fold, as possible N-S trending open fold with 2-3° dips on limbs has apparent axis along Caliwingina Creek. Stratigraphic position ~ 80 m below base of Whaleback Shale, below 3 10-15m BIF bands, 3 10-15m shale bands in Dales Gorge Member. Surface rock ferruginous, gravelly – pebbly colluvium. West bank of creek 2 km south has pisolitic ironstone outcrop ~10 m thick, may fill valley because of Hamersley Iron drilling 5 km S and W. Locally valley walls have reasonably fresh BIF with superficial brecciation and secondary iron mobilization. No evidence for faulting or igneous intrusion in valley walls, as Joffre-Whaleback contact is consistently visible and undisturbed. Bedrock outcrop at same topographic level ~125 m W. Hole dip and azimuth should yield close to 90° intersection with stratification, should only move 17 m closer to fold hinge over 1000m so shouldn't cross fold axis.

Previous HI RC drilling ~7 km away never got down to bedrock, getting bogged in limonite clay below pisolitic ironstone. Long pre-collar makes vertical drilling safer from cave-in and previous drilling suggests pre-collar will be >50 m.

0-22 m	hammer, ferruginous gravelly colluvium like surface
22-40 m	hammer, orange-brown limonite, goethitic pisolitic ironstone, soft, magnetic goethite rims around orange shale plates
40-97 m	hammer, orange limonite clay with chert gravel as minor component
97-101 m	hammer, alternating grey unoxidized BIF and red hematite oxidized BIF. Some vein quartz, some zones of orange limonitic alteration

Casing planned down to 101m, outside of casing greased with Baroid Shelala, prevented from getting further down hole by shoe-bit sealing off cased hole from cored, also drill water goes down inside of casing. Hole abandoned due to continual caving between 15-28 m, impossible to run casing below 15 m.

Relocated 250 m WSW after discovering that pegged sites are all 210 m at 220° from indicated GPS site location. Collar right in axis of anticline, ~ 20 m E of outcrop of ferruginous BIF breccia of Tertiary age. Right by valley wall, hope to avoid thick colluvium/alluvial gravel that caused caving at previous site. Also should hit bedrock at shallower depth if paleovalley has slopes like modern topography. First outcrop of in situ BIF ~ 100m W, bottom of 3<sup>rd</sup> top BIF (B13) band, so collar should be stratigraphically near base of S12, top of B11, ~ 60 m below top of Dales Gorge.

Dip 88.5° S, 170° azimuth, 0543402, 7568042, ~ 40 m NW of peg

0-4 m	hammer, colluvium with BIF pebbles
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4-16 m	hammer, ferruginous BIF breccia, magnetic angular fragments of silica-poor oxidized BIF in red-brown matrix, goethite fragments retain vague laminations of haematite
16-70 m	hammer, water at 16m, orange-brown limonitic BIF breccia, fragments still haematite at top but goethite downwards
70-76 m	hammer, mixed fresh BIF and limonitic weathered BIF
76-96 m	hammer, mixed fresh silicified green shale and oxidized shale
96-102m	hammer, mixed fresh black kerogenous shale (greasy) and oxidized shale

Steel casing to 101.8 m (some caving at bottom) still had Baroid Shelala on outside, but no new grease added. Shredded paper added at 103.0 m because of lost water circulation due to incomplete casing. HQ coring began at 101.8 m, with initial caving rubble from upwards in hole to 136.5 m. Baroid TR-10 added periodically to drilling water to act as lubricant. Water pumped from flowing creek with fish, green algae, lymnacid snails, insects, frogs, birds and adjacent *Eucalyptus camaldulensis* trees shedding leaves. At 217.60 m Baroid Shelala grease on outside of NQ rods while in Mt. Sylvia BIF to prevent further rod damage (already through best black shales). Rods greased again with Baroid Shelala at 550 m, 3 drums. At 565 m water pressure rose markedly, preventing drilling, bubbling up through drill-stem (sampled) and discharging gas (sampled). Apparently due to too much grease clogging circulation, so diesel and degreaser put down hole to dissolve grease clog which had bogged the drill string (125 litres diesel, 20l degreaser, 20 litres geofoam – all sampled). Core scrubbed with detergent to remove grease from 565 to 600 m. At 798 m torque rose markedly with the high risk of bogging rods and reducing potential drilling depth, so at 804 m Baroid Quik-Mud added to lubricate rod-string, as TR-10 lubricant had not been delivered. At 845 m, breakdown and rods greased, more Quik-Mud, back to TR-10 lubricant afterwards. Hole finished at 984.10 m when ran out of usable rods (started with 1100 m, but many damaged). Final Survey 89°, 277° azimuth.

	101.80 m	Rubble
<b>1</b>	0.07 101.87 m	Black chert breccia with 1-2 mm subangular red/white ferruginous clasts, massive to weakly undulose laminated (1-5 mm)
<b>2</b>	0.01 101.88 m	Plane laminated (1 mm) black kerogenous shale, 1-2% TOC? 1% 0.1 mm pyrite with chlorite partings
<b>3</b>	0.02 101.90 m	Clear–white vein quartz with chlorite partings
<b>4</b>	0.04 101.94 m	Plane–laminated black kerogenous shale like <b>2</b> but intruded by 1 cm quartz veins like <b>3</b> , with chloritic contacts between shale and quartz
<b>5</b>	0.29 102.21 m	Plane–laminated (0.5–1 mm) black kerogenous (TOC 1-2%?) shale, laminae defined by content of 0.1 mm pyrite (1-5%), some oblique 0.5 mm chlorite shear partings, no silt, not very fissile, basal 1-2 cm ovoid pyrite nodules
<b>6</b>	0.13	Wavy–laminated (1-2 mm with 0.5 mm relief) grey-white opaque chert, alternating fine (0.3 mm) and coarse (1-2

	102.34 m	mm) silicified arenite, grains angular and sub-ovoid, larger clear and translucent, smaller white and opaque, volcanogenic quartz and lithics respectively? Lamination flexes around large grains. Silicified felsic crystal-lithic tuff? or silicified carbonate
<b>7</b>	0.07 102.41 m	Black kerogenous shale like <b>5</b> but less pyritic, more massive
<b>8</b>	0.02 102.43 m	Silicified black shale, like <b>7</b> , but with 3% 1-2 mm pyrite cubes
<b>9</b>	0.10 102.53 m	Wavy-laminated grey-white silicified arenite, like <b>6</b> , but finer grained (max grain size 1 mm), more white than grey, creamy sericitic? laminae, some 1-5 cm ovoid vughs (soluble mineral?), silicified carbonate arenite?
<b>10</b>	0.25 102.78 m	Alternating, 1-2 cm layers with stylolitic (1 cm relief, bedding parallel) boundaries of weakly effervescent ferroan carbonate, plane to wavy laminated; and green-black chloritic silicified silty shale, some Fe-silicate? massive to weakly plane laminated
<b>11</b>	0.52 103.30 m	Wavy-laminated grey-white silicified arenite, like <b>9</b> , vuggy, silicified carbonate but fine grained (0.5 mm), low vugh percentage (1%), more silicified; interbedded (1-5 cm) with green-black chloritic Fe-silicate silicified silty shale, like <b>10</b> , some stylolitic contacts, others planar and depositional. Some silicified carbonate beds have 30% 1 mm rhombic siderite (very weak effervescence). Some 0.5 – 3 cm pyritic black shale partings
<b>12</b>	0.60 103.36 m	Interbedded (1-2 cm) green-black chloritic Fe-silicate silicified silty shale; and black kerogenous shale; both pyritic, but green silty shale has 0.5 mm nodules
<b>13</b>	*04002 0.11 103.47 m	Plane-laminated black kerogenous shale, like <b>5</b>
<b>14</b>	0.78 104.25 m	Interbedded (1-5 cm) green-black chloritic Fe-silicate silicified silty shale (pyritic), wavy-laminated silicified carbonate fine arenite like in <b>11</b> ; and plane-laminated (0.5 mm) grey opaque slightly haematitic chert, non-magnetic so magnetite scarce, cherty laminae very fine grained; some stylolitic contacts between lithologies, but mostly depositional, some 5 mm black kerogenous shale partings
<b>15</b>	0.88 105.13 m	Plane to wavy laminated haematitic & magnetic BIF, laminae 0.5 mm, either alternating haematite-silicified carbonate with white 0.5 mm rhombs, or pure haematite; interbedded (0-10 cm) with cream wavey-laminated silicified carbonate, in places undulose laminated or poddy; and weakly laminated green-black chloritic silicified silty shale. Pods look like starved ripples

		END OF DALES GORGE/BEGIN McRAE
<b>16</b>	0.52 105.65 m	Interbedded cream wavy-laminated silicified carbonate with 1 mm lam, 0.5 white siderite rhombs; and weakly plane-laminated (0.5 mm) green-black silicified chloritic silty shale. Beds 1-10 cm, some pyritic stylolitic contacts, others depositional, rare 5 mm pyritic black shale partings
<b>17</b>	0.04 105.69 m	Plane-laminated (1 mm) green-black chloritic and kerogenous weakly silicified shale, < 1% TOC, laminae defined by chlorite content, 1% 0.2 mm pyrite
<b>18</b>	0.84 106.53 m	Breccia of plane-laminated green-black shale, like <b>17</b> , in anastomosing set of green chloritic veins, slightly silicified
<b>19</b>	0.05 106.58 m	Plane-laminated green-black silicified shale, like <b>17</b> , but with 3% 0.5 mm pyritic laminae
<b>20</b>	1.29 107.87 m	Interbedded cream wavy-laminated silicified carbonate and green-black silicified chloritic silty shale, like <b>16</b> , beds 1-15 cm, carbonate lamination 1-2 mm
<b>21</b>	0.74 108.61 m	Interbedded pale grey wavy-laminated (1 mm, 0.5 mm relief) silicified carbonate with 30% 0.5 mm siderite rhombs; cream weakly plane-laminated (2 mm) fine grained (0.3 mm) silicified carbonate arenite; and grey-green silicified stilpnomelane (dark needles 0.1 x 0.4 mm) silty mudstone. Stylolitic contacts (up to 2 cm relief) between carbonates and stilpnomelane beds, bedding 1-5 cm. Stilpnomelane beds may contain 3% 0.5 mm pyrite cubes
<b>22</b>	0.32 108.93 m	Pale grey wavy-laminated silicified carbonate and wrinkly-laminated (0.5 mm, relief 0.5 mm) silicified carbonate arenite, like <b>21</b> , but with very little stilpnomelane lutite
<b>23</b>	0.45 109.38 m	Plane-laminated (0.5-1 mm) non-fissile black kerogenous shale with 1-3% 0.1 mm pyrite (concentration defining laminae) and 1-2% 0.3 mm pale grey carbonate lenses (diagenetic nodules?). Rare 1-2 mm laminae of 100% pyrite
<b>24</b>	0.24 109.62 m	Cross-laminated (sets 1 cm) and wavy-laminated (1 mm) silicified fine carbonate arenite, grains white, subspheroidal, subangular, laminae separated by partings of clear grey chert with 0.3 mm siderite rhombs. Cross-laminae at low angles (5°)
<b>25</b>	0.51 110.13 m	Weakly plane-laminated (0.5-1 mm) non-fissile black kerogenous shale with <1% 0.1 mm pyrite, 3% 0.3 mm pale grey carbonate lenses. Rare 1-2 mm laminae of 100% pyrite. Some zoned ellipsoidal pyrite nodules 1-2 cm
<b>26</b>	0.27	Weakly wavy-laminated (1 mm) silicified carbonate with

	110.40 m	0.3 mm siderite rhombs and clear grey chert, laminae defined by siderite content. 1 cm black shale parting
<b>27</b>	*04003 0.48 110.84 m	Plane-laminated (0.5-1 mm) non-fissile black kerogenous shale with 1% pyrite (0.1 mm) and 1-5% 0.1 mm pale grey carbonate lenses defining laminae, rare 1-10 mm 100% pyrite laminae
<b>28</b>	1.45  112.29 m	Plane-laminated (1-10 mm) non-fissile grey-black moderately kerogenous shale with 1-10% pale grey carbonate wispy lenses parallel to bedding defining lamination, trace disseminated 0.1 mm pyrite. Carbonate highly effervescent, therefore calcite
<b>29</b>	0.76  113.05 m	Massive to weakly plane-laminated (1 mm) black kerogenous shale, non-fissile, 1-2% pale grey wispy calcite lenses defining laminae, trace disseminated pyrite (0.1 mm)
<b>30</b>	0.43  113.48 m	Massive to weakly plane-laminated (1 mm) black kerogenous shale, like <b>29</b> , but with abundant 1-3 mm bedding-parallel calcite veins, scattered 1-2 cm pyrite nodules
<b>31</b>	*04001 0.42 113.90 m	Massive, fissile very black kerogenous shale, non-pyritic and non-calcitic, except for rare 1-5cm pyrite nodules
<b>32</b>	*04004 0.44 114.34 m	Weakly plane-laminated (0.5 mm), non-fissile very black kerogenous shale with 3% wispy calcite lenses defining lamination
<b>33</b>	0.62  114.96 m	Weakly plane-laminated (0.5 mm), non-fissile grey-black moderately kerogenous shale with 5-10% 0.1-0.2 mm wispy calcite lenses defining layering, trace disseminated 0.1 mm pyrite
<b>34</b>	0.35  115.31 m	Weakly plane-laminated (0.5-1 mm), non-fissile black kerogenous shale with 3-5% 0.1-0.2 mm wispy calcite lenses defining layering. Rare 1 x 3 cm lenticular pyrite nodules
<b>35</b>	1.31  116.62 m	Weakly plane-laminated non-fissile grey-black moderately kerogenous shale, like <b>33</b> , but laminae 3-5 mm
<b>36</b>	0.06  116.68 m	Normally graded (0.3 to 0.1 mm) planar beds (1-2 cm) of fine calcarenite with black kerogenous matrix in upper part of each bed
<b>37</b>	0.09  116.77 m	Weakly plane-laminated, non-fissile, grey-black moderately kerogenous shale, like <b>33</b>
<b>38</b>	0.09  116.86 m	Normally graded (0.5 to 0.1 mm) cross-beds (sets 5 cm) of fine calcarenite, like <b>36</b>
<b>39</b>	0.73  117.59 m	Weakly plane-laminated, non-fissile, grey-black moderately kerogenous shale, like <b>33</b>
<b>40</b>	0.12	Normally graded (0.3 to 0.1 mm) cross-bedded fine

	117.71 m	calcarenite, like <b>38</b>
<b>41</b>	0.09 117.80 m	Normally graded bed (1 to 0.2 mm) of medium calcwacke, angular subsheroïdal white calcite grains in dark grey matrix, matrix support, diagenetic pyrite replacing 1% of grains
<b>42</b>	0.03 117.83 m	Weakly plane-laminated, non-fissile grey-black moderately kerogenous shale, like <b>33</b>
<b>43</b>	0.03 117.86 m	Cross-bedded (sets 1 cm) fine calcarenite (0.2 - 0.1 mm), grey, tabular cross-beds
<b>44</b>	0.48 118.36 m	Weakly plane-laminated, non-fissile grey-black moderately kerogenous shale, like <b>33</b>
<b>45</b>	0.30 118.66 m	Weakly normally graded (0.3 to 0.1 mm) and cross-laminated fine calcareous arenite with dark grey matrix. Bed bases weakly scoured (2mm)
<b>46</b>	0.09 118.75 m	Weakly plane-laminated, non-fissile grey-black moderately kerogenous shale, like <b>33</b>
<b>47</b>	0.05 118.80 m	Cross laminated (0.5 mm), strongly load-deformed fine (0.2 mm) calcarenite, sets 1 cm, uppermost pyrite lamina 3mm
<b>48</b>	0.18 118.98 m	Massive, non-fissile, grey-black, moderately kerogenous shale, 3% 0.3 mm white calcite lenses and grains
<b>49</b>	0.02 119.00 m	Cross-laminated, load-deformed fine calcarenite, like <b>47</b> , but loading restricted to flame structures
<b>50</b>	0.20 119.20 m	Massive, non-fissile black kerogenous shale, 1% 0.2 mm pale grey calcite lenses
<b>51</b>	0.04 119.24 m	Plane-laminated (0.5 mm) pyritic black shale, laminae defined by pyrite content (up to 50%), also 2 cm round pyrite nodules deflecting laminae
<b>52</b>	0.18 119.42 m	Weakly plane-laminated, grey-black moderately kerogenous shale, like <b>33</b>
<b>53</b>	0.32 119.74 m	Massive black kerogenous shale with lenticular to laminoid pale grey carbonate-rich starved ripples? of calcisiltite, up to 2 mm x 10 mm, rare 1 x 3 cm pyrite lenses
<b>54</b>	0.05 119.79 m	Massive black kerogenous shale
<b>55</b>	0.35 120.14 m	Scoured and cross-bedded fine calcarenite/calcwacke, grains 0.1-0.2 mm, laminae 1-5 mm, defined by content of dark grey matrix, sets 5 cm thick, at 30° angles, weak flame structures
<b>56</b>	0.65 120.79 m	Weakly plane laminated, grey-black, moderately kerogenous shale, like <b>33</b> , rare bedding-parallel stylolites
<b>57</b>	0.01 120.80 m	Cross-laminated, load-deformed fine calcarenite, like <b>49</b>
<b>58</b>	0.45 121.25 m	Weakly plane-laminated (1-2mm), non-fissile grey-black, moderately kerogenous shale with 2-5% pale grey calcite

		lenses, slightly pyritic (<1% 0.1 mm)
<b>59</b>	0.05 121.30 m	Cross-laminated, load-deformed fine calcarenite, like <b>49</b> , but with 1 cm lenticular pyrite nodules
<b>60</b>	0.09 121.39 m	Weakly plane-laminated, grey-black shale, like <b>58</b>
<b>61</b>	0.02 121.41 m	Cross-laminated, load-deformed fine calcarenite, like <b>49</b> , but with scoured base (1 cm)
<b>62</b>	0.31  121.72 m	Breccia (soft-sediment deformation) of massive black kerogenous shale in matrix of coarse calcwacke (0.1-3 mm) with angular blocky white calcite grains supported in black shale matrix. Top of unit is massive black shale, base grades into calcwacke
<b>63</b>	0.22 121.94 m	Weakly normally-graded (0.5 to 0.3 m) beds of medium calcwacke, angular blocky white calcite grains in black shale matrix
<b>64</b>	0.07 122.01 m	Massive medium calcarenite, grains 0.2-0.5 mm, white angular calcite in black mud matrix, grain support
<b>65</b>	0.06 122.07 m	Weakly plane-laminated, grey black shale, like <b>58</b>
<b>66</b>	0.11 122.18 m	Plane-laminated (1-3 mm), weakly graded (0.3 to 0.1 mm) fine calcarenite
<b>67</b>	0.06 122.24 m	Cross-laminated (1 mm, sets 1 cm thick) and scoured fine calcarenite, laminae defined by presence of black muddy matrix
<b>68</b>	0.23 122.47 m	Weakly plane-laminated grey-black shale, like <b>58</b>
<b>69</b>	0.05 122.52 m	Convolute-bedded fine calcarenite and black shale
<b>70</b>	0.34 122.86 m	Weakly plane-laminated (1 mm) to cross-laminated (sets 1 cm thick) medium calcarenite (0.5 to 0.2 mm) with abundant black pyrobitumen-filled stylolites (0.5 mm)
<b>71</b>	0.22 123.08 m	Plane-laminated (1-5 mm) fine calcarenite with black mud matrix, laminations defined by matrix content, some 1 cm scours
<b>72</b>	0.27 123.35 m	Weakly plane-laminated grey-black shale, like <b>58</b>
<b>73</b>	0.33 123.68 m	Interbedded weakly plane-laminated grey-black shale, like <b>58</b> , and plane- to cross-laminated fine calcarenite (sets 1 cm thick)
<b>74</b>	0.20 123.88 m	Weakly plane-laminated grey-black shale, like <b>58</b>
<b>75</b>	0.07 123.95 m	Massive fine calcarenite with black mud matrix, grains white, 0.1 to 0.2 mm, grain support
<b>76</b>	0.06 124.01 m	Graded and cross-laminated (1 mm) fine calcarenite → black shale, base shallowly scoured (2 mm)
<b>77</b>	1.15	Plane-laminated (1-5 mm) black kerogenous shale with

	125.16 m	calcsiltite partings, rare 1-2 cm lenticular pyrite nodules in places, repetitively graded, some massive shale beds up to 5 cm thick
<b>78</b>	1.62 126.78 m	Plane-laminated kerogenous shale with graded calcsiltite bases to laminae (1-5 mm), occasional 1-10 mm pyritic interbeds with up to 100% 0.1 mm pyrite, generally 1% 0.1 mm disseminated pyrite, rare massive shale beds with 2 mm incorporative diagenetic calcite rhombs
<b>79</b>	3.41 130.19 m	Massive black kerogenous shale with 1-3% 0.1 mm pyrite and 1-2% 0.2 mm calcite lenses defining very weak laminae. Scattered 1-3 cm pyrite lenses and 1-5 mm pyrite laminae
<b>80</b>	0.90 131.09 m	Plane-laminated (0.5 mm), pyritic black kerogenous shale, pyrite 0.1 mm 1-10%, defines lamination, also abundant 1-3 cm nodules and 1-10 mm laminae of clustered 0.5 mm pyrite cubes
<b>81</b>	0.02 131.11 m	Grey-white bedding-parallel quartz vein
<b>82</b>	0.14 131.25 m	Intraclast breccia of spherical to lenticular pyrite nodules from 2 mm to 2 cm in black shale matrix, nodules stacked subparallel to bedding, some 2 cm solid pyrite laminae
<b>83</b>	0.78 132.03 m	Interbedded kerogenous black shale and golden pyritic shale, beds 2-10 mm thick, planar, pyritic beds 10-30% 0.1 mm pyrite, also abundant 1-3 cm nodules of 100% 0.3 mm pyrite
<b>84</b>	0.28 132.31 m	Massive black kerogenous shale with rare 1 cm pyritic laminae and carbonate veins
<b>85</b>	0.87 133.18 m	Highly pyritic plane-laminated (0.5 to 10 mm) black kerogenous shale, 50% pyritic laminae composed of 10-50% 0.1 mm pyrite in black shale matrix, remaining laminae of black shale. Abundant 1-2 cm pyrite nodules and rare laminae of 100% pyrite. 1 cm quartz-pyrite veins common, also 1 cm calcite veins
<b>86</b>	1.22 134.40 m	Moderately pyritic interbedded kerogenous black shale and pyritic black shale, like <b>83</b> , but only 10-15% pyritic beds
<b>87</b>	1.12 135.52 m	Highly pyritic interbedded kerogenous black shale and pyritic black shale, like <b>85</b>
<b>88</b>	7.25 142.77 m	Finely plane-laminated (0.5-5 cm) black kerogenous shale and golden pyritic shale, pyrite content defines lamination with pyritic laminae 0.5-1mm, up to 25% 0.1mm pyrite in black shale matrix. Scattered pyrite nodules 1x3cm and laminae 1 cm of 100% 0.3mm pyrite
<b>89</b>	0.18 142.95 m	Silicified breccia of pyritic black shale fragments 0.5-5cm, subangular, blocky, in pyritic vein quartz and pyrite veins, some lithified coarse carbonate arenite?

<b>90</b>	1.42 144.37 m	Finely plane-laminated black kerogenous and golden pyritic shale, like <b>88</b>
<b>91</b>	0.14 144.51 m	Massive black kerogenous shale, 1% 0.1mm pyrite and 1% 0.1mm carbonate silt defining very weak planar laminae (2mm)
<b>92</b>	0.20 144.71 m	Silicified breccia, like <b>89</b>
<b>93</b>	0.42  145.13 m	Silicified wavy-laminated (1mm) fine carbonate arenite, grains white, 0.2mm, laminae defined by clear grey chert with 0.5mm white carbonate rhombs, massive layers to 5cm thick of silicified fine arenite or silicified diagenetic rhombs, arenaceous layers pyritic with 0.5mm cubes
<b>94</b>	*04009 4.31 149.44 m	Massive black kerogenous shale, like <b>91</b> , but rare 0.5-1cm laminae of 100% pyrite, 0.3-1cm veins of calcite bedding-parallel, some 5cm beds with up to 30% disseminated 0.1mm pyrite but mostly 1% or less
<b>95</b>	1.26  150.70 m	Weakly plane-laminated (1-10mm) grey & black kerogenous shale, grey laminae have 20-50% 0.2-0.4 mm wispy grey calcite lenses and 1-5% 0.1mm pyrite in black kerogenous shale matrix, some 1cm bedding-parallel veins of coarse 1-2mm calcite in massive black dull opaque matrix (not pyrobitumen, scratches white)
<b>96</b>	0.60  151.30 m	Massive black kerogenous shale with scattered nodules and laminae (1cm) of 100% pyrite cubes. 1-3% disseminated 0.1mm pyrite, 1-3% disseminated grey calcite lenses, 0.2mm
<b>97</b>	0.14 151.44 m	Silicified fine carbonate arenite and diagenetic carbonate rhombs, like <b>93</b>
<b>98</b>	0.11 151.55 m	Silicified breccia, like <b>89</b>
<b>99</b>	1.60 153.15 m	Massive black kerogenous shale with pyrite nodules and laminae, like <b>96</b>
<b>100</b>	0.02  153.17 m	Cream-khaki massive to weakly plane-laminated (0.2mm) sandy mudstone, grains angular, white, 0.1-0.3mm in sericitic clay matrix – felsic tuff?
<b>101</b>	0.14 153.31 m	Massive black kerogenous shale with pyrite nodules, like <b>96</b>
<b>102</b>	0.22 153.53 m	Silicified fine carbonate arenite with diagenetic carbonate rhombs, like <b>93</b>
<b>103</b>	0.42  153.95 m	Massive black kerogenous shale with 1-3% 0.1mm disseminated pyrite with 4 sharply- to diffusely-bounded cream-khaki sandy mudstone (felsic tuff?) layers 1-2cm
<b>104</b>	0.23 154.15 m	Massive black kerogenous shale with pyrite nodules and laminae, like <b>96</b>
<b>105</b>	1.90	Interbedded massive black kerogenous shale with pyrite nodules and laminae, like <b>96</b> , and silicified fine carbonate

	156.05 m	arenite with diagenetic carbonate rhombs, like <b>93</b> , beds 5-20cm thick, silicified carbonates have internal lamina-parallel stylolitic boundaries, in places stylo-brecciated
<b>106</b>	*04010 0.96 157.01 m	Massive black kerogenous shale with rare 1cm pyrite nodules and laminae, trace disseminated 0.1mm pyrite
<b>107</b>	0.64 157.65 m	Silicified cream-grey fine (0.2mm) carbonate arenite, plane laminated 5mm; and grey chert with 0.1-0.5mm carbonate rhombs, wavy-laminated 1mm; arenites have 1-5% 0.3mm pyrite cubes; beds 1-5cm thick
<b>108</b>	1.59 159.24 m	Massive to weakly plane-laminated (5mm) slightly pyritic (1% 0.1mm) kerogenous black shale with 1-2cm interbeds of clear grey chert with scattered 1mm carbonate rhombs and marginal pyrite laminae (1mm), stylolitic boundaries. Shale beds are 5-20cm thick (95% shale)
<b>109</b>	*04015 2.17 161.41 m	Interbedded black kerogenous slightly pyritic shale and silicified carbonate, like <b>108</b> , but 50% shale, 50% silicified carbonate in beds 1-10cm thick with marked stylolitic boundaries. Silicified carbonates are mostly wavy-laminated grey translucent chert with 0.3mm carbonate rhombs, rare cream fine carbonate arenite beds
<b>110</b>	3.83 165.24 m	Interbedded silicified carbonates and shales, like <b>109</b> , but shales grey, silty, slightly silicified, non-pyritic
<b>111</b>	3.80 169.04 m	Interbedded silicified carbonates and grey shales, like <b>110</b> , but shales are plane-laminated (0.5-2cm), silty shale and very fine carbonate arenite with dark mud matrix (weakly effervescent). 15% chert in 1-5cm beds with stylolitic boundaries, 85% shale in 5-20cm units. Rare bands of 1-5mm quartz-carbonate pyrite nodules
<b>112</b>	2.37 171.41 m	Plane-laminated (1-10mm) grey-black interbedded kerogenous black shale (80%), grey carbonate silty to fine sandy shale (10%) and pyritic (5-10% 0.1mm) shale. Rare cross-laminated fine carbonate sand layers (1cm with 0.5mm tabular laminae) with 5% diagenetic 0.5mm pyrite cubes
<b>113</b>	1.59 173.00 m	Silicified carbonates: massive fine carbonate arenite (0.2-0.3mm, well sorted) and undulose-laminated grey chert with rhombic diagenetic carbonate (0.2-0.4mm), rare cream 2-5cm beds of silicified felsic tuff? with angular quartz grains, 1-3mm, in creamy clayey matrix or with 0.5x3mm wispy fiamme?
<b>114</b>	1.90 174.90 m	Massive to weakly plane-laminated (1-5mm) black kerogenous shale with 1-3% 0.1mm disseminated pyrite, occasional 1-2 cm horizons of 20% 1-5mm spherical quartz-calcite-pyrite nodules, 1-2cm quartz-calcite-pyrite veins

<b>115</b>	3.01  177.91 m	Interbedded black kerogenous shale with 1-3% disseminated 0.1mm pyrite with 2% 0.5-2cm 100% pyrite nodules and laminae; and silicified carbonates, mostly wavy-laminated grey chert with diagenetic carbonate rhombs (1mm laminae) but some massive fine carbonate sand. Carbonate compromises 10% in beds 1-20cm thick
<b>116</b>	1.36  179.27 m	Plane-laminated (0.5-5mm) black kerogenous shale with laminations defined by pyrite content (0.1mm, 0-5%) and calcite silt (0-10%). Occasional 0.2-5cm nodules and laminae of 100% 0.3mm pyrite cubes
<b>117</b>	1.72  180.99 m	Massive to weakly plane-laminated black kerogenous shale with quartz-carbonate-pyrite nodules and veins, like <b>114</b> , also 1-3mm laminae of 100% 0.3mm pyrite
<b>118</b>	2.30  183.29 m	Weakly plane-laminated (1-5mm) black kerogenous shale, like <b>117</b> , but no quartz-carbonate-pyrite nodule horizons, rare quartz-carbonate-pyrite laminae parallel veins 1cm, rare 1mm asbestos laminae
<b>119</b>	1.68  184.97 m	Plane-laminated (1-10mm) black kerogenous shale with 1-3% 0.1mm disseminated pyrite with interlaminae of 30% calcite silt, 30% 0.2mm pyrite, both together, or 1-5mm quartz-carbonate-pyrite nodules (15%). Some silty laminae have scoured bases
<b>120</b>	0.97  185.94 m	Plane-laminated black kerogenous shale, like <b>119</b> , but no quartz-carbonate-pyrite nodule horizons, instead quartz-carbonate-pyrite veins, 5% carbonate silt-pyrite laminae 5mm with scoured bases and cross laminations
<b>121</b>	*04014 1.16 187.10 m	Plane-laminated black kerogenous shale with quartz-carbonate-pyrite nodule horizons up to 10cm thick, nodules up to 1 cm, bedding defined by abundance of calcitic silt (up to 70%), 30% nodular horizons
<b>122</b>	2.13 189.23 m	Weakly plane-laminated (1-10mm) black kerogenous shale with 1-2mm 100% pyrite laminae and lenses; and scattered 1-5cm silicified carbonate (wavy-laminated chert with diagenetic carbonate rhombs) interbeds. Laminae defined by disseminated 0.1mm pyrite (0.5%) and calcitic silt (0-10%), greyer downwards
<b>123</b>	*04016 0.42 189.65 m	Plane-laminated (1-10mm) grey-black kerogenous slightly silicified shale with laminae defined by calcitic silt (0-30%) content
		END OF MCRAE/BEGIN MT SYLVIA
<b>124</b>	0.43  190.08 m	Plane- to wavy-laminated (0.5-1mm) cherty silicified carbonate, alternating laminae of translucent grey chert and 0.5mm white carbonate rhombs, some very fine sand 1mm (carbonate?)
<b>125</b>	4.83	Plane- and wavy-laminated (0.5-10mm) banded iron formation, highly magnetic with 1-5cm bands of inter-

	194.91 m	laminated pink-brown haematite and cream chert, red chert with white (0.1mm) carbonate rhombs, and grey magnetite (100%). Haematite bands often lenticular or pinch-and-swell or have internal 1cm lenses of white chert. Rare 1x3 cm pyrite nodules in haematite-chert bands, lamination displaced around them therefore diagenetic. Lamination in some haematite-chert bands discontinuous, pinched out or merging, looks like hummocky cross-lamination. Haematite and haematite-chert bands constitute ~75%
<b>126</b>	0.24 195.15 m	Wavy-laminated (0.5mm) grey-white chert with 3% scattered 1mm pyrite cubes, no haematite
<b>127</b>	*04017 0.37 195.52	Plane-laminated (1-10mm) black kerogenous shale, lamination defined by pyrite (0.1mm) content (3-10%). Occasional 1-3mm nodules and laminae of 100% pyrite
<b>128</b>	*04020 7.35  202.87 m	Plane-laminated (2-20mm) grey-black kerogenous shale with 0.5-5cm interbeds (10%) of massive fine-medium (0.2-0.5mm) well-sorted calcarenite, sometimes forming lenticular nodules with shale lamination displaced around them. Lamination in shale defined by calcisiltite (0-10%) and pyrite (0-5%) content. Coarsest calcarenites have 20% 0.5mm pyrite cubes. Rare 3mm lenses and laminae of 100% pyrite. Some calcarenites have scoured bases
<b>129</b>	0.46  203.33 m	Plane-laminated (2-20mm) grey-black shale, like <b>128</b> , but with 5-15 cm breccia interbeds, with angular blocky to tabular fragments of fine to coarse laminated calcarenite in fine calcarenite matrix
<b>130</b>	0.68 204.01 m	Massive black kerogenous shale with rare (1%) 2-10mm interlaminae of fine calcarenite with 30% 0.3mm pyrite, 1% 0.1mm disseminated pyrite
<b>131</b>	0.31 204.32 m	Plane-laminated (2-20mm) grey-black kerogenous shale with 50% 1-5cm interbeds of fine calcarenite, like <b>128</b>
<b>132</b>	2.33  206.65 m	Massive black kerogenous shale with 5% 1-5cm interbeds (sometimes lenticular nodules) of fine (0.3mm) or coarse (0.7mm) calcarenite, fine calcarenite is massive, coarse calcarenite is plane- to wavy-laminated, laminae separated by 0.1mm black partings, may be weakly graded
<b>133</b>	3.36  210.01 m	Massive to weakly plane-laminated (1-5mm) black kerogenous shale with 1% 0.1mm disseminated pyrite, laminae defined by calcisiltite content (0-10%) with 1% 1cm interbeds of fine calcarenite and 3% 1cm coarse calcite-pyrite veins
<b>134</b>	*04022 2.08	Plane-laminated (1-5mm) black kerogenous shale (1% 0.1mm disseminated pyrite) with laminae defined by content of pyrite (1-30%) and calcisiltite (0-10%); with 1-20cm interbeds (20%) of wavy-laminated (0.5mm) cherty

	212.09 m	silicified carbonate (20% 0.2mm non-effervescent rhombs)
<b>135</b>	0.60  212.69 m	Banded (1-5cm) chert of silicified fine calcarenite (0.2mm) translucent grey chert with 1mm wavy laminae of non-effervescent 0.5mm white carbonate rhombs and opaque massive grey chert with 30% black stilpnomelane nodules. Stylolitic boundaries common.
<b>136</b>	3.66 216.35 m	Wavy-laminated banded iron formation, like <b>125</b> , with zones of tabular breccia, more podding
<b>137</b>	1.52 217.87 m	Banded chert, like <b>135</b> , but with rare 2cm black kerogenous shale interbeds
<b>138</b>	3.01  220.88 m	Plane-laminated (0.5-5mm) black kerogenous shale with 1-3% 0.1mm disseminated pyrite, rare 1cm pyrite nodules and laminae, with 5% 1-5cm interbeds of wavy-laminated (0.5mm) white chert after carbonate (30% 0.3mm white non-effervescent carbonate rhombs)
<b>139</b>	0.73 221.61 m	Banded chert, like <b>135</b> , but no stilpnomelane bands, stylolitic band boundaries common
<b>140</b>	1.56  223. 17 m	Wavy-laminated banded iron formation like <b>125</b> , with abundant 0.3 mm white non-effervescent carbonate rhombs throughout, pure magnetite bands rare
<b>141</b>	0.22 223.39 m	Banded chert, like <b>135</b> but with no stilpnomelane-rich bands, some podding in zones 5 cm thick
<b>142</b>	0.08 223.47 m	Silicified breccia of black kerogenous and pyritic shale
<b>143</b>	0.31  223.78 m	Wavy-laminated (0.5 mm) white chert with 30% 0.3 mm white non-effervescent carbonate rhombs with 5% interbeds (1-2 cm thick) of silicified fine pyretic calcarenite and rare stilpnomelane-rich chert
<b>144</b>	0.65  224.43 m	Plane-laminated (1-3 mm) black kerogenous shale, laminae alternating between those rich in calcisiltite and fine pyrite (5% silt, 10% pyrite) and poor (0%), rare 1 × 2 cm pyrite nodules, quartz-pyrite nodules
<b>145</b>	1.36  225.79 m	Banded chert (1-5 cm) of silicified fine calcarenite (still moderately effervescent, so only moderately silicified), weakly plane-laminated (0.5 mm) grey translucent chert with 0.5 mm laminae of 0.3 mm white non-effervescent carbonate rhombs, some stylolitic contacts
<b>146</b>	*04024 3.07  228.86 m	Plane-laminated (1-20 mm) black kerogenous silty shale, laminae defined by calcisiltite (10-50%) and 0.1 mm pyrite (0-10%) content, rare 1 cm 100% pyrite nodules and laminae, also chert-pyrite bands parallel to bedding (after coarse calcarenite)
<b>147</b>	2.35	Plane-laminated (1-5 mm) grey/black kerogenous silty shale, laminae defined by calcisiltite (5-30%) and 0.1 mm pyrite (0-5%) content, rare 1 cm pyrite laminae and

	231.21 m	nodules, also chert-pyrite bands (1 cm) parallel to bedding, rare 1-2 cm white chert bands of wavy-laminated chert (0.5 mm) with 0.3 mm white carbonate rhombs
<b>148</b>	<i>0.51</i> 231.72 m	Plane-laminated grey/black kerogenous shale, like <b>147</b> but more strongly laminated, some 1-2 mm calcisiltite interlaminae
<b>149</b>	<i>1.63</i> 233.35 m	Plane- (1-10 mm) and cross-laminated (1 mm, sets 2-10 cm) grey sandy kerogenous shale, fine calcarenite grains (5-40%) in black kerogenous shale matrix, scattered 1 cm bedding-parallel chert-pyrite bands
<b>150</b>	<i>*04025</i> <i>0.66</i> 234.01 m	Plane-laminated (1-10 mm) black kerogenous silty shale, laminae defined by calcisiltite (3-15%) and 0.1 mm pyrite (1-5%) content, rare 1-2 mm pure pyrite laminae
<b>151</b>	<i>0.67</i>  234.68 m	Plane-laminated (2-20 mm) grey-black kerogenous silty shale, laminae defined by silt content (5-10%), some 1-2 cm fine calcarenite interbeds, also chert-pyrite bands, wavy-laminated, after coarse (0.7 mm) calcarenite, laminae defined by 0.1mm black partings (bituminous stylolites?)
<b>152</b>	<i>1.55</i>  236.23 m	Weakly plane-laminated (1-10 mm) black kerogenous shale, laminae defined by calcisiltite content (0-20%), 1% disseminated 0.1 mm pyrite, rare chert-pyrite bands 1-2 cm thick, a single 2 cm zone of 30% 1-3 mm wispy lenticular calcite fenestrae?
<b>153</b>	<i>1.23</i>  237.46 m	Interbedded white chert and silicified massive black shale, beds 10-30 cm, chert mostly wavy-laminated translucent grey chert with 0.5 mm layers of 0.1-0.5 mm white-clear non-effervescent carbonate rhombs, but rare grey massive silicified fine calcarenite, many stylolitic contacts
<b>154</b>	<i>1.54</i>  239.00 m	Weakly plane-laminated (1-5 mm) black kerogenous silty shale, laminae defined by calcisiltite (1-10%) and 0.1 mm pyrite (1-3%) content, rare 1 cm chert-pyrite bands after coarse calcarenite with stylolitic boundaries, rare pyrite nodules
<b>155</b>	<i>*04026</i> <i>1.16</i> 240.16 m	Weakly plane-laminated (1-10 mm) grey/black kerogenous shale, laminations defined by calcisiltite content (0-20%), with 1% 0.1 mm disseminated pyrite, rare 2-4 cm fine calcarenite interbeds, also chert-pyrite bands
<b>156</b>	<i>1.57</i>  241.73 m	Plane-laminated (1-10 mm) grey/black kerogenous silty shale, laminations defined by content of calcisiltite (5-20%) and 0.1 mm pyrite (1-10%), rare 1 cm pyrite nodules, 2-6 cm interbeds of fine calcarenite, sometimes nodular with stylolitic contacts
<b>157</b>	<i>0.73</i> 242.46 m	Plane-laminated (1-10 mm) black kerogenous shale with 1-5% calcisiltite, 1% 0.1 mm disseminated pyrite

<b>158</b>	1.70 244.16 m	Plane-laminated black kerogenous shale like <b>157</b> but with 5% 1-3 cm interbeds of massive calcisiltite and fine calcarenite
<b>159</b>	0.16  244.32 m	Interbedded (50%, 50%) fine calcarenite and black kerogenous shale, beds 1-5 cm, calcarenite highly effervescent, grains 0.1-0.2 mm, subspherical, subangular, with occasional 1-2 mm tabular white calcite grains, black shale has 1% 0.1 mm disseminated pyrite, 3% disseminated calcisiltite
<b>160</b>	0.75  245.07 m	Wavy-laminated white chert, with grey translucent silica containing 0.5 mm layers of 0.3 mm white carbonate rhombs, some interbeds (3-5 cm) of silicified fine calcarenite and fissile black shale
<b>161</b>	1.42  246.49 m	Interbedded (50%, 50%) fine calcarenite and black kerogenous shale, like <b>159</b> but beds thicker (1-12 cm), calcarenite contains rare black stylolites, outsize white clasts are subspherical not tabular, some medium calcarenite beds also with 5% 0.5 mm pyrite
<b>162</b>	*04027 1.16 247.65 m	Weakly plane-laminated (1-20 mm) grey/black kerogenous shale with 0-15% calcisiltite, 1-3% 0.1 mm disseminated pyrite with 5% 1-4 cm interbeds of massive or normally-graded fine calcarenite
<b>163</b>	1.49  249.14 m	Interbedded (50%,50%) grey/black kerogenous shale (1-3% calcisiltite, 1-3% 0.1 mm disseminated pyrite) and fine calcarenite, massive with 2-3% coarse calcite sand grains (subspheroidal, subangular), beds 1-10 cm, sometimes calcarenite beds are lenticular with internal black stylolites, rare 1 cm coarse calcarenite interbeds with stylolitic boundaries, rare pyrite lenses and laminae 1-3 mm
<b>164</b>	0.98  250.12 m	Interbedded grey/black kerogenous shale and fine calcarenite, like <b>163</b> but 80% shale, rare 1 cm chert-pyrite bands after coarse calcarenite, a single 10 cm bed of gravelly calcite breccia? with very indistinct grains
<b>165</b>	1.54  251.66 m	Interbedded (50%, 50%) grey/black kerogenous shale and fine calcarenite, like <b>163</b> but some beds of calcarenite with 30% wispy 1 x 5 mm white calcite laminoid fenestrae?
<b>166</b>	0.57 252.23 m	Interbedded (80%, 20%) grey/black kerogenous shale and fine calcarenite, like <b>164</b> but no breccia
<b>167</b>	0.37 252.60 m	Interbedded (50%, 50%) grey/black kerogenous shale and fine calcarenite, like <b>165</b> but no breccia or fenestral beds
<b>168</b>	1.05  253.65 m	Massive grey/black kerogenous silty shale, 1-5% calcitic silt, 1-3% 0.1 mm disseminated pyrite, with 5% 1-5 cm lenticular interbeds of fine calcarenite
<b>169</b>	0.05	Highly pyritic zone (60% 0.3 mm pyrite cubes), texture

	253.70 m	looks as though pyrite has replaced calcitic laminoid fenestrae 1 x 5 mm, in black shale matrix
<b>170</b>	*04028 0.30 254.00 m	Massive grey/black kerogenous sandy shale, 1-5% fine calcarenite grains with rare 1 mm laminae of fine calcarenite or pyrite
<b>171</b>	1.34  255.34 m	Weakly plane-laminated (1-5 mm) grey/black kerogenous shale, 1-5% calcisiltite, 1-3% 0.1 mm pyrite, with 10% 2-10 mm fine calcarenite interbeds with scoured bases, often lenticular, rare cross-lamination (starved ripples?)
<b>172</b>	0.50  255.84 m	Weakly plane-laminated (1-5 mm) grey/black kerogenous shale, with 30% lenticular interbeds and nodules of fine calcarenite up to 4 cm thick, some with 1-2 mm cross-lamination and scoured (1 cm) bases, also some with weak reverse grading, occasionally fitted together by stylolites
<b>173</b>	0.55  256.39 m	Massive grey fine calcarenite with black shale matrix, sometimes grain-supported but mostly matrix-supported, with abundant (10-30%) subvertical irregular dewatering fractures 3 x 15 mm, filled with coarse (0.7 mm) calcarenite, also laminoid fenestral zones 1-2 cm thick
<b>174</b>	0.72 257.11 m	Weakly plane-laminated grey/black kerogenous shale with lenses and laminae of cross-laminated fine calcarenite, like <b>172</b>
<b>175</b>	0.05 257.16 m	Highly pyritic zone of coalesced pyritic laminae of 0.3 mm pyrite cubes with black shale interlaminae (0.5 mm thick), up to 70% pyrite
<b>176</b>	0.50 257.66 m	Massive black kerogenous mudstone with 1-3% calcisiltite, 1% disseminated 0.1 mm pyrite
<b>177</b>	1.31  258.97 m	Massive black kerogenous silty mudstone with 1-3% calcisiltite, 1% pyrite, like <b>176</b> but with 30% interbeds (1-5 cm) of fine calcarenite, some weakly normally-graded, and silicified coarse calcarenite, pyritic and nodular as well as laminoid
<b>178</b>	0.51 259.48 m	Massive black kerogenous mudstone, like <b>176</b> but with 5% 1-3 mm laminae of silicified pyritic coarse calcarenite and of 100% 0.1 mm pyrite
<b>179</b>	0.45  259.93 m	Silicified massive fine calcarenite, 0.2-0.3 mm grains subangular, subspheroidal, pale grey, close-packed, grain-supported, cemented, some outsize 0.5-1 mm white angular grains? Also grey chert with 0.5 mm rhombs
<b>180</b>	*04029 0.64 260.57 m	Weakly plane-laminated (1-10 mm) black kerogenous shale, 1-5% calcisiltite, 1-3% 0.1 mm pyrite, with scattered 1 cm silicified pyritic coarse calcarenite lenses and laminae
<b>181</b>	0.44 261.01 m	Silicified massive fine calcarenite and grey chert with 50% 0.5 mm white carbonate rhombs, like <b>179</b>

<b>182</b>	0.17 261.18 m	Weakly plane-laminated black kerogenous shale, like <b>180</b> but with silicified laminae only 2 mm thick
<b>183</b>	0.51 261.69 m	Partly silicified massive fine calcarenite with abundant stylolites and at top stylobreccia of fine and coarse calcarenite, including convoluted laminae
<b>184</b>	1.48 263.17 m	Weakly plane-laminated (1-10 mm) black kerogenous shale, 1-5% calcisiltite, 1-3% 0.1 mm disseminated pyrite, with 15% 1-5 cm interbeds of massive fine calcarenite, sometimes lenticular, and fine calcarenite with 1 x 5 mm white calcitic laminoid fenestrae, some calcarenite beds brecciated in situ with black shale matrix, rare 0.5-1 cm nodules and laminae of 100% pyrite
<b>185</b>	0.53 263.70 m	Weakly plane-laminated (1-10 mm) black kerogenous shale, 1-5% calcitic silt, 1-3% 0.1 mm disseminated pyrite
<b>186</b>	0.70 264.40 m	Like <b>184</b> , black kerogenous shale with 15% fine calcarenite interbeds
<b>187</b>	0.61 265.01 m	Massive fine calcarenite, with 3% tabular angular flakes up to 1 x 5 mm of black kerogenous shale
<b>188</b>	4.04 269.05 m	Interbedded black kerogenous shale and fine calcarenite (30%) often with 50% laminated fenestrae, rare 100% pyrite laminae and lenses (1-3 mm), like <b>184</b>
<b>189</b>	0.48 269.53 m	Silicified massive fine calcarenite (grains 0.2-0.3 mm, well sorted, cemented, subspherical, subangular); clear grey chert with 50% 0.5 mm white carbonate rhombs; fine calcarenite with 50% 1 x 5 mm white calcitic laminoid fenestrae. 1-2 mm pyrite cubes form 3%, grey chert with rhombs form irregular nodules 1-3 cm thick
<b>190</b>	*04030 3.26 272.79 m	Interbedded (70%, 30%) weakly plane-laminated (1-10 mm) grey/black kerogenous silty shale and shale, calcitic silt content 1-30%, 1% 0.1 mm disseminated pyrite, but some 1-2 mm laminae of 30% pyrite; massive fine calcarenite in beds 1-5 cm, grains 0.2-0.4 mm (grey, subspherical, subangular), close-packed and grain-supported, with black mud matrix, some beds have basal zone of 1 x 3 mm white calcitic laminoid fenestrae
<b>191</b>	0.56 273.35 m	Interbedded (90%, 10%) weakly plane-laminated grey/black kerogenous silty shale and fine calcarenite, like <b>190</b> but less calcarenite in finer beds (1-10 mm)
<b>192</b>	0.23 273.60 m	Silicified massive fine calcarenite and translucent grey chert with carbonate patches, irregular, 1 cm
<b>193</b>	*04031 1.04 274.64 m	Interbedded (90%, 10%) plane-laminated (1-10 mm) grey/black kerogenous silty shale, 5-30% calcitic silt, with 1 mm black shale partings between silty laminae, 1% disseminated 0.1 mm pyrite, rare 1 mm pyrite laminae; and 1-5 cm fine calcarenite, massive with 10% 1 x 2 mm white calcitic laminoid fenestrae

<b>194</b>	0.36 275.00 m	Massive fine calcarenite with black stylo-laminite zones 1 cm thick, basal unit has 3% 0.5 x 2 mm tabular angular clasts of black shale subparallel to bedding
<b>195</b>	0.20 275.20 m	Massive grey-black kerogenous mudstone, 1% calcitic silt, 1% disseminated 0.1 mm pyrite
<b>196</b>	0.26 275.46 m	Massive fine calcarenite with interbeds (1-2 cm) of grey translucent chert with patches of 0.5 mm white carbonate rhombs
<b>197</b>	5.41 280.87 m	Interbedded (70%, 30%) weakly plane-laminated (1-5 mm) grey/black kerogenous silty shale, 3-15% calcitic silt, 1% 0.1 mm pyrite; and massive or cross-laminated (1 mm, sets 1 cm) fine calcarenite beds 1-5 cm thick, rare 1 cm chert-carbonate-pyrite bands
<b>198</b>	0.40 281.27 m	Cross-bedded (1-10mm, sets 5cm) and weakly normally-graded fine calcarenite to fine calcwacke, bed bases are cemented, bed tops are matrix-supported (black mud), calcarenite has 3-5% black subangular, subspheroidal black shale clasts (0.3 mm)
<b>199</b>	*04032 2.62 283.89 m	Interbedded (80%, 20%) plane-laminated (1-10 mm) grey/black kerogenous silty shale, 2-30% calcitic silt, rare 1 mm pyritic laminae; and 0.5-5 cm fine calcarenite, mostly massive but some cross-laminated (1mm, sets 1cm) with scoured bases (5 mm), rare chert-carbonate-pyrite irregular bands 1-10 mm
<b>200</b>	0.11 284.00 m	Scoured (3 cm) green-grey (mafic tuff?) arenite, non-effervescent grains 0.2-0.4 mm, subangular, subspherical, weak normal grading from grain-supported to matrix-supported upwards, cemented at base, black mud matrix increases upward
<b>201</b>	1.08 285.08 m	Interbedded (80%, 10%, 10%) plane-laminated (1-10 mm) grey-black kerogenous silty shale; grey fine calcarenite in 1-5 cm massive beds; and white chert-carbonate-pyrite layers with stylolitic margins
<b>202</b>	0.06 285.14 m	Irregular stylolitic calcitic breccia with 1 cm white angular calcite fragments in grey fine calcarenite matrix, stylolitic fragment margins
<b>203</b>	1.95 287.09 m	Interbedded (60%, 20%, 20%) plane-laminated grey/black kerogenous silty shale; grey massive fine calcarenite (1-5 cm beds); cherty stylo-laminated white carbonate rhombs (0.3 mm) in grey translucent chert, with stylolitic pyritic boundaries, layers 1-10 cm
<b>204</b>	3.31	Interbedded silicified (40%, 10%, 50%) weakly plane-laminated (2-20 mm) grey silty shale, 5-50% calcitic silt in black kerogenous mud matrix, beds 5-15 cm with stylolitic boundaries; massive grey fine calcarenite in beds 1-2 cm thick; wavy-laminated (1 mm) white carbonate

	290.40 m	rhombs (0.3 mm) in grey translucent chert; with scattered (1%) 1-2 mm lenticular laminae of green, very fine grained chert (silicified mafic/ultramafic hydrovolcanic tuff?), clasts pale to mid-green, appear silt-sized; chert beds 1-5 cm with stylolitic boundaries
<b>205</b>	0.36 290.76 m	Plane-laminated (1-10 mm) grey/black kerogenous silty shale with 5% randomly oriented 0.1 x 0.5 mm stilpnomelane? needles, calcitic silt 5-20%, 1% disseminated pyrite 0.1 mm, rare 1 mm pyrite laminae
<b>206</b>	0.76 291.52 m	Interbedded grey/black silty shale, fine calcarenite, and wavy-laminated chert, like <b>204</b> but shale and carbonate not silicified, shale has stilpnomelane?, no green chert laminae
<b>207</b>	*04033 0.44 291.96 m	Plane-laminated grey/black silty shale with 5% stilpnomelane?, like <b>205</b>
<b>208</b>	0.50 292.46 m	Interbedded (60%, 40%) grey massive fine calcarenite, beds 1-10 cm with stylolitic boundaries; grey translucent chert with patches and laminae (wavy, 1 mm) of 0.5 mm white carbonate rhombs, some green silty tuff? laminae
<b>209</b>	0.67 293.13 m	Interbedded (60%, 30%, 10%) grey-black silty shale with 5% stilpnomelane?; grey fine calcarenite (beds 0.5-5 cm); grey translucent chert with 0.5 mm white carbonate rhombs and stylolitic pyritic margins (beds 1 cm)
<b>210</b>	1.33 294.46 m	Interbedded (50%, 30%, 10%, 10%) wavy-laminated (1 mm) grey translucent chert with 0.2 mm white carbonate rhombs (beds 1-5 cm); grey massive fine calcarenite (weakly silicified); grey/black silty shale (weakly silicified); wavy-laminated (1 mm) pale-mid green silicified silty mafic tuff? with 0.5 mm partings of 0.2 mm white carbonate rhombs between laminae; stylolites bound calcarenite beds
<b>211</b>	0.39 294.85 m	Slightly silicified massive grey/black kerogenous silty shale with 5% stilpnomelane?; with 1-3 cm diffusely-bounded interbeds (10%) of green silicified fine arenite (a mixture of mafic ash and calcarenite?), grain-size 0.2-0.4 mm, moderately well sorted, in black muddy matrix but grain supported; occasional 1-2 cm interbeds of chert-carbonate-pyrite
<b>212</b>	0.05 294.90 m	Upper spherule layer: silicified, normal grading, grain supported, with 50% 1 mm green-black chloritic? spherical grains at base, some zoned with dark core and white rims, some subspherical, in fine calcarenite sand with 0.5 mm angular, blocky grains of green mafic? sand; grades up into stilpnomelane?-bearing grey/black silty shale, spherules get smaller and rarer. Bed has sharp base

		with no scours, no evident cross-bedding or breccia
<b>213</b>	0.20  295.10 m	Alternating 1 cm beds of silicified fine calcarenite and grey/black silty shale, diffuse upper boundaries, stilpnomelane 5% throughout, shows normal grading, no evident cross-bedding or brecciation, some pyritic 1 mm laminae
<b>214</b>	0.05  295.15 m	Lower spherule layer: like <b>212</b> but sharper basal contact, better grading, spherules only 30% at base, grades up into spherule-free, very fine calcarenite (0.1 mm grains), green in intergranular areas, cemented?
<b>215</b>	0.30  295.45 m	Interbedded (50%, 50%) silicified fine calcarenite, massive beds 1-2 cm; and slightly silicified stilpnomelane?-bearing grey/black kerogenous silty shale, massive beds 1-5 cm; spherule layer sits on a slightly incised (1-2 mm) grey/black silty shale lamina 1-2 mm thick overlying massive fine calcarenite with a black muddy matrix
<b>216</b>	0.41  295.86 m	Plane-laminated (1-2 mm) cream-grey chert, very fine grained, with scattered 0.4 mm white carbonate rhombs, scattered 5 mm pyrite cubes; silicified calcilutite or very fine felsic tuff?
<b>217</b>	0.42  296.28 m	Interbedded (60%, 40%) grey/black kerogenous sandy shale, massive, 5-20% fine calcitic sand, beds 1-5 cm; and fine calcarenite with 1-5 cm beds and lenses
<b>218</b>	0.24  296.52 m	Interbedded (40%, 30%, 30%) grey medium calcarenite (grains 0.3-0.5 mm, massive with stylolites); grey/black medium calcarenite with black muddy matrix (grain- to matrix-supported); and green fine calcarenite/calcisiltite with 0.1 mm khaki felsic tuff? grains, 30%; beds 1-5 cm, planar to lenticular
<b>219</b>	0.49  297.01 m	Massive dark grey sandy mudstone, 10-20% 0.3-0.5 mm calcitic sand in kerogenous matrix, matrix-supported, with 10% khaki-green planar interbeds (0.5-3 cm) of felsic tuffaceous? fine calcarenite/calcisiltite
<b>220</b>	1.12  298.13 m	Massive grey muddy medium calcarenite grading to sandy mudstone, calcitic sand grains 0.3-0.5 mm, grey, subspherical, subangular, in black kerogenous mud matrix, boundaries between mudstone and sandstone diffuse, defined by slight variations in grain/matrix ratio
<b>221</b>	1.45  299.58 m	Well-bedded (0.5-15 cm) green-grey to grey medium calcarenite (grey, 0.3-0.6 mm subspheroidal, subangular calcitic grains), grain supported, cemented; tuffaceous? muddy calcarenite (green mafic ash matrix); and sandy mudstone (dark grey, medium calcitic sand in kerogenous mud matrix, matrix supported); sharp boundaries to beds; some green tuffaceous beds have 30% 1 mm grey

		amorphous diagenetic carbonate
<b>222</b>	*04034 5.88  305.46 m	Weakly plane-bedded (1-20 cm), grey, green-grey, and dark-grey medium calcarenite (5%); tuffaceous? medium muddy calcarenite (85%); and kerogenous sandy mudstone (10%); like <b>221</b> but with abundant (10-30%) and ubiquitous 1 mm grey amorphous diagenetic carbonate patches
<b>223</b>	0.04  305.50 m	Very coarse (3-4 mm) gravelly calcarenite, massive, grains well- to sub-rounded, subspheroidal to ellipsoidal, of grey carbonate with occasional pyritic white calcite, in greenish tuffaceous fine calcarenite matrix (passes laterally into this), grain supported
<b>224</b>	0.13 305.63 m	Well-bedded interbedded fine calcarenite; tuffaceous calcarenite; and sandy mudstone; like <b>221</b> but with 5% 1 mm diagenetic carbonate
<b>225</b>	1.04 306.67 m	Massive greenish tuff? with medium calcarenite grains, 0.4-0.6 mm, in tuffaceous? matrix, grain-supported, with 5-10% 1 mm diagenetic carbonate
<b>226</b>	0.26 306.93 m	Weakly plane-bedded (1-5 cm) grey fine calcarenite; greenish tuffaceous? calcarenite; and dark grey sandy mudstone; like <b>221</b>
<b>227</b>	0.44  307.37 m	Massive to weakly plane-bedded greenish tuffaceous? medium calcarenite with 1 mm diagenetic carbonate patches 3-10%, becomes darker and more matrix-rich upward
<b>228</b>	0.94  308.31 m	Massive dark grey calcitic sandy mudstone to muddy sandstone, with 30-60% kerogenous pyritic matrix, 5-15% 1 mm diagenetic carbonate patches, scattered oblique 1 x 5 mm carbonate-filled dewatering channels? with terminal 1 mm pyrite cube (either end)
<b>229</b>	0.34  308.65 m	Plane-bedded (1-2 cm) greenish tuffaceous? medium calcarenite; dark grey sandy kerogenous pyritic mudstone; and grey fine calcarenite; like <b>221</b>
<b>230</b>	0.28  308.93 m	Weakly plane-laminated (0.5 mm) fine calcarenite with grey muddy matrix, laminae with 5% 0.2 mm pyrite, grains 90% 0.3 mm grey carbonate, 10% black shale lithic fragments
<b>231</b>	0.37  309.30 m	Plane-laminated (1-10 mm) greenish tuffaceous? fine calcarenite (30%); grey fine calcarenite (40%); and dark grey sandy kerogenous mudstone (30%); some dewatering disruption; greenish laminae get very khaki (felsic tuff?), finely laminated with green matrix
<b>232</b>	0.07  309.37 m	Massive very coarse (1-10 mm grains) gravelly dark grey muddy calcarenite, large clasts calcite, well-rounded, subspheroidal to ellipsoidal, in muddy medium calcarenite matrix

<b>233</b>	0.18 309.55 m	Plane-laminated (1-20 mm), green, grey and dark grey tuffaceous? and muddy calcarenite, like <b>231</b>
<b>234</b>	0.10 309.65 m	Plane-laminated (1-5 mm) khaki felsic tuff?, mud to silt-sized with scattered 0.5 mm pyrite cubes (3%) and some laminae with fine white carbonate grains (50%, 0.2 mm)
<b>235</b>	0.07 309.72 m	Like <b>231</b> , laminae 1-5 mm
<b>236</b>	*04035 *04036 9.49 319.21 m	Plane-laminated (1-20 mm) grey/black kerogenous silty shale (1-5% calcitic silt, 0-1% disseminated 0.1 mm pyrite; with 10% 1-10 cm planar and lenticular interbeds of fine calcarenite (grains 0.1-0.3 mm), massive or weakly normally graded; also 1% coarse calcarenite, grains white calcite, 0.5-0.7 mm, cemented; rare laminae and nodules of 100% pyrite, 1 cm
<b>237</b>	2.74 321.95 m	Plane-laminated (1-20 mm) grey, slightly kerogenous, silty shale and siltstone, laminae graded from 70% silt to 10% silt; with 10% 1-5 cm planar interbeds of medium to fine calcarenite, normally graded, often with scoured bases (1-3 mm), rare 1 cm pyrite nodules and laminae
<b>238</b>	1.75 323.70 m	Plane-laminated (1-20 mm) grey/black kerogenous silty shale with 10% fine calcarenite interbeds, like <b>236</b> but with rare dewatering brecciation of calcarenite interbeds
<b>239</b>	0.84 324.54 m	Moderately silicified, plane-bedded (1-10 cm) medium and fine calcarenite with 5% 0.5 mm black shale tabular flakes, moderately abundant 0.5 mm pyrobitumenous? black stylolites, some highly silicified zones with white 0.1 mm carbonate rhombs, 5% 1 cm black silty shale interbeds
<b>240</b>	0.16 324.70 m	Plane-laminated (1-2 mm) greenish-grey pyritic silty kerogenous mudstone, with felsic tuffaceous component in greenish laminae?; abundant 0.2 x 1 mm carbonate lenses; scattered nodules of translucent grey chert-pyrite-white carbonate rhombs, 3 x 10 cm, displacing laminae
<b>241</b>	*04037 4.62 329.32 m	Weakly plane-laminated (1-2 mm) black kerogenous silty shale, 1-5% calcitic silt, 1% disseminated 0.1 mm pyrite; with 5% planar and lenticular interbeds of fine calcarenite, some lenses deflect shale laminae, some planar beds weakly graded over scoured (5 mm) bases
<b>242</b>	5.03 334.35 m	Massive fine calcarenite, grains white-pale grey calcite (0.2-0.4 mm, subspherical, subangular, close-packed, calcite cement), may show occasional weak grading and lamination; scattered black kerogenous silty shale partings 1 mm thick; abundant saw-tooth, bedding-parallel, residue-free stylolites with 1.5 cm relief; bed moderately silicified towards base
<b>243</b>	0.77	Interbedded (50%, 50%) massive fine calcarenite (1-10

	335.12 m	cm beds) and greenish silicified silty mudstone (felsic tuff?) with 3% 1 mm pyrite cubes
<b>244</b>	*04038 *04039 16.86  351.98 m	Massive black kerogenous shale, 1% calcitic silt, 1% disseminated 0.1 mm pyrite; with 25% planar and lenticular interbeds of plane-laminated (1 mm) calcisiltite and fine calcarenite; beds 0.5-15 cm, massive, weakly graded or cross-laminated, some with scoured and loaded (1 cm) bases, some lenticular beds deflect shale laminae; rare 0.5-1 cm pyrite laminae; rare calcarenite beds have 1-2 mm lenticular fenestrae of white calcite, may intergrow to brecciate rock resembling roll-up structures
<b>245</b>	0.20 352.18 m	Plane-laminated (1-10 mm) silicified calcisiltite; fine calcarenite; and pyritic (50-100%) black shale, pyrite 0.1 mm
<b>246</b>	3.31 355.49 m	Massive black kerogenous shale with 25% fine calcarenite lenses and beds (2-15 cm), like <b>244</b> with scattered 2 cm pyrite lenses
<b>247</b>	2.10 357.59 m	Interbedded (50%, 50%) massive grey/black kerogenous shale and fine calcarenite, like <b>244</b> , rare dewatering brecciation in calcarenite
<b>248</b>	4.44  362.03 m	Interbedded (75%, 25%) massive grey/black kerogenous silty shale, with 3-5% calcitic silt, 1% disseminated 0.1 mm pyrite; and 2-15 cm planar and lenticular beds of fine calcarenite; like <b>244</b>
<b>249</b>	1.23 363.26 m	Interbedded (50%, 50%) massive grey/black kerogenous silty shale and massive fine calcarenite, like <b>248</b> but beds 2-10 cm
<b>250</b>	0.86  364.12 m	Interbedded (80%, 20%) massive white fine calcarenite with 5% 0.2 mm black, wispy partings/flakes (protostylolites?, rip-up clasts?), occasionally with dewatering brecciation; and massive grey/black kerogenous silty shale, becomes increasingly silicified downwards
<b>251</b>	0.26 364.38 m	Weak plane-laminated grey/black kerogenous silty shale, grading from silty shale to shale, 1-15% calcitic silt
<b>252</b>	2.07  366.45 m	Interbedded (50%, 50%) grey massive fine calcarenite; and graded plane-laminated grey/black silty shale to shale, 1-15% calcitic silt; beds 1-10 cm
<b>253</b>	0.47 366.92 m	Like <b>252</b> but with 75% silty shale, 25% fine calcarenite
<b>254</b>	1.00  367.92 m	Moderately silicified interbedded (50%, 40%, 10%) massive white medium calcarenite with 0.1 mm black wispy stylolites; grey/black kerogenous silty shale; grey massive fine calcarenite; beds 1-5 cm
<b>255</b>	3.27	Interbedded (90%, 10%) massive grey fine calcarenite, grains 0.2-0.4 mm (subangular, subspherical), with

	371.19 m	abundant grey incipient stylolites and sawtooth grey 1 cm stylolites, beds 5-20 cm; and grey translucent chert with patches and laminae (1 mm) of white carbonate rhombs (0.5 mm); rare dark grey kerogenous silty mudstone interbeds (1-5 cm)
<b>256</b>	0.34 371.53 m	Weakly plane-laminated (1-10 mm) black kerogenous shale, 1-3% calcitic silt, 1% disseminated 0.1 mm pyrite; with rare translucent grey chert bands (1 cm)
<b>257</b>	0.23 371.76 m	Interbedded (40%, 40%, 20%) grey translucent chert (1-2 cm); massive black kerogenous shale (1-3 cm); grey massive fine calcarenite (1-2 cm); beds have stylolitic contacts
<b>258</b>	*04043 0.74 372.50 m	Plane-laminated (1-10 mm) graded grey/black kerogenous silty shale to shale, 0-10% calcitic silt; rare 1 cm interbeds of wavy-laminated grey translucent chert
<b>259</b>	0.51 373.01 m	Like <b>258</b> , but interbeds not silicified, of white carbonate with anastomosing 0.1 mm microlaminae (recrystallized arenite?); beds 50%, 50%, 1-5 cm thick
<b>260</b>	1.99 375.00 m	Interbedded (60%, 40%) plane-laminated (1-10 mm) grey/black graded kerogenous silty shale to shale; planar and lenticular beds of massive-weakly plane-laminated fine and medium calcarenite; beds 1-10 cm, some with 5% 1 x 10 mm tabular clasts of silty shale
<b>261</b>	0.26 375.26 m	Grey/black silty shale and fine calcarenite forming anastomosing laminae (1 mm) and lenses (2 x 10 mm); arenite forms matrix at base, silty shale at top
<b>262</b>	0.26 375.52 m	Like <b>261</b> , but becomes breccia with calcarenite nodules squeezed together
<b>263</b>	0.24 375.76 m	Dewatering breccia of fine and medium calcarenite, swirly texture
<b>264</b>	0.51 376.27 m	Massive fine calcarenite with 0.5-1 cm medium calcarenite lenses
<b>265</b>	*04044 1.99 378.26 m	Interbedded (40%, 30%, 30%) dark grey kerogenous graded (1-10 mm) laminae of silty shale to shale, 1-15% calcitic silt; white medium calcarenite with weak wavy lamination (0.5 mm), beds 1-4 cm; grey massive fine calcarenite
<b>266</b>	1.74 380.00 m	Weakly plane-laminated (5-10 mm) calcitic sandy mudstone and muddy sandstone, gradational contacts; sand is calcitic, 0.2-0.4 mm, subangular, subspherical; mud is black & kerogenous; matrix up to 60%, grains up to 60%
<b>267</b>	0.50 380.50 m	Massive white medium calcarenite, grains 0.4-0.6 mm, subangular, subspherical, close pack, with abundant stylolites, 0.5 cm muddy sandstone partings
<b>268</b>	0.51	Plane-laminated (1 mm) green silty felsic tuffaceous?

	381.01 m	chert and grey translucent chert with 0.3 mm white carbonate rhombs
<b>269</b>	3.69 384.70 m	Weakly plane-laminated (1-5 mm) dark grey kerogenous silty shale, 10-30% calcitic silt; with 40% 1-3 cm planar interbeds of medium (30%) and fine (10%) calcarenite, grain supported, subangular, subspherical, calcitic; rare 1-2 mm pyrite laminae
<b>270</b>	0.15 384.85 m	Slightly silicified grey silty shale and medium calcarenite, with 1 mm pyrite laminae at base. LAST CALCITE, LAST COARSE PYRITE (END BEE GORGE MEMBER?).
<b>271</b>	0.58 385.43 m	Massive medium dolarenite, grains white, subangular, subspherical, grain supported, close pack, dolomite cement, with abundant stylolites, 2 mm dark shaley partings. FIRST DOLOMITE.
<b>272</b>	0.28 385.71 m	Interbedded medium dolarenite like <b>271</b> , and green-grey finely laminated (0.3 mm) pyritic silty chert (felsic tuff?), beds 1-5 cm
<b>273</b>	1.06 386.77 m	Interbedded green-grey finely laminated pyritic silty chert like <b>272</b> , and grey translucent chert with laminae and patches of 0.4 mm white carbonate rhombs, beds 1-5 cm, some nodular (carbonate chert)
<b>274</b>	0.50 387.27 m	Coarsely interbedded (50%, 50%) white massive medium dolarenite beds, 1-20 cm; and grey/black kerogenous silty shale, 5-20% dolomitic silt, beds 1-10 cm
<b>275</b>	9.76 397.03 m	Finely interbedded (90%, 10%) massive white medium dolarenite with occasional bedding-parallel stylolites, beds 1-5 cm; and grey/black kerogenous silty shale, beds 0.5-3 cm
<b>276</b>	0.97 398.00 m	Massive to brecciated (stylolitic/dewatering?) medium dolarenite, some dark shaley swirly partings
<b>277</b>	0.37 398.37 m	Interbedded (50%, 50%) massive fine dolarenite with 3% 0.2 mm pyrite, carbonate grains 0.2-0.4 mm; and grey translucent chert with patches and wavy 1 mm laminae of white 0.2 mm carbonate rhombs, beds 1-4 cm
<b>278</b>	*04046 1.19 399.56 m	Interbedded dark grey kerogenous muddy dolosiltite, 20-50% dolomitic silt; and massive fine dolarenite often showing soft sediment deformation and brecciation (40%, 60%)
<b>279</b>	1.30 400.86	Interbedded dark grey kerogenous silty and sandy shale, massive, 10-30% dolomitic silt and fine sand (65%); and weakly plane-laminated (1mm) fine dolarenite with 0.5x3mm white carbonate lenses (diagenetic fenestrae), 1-5cm planar and lenticular beds (35%)
<b>280</b>	*04047 0.37	Plane-laminated grey/black kerogenous silty shale, 1-20% dolomitic silt, weakly graded, with 0.5mm fine dolarenite

	401.23	interbeds (20%), some silicified horizons (2-3 cm) of alternating wavy white and dark grey opaque chert
<b>281</b>	4.53 405.76m	Interbedded (85%, 15%) white medium dolarenite, beds 1-5 cm, massive, grains 0.3-0.5 mm, with internal grey stylolites; and 0.5-1cm dark grey kerogenous silty shale, 5-20% dolomitic silt, with 0.2x1 mm, white carbonate fenestral lenses abundant, often stylocumulate or stylolitic boundaries
<b>282</b>	0.95 406.71m	Plate-laminated (2-20 mm) kerogenous silty shale, dolosiltite, fine dolarenite and medium dolarenite, no particular sequence, gradational contacts, all beds massive, mostly alternating fine and coarse
<b>283</b>	2.18 408.89m	Interbedded (85%, 15%) white medium dolarenite and dark grey kerogeneous silty shale, like <b>281</b>
<b>284</b>	0.29 409.18m	Plane laminated (1-10 cm) grey/black kerogenous silty shale, 5-25% dolomitic silt, some laminae weakly graded; with 30% interbedded (1-5 cm) fine dolarenite, grains 0.1-0.3 mm, massive, rare 0.5 cm pyrite lenses
<b>285</b>	1.60 410.78m	Interbedded (85%, 15%) medium dolarenite and kerogenous silty shale, like <b>281</b> , mostly stylolitic contacts but inversely gradational
<b>286</b>	1.19 411.97m	Interbedded plan-laminated kerogenous silty shale, dolosiltite, fine dolarenite and medium dolarenite, beds 1-10cm, like <b>282</b> , massive to weakly graded
<b>287</b>	0.26 412.33m	Medium dolarenite and silty shale, like <b>281</b>
<b>288</b>	0.33 412.66m	Massive to weakly reverse graded fine dolarenite and muddy siltstone with 0.1x0.5 mm white diagenetic carbonate lenses, beds 0.5-5 cm, rare stylolitic contacts
<b>289</b>	0.60 413.26m	Interbedded (85%, 15%) medium dolarenite and silty shale, like <b>281</b> , some white carbonate veins (1 mm) and brecciation
<b>290</b>	0.46 413.72m	Muddy fine dolarenite and fine sandy mudstone (20% dolomite fine sand), gradational contacts, beds 0.5-2 cm, some white diagenetic carbonate lenses 0.5x3 mm
<b>291</b>	1.65 415.37m	Interbedded (80%, 20%) medium dolarenite and kerogeneous silty shale, beds 0.5-5 cm
<b>291</b>	1.24 416.61m	Interbedded (randomly) kerogenous silty shale, dolosiltite, fine dolarenite and medium dolarenite, like <b>282</b> , massive to weakly graded, mostly gradational contacts, some stylolitic
<b>293</b>	1.45 418.06m	Interbedded (85%, 15%) white medium dolarenite, beds 1-5 cm; and grey/black kerogenous silty shale, 5-15% dolomitic silt, beds 0.5-1 cm, contacts mostly stylolitic
<b>294</b>	1.54 419.60m	Massive to weakly graded fine dolarenite (grains 0.2-0.4 mm) and muddy fine dolarenite (matrix 10-40% but grain

		supported), some stylo-brecciation
<b>295</b>	1.14 *04049 420.74m	Plane laminated (1-10 cm) graded dark grey kerogeneous sandy shale, 2-20% fine (0.1-0.2 mm) dolomite sand, rare 0.5 cm fine dolarenite interbeds, 0.5mm pyritic laminae; becomes muddy fine dolarenite downwards, also cherty
<b>296</b>	3.85 424.59m	Randomly interbedded (1-10 cm) dark grey silty shale, muddy fine dolarenite, fine dolarenite and medium dolarenite, contacts gradational, some inverse grading from silty shale to fine dolarenite, rare beds with 10% 1x5 mm diagenetic carbonate lenses, occasional soft sediment brecciation
<b>297</b>	*04050 0.24 424.83m	Plane-laminated (1-10 mm), weakly graded grey/black kerogeneous silty shale, 1-20% dolomitic silt, grading in silt %, rare 1mm pyritic laminae
<b>298</b>	2.16 426.99m	Muddy fine dolarenite and clean medium dolarenite, laminated (1 mm); beds 1-5 cm, gradational contacts, some random 1 mm white carbonate veins
<b>299</b>	1.11 428.10m	Massive fine muddy dolarenite and kerogenous silty shale, beds 5-10 cm, gradational contacts with normal and reverse grading, some beds have 5% 0.1mm pyrite
<b>300</b>	0.82 429.02m	Brecciated plane-laminated (2-6 cm) fine dolarenite and muddy fine dolarenite (5-15% kerogenous muddy matrix), soft sediment brecciation with stylolitic and carbonate vein overprint (fine dolarenite is matrix to breccia)
<b>301</b>	4.74 433.76m	Massive fine dolarenite, beds 5-20 cm with 1 cm interbeds of muddy fine dolarenite, 10-20% kerogenous black mud matrix but grain supported; and rare kerogenous silty shale partings 1-2 mm, contacts gradational, in places brecciated by 1 cm white carbonate veins (dewatering)
<b>302</b>	1.34 435.10m	Plane-bedded (1-2 cm) massive fine dolarenite, muddy fine dolarenite, and medium dolarenite, with scattered 1 mm silty shale partings, (stylolamine), sharp and gradational contacts
<b>303</b>	0.88 435.98m	Massive to swirly bedded (convoluted soft sediment deformation) grey muddy fine dolarenite, matrix 10-40% kerogenous mud, grains 0.2-0.3 mm, rare 1 mm silty shale partings (stylolamine), brecciated at base
<b>304</b>	*04057 1.17 437.15m	Plane-bedded (1-3 cm) massive fine dolarenite, muddy fine dolarenite and medium dolarenite, like <b>302</b>
<b>305</b>	3.06 440.21m	Massive fine dolarenite and muddy fine dolarenite, beds 1-10 cm with gradational contacts, rare 1 mm pyritic laminae, brecciated base
<b>306</b>	0.27 440.48m	Interbedded (50%, 50%) fine dolarenite and muddy fine dolarenite, contacts stylolitic, beds 1-4 cm
<b>307</b>	3.03	Massive fine dolarenite, grains 0.2-0.4 mm, with abundant

	443.51m	bedding-parallel stylolites, 5% 1 cm gradational beds of muddy fine dolarenite, some brecciated (white carbonate veins) zones
<b>308</b>	2.10 445.61m	Plane-bedded (1-3 cm) fine dolarenite and muddy fine dolarenite, contacts sharp or gradational (50%, 50%), rare brecciation zones (white carbonate veins)
<b>309</b>	*04052 0.52 446.13m	Plane-laminated (1-10 cm) dark grey sandy shale, silty shale and shale, kerogenous, grains dolomitic, up to 20%, subangular subspherical; rare 1 mm fine dolarenite laminae, also 0.5mm pyritic laminae
<b>310</b>	1.01 447.14m	Interbedded (1-10 cm) muddy fine dolarenite, fine dolarenite and kerogenous sandy mudstone, beds planar, some weakly graded (matrix increases up), rare brecciation, some stylolitic contacts but most gradational
<b>311</b>	0.32 447.46m	Brecciated (fragments angular, blocky to tabular, 1-5 cm) muddy fine dolarenite (grains 50%, 0.2-0.4 mm, in 50% black kerogenous mud matrix, either grain or matrix supported) and fine dolarenite, laminated 2-5 mm, in massive fine dolarenite matrix, some white vein carbonate, soft sediment deformation?
<b>312</b>	3.50 450.96m	Plane-bedded (1-5 cm) fine dolarenite (40%) and muddy fine dolarenite (60%, grain supported), sharp contacts, frequently brecciated (soft sediment or carbonate veins) over 10 cm, also convoluted 10 cm zones, abundant 5 mm white carbonate veins subperpendicular to bedding (dewatering?)
<b>313</b>	0.81 451.77m	Massive to weakly plane-bedded (1-5 cm) fine dolarenite and muddy fine dolarenite (grain supported), contacts gradational, rare 5mm laminae of grey/black kerogenous silty shale
<b>314</b>	0.40 452.17m	Interbedded (planar to lenticular, 1-5 cm) fine dolarenite (25%), muddy fine dolarenite (40%), silty shale (25%), kerogenous shale (10%); contacts sharp, rare 1mm pyrite laminae
<b>315</b>	0.39 452.56m	Massive fine dolarenite and muddy fine dolarenite, like <b>313</b>
<b>316</b>	*04053 0.46 453.02	Interbedded (planar to lenticular, 1-5 cm) fine dolarenite, muddy fine dolarenite, silty shale and kerogenous shale, like <b>314</b>
<b>317</b>	0.37 453.39m	Massive to weakly plane bedded fine dolarenite and muddy fine dolarenite, like <b>313</b> but with 5 mm kerogenous shale laminae and 1 mm pyrite laminae
<b>318</b>	0.10 453.49m	Like <b>314</b>
<b>319</b>	0.30 453.79	Brecciated muddy fine dolarenite in fine dolarenite matrix; soft sediment brecciation

<b>320</b>	0.75 454.54m	Massive fine dolarenite (grains 0.2-0.4 mm, subangular, subspherical) with tabular angular fragments (1x5 cm) of plane laminated (1 mm) muddy fine dolarenite floating in near in situ positions (brecciated beds)
<b>321</b>	1.28 455.82m	Plane-laminated (1-5 cm) muddy fine dolarenite (0.1-0.2 mm grains, grain supported), often brecciated by white carbonate veins or by soft sediment deformation (with matrix slightly less muddy)
<b>322</b>	4.93 460.75m	Interbedded (70%, 30%) massive fine dolarenite (0.1-0.3 mm grains); and plane-laminated (1 mm) muddy fine dolarenite; often brecciated (soft sediment and brittle-dilational ) with abundant, subperpendicular white carbonate veins 1 cm, some convolute bedding
<b>323</b>	0.97 461.72m	Plane-laminated (1-5 cm) muddy fine dolarenite, often brecciated (brittle-dilational) by 1 cm white carbonate veins, rare 1 cm fine dolarenite interbeds
<b>324</b>	3.26 464.98m	Interbedded and brecciated fine dolarenite and muddy fine dolarenite, like <b>322</b>
<b>325</b>	0.63 465.61m	Plane-laminated and brecciated muddy fine dolarenite, like <b>323</b> , some laminae grade up into kerogenous sandy shale (10% 0.1 mm dolarenitic sand)
<b>326</b>	0.28 465.89m	Massive fine dolarenite, fractured by abundant 1-10 mm white carbonate veins
<b>327</b>	0.73 466.62m	Plane-laminated and brecciated muddy fine dolarenite, like <b>323</b>
<b>328</b>	3.28 469.90m	Interbedded (50%, 50%) fine dolarenite and muddy fine dolarenite, beds massive to weakly plane laminated (1 mm) 1-5 cm, rarely brecciated (brittle-dilational by 5 mm white carbonate veins)
<b>329</b>	1.46 471.36m	Massive to weakly plane-laminated (2-10 mm) muddy fine dolarenite (grains 0.1-0.3 mm, kerogenous mud matrix 10-20%), occasionally with brittle dilational brecciation (1-5 mm white carbonate veins), some 1 cm fine dolarenite interbeds with gradational contacts
<b>330</b>	0.29 471.65m	Interbedded (60%, 40%) muddy fine dolarenite and fine dolarenite, like <b>328</b>
<b>331</b>	0.24 471.89m	Breccia (brittle-dilational) of blocky angular 1-3 cm fragments of muddy fine dolarenite in white vein quartz
<b>332</b>	0.19 472.08m	Massive to weakly plane-laminated muddy fine dolarenite, like <b>329</b> but scattered 1-2 mm pyrite laminae
<b>333</b>	0.35 472.43m	Interbedded (70%, 30%) and brecciated fine dolarenite and muddy fine dolarenite, like <b>328</b>
<b>334</b>	0.34 472.77m	Massive fine dolarenite (grains 0.3-0.1 mm, close-pack, grain support, dolomite cement) with carbonate-filled irregular vughs, rare 1-3 mm brecciated muddy fine dolarenite interlaminae

<b>335</b>	0.21 472.98m	Interbedded (70%, 30%) and brecciated fine dolarenite and muddy fine dolarenite, like <b>328</b>
<b>336</b>	4.37 477.35m	Massive fine dolarenite, fractured and brecciated in places, with brecciated muddy fine dolarenite interlaminated, abundant 1 cm dolomite-lined (crystals 3 mm) open vughs, like <b>334</b> ; some vughs with 5 cm clear quartz crystals, some beds with swirly soft-sediment deformation
<b>337</b>	5.25 482.60m	Interbedded (60%, 40%) and brecciated fine dolarenite and muddy fine dolarenite, like <b>328</b>
<b>338</b>	0.78 483.38m	Weakly plane-laminated (1 mm) fine dolarenite with 5% 0.5 cm interbeds of muddy fine dolarenite, sharp contacts, some 5 mm white carbonate veins
<b>339</b>	0.52 483.90m	Interbedded (70%, 30%) and brecciated fine dolarenite and muddy fine dolarenite, like <b>328</b>
<b>340</b>	0.75 484.65m	Weakly plane-laminated fine dolarenite, like <b>338</b>
<b>341</b>	1.76 486.41m	Brecciated (brittle-dilational) weakly laminated (1 mm) fine dolarenite with 5% 1 mm muddy fine dolarenite interlaminae, some open vughs with 2mm dolomite crystal lining, white carbonate veins (5 mm) between blocky to tabular, angular fragments
<b>342</b>	* 04055 19.45 505.86m	Massive to weakly plane-laminated (1-10 mm) white medium dolarenite (grains 0.4-0.6 mm, close-pack, grain support, well sorted, subangular, subspherical, with dolomitic cement) with 5% 1mm laminae with 5% muddy matrix, in places swirly soft-sediment deformation, in places brecciated (brittle-dilational) with 1-5 cm angular blocky fragments in white vein carbonate, abundant open vughs (1-2 cm) with 2 mm dolomite crystal lining, some 1-3 cm white quartz veins, rare stylolites
<b>343</b>	0.86 506.72m	Interbedded (70%, 30%) and brecciated (soft-sediment and brittle-dilational) fine dolarenite (0.2-0.4 mm grains) and muddy fine dolarenite, like <b>328</b>
<b>344</b>	0.81 507.53m	Massive to weakly plane-laminated (1-5mm) fine dolarenite (grains 0.2-0.4mm) with 5%.1mm interlaminae of fine dolarenite with 10% muddy matrix; often brecciated (stylolitic and soft-sediment)
<b>345</b>	1.07 508.60m	Interbedded (60%, 40%) and brecciated fine dolarenite and muddy fine dolarenite and muddy fine dolarenite, like <b>328</b>
<b>346</b>	0.92 509.52m	Massive and brecciated (stylobrecciated and brittle-dilational ) mottled medium dolarenite, like <b>342</b> but 3% muddy fine dolarenite in 2mm laminae
<b>347</b>	0.16 509.68m	Interbedded (60%, 40%) fine dolarenite and muddy fine dolarenite, like <b>328</b> with brittle-dilational brecciation

<b>348</b>	3.00 512.68m	Plane-bedded (1-5cm) fine dolarenite (grains 0.3-0.5 mm, grey dolomite, close-pack, grain supported, subspherical, subangular, dolomitic cement); with 15% muddy fine dolarenite interbeds (1 cm) with 5-20% black muddy matrix, grain supported; stylolitic contacts, rare brittle-dilational brecciation, abundant laminoid vughs lined by 2mm dolomite crystals
<b>349</b>	2.68 515.36m	Massive to weakly plane-laminated (5-10 mm) medium dolarenite (grains 0.4-0.6 mm); with 10% muddy fine dolarenite interbeds (0.5 cm), mostly brecciated (soft-sediment, with medium dolarenite matrix, tabular fragments 1x5 cm
<b>350</b>	1.24 516.60m	Plane-bedded (1-5 cm) fine dolarenite and muddy fine dolarenite, like <b>348</b> but some dolarenite beds have 5% 0.2x1 mm black shale flakes subparallel to bedding
<b>351</b>	3.73 520.33m	Strongly brecciated (soft-sediment with fine dolarenite matrix, stylobreccia with fitted fragments, brittle-dilational with white vein carbonate cement) fine dolarenite and muddy fine dolarenite, fragments tabular to blocky, 0.5x1 cm to 5cm
<b>352</b>	0.28 520.61m	Plane-laminated (1 mm) medium dolarenite, grains 0.4-0.6 mm, with 5-10% 0.2x1 mm tabular flakes of black kerogenous shale subparallel to bedding, grading to muddy fine dolarenite upward
<b>353</b>	0.46 521.07m	Interbedded (70%, 30%) dark grey, very muddy fine dolarenite (matrix kerogenous, 40%), plane-laminated (1-10 mm), with some 1-10 mm laminae of 50% pyrite; and wavy-laminated (1 mm) translucent grey chert with 0.3 mm white carbonate rhombs; stylolitic contacts
<b>354</b>	0.34 521.41m	Plane-laminated (1 mm) medium dolarenite with black shale flakes, like <b>352</b>
<b>355</b>	*04056 0.80 522.21m	Interbedded (70%, 30%) dark grey, very muddy fine dolarenite and wavy-laminated grey chert, like <b>353</b> but with some 2cm quartz veins
<b>356</b>	0.09 522.30m	Plane-laminated (1 mm) medium dolarenite, like 352 but black shale flakes rare
<b>357</b>	0.19 522.49m	Massive dark grey, very muddy fine dolarenite with blocky angular clasts 1-2 cm of pale grey fine dolarenite, soft-sediment brecciation, gradational contact with <b>356</b>
<b>358</b>	0.19 522.49m	Interbedded (70%, 30%) pale grey fine dolarenite (grains 0.2-0.4 mm, dolomitic cement); and mid-grey muddy fine dolarenite (matrix 5-20%); beds 1-5 cm, contacts between cemented → muddy often stylolitic, between muddy → cemented often sharp depositional, some reverse grading (matrix diminishes and disappears upwards), moderate brittle-dilational and soft-sediment brecciation in places

<b>359</b>	0.22 528.49m	Massive to weakly plane-laminated (1-5 mm) dark grey muddy fine dolarenite with 40% pale grey massive medium dolarenite interbeds, 1-5 cm, with incipient brittle deformation (abundant white carbonate veins)
<b>360</b>	1.39 529.88m	Strongly brecciated (brittle-dilational, soft-sediment) pale grey medium dolarenite, with 20% dark grey muddy fine dolarenite, fragments irregular, in white vein carbonate with irregular dolomite-lined vughs, or in medium dolarenite matrix
<b>361</b>	13.74 543.62m	Massive to weakly plane-bedded (1-3 cm) pale grey medium dolarenite, grains 0.5-0.7 mm, subangular, subspherical, close-pack, weak grading to slightly muddy medium-fine dolarenite with overlying stylolitic contact, some brittle brecciation with white vein carbonate containing vughs, some beds with 1-3% 1-2 mm black shale flake, also rare reverse grading
<b>362</b>	0.25 543.87m	Mottled pale grey coarse dolarenite (grains 0.7-1 mm) with stylolaminated sandy mudstone interlayers (0.5-1 cm)
<b>363</b>	3.40 547.27m	Interbedded (80%, 20%) massive to weakly plane-laminated (1-10 mm) pale grey medium dolarenite (grains 0.4-0.6 mm), often with 1-3% 0.5-1 mm black shale flakes; and massive muddy fine dolarenite (grains 0.3-0.5 mm, 10-20% black kerogenous mud matrix, often in stringers parallel to bedding); contacts sharp or gradational, uncommon reverse grading, rare normal grading
<b>364</b>	0.49 547.76m	Interbedded (40%, 30%, 30%) 1-5 cm mid-grey muddy fine dolarenite (grains 0.2-0.4 mm, grain-support, 20-30% black kerogenous mud matrix); pale grey massive fine dolarenite (grains 0.2-0.4 mm); mottled diagenetic dolostone with 0.1 mm anastomosing black shale partings around 0.2x1 mm dolomite lenses; reverse grading common
<b>365</b>	1.52 549.28m	Massive to weakly plan-laminated (1 mm) pale grey medium dolarenite; rare stylolites, 1 cm dark grey sandy mudstone interbeds, 1 cm quartz veins, 2 cm mottled zones as in <b>364</b>
<b>366</b>	0.32 549.60m	Brecciated (brittle with white vein carbonate) fine dolarenite and muddy fine dolarenite, interlaminated 1-5 mm, fragments subrounded tabular, abundant stylolites with 0.2 mm shiny, non-platey pyrobitumen? or graphite? (powders, doesnt fracture into sheets), abundant vughs in vein carbonate
<b>367</b>	*04057 2.35	Interbedded (80%, 20%) pale grey medium dolarenite (grains 0.4-0.7 mm, beds 1-5 cm); and mid-grey muddy

	551.95m	fine dolarenite (grains 0.2-0.5 mm, kerogenous matrix 10-25%), rare mottled zones as in <b>364</b> 1-2cm, rare pyrobituminous stylolites
<b>368</b>	3.84 554.79m	Interbedded (40%, 30%, 30%) fine dolarenite; dark grey muddy fine dolarenite (matrix kerogenous, 20-40%); and mottled diagenetic dolostone with anastomosing black shale partings around 0.4x2 mm dolomite lenses (stylolamine?); shiny black graphite (greasy feel when powdered) partings with slickensides; rare brecciation, stylolites with 0.1 mm black graphite? infills
<b>369</b>	1.74 556.53m	Brecciated (soft-sediment and brittle) and massive medium dolarenite with 10% dark grey fragments and laminae (1-10 mm) of muddy fine dolarenite (matrix 20-40% kerogenous mud); 0.1 mm shiny graphitic partings, vughs in white carbonate veins
<b>370</b>	6.29 562.82m	Interbedded (50%, 50%) and brecciated (brittle with white vein carbonate) pale grey fine dolarenite, massive, grains 0.2-0.4 mm; and dark grey muddy fine dolarenite, matrix kerogenous, 20-40%; beds 1-10 cm, brecciation affects 60% of unit, bedding often has reverse grading (matrix lost upward), some breccias contain rare fragments of 100% 0.4 mm pyrite, rare stylolites, some white carbonate veins have central core with black rectangular crystals with golden-brown submetallic luster, brittle, conchoidal fracture = pyrobitumen
<b>371</b>	0.87m 563.69m	Massive and brecciated pale grey medium dolarenite, grains 0.5-0.7 mm, breccia fragments are angular, tabular to irregular muddy fine dolarenite with 5% 1 cm rounded pyritic (100% 0.4 mm crystals) 0.5x2 cm grains; pyrobitumen in cores of white carbonate veins
<b>372</b>	0.19 563.88m	Interbedded (60%, 40%) and brecciated (brittle with white calcite veins) pale grey medium dolarenite (massive, grains 0.4-0.6 mm); and dark grey muddy fine dolarenite (grains 0.2-0.4 mm, matrix kerogenous, 20-40%, grain supported); pyrobitumen partings along rare stylolites
<b>373</b>	0.44 564.32m	Massive to weakly plaen-laminated (2-20 mm) fine dolarenite, pale grey, grains 0.2-0.4 mm; with 5% dark muddy fine dolarenite, reverse grading with matrix disappearing upward, stylolitic contact at base or muddy beds, some soft-sediment brecciation
<b>374</b>	3.24 567.56m	Interbedded (60%, 40%) and brecciated (brittle with white calcite veins, some soft-sediment) pale grey fine dolarenite (grains 0.2-0.4 mm); and dark grey muddy fine dolarenite, rare kerogenous sandy shale laminae 1-20 mm, sometimes reverse graded with basal stylolite, then muddy fine dolarenite, losing muddy matrix upward;

		pyrobitumen (laminar to blocky, 0.3 mm) in white calcite vein cores where vein wider than 1 cm, also in vughs
<b>375</b>	1.53 569.09m	Interbedded (80%, 20%) pale grey fine dolarenite (grains 0.3-0.5 mm), massive; and dark grey muddy fine dolarenite, rarely reverse graded; rare sort-sediment and brittle brecciation, beds 0.5-10 cm
<b>376</b>	0.78 569.87m	Severely brecciated (brittle, soft-sediment, stylolitic and dissolution all together) equivalent of <b>375</b> , many vughs and fractures, pyro-bitumen stylolites
<b>377</b>	1.76 571.63m	Massive pale grey medium dolarenite, rare 1 cm white calcite veins with vughs, rare pyrobitumen stylolites, badly fractured and broken in areas, vughy in white calcite veins
<b>378</b>	0.77 572.34	Severely brecciated (brittle, soft-sediment, stylolitic and dissolutional all together) equivalent of <b>377</b> , many vughs and fractures, pyrobitumen stylolites
<b>379</b>	3.13 575.47m	Massive to weakly plane-laminated (1-15 mm) pale grey medium dolarenite, grains 0.4-0.6 mm; with 5% mid-grey muddy fine dolarenite, matrix 5-20%; moderate brecciation (brittle and soft-sediment), rare stylolites filled with pyrobitumen, some beds have tabular angular flakes of grey/black silty shale 0.5x20 mm which may be sedimentary clasts rather than soft-sediment deformation, abundant 5 mm pyrobitumen in vughs in 2 cm white calcite veins
<b>380</b>	0.34 575.81m	Interbedded (60%, 40%) pale grey fine dolarenite and grey/black sandy kerogenous shale, laminae planar 1-5 mm, reverse grading common above pyrobituminous stylolite base, soft-sediment disruption and distortion of laminae common
<b>381</b>	*04058 3.70 579.51m	Massive to weakly plane-laminated (1-10 mm) pale grey medium dolarenite, grains 0.5-0.7 mm, subangular, subspherical, grain support, close-pack, dolomitic cement, some beds with 3% 0.2x0.8 mm black shale flakes, rare muddy fine dolarenite and sandy shale interlaminae 1-5 mm, scattered 1 cm white calcite veins with 1-2 cm vughs associated with brittle brecciation
<b>382</b>	6.23 585.74m	Massive pale grey fine dolarenite, grains 0.3-0.5 mm, some 1 cm white calcite veins subparallel to bedding, rare pyrobituminous stylolites subparallel to bedding
<b>383</b>	1.24 586.98m	Massive to weakly plane-laminated (1-10 mm) pale grey medium dolarenite, laminae defined by grain size, abundant vughs and white calcite veins 1 cm, some brittle brecciation, rare stylolites, rare black shale flakes 0.8 mm
<b>384</b>	3.56 590.54m	Massive pale grey fine dolarenite, like <b>382</b> but some vughs in veins

<b>385</b>	6.37 596.91m	Interbedded plane-laminated (1-10 mm) pale grey fine dolarenite, grains 0.2-0.4 mm, 90%; and grey/black kerogenous silty shale, 10%, frequent reverse grading above stylolitic base (matrix disappears upward, grains get coarser); sometimes brecciated by white calcite veins, 1 cm, brittle deformation, with vughs
<b>386</b>	0.79 597.70m	Weakly plane-bedded (2-5 cm) pale grey fine dolarenite, frequent reverse grading above basal pyrobituminous stylolite, bed bases have dark muddy matrix (10%) disappearing upward, frequent 1 cm white calcite veins subparallel to bedding
<b>387</b>	2.12 599.82m	Interbedded plane-laminated (1- ) pale grey fine dolarenite (85%); and grey/black kerogenous silty shale (15%); like <b>385</b> but some laminae undulose, pyrobituminous stylolites
<b>388</b>	10.44 610.26m	Massive to weakly plane-bedded (2-10 cm) pale grey fine dolarenite with reverse grading, like <b>386</b> but 1 cm vughy white calcite veins moderately common
<b>389</b>	1.55 611.81m	Interbedded plane-laminated (1-10 mm) pale grey fine dolarenite (90%); and grey/black kerogenous silty shale (10%); like <b>385</b> , reverse grading moderately common
<b>390</b>	11.59 623.40m	Massive to weakly plane-bedded (1-10 cm) pale grey fine dolarenite with reverse grading, like <b>386</b> but better bedded, moderately common stylolites not necessarily at bed bases
<b>391</b>	6.81 630.21m	Alternating (10-20 cm) pale grey massive fine dolarenite, like <b>386</b> ; and brecciated fine dolarenite and grey/black kerogenous silty shale, like <b>385</b> , brecciation brittle by 2 cm white calcite veins, vughy, fragments tabular to blocky, pyrobituminous stylolites moderately common
<b>392</b>	4.23 634.44m	Massive to weakly plane-laminated (1-10 mm) pale grey medium dolarenite, grains 0.5-0.7 mm, rare 1 mm grey/black silty mudstone partings, abundant 2-3 cm white calcite veins with vughs causing brittle brecciation, rare stylolites
<b>393</b>	7.10 641.52m	Severely brecciated (brittle) massive to weakly pale-laminated pale grey medium dolarenite, like <b>392</b> , angular blocky fragments to 5 cm frequently floating in vughy white vein calcite to 5 cm thick, clear vein quartz fills centres of largest veins, some fragments have stylolitic boundaries with internal silty shale laminae, longest intact length of medium dolarenite is 7 cm
<b>394</b>	6.57 648.11m	Interbedded weakly plane-laminated (1-20 mm) fine dolarenite (90%, grains 0.3-0.5 mm); and dark grey muddy fine dolarenite, frequently brecciated by 5 cm white calcite veins with quartz interiors, abundant

		stylolites filled with 0. pyrobitumen, fragments rarely floating, no vein pyrobitumen
<b>395</b>	1.34 649.45m	Interbedded plane-laminated (1-5 mm) pale grey fine dolarenite, grains 0.3-0.5 mm; and mid grey muddy fine dolarenite, kerogenous mud matrix 10-20%, normally graded, moderately brecciated (brittle) by 1 cm white calcite veins
<b>396</b>	4.21 653.66m	Extremely brecciated (brittle, stylolitic) fine dolarenite and muddy fine dolarenite, fragments nebulous, mostly mid-grey with 5% matrix, with pale grey matrix between fragments, blocky to irregular with vague boundaries; apparently first brittle fracturing, then pressure-solution then brittle fracturing again; some 7 cm intact sections of fine dolarenite, rare 0.5 cm white calcite veins with trace pyrobitumen
<b>397</b>	*04059 2.01 655.67	Plane-laminated (1-20 mm) pale grey fine dolarenite and mid-grey muddy fine dolarenite (mud matrix 10-20%), reverse grading, strongly brecciated (brittle, stylolitic) with abundant stylolites filled with 0.5 mm pyrobitumen
<b>398</b>	1.37 657.04m	Massive to weakly plane-laminated (4-20 mm) pale grey medium (grains 0.4-0.6 mm) and fine (grains 0.2-0.4 mm) dolarenite and muddy fine dolarenite (matrix 5%), reverse grading common, brittle brecciation occasional, by 1 cm white calcite veins with central pyrobitumen, some soft-sediment brecciation (muddy fragments in dolarenite matrix)
<b>399</b>	*04060 5.31 662.35m	Interbedded plane-laminated (2-10 mm) pale grey fine dolarenite (80%); and dark grey muddy fine dolarenite (20%), grains 0.3-0.5 mm, matrix 0-20%; frequently brecciated (brittle, soft-sediment) with 1 mm pyrobitumen in 1 cm white calcite vein interiors, some 5-10 cm massive beds
<b>400</b>	1.25 663.60m	Massive and brecciated (brittle) dark grey muddy fine dolarenite, grains 0.3-0.5 mm, in dark kerogenous matrix 15-25%, abundant pyrobituminous stylolites, secondary brittle brecciation by 1 mm white calcite veins
<b>401</b>	0.61 664.21m	Interlaminated (5-20 mm) pale grey fine dolarenite and dark grey muddy fine dolarenite (matrix 10-20%), normal and reverse grading (matrix content), cut by abundant 5 mm white calcite veins and pyrobituminous stylolites
<b>402</b>	0.37 664.58m	Brecciated dark grey muddy fine dolarenite, like <b>400</b>
<b>403</b>	3.95 668.53m	Interlaminated (5-50 mm) pale grey fine dolarenite and dark grey muddy fine dolarenite; like <b>401</b> but moderately brecciated, brittle, with 1 cm white calcite veins and pyrobituminous stylolites

<b>404</b>	*04061 0.46 668.99m	Plane-laminated (5-10 mm) dark grey muddy fine dolarenite, kerogenous matrix 15-25%, grains 0.2-0.4 mm, 5% pale grey fine dolarenite interlaminae
<b>405</b>	1.29 670.28m	Interlaminated (5-20 mm) pale grey fine dolarenite and dark grey muddy fine dolarenite, like <b>401</b> but extensively brecciated (brittle, soft-sediment), with pyrobituminous stylolites (0.5 mm)
<b>406</b>	0.97 671.25	Interbedded plane-laminated (1-20 mm) pale grey fine dolarenite (70%, grains 0.2-0.4 mm); and dark grey muddy fine dolarenite (30%, matrix 10-20%), reverse grading common (matrix disappears), soft-sediment brecciation (fine dolarenite matrix), 3mm white calcite veins subvertical in dewatering? Cracks, 0.5 mm pyrobituminous stylolites, rare pyritic laminae of 60% 0.2 mm pyrite
<b>407</b>	0.85 672.10m	Massive to weakly plane-laminated (1-10 mm) pale grey medium dolarenite (grains 0.4-0.6 mm) with 5% dark grey muddy fine dolarenite interlaminae (1 mm), some soft-sediment brecciation (medium dolarenite matrix), weak normal grading, some 0.5 cm white calcite veins with either pyrobitumen or quartz cores
<b>408</b>	0.14 672.24m	Massive muddy fine dolarenite (matrix 15-30%, grains 0.2-0.4 mm) with abundant pyritic pyrobituminous stylolites 1-2 mm subparallel to bedding, 1 cm pyrobituminous stylolamine at top
<b>409</b>	*04062 3.97 676.21m	Massive to weakly plane-laminated (2-20 mm) pale grey medium dolarenite with 5% dark grey muddy fine dolarenite, like <b>407</b> but more soft-sediment and brittle brecciation, 1 cm white calcite veins with abundant 1 cm vughs
<b>410</b>	3.01 679.22m	Interlaminated (60%, 40%) pale grey medium dolarenite (grains 0.4-0.6 mm, laminae 10-20 mm) and dark grey muddy fine dolarenite (grains 0.2-0.4 mm, laminae 1-10 mm), reverse grading common (matrix disappears, grains coarsen up), soft-sediment deformation (convolution) and brecciation common, rare pyrobituminous pyritic stylolites
<b>411</b>	4.75 683.97m	Highly brecciated (soft-sediment, stylolitic, brittle) interlaminated (60%, 40%) pale grey medium dolarenite, and dark grey muddy fine dolarenite, like <b>410</b> but where laminae intact over 10 cm strongly convoluted, abundant pyrobituminous stylolites
<b>412</b>	0.22 684.19m	Nebulous breccia of subrounded pale grey medium dolarenite floating in white vein calcite, fragment boundaries diffuse, 1-5 cm, weak normal grading, abundant 1 cm vughs

<b>413</b>	1.75 685.94m	Massive to weakly plane-laminated (1-10 mm) pale grey medium dolarenite, grains 0.4-0.6 mm, rare stylolites (no resistate), rare 1 mm muddy fine dolarenite interlaminae (brecciated), rare 1 cm white calcite veins with vughs
<b>414</b>	1.60 687.54m	Interlaminated (90%, 10%) massive pale grey medium dolarenite, grains 0.4-0.6 mm; and dark grey muddy fine dolarenite, grains 0.2-0.4 mm, matrix 5-15%, laminae 1-5 mm, abundant soft-sediment brecciation, (medium dolarenite matrix), rare 1 cm white calcite veins with minor medial pyrobitumen
<b>415</b>	6.22 693.76m	Interlaminated (60%, 40%) pale grey medium dolarenite, grains 0.4-0.6 mm, laminae 1-10 mm; and dark grey muddy fine dolarenite, grains 0.2-0.4 mm, laminae 1-10 mm, matrix 10-20%; abundant soft-sediment brecciation (medium dolarenite matrix), pyrobituminous stylolites, 1 cm white calcite veins with 3 mm blocky medial pyrobitumen, convolute bedding
<b>416</b>	*04063 0.40 694.16m	Massive to plane-laminated (2-10 mm) dark grey sandy mudstone, grains 0.1-0.2 mm, 10-20%, in kerogenous mud matrix, 15% 1 cm interbeds of pale grey medium dolarenite, grains 0.4-0.6 mm, occasional pyrobituminous stylolites, 0.5 cm white calcite veins, some soft-sediment brecciation (sandy mudstone matrix), convolute bedding
<b>417</b>	2.81 696.97m	Weakly plane-laminated (1-5 mm) pale grey medium dolarenite, grains 0.5-0.7 mm, with 5-10% 1 mm interlaminae of dark grey sandy mudstone and muddy fine dolarenite, grains 0.1-0.2 mm, frequently brecciated (soft-sediment with medium dolarenite matrix, and brittle with 0.5 cm white calcite veins, vughy), occasional pyrobituminous stylolites
<b>418</b>	11.88 708.85m	Massive pale grey medium dolarenite, grains 0.5-0.7 mm, with 1-2% interlaminae (1 mm) of dark grey muddy fine dolarenite showing frequent soft-sediment brecciation (medium dolarenite matrix), convolute bedding, rare stylolites, vughs (1 mm), 1 cm white calcite veins
<b>419</b>	0.48 709.33m	Breccia of medium dolarenite, like <b>418</b> , stylobreccia with subsequent dissolution and brittle fracturing, darker grey more muddy resistate overprinted by white calcite veining, fragments with nebulous boundaries
<b>420</b>	6.60 715.93m	Massive to weakly plane-laminated (1-10 mm) pale grey medium dolarenite, grains 0.4-0.6 mm, 5% mud content defines lamination, some pyrobituminous stylolites, vughy 0.5 cm white calcite veins
<b>421</b>	1.54 717.47m	Nebulously brecciated (stylobrecciated, soft-sediment) medium dolarenite in slightly muddy fine dolarenite matrix, some tabular fragments of dark grey plane-

		laminated (1 mm) sandy mudstone, fragments subrounded with diffuse boundaries, matrix with swirly layering subparallel to fragment boundaries, some 10 cm massive zones
<b>422</b>	2.29 719.76m	Massive to weakly plane-laminated (4-10 mm) pale grey medium dolarenite, grains 0.4-0.6 mm, subangular subspherical, grain support, close-pack; with 10% dark grey interlaminae of muddy fine dolarenite and sandy mudstone, 1-3 mm; frequently brecciated (soft-sediment), some tabular clasts (1% 1 mm) in medium dolarenite, reverse grading common (matrix disappears upwards), abundant bedding-parallel pyrobituminous (0.5 mm) stylolites, 0.5 cm pyrobituminous white calcite veins
<b>423</b>	0.66 720.42m	Massive pale grey medium dolarenite, grains 0.5-0.7 mm, rare brecciated 0.5 mm partings of grey/black sandy mudstone, 0.5 cm white calcite veins with minor pyrobitumen
<b>424</b>	*04065 0.99 721.41m	Interbedded (75%, 25%) pale grey medium dolarenite, grains 0.4-0.6 mm, plane-laminated (2-10 mm); and dark grey muddy fine dolarenite and sandy mudstone, grains 0.1-0.3 mm in 20-60% kerogenous mud matrix, frequently brecciated (brittle, stylolitic) with 1 cm pyrobituminous white calcite veins
<b>425</b>	3.21 724.62m	Massive to weakly plane-laminated (1-10 mm) pale grey medium dolarenite, grains 0.4-0.6 mm, with 1% 1 mm dark grey sandy mudstone interlaminae, some brittle brecciation by 1-2 cm white calcite veins with 0.5 mm pyrobitumen
<b>426</b>	1.65 726.27m	Interbedded plane-laminated (1-10 mm) pale grey fine dolarenite, grains 0.2-0.4 mm; and mid grey muddy fine dolarenite, kerogenous matrix 10-15%, rare 1 cm white calcite veins, bedding-parallel stylolites
<b>427</b>	4.01 730.28	Massive to plane-laminated (1-10 mm) pale grey fine dolarenite and muddy fine dolarenite, grains 0.2-0.4 mm; with 5% 1 cm interbeds of dark grey sandy kerogenous mudstone, matrix 50-70%, usually brecciated by 1 cm white calcite veins into tabular angular fragments; some dolarenite beds have 3% 0.3x2 mm clasts of sandy mudstone, 1 mm pyrite laminae near base
<b>428</b>	1.60 731.88m	Massive to plane-laminated (1-20 mm) pale grey medium dolarenite, grains 0.4-0.6 mm; mid grey muddy fine dolarenite; and dark grey sandy kerogenous mudstone; abundant 1-2 mm pyritic laminae, several siliceous horizons of grey translucent chert with 5% white carbonate rhombs; abundant dewatering structures and 1 cm white calcite veins with pyrobitumen; both normal and

		reverse grading
<b>429</b>	*04066 1.03 732.91m	Interbedded (60%, 30%, 10%) massive mid grey muddy fine dolarenite, grains 0.2-0.4 mm with 20-30% kerogenous mud matrix; plane-laminated (1-10 mm) medium dolarenite, grains 0.4-0.6 mm; and dark grey sandy mudstone, grains 0.1-0.2 mm in 50-70% kerogenous mud matrix; abundant pyrobituminous stylolites, 5 mm pyrite lenses and laminae
<b>430</b>	0.85 733.76m	Massive to wispy nebulously laminated pale grey medium dolarenite, grains 0.4-0.6 mm; with irregular lenses of mid grey muddy fine dolarenite; strong soft-sediment deformation, abundant 0.5 mm pyrobituminous stylolites
<b>431</b>	3.92 737.68m	Interbedded (80%, 20%) mid grey fine dolarenite with 10% wispy black muddy partings 0.1 mm, grains 0.2-0.4 mm; and dark grey kerogenous silty mudstone, 10-20% dolomitic silt, plane-laminated 1-5 mm; some soft sediment deformation, rare 2 cm white calcite veins with 2 mm medial pyrobitumen
<b>432</b>	5.55 743.23m	Strongly brecciated and nebulously laminated pale grey medium dolarenite with 10% irregular lenses of muddy medium dolarenite; brecciation soft-sediment, stylolitic and brittle, some irregular fragments of dark grey sandy mudstone, abundant 0.5 mm pyrobituminous stylolites
<b>433</b>	9.68 752.91m	Massive to weakly plane-bedded (1-20 mm) pale grey medium dolarenite, grains 0.5-0.7 mm, irregular 1 cm white calcite veins with trace pyrobitumen, bedding-parallel pyrobituminous stylolites uncommon
<b>434</b>	3.64 756.55m	Plane-bedded (0.5-10 cm) pale grey medium dolarenite, grains 0.4-0.6 mm with kerogenous muddy matrix 0-5%, rare bedding-parallel pyrobituminous (0.5 mm) stylolites
<b>435</b>	5.47 762.02m	Interbedded (70%, 20%, 10%) pale grey massive medium dolarenite, grains 0.5-0.7 mm; mottled nebulously layered muddy medium dolarenite, dark kerogenous matrix 5-10% in wispy 0.5 cm stringers; and mid grey muddy fine dolarenite, grains 0.2-0.4 mm, matrix 10-20%, weak reverse grading; rare bedding parallel pyrobituminous stylolites
<b>436</b>	*04067 0.27 762.29m	Interbedded (50%, 50%) pale grey fine dolarenite, beds 1 cm, grains 0.3-0.5 mm; and mid grey sandy mudstone, grains 0.1-0.2 mm, matrix 40-60%, brecciated at base, beds 1 cm
<b>437</b>	2.57 764.86m	Massive and brecciated (brittle) pale grey medium dolarenite, grains 0.5-0.7 mm, rare 0.5 cm interbeds with 5% dark muddy matrix, bedding parallel stylolites common, also 1 cm white calcite veins, rare 1-2 cm pyrite nodules

<b>438</b>	1.16 766.02m	Interbedded (70%, 30%) pale grey fine dolarenite, grains 0.3-0.5 mm; and dark grey kerogenous silty shale, dolomitic silt 10-30%, beds 0.5-3 cm, strong soft-sediment deformation, 1 cm white calcite veins with trace pyrobitumen
<b>439</b>	*04068 2.41 768.43m	Interbedded (50%, 30%, 20%) mid grey muddy fine dolarenite with wispy 0.5 mm lamination, 40% matrix, grains 0.3-0.5 mm; dark grey sandy mudstone, grains 0.2-0.4 mm, 50% matrix; and grey/black silty shale, 80% kerogenous matrix, beds 1-3 cm; abundant 1 cm white calcite veins with medial pyrobitumen
<b>440</b>	2.60 771.03m	Massive to weakly plane-bedded (1 cm) pale grey medium dolarenite, grains 0.4-0.6 mm, matrix 0-5% (defines bedding) with 2% 1 mm dark grey planar partings of silty shale, often shiny and graphitic (planar stylolites?), 1 cm white calcite veins with 0.5 cm medial vughs
<b>441</b>	*04069 9.22 780.25m	Interbedded (65%, 35%) mid grey muddy fine dolarenite with wispy 0.5 mm laminae defined by matrix lenses; and dark grey sandy mudstone, matrix 50%, grains 0.2-0.4 mm; abundant soft sediment deformation and brecciation, beds 1-5 cm, rare 1 mm pyrite laminae, some 0.5 cm white calcite veins, uncommon reverse grading
<b>442</b>	*04070 1.01 781.26m	Interbedded (60%, 40%) massive pale grey fine dolarenite; and mid grey muddy fine dolarenite, grains 0.2-0.4 mm, matrix 5-20% kerogenous mud; beds 0.5-2 cm, abundant soft-sediment brecciation, 1 cm white calcite veins with medial 2 mm pyrobitumen
<b>443</b>	2.53 783.79m	Massive to weakly plane-bedded (0.5-2 cm) pale grey medium dolarenite, some 1-2 mm dark grey sandy mudstone partings, frequently brecciated or ripped up, scattered 1 cm pyrite nodules, 1 cm white calcite veins with medial pyrobitumen
<b>444</b>	2.87 786.66	Weakly plane-laminated (1-10 mm) pale grey fine dolarenite, grains 0.3-0.5 mm; with 5% 1-5 mm interlaminae of mid grey muddy fine dolarenite, 40% kerogenous matrix; often brecciated (soft-sediment, brittle), common 1 cm white calcite veins with traces of medial pyrobitumen, some bedding parallel stylolites
<b>445</b>	1.34 788.00	Like <b>444</b> but thicker laminae, 2-10 mm, and higher % of mudrock, 25% vs. 5%
<b>446</b>	14.79 802.79m	Massive to weakly plane-bedded (1 cm) pale grey medium dolarenite, grains 0.6-0.8 mm, laminae defined by presence of 5% muddy matrix, brecciated (brittle) by 1 cm white vughy calcite veins, scattered 0.5 mm mid-grey muddy partings, sometimes forming detrital mud flakes,

		rare bedding parallel stylolites
<b>447</b>	3.42 806.21m	Plane-bedded (0.5-2 cm) pale, grey medium dolarenite, grains 0.4-0.6 mm, bedding defined by matrix content (0-5%), some brittle and nebulous dissolutional brecciation, rare stylolites, vughs
<b>448</b>	1.76 807.97	Interlaminated (1-10 mm) pale grey medium dolarenite grains 0.5-0.7mm; and mid-grey muddy fine dolarenite, grains 0.3-0.5 mm, matrix 10-30%; some brittle brecciation by 1 cm white calcite veins, rare pyrobituminous stylolites
<b>449</b>	5.12 813.18m	Interbedded (10-20 cm) massive pale grey medium dolarenite, grains 0.4-0.6 mm; and finely plane-laminated (1-2 mm) fine dolarenite and muddy fine dolarenite, grains 0.3-0.5 mm, matrix 0-20%, often disrupted by brittle or soft-sediment brecciation; abundant 0.5 mm pyrobituminous stylolites, 1 cm white calcite veins with 1 cm vughs
<b>450</b>	10.90 824.08m	Massive to weakly plane-laminated (1-5 mm) pale grey medium dolarenite, grains 0.4-0.6 mm; with 1% interlaminae of dark grey silty shale, often showing soft-sediment deformation and brecciation, abundant 5 cm lenticular calcite-lined vughs some with quartz infill, also 1 cm white calcite veins causing brittle brecciation, rare pyrobituminous stylolites
<b>451</b>	0.72 824.80m	Interlaminated (1-10 mm) pale grey fine dolarenite, grains 0.3-0.5 mm; and mid-grey sandy mudstone, matrix 30-50%, grains 0.1-0.2 mm, mostly brecciated (stylobrecciation, brittle) by pyrobituminous 0.5 mm stylolites or 2 cm white calcite veins with traces of 0.5 mm laminoid pyrobitumen
<b>452</b>	4.44 829.24m	Massive to weakly plane-bedded (1-3 cm) pale grey medium dolarenite, grains 0.5-0.7 mm, abundant brittle brecciation by 2 cm white calcite veins with 1-2 cm vughs some pyrobituminous stylolites, rare 1 mm dark muddy dolarenite partings
<b>453</b>	2.66 831.90m	Plane-bedded (1-5 cm) pale grey medium dolarenite, grains 0.4-0.6 mm; and muddy fine dolarenite, grains 0.3-0.5 mm, matrix 5-10%; abundant 1cm white calcite veins with vughs, some pyrobituminous stylolites
<b>454</b>	3.80 835.70m	Massive to weakly plane-bedded (1-2 cm) pale grey medium dolarenite, grains 0.4-0.6 mm, with occasional 0.5 mm dark partings of sandy mudstone brecciated by soft-sediment deformation, abundant 1cm white calcite veins causing brittle brecciation
<b>455</b>	3.27 838.97m	Interbedded (20-50 cm) massive pale grey medium dolarenite, like <b>454</b> ; and interlaminated fine dolarenite

		and sandy mudstone, like <b>451</b> ; abundant pyrobituminous bedding-parallel stylolites sheared to graphite
<b>456</b>	7.58 846.55m	Massive to weakly plane-bedded (1-5 cm) pale grey medium dolarenite, grains 0.4-0.7 mm with 1% 0.1x1 mm tabular clasts of black shale, rare 1 cm interlaminae of sandy mudstone, kerogenous matrix 40-60%, some bedding-parallel pyrobituminous stylolites sheared to graphite, abundant 1 cm white calcite veins with calcite-lined 1 cm vughs causing brittle brecciation
<b>457</b>	*04072 5.65 852.20m	Massive to weakly plane-bedded (0.5-10 cm) pale grey fine dolarenite, grains 0.3-0.5 mm, with 5% interlaminated (1-10mm) dark grey kerogenous silty mudstone; frequently brecciated by 1-5 cm white calcite veins with 1-2 cm angular patches of white rhombic 1 mm carbonate crystals in pyrobitumen matrix (oil-filled vughs?), also 3 mm pyrobituminous stylolites
<b>458</b>	3.50 855.70m	Massive to weakly plane-bedded (1-3 cm) pale grey fine dolarenite, like <b>457</b> but <1% mudrocks, abundant pyrobituminous stylolites, 25% volume expansion by brecciation, vein filling, vughy cavities
<b>459</b>	4.27 859.97m	Plane-bedded (1-5 cm) pale grey fine dolarenite, grains 0.2-0.4 mm, with 50% stylobreccia containing 0.5-1 cm thick tabular fragments (20%) of silty mudstone and muddy dolarenite, abundant pyrobituminous stylolites, some 1 cm white calcite veins, some beds show reverse grading (matrix disappears up)
<b>460</b>	*04073 9.25 869.22m	Interbedded (50%, 50%) plane-bedded (1-5 cm) pale grey fine dolarenite, grains 0.2-0.4 mm, frequent reverse grading, with 1-3% black stingers of kerogenous mudstone (clasts?, incipient stylolites?); and plane-laminated (1-10 cm) dark grey muddy fine dolarenite, grains 0.2-0.4 mm, kerogenous matrix 40-30%; grey black kerogenous silty mudstone, kerogenous matrix 60-80%, frequently stylobrecciated; rare 1 cm white calcite veins
<b>461</b>	13.69 882.91m	Plane-bedded (1-5 cm) pale grey medium dolarenite, grains 0.5-0.7 mm, muddy matrix 0-5% defines bedding, both normal and reverse grading defined by matrix, some soft-sediment deformation, brittle brecciation by 2 cm white vughy calcite veins increases downward, overall 20% volume expansion (rare stylolites)
<b>462</b>	5.65 888.56m	Interbedded (50%, 50%) plane-bedded fine dolarenite, grains 0.3-0.5 mm, bedding 1-5 cm; and stylobrecciated fine dolarenite and laminated (1-5 mm) muddy fine dolarenite and silty mudstone, rare 1 cm pyrite nodules, stylolites with 1-3mm pyrobitumen, moderately common 1 cm white calcite veins (volume probably neutral)

<b>463</b>	18.01 906.57m	Plane-bedded (1-5 cm) pale grey fine dolarenite, grains 0.3-0.5 mm, matrix 0-2%, defines bedding, abundant bedding-parallel stylolites (no pyrobitumen), 15% 1 cm white calcite veins with 2 cm vughs causing brittle brecciation (overall 10% volume expansion?), both normal and reverse grading (matrix) but most beds massive, some soft-sediment deformation
<b>464</b>	0.24 906.81m	Stylobrecciated weakly plane-laminated (1 mm) fine dolarenite and muddy fine dolarenite, matrix 0-10%, fragments rounded (initial soft-sediment brecciation?), stylolites with 1 mm pyrobitumen
<b>465</b>	0.13 906.94m	Interlaminated (1-3 cm) massive black kerogenous mudstone and grey/green tuffaceous? silty mudstone with 0.05 mm lenticular clear grains (intermediate tuff?), rare 1 cm carbonate lenses, pyritic lenses 1 mm, with stylolitic boundaries
<b>466</b>	4.47 911.41m	Interbedded (50%, 50%) plane-bedded (1-3 cm) pale grey fine dolarenite, grains 0.3-0.5 mm, with dark grey silty mudstone partings (0.5-1 mm) in some sections or pyrobituminous bedding parallel stylolites; and breccia (soft-sediment and stylolitic) of fine dolarenite and laminated (0.5 mm) dark grey silty mudstone
<b>467</b>	4.36 915.77m	Plane-bedded (1-3 cm) pale grey fine dolarenite, grains 0.3-0.5 mm, some stylolitic bed boundaries, with scattered 1 cm white calcite veins causing brittle brecciation, rare muddy fine dolarenite in breccia, some 3 cm crystalline vughs
<b>468</b>	1.22 916.99	Breccia (soft-sediment and stylolitic) of 90% fine dolarenite, 10% plane-laminated (1 mm) muddy fine dolarenite and silty mudstone with 0.1x1 mm carbonate lenses, abundant pyrobituminous stylolites, some 1 cm white carbonate veins, overall volume neutral
<b>469</b>	3.97 920.96m	Interbedded massive to weakly plane-bedded (1-2 cm) pale grey fine dolarenite, grains 0.2-0.4 mm, and brecciated (brittle, soft-sediment) fine dolarenite in units 10-20 cm thick, abundant 1 cm white calcite veins, volume increase 10%, some pyrobituminous stylolites and stylobreccia
<b>470</b>	2.19 923.15m	Breccia (soft-sediment, styobreccia, rare brittle) of fine dolarenite and kerogenous silty mudstone, plane-laminated (0.5-1 mm) in matrix of muddy fine dolarenite, some interbeds (10 cm) of plane-bedded (1-2 cm) fine dolarenite, some 1 cm white calcite veins, pyrobituminous stylolites
<b>471</b>	1.13 924.28m	Stylolaminated (1-2 cm bedding defined by 0.5 mm kerogenous bedding-parallel stylolites) pale grey fine

		dolarenite, grains 0.3-0.5 mm, some stylobreccia, some 1 cm white calcite veins
<b>472</b>	1.41 925.69m	Plane-bedded (0.5-2 cm) pale grey fine dolarenite, grains 0.3-0.5 mm; and muddy fine dolarenite, matrix 5-15%, some reverse grading (matrix disappears upward)
<b>473</b>	2.99 928.68m	Weakly plane-bedded (0.5-2 cm) pale grey medium dolarenite, grains 0.5-0.7mm, matrix 0.5%, bedding defined by matrix %, some brittle brecciation by 1 cm white calcite veins increasing downwards with 1-2 cm vugs
<b>474</b>	3.49 932.17m	Plane-laminated (1-10 mm) pale grey fine dolarenite, grains 0.2-0.4 mm, and mid-grey muddy fine dolarenite, matrix 5-20%, with 1 mm grey/black kerogenous silty shale partings, frequently brecciated (60%), soft-sediment and brittle (0.5 cm white calcite veins), some normal grading (matrix increases upward)
<b>475</b>	*04074 4.14 936.31m	Plane-laminated (1-10 mm) and brecciated (soft-sediment, stylobreccia, brittle) pale grey muddy fine dolarenite, grains 0.3-0.5 mm, matrix 5-20% with 50% 1-2 mm pale diagenetic carbonate patches causing mottled appearance, with 30% interlaminae (1-10 mm) of kerogenous sandy mudstone, grains dolomitic 5-20%, and silty shale, dolomitic silt 10-30%; matrix breccia is fine dolarenite, abundant pyrobitumen stylolites (0.5-3 mm), rare 0.5 cm white calcite veins
<b>476</b>	3.62 939.93m	Plane-laminated (2-20 mm) pale grey medium dolarenite, grains 0.4-0.6 mm, and mid grey muddy fine dolarenite, grains 0.3-0.5 mm, matrix 5-10%, near top with 50% 1-2 mm pale diagenetic carbonate patches giving mottled appearance, some brittle brecciation by bedding-parallel 0.5-1 cm white calcite veins, 5% thickness inflation
<b>477</b>	1.98 941.91m	Plane-bedded (1-4 cm) pale grey fine dolarenite, grains 0.2-0.4 mm, and mid grey muddy fine dolarenite, matrix 2-8%, both normal and reverse grading, some brecciation (stylobrecciation, dissolutional) with diffuse-bounded fragments, rare bedding-parallel stylolites
<b>478</b>	0.92 942.83m	Plane-laminated (2-20 cm) pale grey fine dolarenite, grains 0.3-0.5 mm, and mid-grey muddy fine dolarenite, matrix 5-20% with abundant incipient lamina-parallel stylolites giving mottled texture, with graphitic planar-stylolamine partings 0.5-1 mm, shiny, greasy, also pyrobituminous bedding-subparallel stylolites (1mm), more mottled downwards
<b>479</b>	0.88 943.71m	Massive mottled, pale grey muddy fine dolarenite, grains 0.3-0.5 mm, matrix 5-10% mostly segregated into incipient bedding-subparallel stylolites, also

		pyrobituminous stylolites (0.5 mm)
<b>480</b>	0.75 944.46m	Brecciated (soft-sediment, dissolutional) mid-grey muddy fine dolarenite, grains 0.3-0.5 mm, matrix 5-10%, fragment boundaries angular, diffuse; in fine dolarenite matrix, rare tabular fragments of kerogenous silty shale, grain supported
<b>481</b>	1.52 945.98m	Weakly plane-bedded (1-5 cm) pale grey fine dolarenite, grains 0.3-0.5 mm with 1% 0.1x0.5 mm black tabular clasts of kerogenous shale, with 0.5 mm kerogenous stylolite partings between beds, rare 5 mm interbeds of dark grey sandy mudstone
<b>482</b>	5.86 951.84m	Stylobedded (1-5 cm) pale grey coarse dolarenite, grains 0.6-0.9 mm, beds separated by stylolamine (0.5-1 mm) or stylolite-bounded sandy kerogenous mudstone, grains 20-40%, layers 5-10 mm, brittle brecciation in places by 0.5 cm grey carbonate veins with 3mm crystals, also soft-sediment brecciation, stylobrecciation
<b>483</b>	*04075 *04076 8.59 960.43m	Interbedded (1-10 cm) and frequently brecciated (75%) pale grey coarse dolarenite, grains 0.6-0.8 mm with 0.5 mm pyrite cubes; black kerogenous mudstone with 1% 0.1 mm disseminated pyrite, 1% dolomitic silt; some 1 cm dull grey, silty tuffaceous mudstone interlaminae, rare 5 mm pyrite modules and laminae, abundant pyrobituminous stylolites (0.5 mm), abundant convolute bedding (20 cm), brecciation soft-sediment, stylolitic and brittle (1 cm white calcite veins), fragments subrounded, up to 5 cm, often tabular, may also contain laminae (1-3 mm) of muddy fine dolarenite and sandy mudstone, rare pyrobituminous stylolites
<b>484</b>	3.75 964.18m	Weakly pale-bedded (1-5c m) pale grey medium dolarenite, grains 0.5-0.7 mm, with diffuse or stylolitic bed boundaries, abundant 1 cm white calcite veins causing brittle brecciation, 2 cm calcite-lined vughs
<b>485</b>	0.23 964.41m	Plane-laminated (1-5 mm) muddy medium dolarenite, grains 0.4-0.6 mm, matrix 5-10%, with 1 mm kerogenous grey/black sultry mudstone partings, frequently brecciated (soft-sediment), rare 0.3 mm pyrobituminous bedding-parallel stylolites
<b>486</b>	0.99 965.40m	Plane-bedded (1-5 cm) pale grey medium dolarenite, like <b>484</b> but no vughs
<b>487</b>	0.56 965.96m	Interbedded and brecciated coarse dolarenite and kerogenous mudstone, like 483 but no pyrite nodules or laminae, bedding finer (0.5-2 cm)
<b>488</b>	0.30 966.26m	Plane-laminated (1-5 mm) muddy medium dolarenite with kerogenous silty mudstone partings, like <b>485</b> but not brecciated

<b>489</b>	<i>0.11</i> 966.37m	Massive muddy medium dolarenite, grains 0.4-0.6 mm, matrix 5-10% organized into 0.1-0.5 mm lenses
<b>490</b>	<i>*04077</i> <i>0.61</i> 966.98m	Interlaminated (5-10 mm) grey/black kerogenous silty mudstone (dolomitic silt 10-20%); dark grey sandy mudstone (0.1 mm dolomite sand 5-10%); and mottled coarse dolarenite, grains 0.6-0.8 mm, with pale diagenetic carbonate lenses 1 mm
<b>491</b>	<i>0.51</i> 967.49m	Plane-laminated (1-5 mm) muddy medium dolarenite with kerogenous silty mudstone partings, like <b>485</b> but dolarenite mottled with 1 mm diagenetic carbonate lenses
<b>492</b>	<i>*04079</i> <i>15.37</i> 982.86m	Stylobedded (1-3 cm) pale grey medium dolarenite, grains 0.5-0.7 mm, beds separated by bedding-parallel 0.1 mm pyrobituminous stylolites with 1-10 mm saw-tooth relief, occasionally oblique producing stylo-cross-bedding, very rare brittle breccia zones with 1 cm white calcite veins (volume expansion 2%)
<b>493</b>	<i>*04078</i> <i>0.15</i> 983.01m	Massive kerogenous black mudstone, 1% 0.1 mm disseminated pyrite, 1-3% dolarenite silt (often forming lenses)
<b>494</b>	<i>1.09</i> 984.10m	Irregularly stylobedded (1-10 cm) mottled mid grey muddy medium dolarenite, grains 0.5-0.7 mm, matrix 5-10% forming bedding parallel lenses 0.1x1 mm, beds separated by 1-5 mm kerogenous black mudstone partings, bounded by bedding-parallel stylolites
	EOH	

Survey

984.1m – 89° toward 277°

Geophysical logging (Reeves). Hole impenetrably blocked by grease & cuttings at 135.0m (tried dummy probe 3 times, heavily weighted), right at HQ/NQ changeovers (similar phenomenon to pressure rise at 565m). Caliper gamma, magnetic susceptibility (wouldn't go below 102.0m at hammer RC/HQ transition), resistivity (tool stuck at 102.0m, ceased working, not loose connection), density (from 102.0m)