210.6'-278.4' Troctolitic anorthosite and anorthositic troctolite with crude layering due to variations in olivine content ranging from 10 to 20%. Olivine-rich and olivine-pyroxene-rich lenses are scattered throughout the interval. Intercalations of hornblende granite and diorite veins oriented 30° to 70° core axis occur at 235.3'-353.1'.

278.4'-315' Troctolite.

315'-331' T.D. Troctolitic anorthosite and anorthositic troctolite.

The dip of these strongly laminated rocks is rather consistently oriented 45° to the core axis.

Acid Test Result

Footage	Angle from Horizontal
330'	53°

Notes: A detailed graphic log is available for study. Ten heels were cut.

CONDENSED GEOLOGIC LOG FOR DDH SR-1

The hole was drilled at a 90° angle (vertical).

0'-230' Overburden.

230'-356.2' Layered olivine-bearing and olivine-free oxide gabbros with oxide-rich intercalations (303'-305').

356.2'-392' Oxide gabbro with oxide-rich intercalations at 376'-382' and 389'-392' containing conformable amphibole-bearing syenite veins and dikes up to 1' thick, which gradually increase downhole until they appear to digest the country rock, forming a mixed rock.

392'-600' T.D. Layered olivine-bearing and olivine-free oxide gabbros and olivine melagabbro with oxide-rich intercalations at 402.4'-403' and 418'-419'. Downhole there is a decrease in thickness of the olivine-bearing stretches from 31' down to about 1'. Intercalations of fine-grained norites occur at 432.6'-437.5', 441.4'-444.5', (478'-479.6' with oxide-rich ultramafic rock present at 479.6'), 513'-515', 523.4'-526', 528.6'-533.6', 558.2'-559.3' and 570'-570.3'. Medium-grained to coarse-grained intrusions of syenite and granodioritie up to 7' are observed more or less evenly distributed, including mixed zones at 437.5'-441.4', 528.6'-531.1' and 573.6'-576'.

The layering and lamination are at an angle of 20-30° with the core axis in the upper 470'. Below this depth the angle varies between 45° and 60°. Alkalifeldspar granite and syenite veins have angles varying from 20-80° to the core axis.

PETROGRAPHY SR-1

The major rock type found in this drill hole is a sequence of fine to medium-grained layered oxide-bearing and oxide gabbros, with intercalations of oxide-rich units. Plagioclase lamination is apparent in these rocks. The crystals are twinned following albite, Carlsbad and simple acline laws. Layering is enhanced by zones of olivine with sharp lower contacts. Small-scale layering is reflected by varying colour index due to modal variations of oxide and pyroxene. Amphibole pseudomorphs after clinopyroxene have a characteristic dull greenish colour. Steeply cross-cutting fine-grained norites and oxide rich ultramafites are observed from 432.6' downwards. Both conformable and cross-cutting veins of alkali granite, syenite, granodiorite, and epi-metamorphic gabbro occur all through the drill core, with the highest density between 360' and 390'. These constitute about 30% of the rock. The zones having a high concentration of felsic rock result in a mixed rock composed of uralitized oxide gabbro xenoliths digested to varying degrees by amphibole-bearing syenite.

The oxide gabbros

This rock unit comprises oxide-bearing gabbros (5-15% oxide), oxide gabbros to olivine melagabbro (15-30% oxide) and oxide-rich gabbro (30-50% oxide) with or without olivine.

The *PLAGIOCLASE* of the former two subunits has an An content of 40-54% and has a subparallel to subophitic texture. Coarse-grained euhedral cumulus crystals can be distinguished from a sub- to anhedral fine to medium-grained matrix. Beautiful compaction textures of tabular *PLAGIOCLASE* or prisms on equant *CLINOPYROXENE* are present. *SAUSSURITIZATION* is observed in altered varieties.

Purple-pink titaniferous *AUGITE*, is simple twinned and locally strongly altered into masses of fibrous greenish *AMPHIBOLE* with blastic growth of *ACTINOLITE* and off shoots of secondary silicates extending into the surrounding fractured *PLAGIOCLASE*. *OLIVINE* may occur as larger, slightly flattened crystals, conformable to the layering. *ILMENITE* and *MAGNETITE* are found as lamellar and complex coarse intergrowths, *MAGNETITE* dominating over *ILMENITE*. *CHALCOPYRITE* is found as specks in *CLINOPYROXENE* and *PLAGIOCLASE*. The composition of the oxide gabbros averages plagioclase 15-55%, clinopyroxene 30-50%, olivine 0-25% and oxides 15-25%.The oxide-rich gabbros have the same mineral composition as the oxide-bearing and oxide gabbros. *CLINOPYROXENE* occurs as clusters with *OLIVINE*. The *OXIDE*S show some flattening between *PLAGIOCLASE* laminae. *OLIVINE* is developed both as larger cumulus crystals and as rims on *OXIDE*. The *OXIDE*S form a continuous network with roughly equal amounts of *MAGNETITE* and *ILMENITE* as part of the layering. Total oxide content may amount to 60%. *CHALCOPYRITE* and BORNITE occur as intergrowths and discrete crystals in *CLINOPYROXENE* and *PLAGIOCLASE* and along the fringes of *ILMENITE* and *MAGNETITE* grains. The average composition of these rocks is in the order of 30% plagioclase, 25-30% clinopyroxene, 0-10% olivine and 35-40% oxide. The oxide rocks are plagioclase-clinopyroxene-(olivine) cumulates with post cumulus oxide.

Fine-grained norite and oxide ultramafic rocks.

The *PLAGIOCLASE* of these rocks has an An content of 52%. The larger prismatic or tabular crystals are strongly

zoned with basic cores and *CLINOPYROXENE* inclusions. *CLINOPYROXENE* is finely grained, simple twinned and exhibits a fine lamellar exsolution pattern. *ORTHOPYROXENE* forms oikocrysts up to 12 mm across and displays a spotted exsolution pattern of *CLINOPYROXENE* and encloses *OLIVINE*, if present.The composition of these rocks averages plagioclase trace to 60%, clino-pyroxene 0-5%, orthopyroxene 30-45% and oxide 5-20%. The mafic compositions can be labeled as plagioclase-clinopyroxene cumulates with orthopyroxene postcumulus phases. The ultramafic composition can be labeled as olivine-oxide cumulate with orthopyroxene-plagioclase postcumulus phases.

Veins.

Anorthosite or plagioclase cumulate.

The plagioclase of these conformable veins has an anorthite content of 45-53%, shows beautiful compaction, and is twinned following albite, Carlsbad and lameller as well as simple acline laws. Green to olive green *AMPHIBOLE* occur in voids of *PLAGIOCLASE* both as primary crystals and as pseudomorphs after *CLINOPYROXENE*.

Epi-metamorphic gabbro

This rock may occur as anastomizing off-shoots of conformable anorthosite veins. Voids between plagioclase crystals are filled with *ALKALIFELDSPAR*, *QUARTZ*, *APATITE*, *SPHENE* and *AMPHIBOLE*. *AMPHIBOLE* occurs also as pseudomorphs after *CLINOPYROXENE*. *ILMENITE* and *MAGNETITE* occur as a few, intergrown grains displaying a symplectite pattern.

Graphic alkalifeldspar granite and syenite.

These are fine to coarse-grained leucocratic rocks with graphic intergrowths of *QUARTZ* and *ALBITE* (An5%). *ALBITE* occurs as unevenly distributed large crystals. The *ALKALIFELDSPAR* is twinned on (010) with discontinuous twin lamellae. *AMPHIBOLE* occurs as pseudomorphs after *CLINOPYROXENE*.

Notes: Three thin sections and eight polished thin sections were made and seven samples were assayed. A detailed graphic log is available for study. The analytical results follow in Table SR-1.