



Exploration Licence 99/87

Preliminary report for F. Bardenhagen

Two diamond-drill holes at Kelso,
West Tamar

Logged by J. L. EVERARD

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DEPARTMENT OF RESOURCES AND ENERGY
DIVISION OF MINES AND MINERAL RESOURCES

OPEN FILE

PRELIMINARY REPORT FOR F. BARDENHAGEN

TWO DIAMOND DRILL HOLES AT KELSO, WEST TAMAR AREA

Logged by J.L. Everard, Mines Division, Department of Resources and Energy

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MICROFILMED

Conclusion

Two diamond drill holes were drilled by the Department of Mines for F. Bardenhagen, to test the potential for gold mineralisation in EL 99/87. Both were sited just west of Kelso township, in an area mapped as Tertiary sand, clay and gravel on the Beaconsfield 1:63 360 geological map. Jurassic dolerite crops out a short distance to the south of the holes, and forms Stockyard Hills about 2 km to the west. Tertiary basalt occurs on the shores of the Tamar estuary, both north and south of Kelso.

Hole 1 (located at DQ819489) encountered mainly vesicular basalt, almost certainly of Tertiary age, from about 24 m to about 59.9 m. The basalt is fine-grained to glassy, indicating very rapid cooling, possibly caused by subaqueous eruption.

Two horizons of claystone, black carbonaceous mudstone and tuffaceous sandstone occur in the lower part of the basalt, and 1.7 m of similar sedimentary rocks underlie the basalt. Fossilised plant material is present. Decomposed dolerite occurs from 61.6 m to 85.0 m, but a thin interval of claystone near 69.0 m suggests that at least the upper part is not *in situ* and that weathering is at least partly Tertiary in age. Competent, mostly fresh Jurassic dolerite occurs from 85.0 m to 250.0 m and becomes only slightly finer-grained with depth. Narrow secondary veinlets of calcite and zeolite minerals (stilbite, chabazite and laumontite) occur within the dolerite.

Hole 2, located about 550 m to the WNW (at DQ814491) intersected an upper massive, fine-grained basalt flow from about 4.4 m to 7.3 m, followed by 7.0 m of interbedded claystone and micaceous siltstone containing abundant fossilised plant material and an 0.5 m thick interval of lignite. A possible palaeosoil horizon below these sedimentary rocks suggests an appreciable period of non-deposition occurred after the extrusion of the lower basalt flow, extending to 33.0 m and containing a possible thin tuff layer. This is underlain by 8.2 m of very poorly sorted sedimentary rocks, largely derived from decomposed dolerite but also containing some detrital mica. Fairly fresh medium-coarse-grained dolerite, containing calcite and zeolite (mainly laumontite) veinlets, extends from 41.2 m to the end of the hole at 88.0 m.

Both holes have entered the major dolerite intrusion that forms the central part of the Tamar graben. As the thickness of this body is unknown, and as it is probably underlain by Permo-Triassic Parmeener Super-group rocks which are known to be more than 900 m thick in the Beaconsfield area, it is unlikely that a continuation of either hole could reach lower Palaeozoic basement rocks, such as those that host gold mineralisation at Beaconsfield or Lefroy. Reworked gold in Triassic or Permian rocks cannot be completely ruled out, but is considered most unlikely.

Apart from pyritic encrustations within basalt in hole 1, and a 0.5 m thick lignite interval in hole 2, there is no indication of any mineralisation in either hole.

Geologically, the main point of interest is presence of intra- and sub-basalt sediments, which are expected to contain microfossils that will enable the age of the basalts to be more precisely constrained. This work will be undertaken for general information and be reported separately.

J.L. Everard
GEOLOGIST

Summary Logs

Kelso DDH No. 1

0	-	24	m	No core except for 3 m of basalt (core loss 87%)
24	-	54.5	m	Basalt, vesicular, fine-grained to glassy (core loss 44%)
54.9	-	55.2	m	Claystone
55.2	-	58.4	m	Black carbonaceous mudstone
58.4	-	59.4	m	Claystone and poorly sorted tuffaceous sandstone
59.4	-	59.9	m	Basalt
59.9	-	61.6	m	Tuffaceous sandstone and claystone
61.6	-	68.6	m	Decomposed dolerite (core loss 37%)
68.6	-	69.0	m	Claystone
69.5	-	85.0	m	Decomposed dolerite (core loss 48%)
85.0	-	250.0	m	Dolerite

Kelso DDH No. 2

0	-	4.4	m	Alluvium(?) (core loss 84%)
4.4	-	7.3	m	Basalt
7.3	-	10.8	m	Claystone and micaceous siltstone (core loss 23%)
10.8	-	11.3	m	Lignite
11.3	-	12.8	m	Claystone
12.8	-	13.3	m	Siltstone, poorly sorted, micaceous
13.3	-	13.8	m	Claystone
13.8	-	14.3	m	Palaeosoil(?)
14.3	-	19.3	m	Basalt
19.3	-	19.7	m	Tuff(?), weathered
19.7	-	32.2	m	Basalt
32.2	-	32.6	m	Mudstone/siltstone, gritty, poorly sorted
32.6	-	33.0	m	Basalt
33.0	-	41.2	m	Mudstone/siltstone, gritty, poorly sorted, dolerite-derived
41.2	-	88.0	m	Dolerite

KELSO DRILL HOLE No. 1BOXES 1 & 2

NQ core, diameter 47 mm.

0 - 24 m

Only about 3 m of core, largely broken.

A few rounded pebbles and cobbles (≤ 50 mm) of quartzite and basalt at top. Passes downward into ...

Basalt; fine-grained to glassy, medium-grey, vesicular.

Vesicles rounded, sub-cylindrical to flattened or irregular, often ≤ 5 mm across, several cm long, some with amygdaloidal fillings. About 1.5 m of competent core, remaining 1.5 m at bottom of interval is very vesicular, weathered, brown and crumbly.

24 - 27 m

Basalt; fine-grained to glassy, very vesicular, rather weathered. Core mostly competent, except for very crumbly zone at c.26 m.

27 - 27.9 m

Basalt; very vesicular, weathered, green-brown, very crumbly.

27.9 - 28.1 m

Basalt; very vesicular, medium-grey, competent.

28.1 - 33.0 m

Basalt; vesicular, weathered, crumbly. Core loss 3.4 m.

33.0 - 37.5 m

Basalt; less vesicular, less weathered, medium-grey. More competent, but some very vesicular, glassy crumbly zones, may have iridescent lustre. Calcite amygdales towards bottom of interval. Only 1.5 m of core, maximum unbroken length 0.3 m, core loss c.3 m.

37.5 - 40.5 m

Basalt; fine-grained, moderately vesicular, medium-grey, with minor glassy zones. Only c.1 m of mostly broken core, core loss c.2 m.

40.5 - 43.0 m

Basalt; moderately vesicular, grey or sometimes bluish tinted.

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Less than 1 m of broken core, core loss c.2 m.

Box 3

43.0 - 46.5 m

Basalt; fine-grained, medium grey. No glassy zones, becoming less vesicular, in places nearly massive. Olivine phenocrysts (< 1 mm) conspicuous in places. About 1.5 m of mainly broken core, core loss c.2 m.

46.5 - 51.5 m

Basalt. At top of interval c.1.3 m of glassy and very vesicular, to fine-grained and moderately vesicular, broken core. Followed by c.2.7 m of massive, fine-grained, somewhat weathered competent basalt, with olivine phenocrysts (< 1 mm) locally conspicuous.

Total core recovery c.4 m, core loss c.1 m.

51.5 - c.53.5 m Basalt as above, massive, fine-grained. Broken zone at c.52 m. Sample at 51.55 (Petrography).

BOX 4

c.53.5 - 54.5 m Basalt as above, massive, fine-grained.

54.5 - 54.9 m Claystone, soft but competent, pale brown, containing abundant black to dark brown carbonised plant material. At top of interval (54.5-54.6) claystone is intermixed with fragments of greenish basaltic glass.

Sample at 54.7 m (palynology).

54.9 - 55.2 m ~~Coal, poor quality, or~~ Black carbonaceous mudstone. Hackly fracture, dull lustre. Sample at 55.0 m.

55.2 - 57.5 m Basalt, weathered, grey-green. Some rounded vesicles, also amygdales filled with sparry calcite in upper 0.3 m.

57.5 - 58.4 m Basalt as above, weathered, grey-green, occasional vesicles. Possible also minor intercalated basaltic tuff. Pyritic encrustation on fracture surface near 58.0 m.

58.4 - 58.5 m Tuffaceous sandstone (?), very poorly sorted, dirty brown-green in colour. Contains subrounded quartz granules ≤ 7 mm, commonly 1-3 mm, white.

58.5 - 59.4 m Claystone, intermixed with poorly sorted tuffaceous sandstone/siltstone, as above. All khaki brown-green. Dark brown woody plant material present, notably near 59.2 m.

59.4 - 59.9 m Basalt, weathered, dark grey to black, in places glassy. Probably some intercalated basaltic tuff.

59.9 - 60.5 m Tuffaceous sandstone/siltstone, very poorly sorted, brown-grey to dull brown-green, with subrounded quartz granules. Claystone intermixed. Minor dark brown plant material present.

60.5 - c.61.6 m Tuffaceous sandstone as above, pale brown claystone intermixed, dark brown woody plant material abundant. Glassy weathered basalt, probable clast, c.61.0 - 61.1 m.

BOX 5

61.6 - 66.5 m Only about 3.0 m of core, core loss about 1.9 m.

Dolerite (?) (1.6 m) - coarse-grained, massive, weathered but tough, medium-grey. Possible boulder. SAMPLE at c.61.8 m. Followed by ...

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- Decomposed dolerite (?) (1.4 m) - soft, clayey pale grey-green decomposed rock, probable relict coarse igneous texture.
- 66.5 - 69.5 m Decomposed dolerite (?) as above; soft, grey-green to khaki-green. Near 68.6-69.0 m is a fine-grained khaki-green claystone, possibly of Tertiary age, suggesting Tertiary weathering of dolerite.
- About 2.3 m of core, core loss 0.7 m. SAMPLE 68.8 m (palynology).
- 69.5-76.5 m Only about 3.3 m of core, core loss about 3.7 m.
- Decomposed dolerite as above, soft, crumbly, pale khaki-green, suggestion of relict igneous texture.
- BOX 6
- 76.5-81.5 m Only about 3.1 m of core, core loss about 1.9 m.
- Decomposed dolerite as above, soft, very crumbly, khaki-green.
- Near middle of interval is a pseudobreccia, consisting of angular pseudoclasts (5-30 mm) of khaki-green decomposed dolerite with relict igneous texture, and a finer grained pale green to off-white very weathered matrix.
- 81.5-87.5 m About 4.1 m of core, core loss about 1.9 m.
- Decomposed dolerite and clay (c.1.7 m).
- Followed abrupt at c.85 m by ...
- Dolerite (c.2.4 m). Competent, hard but weathered, medium-grained, with conspicuous dark brown weathering for about 2-3 mm on either side of fractures. Calcite veinlets 1-2 mm wide present.
- BOXES 7 & 8
- 87.5-90.5 m Nearly 100% core recovery below this point.
- Dolerite, hard and mostly competent, but weathered. Calcite veinlets present. More weathered and broken, deep brown to khaki-brown zone from 87.7-89.6. SAMPLE 90.5 m (petrology).
- 90.5-93.5 m Dolerite as above, hard but weathered. White veinlets ≤ 5 mm wide of calcite and minor zeolite present. Core somewhat broken below 91.7 m.
- 93.5-94.1 m Dolerite, broken, weathered, dull brown-green with some zeolite veinlets ≤ 10 mm.
- 94.1-96.5 m Dolerite, competent, fairly fresh medium-coarse. Weathering more intense near calcite/zeolite veinlets, and near joints.

96.5-99.5 m Dolerite as above, hard and competent, medium-coarse, but more weathered and oxidised near joints. Some fractures with 1-2 mm wide off-white to pale green lining of calcite \pm zeolite, usually planar. SAMPLE of zeolite at 98.1 m

99.5-102.4 m Dolerite as above, veinlets and joint linings of calcite \pm zeolite. More weathered, brownish, partly decomposed zone from 101.2-101.5 m.

BOXES 9 & 10

102.4-111.5 m Dolerite, fairly fresh, coarse-grained. Near 108.0 in large fracture at 30° to core axis, lined with a 3 mm veinlet of off-white finely crystalline zeolite - SAMPLE. Narrow (≤ 1 mm) calcite \pm zeolite fracture linings present elsewhere.

111.5-117.5 m Dolerite as above. Fractured zone 114.9-115.0. Calcite veinlet, 2 mm, 80° to core axis at 115.5 m.

BOX 11

117.5-123.7 m Dolerite as above. Zeolite veinlet 1-2 mm, 20° to core axis at 118.0-118.3 m. Joint lined with dark green to off-white substance including calcite, 20° to core axis, near 123.3. Several minor wavy zeolite veinlets also present.

123.7-126.8 Dolerite as above. Off-white veinlet, mainly of calcite, 5 mm wide, 15° to core axis, near 125.1 m.

BOX 12

126.8-134.1 Dolerite as above. Zeolite veinlet 2 mm, 40° near 128.1. Joint 30° near 129.4, with 4 mm lining of off-white calcite on both sides. Zeolite veinlet 5 mm, 50° at 130.5 m - SAMPLE. Zeolite veinlet 3 mm, 35° near 133.9 m.

BOX 13

134.1-137.0 m Dolerite as above. Calcite veinlet 1-2 mm, 20° at 134.2. Zeolite veinlet 1-2 mm, 45° near 136.0.

137.0-139.3 m Change to BQ core (36 mm diameter).

Dolerite as above. Calcite veinlet 2 mm, 45° at 137.4. Several veinlets with margins of zeolite and central zones of calcite, e.g. 2 mm wide and 40° to core axis at 137.8; 4 mm 50° at 137.9; 2 mm, 30° at 138.0. Large veinlet of off-white calcite, 12 mm wide, 40° to core axis at 139.3. Zone of weathered dolerite with calcite veinlets near 139.5.

BOX 14

139.3-142.07 Dolerite as above, medium coarse, fresh. Broken zone 139.3 - 139.6. White wavy zeolite veinlet at high angle to core axis is cut by off-white calcite veinlet, 2 mm, 75° near 140.8 m. Implies calcite veinlet is later.

- 142.07-144.0 m Dolerite as above, medium-coarse. Zeolite veinlet 4 mm, 75° near 143.0. Numerous narrow pale white zeolite veinlets present.
- 144.0 - 145.07 m Dolerite becomes slightly finer-grained.
- 145.07 - 148.07 m Only 1 m of core, core loss 2.03 m.
Medium-grained broken dolerite with a few zeolite veinlets.

BOX 15

- 148.07 - 154.07 Dolerite, medium-coarse. Off-white calcite (+?) zeolite veinlet 10 mm, 50° near 150.0 m. SAMPLE. Several minor narrow off-white to pale grey zeolite veinlets.
- 154.07 - 158.18 Dolerite, medium-coarse. Calcite veinlet 5 mm, 30° at 154.9. Broken, weathered zone 155.9-156.0. Calcite veinlet 4 mm, 15° at 157.7 m.

BOX 16

- 158.18 - 163.15 m Dolerite, medium-grained. Calcite veinlet 7 mm, 35° at 158.8. Zeolite veinlet 2 mm, 60°, also at 158.8. Parallel calcite veinlets, 2 mm and 10 mm wide, 15 mm apart, at 40° to core axis near 159.8. Veinlet of well crystallised zeolite, 6 mm, 25° at 160.3 m (SAMPLE). Calcite veinlet 10 mm, 30° at 161.2.
- 163.15 - 168.15 m Dolerite, medium-grained. Calcite veinlet 2 mm, 20° at 167.8. Calcite veinlet 2 mm, 45° at 168.0. Also several minor veinlets.

BOX 17

- 168.15 - 172.1 m Dolerite, medium-grained. SAMPLE at 172.0 m. Zeolite veinlet 1 mm, 70° at 168.6. Calcite veinlet, 3 mm, with narrow zeolite margins <1 mm, at 168.9. Zeolite veinlet 3 mm, 25° at 169.8. Calcite veinlet 5 mm, 70° at 170.2. Irregular calcite veinlet 2-3 mm wide at 170.9.
- 172.1 - 178.07 m Dolerite, medium-grained, fresh. Calcite veinlet 2 mm, 75° at 175.15 m. Zeolite veinlet 2 mm, 45° at 175.4. Zeolite veinlet 2 mm, 45° at 175.8. Zeolite veinlet with central calcite, 2 mm, 20° at 176.8. Zeolite veinlet 1 mm, 45° at 177.7 m.

BOX 18

- 178.07 - 188.03 m Dolerite, medium-grained. Zeolite veinlets 1 mm, 50° at 179.7 and 1 mm, 60° at 179.9. Calcite veinlet 3 mm, 45° at 181.7. Zeolite veinlet 1 mm, 60° at 184.15. Calcite veinlet 1 mm, 60°, 185.55. Zeolite veinlet 1 mm, 45° at 185.65. Calcite veinlet 1 mm, 45° at 186.1.

BOX 19

- 188.02 - 192.96 m Dolerite, medium-grained, fresh, massive, grey as above. Calcite veinlet 1 mm wide, 20° to core axis at 189.55 - 189.71. Calcite veinlet 10 mm, 70° at 190.34. Calcite veinlet 0.5 mm, 45° at 190.61. Zeolite veinlet 1 mm, 45° at 191.5. Calcite veinlet 2 mm, 60° at 192.58.
- 192.96 - 198.26 m Dolerite, medium-grained, as above. Veinlet of coarsely crystalline calcite (5-10 mm crystals), 15 mm wide near 193.7 m. Fracture at 60° to core axis, lined with fine-grained calcite, at 194.30. Fracture lined with zeolite at 194.66. Calcite veinlets 1 mm, 70° at 196.35; ≤1 mm, 45° at 196.53; 1 mm, 75° at 197.709. Zeolite veinlet 1 mm, 60° at 197.78.

BOX 20

- 198.26 - 202.06 M Dolerite, medium-grained, fresh, as above. Broken zone with calcite ± zeolite on fracture surfaces from 199.12-199.22. Calcite veinlets 2 mm, 60° at 199.52; 1 mm, 45° at 202.08. Veinlet of coarsely crystalline calcite (2-3 mm crystals), 3 mm wide, 60° at 200.7.
- 202.06 - 208.29 m Dolerite as above. Zeolite veinlets <1 mm, 75°, at 202.25; 1 mm, 80° at 202.86. Calcite veinlets <1 mm, 45° at 203.14; 2 mm, 80° at 204.43. Veinlet of more coarsely crystalline calcite, 2 mm, 80° at 204.43. Veinlets of fine calcite, ≤1 mm, 75° at 206.0; 2 mm, 80° at 206.03 m.

BOX 21

- 208.29 - 214.13 m Dolerite, medium-grained, as above. Calcite veinlet 3 mm, 85° at 208.71. Zeolite veinlet, ≤1 mm, 40° at 211.30. Slightly weathered and broken zone of dolerite near 213.0. Calcite veinlet, 1-2 mm, 5° to core axis at 214.0 - 214.2 m.
- 214.13 - 218.37 m Dolerite as above. Calcite veinlets 1 mm, 80° at 214.20; 1 mm, 70° at 216.31; 1 mm, 75° at 216.39. Possible traces of zeolite on fracture at 55° to core axis near 217.65. Zeolite(?) veinlet <1 mm, 30° near 218.3.

BOX 22

- 218.37 - 223.14 m Dolerite, medium-grained, as above. Zeolite veinlet <1 mm, 45° at 218.61. Veinlet of calcite ± zeolite, 1 mm, 5° to core axis from 218.7 - 219.0. traces of zeolite on fractures at 70° to core axis at 220.61, 75° at 220.92, 85° at 221.11. Calcite veinlet 2 mm, 75° at 221.57. Wavy zeolite veinlet, 0.5-1 mm at about 20° from 221.73 - 221.92. Several small calcite veinlets nearly parallel to core axis from 222.5 - 223.1 m.

223.14 - 228.30 m Dolerite as above. Calcite veinlet 1-2 mm, 20° at 223.15 - 223.45. Veinlet of well crystallised calcite, 4 mm, 40° at 225.8 m. Zeolite ± calcite veinlet, 2 mm, 90° to core axis at 226.85. Zeolite veinlet ≤0.5 mm, 45° at 227.8 m (SAMPLE). Several other very minor zeolite veinlets.

BOX 23

228.30 - 232.16 m Dolerite, medium-grained, as above. Zeolite(?) veinlet 1 mm, 75° at 229.03. Calcite veinlet 2 mm, 80° at 229.07. Fracture lined with scaly off-white zeolite at 40° to core axis at 229.3. Zeolite veinlets 0.5 mm, 30° at 229.85; 0.5 mm, 30° at 230.3.

232.16 - 236.24 Dolerite as above. Zeolite veinlet 0.5 mm, 40° near 232.7. Calcite veinlets 0.5 mm, 20° at 234.05; 1 mm, 45° at 234.2. Veinlets of well crystallised sugary calcite 1.5 mm, 40° at 234.8; also 1 mm, 70° at 235.65.

BOX 24

236.24 - 237.95 m Dolerite, medium-grained, as above. Four veinlets, 1-2 mm wide at low angles to core axis (5-20°) in interval 236.35 - 237.4. Fracture with a trace of zeolite encrustation, 70°, at 237.55. Zeolite veinlet 0.5 mm, 30°, 237.7.

237.95 - 241.08 m Dolerite as above, last 100 mm (241.0 - 241.1) is very broken. Zeolite veinlet 0.5 mm, 30° at 238.05. Very minor zeolite veinlets, ≤0.5 mm wide, 25° to core axis from 238.2 - 238.8. Zeolite veinlet 0.5 mm, 20°, 239.7 m. Zeolite encrustation on joint at 65° to core axis at 240.8.

241.08 - 244.23 m Dolerite as above. Calcite veinlet 0.5 mm, 20°, near 242.15. Zeolite veinlet 1 mm, 15° at 243.9 m.

BOX 25

244.23 - 247.09 m Dolerite, medium-grained, as above. Very narrow zeolite veinlet <0.5 mm, 10° to core axis from 244.3 - 244.5. Calcite lined fracture at 90° at 244.9. Zeolite veinlet 0.5 mm, 15° to core axis from 244.9 - 245.0.

247.09 - 250.07 Dolerite, medium-grained as above. White zeolite lining fracture, 65°, at 247.95. Calcite veinlet 0.5 - 1 mm, 10°, from 248.3 - 248.6.

Sample of dolerite at 250.0 m.

END OF HOLE.

KELSO DRILL HOLE No. 2BOXES 1 & 2

HQ core, (diameter 64 mm)

- 0 - 4.29 m Rounded to sub-rounded pebbles and cobbles (≤ 50 mm), mostly of orange-brown weathered basalt, with some kernels of fresh basalt; also subordinate quartzite pebbles. Less than 0.4 m of core. Probable alluvial deposit. Followed by ...
- Basalt. About 0.2 m of competent core of massive, fine-grained, dark grey, fairly fresh basalt, Possible boulder.
- 4.29 - 7.29 m A few well-rounded quartzite pebbles at top of interval. followed by ...
- Basalt. Hard but weathered, massive, fine-grained.
- 7.29 - 10.29 m Claystone and subordinate siltstone. About 2.2 m of core, core loss 0.8 m. Mainly soft pale brown claystone with coarser silty material in places, and abundant black carbonised fragments of plant material. Detrital white mica present, especially in silty intervals. Lower part of interval is dominantly soft, poorly sorted micaceous siltstone.
- Probable Tertiary age.
- 10.29 - 10.8 m Claystone, pale to dark brown, less well consolidated, abundant carbonised plant material.
- 10.8 - 11.3 m Lignite(?), poor quality, dark grey-brown, very friable.
- 11.3 - 12.8 m Claystone, place brown, friable. SAMPLE at 12.5 m (palyology).
- 12.8 - 13.29 m Siltstone, poorly sorted, micaceous. Abundant plant material, occasional quarry granules and pebbles, rare angular clasts to several mm across of fine-grained black basalt.
- 13.29 - 13.8 m Claystone, pale brown, as above.
- 13.8 - 14.3 m Possible palaeosoil, Very poorly sorted zone of soft pale grey-brown to grey-green material, containing dark brown organic matter, fine-grained mica flakes, mud pellets, and rounded vesicles within (?) altered basalt.
- 14.3 - 15.3 m Basalt. Very weathered, soft, friable, pale grey-blue to khaki-green, vesicular. Vesicles typically 5-10 mm across, up to 30 mm.
- 15.3 - 17.33 m Basalt, weathered, grey-green to khaki-coloured. Becoming less vesicular, nearly massive below 15.8 m. Sparse secondary calcite present.

BOX 3

- 17.33 - 17.4 m Basalt, nearly massive, weathered, khaki-green as above.
- 17.4 - 19.29 m Basalt, moderately vesicular, pale grey-green to pale grey-blue. Some amygdaloidal fillings of dark grey-brown limonite.
- 19.29 - 19.7 m Possible tuff or intra-basalt sediment. Poorly consolidated, very weathered, poorly sorted, friable orange-brown material.
- 19.7 - 20.4 m Basalt, vesicular to amygdaloidal, grey-green, weathered.
- 20.4 - 21.0 m Basalt, amygdaloidal, grey, weathered. Abundant irregularly shaped amygdales 10-30 mm across, filled with calcite.
- 21.0 - 21.3 m Basalt, very vesicular, grey.
- 21.3 - 21.6 m Basalt, glassy, dark brown to black, weathered. Grades into
- 21.6 - 23.30 m Basalt, very fine-grained to glassy, vesicular to very vesicular, weathered. Vitreous lustre. Agglomerate?

BOX 4

- 23.30 - 25.30 m Basalt, very fine-grained to glassy, vesicular, as above.
- 25.30 - 27.1 m Basalt, very fine-grained to glassy, very vesicular. Dull medium-grey with bluish ring, weathering khaki-brown.
- 27.1 - 27.8 m Basalt, fine-grained, only moderately vesicular, dull grey, less weathered.
- 27.8 - 28.6 m Irregular, interdigitating contact with very vesicular, often glassy, more even weathered basalt.
- 28.6 - 29.07 m Basalt, fine-grained, slightly to moderately vesicular, dull blue-grey, less weathered. Some amygdale filled with calcite.

BOX 5

(Caution - core may be out of sequence)

- 29.07 - c.31.8 m Basalt, glassy, very vesicular, weathered.
- c.31.8 - c.32.1 m Basalt, less vesicular, less weathered, dull grey. Off-white to pale grey, sugary zeolite lining some large vesicles near 32.1.
- c.32.1 - c.32.2 m Basalt, glassy, weathered.
- c.32.2 - c.32.6 m Gritty mudstone/siltstone (?), poorly sorted, unbedded, dirty yellow-green to khaki-green coloured. Fragments of plant material (stems) present. Probable Tertiary age.
- c.32.6 - c.33.0 Basalt, glassy, very vesicular, weathered.

c.33.0 - c.34.3 m Gritty mudstone/siltstone (?) as above, poorly sorted, unbedded, some angular clasts of basalt.

BOX 6

34.3 - 41.2 m Change to NQ core, (Diameter 47 mm)

About 3.3 m of core, core loss 2.30 m.

Gritty mudstone/siltstone(?) as above, very poorly sorted, soft dirty grey-green coloured, some detrital mica, rare dolerite (?) clasts (e.g. 130 mm at 39.8 m). Probably partly derived from decomposition of dolerite. Also cobble-sized dolerite clasts at 40.3 and 40.5 m.

41.2 m Contact with dolerite, slightly wavy, average about 70° to core axis. Tertiary weathering boundary?

41.2 - 42.90 m Dolerite. Massive, medium-coarse grained, dark grey-green, fairly fresh. Pyroxene 1-2 mm, plagioclase laths 1-3 mm. SAMPLE at 42.87 m (petrology). Zeolite veinlets 1 mm wide, 30° to core axis at 42.2, 42.4 m.

42.9 - 44.58 m Dolerite as above. Several weathered joints from 43.3 - 43.8 m.

BOX 7

44.58 - 46.01 m Dolerite as above. Calcite ± zeolite veinlets at 25-30° to core axis, at 45.8 and 45.9 m.

46.01 - 48.93 m Dolerite as above.

48.93 - 52.36 m Dolerite as above. Joint lined with khaki-green (?) oxidised chlorite at 80° to core axis, near 49.6 m. Several anastomosing zeolite veinlets at low angle to core axis from 51.9 - 52.2 m.

BOX 8

52.36 - 55.00 m Dolerite as above. Fractured zone 54.4 - 54.8 m, dolerite more weathered adjacent to fractures.

55.00 - 58.00 m Dolerite as above. Joint lined with off-white (?) zeolite and minor calcite, 15° to core axis, 55.0 - 55.15 m. Calcite also present in fractured one from 55.2 - 55.4 m. Fracture lined with zeolite, 55.5 - 55.7 m. Joint lined with abundant off-white calcite at 40° to core axis at 55.8; also at 15° to core axis near 56.4 m.

58.00 - 60.04 m Dolerite as above. Calcite ± zeolite veinlet, 2 - 3 mm, 10° at 58.8 - 59.0 m.

BOX 9

60.04 - 64.00 m Dolerite as above. Fractured zone near 60.4 m. Zeolite veinlet 1 mm wide, 30° to core axis, near 61.1 m. Zeolite veinlet ≤10 mm, 30°, from 63.4 - 63.5 m, SAMPLE.

64.00 - 68.03 m Dolerite, medium-coarse, as above. Veinlet of white to pale yellow fine-grained (?) zeolite ± calcite, 8 mm wide, 25° to core axis, at 64.3 m. Calcite veinlet with reddish staining, 5 mm, 35° at 65.3 m. Zeolite veinlet 1-2 mm, 5-10° from 64.2 - 64.5 m.

BOX 10

68.03 - 72.86 m Dolerite as above. Calcite veinlet 1-2 mm, 40° at 68.03 m. Zeolite veinlet, 85° at 69.3 m. SAMPLE. Zeolite veinlet, 1 mm, 85° at 70.8 m.

72.86 - 75.93 m Dolerite as above. Joint lined with pinkish-red stained calcite, at 10° to core axis from 72.2 - 72.45 m. Wavy narrow veinlets of calcite ± zeolite at low angles to core axis from 74.0 - 74.6 m. Planar joint lined with off-white calcite at 25° at 75.8 m.

BOX 11

75.93 - 78.94 m Dolerite as above. Joint lined with pale brown, fine-grained calcite at 75° near 76.5 m. Calcite veinlet 1-2 mm, 75° from 73.3 - 73.5 m. Calcite ± zeolite veinlet, 3-5 mm, 80° from 73.5 - 73.9.

78.94 - 81.97 m Dolerite as above. Fracture lined with calcite, 70° to core axis at 81.1 m. Joint lined with calcite ± zeolite, 90°, at 82.8 m.

BOX 12

82.83 - 84.95 m Dolerite as above. Veinlet of white zeolite and minor calcite, ≤5 mm wide, 15°, 84.7 - 84.9 m. Cross-cut by a probably later calcite veinlet, 2 mm, 85° at 84.85.

84.95 - 87.97 m Dolerite as above. Zeolite veinlet 1 mm, 15° from 85.3 - 85.5 m. Calcite veinlet, ≤1 mm, 10° to core axis, from 85.9 - 86.25 m.

Dolerite has similar grain size throughout hole, from 41.2 m to 87.97 m. SAMPLE at 87.97 m (petrology).

END OF HOLE

014

IDENTIFICATION OF SECONDARY VEINLET MINERALS IN DOLERITE

K1/98.1 m	calcite (major), stilbite/stellerite (minor)
108.0 m	stilbite/stellerite (major), laumontite (minor)
130.5 m	calcite (major), stilbite/stellerite (major), chabazite (minor)
150.0 m	calcite (major), laumontite (minor), stilbite/stellerite (very minor)
160.25 m	chabazite
227.8 m	calcite (major), chabazite (minor), stilbite/stellerite (minor)
K2/63.45 m	laumontite
68.8 m	laumontite (major), stilbite/stellerite (minor)

Identified by X-ray-diffraction by R.N. Woolley.

stilbite: $(\text{CaNa}_2) \text{Al}_2\text{Si}_7\text{O}_{18} \cdot 7\text{H}_2\text{O}$
 stellerite: variety of stilbite with rectangular habit
 chabazite: $\text{CaAl}_2\text{Si}_4\text{O}_{12} \cdot 6\text{H}_2\text{O}$
 laumontite: $\text{CaAl}_2\text{Si}_4\text{O}_{12} \cdot 4\text{H}_2\text{O}$

