

Acid Test Results

Footage	Drill Angle from Horizontal	Bedding Angle with Core Axis	Schistosity Angle with Core Axis
100	51°	0-5°	51°
400	52°	47°	53° (across bedding)
703	46°	-	78° (conglomerate)
1003	36°	17°	51° (subparallel with bedding)
1303	30°	7°	43° (?)
1603	30°	5°?	56°

Notes: Graded beds *may* indicate a major reversal in the stratigraphic section, as in drilling across a fold hinge (1485'-1514.8'?). Limb stratigraphy may not match *because* of tectonism, and/or facies changes. Sixteen thin section heels have been cut. Thirty-one composite and two individual samples, along with area rock samples, have been sent in for analysis. Analytical results follow in Table BM-2. A detailed log is available for study.

CONDENSED GEOLOGIC LOG FOR DDH SE-3

Hole drilled at a 60° angle and an azimuth of 263°.

0'-158' Overburden.

158'-163' No core.

163'-191' Dark grey basalt with slight red tinge near top. Minor hairline fractures-veinlets with local hematite staining, calcite, epidote, and zeolites. Core broken at base.

191'-198.5' Dark red-grey amygdaloidal flow top basalt with hairline fractures and brecciation. Amygdules contain quartz, zeolites, epidote, and chlorite. Fractures contain zeolites, epidote, hematite, chlorite, quartz, talc, and Na-plagioclase(?).

198.5'-201.3' Dark grey amygdaloidal basalt. Slightly magnetic with 3-7% magnetite. Amygdules with quartz, zeolites, epidote and chlorite. Few fractures.

201.3'-202.6' Dark grey basalt, nonmagnetic.

202.6'-222.5' Dark grey amygdaloidal basalt. Somewhat magnetic with 7-10% magnetite. Amygdules with quartz, chlorite, and zeolites. Contains minor fractures with talc, calcite, chlorite, hematite, and zeolites. Local minor flow structure and brecciation. 1 cm, oxide layered, oxide bearing microgabbro dike with 5-60% magnetite (average 15%) at 204.5'.

222.5'-225.6' Variegated altered basalt. Dark grey-red-green. Inter-flow contact with hematite, epidote, zeolite, talc(?), and chlorite(?) alteration.

225.6'-232' Dark grey, somewhat magnetic amygdaloidal hornfelsed basalt with xenoliths(?), and phenocrysts. Contains 7-10% magnetite. Amygdules contain quartz, chlorite, calcite, zeolites. Plagioclase phenocrysts to 1 cm. Xenoliths(?) slightly coarser (microgabbro?). Could also be related to amygdules or more volatile rich areas. Minor fractures with talc, epidote, calcite, and zeolites. Basalt texture almost microgabbroic, granular.

232'-237' Dark grey, somewhat magnetic hornfelsed basalt with xenoliths(?) and phenocrysts. Similar to above unit except no amygdules. Fractures contain calcite with quartz, K-feldspar, and plagioclase toward base of unit.

237'-244' Dark grey, slightly magnetic hornfelsed basalt with xenoliths(?) and phenocrysts. Similar to above unit except only 3-7% magnetite. Contains scattered fine-medium-grained diorite-granodiorite dikes (largest one 239'-239.5'). Magnetic oxides decrease toward base. Basal footage contains trace amounts of pyrite-pyrrhotite.

244'-245' Fine-grained, chilled, somewhat magnetic, dark grey, noritic(?) gabbro. 7-10(?) magnetite.

245'-288.5' Dark grey, medium-grained gabbro with oxides. Slightly to somewhat magnetic with trace to 10% oxides (averages 7%). Plagioclase 40-50%, clinopyroxene 25-35%, altered orthopyroxene-clinopyroxene 15-25%. Subophitic(?). Green pyroxene alteration is chloritic, serpentinitic, and deuteric(?); more noticeable near hairline fractures. Hairline fractures with chlorite, serpentine, calcite, and talc. Plagioclase locally albitized (also with K-feldspar). 1 cm basaltic dike at 281' and 1 cm altered brecciated basaltic dike at 282'. Locally pegmatoidal.

288.5'-303' Dark grey, medium-coarse-grained noritic(?) gabbro with magnetite (7-10%). Similar to above unit except 25-35% greenish, altered pyroxene slightly coarser grained; and fewer hairline fractures cutting rock, with associated alteration (calcite, chlorite).

303'-314' Dark grey, medium-coarse-grained gabbro with 7-10% magnetite. Similar to 245'-288.5' but without hairline fractures and associated alteration minerals.

314'-365' Dark grey, medium-coarse-grained noritic(?) gabbro with 7-10% magnetite. Similar to 288.5'-303', except contains more hairline fractures; and associated calcite, talc, chlorite, Na-plagioclase, and dolomite. Some with slickensides.

365'-403' T.D. Dark grey, medium-coarse-grained gabbro with 7-10% magnetite. Similar to 245'-288.5'. 370.5'-381' locally brecciated with corroded plagioclase altered to Na-plagioclase and K-feldspar with a chloritic matrix and slightly less magnetite. Hairline fractures and alteration decrease with depth.

Acid Test Results

Footage	Drill Angle from Horizontal
163	60°
403	60°

Notes: Alteration may be the major difference between the gabbro and noritic gabbro units. Twelve thin sections are available for inspection. Hole logged on graphic form.

CONDENSED GEOLOGIC LOG FOR DDH BM-1

Hole drilled at a 45 angle and an azimuth of 0.

0'-38' Overburden.

38'-50' No core.

50'-173.1' Metamorphosed-recrystallized-altered, interbedded tuffs, flows, minor sills(?); and minor thin sediments and/or mylonite. Sequence largely volcanic. Apparent compositions range from basaltic-andesitic (grey-green) to dacitic (green-grey) to microgranitic (pink-grey). Typically very fine-grained. Some intervals show gradational mafic to felsic changes (downward), where there is a sharp contact with the mafic rock directly below it. These intervals are at 67'-69.8', 69.8'-71.4' (slightly differentiated), and 138.5'-143.1'. 115'-126' and 149'-156' are similar except 125.4'-126' and 152'-156' show gradually increasing mafics with depth (result of chilling of flows? composition change if tuffs?). Other K-feldspar rich, irregular intervals within 143.2'-144.9', 158'-159', 162'-164.4', 168'-170', 172'-173.1'. More felsic-microgranite areas 35-60% K-feldspar; 20-35% hornblende, chlorite and biotite; 5-20% plagioclase; 10-20% quartz; 5-10% pyrite; and trace-1% chalcopyrite(?). More mafic and plagioclase rich intervals may be flows, breccia flows-tuffs, or sills; or may be parts of differentiated felsic intervals listed above. Local textures are pillowed and fragmental, although alteration and deformation obscure textures. Locally calcareous. Thin .1' black, cherty, interflow sediments or recrystallized ultramylonite(?) occur at 126', 143.1', 144.9', and 156.4'. Sulfides range from 1/4-20% and are generally pyrite with very minor chalcopyrite. Highest amounts occur in felsic intervals associated with veins and adjacent areas. Occasionally massive. Veins in unit are either hairline fractures with chlorite, quartz, calcite, pyrite, chalcopyrite and K-feldspar or larger, irregular veins-segregations with quartz, chlorite, calcite and pyrite. Fabric of rock is generally massive from recrystallization or was not as conducive to schistosity formation as other units.

Bedding-contacts are 18-59° to core axis with penetrative(1st?) schistosity averaging(?) 38° to core axis. Bedding often rotated subparallel to schistosity.

173.1'-254.7' Green, fine-grained, chloritic, intermediate-mafic, crystal metatuff. Probably recrystallized breccia flow tuff of andesitic to rhyodacitic(?) composition. Local pinkish K-feldspar (differentiation) 205.5'-206.5'. Hornblende phenocrysts ubiquitous, up to 2 mm in size. Plagioclase phenocrysts(?) scattered. Feldspar/mafics = 1. Moderately calcareous locally. Original recognizable volcanoclast sizes to 1 cm. Rock fabric semi-schistose; becoming more schistose with depth in general, probably reflecting finer original volcanoclast size. Also more laminated with depth. Minor, scattered calcite, K-feldspar, pyrite, and quartz(?) veins. Unit contains trace-1% pyrite and a trace of chalcopyrite. Sulfides occur in veins and disseminations. Schistosity is 55-66° (average 56°); with bedding often the same down to 38° to core axis.

254.7'-451' Dark green-green grey metatuff-greywacke with minor phyllite. In general, rock becomes less chloritic (green) and more silty-siliceous (grey) and calcareous with depth. Typically it is fine-grained. Rock more highly deformed (broken, folded, brecciated, pseudobrecciated) 257'-283', and has a well developed foliation. Deformed interval contains irregular quartz, pink dolomite-ankerite, and calcite veins with minor pyrite. Below 283' rock is more massive-semi-schistose and veins are irregular, and filled with quartz, chlorite and calcite. 401.5' has irregular bursts-veins with calcite, K-feldspar, minor black chlorite(?) and chalcopyrite. 427'-437' has scattered 1-2 mm hornblende phenocrysts. Superimposed bedding-schistosity is 40-75°, with bedding at 51-70°. Schistosity measures 22° and 57-63° to core axis. Two lineations are present.

451'-641.5' Dark green-green grey metatuff-tuffaceous greywacke with minor graphitic phyllite laminae, veining and brecciation. Graphitic phyllite from 451'-457', 635'-641.5', and often is associated with slip surfaces. 457'-635' is chloritic, fine-medium-grained, somewhat siliceous, with silty matrix. Locally moderately calcareous and broken. Core locally brecciated-pseudobrecciated-veined within 451'-496' (with dolomite-pyrite-calcite breccia cement); 529'-559' (with less dolomite, more clay gouge); and 631'-641.5' (graphitic). 467'-507' contains scattered veinlets of quartz, K-feldspar, calcite, dolomite, chalcopyrite and pyrite(?). 562'-582.5' similar, but less chalcopyrite, more pyrite. Vein paragenesis: quartz early; calcite, K-feldspar, pyrite early(?); dolomite later; and chalcopyrite last. Pyrite varies from 1/2-5%; chalcopyrite, trace-1/2%. Rock fabric is massive-semi-schistose, except with local schistosity associated with phyllites and slip surfaces. Bedding-schistosity measures 55-77° to core axis, and generally the two cannot be separated.

641.5'-762' Black, graphitic-pyritic phyllite. Locally folded, broken and/or brecciated, with good penetrative cleavage. Graphite is powdery, but shiny and crystalline on