UNITED STATES DEPARTMENT OF THE INTERIOR

GEOLOGICAL SURVEY

Logs and correlation of drill holes within the South Kawishiwi Intrusion, Duluth Complex, northeastern Minnesota

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Open File Report 84-14

This report is preliminary and has not been reviewed for conformity with U.S. Geological Survey editorial standards and stratigraphic nomenclature.

1. Reston, Va. 22092

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INTRODUCTION

The Duluth complex in northeastern Minnesota is one of the world's largest mafic igneous intrusions. It is a composite body formed by numerous intrusions that are predominantly of anorthositic, gabbroic, and troctolitic compositions. Along the basal portion of the complex, large tonnages of low grade copper-nickel sulfides have been identified and represent the largest nickel resource in the United States. Numerous drill holes have intersected these sulfides and provide important information on this poorly exposed body.

The South Kawishiwi intrusion is one of the better known of the intrusions in the Duluth Complex (Fig 1). Parts of it have been mapped in detail by Foose and Cooper (1978). The detailed drill logs reported here are intended to extend the geologic information obtained from that surface study into the subsurface. These holes were drilled by the Duvall Co. and are housed in the Hibbing office of the Minnesota Department of Natural Resources. From southwest to northeast these drill holes are DU-10, DU-11, DU-15, DU-9, DU-12, DU-16, DU-14, DU-17, DU-13, DU-6, and DU-8. In addition to these detailed logs, a summary diagram (Fig. 2) is presented which correlates packages of rocks between drill holes. Hole DU-9 is not shown in this correlation as it is only a few feet from DU-12.

TERMINOLOGY

These drill hole descriptions employ abbreviations that result from a nomenclature based on cumulus mineralogy. Under this system, rock mineralogy is divided between those phases which are primary precipitates (cumulus) and those that form the cement which weld the interlocking primary grains together (intercumulus phases). Rocks can, for example, be identified as "plagioclase-olivine cumulates with interstitial pyroxene and biotite" or "plagioclase cumulates with interstitial pyroxene". A system of abbreviations was constructed so that respectively these rocks would be described as POC_{xb} and PC_{x}. Letters to the left of C are cumulus phases, while those to the right are intercumulus. Abbreviations used to denote minerals are: P - plagioclase, O - olivine, b - biotite, x - pyroxene, z - oxides exclusive of identifiable magnetite, M - magnetite. Subscripts are added to these abbreviations to show abundances. Thus $PO_{10-15}C_{x\ \ z\ b}$ is a plagioclase-olivine cumulate with 10 to 15 percent
$_{2-3\ t\ 1}$
olivine and 2 to 3 percent interstitial pyroxene, trace amounts of interstitial oxides, and 1 percent interstitial biotite.

In addition to these abbreviations, more traditional rock names are occasionally used. Again, these are based on cumulus mineralogy. Thus, troctolites are "plagioclase-olivine cumulates" and anorthosites are "plagioclase cumulates", regardless of the abundance of intercumulus phases.

All distances within drill holes are given in feet in order to be consistent with previous presentations of data for these holes and the system under which these cores are stored. For brevity, no abbreviations for feet follow numbers denoting depth.

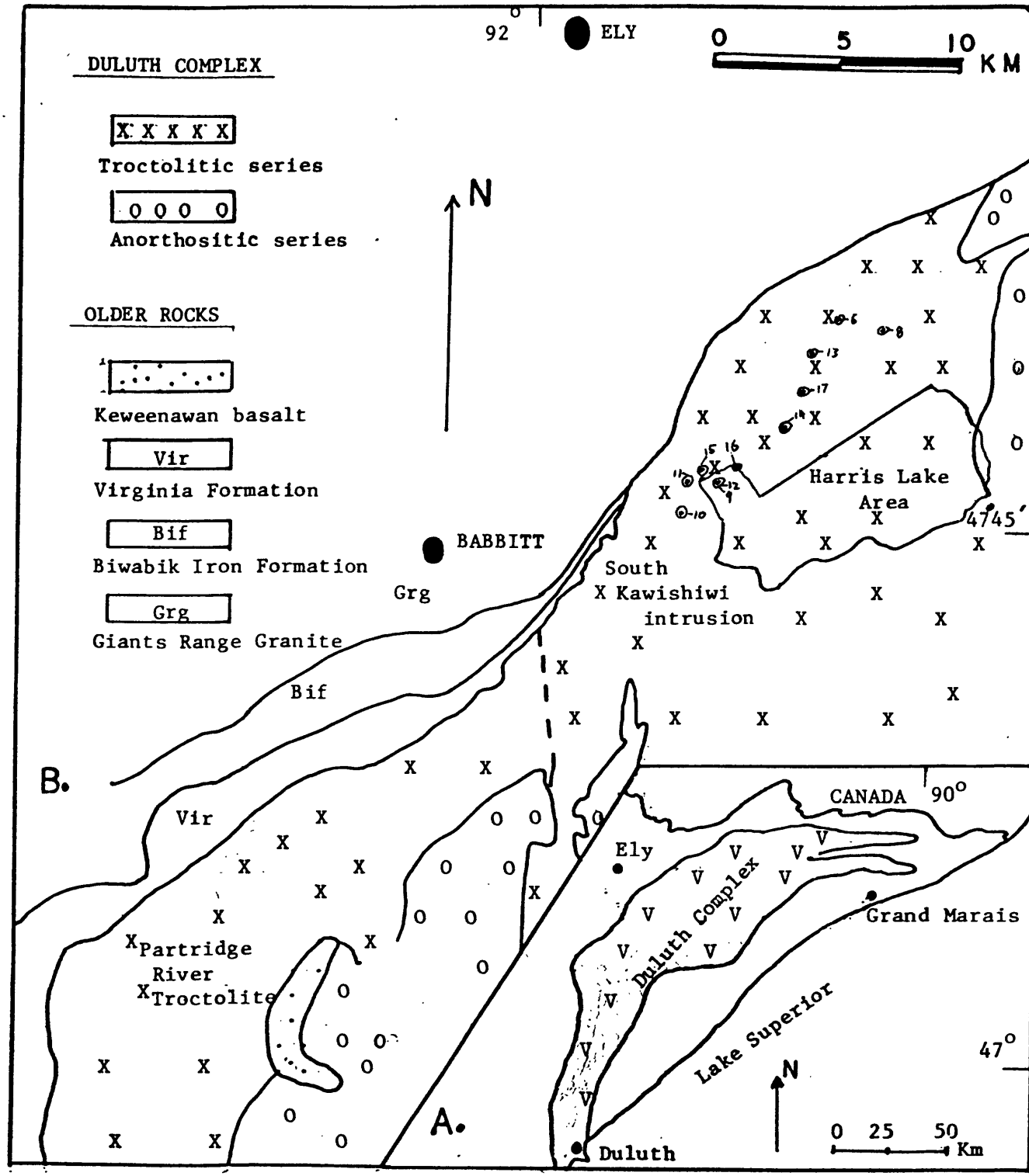


Figure 1: Generalized geology and location of part of the Duluth Complex. Maps show the location of the South Kawishiwi intrusion, the area near Harris Lake mapped by Foose and Cooper (1978), and the logged drill holes. Note that holes DU-9 and DU-12 have nearly the same location.

RESULTS

This report is not intended to present a detailed interpretation of this data. However, some of the more important findings are briefly summarized below.

This portion of the Duluth Complex has a laterally traceable stratigraphy (Fig. 2). The lowest unit is a sulfide-bearing zone composed of a heterogeneous series of rocks including troctolites, anorthosites, picrites, oxide cumulates, and hornfels. this unit lacks laterally traceable layers. It is generally in sharp contact with a plagioclase-rich pegmatoidal layer that forms the base of an overlying sulfide-free zone. Within this sulfide-free zone are laterally correlative packages of rocks. Individual pegmatoidal and plagioclase-rich segments within this upper zone probably form laterally traceable layers.

The contacts between rock types show that deposition of most of these rocks involved repetitions of a crystallization sequence that began with plagioclase and was followed by plagioclase plus olivine. Thus a typical depositional cycle begins with a plagioclase-rich pegmatoid, grades up into anorthosite (PC), and then into troctolite (POC). There are, however, sequences which suggest local crystallization of olivine followed by olivine plus plagioclase.

The generally sharp contact between the sulfide-bearing and sulfide-free sequences of rock and the marked contrast in lithologies and lateral continuity of layers within these two units are evidence for at least two separate magmatic events. The first event involved assimilation of sulfide-bearing country rocks of the Virginia Formation and resultant formation of copper-nickel sulfides. Since footwall rocks here are granitic, this assimilation either involved complete in situ removal of the Virginia Formation, or occurred as a result of interactions of this magma with the Virginia formation prior to emplacement into this area. The lack of laterally continuous layers attests to a dynamic and complicated crystallization of this lower zone. In contrast, the overlying sulfide-free rocks show laterally continuous layers and repeated cyclic sequences, indicating an open magmatic environment in which there was a virtually continuous replenishment of magma.

The top of the sulfide-bearing zone is used as a reference level for the drill cores in the correlation (Plate 1).
Some packages of rocks above and below
this horizon show marked changes in thickness. This is best seen in holes DU-16 and DU-14. These changes occur opposite an area where the basal contact of the complex changes strike from a northeasterly trend to a more northerly trend. The most probable explanation for these variations is that faults were active from the onset of intrusive activity. Offsets on these structures controlled the configuration of the footwall and made troughs into which thicker sequences of rocks accumulated.

REFERENCES

Foose, M.P. and Cooper, R.W., 1978, Geology of the Harris Lake area, northeastern Minnesota: United States Geological Survey, Open-File Report 78-385, 34 p. (1 plate)

DUVALL DRILL HOLE DU-6

Interval (ft.)	Description
0-19	No core.
19-21	$PC_{x_{2-5}z_{t-2}b_{t-1}}$; medium-grained.
21-23	PC pegmatoid.
23-25	$PO_{3-5}C_{x_{3-10}z_{t-5}}$; medium- to coarse-grained.
25-27	PC pegmatoid.
27-29	$PO_{3-5}C_{x_{3-5}z_{t-3}b_{t-1}}$; medium- to coarse-grained, gradational lower contact.
29-30	PC pegmatoid.
30-35	$PO_{3-5}C_{x_{3-7}z_{t-1}}$; medium- to coarse-grained; some pegmatoidal zones with large interstitial pyroxenes.
35-41	$PC_{x_{t-3}z_{t-2}}$; medium-grained; some large interstitial pyroxenes; gradational lower contact.
41-67	$PC_{x_{3-5}z_{2-5}}$; some disseminated olivine; fine-grained; very gradational lower contact.
67-117	$PO_{t-3}C_{x_{3-5}z_{t-2}}$; medium-grained; gradational upper and lower contacts; sheared and silicified zone between 115 and 113.
117-126	$PO_{5-10}C_{x_{3-5}z_{t-2}b_{t-1}}$; medium-grained.
126-189	$PO_{1-3}C_{x_{3-5}z_{t-2}b_{t}}$; medium-grained; locally sheared and silicified.
189-205	PC
205-235	$PO_{t-3}C_{x_{2-5}z_{t-2}b_{t}}$; medium-grained.
235-243	PC; locally sheared and silicified; some shears have a vuggy quartz.

Interval	Description
243-261	$PO_{1-3}C_{x_{2-3}z_{1-2}}$; medium-grained.
261-264	$PO_{30-50}C_{x_{t-2}z_{t-1}b_t}$; medium-grained; gradational upper and lower contacts; vertical serpentinized shears with horizontal slickensides at 261.
264-280	$PO_{7-12}C_{x_{3-5}z_{t-1}b_t}$; medium-grained; gradational upper and lower contacts.
280-281	PC; gradationally sharp lower contact.
281-285	Mixed PC and $PO_{7-12}C$; gradationally sharp lower, sharp upper contact.
285-687	$PO_{7-12}C_{x_{3-5}z_{t-2}b_t}$; medium-grained troctolite; one-inch OC at 397; some interlayered zones of more plagioclase-rich material that have gradational upper and lower contacts; fault at 513 dips 60°, and is somewhat silicified.
687-697	$PC_{x_{2-3}z_t}$; gradationally upper and lower contacts.
697-932	$PO_{7-12}C_{x_{3-5}z_{t-2}b_{t-1}}$; two-inch PC horizons occur at 809 and 815; both have sharp lower contacts and gradational upper contacts; troctolite has a gradational lower contact.
932-957	$PO_{1-3}C_{x_{3-5}z_{1-2}}$; medium-grained pyroxene-rich troctolite; gradational lower contact.
957-1146	$PO_{7-12}C$; extensive serpentinization of shearing between 1137 and 1138; faults dip 70° and rake vertically; gradational lower contact.
1146-1185	PC; a very pure, medium-grained PC; gradational upper contact; sharp lower contact.

Interval	Description
1185-1186	$PO_{3-5}C_{x_{2-3}z_1}$; medium-grained; gradational lower contact.
1186-1236	$PO_{1-2}C_x$; medium-grained; gradational upper and lower contacts.
1236-1240	$PO_{3-5}C_{x_{t-2}z_t b_t}$; gradational upper and lower contacts.
1240-1254	$PO_{1-2}C_{x_{2-3}z_{t-3}}$; medium-grained.
1254-1265	$PO_{7-12}C_{x_{3-5}z_{t-1}}$; medium-grained troctolite.
1265-1265 1/2	PC; sheared and serpentinized; has vertical dipping faults with horizontal slickensides.
1265 1/2-1300	$PO_{7-12}C_{x_{3-5}z_{t-1}}$; medium-grained homogeneous troctolite.
1300-1301	OC; serpentinized and sheared fractures dip 70° to 90°; slickensides rake 30°.
1301-1379	$PO_{15-20}C_{x_{2-5}z_{t-1}}$; medium-grained troctolite; slightly more olivine-rich than the overlying troctolite.
1379-1380	OC; sheared and serpentinized.
1380-1381	OPC
1381-1421	$PO_{7-12}C$; typical troctolite extensively fractured and serpentinized between 1401 and 1405; vertical fractures with slickensides raking 70°.
1421-1424	OC mixed with OPC; vertical fractures, slickensides rake 70°.
1424-1451	$PO_{7-12}C$; typical troctolite.
1451-1452	PC; gradationally sharp upper and lower contacts.
1452-1453	$PO_{7-12}C$
1453-1462	$PC_{x_{2-5}}$; gradational lower contact.
1462-1465	$PO_{3-5}C_{x_{t-3}\ z_t}$; olivine-poor troctolite mixed with some PC.

Interval	Description
1465-1747	$PO_{7-12}C_{x_{3-5}}z_{t-1}b_{t-1}$; medium-grained troctolite; contains thin PC interlayers at 1472, 1477, 1482, 1485, 1511, 1513, 1515, 1516, 1517, and 1640. All PC layers have gradational upper and lower contacts. Troctolite is extensively sheared and serpentinized between 1714 and 1717. Troctolite has a gradational lower contact.
1747-1759	$PO_{20-30}C$; distinctly finer-grained than overlying rock; gradational upper and lower contacts.
1759-1765	$PO_{7-12}C_{x_{5-10}}z_{t-3}$; medium-grained troctolite; extensively sheared and serpentinized.
1765-1803	Extensively brecciated, sheared and altered zone with syenite injections. Rock is dominatly a $PO_{7-12}C$ but is badly fractured and altered. Syenite encloses pieces of fractured and altered troctolite and thus postdates some of the faulting. Faults dip vertically and have slickensides raking 30°.
1803-1901	Fine-grained hornfels. Injected by some syenite.
1901-1907	Extensively altered and sheared zone that is serpentinized and has syenite injections. Rock is dominantly a troctolite. Faults dip 70°; slickensides rake 70°.
1907-1935	$PO_{20-30}C_{x_{5-7}}z_{t-3}$; medium-grained olivine troctolites. A three-inch pegmatoidal zone occurs at 1913.
1935-1942	Extensively sheared and faulted zone with vertical faults with slickensides raking 20°. Rock is an

Interval	Description
	olivine-rich troctolite, locally two- or three-inch segments may be OC.
1942-1950	$PO_{7-12}C_{x_{3-5}}z_{t-3}$; medium-grained troctolite. Distinctly less olivine-rich than the rock above the fault zone.
1950-1965	$PO_{3-5}C_{x_{3-5}}z_{t-2}$; medium-grained. Olivine-poor troctolite; gradational upper contact and sharp lower contact. This sharp lower contact may represent a major depositional break.
1965-1966	$PO_{7-12}C$; gradational lower contact.
1966-1976	$PO_{5-10}C_{x_{2-5}}z_{t-1}$; medium-grained troctolite; gradational lower and upper contacts.
1976-1984	$PO_{1-3}C_{x_{1-2}}z_{t-2}$; medium-grained; moderately sharp lower contact.
1984-1993	$PO_{7-12}C_{x_{3-5}}z_{t-2}$; medium-grained troctolite; gradational lower contact.
1993-1994	PC; moderately sharp lower contact, gradational upper contact.
1994-2003	$PO_{10-20}C_{x_{3-5}}z_{t-1}$; medium-grained troctolite.
2003-2003 1/2	PC pegmatoid.
2003 1/2-2004	$PO_{10-20}C$
2004-2004 1/2	PC pegmatoid.
2004 1/2-2005	$PO_{3-5}C$
2005-2006	$PO_{5-7}C_{x_t}z_t$; medium-grained; gradational lower contact.

Interval	Description
2006-2020	$PO_{1-3}C_{x_{t-3}z_{t-1}}$; medium-grained; moderately sharp lower contact.
2020-2025	$PO_{7-12}C_{x_{3-5}z_{t-1}b_t}$; medium-grained; moderately sharp lower contact.
2025-2034	$PC_{x_{2-5}z_{t-1}}$; pyroxene content increases downward; gradational lower contact.
2034-2129	$PO_{3-5}C_{x_{t-3}}$; medium-grained; olivine-poor troctolite; vertical faults with horizontal slickensides at 2043; gradational lower contact.
2129-2135	$PO_{7-12}C$; fine-grained; an inclusion.
2135-2136	$PO_{1-2}C_{x_{3-5}z_{t-2}}$
2136-2137	$PO_{7-12}C_{x_{2-3}z_t}$; medium-grained.
2137-2138	$PO_{7-12}C$; mixed with several fine-grained inclusions.
2138-2139	Fine-grained inclusion.
2139-2140	$PO_{7-12}C$; typical medium-grained troctolite.
2140-2141	Fine-grained inclusion.
2141-2156	$PC_{x_{3-5}z_{t-2}}$; medium-grained.
2156-2162	$PO_{3-7}C_{x_{3-5}z_{1-2}}$; medium-grained.
2162-2186	$PO_{1-2}C_{x_{3-5}z_{t-2}}$; olivine-poor troctolite, parts with abundant horizontal fractures.
2186-2220	PC; pure PC; gradational upper and lower contacts.
2220-2289	$PO_{2-7}C_{x_{2-5}z_{t-1}}$; much of it has been altered and serpentinized; faults at 2242 dip vertically and have horizontal slickensides; vertical faults at 2251 have horizontal

Interval	Description
	slickensides; faults at 2275 dip vertically and have slickensides raking 60°.
2289-2406	$PO_{15-25}C_{x_{1-3}z_{t-1}}$; sharp contact with the overlying rock with vertical faults at 2289 that have horizontal slickensides; syenite near 2306 is associated with vertical faults that have horizontal slickensides; rock is a medium- to medium-coarse-grained troctolite; rock has 30% olivine towards base of sequence; moderately sharp lower contact.
2406-2417	$PO_{3-7}C_{x_{3-5}z_{2-5}}$; medium- to coarse-grained; some large interstitial pyroxenes.
2417-2419	$PO_{3-7}C_{x_{1-3}z_{t-2}}$; fine-grained; gradational upper and lower contacts.
2419-2443	$PO_{3-7}C$; coarse-grained; gradational lower contact.
2443-2460	$PO_{1-3}C_{x_{3-5}z_{t}}$; medium-grained; extensively faulted between 2453 and 2460 with faults dipping nearly vertical and having slickensides raking 20°.
2460-2506	Fine-grained hornfels.
2506-2525	Extensively sheared and brecciated zone. Rock is a POC, but extensive faulting makes it difficult to identify with certainty. Faults dip nearly vertically and have slickensides raking 40° to 50°. There appear to be two sets of shears which intersect each other at 90°; both have slickensides. Locally, the brecciated rock is intruded by syenite.

Interval	Description
2525-2576	$PO_{1-2}C_{x_{2-3}}z_{t-1}$; extensively sheared and faulted.
2576-2577	PC pegmatoid.
2577-2595	$PO_{5-10}C_{x_{2-3}}z_{t-2}$; medium- to coarse-grained olivine-poor troctolite.
2595-2612	$PO_{1-2}C_{x_{1-5}}z_{t-3}$; medium- to coarse-grained; gradational upper and very gradational lower contacts.
2612-2667	$PO_{7-12}C_{x_{2-3}}z_{t-2}$; medium-grained, typical troctolite; very gradational upper contact; contains thin PC zones which have moderately sharp contacts.
2667-2677	$PO_{5-10}C_{x_{1-4}}z_{t-2}$; extensively serpentinized and sheared with horizontal slickensides on vertical fractures; essentially the same rock as above and below.
2677-2713	$PO_{7-12}C_{x_{2-5}}z_{t-3}$; medium- to coarse-grained; some horizontal fractures.
2713-2714	$PO_{1-3}C_{x_{3-5}}z_{2-5}$; medium-grained; gradational upper and lower contacts; abundant horizontal fractures.
2714-2715	PC pegmatoid; sharp lower contact; gradational upper contact.
2715-2732	$PO_{7-12}C$; medium- to coarse-grained; gradational lower contact.
2732-2745	$PO_{15-20}C_{x_{2-5}}z_{t}$; medium-grained; slightly more olivine-rich and finer-grained than overlying rock into which it grades.
2745-2748	$PO_{5-10}C_{x_{3-10}}z_{t-2}$; medium- to coarse-grained; gradational lower contact.

Interval	Description
2749-2750	Pegmatoid; a coarse-grained $PO_{3-5}C_{x_3}z_5$; gradational lower contact.
2750-2753	$PO_{5-10}C_{x_{3-5}}z_{t-2}$; medium- to coarse-grained; gradational lower contact.
2753-2787	PC pegmatoid; sulfides become more abundant in lower four feet of this section.
2787-2960	Core is split and badly jumbled. These are rocks of the basal sulfide-bearing zone. Most core is $PO_{3-7}C_{x_{t-2}}z_t$, although there are several pegmatoidal zones. Pegmatoid occurs between 2813 and 2825, at 2831, 2871, and 2875. The core is so badly jumbled so that the footages are imprecise; core is dominantly medium-grained olivine-poor troctolite.
2960-2975	Fine-grained, hornfels contact zone.
2975-3005	Granitic rocks of the Giant Range Batholith. Hole bottoms at 3005.

Summary DU-16

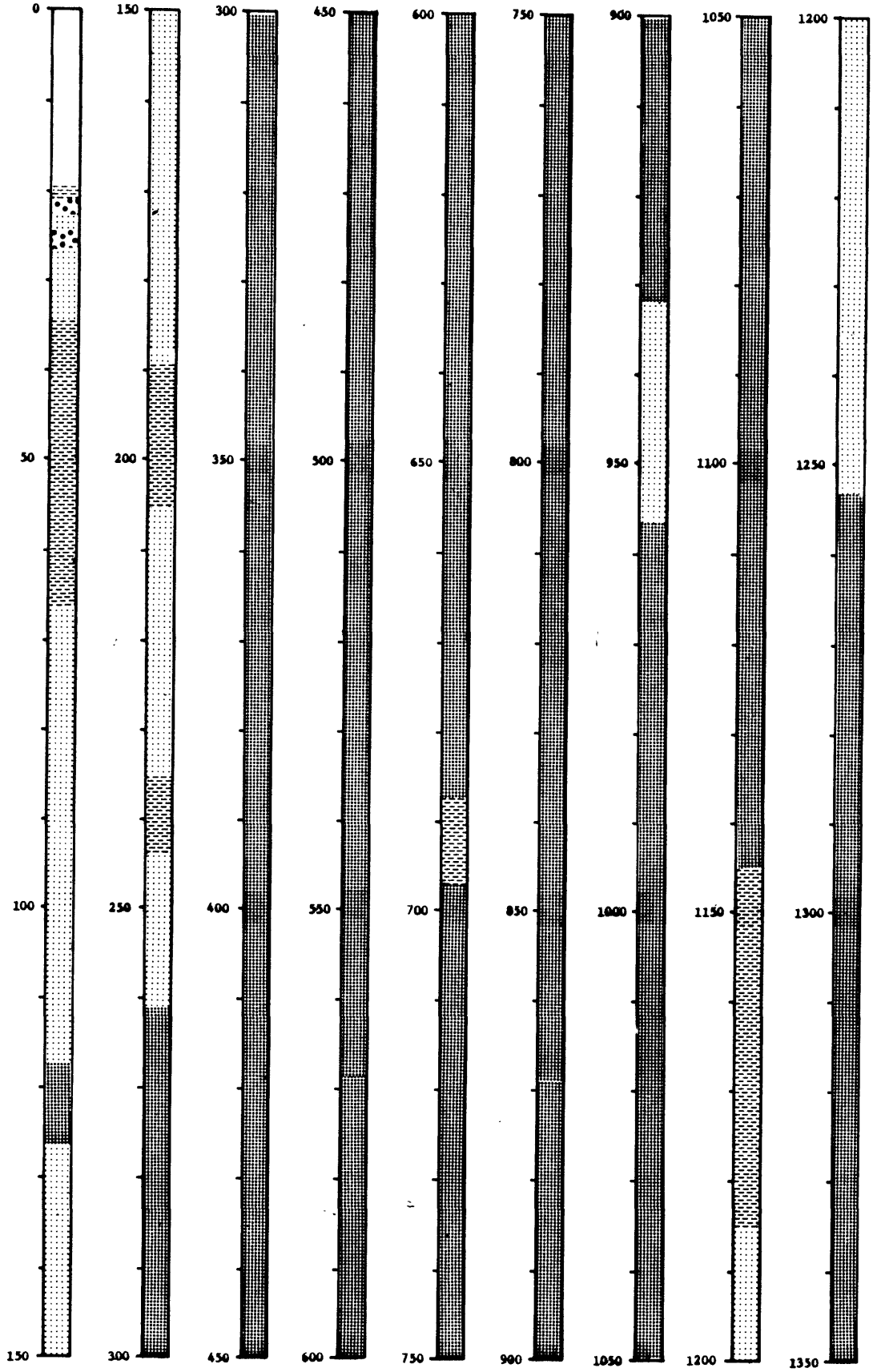
The sequence from 19 to 39 is a plagioclase-rich zone of alternating olivine-poor troctolites and pegmatoidal layers. At 39 it grades into a medium- to fine-grained homogeneous PC or olivine-poor troctolite which extends with increasing amounts of olivine to 125 where the rock is troctolite. Below this zone, the rock becomes more plagioclase-rich until it is a pure PC between about 189 and 263. At 263 there is a gradationally sharp contact with underlying picritic rocks that are only about 2 feet thick and which grade into medium-grained troctolite. This troctolite extends to 1146 and has a few thin PC layers. Many of these PC layers are only 6 to 12 inches thick, but some are thicker. Well-developed PC layers occur at 687-697 and 932-957. Between 1146 to 1246 is dominantly PC. The first 50 feet of this sequence is a very pure PC. It has a fairly sharp contact at 1185 with a more pyroxene - and olivine-rich rock, that may represent a major break in rock deposition.

The olivine-poor troctolite at 1185 grades into good troctolite and then into OC at 1265. This OC grades back into troctolite which extends as a homogeneous sequence to 1421 where there is a fairly thick OC. Below this one foot thick OC the rock is again a homogeneous troctolitic sequence down to 1451, at which point it grades into a PC that is about 12 to 13 feet thick. This PC grades back into a homogeneous troctolite that extends to 1804 where it is sheared and faulted.

Below 1804 is a hornfels sequence to 1902. This hornfels is surrounded by sheared and serpentinized rocks and may be faulted into its present position. Below the hornfels the rock is an olivine-rich troctolite which extends to another prominent fault zone between 1937 and 1941. Below this fault is an olivine-poor troctolite that extends down to 1985 where it grades into a typical troctolite. At 2005 the rock grades back to an olivine-poor troctolite that extends to 2139.

Below 2139 is a zone of fine-grained inclusions. Rocks below these inclusions are plagioclase-rich and have some disseminated olivine and pyroxenes. At 2187 the rock is a pure PC, but grades back into an olivine-poor troctolite which is in part extensively faulted. This troctolite extends to about 2289, at which point there is an abrupt contact that is complicated by shears and faulting. Below this zone the rock is an olivine-rich troctolite which extends to about 2406. At 2406 there is a sharp contact, below which the rocks become plagioclase-rich and contain zones that are medium- to coarse-grained.

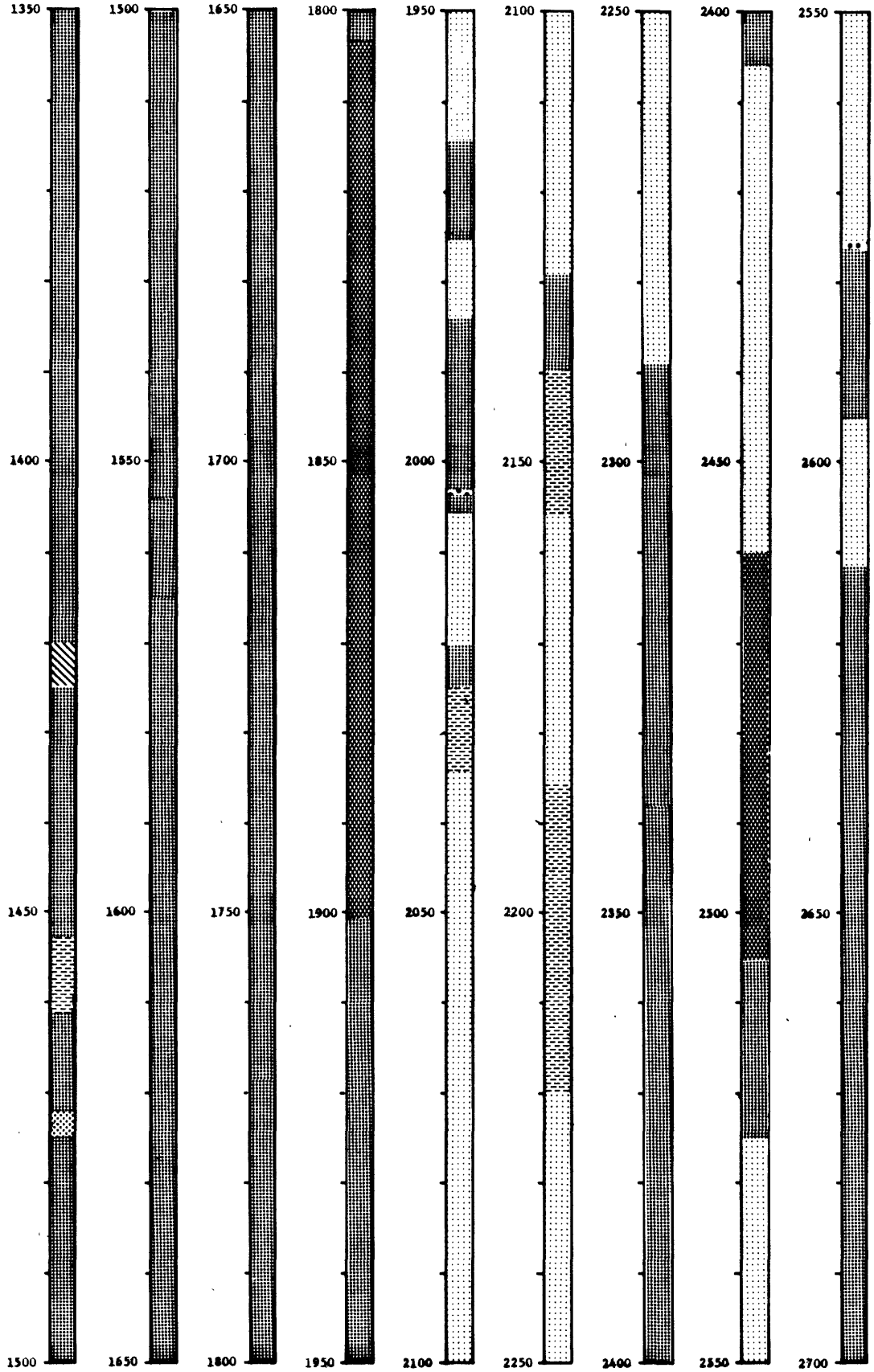
This plagioclase-rich zone extends to 2460 at which point there is a 46 foot thick zone of hornfels. Below the hornfels is a 10 to 20 foot fractured zone which is underlain by olivine-poor troctolite that develops a coarser grain size and more olivine to 2600 and then grades down to more typical troctolite near 2619. Below 2669, olivine-poor troctolite is again present. It is medium- to coarse-grained, is interlayered with several small PC horizons, and extends to about 2753 at which point there is a 30 foot thick pegmatoid. This pegmatoid extends to 2787 and marks a major break in the core, as below 2787, the rock contains abundant sulfides. These sulfide-bearing rocks are dominantly plagioclase-rich. They are interlayered pegmatoidal rocks and are medium- to medium-fine-grained $PO_{3-7}C$. These rocks are underlain by a 2-5 foot thick chilled zone which is underlain by granitic rocks of the Giant Range Complex. This hole, therefore, has an extremely thin sulfide-bearing basal zone and contains very little mineralization.



EXPLANATION OF PATTERNS

- Plagioclase-rich pegmatoid
- Plagioclase cumulate
- Olivine-poor troctolite
- Troctolite to olivine-rich troctolite
- Olivine cumulate or olivine-rich cumulate
- Magnetite-rich cumulate
- Hornfels
- Monsonite
- Granitic Country Rock
- Fault or shear

DRILL HOLE DU-6



EXPLANATION OF PATTERNS

- Plagioclase-rich pegmatoid
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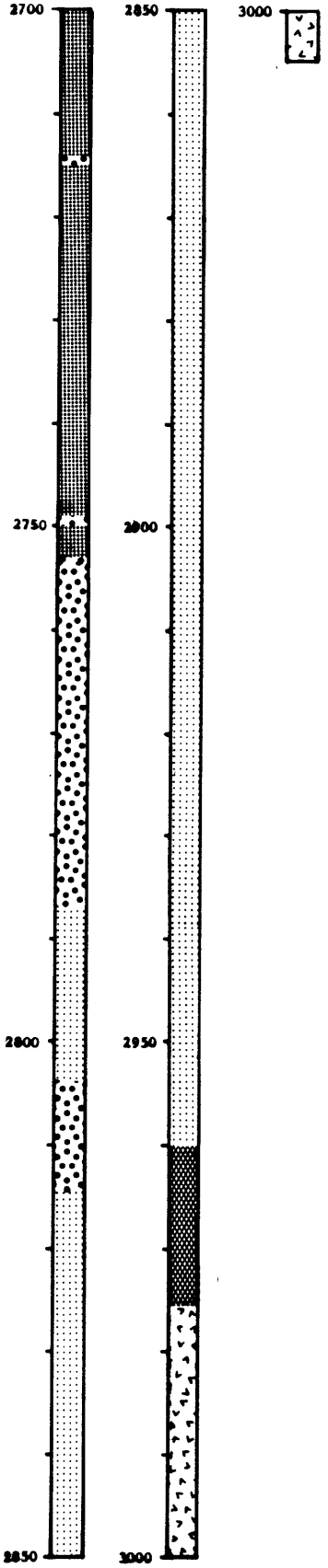
- Hornfels
- Monzonite
- Granitic Country Rock
- Fault or shear

DRILL HOLE DU-6



EXPLANATION OF PATTERNS

- Plagioclase-rich pegmatoid
- Plagioclase cumulate
- Olivine-poor troctolite
- Troctolite to olivine-rich troctolite
- Olivine cumulate or olivine-rich cumulate
- Magnetite-rich cumulate
- Hornfels
- Monzonite
- Granitic Country Rock
- Fault or shear

DUVALL DRILL HOLE DU-8

Interval (ft.)	Description
0-5	No core.
5-79	$PO_{7-12}C_{x_{2-3}z_{t-1}}$; medium-grained troctolite.
79-79 1/2	PC pegmatoid
79 1/2-80 1/2	$PO_{7-12}C$
80 1/2-81 1/2	PC pegmatoid; gradational upper, sharp lower contacts.
81 1/2-259	$PO_{7-12}C_{x_{2-3}z_{t-1}}$; medium-grained troctolite; a six-inch $PO_{3-5}C$ zone at 97, a twelve-inch $PO_{7-12}C$ zone at 116. 60° serpentinized shear with vertical slickensides at 217 and 222. 60° dipping serpentinized shear at 255.
259-268	$PO_{5-10}C_{x_{2-3}z_{t-1}b_{t-1}}$; medium-grained; slightly less olivine-rich than rock above and below; very gradational contacts. 70° dipping shear serpentinized at 266 with vertical slickensides.
268-325	$PO_{7-12}C_{x_{2-3}z_{t-1}}$; medium-grained troctolite; vertical shears at 272 with slickensides raking 60°.
325-326	PC pegmatoid; gradational upper and lower contacts.
326-360	$PO_{7-12}C$
360-370	$PO_{1-5}C_{x_{2-5}z_{1-3}}$; medium- to coarse-grained; a transitional zone, becoming more plagioclase-rich toward base.
370-373	PC pegmatoid
373-373 1/2	$PO_{7-12}C_{x_{3-5}z_{t-2}}$; medium- to fine-grained; sharp upper and lower contacts.

Interval	Description
$373\frac{1}{2}$-375	PC pegmatoid; coarse-grained pyroxenes 3 cm across.
375-376	$PO_{7-12}C_{x_{5-10}}z_{1-2}$; medium- to coarse-grained; gradational lower and upper contacts.
376-377	PC pegmatoid; coarse pyroxenes; moderately sharp lower contact.
377-464	$PO_{7-12}C_{x_{2-3}}z_{1-2}$; medium grained troctolite. 70° dipping shear with slickensides raking 60° at 388.
464-466	PC pegmatoid; gradational upper and lower contacts.
466-486	$PO_{7-12}C_{x_{3-6}}z_{t-1}$; medium- to coarse-grained troctolite; gradational lower contact.
486-498	Transition zone dominantly $PO_{3-5}C_{x_{3-10}}z_{t-4}$; medium- to coarse-grained; gradational lower contact.
$498-507\frac{1}{2}$	PC pegmatoid; thin layers of $PO_{5-10}C$; rock contains coarse masses of pyroxene and oxides (both range up to 2 centimeters in length); moderately sharp lower contact.
$507\frac{1}{2}$-$508\frac{1}{2}$	$PO_{7-12}C$; gradational lower contact.
$508\frac{1}{2}$-$509\frac{1}{2}$	$PO_{1-3}C$
$509\frac{1}{2}$-$510\frac{1}{2}$	PC pegmatoid.
$510\frac{1}{2}$-$511\frac{1}{2}$	$PO_{5-10}C$; medium-grained.
$511\frac{1}{2}$-$512\frac{1}{2}$	PC pegmatoid; sharp lower contact.
$512\frac{1}{2}$-513	$PO_{5-10}C_{x_{3-5}}z_{t-2}$
513-514	PC pegmatoid; sharp lower contact.
514-516	$PO_{5-10}C$; gradational lower contact.
$516-517\frac{1}{2}$	PC pegmatoid.

Interval	Description
517 1/2-525	$PO_{2-7}C_{x_{2-5}z_{1-2}}$; medium- to coarse-grained; gradational lower contact.
525-526	PC
526-528	$PO_{5-10}C$
528-529	PC
529-534	$PO_{3-7}C_{x_{2-5}z_{t-2}}$
534-534 1/2	PC
534 1/2-544	$PO_{3-7}C_{x_{2-5}z_{1-2}}$; medium- to coarse-grained.
544-545	PC pegmatoid; large pyroxenes and oxide masses.
545-546	$PO_{7-12}C$
546-547	$PO_{1-3}C$
547-550	$PO_{3-10}C_{x_{2-5}z_{1-2}}$; medium- to coarse-grained.
550-551	PC pegmatoid
551-553	$PO_{3-10}C_{x_{3-5}z_{1-2}}$
553-555	$PO_{3-5}C$; grades down to pegmatoid.
555-557	$PO_{5-7}C_{x_{1-3}z_{t-1}}$; gradational lower contact.
557-558	PC
558-561	$PO_{1-5}C_{x_{2-4}z_{t-1}}$; medium- to coarse-grained.
561-564	PC pegmatoid.
564-571	Transitional zone; mostly coarse-grained pegmatoid with masses of olivine that may be cumulate.
571-602	Very fine-grained troctolitic rock with occasional layers of medium- to coarse-grained $PO_{1-5}C$; grades up into overlying pegmatoidal zone, grades down with moderately abrupt contact with underlying rock.

Interval	Description
602-786	Fine-grained hornfels. Massive fine-grained, light gray rock.
786-868	$PO_{7-12}C_{x_{2-5}}z_{t-3}$; medium- to very fine-grained; a hybrid rock associated with hornfels.
868-874	Fine-grained hornfels.
874-875	Fine-grained POC; similar to that at 825.
875-876	Hornfels.
876-877	Fine-grained PC.
877-894	Fine-grained hornfels with numerous vertical to sub-vertical faults; horizontal slickensides.
894-898	Fine-grained PC; some disseminated sulfides; core split.
898-914	Fine-grained $PO_{7-12}C$; similar to rock at 825; a hybrid rock associated with hornfels; some disseminated sulfides.
914-929	$PO_{15-25}C_{x_{2-5}}z_{1-2}$; medium-grained; gradationally sharp lower contact.
929-945	$PO_{5-7}C_{x_{t-2}}z_{t}$; plagioclase-rich troctolite; gradational lower contact.
945-993	PC; contains interlayers of $PO_{1-2}C_{x_{2-4}}z_{1-2}$; medium-grained.
993-994	Fine-grained hornfels; sharp contacts.
994-1005	PC
1005-1048	Medium coarse-grained PC almost pegmatoidal but lacking coarse interstitial pyroxenes and oxides; gradational lower contact.
1048-1052	$PO_{1-3}C_{x_{t-1}}z_{t-1}$; medium-grained.

Interval	Description
1052-1148	$PO_{2-5}C_{x_{3-5}}z_{t-3}$; medium- to coarse-grained; a plagioclase-rich troctolite with olivines occurring as disseminated clots that are up to 5 centimeters large, pyroxenes are up to 1 centimeter long; almost pegmatoidal in places; very gradational upper and lower contacts.
1148-1221	$PO_{3-7}C_{x_{2-4}}z_{t-1}$; medium-grained; plagioclase-rich troctolite that is finer-grained than overlying rock; some large pyroxene and oxide segregations; abrupt lower contact.
1221-1228	$PO_{1-3}C_{x_{t-2}}z_{t}$; fine-grained; gradational lower contact.
1228-1255	$PO_{5-10}C_{x_{3-5}}z_{1-3}$; medium- to coarse-grained troctolite with some large pyroxene and oxide segregations.
1255-1290	$PO_{1-5}C_{x_{3-5}}z_{2-3}$; coarse-grained, mottled olivine-poor troctolite; olivine occurs in masses that are 3 to 10 mm across; some large pyroxene segregations; gradational upper contact.
1290-1299	Syenite
1299-1406	$PO_{1-5}C_{x_{3-5}}z_{2-3}$; very gradational lower contact.
1406-1422	$PO_{3-7}C_{x_{3-5}}z_{t-2}$; mottled troctolite; some coarse-grained pyroxenes, but generally finer grained than the rock above.
1422-1539	$PO_{1-2}C_{x_{t}}z_{t}$; very fine grained homogeneous rock; may be an inclusion; gradationally sharp upper contact and very gradational lower contact.

Interval	Description
1539-1598	$PO_{3-7}C_{x_{t-2}}z_{t-1}$; medium- to medium-fine-grained; contains some zones from 1569 to 1569 1/2 and 1584 to 1586 that are composed almost entirely of pyroxene and oxides; some pyroxenes as coarse oikocrysts; dominant rock type is coarser grained than the overlying rock into which it grades.
1598-1637	$PO_{5-10}C_{x_{1-3}}z_{t-2}$; fine- to extremely fine grained rock with disseminated olivine.
1637-1638	$PC_{3-5}z_{3-5}o_{5-10}$; medium- to coarse-grained; gradational lower contact.
1638-1655	$PO_{t-2}C_{x_{3-5}}z_{2-4}$; medium- to fine-grained.
1655-1656	PC pegmatoid; coarse-grained pyroxene.
1656-1715	$PO_{t-2}C_{x_{3-5}}z_{t-2}$; fine-grained; cut by some stringers of medium- to coarse-grained troctolite which indicates that this fine-grained material is an inclusion.
1715-1791	$PO_{1-2}C_{x_{5-15}}z_{t-5}$; medium- to fine-grained; large plagioclase laths; very plagioclase-rich rock with much interstitial pyroxene.
1791-1801	Fine equigranular rock; probably a hornfels; contains disseminated sulfides.
1801-1891	$PO_{t-5}C_{x_{3-15}}z_{t-5}$; medium- to fine-grained; plagioclase occurs as good cumulate laths.
1891-1908	$PO_{3-7}C_{x_{2-5}}z_{1-2}$; medium-grained; coarser grained than the overlying material into which it grades.

Interval	Description
1908-1911	$PO_{5-7}C_{x_{t-2}}z_{1-2}$; medium- to fine-grained equigranular.
1911-1943	$PO_{7-12}C_{x_{1-5}}z_{t-1}$; medium- to fine-grained.
1943-1945	$PC_{x_{3-5}}z_{t-2}$
1945-1949	PC; coarse interstitial pyroxenes and oxides.
1949-1999	$PO_{1-2}C_{x_{15-25}}z_{5-10}$; medium- to coarse-grained; some cumulate olivine, but has abundant intercumulate pyroxene and oxides that form large masses; grades upward into finer grained rock.
1999-2072	$PO_{2-5}C_{x_{5-20}}z_{5-10}$; medium- to coarse-grained troctolite; rock has a distinctive mottled texture made by coarse interstitial pyroxenes.
2072-2074	PC pegmatoid; coarse interstitial pyroxene; gradational upper, sharp lower contacts.
2074-2078	$PO_{5-7}C_{x_{3-8}}z_{2-5}$; medium-grained; some disseminated sulfides.
2078-2079	PC pegmatoid.
2079-2080	$PO_{3-5}C_{x_{5-10}}z_{1-3}$; medium-grained.
2080-2080 1/2	PC pegmatoid.
2080 1/2-2082	$PO_{t-3}C_{x_{5-10}}z_{2-3}$; medium grained.
2082-2083	PC pegmatoid.
2083-2090	$PO_{1-2}C$
2090-2127	PC; no pyroxenes; gradational upper and lower contacts.
2127-2130	PC to $PO_{1-2}C_{x_{3-5}}z_{1-2}$; medium-grained.

Interval	Description
2130-2131	PC
2131-2177	$PO_{2-5}C_{x_{3-5}}z_{1-3}$; abundant disseminated sulfides; medium-grained; mottled; gradational lower contact.
2177-2200	PC to $PO_{1-2}C_{x_{5-20}}z_{3-7}$; medium- to coarse-grained; distinctive rock because the abundant pyroxenes enclose long thin plagioclase laths; disseminated sulfides.
2200-2209	$PO_{1-2}C_{x_{t-1}}z_{t-1}$; medium-grained; gradational contact with overlying pyroxene-rich rock; gradational lower contact.
2209-2220	PC; contains abundant pyroxenes and minor amounts of disseminated olivine.
2220-2228	$PO_{2-5}C_{x_{t-1}}b_{t-1}$; fine-grained; sharp upper and lower contacts.
2228-2260	$PO_{1-2}C_{x_{5-15}}z_{t-5}$; medium-grained; intercumulus pyroxene encloses long plagioclase laths; sharp lower contact.
2260-2269	PC; very fine grained; almost no pyroxene or oxides; sharp upper and lower contacts.
2269-2275	$PO_{2-5}C_{x_{2-5}}z_{t-2}$; medium-grained; gradational lower contact.
2275-2371	$PO_{1-3}C_{x_{5-15}}z_{2-5}$; mottled texture formed by intercumulate pyroxene enclosing plagioclase laths; gradational lower contact.
2371-2375	$PO_{2-5}C$; medium- to fine-grained; virtually no pyroxene; gradational lower contact.
2375-2401	$PO_{1-3}C$
2401-2403	PC pegmatoid.

Interval	Description
2403-2417 1/2	$PO_{1-3}C_{x_{5-15}z_{2-5}}$; medium- to coarse-grained.
2417 1/2-2419	PC pegmatoid; moderately sharp lower contact.
2419-2464 1/2	$PC_{x_{2-1}z_t}$; very pure, medium-grained PC in sharp contrast to the overlying oxide and pyroxene-rich rocks.
2464 1/2-2466	PC pegmatoid.
2466-2470 1/2	$PO_{1-2}C$; sharp lower contact.
2470 1/2-2485	$PO_{1-3}C$; contains abundant pyroxene and oxide.
2485-2486	PC pegmatoid.
2486-2496	PC
2496-2526	$PO_{2-5}C_{x_{5-15}z_{3-7}}$; medium- to coarse-grained; similar to the rock seen 2408.
2526-2536	$PO_{t-1}C_{x_{t-2}z_{t-1}}$; medium-grained; sharp upper contact and gradational lower contact.
2536-2563	$PO_{1-3}C$
2563-2564	$PO_{t-1}C_{x_{t-2}z_{t-1}}$; medium-grained; gradational upper and lower contacts.
2564-2586	$PO_{1-3}C_{x_{2-5}z_{1-5}}$; medium-grained; gradational lower and upper contacts.
2586-2635	$PO_{t-2}C_{x_{t-3}z_{t-2}}$; medium- to fine-grained; many thin interlayers of PC.
2635-2649	$PO_{1-5}C_{x_t z_{1-3}}$; spotted rock with poikilitic olivine and oxide masses; gradational lower and sharp upper contacts.
2649-2669	$PO_{t-2}C_{x_{t-4}z_{t-2}b_{1-3}}$; heterogenous mixed PC to olivine-

Interval	Description
(2649-2669) cont'd	poor troctolite with some poikilitic olivine; gradational upper and lower contacts; distinguished from overlying rock by its coarser grain size and more abundant interstitial pyroxene.
2669-2715	$PO_{t-2}C_{x_{t-2}}z_t$; abundant horizontal fractures; medium-grained PC.
2715-2725	$PO_{t-2}C_{x_{t-3}}z_{t-1}$; mixed sequence of PC and olivine-poor troctolite.
2725-2768	$PO_{1-2}C_{x_{1-3}}z_t$
2768-2794	PC; fine-grained; one or two thin disseminated masses of coarse pyroxene in an otherwise fine-grained matrix; sharp upper and lower contacts. This rock appears to be an inclusion because of a fine-grained texture and sharp contacts.
2794-2805	$PO_{1-3}C_{x_{15-20}}z_{3-6}$; medium- to coarse-grained; an olivine-poor rock that is rich in pyroxene and oxides; sharp lower contact.
2805-2815	Fine-grained PC.
2815-2820	$PO_{1-3}C_{x_{t-3}}z_{t-1}$; gradational contact with overlying fine-grained PC; gradational lower contact.
2820-2901	Oxide-rich PC; similar to the rock at 2799; gradational upper and lower contacts.
2901-2902	PC pegmatoid.
2902-2923	$PO_{1-2}C_{x_t}z_t$; medium-grained; pure PC; gradational upper and lower contacts.

Interval	Description
2923-2962	$PO_{1-2}C_{x_t z_t}$; medium-grained; olivine occurs in larger disseminated masses and is much more abundant than in the overlying rock; gradational lower and upper contacts.
2962-2978	$PO_{3-5}C_{x_{t-3} z_{t-1}}$; medium-grained with thin wispy PC layers.
2978-3072	$PO_{1-2}C_{x_t z_t}$; medium-grained; plagioclase-rich rock similar to that occurring at 2915; gradational lower contact.
3072-3089	$PO_{1-3}C_{x_{3-5} z_{t-2}}$; medium- to coarse-grained; marked increase in pyroxene content; pyroxene as 8 to 10 mm interstitial masses; gradational upper and lower contacts.
3089-3121	$PO_{1-3}C$
3121-3126	PC to $PO_{1-2}C_{z_{40-60}}$; abundant disseminated sulfides; rock is almost pure oxide in some zones; grades upward and downward into $PO_{1-3}C$.
3126-3130	$PO_{3-5}C_{x_{t-3} z_{t-1}}$; medium-grained.
3130-3169	$PO_{1-3}C$; abundant disseminated sulfides.
3169-3193	$PO_{1-2}C_{x_{2-5} z_{1-3}}$; medium-grained with some pyroxene-rich zones; gradational upper contact, sharp lower contact.
3193-3196	$PC_{x_t z_t}$; medium-grained; differs from the overlying rock by its conspicuous absence of large pyroxene and oxide masses and lack of olivine.
3196-3200	$PO_{2-3}C$
3200-3230	$PO_{t-1}C_{x_{t-2} z_{t-1}}$; medium-grained; contains disseminated sulfides.

Interval	Description
3230-3248	$PO_{3-5}C_{x_{20}}$; medium-grained; gradational upper and moderately sharp lower contacts.
3248-3259	$PO_{1-3}C_{x_{5-10}z_{2-3}}$; medium- to coarse-grained; pyroxene-rich rock.
3259-3260	PC
3260-3265	$PO_{1-3}C$
3265-3287	$PO_{2-5}C_{x_{t-2}z_t}$; medium-grained; abundant disseminated sulfides; gradational upper contact, very gradational lower contact.
3287-3331	$PC_{x_{t-2}z_t}$; some disseminated olivine; medium- to fine grained; gradational upper contact.
3331-3365	PC; fine-grained; appears to be a hornfels; contacts appear to be sharp.
3365-3414	$PO_{t-2}C_{x_{t-3}z_{t-10}}$; some cumulate olivines; fine-grained; abundant disseminated sulfides.
3414-3493	$PO_{2-3}C_{x_{2-5}z_{t-1}}$; medium- to coarse-grained; slightly more pyroxene than in rock above.
3493-3497	PC pegmatoid; zone with coarse interstitial pyroxenes.
3497-3636	PC; fine-grained; disseminated sulfides.
3636-3645	$PO_{3-7}C$; medium-grained.
3645-3668	PC
3668-3684	$PO_{7-12}C$; medium- to fine-grained.
3684-3700	PC to $PO_{1-2}C_{x_{t-3}z_t}$
3700-3707	$PO_{3-5}C$; medium- to fine-grained.
3707-3715	$PO_{1-2}C$

Interval	Description
3715-3730	$PO_{5-10}C$; fine-grained.
3730-3773	$PO_{t-1}C_{x_{t-3}}$
3773-3779	$PO_{7-12}C$; medium- to fine-grained with some zones that are $PO_{10-20}C$; sharp lower contact, gradational upper contact.
3779-3831	$PO_{1-3}C$; disseminated sulfides between 3783 and 3810.
3831-3833	PC
3833-3834	$PO_{7-12}C_{x_{2-3}z_{t-2}}$; medium-grained; sharp lower contact.
3834-3868	PC; medium-grained; no pyroxene.
3868-3875	$PO_{7-12}C_{x_{t-5}z_{t-1}}$; medium- to fine-grained; abundant disseminated sulfides; moderately sharp lower contact; gradational upper contact.
3875-3901	PC to $PO_{1-2}C_{x_t z_t}$; abundant horizontal fractures; moderately sharp upper contact; lower contact not exposed.
3901-3992	$PO_{7-12}C_{x_{2-5}z_{t-1}}$; medium-grained; abundant disseminated sulfides; homogeneous equigranular; medium-grained troctolite.
3992-4020	Granitic country rock; cut by fine-grained intrusive stringers.
4020-4080	$PO_{7-12}C_{x_{t-1}z_t}$; abundant disseminated sulfides; medium-grained.
4080-4096	Granitic country rock with some disseminated sulfides.
4096-4130	$PO_{5-10}C_{x_{3-5}z_t}$; abundant disseminated sulfides; medium-grained.

Interval	Description
4130-4138	Transition zone; mixed troctolite and granitic rocks.
4138-4235	Granitic rocks and fine-grained gray hornfels at the bottom of hole.

Summary DU-8

Typical medium-grained troctolite extends from the top of the hole to a pegmatoidal zone at 79 to 81. The pegmatoid contains interlayered troctolite. Medium-grained troctolite continues from 81 to 360, at which point it grades into a coarser-grained, more plagioclase-rich rock that becomes a pegmatoid interlayered with some thin troctolites. The base of this pegmatoid is near 376. Below 376, the rock is medium-grained troctolite which extends to 424.

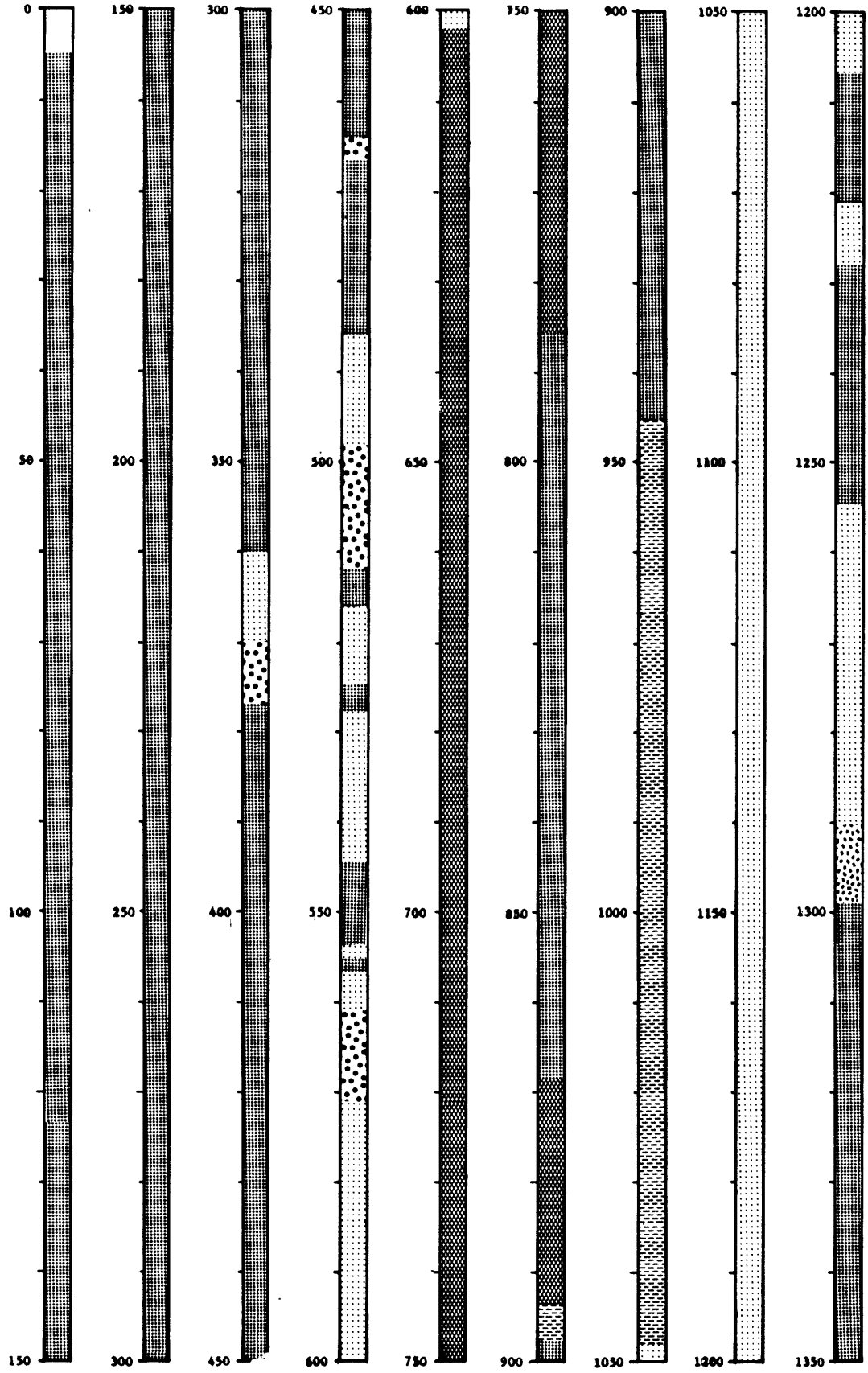
At 424 the rock grades into a coarse-grained plagioclase-rich rock near 497. Although numerous interlayers are present, the rock is mostly a pegmatoid which extends to an abrupt lower contact at 507. Below 507 is a two foot thick sequence with a pegmatoidal bottom at 509. Below 507 are several other thin sequences that have a pegmatoidal zone that grades upward into troctolite. Bottoms of these successions are at 511 1/2, 514, 516, and 526. The cycle ending at 545 is a particularly well-developed one. At 571, a transition occurs into fine-grained rocks associated with hornfels. This zone extends to about 900 at which point it grades into a 40 foot thick troctolitic zone that grades into a plagioclase-rich rock. The contact between troctolitic and hornfels above 940 and plagioclase-rich rocks below is a major break in this hole. Coarse-grained PC is in sharp contact at 1040 with underlying olivine-poor troctolite that extends down to approximately 1148. At this point the rock becomes a fine-grained plagioclase-rich troctolite that is interlayered with mottled plagioclase-rich troctolites. These rocks extend to troctolitic at 1422.

These fine-grained troctolitic rocks extend to 1715, but from 1569 to 1569 1/2 and between 1584 and 1586 there are two zones which are almost pure pyroxene and oxides. Below 1715, the rock become slightly coarser grained and contains interstitial masses of pyroxene and oxides. Locally it has zones of equigranular fine-grained material which may be inclusions. This olivine-poor, medium- to fine-grained rock (most is a PC) extends to 1949 at which point it coarsens, and becomes a coarse-grained plagioclase-rich troctolitic rock with large masses of interstitial pyroxenes and oxides. Disseminated sulfides occur throughout this sequence below 1725. This rock grades down to a pegmatoidal zone at 2073. Between this zone and 2092 are several other successions of olivine-poor rock which have basal layers of thin pegmatoids. From 2092 to 2130 is a nearly pure PC which grades down into a pyroxene-rich, olivine-poor, medium- to coarse-grained rock with abundant intercumulus pyroxene that extends to 2198. Between 2198 and 2209 is another fine-grained, nearly pure PC. Below 2209, the rock is coarse-grained olivine-poor troctolite with abundant interstitial pyroxene. This rock has several fairly fine-grained olivine-poor interlayers, but extends as a coherent sequence to 2260 where it becomes a fine-grained PC, which extends down to 2269. This fine-grained PC has the texture of a hornfels. Below 2269 is more medium- to coarse-grained olivine-poor rock with abundant interstitial pyroxene that alternates with plagioclase cumulates. The content of interstitial pyroxene and oxides is variable. The section is a very plagioclase-rich one, and usually also has disseminated sulfides. There are some pegmatoidal zones. The poikilitic olivines

in PC between 2635 and 2648 make fairly distinctive layers, but the entire sequence between 2269 and 3901 basically can be characterized as a homogeneous plagioclase-rich package with no marked breaks. The rock below about 3901 contains much more olivine and has more sulfides. This olivine-rich and sulfide-rich rock extends down to 4130 where it is in transitional contact with the Giants Range batholith.

Thus, this hole may be characterized as troctolite extending to 600, hornfels from 600 to 900, troctolite from 900 to 940, plagioclase-rich rocks to 3900, and sulfide-bearing troctolites to the bottom of the hole at 4130. The plagioclase-rich rocks are probably part of the anorthositic series and, although some contain olivine, they are probably mostly plagioclase cumulates.

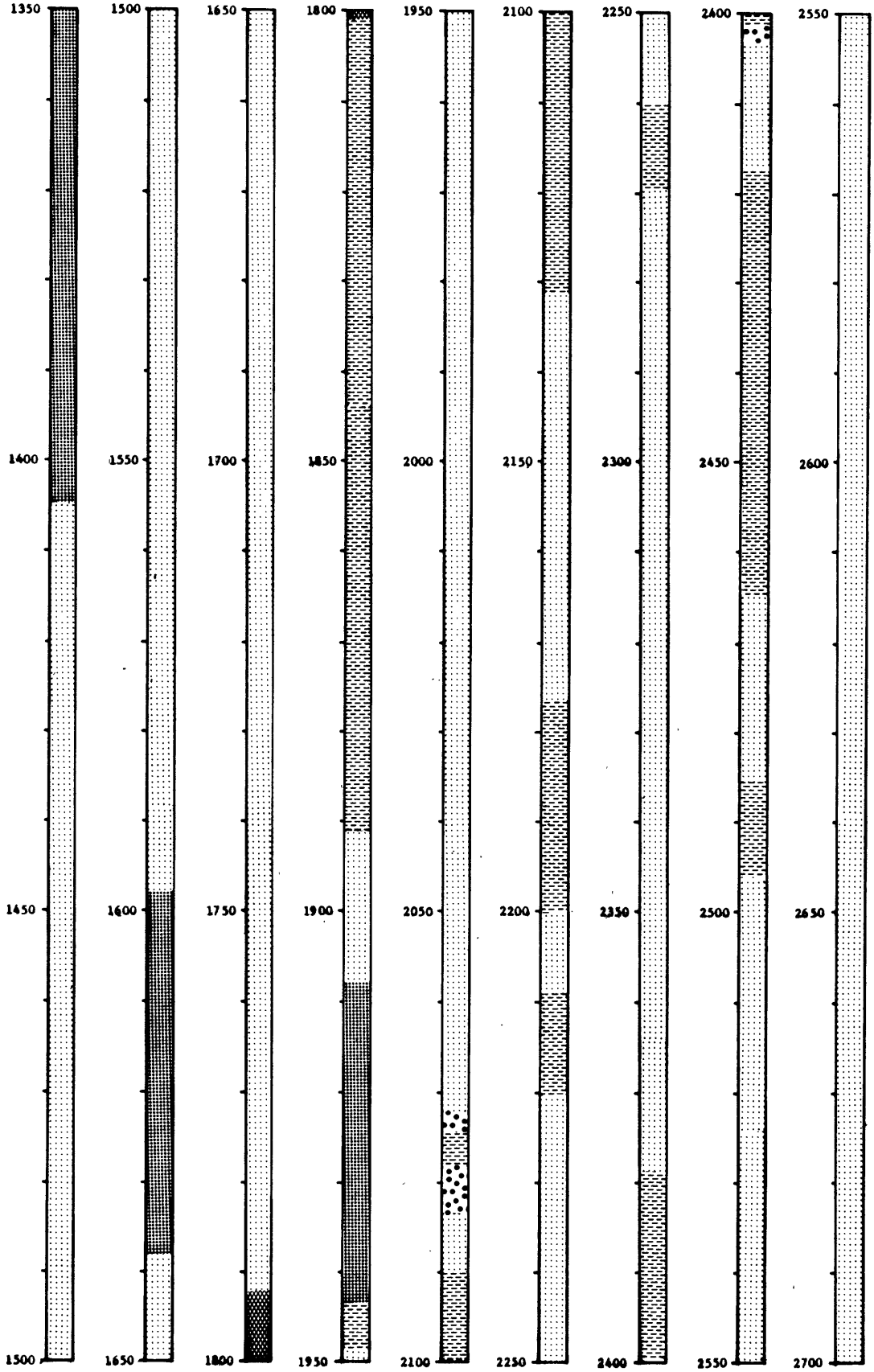
DRILL HOLE DU-8



EXPLANATION OF PATTERNS

- Plagioclase-rich pegmatoid
- Plagioclase cumulate
- Olivine-poor troctolite
- Troctolite to olivine-rich troctolite
- Olivine cumulate or olivine-rich cumulate
- Magnetite-rich cumulate
- Hornfels
- Monzonite
- Granitic Country Rock
- Fault or shear

DRILL HOLE DU-8



EXPLANATION OF PATTERNS

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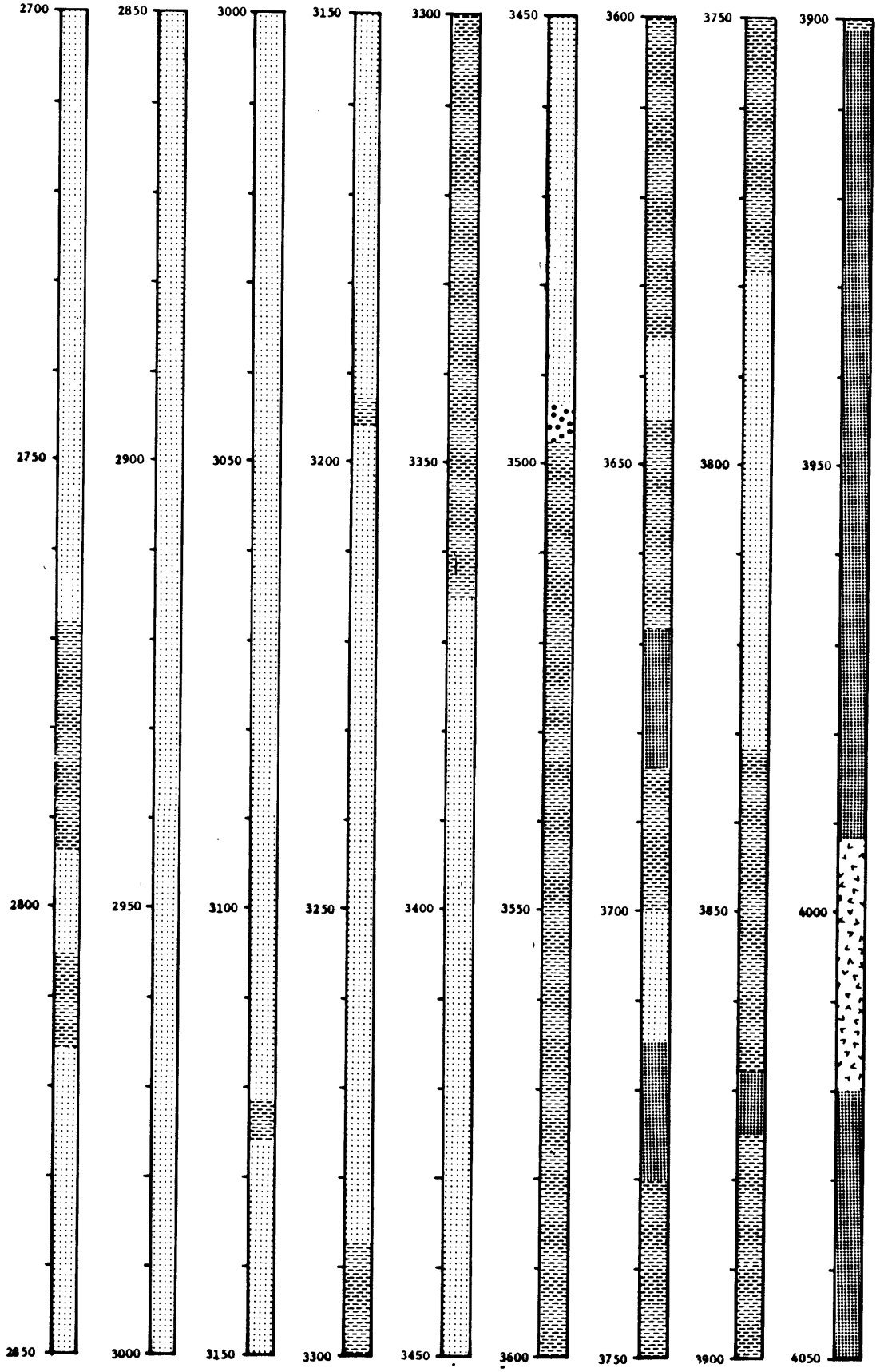
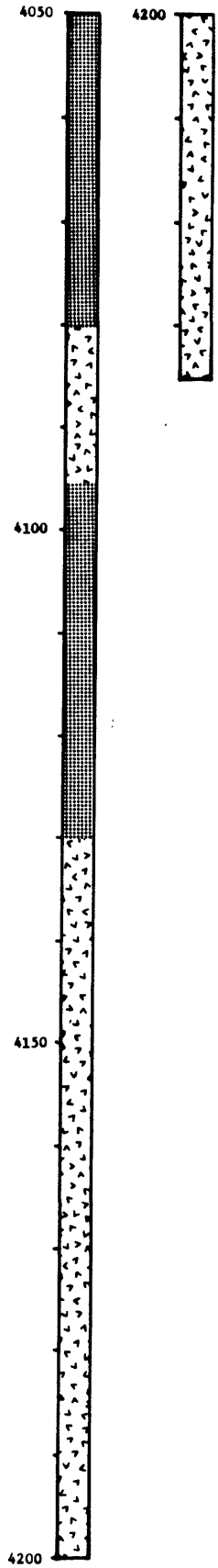
DRILL HOLE DU-8



EXPLANATION OF PATTERNS

- Plagioclase-rich pegmatoid
- Plagioclase cumulate
- Olivine-poor troctolite
- Troctolite to olivine-rich troctolite
- Olivine cumulate or olivine-rich cumulate
- Magnetite-rich cumulate
- Hornfels
- Monzonite
- Granitic Country Rock
- Fault or shear

DRILL HOLE DU-8



EXPLANATION OF PATTERNS

- Plagioclase-rich pegmatoid
- Plagioclase cumulate
- Olivine-poor troctolite
- Troctolite to olivine-rich troctolite
- Olivine cumulate or olivine-rich cumulate
- Magnetite-rich cumulate
- Hornfels
- Monzonite
- Granitic Country Rock
- Fault or shear

DUVALL DRILL HOLE DU - 9

Interval (ft)	Description
0-5	No core.
5-17 1/2	$PO_{7-12}C_{x_t}b_{1-2}z_t$; medium-grained.
17 1/2-28 1/2	$PO_{7-10}C_{x_t}z_1b_t$; rock has slightly less olivine and more oxides than that above and is slightly coarser grained.
28 1/2-30	$PO_5C_{x_{1-2}}z_1b_t$; rock is coarse-grained; with prominent interstitial oxides and pyroxenes.
30-43	$PO_{7-12}C_{x_{3-5}}z_1b_{t-1}$; medium-grained; with prominent interstitial pyroxenes and oxides and zones of large biotite.
43-43 1/2	PC pegmatoid; zone with large interstitial pyroxenes and oxides; olivine 3%, pyroxenes about 3%, oxides about 1%; gradational upper and sharp lower contacts.
43 1/2-43 3/4	$PO_{7-12}C$; gradational lower contact.
43 3/4-55	PC; fine-grained with small oxide grains giving rock a spotted appearance; trace of olivine and biotite. Rock is distinctive because of fine-grained spotted appearance. Upper contact is sharply gradational, lower contact is sharp. Sample from 45 1/2.
55-55 1/2	$PO_{7-12}C$; medium-grained.
55 1/2-56	$PO_{15-20}C$; thin olivine-rich zone.
56-65	$PO_{10-15}C_{x_{3-5}}z_{t-1}b_t$
65-83	$PO_{5-10}C_{x_{2-5}}z_{t-1}b_{t-1}$; medium- to coarse-grained with oxide-rich zones; gradational lower contact.

Interval	Description
83-83^{1}/2	$PO_{1-5}C_{x_{3-5}z_{3-5}b_{1-2}}$; thin, olivine-poor coarse-grained unit, becoming pegmatoidal toward base; gradational upper and lower contacts.
83^{1}/2-86	$PO_{5-10}C_{x_{2-5}z_{t-1}b_{t-1}}$
86-87	$PC_{z_{1-2}b_{t}}$; fine-grained with gradational upper and sharp lower contacts.
87-89	$PO_{5-10}C$; medium-grained.
89-89^{1}/2	$PC_{z_{1-2}}$
89^{1}/2-90	POC; fine-grained.
90-96	PC to $PO_{t-2}C_{z_{t}x_{t}}$; fine-grained with gradational upper and sharp lower contacts.
96-155	$PO_{5-10}C_{x_{3-5}z_{t-1}b_{t}}$; medium-grained.
155-156	PC; gradationally sharp upper and lower contacts.
156-159	$PO_{1-3}C_{x_{t}b_{t-1}}$; medium-grained.
159-166	$PO_{3-7}C_{x_{t}z_{t}b_{t}}$; olivine has increased slightly; fault at 164.
166-173	$PO_{5-10}C_{x_{3-6}z_{t-1}b_{t}}$; extensively altered rock; some olivine is serpentinized; it has been altered to form limonite. Rock has been fractured and locally sheared.
173-173^{1}/2	PC
173^{1}/2-175^{1}/2	POC
175^{1}/2-177	$PC_{z_{1-3}}$; very little alteration.
177-185	$PO_{5-10}C$; extensively limonitically altered.
185-186	Monzonite dike.
186-190	$PO_{5-10}C$
190-191	Monzonite

Interval	Description
191-196	$PO_{5-10}C$; mixed with monzonite; an extensively sheared and altered rock, in places brecciated.
196-207 1/2	PC_{z_t}; rock grades up into a sheared zone with monzonite; sharp lower contact.
207 1/2-211	$PO_{5-10}C_{x_{5-8}z_t b_t}$; medium-grained; gradational lower contact.
211-213 1/2	$PO_{5-10}C_{x_{1-3}}$; slightly more felsic than above; gradational lower contact.
213 1/2-214 1/2	PC; sharply gradational lower contact.
214 1/2-217 1/2	$PO_{7-12}C_{x_{3-5}z_t}$; monzonite at 215.
217 1/2-247 1/2	$PO_{5-10}C_{z_{3-5}x_{t-1}}$; slightly finer grained than above; gradational lower contact.
247 1/2-248 1/2	$PC_{x_{1-2}}$
248 1/2-249 1/2	PO_{5-10}
249 1/2-266	$PO_{5-7}C_{x_{3-10}z_{1-2}}$; medium- to coarse-grained; coarsening downward and locally almost pegmatoidal; gradational lower contact.
266-270	$PO_{5-7}C_{x_{t-2}z_t}$; medium-grained rock with sharp lower contact.
270-271	PC; sharp lower contact.
271-286	$PO_{5-10}C_{x_{3-7}z_{1-2}}$; medium- to coarse-grained rock similar to 260.
286-288	PC_{x_1}; sharp upper contact.
288-290	Monzonite
290-290 1/2	PC; with sharp contact.
290 1/2-309	$PO_{5-10}C_{z_{3-7}}$; medium- to coarse-grained with much interstitial pyroxene and many oxides.
309-311	Sheared zone with olivines altered to limonite, similar to shear zone at 195.

Interval	Description
311-329 1/2	$PO_{5-10}C_{x_{1-4}z_t b_t}$; medium-grained.
329 1/2-351	$PO_{5-10}C_{x_{3-5}z_{t-1}}$; extensively altered and sheared with limonite replacing olivine.
351-353	Monzonite.
353-353 1/2	Altered POC.
353 1/2-485 1/2	$PO_{7-12}C_{x_{3-5}z_{1-2}b_t}$; medium-grained; 2" plagioclase-rich layer at 363 1/2.
485 1/2-485 3/4	Thin PC; sharp upper and lower contacts.
485 3/4-501	$PO_{5-7}C_{x_t z_{2-4} b_t}$; medium-grained; distinguished from troctolite above by lack of pyroxene and its chalky white color. A distinctive break in troctolite.
501-501 1/2	$PC_{z_{2-5}x_t}$; sharp upper and lower contacts.
501 1/2-502	$PO_{5-7}C$
502-521	PC, fine-grained; variable amounts of oxide and pyroxene. Rock ranges from pure PC to one with 3-4% oxides and trace to 2% pyroxenes. Olivine might be present in trace amounts in indistinct grains.
521-526 1/2	$PO_{7-12}C_{x_{3-6}z_{1-3}b_{t-1}}$; medium- to coarse-grained; pyroxenes up to 2 cm across; oxides occur in large intercumulus masses up to 3/4 cm across.
526 1/2-527	PC; gradational upper and sharp lower contacts.
527-532	$PO_{7-12}C$; medium- to coarse-grained with some large oxide and pyroxene masses.
532-537	$PC_{z_t x_{0-2}}$; variable amounts of intercumulus pyroxene and oxides. Locally pyroxene may be 3-5% and oxides 1-3%. Olivine may be

Interval	Description
(532-537) cont'd	present as disseminated small grains. Gradational upper contact; gradational lower contact.
537-539 1/2	$PO_{1-4}C_{x_{1-2}}z_{t-1}$; fine-grained.
539 1/2-541	Transition zone with interlayered POC and PC.
541-550	$PC_{x_{3-5}}z_{2-4}$; local zones of nearly pure PC.
550-585	$PO_{3-5}C_{x_{2-3}}z_{1-2}$; medium-grained, chalky white troctolite; gradational contact with overlying PC.
585-665	$PC_{z_{t-2}}x_{t-4}$; fine-grained; possibly some olivine, but no obviously cumulate grains. Rock is fine-grained and grades upward to troctolite. Granitic dike cuts across at 660.
665-731	$PO_{5-10}C_{x_{3-5}}z_{1-3}$; medium-grained; chalky white color; much olivine appears intercumulus, some probably is cumulate. Lithology is somewhat heterogeneous and there are wisps of nearly pure PC mixed with the dominant troctolitic rock.
731-732 1/2	PC
732 1/2-733	$PO_{5-10}C$
733-778	Heterogeneous mixture of $PO_{5-10}C$ and thin layers of PC. PC layers are not more than 6 inches thick. The dominant rock is the $PO_{5-10}C$.
778-778 1/2	$PO_{5-10}C$; good cumulate olivine.
778 1/2-780	PC
780-780 1/2	$PO_{5-10}C$; good cumulate olivine.
780 1/2-782	PC
782-785	$PO_{5-10}C_{x_{3-6}}z_{t-3}$; olivines as distinct intercumulate grains; medium-grained.

Interval	Description
785-785^{1}/2	$PC_{x_{3-5}z_{3-5}}$; sharp upper contact, gradational lower contact.
785^{1}/2-786	PC pegmatoid; large pyroxenes.
786-786^{1}/2	$PO_{5-10}C_{x_{3-5}z_{1-3}}$; olivines occur as distinct cumulate grains.
786^{1}/2-786^{3}/4	PC; sharp upper and lower contacts.
786^{3}/4-791^{1}/2	$PO_{5-10}C$
791^{1}/2-791^{3}/4	PC
791^{3}/4-824	$PO_{5-10}C_{x_{3-5}z_{1-3}}$; medium- to fine-grained; olivines are small, rock has many zones of nearly pure PC 3 to 4 inches thick.
824-825	$PC_{x_{1-2}z_{1-2}}$; gradational upper and lower contacts.
825-850	$PO_{5-7}C_{x_{2-5}z_{1-3}b_{t}}$; 3 to 4 inches thick zones of plagioclase-rich material.
850-851	PC; gradational upper and lower contacts; pyroxenes 3-5%, oxides 2-4%.
851-858	$PO_{5-10}C$
858-862	$PO_{5-10}C_{x_{2-3}z_{t-1}b_{t}}$; medium- to coarse-grained; distinct cumulate olivines.
862-880	$PO_{7-12}C_{x_{3-6}z_{1-3}b_{t-2}}$; medium-grained.
880-881	PC
881-885	$PO_{5-10}C$
885-885^{1}/2	OC
885^{1}/2-886	$PO_{5-10}C$
886-891	$PO_{2-4}C_{x_{3-5}z_{t}}$; gradational upper and lower contacts.
891-900	PC
900-910	$PO_{2-4}C$
910-910^{1}/2	PC
9101/2-911	$PO_{2-4}C$

Interval	Description
911-954	$PC_{x_{t-1}z_{t-1}}$; some zones with minor olivine, none definitely cumulate.
954-955	$PO_{5-7}C_{x_{3-5}z_{t-1}}$; gradational upper and lower contacts.
955-972 1/2	$PC_{x_{t-5}z_{t-3}}$; some small, thin, less than 6-inch thick zones with possible cumulate olivine.
972 1/2-973	$PO_{3-5}C_{x_{3-5}z_{1-2}}$; sharp lower contact.
973-980	$PC_{x_{t-3}z_{t-2}}$
980-982	$PO_{1-3}C$
982-985	PC
985-988 1/2	$PO_{1-2}C_{z_{1-3}x_{1-3}}$
988 1/2-990	PC pegmatoid; coarse pyroxene, olivines and oxides. Gradationally sharp upper contact, sharp lower contact; marks the base of a cycle that passes up through the plagioclase-rich zone at 951, through 911, up into the more olivine-rich material of 892, into the OC of 885, and continues into the olivine-rich material of 872.
990-992	$PO_{1-2}C$; coarse-grained, almost pegmatoidal.
992-993 1/2	$PO_{1-2}C$; medium-grained.
993 1/2-995	$PO_{1-2}C_{x_5z_{2-3}}$; coarse-grained, almost pegmatoidal; large intercumulate pyroxenes.
995-1003	$PO_{1-2}C_{x_{t-2}z_{t-1}}$; medium- to fine-grained; gradational upper contact with more coarse-grained olivine-rich material; gradational lower contact.
1003-1008 1/2	PC; very little intercumulus material.
1008 1/2-1014	$PO_{1-4}C_{x_{t-3}z_{t-1}}$; gradational upper and lower contacts.

Interval	Description
1014-1020 1/2	$PO_{2-5}C_{x_{3-5}}z_{t-2}$; medium-grained; gradational lower contact.
1020 1/2-1045	$PC_{z_{t-2}}x_{1-4}$; thin 2- to 4-inch zones with some disseminated olivine; gradational lower contact.
1045-1057	PC pegmatoid; coarse-grained plagioclase and pyroxene; contains some oxide and biotite; sharp lower contact with finer-grained rock. Possibly represents a depositional break as it grades up into finer-grained plagioclase-rich rock at 1045, and into a zone of PC near 998, into POC, and ends at an abrupt contact with an overlying pegmatoid at 990.
1057-1062	$PC_{x_{2-5}}z_{t-2}$; fine-grained.
1062-1062 1/2	PC pegmatoid.
1062 1/2-1078	$PO_{1-2}C$; olivine occurs in disseminated grains; contains disseminated sulfides and has been split for sampling.
1078-1080 1/2	PC; gradational upper and lower contacts.
1080 1/2-1082	$PO_{1-2}C$
1082-1082 1/2	PC
1082 1/2-1103	$PO_{3-5}C_{x_{1-2}}z_{t-1}$; medium- to fine-grained troctolite; disseminated sulfides are present.
1103-1104	PC; gradational upper and lower contacts.
1104-1108 1/2	$PO_{1-2}C$
1108 1/2-1120	PC

Interval	Description
1120-1153	$PO_{1-2}C$; fine-grained; cumulate olivine appears to be present in very minor amounts; gradational upper and lower contacts.
1153-1153 1/2	PC; gradational lower contact.
1153 1/2-1155 1/2	PC pegmatoid; coarse-grained.
1155 1/2-1168	$PO_{1-2}C_{x_{3-5}}z_{1-2}$; a olivine-poor troctolite with thin layers of plagioclase cumulate.
1168-1175	PC; gradational upper contact; moderately sharp lower contact; distinct large masses of intercumulus oxide.
1175-1176	$PO_{5-10}C_{z_t}x_{t-1}b_t$; moderately sharp lower contact.
1176-1179	PC
1179-1193	$PO_{1-3}C_{x_{3-7}}z_{1-4}b_t$; a coarse-grained plagioclase-rich troctolite.
1193-1198 1/2	PC; fine-grained; very little interstitial pyroxene or olivine; some oxide spots but generally a fine-grained rock with a sharp upper and sharply gradational lower contact.
1198 1/2-1230	$PO_{7-12}C_{x_{t-1}}z_tb_t$; medium-grained; typical troctolite.
1230-1230 1/2	PC
1230 1/2-1257 1/2	$PO_{5-10}C_{x_{3-5}}z_{t-2}b_t$; some thin PC layers.
1257 1/2-1258	PC; gradational upper and lower contacts.
1258-1260	$PO_{1-2}C$
1260-1261	$PO_{5-10}C$

Interval	Description
1261-1264	$PO_{3-5}C$; medium- to coarse-grained with large interstitial oxides and pyroxenes; some pegmatoid; sharp lower contact.
1264-1274	$PO_{1-2}C$; fine-grained.
1274-1280	PC; gradational upper and lower contacts.
1280-1285	$PO_{3-5}C$; medium- to fine-grained.
1285-1291	$PO_{5-10}C_{x_{2-5}}z_{1-3}b_t$; coarse-grained; large oxides and pyroxenes; olivines are 3-5 mm across serpentinized fault at 1290.
1291-1305	$PO_{5-10}C_{x_{1-3}}z_{t-2}$; medium- to coarse-grained troctolite with large interstitial oxides and pyroxenes.
1305-1305 1/2	PC pegmatoid
1305 1/2- 1313	POC; gradational lower contact.
1313-1315	PC
1315-1315 3/4	$PO_{3-5}C_{x_3}z_{1-2}$; sharply gradational upper and lower contacts.
1315 3/4-1319	PC pegmatoid; up to 20% interstitial pyroxene and 5-10% interstitial oxides; sharp lower contact.
1319-1321	$PO_{5-10}C_{x_{3-5}}z_{1-3}$; gradationally sharp lower contact.
1321-1322 1/2	PC pegmatoid
1322 1/2- 1322 3/4	POC
1322 3/4-1328	PC pegmatoid; gradational lower contact.
1328-1335	$PO_{5-7}C_{x_{t-2}}z_t$; sharp lower contact.
1335-1335 1/2	PC; sharp lower contact.

Interval	Description
1335 1/2-1350	$PO_{5-10}C_{x_{2-7}z_{t-3}}$; medium- to coarse-grained with large intercumulate pyroxenes and oxides, in places almost a pegmatoid. Some thin PC layers; gradational lower contact.
1350-1355	$PO^{3-5}C_{x_{1-3}z_{t-1}}$
1355-1359 1/2	PC
1359 1/2-1359 3/4	OC; sharp upper and lower contacts.
1359 3/4-1360	PC
1360-1399 1/2	$PO_{1-5}C_{x_{t-2}z_{t-1}b_t}$; fault between 1387 and 1389; medium- to fine-grained olivine-poor troctolite with zones of PC; monzonite at 1378; mafic pegmatoid at 1397 1/2.
1399 1/2-1403 1/2	PC
1403 1/2-1404	POC; sheared and serpentinized.
1404-1405	PC; brecciated and silicified.
1405-1406 1/2	Monzonite
1406 1/2-1487	$PO_{5-10}C_{x_{t-3}z_{t-1}}$; fine-grained troctolite; some is almost PC. Extensively sheared and fractured. Silicified at 1419-1420; vertical fractures at 1455-1458; serpentinized and sheared at 1463-1467.
1487-1497 1/2	$PO_{5-10}C_{x_{3-5}z_{1-3}}$; medium- to coarse-grained; some is almost pegmatoid; mixed with nearly pure thin PC. Rock is much coarser-grained and more olivine-rich than overlying rock; gradational lower contact.
1497 1/2-1499	PC; basal part is pegmatoidal; sharp lower contact.

Interval	Description
1499-1507	$PO_{5-10}C_{x_{3-5}}z_{1-2}$; medium- to coarse-grained.
1507-1507 1/2	PC; sharp upper and lower contacts.
1507 1/2-1512	$PO_{5-10}C$; medium-grained.
1512-1512 1/2	PC
1512 1/2-1514	$PO_{5-10}C$; medium-grained.
1514-1514 1/2	PC
1514 1/2-1525	$PO_{5-10}C_{x_{3-5}}z_{2-3}$; medium- to coarse-grained. Some is pegmatoidal; thin interlayers of PC at 1523 and 1507.
1525-1527	PC
1527-1528	$PO_{5-10}C$; medium-grained.
1528-1529	PC
1529-1530	PC pegmatoid; sheared and silicified.
1530-1533 1/2	PC; silicified and contains some monzonite.
1533 1/2-1536	$PC_{x_{3-5}}z_{t-2}$
1536-1537	PC
1537-1540	$PC_{x_{3-5}}z_{1-2}$
1540-1541	PC
1541-1541 1/2	$PO_{1-2}C$
1541 1/2-1544	PC
1544-1544 1/2	$PO_{1-2}C_{x_{5-7}}z_{1-2}$
1544 1/2-1547	PC
1547-1548	$PO_{5-10}x_{2-3}z_{2-3}$
1548-1552	Monzonite
1552-1554	PC pegmatoid
1554-1558	PC pegmatoid cut by monzonite.

Interval	Description
1558-1561	Pegmatoid with sharp lower contact.
1561-1562	$PO_{5-10}{}^{z}{}_{1-2}{}^{x}{}_{2-4}$; medium- to coarse-grained.
1562-1562 1/2	PC
1562 1/2-1566	$PO_{5-10}{}^{C_x}{}_{1-3}{}^{z}{}_{t-2}$; medium-grained typical troctolite.
1566-1574 1/2	$PO_{5-10}{}^{C_x}{}_{3-5}{}^{z}{}_{t-2}$; medium- to coarse-grained troctolite; gradational upper contact to finer grained material, gradational lower contact.
1574 1/2-1575	PC pegmatoid; gradational upper and lower contacts.
1575-1579	POC; coarse-grained.
1579-1580	PC pegmatoid
1580-1586	$PO_{5-10}{}^{C_x}{}_{3-5}{}^{z}{}_{1-3}$; medium- to coarse-grained.
1586-1592	$PO_{3-7}C$; medium- to fine-grained.
1592-1597	$P_{8}C$; fine-grained.
1597-1598	POC; very fine-grained.
1598-1606	$PO_{2-5}C$; fine-grained.
1606-1618	$PO_{5-10}C$; medium- to coarse-grained, some are pegmatoidal.
1618-1618 1/2	PC pegmatoid
1618 1/2-1633	$PO_{3-6}{}^{C_x}{}_{2-5}{}^{z}{}_{1-2}$; pegmatoidal zones mixed with medium- to coarse-grained troctolite.
1633-1662 1/2	$PO_{5-10}C_{x}{}_{2-4}{}^{z}{}_{1-2}$; medium-grained; gradational lower contact.
1662 1/2-1664	PC
1664-1666	PC pegmatoid; sharp lower contact; gradational upper contact.
1666-1671 1/2	$PO_{7-12}{}^{C_x}{}_{2-5}{}^{z}{}_{t-2}$; medium-grained; gradational lower contact.
1671 1/2-1673	PC pegmatoid; sharp lower contact.

Interval	Description
1673-1689	$PO_{7-12}C$; thin pegmatoidal zone at 1686.
1689-1689 1/2	PC; sharp upper and lower contacts.
1689 1/2-1695	$PO_{7-12}C_{x\,3-5}z_{1-2}$; medium- to coarse-grained.
1695-1700 1/2	$PO_{7-12}C$; medium-grained; gradational lower contact.
1700 1/2-1701	PC
1701-1706	$PO_{7-12}C$; gradational lower contact.
1706-1708	PC; gradational upper, sharp lower contacts.
1708-1711	$PO_{5-10}C$; fine-grained.
1711-1712	PC
1712-1713	POC
1713-1717 1/2	PC
1717 1/2-1721	$PO_{5-2}C_{x\,3-5}z_{1-2}$; medium- to coarse-grained.
1721-1721 1/2	PC
1721 1/2-1724	$PO_{5-10}C$; medium-grained.
1724-1725	Sheared zone with possible PC.
1725-1725 1/2	OC or OPC
1725 1/2-1731	OC
1731-1736	$PO_{5-10}C_{x\,3-7}z_{1-3}$; medium- to coarse-grained POC with finer grained material; gradational upper and lower contacts.
1736-1745	$PO_{7-12}C$; finer-grained than above; serpentenized faults at 1739, 1740, and 1745 to 1747.
1745-1749	PC; gradational upper and sharp lower contacts.
1749-1749 1/2	OPC

Interval	Description
1749 1/2-1753	$PO_{7-12}C$; gradational lower contact, moderately sharp upper contact.
1753-1755	PC
1755-1759	$PO_{7-12}C$
1759-1760	$PO_{5-10}C$; fine-grained.
1760-1765	$PO_{7-12}C$; medium- to coarse-grained; gradational upper and sharp lower contacts.
1765-1765 1/2	OC
1767 1/2-1768	$PO_{5-10}C_{x_{3-6}}z_{1-3}$; medium- to coarse-grained; gradational lower contact.
1768-1769	PC pegmatoid
1769-1774	$PO_{5-7}C_{x_{1-2}}z_t b_t$; medium-grained; gradational lower contact.
1774-1775 1/2	PC
1775 1/2-1778	OPC
1778-1779	OPC; medium-grained.
1779-1780 1/2	$PO_{5-10}C_{x_{3-5}}z_{T-2}$; medium-grained; gradational upper and lower contacts.
1780 1/2-1785	PC
1785-1787	$PO_{5-10}C_{x_{1-4}}z_{t-1}$; medium-grained; gradational lower contact.
1787-1810	PC; rock is mostly fine-grained with varying amounts of interstitial pyroxene. Mostly contains 1-2% pyroxene and trace oxides. There are thin layers of olivine that are probably cumulate but most of the rock is olivine-free. Lower contact is gradational.

Interval	Description
1810-1824	$PO_{5-10}C_{x_{3-5}}z_{t-1}$; medium- to coarse-grained; more olivine-rich towards top.
1824-1828	POC pegmatoid; olivine is 5-10% of rock; pyroxene 3-5%, oxides trace to 1%; gradational upper and lower contacts.
1828-1836 1/2	PC pegmatoid; large intercumulus pyroxenes and oxides mark the base of a cycle. At the base oxides are 10-15% and pyroxenes 15-20% of rock, and occur as masses up to 3-4 cm large. Basal contact is abrupt. This is the bottom of a cycle that grades from PC pegmatoid up into POC.
1836 1/2-1847 1/2	$PO_{5-10}C_{x_{1-2}}z_{T-1}b_T$; medium- to coarse-grained.
1847 1/2-1848	PC pegmatoid
1848-1856	$PO_{5-10}C$; medium- to coarse-grained.
1856-1857	POC; medium-grained.
1857-1860	PC pegmatoid
1860-1865	$PO_{1-2}C_{x_{2-5}}z_{1-2}$; medium-grained; some zones have coarser grained intercumulate oxides and pyroxenes.
1865-1866	POC; medium-grained.
1866-1867	$PO_{12-20}C$; medium-grained.
1867-1868	POC; medium-grained with gradational lower contact.
1868-1868 1/2	PC; sharp lower contact.
1868 1/2-1893	$PO_{3-7}C_{x_{1-2}}z_{t-1}$; medium- to fine-grained. Between 1883 and 1886 are many horizontal fractures.

Interval	Description
1893-1893 1/2	PC pegmatoid
1893-1899	$PO_{5-10}C_{x}{}_{3-6}z_{1-3}$; medium- to coarse-grained.
1899-1903	$PO_{3-5}C$; medium- to fine-grained, grades upward into coarser-grained rock.
1903-1905	The core has been lost.
1905-1905 1/2	POC; medium- to fine-grained.
1905 1/2-1906	PC
1906-1906 1/4	OPC; sharp upper and lower contacts.
1906 1/4-1913	PC to $PO_{1-2}C_{x}{}_{t-1}z_{t}$; fine-grained.
1913-1915	Core has been lost.
1915-1933	PC to $PO_{1-2}C$; medium- to fine-grained; sharp lower contact.
1933-1935	$PO_{5-10}C_{x}{}_{3-5}z_{1-2}$; medium-grained; gradational lower contact.
1935-1971	$PO_{3-8}C_{x}{}_{3-5}z_{2-4}$; medium- to coarse-grained, almost pegmatoidal in places; intercumulate pyroxenes up to 1 cm across and oxides up to 1/2 cm. Similar to the rock at 1840 and 1852. Core has been lost between 1942 1/2 and 1944 1/2. Rock is often badly fractured and serpentinized.
1971-1974 1/2	PC pegmatoid; sharp lower contact.
1974 1/2-1979	$PO_{5-10}C_{x}{}_{2-5}z_{T-1}$; medium- to coarse-grained; sharp upper gradational and lower contacts.
1979-1979 1/2	PC pegmatoid; sharp lower contact.
1979 1/2-1981	POC; medium-grained; gradational lower contact.

Interval	Description
1981-1982	PC pegmatoid
1982-1987 1/2	$PO_{5-10}C_{x}{}_{3-5}z_{1-2}$; medium- to coarse-grained, almost pegmatoidal in some places; gradational lower contact.
1987 1/2-2049	$PO_{1-2}C_{x}{}_{t-1}z_{t}b_{t}$; fine-grained; olivines are present in some parts as cumulate grains, other parts may be PC. The rock is distinctly finer-grained and contains less olivine than the material it grades into above, and has a sharp lower contact.
2049-2049 1/4	OC
2049 1/4-2055	$PO_{5-10}C_{x}{}_{1-3}z_{t-1}$; medium-grained; gradational lower contact.
2055-2064	POC; medium- to coarse-grained; gradational lower contact.
2064-2068	POC; medium- to fine-grained.
2068-2112	PC; moderately sharp lower contact.
2112-2115	$PO_{5-10}C$
2115-2115 1/2	PC pegmatoid
2115 1/2-2121	$PO_{5-10}C$; some coarse oxide-rich zones.
2121-2121 1/2	PC pegmatoid; very sharp lower contact, gradational upper contact.
2121 1/2-2139 1/2	$PO_{7-12}C$; some coarse oxide-rich zones.
2139 1/2-2142	PC pegmatoid; very sharp lower contact, gradationally sharp upper contact.

Interval	Description
2142-2148 1/2	$PO_{7-12}C$; 70° dipping fault with vertical slickensides at 2148.
2148 1/2-2149	PC pegmatoid
2149-2179	$PO_{7-12}C_{x_{3-5}}z_{t-1}$; medium-grained troctolite; gradational lower contact.
2179-2180	PC
2180-2187	$PO_{7-12}C$
2187-2187 1/2	PC; gradational lower and sharp upper contacts.
2187 1/2-2209	$PO_{7-12}C$
2209-2209 1/2	PC; gradational upper and lower contacts.
2209 1/2-2275	$PO_{7-12}C_{x_{3-5}}z_{t-2}b_{t-1}$; medium-grained.
2275-2291	$PO_{7-12}C$; slightly coarser-grained than above.
2291-2326	$PO_{7-12}C$; medium-grained.
2326-2327	PC pegmatoid; gradational upper and sharp lower contacts.
2327-2328	$PO_{7-12}C$; medium-grained.
2328-2352	PC pegmatoid; gradational upper and sharp lower contacts. Lower contact is marked by mass of pyroxene.
2352-2374	$PO_{7-12}C$; medium-grained.
2374-2375	PC; gradational lower contact.
2375-2387	$PO_{7-12}C$; medium-grained; gradational lower contact.
2387-2388 1/2	$PO_{15-25}C$; medium- to coarse-grained; olivine-rich zone; gradational upper and lower contacts.
2388 1/2 - 2391 1/2	$PO_{7-12}C$; medium-grained; gradational lower contact.

Interval	Description
2391 1/2- 2392	PC pegmatoid
2392-2403	$PO_{2-5}C_{x}{}_{t-2}{}^{z}{}_{t-1}$; medium- to coarse-grained; diffuse upper and lower contacts. A plagioclase-rich troctolite that contains some pegmatoidal material.
2403-2445	$PO_{7-12}C$; medium-grained, grades upward with decreasing olivine and increasing grain-size to an olivine-poor troctolite.
2445-2445 1/4	OC
2445 1/4-2421	$PO_{3-7}C$; medium- to fine-grained with PC layers.
2421-2425	$PO_{7-12}C$; medium-grained; gradational lower contact.
2425-2454	$PO_{7-12}C_{x}{}_{2-5}{}^{z}{}_{1-2}{}^{b}{}_{t}$; medium- to coarse-grained; gradational lower contact. Contains some layers of finer-grained olivine-poor troctolite.
2454-2455	PC pegmatoid; sharp lower, gradational upper contacts.
2455-2487 1/2	$PO_{7-12}C$; medium-grained.
2487 1/2- 2487 3/4	$PO_{1-2}C$; fine-grained.
2487 3/4-2489	PC pegmatoid; gradational upper, sharp lower contacts.
2489-2499	$PO_{7-12}C$
2499-2509	PC pegmatoid; gradational upper and sharp lower contacts.

Interval	Description
2509-2559	$PO_{7-12}C$; medium-grained with some coarse-grained zones; a pegmatoidal zone occurs at 2535 1/2; gradational lower contact.
2559-2562	PC pegmatoid. There are also some coarse-grained olivine-poor troctolites and large intercumulus pyroxenes and oxides; gradational upper and very sharp lower contacts. This is not a typical pegmatoidal PC as it is distinguished by generally finer-grained oxide phases and the presence of small olivines.
2562-2565	$PO_{3-5}C$; medium- to fine-grained; sharp lower contact.
2565-2572	$PO_{7-12}C$; medium- to coarse-grained.
2572-2573	$PO_{7-12}C$; medium- to coarse-grained; gradational lower contact.
2573-2574	PC pegmatoid
2574-2581	$PO_{7-12}C$; medium- to coarse-grained with a 6-inch PC at 2577.
2581-2581 1/2	PC pegmatoid; diffuse lower, sharp upper contacts.
2581 1/2-2592	$PO_{7-12}C$; medium- to coarse-grained; diffuse lower contact.
2592-2593	PC pegmatoid
2593-2594	PC pegmatoid; abundant oxides occur as finely disseminated grains constituting about 20% of the rock.
2594-2594 1/2	PC pegmatoid

Interval	Description
2594 1/2-2600 1/2	$PO_{5-7}C$; medium- to coarse-grained with some pegmatoidal zones. Grades upward into PC pegmatoid.
2600 1/2-2604	PC pegmatoid
2604-2605	$PO_{5-10}C$; medium- to fine-grained.
2605-2610 1/2	$PO_{5-7}C$; fine-grained.
2610 1/2 -2611	$PO_{5-10}C$; medium- to fine-grained.
2611-2611 1/2	PC pegmatoid
2611 1/2-2613 1/2	POC; medium- to fine-grained.
2613 1/2-2614	PC pegmatoid
2614-2622	$PO_{5-10}C$; medium- to fine-grained.
2622-2624	PC pegmatoid
2624-2624 1/2	$PO_{5-10}C$; medium- to fine-grained.
2624 1/2-2626	OPC
2626-2626 1/2	$PO_{3-5}C$; medium- to fine-grained; sharp lower contact.
2626 1/2-2627	PC pegmatoid
2627-2627 1/2	$PO_{3-5}C$; medium- to fine-grained.
2627 1/2-2628	OPC
2628-2628 1/2	$PO_{5-8}C$; medium- to fine-grained.
2628-2631	PC pegmatoid; sharp lower contact, diffuse upper contact.
2631-2632	$PO_{5-7}C$; medium- to fine-grained; gradational lower contact.
2631-2631 1/2	PC pegmatoid

Interval	Description
2631 1/2-2634	$PO_{5-7}C$; medium- to fine-grained.
2634-2634 1/2	PMC or PMOC; the rock has about 40% magnetite.
2634 1/2-2648	$PO_{5-7}C$; medium- to fine-grained with thin layers of POMC at 2637, 2643, and 2644 1/2.
2648-2650	MC; nearly pure magnetite.
2650-2657	$PO_{5-7}C$; medium- to fine-grained.
2657-2657 1/4	PC
2657 1/4-2658	MOPC
2658-2659	PC pegmatoid
2659-2659 1/2	PMOC
2659 1/2-2660	PC pegmatoid
2660-2660 1/2	PMC
2660 1/2-2661 1/2	$PO_{15-20}C$; fine-grained.
2661 1/2-2669	$PO_{5-15}C$; mostly medium-grained but some coarser-grained zones.
2669-2671	PMOC; pegmatoidal zone with some fine-grained POC layers.
2671-2690	Core is badly mixed and cannot be logged. At 2690, hole collapsed. Drill was wedged at 2506 and redrilled.
2506-2508	PC pegmatoid
2508-2536 1/2	$PO_{5-10}C_{x_{2-5}z_{1-2}}$; medium- to coarse-grained troctolites; gradational lower contact.
2536 1/2-2537	PC pegmatoid; diffuse upper and lower contacts.

Interval	Description
2537-2563	$PO_{5-10}C$; medium- to coarse-grained.
2563-2575	$PO_{5-10}C$; fine-grained; gradational upper and sharp lower contacts.
2575-2578	$PO_{5-10}C$; medium- to coarse-grained.
2578-2580	PC; gradational upper and lower contacts.
2580-2589 1/2	$PO_{5-10}C$
2589 1/2-2591 1/2	PC pegmatoid; sharp lower contact.
2591 1/2-2592 1/2	PMC; a plagioclase-magnetite cumulate; medium- to fine-grained; some places may be almost a magnetite cumulate; sharp lower contact.
2592 1/2-2593	$PO_{15-25}C$; medium- to coarse-grained; gradational lower contact.
2593-2597 1/2	$PO_{5-10}C$; medium- to coarse-grained with some pegmatoidal zones; gradational lower contact.
2597 1/2-2599	PC pegmatoid; sharp lower contact.
2599-2601	$PO_{5-10}C$; medium- to coarse-grained; sharp gradational lower contact.
2601-2603	PC pegmatoid; sharp lower contact.
2603-2604 1/2	$PO_{5-10}C$; medium- to coarse-grained; gradational lower contact.
2604 1/2-2611	PC pegmatoid; sharp lower contact.
2611-2612 1/2	$PO_{5-10}C$; medium- to fine-grained.
2612 1/2-2614 1/2	$PO_{5-10}C$; medium- to coarse-grained.
2614 1/2-2616	Monzonite

Interval	Description
2616-2620	$PO_{5-10}C$; medium- to fine-grained; gradational lower contact.
2620-2621 1/2	PC pegmatoid; sharp lower contact.
2621 1/2-2622 1/2	POC; medium- to fine-grained; gradational lower contact.
2622 1/2-2623 1/2	OPC; medium- to fine-grained.
2623 1/2-2628	$PO_{5-10}C$; medium- to fine-grained; gradational lower contact.
2628-2631	PC pegmatoid
2631-2631 1/2	MC; gradational lower contact.
2631 1/2-2635	$PO_{5-10}C$; medium- to fine-grained.
2635-2635 1/4	MC
2635 1/4-2637 1/2	POC; medium- to fine-grained.
2637 1/2-2641 1/2	MC
2641 1/2-2649	$PO_{5-10}C$; medium- to fine-grained; some thin PC layers.
2649-2649 1/2	PC pegmatoid
2649 1/2-2650	$PO_{10-25}C$; medium- to fine-grained; gradational lower contact.
2650 1/2-2656	POC; medium- to fine-grained.
2656-2657	PMOC; olivine is 15% to 25% of rock; medium- to fine-grained.
2657-2659 1/2	$PO_{5-10}C$; medium- to fine-grained.
2659 1/2-2660 1/2	PMC
2660 1/2-2664	POC; medium- to fine-grained.
2664-2665 1/2	MOPC or MOC; parts are probably magnetite cumulate; medium- to fine-grained; sharp upper, sharp lower contacts.

Interval	Description
2665 1/2-2667	PMC; pegmatoidal zone with cumulate magnetite; large interstitial pyroxenes.
2667-2671	PMOC; pegmatoidal zone. The rock is mixed and consists mainly of coarse magnetite and plagioclase with some parts made up of olivine, magnetite, and plagioclase. Coarse interstital pyroxene is present and thus this layer is somewhat similar to the pegmatoidal layers seen elsewhere in this core. However, unlike other areas, magnetite is here a dominant phase and appears in places to be cumulate.
2671-2675	$PO_{5-10}C$; very fine-grained.
2675-2693	Core is split and scrambled and cannot be logged. At 2693, the hole again collapsed and was abandoned.

Summary of DU - 9

From 0 to 485 is mostly typical troctolite. Exceptions occur between 44 and 55 where there is a PC with distinctive grains of cumulus oxides and at layers of plagioclase-rich rocks between 86 and 106 and between 197 and 225. The medium-grained $PO_{5-10}C$ at the beginning of the hole changes to a finer grained, slightly less olivine-rich troctolite below 230. At approximately 485 the troctolite becomes chalky white.

Between 500 and 520 is PC that is underlain by a small interval of POC which extends from 520 to 530. Below 530 is a sequence of plagioclase-rich rocks that extends to 665. Some troctolite is interlayered in the upper parts of this interval. From 665 to 862 is a heterogeneous sequence of POC to PC. Sharp contacts between PC and POC occur within this sequence at 521, 527, and 537. PC above these contacts commonly grades up into POC and thus may represent the bottoms of thin cycles.

From 862 to 886 is typical POC that contains an OC layer at 885. Plagioclase-rich rocks then extend from 884 to 988 and are distinguished by various amounts of interstital pyroxenes and oxides. At 988, there is a pegmatoidal zone which extends to 992 and may mark the base of a cycle. Troctolite extends below 992 and grades into plagioclase-rich, olivine-poor troctolite or PC that extends down at 1049 into a pegmatoid. This pegmatoid marks the base of a cycle. Rocks below this pegmatoid (1058 to 1108) are olivine-poor troctolites; sulfides occur in this interval. Olivine may occur as a cumulus phase in some of this sequence.

Pegmatoids occur at 1154 and may be the base of another cycle. Olivine-poor troctolite extends below 1154 and grades into plagioclase-rich rocks. PC occurs between 1168 and 1175 and may mark the base of this sequence. Troctolite below 1175 grades down into more plagioclase-rich rock and then into a coarse-pegmatoidal rock between 1185 and 1193. Below 1193 there is an abrupt break with a distinctly finer-grained PC that has some small oxide grains and which extends to about 1199.

Below 1199 is typical $PO_{5-7}C$. Although some plagioclase-rich rocks occur, there is no distinct break in lithology and the rock grades into more plagioclase-rich rock at 1250. The angle of intersection between drill core and layering is about 60^{o}.

Below 1250 is a medium- to coarse-grained, olivine-poor troctolite with some large intercumulus oxides and pyroxenes; locally the rock has a pegmatoidal appearance. Some cumulus olivine may occur locally. Typical medium-grained troctolite occurs from 1296 to 1305 at which point there is a pegmatoid that may mark the base of a cycle. Below 1305 is typical troctolite that grades into plagioclase-rich rocks at 1314, and into a pegmatoidal zone at 1328. This pegmatoid appears to be the base of another cycle.

Below 1328 is typical trocotolite, which then grades down into a mixture of plagioclase-rich rocks and coarse-grained, almost pegmatoidal POC. These rocks grade down to a pure PC at 1355. This PC extends to 1407 and may represent the base of a cycle that extends up to 1328.

Below this PC is medium-grained troctolite that grades downward into a finer-grained, olivine-poor troctolite between 1421 and 1485. The section is highly fractured and serpentinized. Coarse-grained olivine-poor troctolite extends to 1506 where the rocks become finer grained and more plagioclase-rich. They grade downward into nearly pure PC and are cut by monzonite. This PC becomes pegmatoidal between 1554 and 1558 where it makes the base of a cycle that has a sharp lower contact with troctolite.

Underlying troctolite grades down into medium- to coarse-grained olivine-poor troctolite. Pegmatoidal zones occur within this sequence and may mark bottoms of cylces. The first of these is at 1665 and grades upward into olivine-poor troctolite at 1652; a second pegmatoid is at 1673 and grades up to troctolite at 1671; a third pegmatoid occurs at 1665. Below 1671 mixed PC and olivine-poor troctolite grades into finer-grained POC, then into coarser-grained POC at 1712. Pegmatoid at 1725 may mark the base of this succession.

Below 1725 is an OC or OPC that grades into coarser-grained POC at 1742 and then into PC at 1749. This succession of olivine-rich rocks underlain by plagioclase-rich rocks that in places are pegmatoids is repeated in underlying rocks with bottoms of these sequences located at 1775, 1810, 1835, 1847.5, 1868, 1894, 1933.5, 1975, 1979.5, 1981.5, and 2049.

The sequence from 2049 to 2631 is mostly homogeneous troctolite. Pegmatoids occur locally and may mark bottoms of cyclic layers. They are at 2214, 2326.5, 2328.5, 2392 to 2403, 2454 1/2, 2487, 2499 to 2509, 2560 to 2562, 2574, 2581, 2595, 2604, 2611, 2614, 2624, 2627, and 2631. The troctolite in these cycles is dominantly a medium- to fine-grained rock with 5% to 10% olivine. Some cumulate magnetite may be present.

A 1 1/2 foot thick magnetite layer occurs at 2649. OC or OPC occurs at 2626, 2661, and possibly at 2670. Disseminated sulfides appear below an OC at 2661. In this portion of the core, pegmatoids that may mark the bottoms of cycles occur at 2508, 2590, 2602, 2604.5 to 2610, 2629, 2649, 2669. Magnetite-rich zones are at 2592, 2631 to 2632.5, 2635 to 2635.5, 2638 to 2641.5, 2659.5 to 2660.5, 2664 to 2665.5, and 2667 to 2671. Sulfides appear to be associated with magnetite-rich zones or with olivine-rich areas.

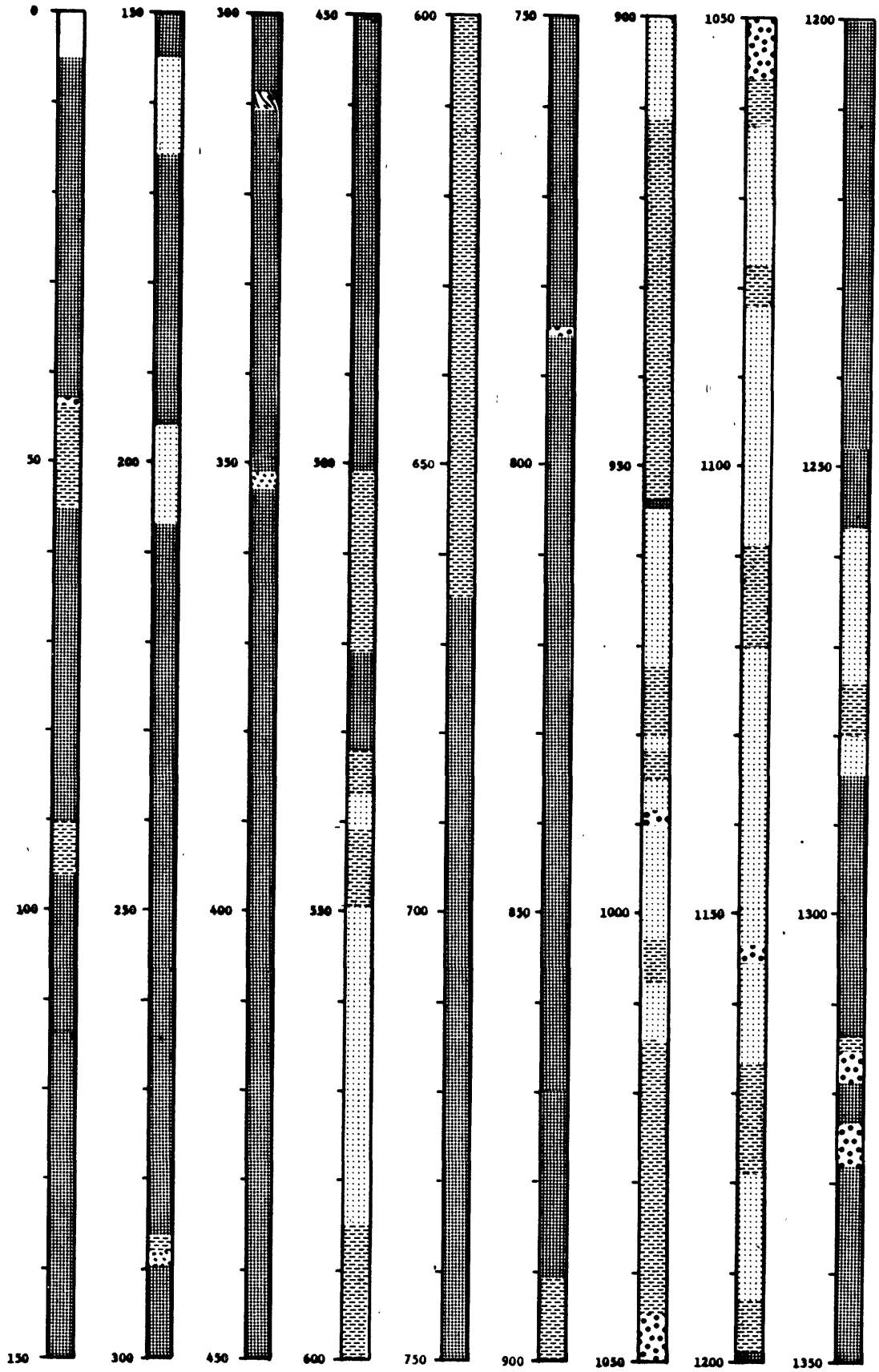
This hole was wedged and redrilled at 2506. The following summary compares the core in the original and wedged segments. Footages associated with the wedged hole are followed by the letter "W".

PC pegmatoids extends to 2508 W (2509) and are underlain by medium- to coarse-grained $PO_{5-10}C_{x_{t-4}}z_{1-2}b_{t-1}$ that extends to 2535 and 2535 1/2 W, where there is a 3" to 4" pegmatoidal zone with some layered monzonitic intrusions. Below this zone the medium- to coarse-grained POC continues to 2559 W (2562), where there is a fine-grained POC', which extends to 2565 W (2565). Below the fine-grained layer is medium- to coarse-grained POC, which extends to 2589 W (2591). At 2570 1/2, there is a 1/2" OC, which probably occurs at 2570 1/2 W as a 1/4" serpentinized zone. At 2573 1/2 and at 2581, there are 6" thick pegmatoidal zones, which do not occur in the wedged core. From 2589 W (2591) to 2591.5 W (2593) is a pegmatoidal PC. Below that there is a magnetite-rich zone, which extends to 2592.5 W (2593.5). From (2593.5) to (2597) is a pegmatoidal zone which grades upward into the magnetite-rich zone. However, between 2592.5 W to 2594 W is a coarse-grained $PO_{5-10}C$ that is pegmatoidal but is also much more olivine-rich than the non-wedged section.

The underlying section from 2594 W (2597) to 2611 W (2614) is complex and basically consists of medium- to coarse-grained troctolites with interlayered pegmatoidal layers which do not necessarily correlate from one hole to the other. From 2611 W to 2615 W is medium-grained PC, which also extends from 214 to 217.5; then there is a silicified zone in both cores which extends to 2616 W and 2618. Medium-grained POC is between 2620 W and 2622. Pegmatoidal zones are between 2620.5 W and 2624; medium-grained POC extends to 2622.5 W (2624.5). A fine-grained olivine-rich mixed zone extends to 2623.5 W (2624). Medium-grained POC extends from 2623.5 W to 2628 W. The same medium-grained POC is found from 2625 1/2 to 2629 but there is a pegmatoidal zone that is 12" wide at 2628 that does not occur in the wedged section. From 2629 to 2631 is pegmatoidal PC which also occurs between 2628 W and 2630 W. Medium-grained POC extends to 2649 W (2648) and contains magnetite-rich interlayers which do not appear to correlate between the two sections. Magnetite occurs between 2621 W and 2623 W, 2637.5 W to 2641.5 W (2634.5 to 2635, and 2649 to 2650). At 2649 W (2648) is a thin pegmatoidal zone, below which there is more medium-grained POC that extends to 2667 W (2669). Pegmatoids that appear to be a PMOC extend between 2657 and 2661 and do not occur in the wedged core.

Basically, the correlation between the two cores in this lower segment is poor. Pegmatoidal zones do not continue over any significant distance and thus correlations appear to be marked by transitions from medium to fine-grained units and by thicker pegmatoidal PC. The magnetite-rich horizons do not show any lateral consistencies.

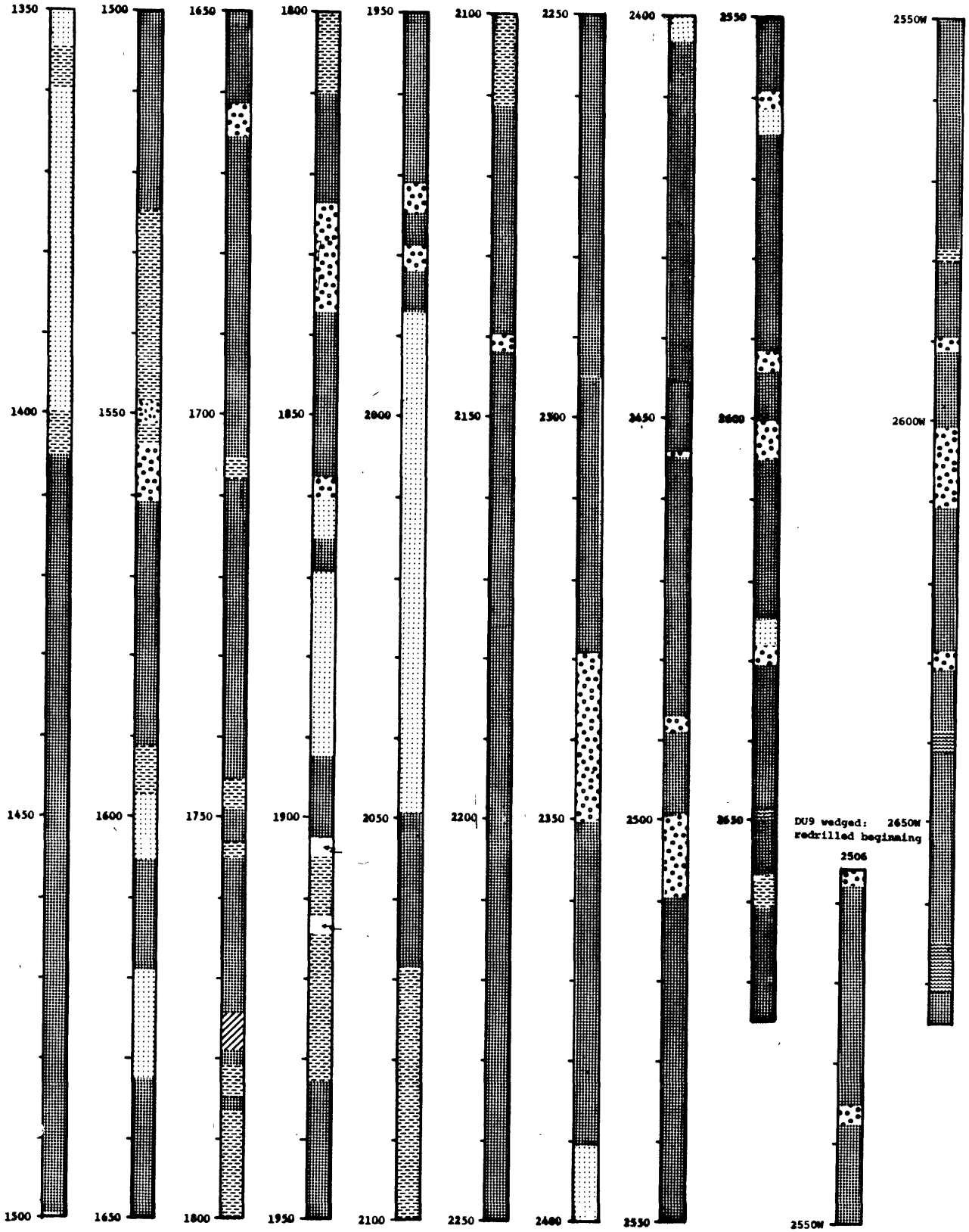
DRILL HOLE DU-9



EXPLANATION OF PATTERNS

- Plagioclase-rich pegmatoid
- Plagioclase cumulate
- Olivine-poor troctolite
- Troctolite to olivine-rich troctolite
- Olivine cumulate or olivine-rich cumulate
- Magnetite-rich cumulate
- Hornfels
- Monzonite
- Granitic Country Rock
- Fault or shear

DRILL HOLE DU-9



EXPLANATION OF PATTERNS

- Plagioclase-rich pegmatoid
- Plagioclase cumulate
- Olivine-poor troctolite
- Troctolite to olivine-rich troctolite
- Olivine cumulate or olivine-rich cumulate
- Magnetite-rich cumulate
- Hornfels
- Monzonite
- Granitic Country Rock
- Fault or shear

DUVALL DRILL HOLE DU-10

Interval (ft)	Description
0-20	Overburden.
20-198	$PO_{t-5}C_{x_{t-5}}z_{t-2}$; medium-grained anorthosite with small amounts of disseminated olivine. 2' PC layers at 116 with gradational contacts.
198-400	PC; medium-grained at 198, becoming medium- to coarse-grained at 230, and medium- to very coarse grained at 334; 235-248 has 3 to 5% disseminated olivine. 334-337 has 15 to 25% interstitial pyroxene. 360-400 has 5 to 10% interstitial pyroxene. Thin syenite at 170, 282, 287, 288, 291, and 294.
400-429	Fault with red clay and serpentine.
429-602	$PO_{5-10}C_{x_{1-4}}z_{1-2}b_{1-2}$; medium-grained troctolite; locally extensively altered and cut by many granitic or syenitic veins; much is serpentinized. Nearly vertical fractures contain slickensides that rake 60°.
602-637	Fault zone; altered to reddish clay and serpentine.
637-641	$PO_{15-25}C_{x_{3-5}}z_{t-1}$; fine- to medium-grained olivine-rich troctolite with graditional lower contact.
641-642	OC; medium-grained olivine cumulate with gradational lower contact.
642-650	$PO_{15-70}C_{x_{3-5}}z_{t-2}b_{t-1}$; medium- to fine-grained picritic zone with olivine increasing downward.

Interval	Description
650-652	OC; gradational lower contact.
652-733	$PO_{7-20}C_{x_{3-5}}z_{1-3}b_{t-2}$; medium-grained troctolite with gradual decrease in olivine from 20% at 663 to 10% at 733; grain-size coarsens downward, locally becoming pegmatoidal; coarse pyroxenes and olivines occur near 733. Locally strongly serpentinized between 683 and 696.
733-792	$PO_{1-5}C_{x_{t-3}}z_{t-2}$; medium-grained olivine-poor troctolite with gradational lower contact; thin PC layers at 771, 780, and 784. Syenite dike at 745.
792-792 1/2	Pegmatoidal PC.
792 1/2-802	$PO_{7-12}C_{x_{3-7}}b_{t-3}$; medium- to coarse-grained troctolite.
802-828	$PO_{2-5}C_{x_{2-3}}b_{t-1}$; medium- to coarse-grained olivine-poor troctolite with gradational lower contact.
828-968	$PO_{7-12}C_{x_{t-7}}z_{t-2}b_{t}$; mostly medium-grained troctolite but at 923 grain size begins to coarsen and pegmatoidal zones develop with pegmatoidal segregations occurring at 924, 925, 929, 951, 952, 958, and 962.
968-1004	$PO_{7-12}C_{x_{t-3}}z_{t-2}b_{t}$; medium-grained, marked size gradation from above rock.
1004-1005	PC; medium-grained.

Interval	Description
1005-1011	$PO_{3-5}C_{x_{5-10}}z_{2-5}$; very coarse grained with gradational upper and lower contacts.
1011-1025	$PO_{7-12}C_{x_{3-8}}z_{t-2}b_{t-1}$; medium- to coarse-grained troctolite with pegmatoidal segregations at 1022 and 1024.
1025-1031	$PO_{3-5}C_{x_{3-9}}z_{t-1}$; coarse-grained and locally pegmatoidal.
1031-1039	$PO_{7-12}C_{x_{3-5}}z_{t-1}$; medium- to fine-grained; sharp upper contact, gradational lower contact.
1039-1093	$PC_{x_{2-5}}z_{t-1}$; mostly fine-grained but with some pegmatoidal material near base; sharp lower contact.
1093-1460	$PO_{7-15}C_{x_{3-5}}z_{t-2}b_{t}$; medium-grained; very gradational and somewhat subjective contacts with PC layers at 1123 and 1121. Syenite at 1170, 1175, between 1246 and 1247, and between 1385 and 1386.
1460-1488	$PO_{30-40}C_{x_{t-3}}z_{t-1}b_{t}$; gradational lower contact.
1488-1593	$PO_{7-15}C_{x_{3-5}}z_{t-1}b_{t}$; gradational and uniform decrease in olivine downward; gradational lower contact.
1593-1606	$PO_{1-5}C_{x_{2-5}}z_{1-3}$; medium- to coarse-grained.
1606-1630	$PC_{x_{2-3}}z_{t-1}$; gradational lower contact.
1630-1632	PC; pegmatoid.
1632-1705	$PO_{1-3}C_{x_{3-5}}z_{t-1}$; medium-grained; syenite at 1638.
1705-1709	$PO_{7-12}C_{x_{3-5}}z_{t-1}$; medium- to fine-grained; very gradational upper and lower contacts.

Interval	Description
1709-1710	PC pegmatoid
1710-1712	$PO_{7-12}C_{x_{3-5}}z_{1-3}$; medium- to fine-grained; gradational lower, sharp upper contacts.
1712-1716	$PO_{3-5}C_{x_{3-5}}z_{t-1}$; medium-grained; gradational lower contact with olivine decreasing downward.
1716-1725	PC; becomes pegmatoidal at base; gradational lower contact.
1725-1728	$PO_{1-3}C_{x_{2-5}}z_{t-1}$; medium- to coarse-grained; gradational lower contact.
1728-1731	PC pegmatoid
1731-1733	$PO_{7-12}C_{x_{3-5}}z_{t-1}$; medium-grained.
1733-1747	$PO_{3-5}C_{x_{3-5}}z_{t-2}$; medium- to coarse-grained; grain-size coarsens downward becoming pegmatoidal near bottom; sharp lower contact.
1747-1771	$PO_{10-15}C_{x_t}z_tb_t$; medium-grained; gradational lower contact; syenite at 1775 and 1761.
1771-1775	$PO_{1-3}C$ to PC; medium-grained; olivine decreases downward.
1775-1775 1/2	PC pegmatoid; sharp lower contact.
1775 1/2-1777	$PO_{2-3}C_{x_t}z_tb_t$; medium-grained; makes distinct contact with overlying olivine-free pegmatoidal zone; gradational lower contact.

Interval	Description
1777-1779	PC; pegmatoidal at bottom; sharp lower contact.
1779-1780	$PO_{3-5}C_{x_{3-5}}z_{t-1}b_{t-1}$; medium- to coarse-grained.
1780-1783	Syenite
1783-1803	$PO_{10-20}C_{x_{3-5}}z_{t-1}b_{t}$; gradational lower contact; olivine increases to 1800 and then decreases; gradational lower contact.
1803-1818	$PO_{3-5}C_{x_{2-3}}z_{t-1}b_{t}$; medium-grained; syenite at 1814; gradational lower contact.
1818-1830	PC; medium-grained but becoming pegmatoidal towards base; syenite between 1822 and 1824 and a medium-grained inclusion with sharp upper and lower contacts occurs betweens 1827 and 1828.
1830-1835	$PO_{1-3}C_{x_{2-3}}z_{1-2}$; medium- to coarse-grained. An angular inclusion that that contains disseminated sulfides and coarse blocky pyroxenes occurs between 1833 and 1833 1/2.
1835-1861	$PO_{7-12}C_{x_{2-3}}z_{t-1}$; medium-grained; gradational lower contact. 1 foot PC layer at 1859.
1861-1862	PC pegmatoid
1862-1865	$PO_{7-12}C_{x_{2-3}}z_{t-1}$
1865-1870	$PO_{30-40}C_{x_{t-2}}z_{t}b_{t}$; medium-grained; gradational lower contact.

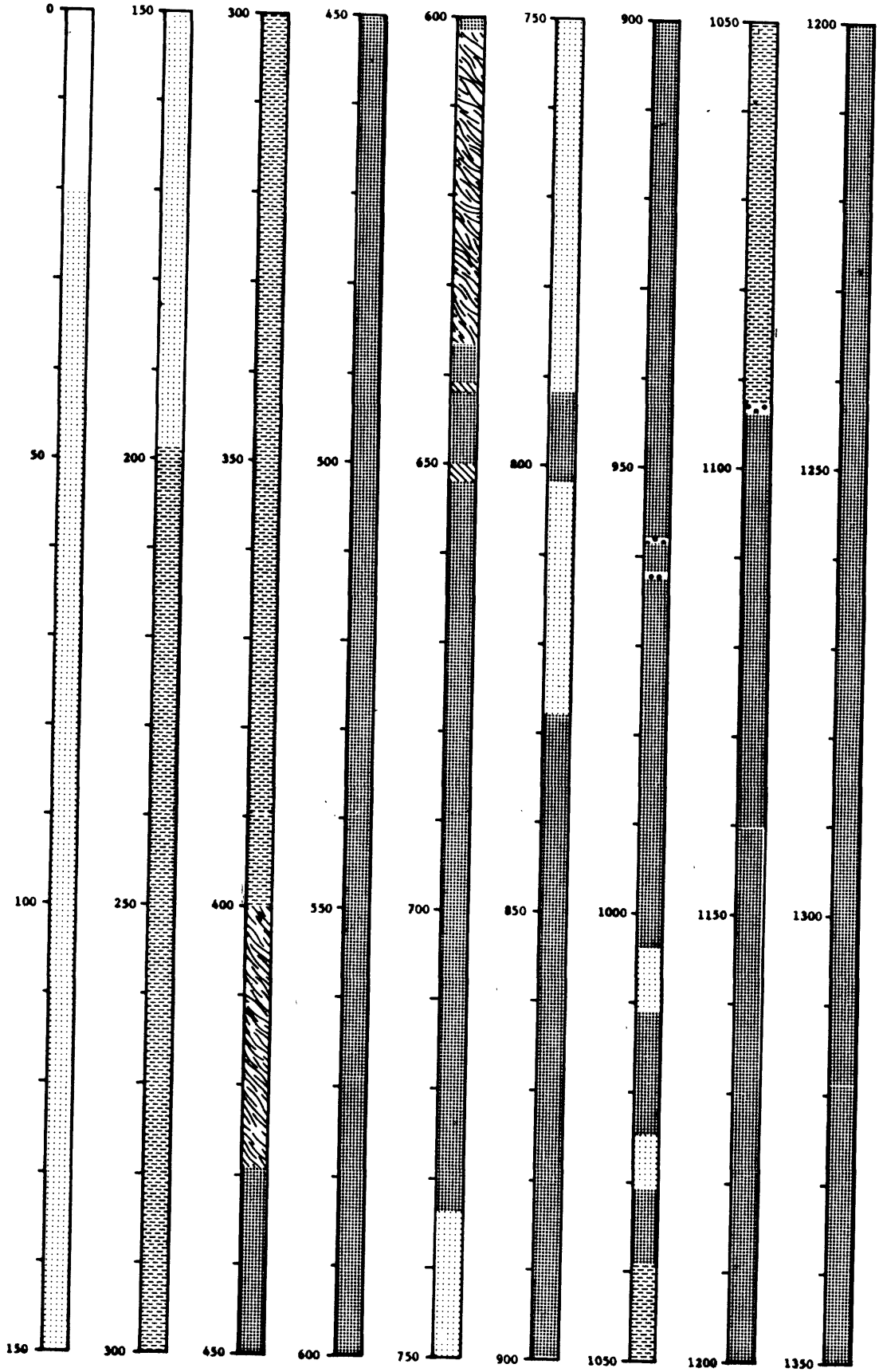
Interval	Description
1870-1886	$PO_{3-12}C_{x_{2-3}}z_{t-1}$; medium-grained; sharp lower contact; fine-grained pyroxene-rich inclusions with sharp upper and lower contacts at 1881-1881 1/2 and at 1883-1883 1/2.
1886-1888	OC; gradational lower contact.
1888-1893	PC pegmatoid
1893-1896	$PX_{15-20}C$; medium- to coarse-grained; cumulate orthopyroxene.
1896-1896 1/2	Hornfels inclusion; fine-grained.
1896 1/2-1900	$PO_{3-4}C_{x_{5-15}}$; highly sheared and serpentinized.
1900-1901	OC; gradational lower contact.
1901-1922	PC; sharp lower contact.
1922-1924	$PO_{7-12}C_{x_{t-2}}z_t b_t$; gradational lower contact.
1924-1925	$PO_{20-25}C_{x_{3-5}}$; medium-grained; gradational lower contact.
1925-1926	PC
1926-1930	$PX_{5-10}C$; cumulate orthopyroxene.
1930-1934	PC pegmatoid
1934-1950	OC to OPC; olivine content decreases downward; gradational lower contact.
1950-1969	$PO_{5-40}C$; variable olivine content.

Interval	Description
1969-1983	PC; medium- to very coarse grained pegmatoid; locally contains 60 to 80% pyroxene; pegmatoidal zones at 1971 and 1983; inclusions of equigranular medium- to fine-grained pyroxene-bearing rock at 1971-1971 1/2 and 1976-1979; inclusions have sharp upper and lower contacts.
1983-1985	Hornfels inclusion.
1985-1999	$PO_{2-15}C$; medium- to fine-grained; disseminated sulfides; hornfels inclusion at 1986 to 1987.
1999-2001	PC pegmatoid
2001-2009	$PO_{3-7}C_{x_{2-3}}$; fine-grained with trace to 2% disseminated sulfides.
2009-2015	Inclusion; fine-grained, serpentinized.
2015-2052	$PO_{5-10}C$; fine-grained troctolite; possibly contains some cumulative pyroxene.
2052-2070	$PO_{30-40}C_{x_{t-2}z_{1-2}}$; fine-grained.
2070-2072	Pyroxene-rich inclusion.
2072-2076	$PO_{70-80}C$; fine-grained; gradational upper and lower contact.
2076-2186	$PO_{5-15}C$; medium- to fine-grained; some thin plagioclase-rich layers at 2173 and at 2176. T to 5% sulfides.
2186-2225	Granitic country rock; bottom of hole.

SUMMARY OF DU-10

The hole starts in a plagioclase-rich sequence of rocks which are marked by some changes in the amount of intercumulus pyroxene. At 400, there is a fault which juxtaposes these plagioclase-rich rocks against troctolitic rocks containing between 5 and 10% olivine. A second sheared and serpentinized zone at 602 separates these troctolites from a sequence of olivine-rich rocks that locally contain OC layers. This olivine-rich zone grades down into troctolite which in turn, with decreasing olivine, grades into olivine-poor troctolite at around 732. This plagioclase-rich section extends to $792\frac{1}{2}$, where there is a thin pegmatoidal zone, which then grades back into more olivine-rich troctolite near 800. Troctolite containing between 2 and 15% olivine extends as a fairly uniform unit to about 923 where grain size begins to coarsen markedly and pegmatoidal segregations are developed. This coarse-grained zone ends at 968 and is underlain by uniform medium-grained troctolite that grades down into a pegmatoidal zone which ends at 1011. This is underlain by a second troctolitic sequence that is about 10 feet thick and which ends in another pegmatoidal zone at 1031. Troctolite below 1031 grades into a major anorthositic layer that extends to a pegmatoidal base at 1093. Uniform medium-grained troctolite extends as a uniform sequence from 1093 to 1460. At 1460 there is a gradational but noticeable increase in olivine, which then grades back into a uniform $PO_{7-12}C$ which extends to 1593. At this point, plagioclase increases and the rocks grade into anorthosite with a pegmatoidal base at 1630. More plagioclase-rich material extends below this pegmatoidal zone to 1728 where another pegmatoidal plagioclase layer marks the boundary with underlying troctolite. Troctolite extends down and grades into pegmatoidal plagioclase at 1779. Olivine-rich troctolite below this pegmatoidal zone grades downward into olivine-poor troctolite and into anorthositic rock with a pegmatoidal-plagioclase layer at 1830. Troctolite extends below this layer to a pegmatoidal zone at 1861. Olivine-rich troctolite extends below 1861 with some olivine cumulate interlayers and pyroxene-rich inclusions. This appears to grade into a well-developed pegmatoidal zone near 1893. Below 1893 more troctolite and OC grades into a plagioclase-rich zone which then grades into a complexly mixed zone that contains some pegmatoidal material. The bottom of this zone is at 1934. Below 1934, the rocks appear quite different. Most are fine-grained troctolite, some of which is plagioclase rich. Sulfides first become abundant near 1990. Inclusions of pyroxene hornfels are also more common in this lower zone. The mixed fine-grained troctolite extends down to the contact with granitic country rock at 2186.

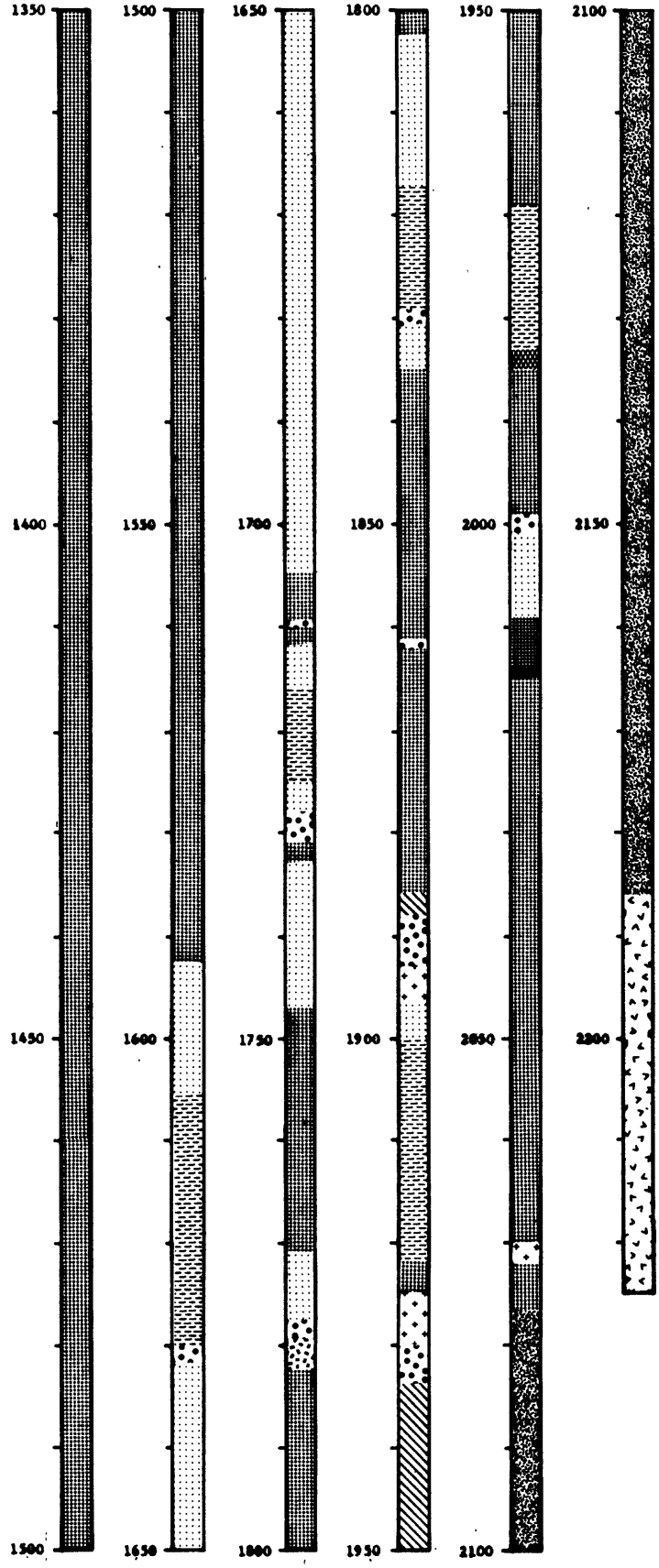
DRILL HOLE DU-10



EXPLANATION OF PATTERNS

- Plagioclase-rich pegmatoid
- Plagioclase cumulate
- Olivine-poor troctolite
- Troctolite to olivine-rich troctolite
- Olivine cumulate or olivine-rich cumulate
- Magnetite-rich cumulate
- Hornfels
- Monzonite
- Granitic Country Rock
- Fault or shear

DRILL HOLE DU-10



EXPLANATION OF PATTERNS

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DUVALL DRILL HOLE DU-11

Interval (ft.)	Description
0-4	No core.
4-19	$PO_{3-5}C_{x_{2-3}z_{t-1}}$; medium-grained.
19-32	PC
32-42	$PO_{3-7}C_{x_{2-3}z_{t-1}b_t}$
42-51	$PO_{3-7}C_{x_5z_{t-2}b_t}$
51-56	PC
56-69	$PO_{1-2}C_{x_{5-10}z_{t-2}}$; medium-grained.
69-82	$PO_{7-12}C_{x_{3-7}z_{t-2}}$; medium-grained.
82-84	$PO_{1-2}C_{x_{3-5}z_{t-2}}$
84-92	$PO_{7-12}C$
92-95	$PO_{1-2}C_{x_{2-5}z_{1-2}}$
95-111	$PO_{7-12}C_{x_{3-5}z_{t-1}b_t}$; medium-grained.
111-111 1/2	PC
111 1/2-142	$PO_{7-12}C_{x_{2-5}b_t}$; syenite intrusion at 118; two-inch thick pegmatoidal zones at 135 1/2 and 139.
142-149	$PO_{5-10}C_{x_{2-3}z_t}$
149-153	$PO_{7-12}C$
153-154	PC pegmatoid
154-155	$PO_{30-40}C_{x_{3-5}b_t}$
155-200	$PO_{5-10}C_{x_{3-5}z_{t-2}}$; medium- to fine-grained; two-inch PC at 161 1/2; a 6-inch PC at 173; syenite at 171.
200-212	$PO_{3-5}C_{x_{3-7}z_{t-1}}$; medium-grained.

Interval	Description
212-217	$PO_{15-20}C_{x_{3-5}}z_{t-2}b_t$
217-221	$PO_{7-12}C_{x_{3-5}}z_{t-1}b_t$
221-223	$PO_{10-15}C_{x_{3-5}}z_{t-1}$; fine-grained.
223-249	$PO_{7-12}C_{x_{3-5}}z_{6-2}b_t$; medium-grained.
249-252	Syenite
252-265	$PO_{1-3}C_{x_{2-5}}z_t$; syenite at 255, 258, and 261.
265-331	$PO_{3-7}C_{x_{2-3}}z_{t-1}$; fine-grained.
331-343	$PO_{7-12}C_{x_{2-3}}z_{t-1}$; medium-grained.
343-348	$PO_{1-2}C_{x_{3-5}}z_{t-2}$; medium-grained.
348-390	$PO_{7-12}C_{x_{3-5}}z_{t-2}b_t$
390-405	PC
405-419	$PO_{3-7}C_{x_{3-5}}z_{t-1}$; medium- to coarse-grained. This troctolitic sequence grades up into the overlying plagioclase-rich zone; gradational lower contact.
419-447	$PO_{30-40}C_{x_{3-10}}z_{t-3}$; olivine-rich troctolite; gradational upper and lower contacts.
447-451	$PO_{3-5}C_{x_{3-5}}z_{t-2}$; medium- to coarse-grained.
451-453	PC pegmatoid; moderately sharp lower contact.
453-500	$PO_{7-12}C_{x_{3-5}}z_{t-1}b_t$; medium-grained troctolite.
500-501	$PO_{30-40}C$
501-507	$PO_{7-12}C$
507-609	$PO_{7-12}C_{x_{3-5}}z_{t-1}$; medium-grained troctolite; 45° dipping shears at 569; gradational lower contact.
609-611	PC; pegmatoidal toward base; sharp lower contact.
611-612	$PO_{7-12}C$

Interval	Description
612-613	PC pegmatoid
613-626	$PO_{5-7}C_{x_{t-1}z_t}$
626-635	PC pegmatoid
635-644	$PO_{1-3}C_{x_{3-5}z_{t-1}}$; pegmatoidal to medium-coarse-grained; the rock from 644 to 610 is split and contains abundant disseminated sulfides.
644-653	$PO_{7-12}C_{x_t}$; fine-grained.
653-655	$PO_{5-7}C_{x_{2-3}z_t}$
655-667	PC pegmatoid
667-673	$PO_{7-12}C_{x_{2-3}z_t b_t}$
673-673 1/2	PC pegmatoid
673 1/2-674	$PO_{1-3}C_{x_{2-3}z_{t-2}b_t}$
674-675 1/2	PC pegmatoid
675 1/2-757	$PO_{7-12}C_{x_t z_t}$; fine-grained; one-inch thick OC at 733 and OC at 720.
757-759	$PO_{30-50}C_{x_{1-3}z_{t-1}}$
759-759 1/2	POC
759 1/2-763 1/2	$PO_{30-50}C$
763 1/2-764	PC pegmatoid
764-766	$PO_{30-50}C$
766-768	$PO_{7-12}C_{x_{t-2}z_{t-1}b_t}$
768-772	$PO_{30-50}C$
772-774	$PO_{7-12}C$
774-790	$PO_{30-50}C$
790-791	$PO_{1-2}C$

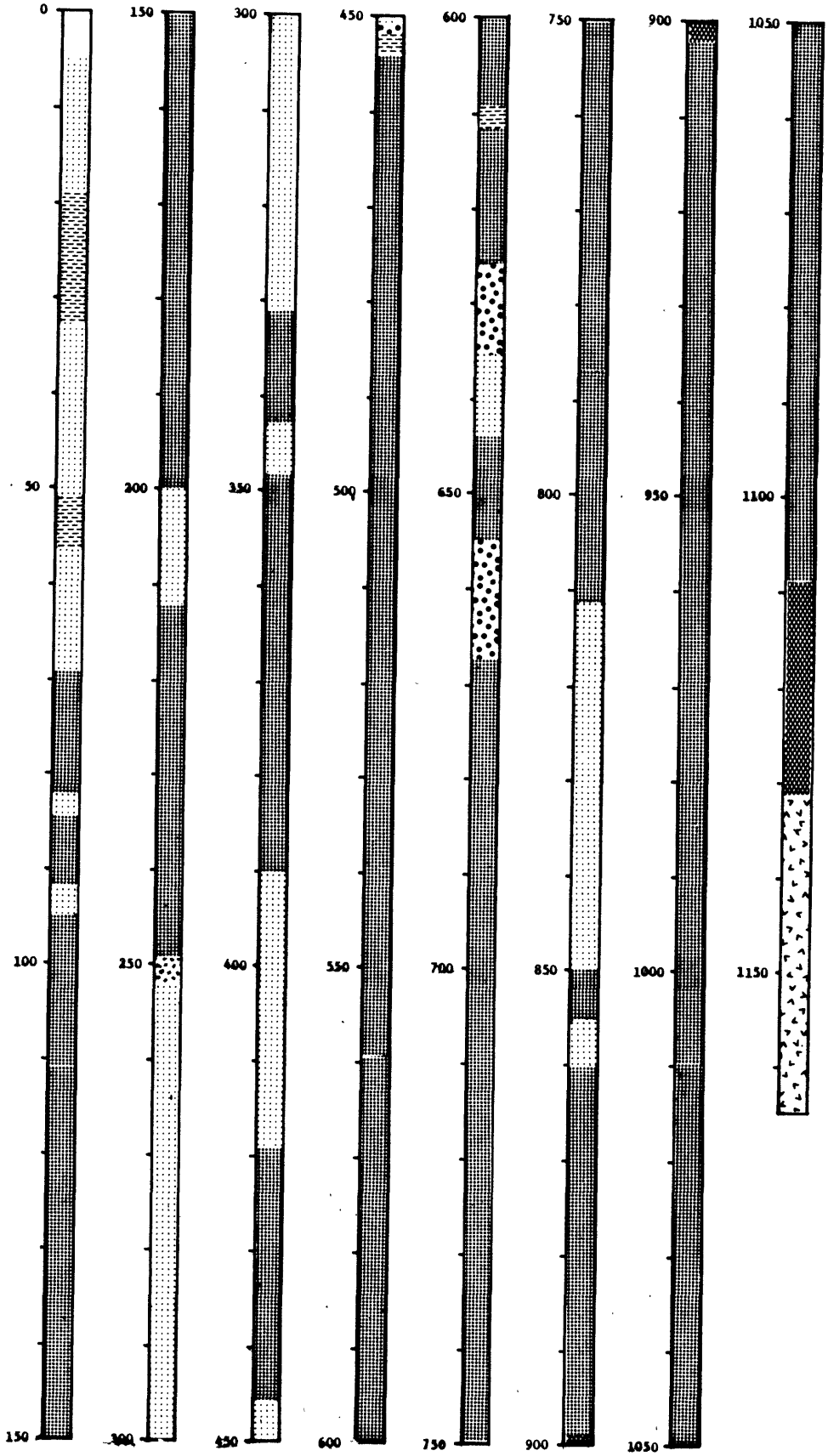
Interval	Description
791-796	$PO_{30-50}C$
796-798	$PO_{7-12}C_{x_{2-3}}$
798-800	$PO_{30-50}C$
800-811	$PO_{7-12}C_{x_t}z_t$
811-827	Fine-grained troctolitic rocks; most are $PO_{3-7}C_{x_t}z_t$; some are interlayers of $PO_{1-2}C$; moderately sharp lower contact.
827-829	$PO_{3-5}C_{x_{3-5}}z_t$; medium- to coarse-grained; disseminated sulfides; gradational lower contact.
829-850	Heterogeneous fine-grained troctolitic rocks; most are $PO_{3-7}C_{x_t}z_t$; abundant disseminated sulfides.
850-854	$PO_{30-40}C_{x_t}z_t$
854-855	$PO_{1-2}C$
855-855 1/2	OC
855 1/2-860	$PO_{3-5}C$
860-878	$PO_{25-30}C_{x_t}z_t$
878-889	$PO_{7-20}C_{x_{t-3}}$; abundant coarse sulfides.
889-899	$PO_{30-50}C$
899-902	Fine-grained hornfels.
902-905	$PO_{30-50}C$
905-905 1/2	OC; sharp upper and lower contacts.
905 1/2-909	$PO_{30-50}C$
909-930	$PO_{15-20}C_{x_{t-1}}z_t$; one inch thick OC at 928 1/2.
930-938	$PO_{50-70}C_{x_{3-15}}z_t$

Interval	Description
938-1109	Mostly medium- to fine-grained troctolitic rocks containing 3 to 15% olivine and trace to 5% pyroxene; core is split below 1004 and contains abundant sulfides; rock has distinctly more pyroxene than most of the material above it.
1109-1131	Fine-grained hornfels.
1131-1165	Granitic rocks of the Giants Range Batholith. End of hole at 1165.

Summary of DU-11

Between 4 and 95, the rocks are plagioclase-rich with some zones that contain disseminated olivine. Pyroxene abundance increases markedly at 57. Below 95 the rocks are dominantly troctolites with interlayered plagioclase-rich zones. The rocks contain abundant pyroxenes and plagioclase-rich parts are also very pyroxene-rich. Troctolites extend down to about 339 and become coarser in grain size downward. These troctolites extend to 390 where the rock becomes plagioclase-rich. This plagioclase-rich rock grades down into an olivine-rich rock at 419. This olivine-rich rock in turn grades into plagioclase-rich rock at 447, which grades into a pegmatoid at 451. The sequence from 451 to 419 is a well-developed succession of pegmatoid overlain by PC, which is then overlain by POC. Below this pegmatoidal zone is mottled, medium-grained $PO_{7-12}C$ extending to a picritic layer at 500. Below this zone, troctolite continues as a monotonous sequence until 609, where it grades into a PC that in turn grades down to a coarse-grained zone at 635. Below this point, the core is split and contains abundant sulfides. Below 635 the rock is dominantly medium- to coarse-grained, almost pegmatoidal. At 644, the sulfides disappear and the rock becomes a fine-grained troctolitic rock which grades downward at 655 into a coarse-grained pegmatoidal zone extending extend to 665. Below 665 is a sequence of mixed medium- to fine-grained olivine-poor troctolites and which have some thin pegmatoidal layers. This mixed zone extends to 675, below which is a homogeneous fine-grained troctolitic rock that extends to 757. At this point the rock contains a number of very olivine-rich zones. Below 800 the rock is a fine- to medium-grained $PO_{7-12}C$ that has been split for sulfides. Although sulfides are present at 700, they do not become common until the picritic zone near 760. Below that point, they occur as disseminationed grains throughout most of the rocks. These fine-grained basal zone rocks continue to about 862 where they become more olivine-rich. A zone of intermixed olivine-rich and more typical troctolitic rocks extends to about 938. Below 938 the rocks become generally finer grained and more uniform. This zone extends to a 10-15 foot thick hornfels zone which is in contact with granitic country rock.

DRILL HOLE DU-11



EXPLANATION OF PATTERNS

- Plagioclase-rich pegmatoid
- Plagioclase cumulate
- Olivine-poor troctolite
- Troctolite to olivine-rich troctolite
- Olivine cumulate or olivine-rich cumulate
- Magnetite-rich cumulate
- Hornfels
- Monzonite
- Granitic Country Rock
- Fault or shear

DUVALL DRILL HOLE DU-12

Interval (ft.)	Description
0-5	Overburden.
5-137	$PO_{7-15}C_{x_{t-1}}z_t b_4$; 3 mm olivines; grain-size coarsens between 101-111; syenite dikes at 30 and 57. Sheared zone from 135-137.
137-139	OC; with intercumulus clinopyroxene.
139-152	$PO_{7-12}C_{x_{2-3}}z_{2-3}b_{1-2}$; pyroxene increases; oxide-rich layer at 144.
152-156	$PC_{x_{5-7}}z_{1-2}b_2$; upper and lower contacts are gradational.
156-157	$PO_{7-12}C$
157-162	PC; sharp lower contact.
162-197	$PO_{7-12}C_{x_{2-3}}z_{2-3}b_{1-2}$
197-204	PC
204-414	$PO_{7-15}C_{x_{3-5}}z_{1-2}b_{t-1}$; olivine increases downward to 156. 6" PC layer at 411 1/2.
414-421	PC; gradational upper and lower contacts.
421-438	$PO_{1-2}C$; has thin interlayers of PC, fine-grained.
438-446	$PO_{1-2}z_{1-10}C$; distinct cumulate grains of magnetite.
446-483	PC; 6" POC with 1" thick oxide-rich zone at 477 1/2; sharp lower contact.
483-496 1/2	$PO_{20-25}C$; gradational lower contact.
496 1/2-540	$PO_{7-10}C_{x_{2-3}}z_2b_{t-1}$; gradational lower contact.

Interval	Description
540-549	$PO_{3-5}C_{x_{3-5}}b_{t-1}$; olivine increases slightly downwards.
549-556	PC
556-564	$PO_{7-12}C_{z_1}$
564-566	PC
566-586	$PO_{12-15}C_{x_{5-7}}$; gradational lower contact.
586-611	PC, with minor POC layers.
611-780	$PO_{7-15}C_{x_{3-7}z_{1-3}}b_{t-1}$; 6" PC layer at 767; gradational lower contact.
780-796	PC, 6" POC at 791.
796-831	Alternating layers of PC and $PO_{1-5}C$ with gradational contacts. PC occurs at 801-803, 806-809, 815-817, 818-821, and 829-831.
831-949 1/2	$PO_{7-12}C_{z_2}x_{5-7}b_t$; medium- to coarse-grained; olivines measure 7-10 mm. PC with sharp upper and lower contacts at 864-865 1/2 and 904-904 1/3. Grain-size coarsens downward. Shear zones at 862, 864, 868, 870, and 871.
949 1/2-950	PC pegmatoid; coarse-grained; large intercumulus pyroxene and olivine.
950-958	$PO_{5-7}C_{x_{7-15}z_3}b_{t-1}$
958-962	PC pegmatoid; locally becoming rich in massive pyroxene and oxides. Sheared and locally serpentinized and cut by late syenite intrusions; sharp lower contact.

Interval	Description
962-967	$PO_{5-7}C$
967-970	PC pegmatoid.
970-1058 1/2	$PO_{5-7}C_{x_{7-10}z_{2-4}b_t}$; medium-grained. Small 1" thick PC at 1036.
1058 1/2-1068	PC pegmatoid; some sulfides.
1068-1156 1/2	$PO_{5-10}C_{x_{5-9}z_{2-3}b_{t-1}}$
1156 1/2-1160	Serpentinized fault zone and gouge.
1160-1160 1/3	OC
1160 1/3-1214	$PO_{5-10}C_{x_{5-9}z_{2-3}b_{t-1}}$; shear zone at 1172. 6" PC at 1179 and 1191.
1214-1214 1/3	OC
1214 1/3-1217	$PO_{5-7}C_{x_{7-5}z_3b_{t-1}}$
1217-1218	PC pegmatoid zone; sharp basal and gradational upper contacts.
1218-1230 1/2	$PO_{5-7}C$
1230 1/2-1230 2/3	PC pegmatoid; sharp lower and diffuse upper contacts.
1230 2/3-1300	$PO_{5-7}C$; shear zones occur at 1240, 1247, 1249, and 1251. 12" PC at 1262, and thinner PC at 1278, 1284, 1291, 1293, and 1298.
1300-1320	PC; coarse-grained to pegmatoidal with pyroxene, olivine, and minor biotite as interstitial phases. Some minor POC at 1303.
1320-1335	$PO_{5-7}C_{x_{7-12}z_{2-4}}$ with a 12" PC at 1331.

Interval	Description
1335-1335 1/2	PC pegmatoid
1335 1/2-1337 1/2	$PO_{5-7}C$
1337 1/2-1338	PC pegmatoid with magnetite, biotite and pyroxene.
1338-1405 1/2	$PO_{7-12}C_{x_{5-7}}z_{2-3}b_{t-1}$; 6" at 1345; shears or faults at 1367-1368 and 1380-1386.
1405 1/2-1408	PC pegmatoid with interstitial olivine, pyroxene, and biotite.
1408-1427	$PO_{7-12}C$, medium- to coarse-grained. 6" PC at 1425.
1427-1457	PO_1C; shear at 1438.
1457-1462 1/2	PC pegmatoid; sharp lower contact.
1462 1/2-1494	$PO_{5-10}C$; thin interlayers of PC at 1473 and 1478.
1494-1513	PC
1513-1573	$PO_{7-9}C_{x_{3-5}}z_{1-2}b_{t-1}$; serpentinized zone at 1533, fault with serpentinization at 1548; thin coarse-grained zone at 1563.
1573-1574	PC
1574-1600	$PO_{3-7}C_{x_{12-15}}z_{2-5}b_{t-1}$; thin PC layers at 1586, 1587, and 1590 1/2-1595; gradational lower contact.
1600-1606	PC
1606-1612 1/2	PC pegmatoid; sharp lower and diffuse upper contacts.
1612 1/2-1627	$PO_{7-9}C_{x_{3-5}}z_{1-2}b_{t-1}$; shear zone at 1616 and an almost pegmatoidal POC from 1616-1627.
1627-1641	Very fine-grained POC with diffuse upper and lower contacts.

Interval	Description
1641-1642	PC; sharp lower contact.
1642-1650	POC; thin PC from 1646 1/2-1647.
1650-1654	OC; extremely sheared and serpentinized.
1654-1685	$PO_{7-12}C_{x_{10}}z_3b_{t-1}$; rock is coarse-grained from 1673 to 1682. Between 1682 and 1685 there are many horizontal fractures.
1685-1696	POC; very fine-grained.
1696-1698	$PO_{1-2}C$; gradational upper and lower contacts.
1698-1698 1/2	PC pegmatoid; thin with sharp lower contact.
1698 1/2-1702 1/2	OC
1702 1/2-1707	POC; gradational lower contact.
1707-1723	PC; gradational lower contact.
1723-1724	PC pegmatite
1724-1727 1/2	PC; gradational upper and sharp lower contacts.
1727 1/2-1734	POC; gradational lower contact.
1734-1736	PC; sharp lower contact.
1736-1737	OPC
1737-1739	$PO_{15-30}C$; gradational upper and lower contacts.
1739-1752	$PO_{7-12}C_{x_5}z_3$
1752-1772	$PO_{2-5}C$; fine-grained.
1772-1778	Alternating PC and $PO_{1-5}C$; thin layers with gradational contacts.

Interval	Description
1778-1788	$PO_{5-10}C$; gradational lower contact.
1788-1797	PC
1797-1800	POC; gradational upper and lower contacts.
1800-1802 1/2	PC pegmatoid; sharp lower contact.
1802 1/2-1809	POC pegmatoid
1809-1812	OC; extensively serpentinized.
1812-1828	OPC; extensively serpentinized and sheared; PC at 1824-1826.
1828-1843	PC
1843-1844	Mislatch.
1844-1847	OPC
1847-1856	$PO_{12}C$; partially serpentinized.
1856-1857	OPC
1857-1858	OC
1858-1859	POC; gradational lower contact.
1859-1859 1/2	OPC
1859 1/2-1890	$PO_{12}C$; gradational upper and lower contacts. 6" thick PC layer at 1865.
1890-1891 1/2	PC; gradational lower contact.
1891 1/2-1892	PC pegmatoid; sharp lower contact.
1892-1897	$PO_{7-12}C$; gradational lower contacts.
1897-1901	PC; sharp lower contact.
1901-1920	$PO_{7-12}C$; gradational lower contact.

Interval	Description
1920-1922	$PO_{2-4}C$; gradational lower contact.
1922-1925	PC; sharp lower contact.
1925-1942	POC
1942-1942 1/2	OPC
1942 1/2-1964	POC; 1-3 mm olivines.
1964-1979 1/2	PC; sharp lower contact.
1979 1/2-2007	POC; gradational lower contact.
2007-2022	POC; interlayers of PC at 2007-2008 and 2010-2011.
2022-2034 1/2	POC; pegmatoid; gradational upper and lower contacts.
2034 1/2-2037	PC
2037-2044 1/2	PC and POC; gradationally interlayerd, 6-8 inches thick.
2044 1/2-2049 1/2	POC; gradational lower contact.
2049 1/2-2051	PC pegmatite; sharp lower contact.
2051	2" thick OC layer.
2051-2052 1/2	POC; gradational lower contact.
2052 1/2-2054 1/2	PC pegmatoid; sharp lower contact.
2054 1/2-2055 1/2	POC; gradational lower contact.
2055 1/2-2056 1/2	OPC; gradational lower contact.
2056 1/2-2057	OC; gradational lower contact.
2057-2060	OPC; gradational lower contact.
2060-2062	POC; fine-grained with gradational lower contact.
2062-2064	PC pegmatoid
2064-2068	PC; fine-grained with sheared zone at 2064-2067; gradational lower contact.

Interval	Description
2068-2091 1/2	PO_1C; medium-grained.
2091 1/2-2104	POC; gradational lower contact.
2104-2104 1/2	PC pegmatoid; sharp lower contact.
2104 1/2-2121	POC; gradational lower contact.
2121-2124	Interlayered medium-grained $PO_{7-12}C$ and fine-grained $PO_{1-5}C$; contacts are gradational.
2124-2125 1/2	PC; gradational upper and lower contacts.
2125 1/2-2149	POC
2149-2152	PC pegmatoid; 6" POC layer at 2151.
2152-2157	POC pegmatoid; grading downward into a medium-grained POC that has a gradational lower contact.
2157-2160	PC pegmatoid
2160-2162	POC; medium-grained.
2162-2163	PC pegmatoid
2163-2178	$PO_{5-7}C$; coarse-grained; grading down to finer-grained sequence with gradational lower contact.
2178-2179	PC; fine-grained; gradational lower contact.
2179-2188	PC; medium-grained.
2188-2189	PC pegmatoid
2189-2322	$PO_{10-12}C_{x_{7-10}}z_{2-3}b_{t-1}$; medium-grained; shear zones at 2211, 2232 and 2235; sharp lower contact.
2322-2385	$PO_{2-5}C_{x_5}$; fault zone with syenitic material from 2324 and 2329. 12" PC layer at 2351; syenitic material at 2362, 2364, 2374, and 2383.

Interval	Description
2385-2400	$PO_{5-10}C$; medium-grained with gradational lower contact.
2400-2406	POC; fine-grained with a 2" PC layer at 2403 and a 4" coarse-grained POC layer at 2406; sharp lower contact.
2406-2407	OC
2407-2408	Syenite
2408-2410	OPC; sharp lower contact.
2410-2487	$PO_{5-7}C$; medium-grained; thin layers of PC at 2440-2441, 2442-2444, 2463, and 2464.
2487-2488	PC
2488-2489	OC; sharp contacts.
2489-2489^1/2	PC
2489^1/2-2494	$PO_{5-10}C$
2494-2497	$PO_{3-5}C$
2497-2498^1/2	Syenite
2498^1/2-2524	$PO_{5-10}C$; syenite at 2502, and at 2515-2517; PC at 2517^1/2-2518^1/2 and 2523^1/2-2524.
2524-2526	$PO_{3-5}C$; coarse-grained; gradational upper and lower contacts.
2526-2526^1/2	PC pegmatoid; gradational upper and lower contacts.
2526^1/2-2565	$PO_{3-5}C$; coarse-grained; syenite at 2563-2565.
2565-2567	OC
2567-2568	OPC
2568-2587	$PO_{5-10}C$; gradational lower contact.
2587-2593	$PO_{2-5}C$; gradational lower contact.

Interval	Description
2593-2601 1/2	PC pegmatoid
2601 1/2-2610	POC; gradational upper and lower contacts.
2610-2676	PC pegmatoid; syenite at 2648-2650 and 2656-2657 1/2; sharp lower contact.
2676-2682	$PO_{5-0}C_{x}{}_{5-10}{}^{z}{}_{1-3}{}^{b}{}_{t-1}$; gradational lower contact.
2682-2686	PC pegmatoid; sharp lower contact.
2686-2690 1/3	OC
2690 1/3-2691	OPC
2691-2691 1/2	PC; rocks below 2691 contain fairly abundant disseminated sulfide mineralization; little or no sulfide occurs above 2691.
2691 1/2-2694	PC
2694-2700	POC; coarsening downward; PC at 2698-2698 1/2.
2700-2700 1/2	PC pegmatoid
2700 1/2-2701 1/2	PC pegmatoid
2701 1/2-2702	PC pegmatoid
2702-2703	POC
2703-2703 1/2	PC pegmatoid
2703 1/2-2704 1/2	POC; fine-grained.
2704 1/2-2717	POC; grain-size decreases downward.
2717-2732 1/2	$PO_{3-5}C$; grain-size decreases downward; becomes fine-grained.
2732 1/2-2733	PC pegmatoid; contains some sulfides; sharp lower contact.

Interval	Description
2733-2737	$PO_{5-10}C$; becomes finer-grained downward; gradational lower contact.
2737-2739	$PO_{1-5}C$; coarser-grained; almost a PC pegmatoid.
2739	1" thick MOC (magnetite-olivine cumulate).
2739-2745	MC (magnetite cumulate).
2745-$2752^{1}/2$	$PO_{5-10}C$; gradational lower contact.
$2752^{1}/2$-2753	PC pegmatoid
2753-$2759^{1}/2$	POC; gradational upper and lower contacts.
$2759^{1}/2$-2762	PC pegmatoid
2762-2766	POC; gradational upper and lower contacts.
2766-2767	PC pegmatoid; sharp lower contacts.
2767-$2775^{1}/2$	POC
$2775^{1}/2$-2776	PC pegmatoid
2776-$2780^{1}/2$	POC with 3" thick pegmatite; PC pegmatoid at base.
$2780^{3}/4$	3" thick OC.
2781-$2784^{1}/2$	PC
$2784^{1}/2$-$2791^{1}/2$	POC
$2791^{1}/2$-$2791^{2}/3$	PC; gradational lower contact.
$2791^{2}/3$-$2792^{1}/2$	OC; sharp lower contact.
$2792^{1}/2$-2794	POC; gradational lower contact.
2794-2795	PC pegmatoid with a 3" POC layer at $2794^{1}/2$; sharp lower contact.
2795-$2799^{1}/2$	POC
$2799^{1}/2$	OC; 1" thick.

Interval	Description
2799 1/2-2802	POC; becomes finer-grained downward; gradational lower contact.
2802-2803	OC; gradational lower contact.
2803-2804	PC; gradational lower contact.
2804-2807 1/2	POC; gradational lower contact.
2807 1/2-2808	PC pegmatoid
2808-2810 1/2	POC
2810 1/2-2811	PC; gradational lower contact.
2811-2812	PC pegmatoid
2812-2824	POC; fine-grained; sharp lower contact.
2824-2825 1/2	POC; coarse-grained; gradational lower contact.
2825 1/2-2826	PC pegmatoid; sharp lower contact.
2826-2831	POC; gradational lower contact.
2831-2831 1/2	PC pegmatoid
2831 1/2-2845 1/2	POC; medium-grained with interlayers of PC at 2840-2841 1/2, 2842-2843, and 2844 1/2-2845.
2845 1/2-2847	PC pegmatoid
2847-2853	POC; gradational lower contact.
2853-2874	PC; coarse-grained.
2874-2876	POC; becomes coarser-grained downward; gradational lower contact.
2876-2884 1/2	$PO_{1-5}C$; coarse-grained; sharp lower contact.
2884 1/2-2889	$PO_{5-10}C$; fine-grained; contains some 12" thick $PO_{1-5}C$ layers.

Interval	Description
2889-2907 1/2	$PO_{5-10}C$; medium-grained; syenite at 2903 1/2; gradational lower contact.
2907 1/2-2908	PC pegmatoid; sharp lower contact.
2908-2910	POC; fine-grained; sharp lower contact.
2910-2910 1/2	PC pegmatoid; gradational lower contact.
2910 1/2-2918	POC
2918	OC; 3" thick and serpentinized.
2918-2918 1/2	POC
2918 1/2-2918 3/4	PC pegmatoid
2918 3/4-2919	OC
2919-2921	Shear zone.
2921-2924	POC; fine-grained; gradational lower contact.
2924-2924 1/2	PC pegmatoid; sharp lower contact.
2924 1/2-2931	POC medium-grained; sharp lower contact.
2931-2937	Fine-grained hornfels.
2937-2937 1/2	PC; sharp basal contact.
2937 1/2-2939 1/2	POC; medium- to coarse-grained; gradational lower contact.
2939 1/2-2940	PC pegmatoid; sharp lower contact.
2940	OC; 3" thick.
2940-2942	POC; fine-grained; sharp lower contact.
2942-2943	OC; gradational lower contact.
2943-2943 1/2	OPC; sharp lower contact.
2943 1/2-2947	PC pegmatoid
2947-2960	$PO_{1-5}C$; coarse-grained.

Interval	Description
2960-2960 1/2	PC pegmatoid
2960 1/2-2964	POC; coarse-grained.
2964-2966	POC; fine-grained; gradational lower contact.
2966-2968	POC; medium-grained; sharp lower contact.
2968-2977	Fine-grained hornfels; sharp lower contact.
2977-2977 1/2	OC
2977 1/2-2984	Fine-grained hornfels.
2984-2984 1/2	POC; medium-grained; gradational lower contact.
2984 1/2-2984 3/4	OC; gradational lower contact.
2984 3/4-2992	POC; medium-grained; grain size coarsens downward.
2992-2993	Massive sulfides.
2993-2996	Fine-grained hornfels; disseminated sulfides.
2996-3354	Felsic country rock; disseminated sulfides are present; minor amounts of mafic intrusion cut the felsic country rock, but dominant lithology from here to bottom of hole at 3354 is pink to light grey granitic rock that is part of the Giants Range batholith.

Summary of DU-12

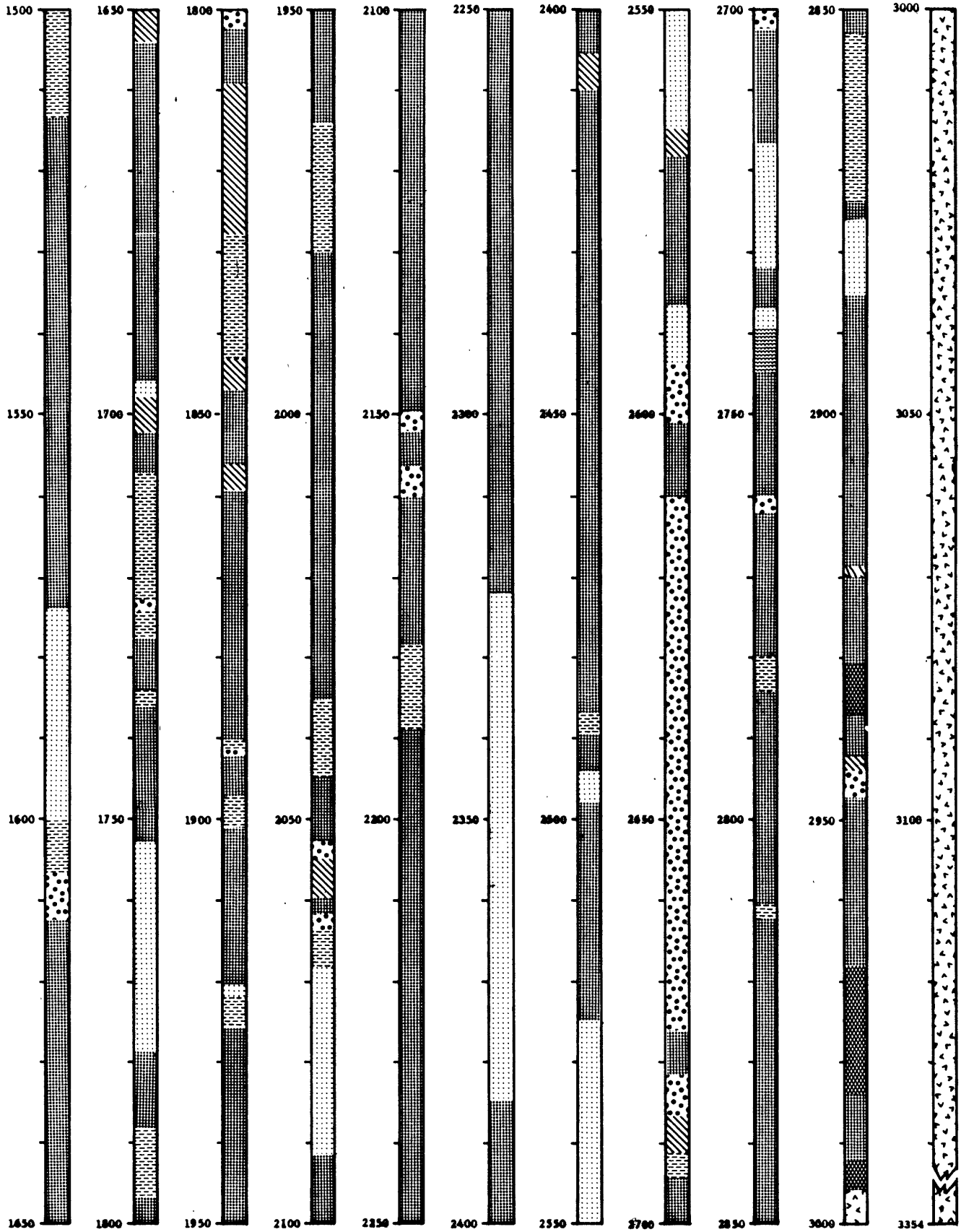
The first 410 feet of DU-12 are mostly homogeneous POC with variable pyroxene content. This grades sharply into a PC which is fine-grained and locally contains distinctive, small (1 mm) oxide spots. At 439, this rock becomes a distinctive plagioclase-oxide cumulate. Below 480 is good POC, locally with some cumulate pyroxene. Three plagioclase-rich zones occur at 550, 563, and 590. Between 767 and 832 is a plagioclase-rich zone which contains PC layers rich in cumulate olivine. The POC below this layer extends to 959 where a pegmatoidal zone occurs. This pegmatoid grades into mediumgrained POC that extends to 1058 1/2 where a second pegmatoid occurs. This pegmatoid is also underlain by homogeneous POC that extends to 1427 and which has some thin OC layers at 1160 and 1221 and pegmatoidal layers at 1218, 1230, and 1408. Between 1427 and 1513 the rock becomes mostly PC with thin interlayers of POC, or PC with sparse cumulus olivine. This olivine-poor rock is underlain by typical POC which grades down into plagioclase cumulate and a pegmatoid at 1610. POC below 1612 grades into an OC bed at 1650. Between 1650 and 2192 are several repetitions of sequences that contain a base of PC or pegmatoidal PC, in gradational contact with finer grained PC or POC, and a top of olivine-rich POC or OC. However, the sequence of olivine-rich rocks from 1809 to 1860 has several sequences which grade upward from an OC base to an OPC and then to a POC or a PC.

A particularly good succession with basal pegmatoidal zones begins at 1979. At 2192, this cyclic pattern gives way to a monotonous sequence of POC which extends to 2592. Between 2592 and 2685 is a thick pegmatoidal zone which represents a major rock unit. Below this zone is an olivine cumulate. Above this OC, there are few sulfides in the rock. Below it, however, there are many sulfides. Further, between 2685 the rocks are complexly interlayered POC, fine-grained POCs or olivine-poor POC and some very thin PC or pegmatoidal PC lenses which are usually only 1-3 inches thick. There is no pattern to the layering. The finer grained rocks may represent chill facies. At 2745, there is a magnetite cumulate which has a thin zone of magnetite-olivine cumulate on top. Between 2853 and 2893 is a distinctive coarse-grained PC or olivine-poor POC which is underlain by a sequence of alternating medium-grained POC and fine-grained "chill-type" rock. Fine-grained rock with disseminated or massive sulfides extends from 2992 to the base of the complex at 3001.

EXPLANATION OF PATTERNS

- Plagioclase-rich pegmatoid
- Plagioclase cumulate
- Olivine-poor troctolite
- Troctolite to olivine-rich troctolite
- Olivine cumulate or olivine-rich cumulate
- Magnetite-rich cumulate
- Hornfels
- Monzonite
- Granitic Country Rock
- Fault or shear

DRILL HOLE DU-12



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- Grenitic Country Rock
- Fault or shear

DUVALL DRILL HOLE DU - 13

Interval (ft.)	Description
0-377	$PO_{7-12}C_{x_{1-5}}z_{t-2}$; medium-grained; homogeneous troctolite; two inch PC layer with sharp upper and lower contacts at 248.
377-381	$PO_{1-2}C_{x_{2-3}}z_{1-2}$; medium-grained; gradational upper and lower contacts.
381-405	$PO_{7-12}C_{x_{3-5}}z_{1-2}$; medium-grained troctolite.
405-407	$PO_{20-30}C$; gradational upper and sharp lower contacts.
407-481	$PO_{7-12}C_{x_{3-5}}z_{t-1}$; medium-grained; typical troctolite with a two inch $PO_{20-35}C$ at 416; gradational upper and lower contacts. $PO_{20-30}C$ between 425 and 425 1/2 has a gradational lower contact.
481-483	$PC_{x_{2-5}}z_{t-1}$; gradational upper and lower contacts.
483-510	$PO_{15-25}C_{x_{2-5}}z_{t-1}$; medium-grained olivine-rich troctolite; sharp lower contact.
510-540	PC pegmatoid; coarse pyroxene up to 6 inches long; large oxide masses.
540-544	$PO_{7-12}C_{x_{3-5}}z_{t-1}$; medium-grained; gradational upper contact into the coarse-grained pegmatoidal zone; sharp lower contact.
544-557	PC pegmatoid
557-581	$PO_{7-12}C_{x_{3-5}}z_{1-2}$; medium-grained troctolite; sharp upper and gradationally sharp lower contacts.
581-596	PC pegmatoid

Interval	Description
596-598	$PO_{7-12}C_{x_{3-5}}z_{t-1}$; medium-grained troctolite; sharply gradational lower contact.
598-599	PC pegmatoid; gradational lower contact.
599-600	$PO_{7-12}C$; typical medium-grained troctolite.
600-603	Coarse-grained pegmatoidal zone; gradational upper and sharp lower contacts.
603-608	$PO_{7-12}C_{x_{3-5}}z_{1-2}$; medium- to coarse-grained troctolite; gradational lower contact.
608-610	PC pegmatoid; gradational upper, moderately sharp lower contacts.
610-648	$PO_{7-12}C_{x_{3-5}}z_{1-2}$; typical medium-grained troctolite; gradational lower contact.
648-651	$PO_{1-5}C_{x_{t-2}}z_{t}$; gradational upper and sharp lower contacts.
651-652	$PO_{7-12}C$; medium-grained, typical troctolite; gradational lower contact.
652-655	PC pegmatoid; sharp lower contact.
655-657	$PO_{7-12}C$; typical troctolite.
657-663	$PO_{1-3}C_{x_{1-3}}z_{t-1}b_{t}$; plagioclase-rich rock; gradational upper and moderately sharp lower contacts. Bottom 2 inches of this section is pegmatoidal.
663-664	$PO_{7-12}C$; medium-grained troctolite.
664-665	PC pegmatoid
665-687	$PO_{1-5}C_{x_{t-2}}z_{t-1}b_{t}$; some thin zones of $PO_{7-12}C$. A mixed plagioclase-rich rock; medium-grained; gradationally sharp lower contact.

Interval	Description
687-696	$PO_{7-12}C_{x_{3-5}}z_t b_t$; gradational lower contact.
696-714	$PO_{1-3}C_{x_{t-2}}z_t b_t$; gradational upper and lower contacts. Plagioclase-rich zone.
714-749	$PO_{7-12}C$; typical medium-grained troctolite.
749-750	Pegmatoidal zone.
750-753	$PO_{3-7}C_{x_{t-2}}z_{t-1}b_t$; medium- to coarse-grained; gradational upper and lower contacts.
753-754	PC pegmatoid
754-761 1/2	$PO_{7-12}C_{x_{3-5}}z_{t-1}$; medium-grained troctolite.
761 1/2-762	PC; gradational upper and lower contacts.
762-763	$PO_{3-7}C$; gradational upper and lower contacts.
763-764	PC; gradational upper and lower contacts.
764-765	$PO_{3-5}C$; gradational upper and lower contacts.
765-766	PC; gradational lower contact.
766-771	$PO_{1-2}C$ to PC; mixed plagioclase- and olivine-bearing zones; gradational lower contact.
771-785	PC and $PO_{1-3}C$; interlayered and intermixed.
785-799	Dominantly $PO_{5-9}C_{x_{2-3}}z_t$; mixed with some olivine-poor troctolite; gradational lower contact.
799-801	PC pegmatoid
801-806	$PO_{3-7}C_{x_{t-3}}z_{t-1}b_t$; gradational lower contact; moderately sharp upper contact.
806-807	PC; pegmatoidal toward base.
807-814	$PO_{3-7}C$

Interval	Description
814-815	$PO_{10-15}C_{x_{3-5}}z_{1-2}$; sharp upper contact; gradationally sharp lower contact.
815-852	$PO_{1-3}C_{x_{2-4}}z_{t-1}$; medium-grained olivine-poor troctolite; zone has some nearly pure PC mixed with olivine-poor troctolites; gradational lower contact.
852-855	$PO_{5-10}C_{x_{3-5}}z_{1-3}$; medium-grained; gradational lower contact.
855-863	$PO_{1-3}C$
863-864	$PO_{10-15}C_{x_{3-5}}z_{t-1}$; medium- to fine-grained.
864-867	PC pegmatoid; medium- to coarse-grained; coarsens toward bottom; moderately sharp lower contact.
867-868	$PO_{3-5}C_{x_{3-5}}z_{t-3}$; medium- to coarse-grained.
868-873	$PO_{2-3}C_{x_{3-5}}z_{1-3}$; medium- to coarse-grained; zone is mixed with thin PC layers; a heterogenous pegmatoidal olivine-poor troctolite; gradationally sharp lower contact, gradational upper contact.
873-876	$PO_{7-12}C_{x_{2-5}}z_{t-1}$; medium- to fine-grained; gradational upper and lower contacts.
876-882	Mixed zone of medium- to fine-grained $PO_{7-12}C$ with thin PCs; each rock type occurs in about equal abundance; fine- and medium-grained POCs are in sharp contact with PC.
882-884	$PO_{7-12}C_{x_{2-3}}z_{t-1}$; medium- to fine-grained.
884-885	$PO_{2-3}C_{x_{t-2}}z_{t-3}$; olivine-poor troctolite.

Interval	Description
885-888	Fine-grained troctolite rock with wispy layers of PC.
888-890	$PO_{1-3}C_{x_{2-3}}z_{1-2}$; medium-grained olivine-poor troctolite.
890-906	Fine-grained homogeneous troctolitic rock; has a hornfels appearance; contains wispy PC layers; sharp lower contact, gradationally sharp upper contact.
906-913	$PO_{7-12}C_{x_{3-5}}z_{t-3}$; medium-grained troctolite; sharp upper and lower contacts.
913-921	Fine-grained troctolitic rocks; sharp upper and lower contacts.
921-923	$PO_{1-5}C_{x_{2-3}}z_{1-2}$; medium-grained olivine-poor troctolite.
923-925	$PO_{7-12}C$; typical medium-grained troctolite with thin wisps of fine-grained troctolite.
925-929	$PO_{20-30}C_{x_t}z_t b_{t-1}$; medium- to fine-grained.
929-930	Fine-grained troctolite; gradationally sharp upper, sharp lower contacts.
930-938	$PO_{7-12}C_{x_{3-5}}z_{t-1}b_{t-2}$; medium-grained troctolite.
938-939	$PO_{1-2}C$
939-944	$PO_{2-5}C_{x_{t-2}}z_t$; medium- to fine-grained olivine-poor troctolite.
944-968	$PO_{1-2}C_{x_{t-2}}z_{t-2}b_{t-1}$; fine-grained olivine-poor troctolite.
968-1044	$PO_{7-12}C_{x_{3-5}}z_{1-2}b_{t-1}$; medium- to medium coarse-grained troctolite; sharp upper contact; gradational lower contact.
1044-1045	Fine-grained troctolitic zone.

Interval	Description
1045-1115	$PO_{7-12}C$; medium- to coarse-grained; between 1089 and 1091 the rock is a $PO_{3-7}C$; medium- to coarse-grained; at 1093 rock is pegmatoidal; gradational lower contact.
1115-1141	PC; medium- to fine-grained; gradational lower contact.
1141-1260	$PO_{7-12}C_{x_{3-5}z_{t-1}b_t}$; medium-grained; distinctly finer grained than the rock occurring at 1032.
1260-1309	$PO_{7-12}C_{x_{3-5}z_{t-2}}$; medium- to medium coarse-grained; upper contact is very gradational but is marked by increase in grain size of olivine and interstitial oxides and pyroxenes.
1309-1312	$PO_{7-12}C_{x_{3-5}z_{1-2}}$; medium-grained; gradational upper contact; rock changes to a distinctly finer grained typical troctolite.
1312-1314	PC
1314-1317	$PO_{7-12}C$; fine-grained.
1317-1318	$PO_{1-2}C$
1318-1326	$PO_{7-12}C_{x_t z_t b_t}$; medium- to fine-grained.
1326-1333	$PO_{1-3}C_{x_{1-3}z_t}$; medium- to fine-grained.
1333-1356	PC
1356-1357	$PO_{1-2}C_{x_{1-2}z_t}$
1357-1359	PC
1359-1361	$PO_{2-5}C_{x_{2-5}z_t}$; medium-grained.
1361-1362	PC
1362-1372	$PO_{3-5}C_{x_{t-2}z_t}$; medium-grained.

Interval	Description
1372-1377	PC
1377-1379	$PO_{3-5}C_{x_{3-5}}z_{1-3}$; medium-grained.
1379-1384	PC
1384-1387	$PO_{3-5}C_{x_{5-15}}z_{1-5}$; medium- to coarse-grained.
1387-1447	$PO_{1-2}C_{x_{2-3}}$
1447-1478	$PC_{x_{t-2}}$; decrease in pyroxene content upwards.
1478-1488	$PO_{3-5}C_{x_{1-3}}z_{t}$; medium- to coarse-grained; olivine-poor troctolite.
1488-1490	PC pegmatoid
1490-1497	$PO_{1-2}C_{x_{1-3}}z_{t-1}$; medium-grained.
1497-1502	$PC_{x_{t-1}}$; medium- to coarse-grained.
1502-1503	$PO_{1-2}C_{x_{3-5}}$; medium- to coarse-grained.
1503-1603	$PO_{1-3}C_{x_{1-3}}z_{t-1}$; medium-grained.
1603-1761	$PO_{7-12}C_{x_{3-5}}z_{t-2}b_{t}$; typical medium-grained troctolite; gradational upper and lower contacts.
1761-1763	PC; gradational upper, moderately sharp lower contacts.
1763-1773	$PO_{7-12}C_{x_{3-5}}z_{t-2}b_{t-1}$; medium-grained troctolite; gradational lower contact.
1773-1775	PC
1775-1778	$PO_{3-5}C_{x_{2-3}}$; fine-grained; gradationally sharp upper and lower contacts.
1778-1797	$PC_{x_{2-3}}z_{t-1}$; gradational upper and lower contacts.
1797-1843	$PO_{1-3}C_{x_{1-3}}z_{1-t}$; medium-grained; gradational upper and moderately sharp lower contacts.

Interval	Description
1843-1913	$PO_{7-12}C_{x_{3-5}}z_{t-1}b_t$; medium-grained troctolite; gradationally sharp upper contact, gradational lower contact; a six-inch PC at 1889.
1913-1914	PC; sharp lower contact.
1914-1915	$PO_{7-12}C$; typical medium-grained troctolite.
1915-1919	Fine-grained hornfels; sharp upper and lower contacts.
1919-2013	PC; medium-grained.
2013-2640	$PO_{7-12}C_{x_{3-5}}z_{1-2}b_t$; medium-grained; upper contact with PC is gradational; lower contact is gradational; there are thin PC layers at 2017, 2087, 2089, 2102 and at 2105.
2640-2665	$PC_{x_{2-3}}z_{t-1}$; very gradational lower contact.
2665-2735	$PO_{t-2}C_{x_{2-5}}z_{t-2}b_t$; gradational lower contact.
2735-2998	$PO_{7-12}C_{x_{3-5}}z_{t-1}b_{t-1}$; coarse-grained troctolite at the top of this interval grades down to a medium-grained troctolite over a distance of about 100 feet; serpentinized fault with mixed syenitic intrusion between 2813 and 2815, slickensides rake 70°; a highly serpentinized and punky gouge zone between 2893 and 2896; a thin serpentinized fault at 2906, fractures dip 60°; serpentinized and sheared rock between 2928 and 2932, most fractures are vertical, slickensides rake 70°; serpentinized zones mixed with syenite occur between 2939 and 2942; serpentinized and sheared rock with

Interval	Description
2735-2998 (cont'd)	some vertical fractures occur between 2955 and 2959, slickensides rake 40°; subvertical serpentinized fractures with 80° raking slickensides occur between 2971 and 2975.
2998-2999	PC pegmatoid; gradational upper, moderately sharp lower contacts; contains large masses of pyroxene.
2999-3006	$PO_{7-12}C$; some disseminated coarse masses of pyroxene.
3006-3007	PC pegmatoid; gradational upper and lower contacts.
3007-3014	$PO_{7-12}C$
3014-3015	PC pegmatoid; gradational upper and lower contacts.
3015-3017	$PO_{7-12}C$
3017-3017 1/2	Pegmatoidal zone with large masses of pyroxene.
3017 1/2-3039	$PO_{7-12}C_{x_{3-5}}z_{t-2}$
3039-3039 1/2	Pegmatoidal zone.
3039 1/2-3047	$PO_{7-12}C_{x_{3-7}}z_{t-2}b_t$; large masses of pyroxenes and oxides.
3047-3064	Fine-grained troctolitic inclusion; rock has 15% to 20% olivine, a "salt and pepper" texture, and abrupt upper and lower contacts.
3064-3065	PC pegmatoid
3065-3069	$PO_{3-7}C_{x_{3-5}}z_{t-1}$; medium- to coarse-grained; gradationally abrupt lower contact.
3069-3071	Fine-grained troctolitic inclusion.
3071-3079	$PO_{3-5}C_{x_{3-5}}z_{t-1}b_t$; medium- to coarse-grained.

Interval	Description
3079-3080	PC pegmatoid
3080-3092	$PO_{3-5}C_{x_{2-3}}z_{t-1}$; medium- to coarse-grained.
3092-3094	PC pegmatoid
3094-3103	$PO_{3-5}C_{x_{3-5}}z_{t-1}$; coarse-grained.
3103-3105	PC pegmatoid
3105-3122	$PO_{5-7}C_{x_{3-5}}z_{t-1}$; coarse-grained.
3122-3125	PC pegmatoid
3125-3133	$PO_{3-5}C_{x_{2-3}}z_{t-1}$; coarse-grained.
3133-3133 1/4	Pegmatoidal zone.
3133 1/4-3135	$PO_{7-12}C_{x_{3-5}}z_{t-1}$; medium-grained.
3135-3137	PC pegmatoid
3137-3152	$PO_{3-7}C_{x_{3-5}}z_{t-3}b_t$; medium- to coarse-grained; gradational lower contact.
3152-3153	PC pegmatoid
3153-3154	$PO_{7-12}C_{x_{3-5}}z_{t-1}$; medium-grained; sharp upper contact with pegmatoid; gradational lower contact.
3154-3155	PC pegmatoid
3155-3272	$PO_{7-12}C_{x_{3-5}}z_{t-1}$; typical medium-grained troctolite; lower contact is gradational.
3272-3285	$PO_{7-12}C_{x_{3-7}}z_{t-2}$; medium- to coarse-grained; grain size coarsens downward.
3285-3285 1/2	PC pegmatoid
3285 1/2-3286	POC
3286-3287	PC pegmatoid
3287-3287 1/2	$PO_{7-12}C_{x_{3-7}}z_{t-2}$

Interval	Description
3287 1/2-3288	PC pegmatoid
3288-3291	$PO_{3-5}C_{x_{3-7}z_{t-2}}$; medium- to coarse-grained.
3291-3292	PC pegmatoid
3292-3297	$PO_{3-5}C_{x_{3-7}z_{t-2}}$; medium- to very coarse-grained.
3297-3300	PC pegmatoid
3300-3306	$PO_{5-10}C_{x_{3-10}z_{t-3}}$; medium- to coarse-grained.
3306-3321	PC pegmatoid
3321-3329	$PO_{3-5}C_{x_{3-7}z_{t-2}}$; medium- to very coarse-grained; numerous pegmatoidal zones.
3329-3333	PC pegmatoid
3333-3338	$PO_{3-5}C_{x_{3-5}z_{t-1}}$; medium- to coarse-grained.
3338-3341	PC pegmatoid
3341-3345	$PO_{3-10}C_{x_{3-7}z_{t-3}}$; medium- to coarse-grained.
3345-3350	PC pegmatoid
3350-3354	$PO_{7-12}C_{x_{3-15}z_{t-3}}$; medium- to very coarse-grained.
3354-3356	PC pegmatoid
3356-3364	$PO_{3-5}C_{x_{3-15}z_{t-3}}$; medium- to very coarse-grained.
3364-3365	PC pegmatoid
3365-3370	$PO_{5-10}C_{x_{3-15}z_{t-5}}$; medium- to very coarse-grained.
3370-3374	PC pegmatoid
3374-3380	$PO_{5-7}C_{x_{3-5}z_{t-1}}$; medium- to coarse-grained.
3380-3381	PC pegmatoid
3381-3393	$PO_{5-10}C_{x_{3-5}z_{t-1}}$; medium- to coarse-grained.
3393-3394	PC pegmatoid
3394-3397	$PO_{7-12}C_{x_{3-5}z_{t-3}}$; medium-grained.

Interval	Description
3397-3398	PC pegmatoid
3398-3400	$PO_{3-5}C_{x_{3-10}}z_{t-2}$; medium- to very coarse grained.
3400-3401	PC pegmatoid
3401-3402	$PO_{3-5}C_{x_{2-5}}z_{t-1}$; medium-grained.
3402-3404	PC pegmatoid
3404-3405	$PO_{3-5}C_{x_{3-5}}z_{t-1}$; medium- to coarse-grained.
3405-3406	PC pegmatoid
3406-3410	$PO_{5-10}C_{x_{2-3}}z_{t-1}$; medium-grained.
3410-3411	PC pegmatoid
3411-3412	$PO_{3-5}C_{x_{3-5}}z_{t}$; medium- to coarse-grained.
3412-3414	PC pegmatoid
3414-3416	$PO_{7-12}C_{x_{3-5}}z_{t-1}$; medium-grained.
3416-3417	PC
3417-3423	$PO_{3-5}C_{x_{3-10}}z_{t-3}$; medium- to very coarse grained.
3423-3464	PC pegmatoid
3464-3468	$PO_{3-5}C_{x_{3-5}}z_{t-2}$; medium-grained.
3468-3469	PC pegmatoid
3469-3470	$PO_{3-5}C_{x_{3-10}}z_{t-1}$; medium-grained.
3470-3471	PC pegmatoid
3471-3475	$PO_{3-5}C_{x_{3-5}}z_{t-1}$; medium- to coarse-grained.
3475-3487	PC pegmatoid
3487-3488	$PO_{3-5}C_{x_{3-5}}z_{t-1}$; medium-grained.
3488-3489	PC pegmatoid
3489-3499	Core is split and badly jumbled. Dominant rock is a fine-grained PC or olivine-poor troctolite.

Interval	Description
3499-3550	Core is split and badly jumbled. Dominant rock type is a fine-grained $PO_{30-50}C$.
3550-3620	Core is split and badly jumbled. Some massive sulfides; dominantly granitic rock.
3620-3806	Granitic rocks of the Giants Range Batholith with some fine-grained hornfels inclusions. Hole bottoms in granite at 3806.

Summary of DU-13

From 0 to 508, the rock is dominantly homogeneous, medium-grained troctolite with some interlayers of PC and with some olivine-rich zones. At 508 there is a well-developed pegmatoidal zone that is about 30 feet thick and appears to have sharp upper and gradational lower contacts. It is separated from a second 12 foot pegmatoidal zone by a 2 to 4 foot medium-grained POC layer. Below 557, there is a 20 foot section of medium-grained troctolite which then grades sharply into another pegmatoidal zone that extends from 581 to 610. There are some interlayers of good medium-grained troctolite within this pegmatoidal sequence. Between 610 and 652 is a homogeneous medium-grained troctolite which grades down into another pegmatoidal zone at 654.

Below this point, the rocks become distinctly plagioclase-rich, except for a thin zone of troctolite between 686 and 696. This plagioclase-rich zone extends to 715 where it grades back into a typical medium-grained troctolite that then grades into a pegmatoidal zone between 750 and 753. Below 753 the rock is a medium-grained troctolite that grades into a sequence of olivine-poor troctolites ending in a pegmatoidal zone at 800.

Below this zone, the rock is dominantly plagioclase-rich with very little disseminated olivine. It grades down into a coarse-grained pegmatoidal zone at 870. Below 870, it is underlain by a fine-grained rock that appears to be a hornfels zone. This rock is mixed with fine-grained PC, fine-grained POC, and medium-grained POC. Below the hornfels the rock is a medium- to fine-grained olivine-rich troctolite that grades down into a plagioclase-rich zone at 940. This plagioclase-rich zone then grades into medium- to medium-coarse-grained troctolitic rock which extends down to 1115. This troctolite becomes coarser grained downward and has some almost pegmatoidal zones near its base. The contact at 1115 is gradational. Below 1115, plagioclase-rich rocks grade into troctolite which coarsens in grain size downward to 1305. At 1305 there is a transition zone to 1333 made up of medium- to fine-grained troctolite interlayered with PC or olivine-poor troctolite.

Below this transition is a monotonous sequence of plagioclase-rich rocks which extends to 1585. There are some variations in olivine content within this sequence, the most significant being the development of a pegmatoidal zone near 1489. Thus the transition at 1305 separates dominantly anorthostic rocks from overlying troctolitic rocks.

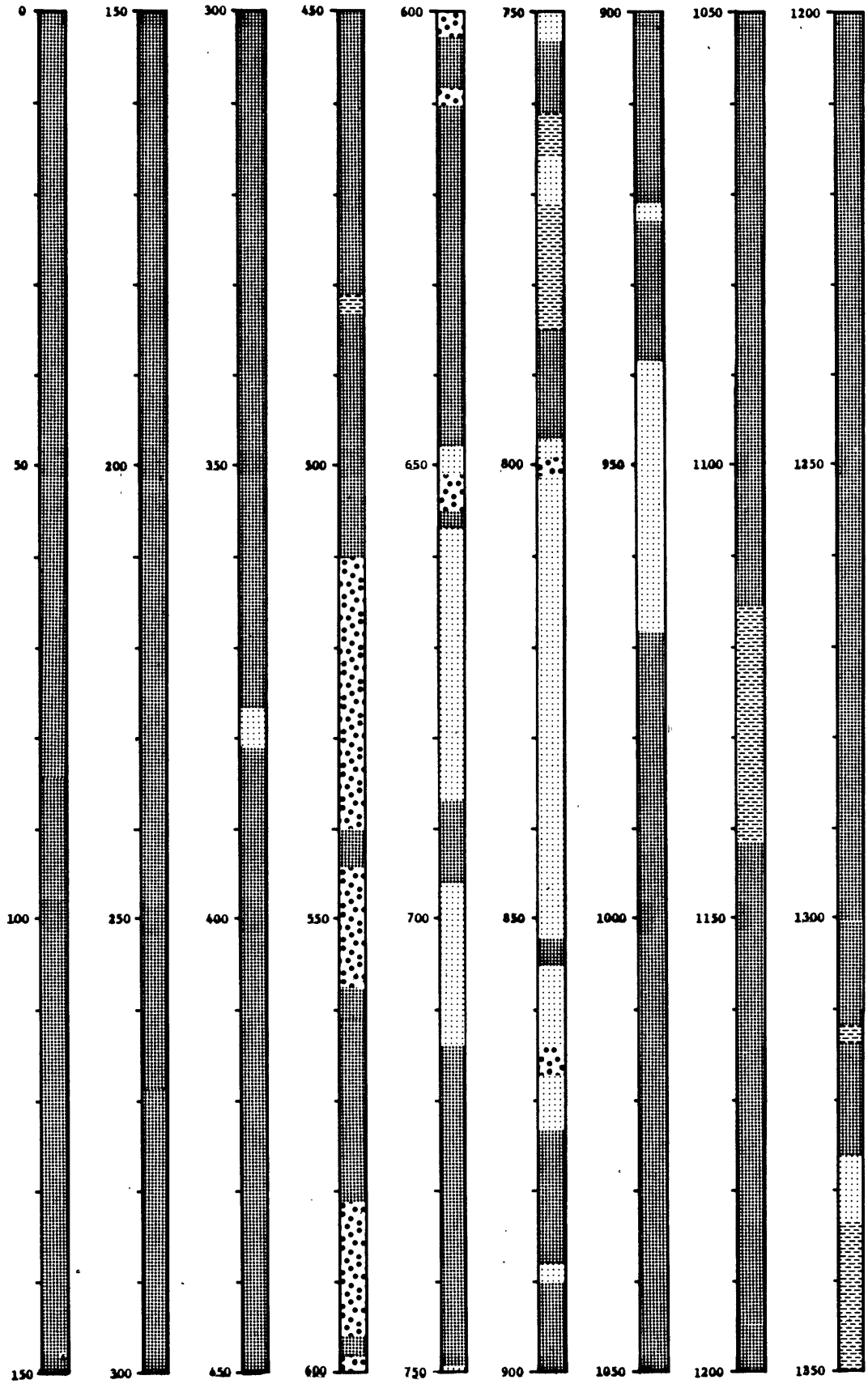
The anorthositic section extends to 1603 where it grades into medium- to medium-coarse-grained $PO_{7-12}C$. Troctolitic rock is between 1603 and 1773 at which point it grades into a plagioclase-rich rock that extends to 1845. At 1845 there is a gradationally sharp contact with more typical medium-grained troctolitic rocks that extend down to hornfels at 1919.

Below 1919, the rock is dominantly PC. At 2013 it grades into a homogeneous section of medium-grained troctolite that extends to 2640.

At 2640 troctolite grades into PC which grades downward into olivine-poor troctolite and then to medium- to medium-coarse-grained troctolite at 2735 which extends to 2998. There are numerous serpentinized faults in this section, many of which are mixed with syenites. Below 2998 are pegmatoidal zones. Initially these zones are interlayered with troctolite and are not abundant. This dominantly troctolitic zone extends to 3047.

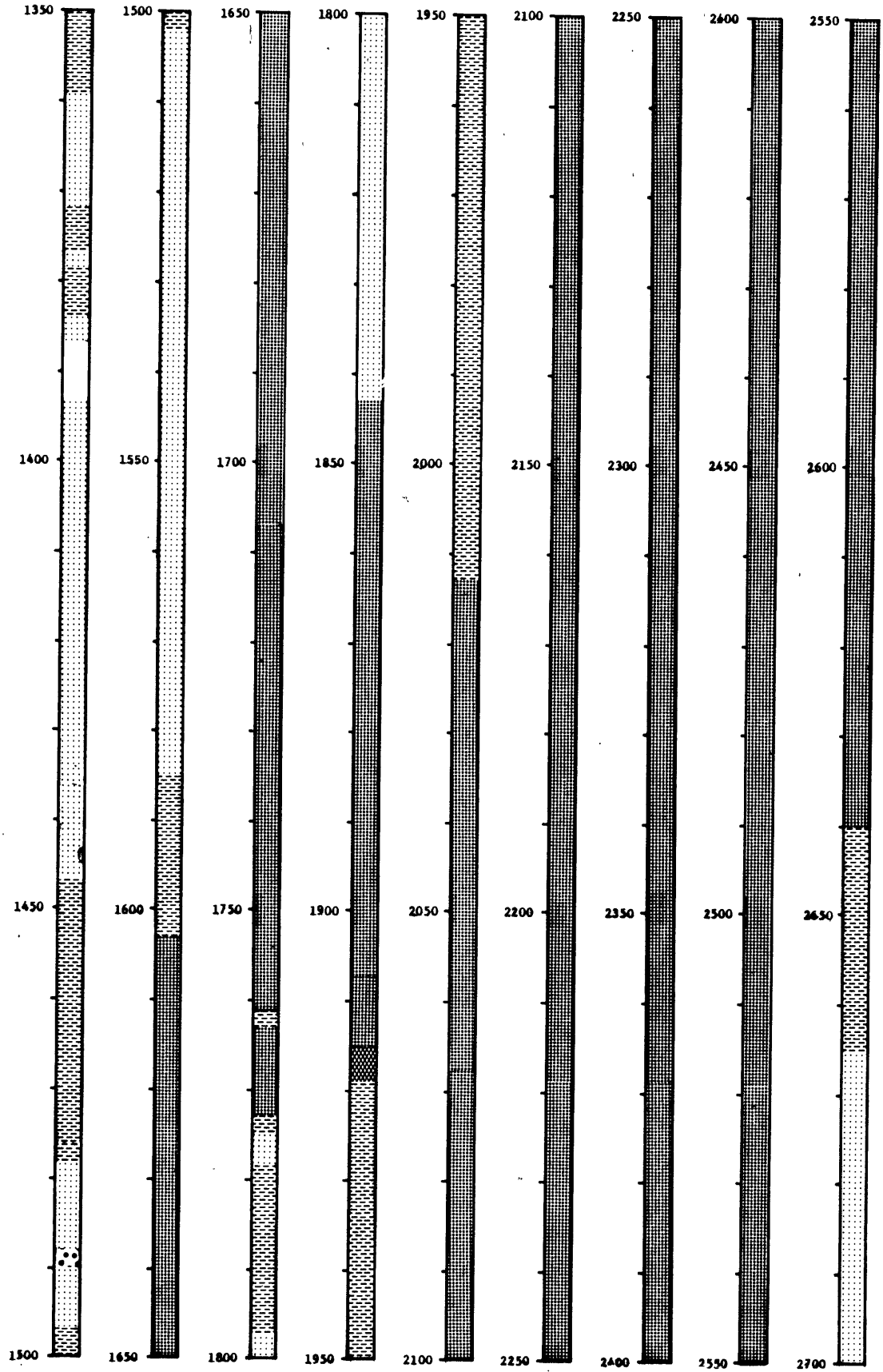
At 3047 there is a distinctive break and the rock becomes finer grained; it has the appearance of an inclusion. This fine-grained rock extends to 3065. At 3065 is homogeneous troctolite; from 3065 to 3153 is a mottled-textured, olivine-poor troctolite below which there are numerous pegmatoidal zones interlayered with the troctolite. Most have gradational upper and lower contacts and thus are probably local variations. Prominent pegmatoidal zones occur at 3079, 3104, 3125, and 3137. Below 3153 is good homogeneous troctolite with a thin pegmatoidal PC between 3154 and 3155. This homogeneous troctolite extends to about 3285 at which point there are numerous pegmatoidal layers. Above 3307 these are interlayered with troctolite. Below 3307 the dominant rock type is pegmatoidal PC, or very coarse-grained olivine-poor troctolite. The sequence between 3307 and 3485 is interlayered pegmatoidal PC and olivine-poor coarse-grained troctolite with a few thin zones of olivine-rich fine-grained troctolite. Below 3485 the rock is split and badly mixed. The dominant rock type to 3499 appears to be pegmatoidal PC or olivine-poor troctolite. This rock grades down into a 16- to 20-foot sequence of fine-grained olivine-rich rock and then into granitic rocks. Disseminated sulfides occur throughout this lower sequence. In this hole, it appears that the typical basal zone sequence seen in other drill holes is essentially absent and that the pegmatoidal marker layer extends down to 3489, immediately above the sulfide-rich zone.

DRILL HOLE DU-13



EXPLANATION OF PATTERNS

- Plagioclase-rich pegmatoid
- Plagioclase cumulate
- Olivine-poor troctolite
- Troctolite to olivine-rich troctolite
- Olivine cumulate or olivine-rich cumulate
- Magnetite-rich cumulate
- Hornfels
- Monzonite
- Granitic Country Rock
- Fault or shear



EXPLANATION OF PATTERNS

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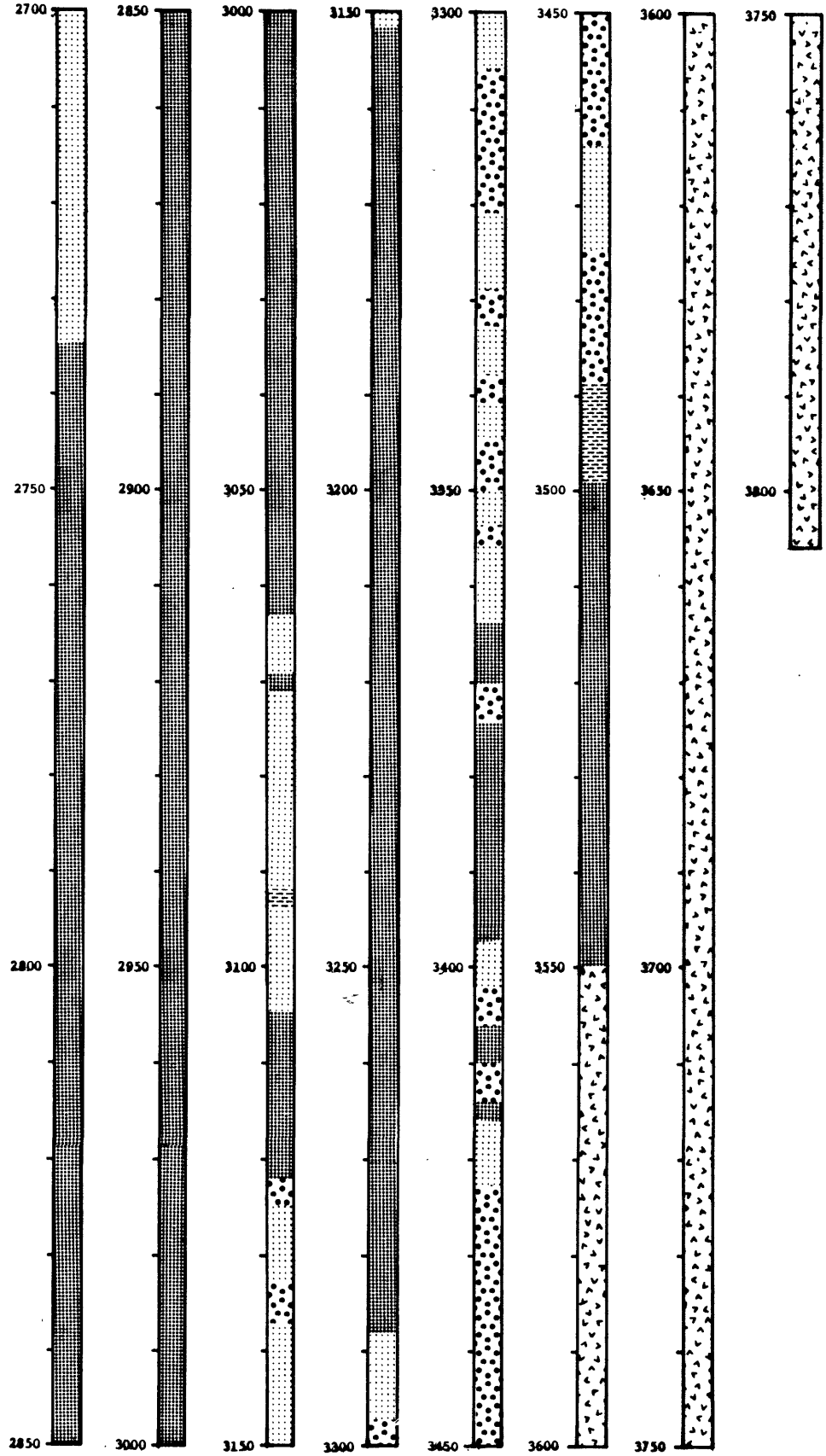
DRILL HOLE DU-13



EXPLANATION OF PATTERNS

- Plagioclase-rich pegmatoid
- Plagioclase cumulate
- Olivine-poor troctolite
- Troctolite to olivine-rich trocolite
- Olivine cumulate or olivine-rich cumulate
- Magnetite-rich cumulate
- Hornfels
- Monzonite
- Granitic Country Rock
- Fault or shear

DUVALL DRILL HOLE DU-14

Interval (ft.)	Description
0-9	No core.
9-16	PC; very gradational lower contact.
16-21	$PO_{3-7}C$; medium- to fine-grained.
21-81	$PO_{3-5}C$; medium-grained; pyroxene varies from 0-4%; oxides vary from 0-1%. Rock is plagioclase-rich but most contain distinct cumulate olivine. It grades from nearly pure PC to distinctly good troctolite.
81-87	$PO_{7-12}C$; medium- to coarse-grained. Distinguished from overlying rock by its marked increase in grain size with pyroxene 2-5% of rock up to a centimeter across and oxides 1-2% of rock, some up to a centimeter across. Very gradational lower contact.
87-106	$PO_{5-10}C_{x_{2-3}}z_{t-1}$; medium-grained. Typical medium-grained troctolite. Sharp lower contact.
106-112	$PO_{1-3}C$; medium-grained with a 6-inch $PO_{7-12}C$ horizon at 109 with gradational upper and lower contacts.
112-115	PO_1C; medium- to coarse-grained. Distinguished from overlying rock by its very coarse grain size; gradational upper contact, sharp lower contact.
115-138	$PO_{7-12}C_{x_{t-3}}z_{t-1}b_t$; medium-grained troctolite, sharp lower contact.
138-140	$PO_{7-12}C$; very fine grained; gradational lower contact.
140-217	PC to $PO_{1-3}C$; a good PC with pegmatoidal zones at top, and olivine increasing slightly towards lower part of the section. Sequence is a distinctive plagioclase-rich zone.

Interval	Description
140-217 (cont'd)	Very gradational and subjective lower contact. Gradational but distinct upper contact.
217-310	Mixed heterogeneous zone composed dominantly of $PO_{3-5}C$ with gradational PC layers interlayered with good typical $PO_{7-12}C$. Most of rock is plagioclase-poor troctolite with 2-4% pyroxene and t-1% oxide. Gradational in approximately located lower contact.
310-325	$PO_{7-12}C_{x_{t-1}}z_t b_t$; typical medium-grained troctolite.
325-329 1/2	$PO_{1-2}C_{x_{t-1}}z_t b_t$
329 1/2-332	$PO_{3-5}C_{x_{3-5}}z_{t-1}b_t$. Distinguished from overlying rock by its greater olivine and pyroxene content. Moderately sharp upper contact, gradational lower contact.
332-334	PC with pegmatoidal base.
334-338	$PO_{7-12}C$; typical medium-grained troctolite.
338-350	Serpentinized fault zone. Vertical shears are abundant and have slickensides which rake 20°. Rock seems to be typical medium-grained troctolite with olivines altered to reddish clay. An extensive fault zone.
350-351	$PO_{7-12}C$; medium-grained troctolite.
351-353	PC; sharp upper and lower contacts.
353-364	$PO_{7-12}C$ with thin intergradational layers of PC.
364-383	Serpentinized and sheared fault zone. Faults dip 70°; slickensides rake 20°-30°. Dominant rock type is medium-grained troctolite with olivines altered to reddish clay.
383-386	$PO_{7-12}C$; medium- to fine-grained.

Interval	Description
386-390	PC mixed with $PO_{3-5}C$.
390-397 1/2	$PO_{7-12}C$; medium-grained; at 397, a 6-inch pegmatoidal PC.
397 1/2 - 405	$PO_{7-12}C$; coarse-grained, becoming finer-grained downward.
405-406	$PO_{20-30}C$; medium-grained. Gradationally sharp upper contact.
406-406 1/2	$PO_{20}C$; sharp lower contact.
406 1/2-419	$PC_{x_{t-1}z_t}$
419-430	Fault zone. Nearly vertical fractures with slickensides raking 40°. Mafic minerals altered to reddish clay. Rock in fault zones is a $PO_{1-2}C$.
430-433	$PO_{1-2}C$
433-438	Faulted and fractured zone with nearly vertical dipping fractures; slickensides rake nearly vertically with the younger set showing nearly horizontal motion. Rock is $PO_{1-2}C$.
438-459	$PO_{1-2}C$; altered and with nearly vertical fractures; gradational lower contact.
459-485	$PO_{1-2}C$. Many 6- to 12-inch PC layers. Some coarse masses of pyroxene.
485-488	PC; abrupt lower contact.
488-493 1/2	$PO_{1-2}C_{x_{5-10}z_{3-5}}$; very similar to overlying PC in that it is olivine-poor, but there is a marked increase in intercumulus mafic minerals. Sharp lower contact. Serpentinized zone at 486 dips nearly vertically. Slickensides are sub-horizontal.
493 1/2-523	$PC_{x_t z_t}$; gradational lower contact, moderately sharp upper contact.

Interval	Description
523-552	$PO_{3-7}C$; medium-grained and olivine-poor troctolite; sharp lower contact.
552-572	$PO_{20-30}C$; medium- to fine-grained. A one-foot thick PC with sharp upper and lower contacts at 565-566. 60° dipping serpentinized fracture at 565 1/2 with nearly vertical slickensides. Gradational lower contact.
572-594 1/2	$PO_{5-10}C_{x_{3-5}z}$; medium-grained; a typical if slightly olivine-poor troctolite. Abrupt lower contact.
594 1/2 - 604	$PO_{20-30}C$; medium- to coarse-grained; gradational lower contact.
604-609	$PO_{60-80}C$ with several thin one-inch thick OC layers. Gradationally sharp lower contact, gradational upper contact. Lower contact probably marks break in this depositional package.
609-627	$PO_{5-12}C$; olivine content increases downward; medium-grained; an olivine-poor POC towards top; gradational lower contact, abrupt upper contact.
627-659 1/2	$PO_{7-12}C_{x_{3-7}z_{t-1}}$; medium- to coarse-grained; thin PC zones distinguished from overlying rock by their much coarser grain size and greater abundance of interstitial mafics.
659 1/2- 662	PC
662-674	$PO_{7-12}C_{x_{3-5}z_{t-1}}$; medium- to coarse-grained.
674-710	$PO_{3-7}C_{x_{3-7}z_{t-2}}$; medium- to coarse-grained. Many plagioclase-rich zones. A transitional sequence with some troctolite.
710-716	PC

Interval	Description
716-720	$PO_{15-20}C_{x_{5-10}}z_{1-2}$; medium- to coarse-grained; abrupt upper contact, gradational lower contact.
720-721	PC; sharp lower contact.
721-729	$PO_{7-12}C_{x_{4-7}}z_{t-1}$; medium-grained. Typical medium-grained olivine-pyroxene-rich troctolite.
729-733	$PO_{7-12}C$; medium- to coarse-grained troctolite.
733-734	PC; sharp upper contact, gradational lower contact.
734-737	Mixed zone with interlayered PC and PO_{5-10}; interstitial mafics in PC layers increase to 3-5% pyroxene in contrast to the nearly mafic-free PC above. The zone is transitional.
737-743	$PO_{3-12}C$; mixed zone of good troctolite but with varying amounts of olivine. Gradational lower contact.
743-745	PC, becoming coarse-grained and pegmatoidal toward base. Sharp lower contact. Syenite at 745.
745-749	$PO_{25-30}C$; medium-grained.
749-754	$PO_{7-12}C$; medium- to coarse-grained.
754-755 1/2	Pegmatoidal PC; pyroxenes to six inches long. This is the first good pegmatoidal PC seen in this core. Gradational lower contact, gradational upper contact.
755 1/2-772	$PO_{7-12}C_{x_{3-6}}z_{t-2}$; medium-grained.
772-776	Granitic intrusions.
776-777	$PO_{1-2}C$

Interval	Description
778-804	$PO_{15-25}C_{x_{3-5}}z_t b_t$; medium-grained.
804-824	$PO_{1-2}C$ with numerous PC interlayers which are from 3- to 12-inches thick. A transitional zone. Gradational upper and lower contacts.
824-854	Most is PC although there are zones of PO_{1-3}. Typical rock is PC with 1% to 2% oxides and 1% to 2% pyroxene. Olivine-rich zones occur as wispy 1- to 3-inch horizons. Gradationally sharp lower contact.
854-860	Transitional zone composed mostly of $PO_{3-7}C$. Many olivine-poor horizons.
860-913	Dominantly $PO_{5-10}C_{x_{3-5}}z_{t-1}$ with much $PO_{1-5}C$ and thin PC horizons. Gradational upper contact.
913-919 1/2	$PO_{7-12}C$; medium- to very coarse-grained. Some plagioclases in excess of one inch. Oxide masses to 1/2 inch. Pyroxenes to 1/2 inch. Gradational lower contact.
919 1/2 - 924	PC to pegmatoidal PC. Sharp lower contact.
924-940	PO_{7-12} C; medium- to very coarse-grained; gradational lower contact.
940-943	Pegmatoidal PC; gradational lower contact.
943-989	Mixed zone dominantly of coarse-grained $PO_{7-12}C_{x_{1-3}}z_{3-8}$ with PC zones and some thin $PO_{7-12}C$ zones mixed into this coarse-grained, almost pegmatoidal rock. Area is extensively fractured and serpentinized between 964 and 970. Fractures dip vertically with slickensides raking 45°.

Interval	Description
989-994	PC; medium-grained; sharp lower contact.
994-1002	$PO_{20-40}C$; medium- to coarse-grained.
1002-1006	$PO_{5-10}C$; medium- to coarse-grained; gradational upper and lower contacts.
1006-1012 1/2	PC; gradational lower contact.
1012 1/2-1023	PO_{1-3}, nearly pure PC. Coarsens downward to a pegmatoidal zone; sharp lower contact.
1023-1039	$PO_{7-12}C_{x_{3-5}}z_{1-3}$; medium-grained troctolite.
1039-1041	PC; gradational upper and lower contacts.
1041-1043	$PO_{7-12}C$
1043-1195	$PO_{7-12}C_{x_{2-5}}z_{t-1}$; a remarkably homogeneous sequence of uniform medium-grained troctolite; gradational lower contact.
1195-1197	PC; gradational lower contact.
1197-1201	$PO_{7-12}C_{x_{5-7}}z_{t-1}$; similar to troctolite above but contains more pyroxene.
1201-1202	PC
1202-1203	$PO_{7-12}C$
1203-1204	PC
1204-1282 1/2	$PO_{7-12}C_{x_{3-5}}z_{t-1}$; grain sizes coarsening downward. Note all the plagioclase units above have gradational contacts.
1282 1/2-1283	PC; gradational upper and lower contacts.
1283-1296	$PO_{7-12}C_{x_{5-7}}z_{1-3}$; coarse-grained.

Interval	Description
1296-1297	PC
1297-1302 1/2	$PO_{7-12}C$; coarse-grained, similar to 1284.
1302 1/2-1307	PC; gradational upper, moderately sharp lower contact.
1307-1319	$PO_{7-12}C_{x_{5-7}}{}^{z}{}_{1-3}$; very coarse grained, gradational lower contact.
1319-1324	PC; gradational lower contact.
1324-1354	$PO_{2-5}C_{x_{2-3}}{}^{z}{}_{t-1}$; medium-grained olivine-poor troctolite with some layers of troctolite and some layers of PC.
1354-1469	$PO_{5-10}C_{x_{3-5}}{}^{z}{}_{1-2}$; medium-grained. Troctolite is somewhat heterogeneous in that there are a number of zones ranging from 3 to 15 inches in thickness that contain very little cumulus olivine. Rock type grades back and forth from slightly olivine-poor troctolite to distinctly olivine-poor troctolite. However, the sequence is basically monotonous with no distinctive break. Very gradational lower contact.
1469-1497	PC to olivine-poor $POC_{x_{3-7}}{}^{z}{}_{2-3}$.
1497-1498	$PC_{x_{10-15}}{}^{z}{}_{2-3}$; a 1- to 2-foot zone of pyroxene rock; gradational upper and lower contacts.
1498-1506	Pegmatoidal PC; gradational upper contact, gradationally sharp lower contact; coarse pyroxenes 1 to 2 inches in length; the first good pegmatoidal PC seen after the overlying homogeneous troctolite section.
1506-1645 1/2	$PO_{7-12}C_{x_{2-5}}{}^{z}{}_{1-2}$; medium-grained troctolite varying somewhat to medium-grained olivine-poor troctolite; gradational lower contact.

Interval	Description
1645 1/2-1651	$PO_{1-2}C$ to $PC_{x_{1-2}z_{1-2}}$; gradational upper and lower contacts.
1651-1670	$PO_{10-15}C_{x_{3-5}z_{t-1}}$; medium-grained. Also, serpentinized faults at 1658, dip 70°. Slickensides rake sub-horizontal. Faults at 1664 dip vertically, rake sub-horizontal. Syenite at 1652 and 1650. There is an abrupt distinct contact between slightly more mafic-rich and coarser grained troctolite below 1654 and a finer grained, more plagioclase-rich troctolite above.
1670-1792	$PO_{7-12}C_{x_{2-3}z_{t-1}b_t}$; medium- to coarse-grained; granitic intrusion between 1676 and 1678. Serpentinized vertical faults at 1682 with slickensides raking 30°. Serpentinized fractures at 1692 dipping 70°; slickensides vertical.
1792-1793	$PO_{7-12}C$; medium- to fine-grained; gradational upper and lower contacts.
1793-1911	$PO_{7-12}C_{x_{3-5}z_{t-2}}$; medium-grained troctolite. Some PC layers between 6 and 12 inches thick occur between 1868 and 1902, but their precise locations cannot be described because of core spills and mislabelling. They appear to grade into the troctolite and thus are not significant intervals.
1911-1920	$PO_{1-2}C_{x_{2-5}z_{t-2}}$; medium-grained, dominantly plagioclase-rich rock with sharp upper contact and gradationally sharp lower contact.
1920-1933	$PO_{7-12}C_{x_{5-10}z_{1-3}}$; medium- to coarse-grained; some pegmatoidal zones appear to be much more pyroxene-rich than the normal troctolite above. Gradationally sharp lower contact.

Interval	Description
1933-1946	Pegmatoidal PC or $PO_{1-3}C$
1946-1950	PC
1950-1960	PC to $PO_1C_{x_{1-2}}z_{1-3}$; medium-grained pyroxene-rich plagioclase cumulate to plagioclase olivine-poor cumulate. Appears to grade upward into the PC which then grades into the PC which then grades upward to the pegmatoidal PC.
1960-1966	$PO_{7-12}C_{x_{3-7}}z_{1-2}$; medium- to fine-grained with some wisps of PC.
1966-1968	PC to olivine-poor POC; gradational upper and lower contacts.
1968-1974	$PO_{7-12}C$; medium-grained.
1974-1977	PC; gradational upper and lower contacts.
1977-2012	$PO_{7-12}C$; medium- to coarse-grained.
2012-2013	PC; gradational upper and lower contacts.
2013-2014	$PO_{7-12}C$
2014-2016	PC; sharp lower contact.
2016-2054	$PO_{7-12}C_{x_{1-3}}z_1$; medium-grained.
2054-2062	PC; coarse-grained with much interstitial pyroxene and oxide in zones. Pyroxenes constitute 15% to 20% of rock, oxides 5% to 10%. These zones are interlayered with finer grained pyroxene-poor, oxide-poor zones. Gradational lower, sharp upper contacts.
2062-2064	$PO_{1-3}C$.
2064-2095	$PO_{7-12}C_{x_{2-5}}z_t b_t$; gradational lower contact.
2095-2130	$PO_{1-2}C_{x_{2-3}}z_t b_t$; a plagioclase-rich section.

Interval	Description
2130-2132	$PO_{5-7}C$; medium-to fine-grained; gradational upper and lower contacts.
2132-2137	$PO_{3-7}C$; medium-grained. Differs from the above material by its larger grain size.
2137-2144	PC to $PO_{1-3}C$; medium-grained; gradational upper and lower contacts.
2144-2147	Pegmatoidal PC
2147-2150	$PO_{1-3}C$; medium-grained; gradational upper and lower contacts.
2150-2171	Pegmatoidal PC
2171-2175 1/2	PC to olivine-poor POC; medium- to coarse-grained with 10% to 15% pyroxene and 5% to 7% oxides. Rock appears to be a mafic-rich intergradational layer with the pegmatoidal horizons.
2175 1/2-2183	Pegmatoidal PC with 15% pyroxene, 5% oxides.
2183-2189	PC or olivine-poor POC with 20% pyroxene, 5-10% oxides, similar to material at 2174.
2189-2192	Pyroxene-oxide pegmatite. Coarse pyroxene and oxides constitute entire rock. Gradational upper and lower contacts.
2192-2193	Pyroxene-rich PC or olivine-poor POC.
2193-2230	Pegmatoidal PC to olivine-poor POC with magnetite-rich zone between 2203 and 2205. Syenite between 2206 and 2207, and between 2209 and 2210. Magnetite-rich zone between 2215 and 2216. Moderately sharp lower contact.
2230-2233	$PO_{3-5}C_{x_{2-3}}z_{2-3}$; medium-grained; sharp lower contact.
2233-2235	$PO_{10-15}C$; medium- to fine-grained. Interlayered with thin wisps of PC.

Interval	Description
2235-2247	$PO_{5-7}C_{x_{1-3}}z_{t-1}$; medium-grained, interlayered with many thin wisps of PC.
2247-2250	PC
2250-2253	$PO_{7-12}C$; medium- to fine-grained.
2253-2262	PC
2262-2270	PC; locally pegmatoidal.
2270-2284	$PO_{1-5}C$; fine-grained, very little pyroxene or oxide. Looks like a PC but much finer grained than the overlying PC and appears to have some disseminated olivine.
2284-2287	Pegmatoidal PC
2287-2289	PC; fine-grained.
2289-2291	Syenitic dike.
2291-2297	PC
2297-2299	Pegmatoidal PC
2299-2301	$PO_{3-5}C$; sharp upper contact, gradational lower contact.
2301-2304	PC; pegmatoidal toward base. Syenite dike between 2302 and 2302 1/2.
2304-2311	$PO_{7-12}C_{x_{3-5}}z_{t-1}$; medium-grained troctolite.
2311-2320	$PO_{7-12}C_{x_{3-5}}z_{t-1}$; pyroxene increases downward; gradational lower contact.
2320-2322	PC
2322-2322 1/2	Pegmatoidal PC; gradationally sharp lower contact.
2322 1/2-2323	$PO_{3-5}C$

Interval	Description
2323-2325	Syenite
2325-2327	PC
2327-2329	Pegmatoidal PC
2329-2336	$PO_{3-5}C_{x_{t-1}}z_t b_t$; medium-grained.
2336-2337	PC
2337-2341 1/2	$PO_{1-3}C_{x_{2-3}}z_{1-2}$
2341 1/2-2344	PC
2344-2368	$PO_{7-12}C_{x_{2-3}}z_t$; medium-grained troctolite.
2368-2369	PC; gradational upper and lower contacts.
2369-2388	$PO_{7-12}C_{x_{2-3}}z_{t-2}$; medium-grained troctolite.
2388-2394	$PO_{3-5}C$
2394-2398	PC
2398-2402	Pegmatoidal PC; gradational lower contact.
2402-2432	$PO_{7-12}C_{x_{3-5}}z_{1-2}$; medium-grained troctolite.
2432-2436	$PO_{7-12}C_{x_{10-15}}z_{3-5}$; gradational upper and lower contacts. Interstitial mafics more abundant.
2436-2448	$PO_{7-12}C_{x_{3-7}}z_{t-1}$; medium-grained troctolite.
2448-2450	Granitic dike.
2450-2696	$PO_{7-12}C_{x_{3-5}}z_{t-2}$; medium-grained troctolite. A thick homogeneous sequence of troctolite in which there are some minor but no significant variations. Fault at 2684 to 2686; fractures dip 60°, slickensides are vertical; syenite dike at 2617; extensively faulted and serpentinized zone from 2575 to 2594. Fractures are vertical, slickensides

Interval	Description
2450-2696 cont'd	are horizontal. Some olivines are altered to reddish clay. Monzonitic intrusion between 2552 and 2556, at 2537, and between 2526 and 2529. 2-inch thick monzonite at 2514. Syenite between 2476 and 2478. 6-inch thick monzonite at 2472. 2-inch thick brecciated zone with recemented plagioclase at 2469 1/2.
2696-2713	$PO_{5-10}C_{x_{2-4}}z_t$; medium- to coarse-grained troctolite, less olivine and somewhat coarser-grained than the overlying rock into which it grades.
2713-2732	$PO_{5-7}C_{x_{5-7}}z_{1-3}$; medium- to coarse-grained olivine-poor troctolite; almost pegmatoidal in places.
2732-2733	PC
2733-2738	Pegmatoidal PC; large masses of coarse pyroxene; gradational lower contact.
2738-2756 1/2	$PO_{7-12}C_{x_{2-3}}z_t$; medium-grained troctolite cut by syenite between 2750 1/2 and 2752, and 2753 to 2755 1/2.
2756 1/2- 2757	Pegmatoidal PC
2757-2820	$PO_{30-40}C_{x_t}z_t$; medium- to fine-grained. A homogeneous, olivine-rich troctolite, well-laminated in places. Cut by vertical-dipping faults at 2763 with sub-horizontal slickensides, by syenite from 2765 to 2766, and from 2768 1/2 and 2770; brecciated monzonitic material between 2787 1/2 and 2788 1/2. Monzonite between 2810 and 2810 1/2 Very gradational lower contact.
2820-2872	$PO_{10-15}C$; medium-grained. Cut by monzonite at 2833 to 2834.

Interval	Description
2820-2872 cont'd	Vertical faults with horizontal slickensides at 2835; monzonite at 2839 to 2840; gradational lower contact.
2872-2875 1/2	Syenitic intrusion.
2875 1/2- 2906	$PO_{40-50}C$; medium-grained; gradational lower contact, apparently abrupt upper contact against monzonite altered zone.
2906-2928	$PO_{10-15}C$; medium-grained. Cut by syenite between 2914 and 2916; gradational upper and lower contacts.
2928-2980	$PO_{30-50}C$; medium-grained, cut by syenite at 2953 to 2954, 2959 to 2961, and 2976 to 2979.
2980-2981	Pegmatoidal PC; sharp upper and lower contacts.
2981-3021	$PO_{7-12}C$; medium-grained. Syenite at 3000.
3021-3023	Pegmatoidal PC; gradational upper and lower contacts.
3023-3026	$PO_{7-12}C$
3026-3052	$PO_{30-50}C$; medium-grained.
3052-3055	OPC
3055-3065	$PO_{30-50}C$; medium-grained.
3065-3065 1/2	OC; very sharp upper contact seen in drill core shows abrupt change from POC to OC.
3065 1/2- 3067 1/2	Monzonitic intrusion.
3067 1/2- 3068	OC with extremely sharp contact visible in drill core.
3068- 3074 1/2	$PO_{30-40}C$
3074 1/2- 3075	OPC
3075- 3075 1/2	Syenitic intrusion.

Interval	Description
3075 1/2 -3094	$PO_{7-12}C$; medium-grained troctolite. Syenitic intrusion between 3079 and 3079 1/2.
3094-3212	$PO_{7-12}C_{x_{t-1}}b_t z_{t-1}$; medium-grained, typical troctolite. 60° dipping fracture at 3103 with well-developed horizontal slickensides; 80° dipping fracture with slickensides raking 30° at 3174. Vertical shears with horizontal slickensides well-developed at 3179. Brecciated zone with syenitic intrusion two to three inches thick at 3207.
3212-3215	Extensively faulted and serpentinized zone with poor core recovery. Locally fractured and recemented; appears to be troctolite.
3215-3218	$PO_{7-12}C$, grading downward to $PO_{20-30}C$.
3218-3218 1/2	Pegmatoidal PC; sharp upper, gradationally sharp lower contacts.
3218 1/2-3224	$PO_{7-12}C_{x_{3-7}}z_{1-3}$. Oxide and pyroxene contents have been increasing downward from when first noted at 3194.
3224-3225	PC
3225-3225 1/2	OC
3225 1/2- 3227	Mixed zone of $PO_{7-12}C$, with thin $^1/8$ to $^1/4$ inch OC layers that have extremely sharp upper and lower contacts. They appear to be veins which cut the troctolite. Dominant rock appears to be typical troctolite. Very sharp lower contact made by OC.
3227-3229	$O_{50-70}P_{20-30}C_{x_t}$; medium- to fine-grained.

Interval	Description
3229-3229 1/2	Pegmatoidal PC. Contact with overlying olivine-rich rock is sharp, as if the olivine-rich rock were cutting down through the pegmatoidal zone.
3229 1/2-3230 1/2	$O_{70-80}P_{20}C$; very fine grained. Sharply gradational upper and lower contacts.
3230 1/2-3231	Pegmatoidal PC
3231-3237	$O_{60-80}P_{15-20}C$; medium- to fine-grained. Rock has a pervasive sub-vertical foliation defined by thin serpentinized faults. Extremely sharp lower contact which abuts against underlying pegmatoidal PC. Contacts display some olivine-rich zones which are truncated unevenly against the pegmatoidal PC. The abruptness of the contact suggests that the rock is an inclusion.
3237-3239	Pegmatoidal PC; sharp upper, gradational lower contacts.
3239-3240	Fine-grained olivine-rich troctolite; cannot distinguish mode. Appears to have gradational lower contact.
3240-3268	$O_{60-80}P_{15-20}C$; medium- to fine-grained; sharp lower contact.
3268- 3268 1/2	Pegmatoidal PC; sharp lower contact.
3268 1/2- 3270	$O_{60-80}P_{20}C$ with sub-vertical foliation; sharp lower contact.
3270- 3272	Pegmatoidal PC
3272- 3272 1/2	OC to $O_5P_{5-10}C$; occurs as an irregular stringer from one-half to three inches thick with extremely sharp upper and lower contacts.
3272 1/2 - 3278 1/2	Pegmatoidal PC

Interval	Description
3278 1/2- 3279	OC; very sharp contact with overlying pegmatoidal PC, poorly exposed lower contact.
3279-3281	$PO_{1-2}C$ to PC; gradationally sharp lower contact.
3281-3283	$PO_{20-30}C$
3283-3284	PC; gradationally sharp lower contact.
3284-3285	Mixed PC and $PO_{30-50}C$. Olivines as distinct $^1/4$ to $^1/2$ inch euhedral grains.
3285-3288	Mixed zone with $O_{60-80}C$ and $PO_{40-60}C$; gradational upper and lower contacts.
3288-3292	$PO_{15-20}C$; medium-grained; gradational lower contact.
3292-3296	$PO_{5-10}C_{x_{2-3}}z_{1-2}$; medium- to coarse-grained.
3296- 3296 1/2	Pegmatoidal PC; gradationally sharp upper and lower contacts.
3296 1/2- 3303	$PO_{7-12}C_{x_{2-3}}z_{t-1}$; medium-grained; gradational lower contact.
3303-3306	$PO_{15-30}C$; olivine increases downward.
3306-3306 1/2	Thin pegmatoidal zone.
3306 1/2- 3307 1/2	$PO_{3-5}C$
3307 1/2- 3308	PC to $PO_{1-2}C$.
3308-3309	$PO_{5-10}C$; medium- to coarse-grained.
3309-3310	Serpentinized zone; poor core recovery. Fractures dip vertically, and have vertical slickensides; possibly OC.
3310-3311	$PO_{5-10}C$; medium- to coarse-grained.
3311-3315	Fine-grained picritic rock, may be an inclusion; sharp upper and lower contacts.

Interval	Description
3315-3317	Brecciated $PO_{3-5}C$. Some fractures dip 65° with vertical slickensides; gradational lower contact.
3317-3318	PC
3318-3322	Dominantly a $PO_{10-30}C$, medium-grained, with olivine content grading from olivine-rich fine-grained rock to less olivine-rich coarser-grained rock. At 3320 and 3321 there are three- to four-inch olivine-rich bands, the cores of which are OCs. These appear to have sharply gradational contacts with the surrounding troctolite.
3322-3324	$O_{40-60}P_{40-60}C$; medium- to fine-grained; gradational upper and lower contacts.
3324-3338	$PO_{30-40}C$; medium-grained; gradational upper and lower contacts.
3338-3344	$O_{50-60}P_{40-50}C$; medium-grained. Olivine content increases downward. Lower contact is not exposed.
3344-3350	Pegmatoidal PC with disseminated sulfides. Cut by syenite between 3347 and 3348 1/2. Gradational lower contact.
3350-3351	$PO_{3-5}C$; medium- to coarse-grained.
3351-3352	Pegmatoidal PC
3352-3355	$PO_{7-10}C$; medium- to coarse-grained; moderately abrupt lower contact.
3355-3361	$PO_{30-70}C$; medium-grained; between 3359 and 3359 1/2 is an OC; gradationally sharp lower contact.
3361-3362	Pegmatoidal PC; sharp lower contact.
3362-3364	Fine-grained troctolitic rock; appears to be an inclusion.
3364-3368	Pegmatoidal PC with fine-grained inclusion between 3366 and 3366 1/2.

Interval	Description
3368-3373	$PO_{15-50}C$; grades from fine-grained $PO_{15-20}C$ at top to medium- to coarse-grained olivine-rich zone at 3371 to medium-grained $PO_{15-20}C$ at 3373.
3373-3376	$O_{60-80}P_{20-40}C$; medium- to fine-grained; gradationally sharp upper and lower contacts.
3376-3383	$PO_{15-20}C$; medium-grained; gradational lower contact.
3383-3384	PC to $PO_{1-2}C$.
3384-3386	Pegmatoidal PC. This marks the base of a cycle which starts in the pegmatoidal PC, grades up through thin PC, into a $PO_{15-25}C$, then into an olivine-rich troctolite, which then grades through a zone with decreasing olivine to pegmatoidal PC which starts at 3368.
3386-3392 1/2	$PO_{15-25}C$; medium- to coarse-grained; gradational lower contact, gradationally abrupt upper contact.
3392 1/2-3394	Pegmatoidal PC
3394-3398	$PO_{10-20}C$; medium- to coarse-grained.
3398-3401	$O_{50-60}P_{50-40}C$; medium-grained; gradational upper and lower contacts.
3401-3405	$PO_{7-12}C$
3405-3406	Pegmatoidal PC. Gradational upper contact, gradationally sharp lower contact.
3406-3406 1/2	$PO_{7-12}C$
3406 1/2-3407	$O_{70-80}P_{20-30}C$; fine-grained.
3407-3408	$PO_{7-12}C$; medium- to very fine grained.
3408-3410	Mixed zone of medium to coarse $PO_{20-30}C$ and fine-grained $PO_{10-20}C$; very gradational upper and lower contacts.

Interval	Description
3410-3413 1/2	$PO_{7-12}C_{x_t}z_tb_t$
3413 1/2-3414	$PO_{25-40}C$; medium-grained.
3414-3419	$PO_{7-12}C_{x_t}b_tz_t$
3419-3419 1/2	Pegmatoidal PC; gradational lower contact, sharp upper contact.
3419 1/2-3434	$PO_{10-15}C$; medium-grained.
3434-3434 1/2	Pegmatoidal PC; gradationally sharp upper and lower contacts.
3434 1/2-3436	$PO_{7-12}C$
3436-3437 1/2	$PO_{40-60}C$; gradational upper and lower contacts.
3437 1/2-3438	$PO_{7-12}C$
3438-3439	$PO_{40-60}C$
3439-3447	$PO_{7-12}C$; medium- to coarse-grained.
3447-3447 1/2	OC
3347 1/2-3449	$PO_{30-50}C$; medium-grained.
3449-3450	$PO_{10-20}C$; medium-grained.
3450-3451	Pegmatoidal PC; gradationally sharp lower contact.
3451-3452	$PO_{40-70}C$; medium- to fine-grained. An olivine-rich zone with thin interlayers of plagioclase-rich rock.
3452-3459 1/2	$PO_{10-20}C$; medium-grained.
3459 1/2-3460 1/2	$O_{70-80}P_{20-30}C$; fine-grained; gradational to gradationally sharp upper and lower contacts.
3460 1/2-3474	$PO_{2-4}C$; medium- to coarse-grained.
3474-3479 1/2	Pegmatoidal PC; very sharp lower contact.

Interval	Description
3479 1/2-3484	Fine-grained olivine-rich rock, olivine 70-80%, plagioclase 15-20%; very sharp upper contact, possibly an inclusion.
3484-3490	$PO_{60-70}C$; medium-grained; gradational lower contact.
3490-3494	Dominantly $PO_{10-20}C$; medium-grained, with a two-inch PC at 3490; rock has some gradational olivine-rich layers.
3494-3494 1/2	$PO_{70-90}C$; medium- to very fine-grained; very sharp lower contact.
3494 1/2-3526	$PO_{7-12}C$; medium- to coarse-grained; grades into olivine-rich material up at 3501, which then grades into $PO_{7-12}C$ at 3498; disseminated sulfides occur in split core between 3501 and 3490.
3526-3528	PC; gradational lower contact.
3528-3529	$PO_{30-40}C$; medium- to fine-grained; gradational lower contact.
3529-3539	$PO_{7-12}C_{x_{2-5}z_t}$; grades downward into plagioclase-rich material, grades upward into olivine-rich material.
3539-3549 1/2	$PO_{7-12}C$; medium-grained.
3549 1/2-3551	Pegmatoidal PC
3551-3553	$PO_{7-12}C$; medium- to coarse-grained.
3553-3555	Pegmatoidal PC
3555-3557	PC to pegmatoidal PC.
3557-3561	$PO_{15-25}C$; medium-grained; gradationally sharp lower contact.
3561-3562 1/2	Pegmatoidal PC
3562 1/2-3563	$PO_{30-40}C$; fine-grained.
3563-3569	$PO_{10-20}C$; medium- to coarse-grained.

Interval	Description
3569-3571	$PO_{1-3}C$; coarse-grained, equivalent to pegmatoidal PC.
3571-3573	$PO_{7-12}C$; gradational lower contact, moderately sharp upper contact.
3573-3584	$PO_{30-50}C$; medium-grained; gradational upper and lower contacts.
3584-3586	Pegmatoidal PC; core split for sulfides.
3586-3596	Fine-grained troctolitic rock; has gradational lower and upper contacts.
3596-3598	$PO_{10-20}C$; medium-grained.
3598-3600	Pegmatoidal PC
3600-3603	$PO_{7-12}C$; medium-grained.
3603-3612	$PO_{30-50}C$ with a three-inch OC at 3607; rock grades from OC to PC into $PO_{40-60}C$; gradational lower contact.
3612-3618	$PO_{15-30}C$; gradationally sharp lower contact.
3618-3620	Pegmatoidal PC
3620-3624	$PO_{7-12}C$; medium- to coarse-grained.
3624-3631	$PO_{15-30}C$; medium-grained.
3631-3641	$PO_{40-60}C$; fine-grained; gradationally sharp upper and lower contacts.
3641-3642	$PO_{7-12}C$ with a two-inch OPC.
3642-3643	Syenitic intrusion.
3643-3644	$O_{40-80}PC$; medium-grained; gradationally sharp lower contact.
3646-3667 1/2	$PO_{15-25}C$; medium- to coarse-grained; continuous on 1-3 inch thick very fine grained troctolitic rocks which may be inclusions; rock contains disseminated sulfides

Interval	Description
3646-3667 1/2 (cont'd)	for which it was split; gradational to abrupt lower contact.
3667 1/2 - 3668 1/2	Fine-grained inclusion.
3668 1/2 - 3690	$PO_{30-40}C$; medium- to fine-grained; disseminated sulfides; gradational lower contact.
3690-3690 1/2	$PO_{5-10}C$; gradational lower contact.
3690 1/2-3692	$PO_{5-10}C$
3692-3692 1/2	$PO_{40-60}C$
3692 1/2-3693	$PO_{1-10}C$; sharp but gradational upper contact, gradational lower contact.
3693-3694	$PO_{15-20}C$
3694-3695	PC
3695-3697	$PO_{1-2}C$
3697-3712	$PO_{3-7}C$; medium- to fine-grained; gradational upper and lower contacts.
3712-3718	Pegmatoidal PC
3718-3719	OC
3719-3719 1/2	Pegmatoidal PC
3719 1/2-3720	$PO_{7-12}C$; medium-grained. Core between 3720 and 3710 contains some disseminated sulfides, particularly in the OC.
3720-3723	$PO_{7-12}C$; medium-grained.
3723-3724	Pegmatoidal PC; gradational lower, gradationally sharp upper contacts.

Interval	Description
3724-3728	$PO_{3-7}C$, with some zones slightly more olivine-rich; medium- to coarse-grained.
3728-3728 1/2	Pegmatoidal PC
3728 1/2-3729	$PO_{10-20}C$; medium-grained; gradational upper, gradationally sharp lower contacts.
3729-3734	Pegmatoidal PC
3734-3747	$PO_{2-4}C$; medium-grained; a two-inch pegmatoidal zone at 3745; gradationally sharp lower contact.
3747-3749	$PO_{10-15}C$; very fine grained; sharp lower, gradational upper contact.
3749-3760	Pegmatoidal PC; gradational lower contact.
3760-3779	$PO_{7-12}C$; medium-grained.
3779-3780	Pegmatoidal PC
3780-3781	$PO_{3-5}C$; medium- to coarse-grained; gradationally sharp upper and lower contacts.
3781-3790	Pegmatoidal PC; vertical fault with slickensides raking 70° at 3786.
3790-3794	$PO_{20-30}C$; medium- to coarse-grained.
3794-3795	$PO_{30-40}C$; finer grained; gradationally sharp lower contact; two-inch PC zone at 3794 may represent a break.
3795-3800	Pegmatoidal PC; two-inch OC at bottom of section.
3800-3806	$PO_{7-12}C$; medium-grained; three-inch PC at 3861.
3806-3814	$PO_{30-60}C$; gradational upper and lower contacts.
3814-3816	PC
3816-3817	$PO_{20-40}C$; gradational lower contact.

Interval	Description
3817-3820	PC
3820-3834	$PO_{20-30}C$; medium-grained; upper contact is interlayered and transitional into magnetite cumulate; lower contact is not exposed.
3834-3835	Pegmatoidal PC
3835-3853	$PO_{40-50}C$; medium-grained; two-foot syenite between 3845 and 3847; zone three inches thick, rich in magnetite at 3852.5; sharply transitional zone at base.
3853-3864	$PO_{3-5}C$; medium- to coarse-grained; cut by syenite dike between 3960 and 3962.
3864-3873	$PO_{30-40}C$; medium- to fine-grained; some disseminated sulfides; moderately sharp lower contact.
3873-3880	$PO_{15-20}C$; medium-grained.
3880-3881	Pegmatoidal PC
3881-3899	$PO_{20-40}C$ with a two-inch OC at 3891; 70° dipping fault with an older set of 30° raking slickensides overlain by a horizontal set of younger slickensides at 3883.
3899-3904	Magnetite cumulate; sharp upper contact, gradational lower contact.
3904-3906	$PO_{20-30}C$; medium-grained; upper contact is interlayered and transitional into magnetite cumulate, lower contact is not exposed.
3906-3908	$PO_{1-3}C_{x_t}z_{5-10}$; magnetite-rich rock; some disseminated sulfides.
3908-3915	$PO_{15-20}C$; medium- to fine-grained.

Interval	Description
3915-3915 1/2	Pegmatoidal PC; gradational upper and lower contacts.
3915 1/2-3935 1/2	Interlayered $PO_{7-12}C$, medium-grained and $PO_{15-20}C$, medium- to fine-grained.
3935 1/2-3952	$PO_{20-30}C$; medium- to fine-grained; two-inch thick pegmatoidal zones at 3942 and 3946.
3952-3955	Mixed zone of $PO_{20-30}C$, fine-grained and $PO_{5-10}C$, medium- to coarse-grained with abundant interstitial oxides; coarsening downward bottom of sequence is a three-inch pegmatoidal layer.
3955-3960	$PO_{7-12}C$; medium-grained.
3960-3962	$PO_{30-50}C$; medium- to fine-grained; gradational upper and lower contacts.
3962-3963	$PO_{7-12}C$
3963-3964	Pegmatoidal zone, pegmatoidal PC; disseminated sulfides and abundant interstitial magnetite.
3964-3966 1/2	$PO_{15-20}M_{3-5}C$; gradational sharp upper and lower contacts.
3966 1/2-3967	Pegmatoidal PC
3967-3970	$PO_{2-3}M_{1-2}C$; medium- to coarse-grained.
3970-3975	$PO_{3-5}M_{1-2}C$; medium- to fine-grained; gradational lower contact.
3975-3976	Pegmatoidal zone with some cumulate olivine-magnetite.
3976-3992	$PO_{7-12}C_{x_{2-4}}z_{t-1}$; typical medium-grained troctolite.
3992-3995	$PO_{1-2}C$; medium- to coarse-grained, becoming pegmatoidal toward base.

Interval	Description
3995-4011	$PO_{15-25}C$; fine- to medium-grained; gradational lower contact.
4011-4012	$PO_{1-2}C$
4012-4030	$PO_{7-12}C_{x_{3-5}}z_{t-2}$; medium- to fine-grained; gradational lower contact.
4030-4032	$PO_{5-7}C_{x_{5-15}}z_{t-3}$; possibly some cumulate magnetite coarsening downward to an almost pegmatoidal zone.
4032-4044	$PO_{7-12}M_1C_{x_{3-5}}$; medium-grained with some disseminated sulfides; syenite between 4036 and 4040; gradational lower contact.
4044-4050	$PO_{15-25}C$; fine-grained; abrupt lower contact.
4050-4051	Pegmatoidal PC
4051-4073	$PO_{15-20}C_{x_t}z_{t-1}$; very fine grained homogeneous-appearing rock; pegmatoidal zone between 4062 and 4065, composed of $PO_{2-5}C_{x_{3-5}}z_{2-5}$; medium- to medium-coarse-grained.
4073-4085	$PO_{7-12}C_{x_{5-8}}z_{t-2}$; medium- to coarse-grained, distinctly coarser grained than the finer grained material into which it grades above and below.
4085-4092	$PO_{30-40}C$; medium- to fine-grained.
4092-4104	$PO_{5-7}C$; medium- to fine-grained; grades upward into more olivine-rich material; moderately abrupt lower contact.
4104-4108	$PO_{2-3}C_{x_{15-30}}z_{1-3}$; an extremely pyroxene-rich zone; medium- to coarse-grained.
4108-4122	Pegmatoidal PC; some massive sulfide stringers.
4122-4122 1/2	$PO_{10-20}C_{x_{5-10}}z_{t-1}$; medium- to coarse-grained.

Interval	Description
4122-4124	Core lost.
4124-4130	$PO_{5-7}C_{x_{5-7}z_t}$; medium-grained.
4130-4135	$PO_{7-12}C_{x_t z_{t-1}}$, some possibly cumulate; medium- to fine-grained.
4135-4139	$PO_{1-3}C_{x_{3-5}z_{1-2}}$; medium- to coarse-grained.
4139-4160	PC; fine-grained, with abundant horizontal fractures; gradational lower and upper contacts.
4160-4176	$PO_{1-3}C_{x_{1-3}z_{t-2}}$ with zones that are $PO_{5-7}C$, olivine-poor troctolite; medium- to fine-grained.
4176-4177	Pegmatoidal PC; gradational upper, sharp lower contacts.
4177-4184	$PO_{7-12}C_{x_{2-7}z_{t-2}}$; medium-grained, coarsening grain size downward.
4184-4185	Pegmatoidal PC
4185-4192	$PO_{10-20}C_{x_{3-5}z_{t-2}}$; medium-grained.
4192-4197	$PO_{1-3}C_{x_{t-5}z_{t-3}}$; medium- to coarse-grained; sharp lower contact.
4197-4198	$PO_{40-60}C$; medium-grained; sharp lower contact.
4198-4205	$PO_{5-10}C$ with some olivine-rich and plagioclase-rich zones; gradational lower contact.
4205-4206	Pegmatoidal PC
4206-4207	$PO_{10-20}C$; pegmatoidal.
4207-4211	$PO_{7-12}C_{x_{3-5}z_{t-3}}$; gradational lower contact.
4211-4214	$PO_{20-30}C_{x_2 z_{t-2}}$; medium-grained.

Interval	Description
4214-4215	$PO_{1-2}C_{x_{30-40}}z_{t-1}$; coarse-grained pyroxene-rich zone, almost pegmatoidal; some disseminated sulfides.
4215-4223	$PO_{1-5}C_{x_{3-5}}z_{t-2}$; medium- to coarse-grained heterogeneous transition zone with abundant disseminated sulfides.
4223-4226	Pegmatoidal PC
4226-4233	$PO_{3-5}C_{x_{t-2}}z_{t}$; fine-grained; with some sulfides.
4233-4238	$PO_{3-5}C_{x_{3-10}}z_{t-4}$; heterogeneous zone of mixed fine- and coarse-grained rocks.
4238-4239	$PO_{7-12}C$; medium- to fine-grained.
4239-4240	Pegmatoidal zone.
4240-4261	$PO_{7-12}M_{1-2}C$; fine-grained with spots which probably are cumulate magnetite; two-inch thick OC layer at 4225, fine-grained unit; gradational lower contact.
4261-4262	PC; fine-grained; gradational lower contact.
4262-4269	$PO_{t-1}C_{z_{1-3}}x_{3-5}$; fine-grained, plagioclase-rich zones defined by variations in intercumulus pyroxene.
4269-4270	PO_1M_1C; fine-grained; virtually no pyroxene.
4270-4276	$PO_1M_1C_{x_{3-5}}z_{1-5}$; mixed zone with some sharp contacts defined by changes in pyroxene and oxide content; gradational lower contact.
4276-4284	PC
4284-4289	$PO_{1-2}C$; sharp lower contact, gradational upper contact.
4289-4300	$PO_{3-7}M_{1-2}C_{x_{3-8}}$; a mottled medium- to fine-grained rock, with plagioclase-rich zones where oxides and pyroxenes are less abundant.

Interval	Description
4300-4308	$PO_{7-12}M_{1-2}C_{x_{3-5}}z_{3-6}$; medium- to coarse-grained.
4308-4312	$PO_{5-10}C_{x_t}z_{1-2}$; fine-grained.
4312-4316	$PO_{1-2}C_{x_{3-5}}z_{1-2}$; medium- to coarse-grained, pegmatoidal in some areas; parts are PC pegmatoid.
4316-4320	POC; fine-grained.
4320-4327	$PO_{5-7}C$; medium- to coarse-grained, becoming pegmatoidal toward bottom.
4327-4328	$PO_{7-12}C$; medium-grained.
4328-4334	Pegamtoidal PC
4334-4351	$PO_{5-7}C$; coarse-grained, grades up into pegmatoidal PC.
4351-4352	Fine-grained troctolite similar to material at 4308.
4352-4354	$PO_{5-7}C_{x_{1-2}}z_{3-5}$; medium- to coarse-grained.
4354-4374	$PO_{3-7}C_{x_{1-3}}z_{1-2}$; fine-grained POC similar to material at 4308.
4374-4376	Pegmatoidal PC
4376-4387	$PO_{7-12}C_{x_{3-5}}z_{1-2}$; medium- to coarse-grained.
4387-4400	POC; fine-grained.
4400-4406	$PO_{3-5}M_{3-5}C_{x_{2-3}}$; medium- to coarse-grained; good cumulate magnetite.
4406-4421	$PO_{3-5}M_{3-10}C_{x_{1-7}}$; fine- to medium-fine-grained; pyroxene and magnetite content increase downward; sharp lower contact.
4421-4434	Fine-grained hornfels.
4434-bottom	Mixed granitic rock and fine-grained gray hornfels rock; disseminated sulfides occur in some of the granitic material.

Summary of DU-14

The first part of this hole (0 to 334) is plagioclase-rich with some interlayered troctolite. Most contacts are gradational. The first well-developed troctolite is between 81 and 142. The second troctolite (310 to 324) forms the top of a troctolite-anorthosite-pegmatoid sucession that bottoms at 334. Troctolite that is locally sheared extends from 334 to 406.5 where it has a sharp contact with PC. PC and plagioclase-rich troctolite that is locally sheared extends to 553 where it grades into troctolite. This troctolite is in abrupt contact at 574 with less olivine-rich troctolite, which in turn extends down to an abrupt contact with a picritic zone at 610. Below this olivine-rich zone, troctolite again becomes more olivine-rich, but grades into a plagioclase-rich zone at 699. Anorthosite at the base of this zone (716) is in sharp contact with troctolite that extends down through a thin plagioclase-rich pegmatoid at 745 into plagioclase-rich rocks between 804 and 866. These, in turn, grade back into troctolite that extends to 924 where there is a gradational contact with a plagioclase pegmatoid.

Between 924 and 989 are coarse-grained rocks, most of which are troctolitic, but some contain olivine. More typical troctolite is between 989 and 1006 and has a gradational lower contact with PC that extends from 1006 to 1023. A sharp contact separates this PC from nearly homogeneous troctolite that extends to 1294. At about 1294, a coarse-grained troctolite occurs which is interlayered with PC. This troctolite is distinguished from the overlying troctolite into which it grades principally by its very coarse grain size and abundance of pyroxenes and oxides. It extends to 1319, where there is a medium- to fine-grained plagioclase-rich sequence in which olivines occur as diffuse, wispy, small grains. These rocks extend to 1354 at which point they become a monotonous, somewhat olivine-poor troctolite. These grade down into a pegmatoid at 1506 which marks the base of a cycle. Below 1506, the troctolite is again fine-grained and somewhat olivine-poor with wisps of PC. It extends down to approximately 1645 at which point it becomes plagioclase-rich. There is an abrupt contact between the plagioclase-rich zone and underlying material at 1652; the underlying rock is coarser-grained and distinctly more olivine-rich.

From 1652 to 1868 is a homogeneous sequence of medium-grained troctolite. Below 1868 is a zone that is 30 to 50 feet thick in which there are thin plagioclase layers. They grade into troctolite. Below this mixed zone, from 1920 to 1933, grain size coarsens but the rock is still troctolite. It then grades down sharply at 1933 into a pegmatoidal zone with coarse interstitial oxides and pyroxenes. At 1946 this pegmatoidal zone grades sharply into a pure PC which at 1950 grades into a pyroxene-rich PC. Below 1960, the rock is medium-grained troctolite which has some plagioclase-rich interlayers. These grade into a plagioclase-rich sequence that then grades into a pegmatoid at 2230. A major break exists at 2230 separating the PC pegmatoid above from medium- to fine-grained troctolite below. This troctolite grades into a plagioclase-rich zone which extends down to a pegmatoidal zone at 2250. Immediately below this cycle is

another fine-grained troctolite which extends to a pegmatoidal zone at 2262. The plagioclase-rich rock associated with this pegmatoidal zone extends to 2299 with some textural variations. Below 2299 the rock is mostly troctolite that grades into plagioclase-rich and pegmatoidal rocks between 2320 and 2344. From 2344 to 2394, the rocks are troctolitic with interlayered PC. Below 2394 rocks become plagioclase-rich and then grade into a pegmatoidal zone at 2400. This is the base of another cycle. Below 2404 there is a very continuous and homogeneous sequence of troctolite that is cut by numerous serpentinized fractures and some granitic stringers, but basically is a medium-grained $PO_{7-12}C$ to 2696.

This troctolite grades into a pegmatoidal zone at 2738. Below this pegmatoid is a mixed zone of troctolite, olivine-poor troctolite, and syenite with a PC at 2757. This represents another major break in the troctolite sequence. Below 2752 is olivine-rich troctolite with some thin pegmatoids at 2757,2736, 2875, and 3021. These appear to be bottoms of cycles where cumulus olivine disappears. Rocks below 3224 are distinctly different. First there is a four-foot section of very fine grained picritic rocks which end at a PC pegmatite at 3231. Below that is an eight-foot segment of olivine-rich rock distinguished by its penetrative vertical serpentinized fractures. This ends in a pegmatoidal PC which extends to 3240. The pegmatoids in both of these sequences have very sharp contacts with the overlying and underlying picritic material, and it appears that the picrite was cut by the pegmatoids as the rock at 3240 shows olivine-rich bands truncated against the pegmatoidal PC.

Below the 3240 pegmatoidal zone is a thick sequence of picritic rocks which end with an abrupt contact at another pegmatoidal zone at 3272. This zone has interlayered in it several thin olivine bands which appear to cut across it in an irregular fashion. This pegmatoidal zone extends down to 3278 where there is a thin OC or OPC which grades down into more plagioclase-rich rocks which then seem to have gradational contacts with some olivine-rich zones. The contacts in this section are gradational whereas those above appear to be sharp. This olivine-rich mixed zone extends to about 3345 where it is underlain by a pegmatoidal zone containing some sulfides. Fine-grained rocks occur in this zone at 3312.

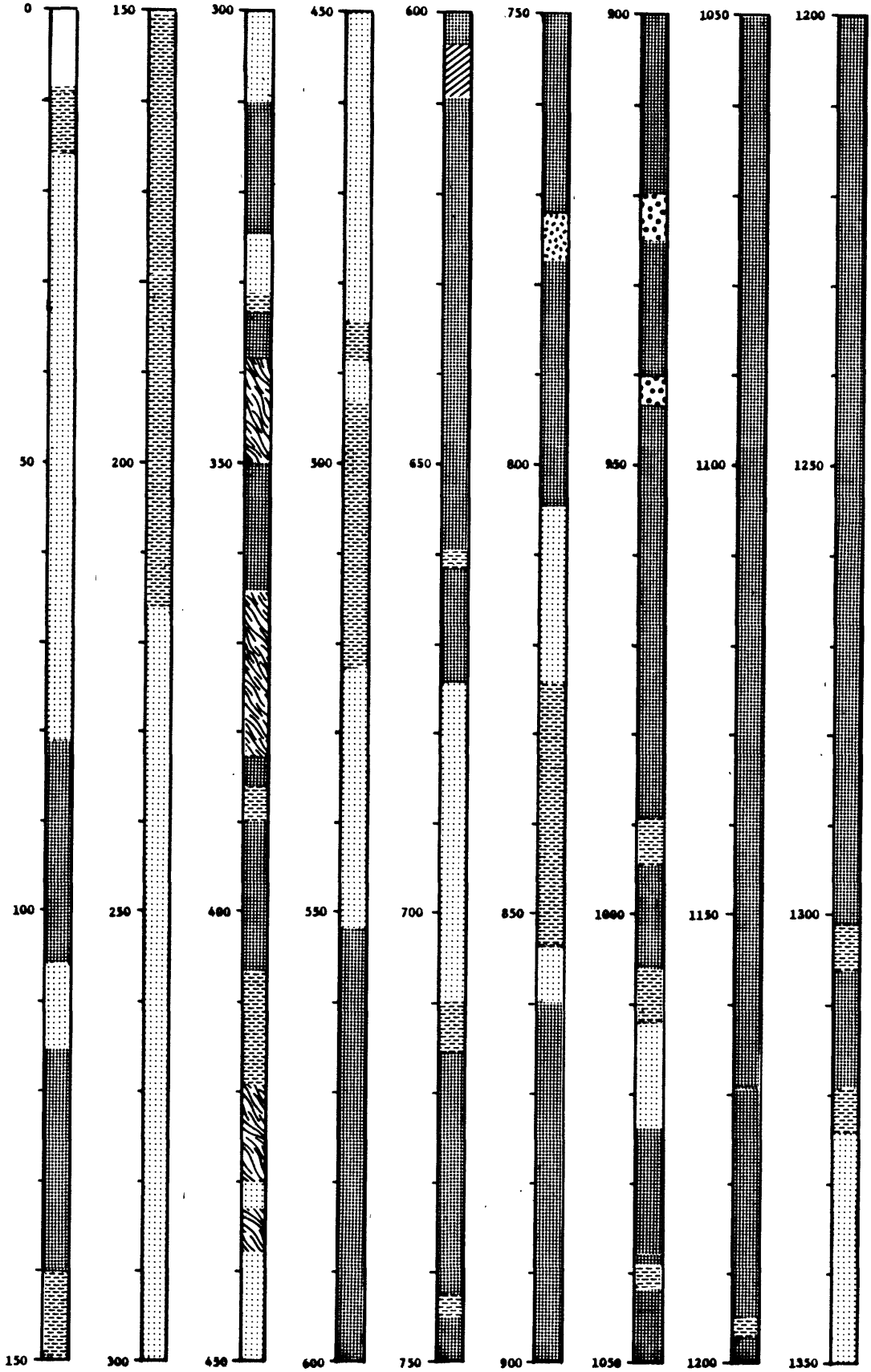
The core below 3345 has been split. This sulfide-bearing pegmatoidal zone extends to approximately 3349 and is underlain by olivine-poor troctolites which grade into olivine-rich troctolites and extend down to 3366 where there is another pegmatoidal horizon also containing sulfides. Fine-grained rock at 3362 appears to be associated with this lower pegmatoidal zone. Other successions that start in troctolite and end in pegmatoids are from 3368 to 3382, 3382 to 3393, and 3393 to 3475. Below 3475 the rocks again are slightly more olivine-rich; they grade down into more plagioclase-rich rocks which extend down to a pegmatoidal zone at 3451. This is underlain sharply by olivine-rich troctolite that again grades into plagioclase-rich rock and then into a PC pegmatoid at 3479. The contact at 3479 is extremely sharp and below it is fine-grained olivine-rich rock. There are two different types of olivine-rich rocks in this section.

One is intergradational and interlayered with the more plagioclase-rich troctolites. The other has sharp contacts and occur as inclusions.

These picritic rocks grade into more plagioclase-rich troctolite and then into medium- to coarse-grained troctolite, and then into a pegmatoidal zone at 3543. This pegmatoidal zone is mixed with other rocks but extends to 3553 and appears to contain disseminated sulfides. Below 3553 is medium-grained $PO_{7-12}C$ which grades into extremely olivine-rich and fine-grained rock near 3572. This olivine-rich rock extends down to a pegmatoid at 3584. Underlying troctolites vary from olivine-rich fine-grained rock to medium-grained $PO_{7-12}C$, and contain pegmatoids at 3599 and 3620. Below 3620 is fine-grained olivine-rich troctolite which extends to 3690; parts of this section have been split for sulfides. From 3690 to 3710 the rock is basically a medium- to fine-grained moderately olivine-rich troctolite. It grades into pegmatoidal PC that contains some sulfides. This zone is underlain by plagioclase-rich troctolite which starts at 3720 and extends into pegmatoids at 3732. Several other sequences that have troctolite grading down into pegmatoids occur at 3748-3760, 3760-3790, and 3790-3800.

Sulfide-bearing troctolites below 3800 has some interlayered magnetite cumulates but are fairly homogeneous to 4105. At 4100 rocks become coarser-grained and grade into a thick pegmatoidal PC that continues down to 4132. Below 4132 is a sequence of interlayed troctolite and anorthosite that extends down into a sequence of predominatly plagioclase-rich troctolites and anorthosites at 4214. This plagioclase-rich sequence locally contains magnetite and extends to the granite footwall contact at 4434.

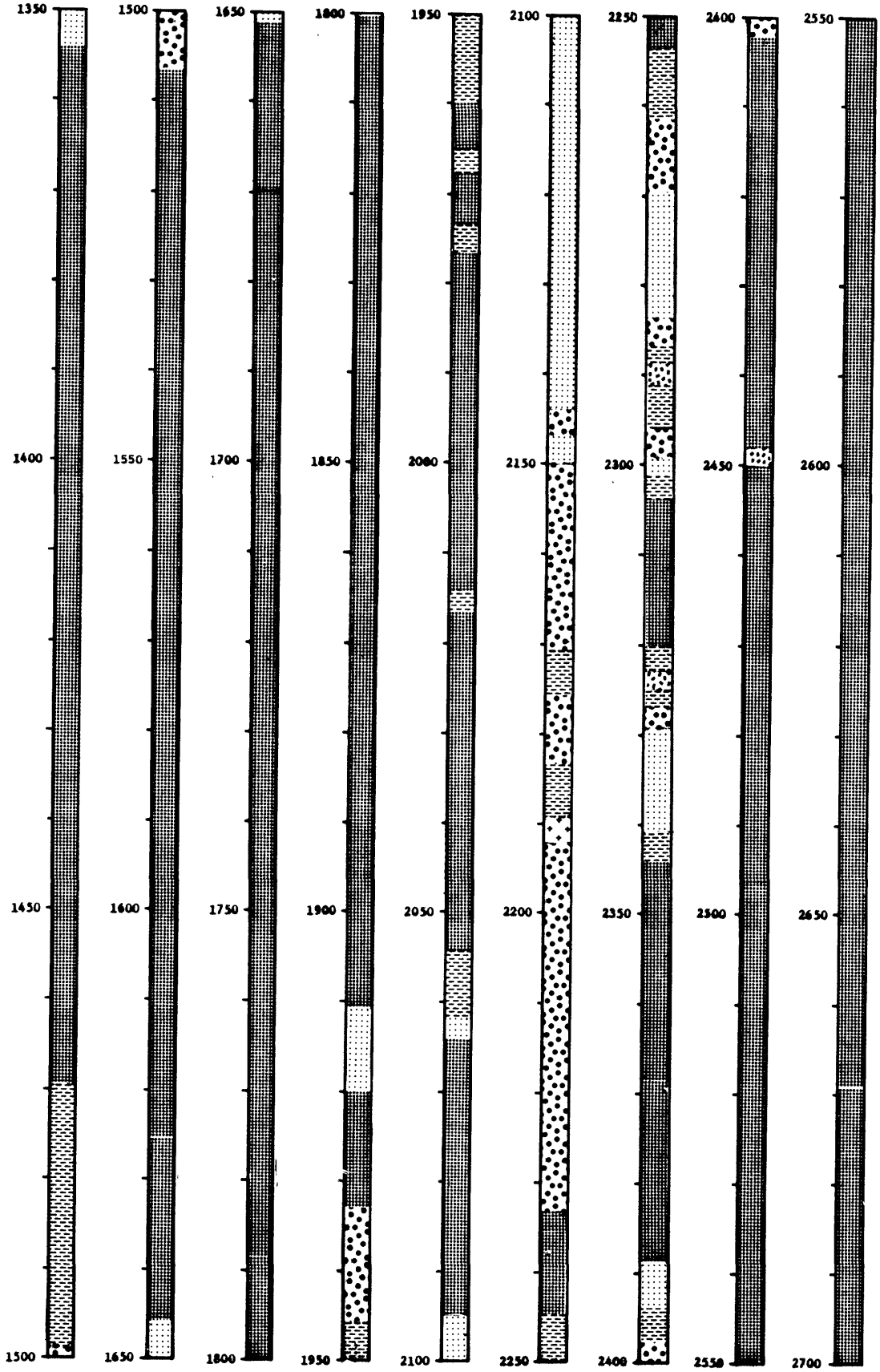
DRILL HOLE DU-14



EXPLANATION OF PATTERNS

- Plagioclase-rich pegmatoid
- Plagioclaee cumulate
- Olivine-poor troctolite
- Troctolite to olivine-rich troctolite
- Olivine cumulate or olivine-rich cumulate
- Magnetite-rich cumulate
- Hornfele
- Monzonite
- Granitic Country Rock
- Fault or shear

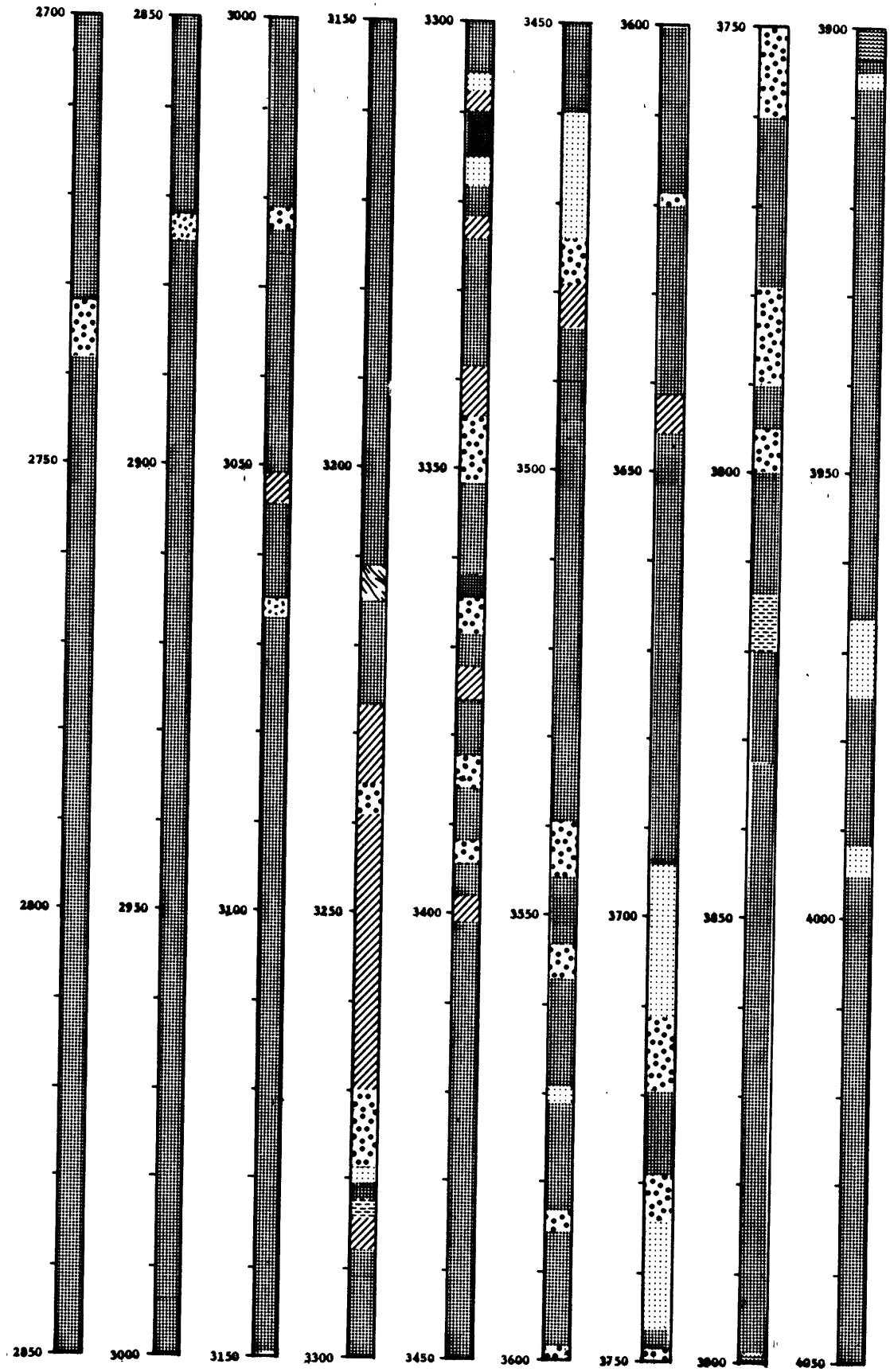
DRILL HOLE DU-14



EXPLANATION OF PATTERNS

- Plagioclase-rich pegmatoid
- Plagioclase cumulate
- Olivine-poor troctolite
- Troctolite to olivine-rich troctolite
- Olivine cumulate or olivine-rich cumulate
- Magnetite-rich cumulate
- Hornfels
- Monzonite
- Granitic Country Rock
- Fault or shear

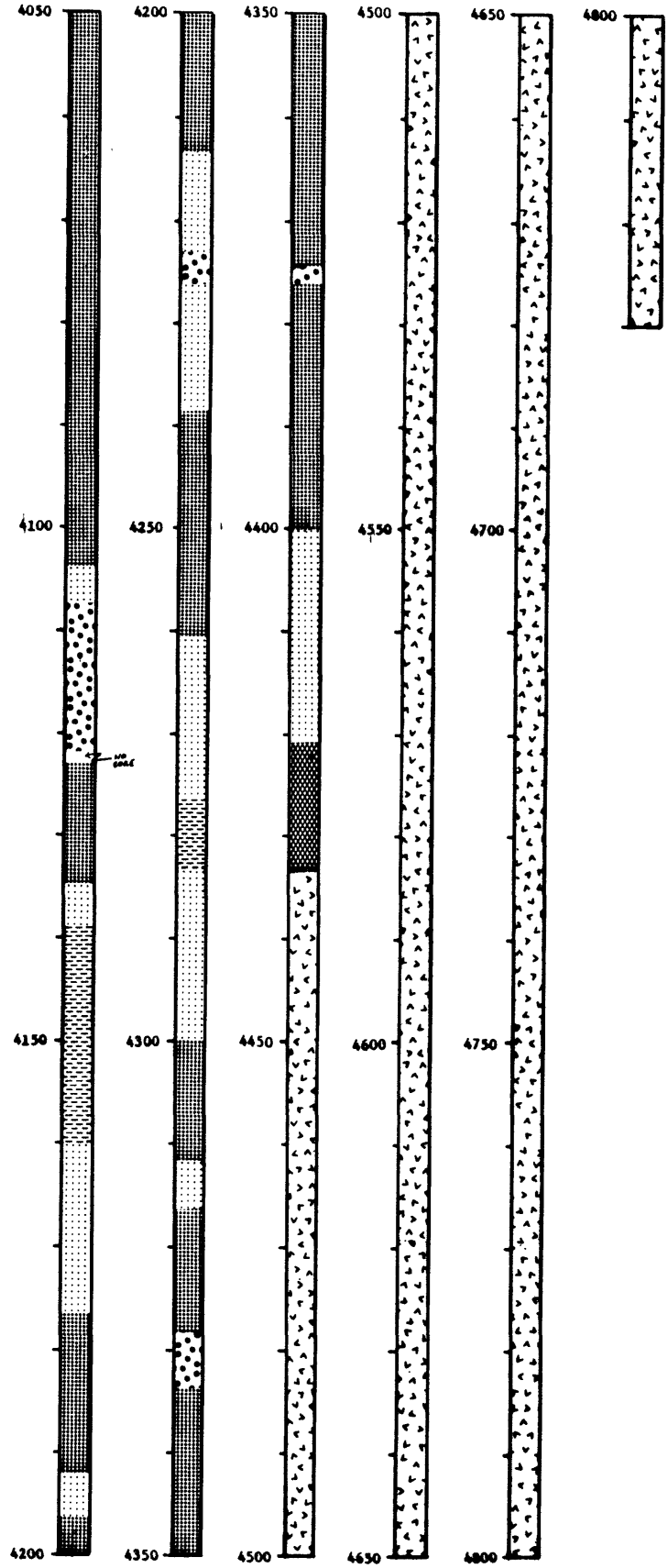
DRILL HOLE DU-14



EXPLANATION OF PATTERNS

- Plagioclase-rich pegmatoid
- Plagioclase cumulate
- Olivine-poor troctolite
- Troctolite to olivine-rich troctolite
- Olivine cumulate or olivine-rich cumulate
- Magnetite-rich cumulate
- Hornfels
- Monzonite
- Granitic Country Rock
- Fault or shear

DRILL HOLE DU-14



EXPLANATION OF PATTERNS

- Plagioclase-rich pegmatoid
- Plagioclase cumulate
- Olivine-poor troctolite
- Troctolite to olivine-rich troctolite
- Olivine cumulate or olivine-rich cumulate
- Magnetite-rich cumulate
- Hornfels
- Monzonite
- Granitic Country Rock
- Fault or shear

DUVALL DRILL HOLE DU-15

Interval (ft)	Description
0-36	$PO_{7-12}C_{x_{t-1}}b_{t-1}z_{t-1}$; medium-grained troctolite with 6-inch PC at 13, 14 and 19. All have gradational contacts; 2-inch PC at 30 and 32 with sharp upper and lower contacts.
36-37 1/2	$PO_{25-30}C$; medium- to coarse-grained; sharp lower contact, gradational upper contact.
37 1/2-73 1/2	$PO_{7-12}C_{x_{1-3}}z_{t-1}b_{t-1}$; typical medium-grained troctolite; 2-inch thick PC layer at 48 1/2 with sharp upper and lower contacts.
73 1/2-81	PC; sharp upper and lower contacts.
81-153	$PO_{7-12}C$; typical medium-grained troctolite with a PC between 116 and 116 3/4; gradationally sharp upper and lower contacts.
153-154	PC; sharp upper contact and gradational lower contacts. Appears to define some sort of break between homogeneous troctolite above and below.
154-303	$PO_{7-12}C$; typical medium-grained troctolite; syenitic dike two inches wide at 192 1/2; 2-inch PC at 193 1/2; a remarkable homogeneous section of rock.
303-307	$PO_{3-7}C$; medium- to coarse-grained, locally pegmatoidal; grades upward through alternating coarse- and finer grained zones into medium-grained troctolite; appears to have a gradational lower contact.
307-319	$PO_{7-12}C$; typical medium-grained troctolite with 2-inch thick pegmatoidal zone at 316; sharp lower contact.

Interval	Description
319-319^{1}/2	PC; gradational lower contact.
319^{1}/2-329	$PO_{15-20}C$; medium-grained, slightly olivine-rich troctolite with gradational lower contact.
329-345	$PO_{7-12}C$; typical medium-grained troctolite.
345-346	$PO_{5-10}C$; fine-grained, gradational upper and lower contacts.
346-360	$PO_{7-12}C_{x_{3-5}}z_{1-2}b_{t}$; typical medium-grained troctolite.
360-362	$PO_{7-12}C$; slightly coarser grained.
362-364	$PO_{5-10}C$; medium-grained, gradational contacts.
364-367	$PO_{15-20}C$; medium- to fine-grained, gradational upper and lower contacts.
367-368	$PO_{3-7}C$; medium- to fine-grained, plagioclase-rich, gradational upper and lower contacts.
368-369	PC pegmatoid; sharply gradational lower contacts. This appears to mark the bottom of the cycle which grades from pegmatoid up into plagioclase-rich rock into an olivine-rich troctolite which then grades back into a typical medium-grained $PO_{7-12}C$ with thin interlayers of plagioclase.
369-381	$PO_{5-10}C$; medium-grained, with numerous thin plagioclase-rich zones; gradational lower contact.
381-384	PC; gradational lower contact.
384-428	$PO_{7-12}C_{x_{2-5}}z_{1-2}b_{t}$; typical medium-grained troctolite; gradational lower contact.
428-431	$PO_{1-2}C$ to PC; medium- to coarse-grained, some plagioclase-rich areas are almost pegmatoidal; lower contacts not exposed.

Interval	Description
431-447	$PO_{7-12}C$; medium- to fine-grained.
447-451	PC; gradational upper and sharp lower contacts.
451-452	$PO_{7-12}C$; medium- to coarse-grained.
452-454	Sheared and serpentinized zone. Rock appears to be a POC, coarse-grained; faults subvertical with horizonal slickensides.
454-457	$PO_{3-5}C$ to PC; coarse-grained to pegmatoidal.
457-460	$PO_{15-20}C$; medium-grained; gradational lower contact.
460-465 1/2	PC pegmatoid; gradationally sharp upper contact, gradational sharp lower contact; good coarse-grained masses of oxides and pyroxenes.
465 1/2-470	$PO_{15-25}C$; medium- to fine-grained, very gradational lower contact.
470-475	PC; some coarse pegmatoidal zones and also some thin zones which contain 3-5% pyroxene, 2-5% oxide, and may have disseminated cumulate olivine.
475-482	$PO_{5-10}C$; medium- to fine-grained, grading downward to $PO_{7-12}C$, medium- to coarse-grained; gradational lower contact.
482-483	PC; sharp lower and upper contacts.
483-509	$PO_{3-7}C$; a heterogeneous zone with numerous thin PC layers which have gradational contacts.
509-554	$PO_{1-2}C_{x_{t-2}}z_{t-1}$; medium- to fine-grained; cumulate olivine probably occurs disseminated throughout sequence; gradational upper and lower contacts.
554-556	PC pegmatoid; sharp lower contact.
556-561	$PO_{15-25}C$; medium- to fine-grained; syenite dike at 558; gradational lower contact.

Interval	Description
561-573 1/2	PC; fine-grained; sharp lower contact.
573 1/2-616	$PO_{7-12}C_{x_{1-4}}z_{t-2}b_t$; typical medium-grained troctolite; gradational lower contact.
616-617	PC; gradational lower contact.
617-618	$PO_{1-2}C$; medium- to coarse-grained.
618-619	PC; sharp lower contact.
619-662	$PO_{5-10}C$; medium- to fine-grained; rock is finer grained and less olivine-rich than the troctolite above 619.
662-665	$PO_{15-20}C$; medium- to fine-grained; sharp lower contact.
665-667	$PO_{1-5}C$; medium-grained; gradationally sharp lower contact.
667-668	$PO_{15-25}C$; medium-grained; gradational lower contact.
668-672	$PO_{10-15}C$; medium- to coarse-grained; several large interstitial masses of pyroxene and oxide.
672-673	PC; gradational upper contact, sharp lower contact; pegmatoidal at base. This must be the bottom of the cycle which extends up into olivine troctolite to plagioclase-rich material near 662.
673-687	$PO_{15-25}C$; medium- to fine-grained; 1-inch thick pegmatoidal zone at 680 1/2; gradational lower contact.
687-694	PC
694-695	PC pegmatoid; coarse interstitial pyroxenes, in excess of 10 cm in diameter and plagioclases over 5 cm in length; extremely abrupt lower contact. This is the base of the cycle which extends up to the PC at 673.
695-699	$PO_{15-25}C$, medium- to fine-grained, gradational lower contact.
699-699 1/2	PC

Interval	Description
699 1/2-712	$PO_{7-12}C$; medium-grained.
712-722	$PO_{1-3}C$; medium-grained.
722-726	PC; sharp lower contact.
726-739	$PO_{7-9}C_{x_{3-5}}z_{t-1}b_t$; medium-grained with a 1-foot pegmatoidal zone at 730; gradational lower contact.
739-740	PC; sharp lower contact.
740-749	Transitional zone with 3- to 6-inch layers of $PO_{7-12}C$ and pegmatoidal layers of $PO_{1-5}C$; gradational lower contacts.
749-773	PC; some thin zones with cumulate olivine that are gradational with PC and do not exceed 1 or 2 inches in thickness; rock has average of 3-4% pyroxene and 1-2% oxides, usually occurring in thin layers or clots.
773-784	$PO_{5-10}C$; medium-grained; sharp upper contact, gradational lower contact.
784-785 1/2	PC; gradational lower contact.
785 1/2-790	$PO_{5-10}C$; medium-grained; gradational lower contact.
790-797	$PO_{3-5}C_{x_5}z_{t-1}$; pegmatoidal; gradational lower contact.
797-798 1/2	PC; sharp lower contact.
798 1/2-812	$PO_{5-10}C$; medium- to coarse-grained; locally almost pegmatoidal; abrupt upper contact with PC, gradational lower contact.
812-815	$PO_{5-15}C$; medium-grained; sharp lower contact.
815-815 1/2	PC; sharp lower contact.
815 1/2-822	$PO_{3-7}C$; medium-grained; sharp upper contact, gradational lower contact.

Interval	Description
822-824 1/2	PC; sharp lower contact.
824 1/2-829	$PO_{5-10}C$; medium- to coarse-grained; gradational lower contact.
829-830	PC pegmatoid; sharp lower contact.
830-841 1/2	$PO_{7-12}C$; medium-grained.
841 1/2-843	PC pegmatoid.
843-860	$PO_{7-12}C$; medium-grained, becomes finer grained downward.
860-871	$PO_{3-5}C$; medium- to fine-grained; a plagioclase-rich zone with gradational upper and lower contacts.
871-887	$PO_{15-25}C_{x_{3-5}z_{t-1}}$; medium- to slightly coarse-grained; sharp lower contact.
887-899	$PO_{10-20}C$; medium- to fine-grained; distinctly finer grained than the rock above; gradationally sharp lower contact.
899-900	PC pegmatoid; sharp lower contact.
900-902	$PO_{15-25}C$; medium- to fine-grained.
902-905	PC; locally pegmatoidal; gradational upper, abrupt lower contacts; represents the base of a cycle.
905-945	$PO_{7-12}C_{x_{2-5}z_{t-1}b_t}$; medium-grained troctolite.
945-946	$PO_{10-15}C$; medium- to fine-grained troctolite; gradational upper and lower contacts.
946-972	$PO_{3-7}C_{x_{t-3}z_{t-1}b_t}$; medium-grained troctolite; gradational upper and lower contacts.
972-975	$PO_{10-15}C$; medium-grained troctolite; gradational upper and lower contacts.

Interval	Description
975-980	$PO_{10-20}C_{x_{3-6}}z_{t-2}$; medium- to coarse-grained troctolite, gradational upper and lower contacts.
980-992	$PO_{7-12}C$; medium-grained; typical troctolite; gradational upper and lower contacts.
992-1000	$PO_{7-12}C$; medium- to fine-grained; gradational upper contacts.
1000-1003	Fault zone with syenitic intrusion.
1003-1017	$PO_{7-12}C_{x_{2-5}}z_{t-3}b_t$; typical medium-grained troctolite; sharp lower contact.
1017-1021 1/2	$PO_{10-15}C_{x_{3-5}}z_{t-3}b_t$; medium- to coarse-grained; sharp contact between overlying finer grained troctolite; gradational lower contact.
1021 1/2-1025	$PO_{10-15}C$; medium-grained; sharp lower contact; contains some thin zones of OPC.
1025-1026	$PO_{3-5}C$; medium-grained; gradational lower contact, sharp upper contact.
1026-1032	PC; some thin intergradational $PO_{1-3}C$ layers; gradational upper and lower contacts.
1032-1041	$PO_{3-7}C$; medium-grained.
1041-1042	Shear zone; serpentinized troctolite; shears dip 70°; slickensides rake 60°.
1042-1065	$PO_{7-12}C$; medium- to fine-grained; some $PO_{15-20}C$; syenite at 1046, between 1053 and 1054, and at 1063.
1065-1077	$PO_{7-12}C$; medium- to fine-grained, syenite at 1072.
1077-1077 1/2	PC; gradational upper and lower contacts.
1077 1/2-1079	$PO_{7-12}C$

Interval	Description
1079-1081	PC
1081-1082 1/2	$PO_{2-5}C$
1082 1/2-1083 1/2	PC; sharp lower contact.
1083 1/2-1094	$PO_{10120}C$; fine-grained; gradational lower contact.
1094-1098	Mixed zone of medium-grained $PO_{2-7}C$ and PC; sharp lower contact.
1098-1103	PC pegmatoid; sharp lower contact.
1103-1106	$PO_{15-20}C$; medium- to fine-grained; gradational lower contact.
1106-1110	$PO_{10-15}C$; medium- to coarse-grained; gradational lower contact.
1110-1111	$PO_{15-20}C$; medium- to fine-grained.
1111-1113	$PO_{10-15}C$; medium-grained; gradational lower contact.
1113-1119	$PO_{1-5}C$ or PC pegmatoid; gradational upper, sharp lower contacts.
1119-1119 1/2	$PO_{7-12}C$; medium-grained.
1119 1/2-1122	$PO_{3-5}C$; medium- to coarse-grained.
1122-1123	PC pegmatoid
1123-1125	$PO_{7-12}C$; medium-grained.
1125-1127 1/2	$PO_{3-5}C$; medium- to coarse-grained, sharp lower contact.
1127 1/2-1128 1/2	$PO_{15-20}C$; medium- to fine-grained.
1128 1/2-1129	PC pegmatoid
1129-1141	$PO_{7-12}C$; medium- to fine-grained with a one-inch thick pegmatoidal zone at 1136 1/2; gradational lower contact.
1141-1144	$PO_{7-12}C$; medium-grained; gradational lower contact; thin pegmatoidal zone at 1142.
1144-1144 1/2	PC
1144 1/2-1147 1/2	$PO_{7-12}C$; gradational lower contact.

Interval	Description
1147 1/2-1149	PC; grading down to pegmatoidal zone at base; sharp lower contact.
1149-1152	$PO_{7-12}C$; medium- to fine-grained; interlayered with thin zones of medium-grained $PO_{3-5}C$; gradational lower contact.
1152-1157 1/2	$PO_{7-12}C$; fine-grained; gradational lower contact.
1157 1/2-1178 1/2	PC; sharp lower contact.
1178 1/2-1179	$PO_{15-20}C$; medium-grained; gradational lower contact.
1179-1191 1/2	PC; thin $PO_{1-2}C$ layers; sharp lower contact.
1191 1/2-1194	$PO_{3-5}C$; medium-grained; gradational lower contact.
1194-1200	PC; sharp lower contact.
1200-1206	$PO_{7-12}C$; fine- to medium-grained; gradational lower contact.
1206-1208	$PO_{30-50}C$; medium-grained; sharp lower contact.
1208-1232	$PO_{7-12}C$; medium-grained; gradational lower contact.
1232-1246	$PO_{7-12}C_{x_{3-5}}z_{t-1}$; medium- to coarse-grained; thin PC interlayers; grades up into medium-grained troctolite; grades down into PC.
1246-1250 1/2	PC; sharp lower contact.
1250 1/2-1251 1/2	$PO_{7-12}C$; medium to fine-grained; gradational lower contact.
1251 1/2-1252	PC
1252-1256 1/2	PC pegmatoid; pyroxene and oxide masses in excess of 5 inches in diameter; sharp lower contact.
1256 1/2-1261	$PO_{7-12}C$; medium- to coarse grained; gradational lower contact.
1261-1262	PC pegmatoid; extremely sharp lower contact.

Interval	Description
1262-1278	$PO_{15-20}C_{x_{3-7}}z_{t-1}b_t$; medium-grained; gradational lower contact.
1278-1279	PC; gradationally sharp lower contact.
1279-1281	$PO_{15-25}C$; medium- to fine-grained; gradational lower contact.
1281-1283	$PO_{5-7}C$; medium- to coarse-grained; gradational lower contact.
1283-1285	PC pegmatoid
1285-1285 1/2	$PC_{x_{5-15}z_{5-7}}$; fine-grained.
1285 1/2-1286	PC pegmatoid.
1286-1292	$PO_{3-5}C_{x_{2-5}}$; medium- to coarse-grained, almost pegmatoidal in places; gradational lower contact.
1292-1293	$PO_{7-12}C$; medium-grained.
1293-1293 1/2	PC
1293 1/2-1294 1/2	PC pegmatoid; sharp lower contact.
1294 1/2-1303	$PO_{7-15}C$; medium-grained, and medium- to coarse-grained layers are intermixed; gradational lower contact.
1303-1304	PC pegmatoid
1304-1307	$PC_{x_{3-7}z_{2-5}}$; sharp lower contact.
1307-1309 1/2	$PO_{3-5}C_{x_{3-5}z_{1-2}}$; gradational lower contact.
1309 1/2-1321 1/2	$PO_{1-3}C$; gradational lower contact.
1321 1/2-1323 1/2	$PO_{7-12}C$; fine-grained; gradational lower contact.
1323 1/2-1340	$PO_{15-20}C_{x_{3-5}z_{1-3}}$; medium-grained; sharp lower contact; two-inch PC at 1340.
1340-1351	PC; sharp lower contact.
1351-1375	$PO_{15-20}C$; medium- to coarse-grained; one-inch fine-grained $PO_{20-25}C$ at 1357 1/2; gradational lower contact.

Interval	Description
1375-1378 1/2	PC; gradationally sharp lower contact.
1378 1/2-1389	$PO_{5-7}C_{x_5}$; medium- to fine-grained; gradational lower contact.
1389-1401	$PO_{7-12}C$; medium-grained; gradational lower contact.
1401-1403	PC; sharp lower contact.
1403-1406	$PO_{7-12}C_{x_{2-5}}$; medium-grained; gradational lower contact.
1406-1407 1/2	PC; gradational lower contact.
1407 1/2-1409 1/2	$PO_{15-20}C$; medium- to coarse-grained, gradational lower contact.
1409 1/2-1410 1/2	PC; gradational lower contact.
1410 1/2-1414	$PO_{7-12}C$; gradational lower contact.
1414-1433 1/2	PC; containing about 3 to 5 percent pyroxene and 2 to 3 percent oxides; sharp lower contact.
1433 1/2-1435	$PO_{2-3}C$; medium-grained.
1435-1445	$PC_{x_5z_3}$
1445-1450	PC pegmatoid; sharp lower contact.
1450-1456 1/2	$PO_{3-5}C$; medium to fine grained; gradational lower contact.
1456 1/2-1464 1/2	PC pegmatoid.
1464 1/2-1543	$PO_{5-10}C_{x_{2-3}z_{t-1}}$; medium-grained with a PC from 1498 to 1499 and from 1505 to 1506.
1543-1656	$PO_{20-25}C_{x_{t-2}z_t b_t}$; medium-grained with 5 to 7 mm olivine grains; a one-inch thick PC at 1594 and 1598; a two-inch thick syenite dike at 1617; serpentinized fractures at 1524; gradational lower contact; a monotonous sequence of medium-grained olivine-rich troctolite.

Interval	Description
1656-1789	$PO_{7-12}C$; medium- to coarse-grained; serpentinized faults that dip about 70° between 1677 and 1681; slickensides are subvertical; a monotonous sequence of medium-grained typical troctolite; a 2-inch PC layer at 1750.
1789-1790 1/2	PC; gradational upper and lower contacts.
1790 1/2-1793	$PO_{25-30}C$; medium-grained, gradational lower contact.
1793-1795 1/2	PC; gradational lower contact.
1795 1/2-1796	$PO_{7-12}C$; gradational lower contact.
1796-1798	PC
1798-1800 1/2	PC pegmatoid
1800 1/2-1803	$PC_{x_5z_3}$
1803-1810	$PO_{5-7}C$; mixed fine- and coarse-grained rocks; some thin zones of PC; gradational contacts.
1810-1810 1/2	PC pegmatoid
1810 1/2-1811	$PO_{5-10}C$; pegmatoidal.
1811-1820 1/2	$PC_{x_{3-6}z_{2-3}}$; some thin zones with cumulate olivine; some thin pegmatoidal zones, particularly at the base of the section; sharp lower contact.
1820 1/2-1853	$PO_{20-30}C$; medium- to coarse-grained; 3-inch pegmatoidal zone at 1838.
1853-1873	$PO_{7-12}C$; medium- to coarse-grained; gradational upper and lower contacts.
1873-1876	$PO_{1-2}C$; medium- to coarse-grained; almost a pegmatoid.
1876-1901	$PO_{7-12}C$; medium-grained; gradational lower contact.

Interval	Description
1901-1902	PC pegmatoid; sharp lower contact.
1902-1903	$PO_{3-5}C$; some interlayered PC; gradational lower contact.
1903-1907	$PO_{15-20}C$; medium-grained.
1907-1950	$PO_{7-12}C$; medium-grained; grading down to medium-grained $PO_{10-20}C$
1950-1951	OC; serpentinized and sheared with 70° dipping faults; gradational upper and lower contacts.
1951-1956	$PO_{20-30}C$; medium-grained.
1956-1958	OC; gradational upper and lower contacts.
1958-2015	$PO_{10-20}C$; grades upward into OC; grades downward into more plagioclase-rich rock.
2015-2020	$PO_{1-5}C$; medium- to coarse-grained, almost pegmatoidal.
2020-2023	PC pegmatoid; gradational lower contact.
2023-2035	$PO_{2-5}C$; medium- to coarse-grained; almost pegmatoidal; gradational lower contact.
2035-2056	$PO_{7-12}C$; grades downward from medium- to coarse-grained to medium-grained.
2056-2058	PC pegmatoid
2058-2062	PC; some pegmatoidal areas.
2062-2082	$PO_{15-20}C$; medium- to fine-grained, grades up into very fine grained rock which appears to be in sharp contact with overlying pegmatoidal zone.
2082-2084	PC; coarse-grained.
2084-2116	PC; fine-grained.

Interval	Description
2116-2133	PC pegmatoid
2133-2142	$PC_{x_{2-5}}$; some scattered olivine grains.
2142-2143	PO_1C; very fine grained.
2143-2157	PC; 3-5 mm oxide blebs; fine-grained.
2157-2158	PC to $PO_{1-2}C$; medium to coarse-grained; gradational upper and lower contacts.
2158-2165	PC to $PO_{2-5}C$; very fine grained.
2165-2179	PC pegmatoid; coarse-grained; sharp lower contact.
2179-2180	$PO_{20-30}C$; medium- to fine-grained; gradational lower contact.
2180-2181	$PO_{5-7}C$; medium-grained; gradational lower contact.
2181-2183	PC; gradational lower contact.
2183-2184	$PO_{3-5}C$; medium- to coarse-grained; gradational lower contact.
2184-2185	$PO_{20-30}C$; medium-grained.
2185-2187	PC; fine-grained; sharp lower contact.
2187-2187 1/2	$PO_{20-30}C$; fine-grained.
2187 1/2-2190	PC; mixed zone with coarse- and fine-grained rocks; some $PO_{10-20}C$.
2190-2191	PC; sharp lower contact.
2191-2192 1/2	$PO_{20-30}C$; medium- to very fine grained; gradational lower contact.
2192 1/2-2194 1/2	PC; pegmatoidal toward base; sharp lower contact.
2194 1/2-2231 1/2	$PO_{1-3}C$; medium- to fine-grained, some zones of nearly pure PC; very gradational lower contact.
2231 1/2-2245	PC to $PO_{1-2}C$.

Interval	Description
2245-2260	$PO_{5-10}C$; medium-grained; gradational lower contact.
2260-2266 1/2	$PO_{15-25}C$; medium- to coarse-grained; very gradational upper contact, sharply gradational lower contact.
2266 1/2-2267	PC; some pegmatoidal zones; sharp lower contact.
2267-2287	$PO_{10-15}C$; fine-grained; a very uniform troctolite distinct from the coarser-grained, more blotchy-textured troctolite above 2267.
2287-2297	$PO_{7-12}C$; medium-grained with some coarse pegmatoidal zones; core is split in this section.
2297-2299 1/2	PC pegmatoid; sharp lower contact.
2299 1/2-2302	$PO_{7-12}C$; medium- to fine-grained.
2302-2305	PC pegmatoid; sulfides become ubiquitous below this point.
2305-2307	$PO_{7-12}C$
2307-2315	$PO_{20-30}C$; medium- to fine-grained with numerous 1/2-inch to 1-inch plagioclase-rich stringers; gradational upper contact, sharp lower contact with a 1- to 2-inch thick pegmatoidal PC.
2315-2323	$PO_{30-50}C$; medium- to fine-grained.
2323-2323 1/2	PC pegmatoid
2323 1/2-2328	$PO_{5-7}C$; medium- to coarse-grained; gradational upper and lower contacts.
2328-2329	PC pegmatoid
2329-2330	$PO_{5-10}C$; medium-grained; sharp upper contact, gradational lower contact.

Interval	Description
2330-2332	PC pegmatoid
2332-2334	$PO_{7-12}C$
2334-2334 1/2	PC pegmatoid
2334 1/2-2337 1/2	$PO_{5-10}C$; medium- to coarse-grained; gradational lower contact.
2337 1/2-2339	PC pegmatoid
2339-2344	PMC; coarse-grained magnetite and plagioclase intermixed; magnetite in most cases is 70-90% of rock with magnetite decreasing upwards; appears to grade into pegmatoidal PC.
2344-2354	MC
2354-2357	MPC
2357-2363	$PO_{20-35}C$; medium-grained.
2363-2364	PC pegmatoid and PMC.
2364-2383	$PO_{30-50}C$; medium-grained.
2383-2386	OC; mixed with OPC.
2386-2391	Granitic intrusion.
2391-2392	OPC or OC
2392-2395	$PO_{20-30}C$; medium-grained.
2395-2396	MPC
2396-2397	$PO_{15-25}C$
2397-2402	MC; slightly more plagioclase-rich toward base.
2402-2406	MPC; sharp lower contact.
2406-2408	$PO_{20-30}C$; medium-grained.
2408-2419	MPC; medium- to locally coarse-grained.
2419-2419 1/2	POC

Interval	Description
2419 1/2-2423	PMC; pegmatoidal toward base.
2423-2425 1/2	Mixed POC and PMOC.
2425 1/2-2430 1/2	PC mixed with PMC; coarse-grained; sharp lower contact.
2430 1/2-2439	POMC
2439-2441 1/2	PMC
2441 1/2-2445	PC; appears to be the base of a depositional sequence that grades up into PMC and then into POMC. The top of the sequence is at 2431, where there is a sharp contact with overlying pegmatoid.
2445-2455	Fine-grained hornfels with disseminated sulfides.
2455-2520	Fine- to medium-grained, granitic rock with disseminated sulfides; contact zone.
2520-2580	Giants Range granitic complex; no sulfides.
2580-2701	Giants Range granitic complex with disseminated sulfides.
2701-2800	Giants Range granitic complex; pink, medium-grained granitic rocks with some finer grained inclusions; contains some greenstone inclusions.

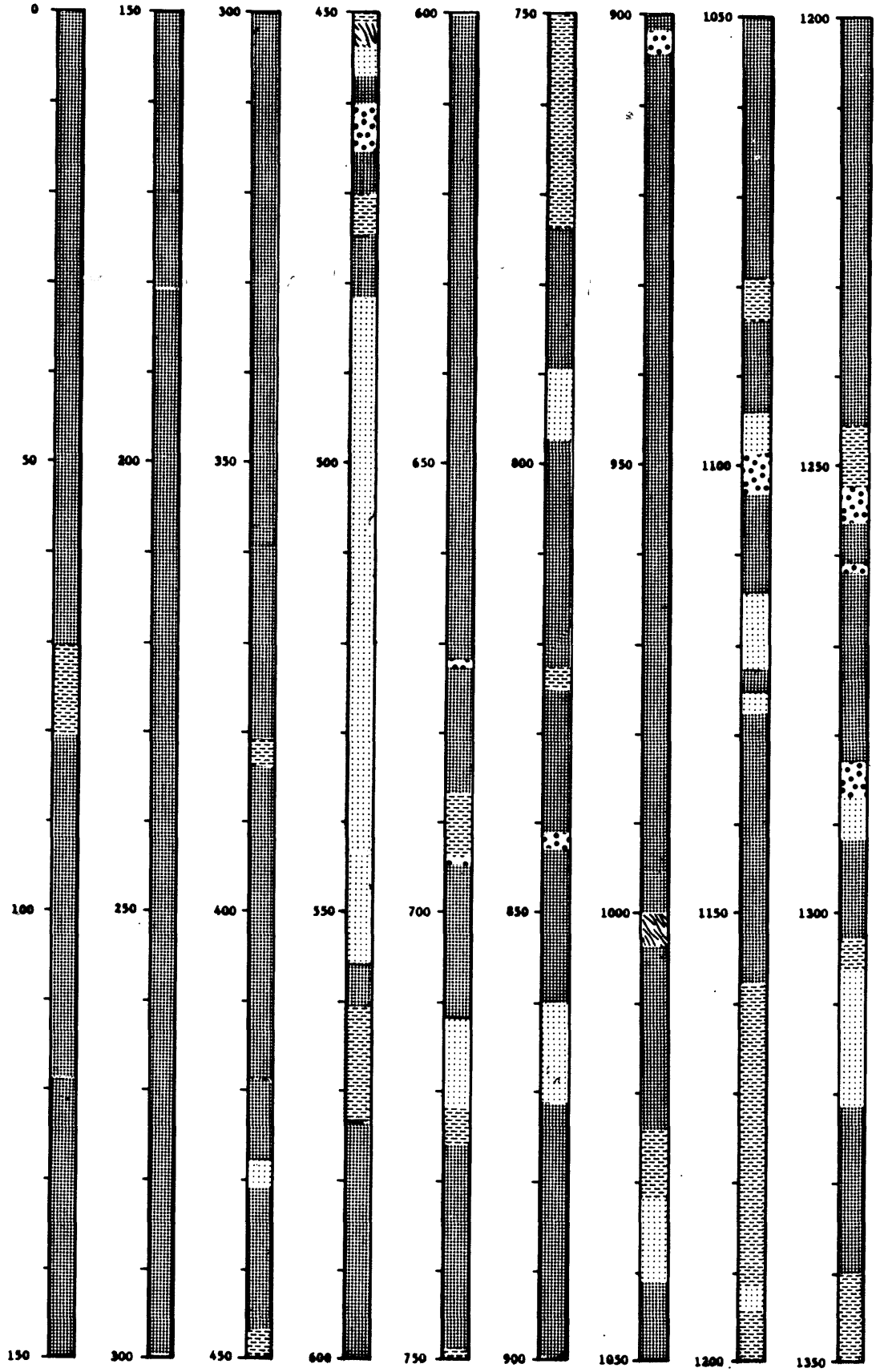
End of Hole at 2800

Summary of Duvall drill hole #15

The upper part of the drill hole to 456 is a remarkably homogeneous sequence of troctolite. A good pegmatoid occurs at 356, marking the base of a cycle. A second pegmatoid at 464 also represents the base of another cycle. Immediately below this zone, the rocks are finer grained and more olivine-rich, but quickly grade into plagioclase-rich rocks at 485. This plagioclase-rich zone extends to 559. Below this, troctolites form a layer which again grades into PC that ends at 573. POC extends below 573 to 673, with thin pegmatoidal zones at 616. Pegmatoid at 673 marks the bottom of this troctolite-rich sequence. Another sequence extends from 673 to pegmatoid at $694^1/2$. Below $694^1/2$, rocks alternate between fine-grained olivine-rich troctolite and thin plagioclase-rich layers, then grades into PC at 722 with a sharp contact at 726. Troctolite again gradationally overlies PC from 722 to 773 and 773 to 824. Pegmatoids occur at 842 and at 905 which appear to mark depositional breaks within a predominantly troctolitic sequence of rocks. Troctolite forms a homogeneous sequence from 907 to 1017, becomes coarse-grained between 1017 and 1025, and grades into PC between 1025 and 1041. From 1041 to 1103 is a succession of rocks grading from troctolite at the top, down through more plagioclase-rich rocks, to a pegmatoidal zone at 1103. Similar but thinner successions of rock types occur from 1117 to 1103, $1123^1/2$ to 1117, and 1127 to $1123^1/2$. Between 1129 and 1154 the rocks are mostly fine- to medium-grained troctolites. From 1154 to 1204 rocks are plagioclase-rich. Below 1204 rocks are again good troctolites which become coarse-grained near 1246 and grade down into PC and pegmatoid at 1252. This pegmatoid represents the base of another discrete depositional sequence. Bottoms of other sequences below this zone are marked by pegmatoids at 1261, 1288, 1294, and 1303. Below 1303, the rocks are mostly plagioclase-rich, fine-grained troctolites which grade into PC at 1449 that ends in a pegmatoid at 1450. A thinner sequence of plagioclase-rich rocks with underlying pegmatoid occurs between 1450 and 1463. Below 1463, there is a 300-foot thick section of homogeneous troctolite. At 1789, rocks become more plagioclase-rich. Between 1799 and 1820, rocks are interlayered PC and pegmatoids. The depositional sequence from 1820 to 1464 is that of a large unit with a plagioclase-rich bottom, gradational middle zone, and troctolitic top. Below 1820, the troctolite changes character as it has larger (7-13 mm) and more abundant olivines than in the units above. This rock extends to 1901 with a thin PC zone between 1873 and 1875. At 1901, there is a thin pegmatoid, below which is a medium- to coarse-grained olivine-rich rock that becomes an OC at 1956. Troctolite below 1956 grades into plagioclaserich rocks and pegmatoids which extend from 2023 to 2058. The rock abruptly changes character at 2058, where the base of a depositional unit probably occurs. From 2058 to 2132 is a welldeveloped sequence of troctolite, PC, and basal pegmatoid. The zone from 2132 to 2245 is plagioclase-rich and may represent the plagioclase-rich zone that overlies the sulfide-bearing basal zone rocks seen in other holes. From 2245 to 2298 is homogeneous troctolite. The pegmatoids at 2305 mark the level below which sulfides are ubiquitous. Troctolites below 2305 are finer grained and more olivine-rich than

those above 2305. Although mostly troctolite, the sequence between 2305 and 2395 also has pegmatoids, magnetite-rich zones, and fine-grained olivine-rich rocks. A sequence of magnetite-rich cumulates occurs between 2395 and 2445. The cumulates are part of depositional sequences that start with coarse-grained PC or PMC and grade up into POC or POMC. Bases of these sequences are at 2423, 2430 1/2, and 2445. Below 2445 is hornfels and granitic country rock.

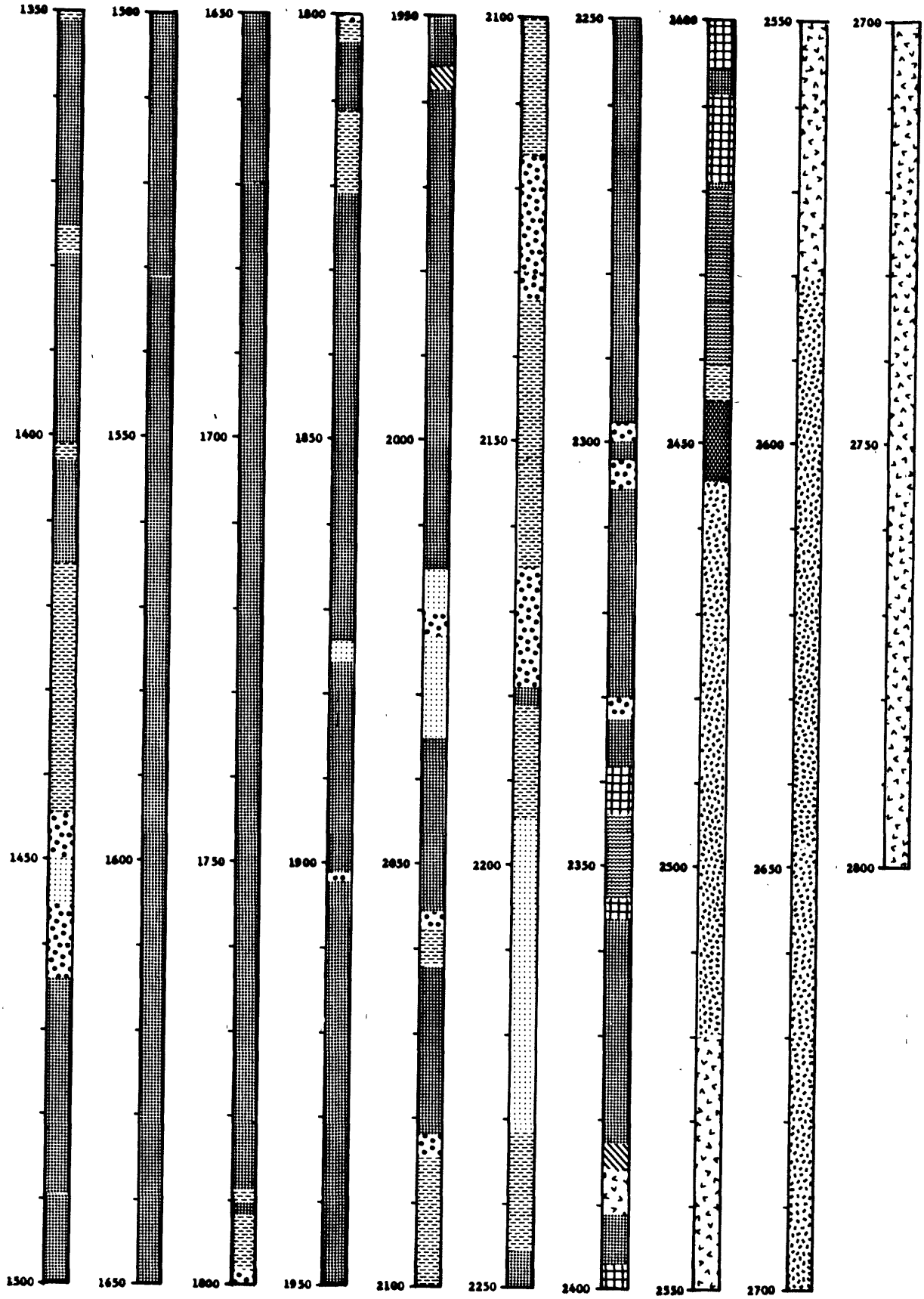
DRILL HOLE DU-15



EXPLANATION OF PATTERNS

- Plagioclase-rich pegmatoid
- Plagioclase cumulate
- Olivine-poor troctolite
- Troctolite to olivine-rich troctolite
- Olivine cumulate or olivine-rich cumulate
- Magnetite-rich cumulate
- Hornfels
- Monzonite
- Grenitic Country Rock
- Fault or shear

DRILL HOLE DU-15



EXPLANATION OF PATTERNS

- Plagioclase-rich pegmatoid
- Plagioclase cumulate
- Olivine-poor troctolite
- Troctolite to olivine-rich troctolite
- Olivine cumulate or olivine-rich cumulate
- Magnetite-rich cumulate
- Hornfels
- Monzonite
- Granitic Country Rock
- Fault or shear

DUVALL DRILL HOLE DU-16

Interval (ft)	Description
0-4	No core.
4-297	$PO_{7-12}C_{x_{t-3}}z_{1-3}b_{1-2}$; medium-grained, olivines 2-5 mm, pyroxenes 0-2 mm, oxide 0-3 mm, biotites 1-4 mm; prominent subvertical shear serpentinized at 180; 2 in. thick PC horizons occur at 186, 187, 190, and 195. Serpentinized subvertical fault at 216. Horizontal fracture serpentinized at 245. Thin olivine-rich zones begin to occur at 260 and increase to 297.
297-307 1/2	$PO_{25-35}C_{x_{t-2}}z_{t-1}b_t$; upper contact is gradational, lower contact is sharp; a picritic zone somewhat sheared and serpentinized; biotite seems to be less prominent here and in the more plagioclase-rich rocks above and below.
307 1/2-369 1/2	$PO_{7-12}C$; medium-grained; identical to troctolite between 4 and 297; horizontal serpentinized shear at 313; 60° dipping shear at 319; 60° serpentinized shear at 351; 6-inch olivine-rich horizon at 361 with sharply gradational upper and lower contacts.
369 1/2-370	$PO_{3-7}C$; medium-grained; gradational lower contact.
370-371	$PO_{15-25}C$; sharp lower contact.
371-374	$PO_{7-12}C$; medium-grained; gradational lower contact.
374-379	$PO_{3-7}C$; medium-grained; gradational lower contact.
379-419	$PO_{7-12}C_{x_{t-2}}z_{t-1}b_t$; medium-grained.

Interval	Description
419-460	$PO_{7-12}C$; extensively serpentinized and sheared; medium-grained. Rock is cut by numerous subvertical fractures that are filled with serpentine. Most olivine has been altered; slickensides on most fractures are subhorizontal, some rake 30-40°. Most extensively serpentinized and brecciated area occurs at 439-441. Some shears have brecciated fragments which have been rotated. Shears are filled in places with chlorite, although altered troctolite appears identical to unaltered material above and below the fault zone.
460-524	$PO_{7-12}C$; medium-grained troctolite. A 6-inch $PO_{15-25}C$ occurs at 489 with gradational upper and lower contacts.
524-525	OC or OPC; sharp upper and lower contacts.
525-534	$PO_{7-12}C$; medium-grained.
534-535	PC; poikolitic olivine and pyroxene; sharp upper and lower contacts.
535-562	$PO_{7-12}C$; medium-grained; 60° dipping serpentinized fractures at $544\frac{1}{2}$ and 548; long subvertical serpentinized fractures at 550 to 554 and 556 to 559. 2-inch pegmatoidal zone at $536\frac{1}{2}$ marked by a slight coarsening in grain size.
562-601	$PO_{20-40}C_{x_{2-5}}z_{t-2}b_t$; medium-grained; upper contact is gradational to medium-grained troctolite, lower contact is abrupt; olivine increases in abundance downward.
601-$601\frac{1}{2}$	PC; sharp lower contact.
$601\frac{1}{2}$-602	$PO_{7-12}C$; medium-grained; sharp lower contact.

Interval	Description
602-603	PC; sharp lower contact.
603-606 1/2	$PO_{7-12}C$
606 1/2-607	PC
607-608 1/2	$PO_{3-7}C$; gradational upper contact, sharp lower contact.
608 1/2-609	PC; gradational lower contact.
609-612	$PO_{3-5}C$; medium- to coarse-grained.
612-616	$PO_{7-12}C$; medium-grained; sharp upper contact with less olivine-rich rock.
616-616 1/2	PC
616 1/2-618	$PO_{7-12}C$; gradational lower contact.
618-619	PC; gradational lower contact.
619-621	$PO_{1-5}C$; gradational lower contact.
621-629	PC; gradational lower contact.
629-641	$PO_{5-10}C_{x_{2-3}}z_{1-2}b_t$; medium- to coarse-grained, gradational upper contact, sharp lower contact; 2-inch thick PC layer at 635 1/2.
641-646	PC; sharp lower contact.
646-647	$PO_{1-2}C_{x_{3-5}}$; sharp upper and lower contacts; distinguished from the PC principally by its greater pyroxene content.
647-648	PC
648-649	$PO_{1-2}C$ or PC; abundant intercumulus pyroxene.
649-662	PC; the rocks from 641 to 662 may all be PC with variable amounts of intercumulus pyroxene and oxide defining thin layers.
662-672	PMC; medium- to fine-grained; containing 1-2% oxide as small cumulate grains; olivine is intercumulate; gradational upper contact and gradational lower contact. Sample at 664.

Interval	Description
672-703	$PM_{10-15}C$; fine-grained; oxides occur mostly as 1 mm grains that are cumulate; grades up into rock poor in magnetite and then into PC; a thin PC layer occurs at 687; an oxide-rich band occurs at $688^1/2$.
703-708	Monzonite intrusion.
708-722	Fault zone; rock is badly serpentinized, sheared, locally brecciated. Dominant lithology is troctolite. Faulting post-dates syenite intrusion. Slickensides are subvertical. Most faults dip 70-90°.
722-773	$PO_{7-12}C_{x_{3-6}z_{t-2}b_t}$; medium-grained; syenite dike at 734. A $PO_{15-25}C$ between 744 and 747 with gradational upper and lower contacts.
773-774	$PO_{1-2}C$; gradational upper and lower contacts.
774-799	$PO_{7-12}C$; gradational lower contact.
799-811	PC; has layering defined by changes in intercumulus pyroxenes and magnetite; most is nearly pure plagioclase; gradational lower and upper contacts. Monzonite at 803.
811-814	$PO_{7-12}C$; medium-grained; sharp lower contact.
814-816	PC; gradational lower contact.
816-830	$PO_{7-12}C$
830-$831^1/2$	PC
$831^1/2$-850	$PO_{7-12}C$
850-851	PC; gradational lower and upper contacts.
851-852	$PO_{7-12}C$; gradational lower contact.

Interval	Description
852-855	PC; gradational lower contact.
855-856	$PO_{3-5}C$; gradational lower contact.
856-857	PC; gradational lower contact.
857-934	$PO_{7-12}C$; typical medium-grained troctolite; syenite at 892 and 836.
934-966	PC; layering defined by modal changes in intercumulus pyroxenes and oxides; gradational upper and lower contacts.
966-1000	$PO_{7-12}C$; a 1-inch thick PC at 986; syenite at 989; gradational lower contact.
1000-1001 1/2	PC; gradational lower contact.
1001 1/2-1002	$PO_{7-12}C$; gradational lower contact.
1002-1002 1/2	PC; gradational lower contact.
1002 1/2-1004	$PO_{7-12}C$
1004-1011	$PO_{7-12}C$; a 1 inch PC at 1004 1/2.
1011-1012	PC; sharp upper, gradational lower contacts.
1012-1016	$PO_{7-12}C$; nearly vertical serpentinized fault at 1014.
1016-1017	PC; gradational lower contact.
1017-1020	$PO_{7-12}C$
1020-1022	PC
1022-1023	PC pegmatoid
1023-1025 1/2	$PO_{7-12}C$; some thin interlayers of PC.
1025 1/2-1026	PC; pegmatoidal toward bottom; sharp lower contact.
1026-1029 1/2	$PO_{7-12}C$; gradational lower contact.
1029 1/2-1030 1/2	PC; pegmatoidal toward bottom; sharp lower contact.

Interval	Description
1030 1/2-1034	$PO_{7-12}C$; faulted and serpentinized.
1034-1035	PC
1035-1041	$PO_{7-12}C$
1041-1043	PC; gradational upper and lower contacts.
1043-1087	$PO_{7-12}C_{x_{1-3}z_{t-2}b_{t-1}}$; medium-grained troctolite; 2-inch thick PC layers at 1059, 1061 1/2, and 1084 1/2.
1087-1090	PC; gradational lower, sharp upper contacts.
1090-1116	$PO_{7-12}C$; medium-grained troctolite; 2-inch thick PC at 1100 and 1101.
1116-1117	PC; sharp lower and upper contacts.
1117-1140 1/2	$PO_{7-12}C$
1140 1/2-1143	$PO_{15-25}C$; an olivine-rich zone with gradational upper and lower contacts.
1143-1149	$PO_{7-12}C$
1149-1153	$PO_{15-25}C$; olivine-rich zone, gradational upper and lower contacts.
1153-1161	$PO_{7-12}C$
1161-1163	$PO_{10-20}C$; gradational upper and lower contacts.
1163-1184	$PO_{7-12}C$; 1-inch thick PC at 1075; granitic vein at 1165.
1184-1197	PC; gradational upper contact.
1197-1198	PC pegmatoid
1198-1253 1/2	$PO_{5-8}C_{x_{1-3}z_{1-2}b_t}$; a slightly more plagioclase-rich troctolite than the troctolite seen previously in most of this hole; sharp upper contact with pegmatoid; gradational lower contact.

Interval	Description
1252 1/2-1257	PC
1257-1267	$PO_{7-12}C$; medium- to fine-grained.
1267-1269	Monzonite intrusion in fault zone.
1269-1279	Serpentinized and sheared troctolite with reddish olivine grains; faults dip 60° with slickensides nearly vertical.
1279-1295	$PO_{5-10}C$; medium- to coarse-grained olivines.
1295-1296	POC; pegmatoidal with coarse pyroxenes, olivines, interstitial oxides; gradational upper and lower contacts.
1296-1310	$PO_{7-12}C$
1310-1313	PC pegmatoid; gradational upper, moderately sharp lower contacts.
1313-1344	$PO_{2-7}C$; medium- to fine-grained; a troctolite with very little olivine mixed with thin layers of PC; very gradational lower contact.
1344-1358	PC; 5-10% pyroxene, 1-3% oxides, possibly a few cumulate olivine grains; coarse 2-inch thick POC layers at 1353 and 1357; rock is dominantly PC; sharp lower contact.
1358-1372	$PO_{7-12}C$; a typical medium-grained troctolite. Monzonite stringers at 1359 and 1367 1/2.
1372-1377	$PO_{1-5}C$; grades downward into fine-grained PC; diffuse lower contact.
1377-1385	$PO_{7-12}C$
1385-1389	$PO_{15-25}C$; medium- to fine-grained; gradational upper and lower contacts.

Interval	Description
1387-1445	$PO_{7-12}C$; typical medium-grained troctolite; monzonite injections at $1418^1/2$ and $1426^1/2$.
1445-1459	PC; sharp upper contact, gradational lower contact.
1459-1467	$PO_{7-12}C$
1467-1473	Mixed zone of $PO_{2-5}C$ and PC; has 3- to 4-inch thick interlayers which occur in about equal proportions. Section is a plagioclase-rich zone which grades up into the troctolite.
1473-1475	Faulted and serpentinized zone with monzonite intrusion.
1475-1489	$PO_{7-12}C$; sheared and serpentinized locally along 40° dipping fractures that have nearly vertical slickensides. A pegmatoidal zone occurs at 1480-$1480^1/4$; a 6-inch thick olivine-rich zone occurs at 1488.
1489-$1489^1/2$	OC; serpentinized; gradational upper and lower contacts.
$1489^1/2$-$1494^1/2$	$PO_{7-12}C$; gradational lower contact.
$1494^1/2$-1501	PC; gradational upper contact to troctolite, moderately sharp lower contact; rock contains 3-5% pyroxene and 1-3% oxides.
1501-1517	$PO_{7-12}C$; gradational lower contact.
1517-$1518^1/2$	PC pegmatoid; sharp lower contact; marks the base of a depositional sequence.
$1518^1/2$-1519	$PO_{7-12}C$; gradational lower contact.
1519-1523	PC pegmatoid; sharp lower contact.
1523-1524	$PO_{7-12}C$; gradational lower contact.
1524-1529	PC pegmatoid; sharp lower contact.
1529-1532	$PO_{7-12}C$; gradational lower contact.

Interval	Description
1532-1535	PC pegmatoid
1535-1541	Monzonite intrusion.
1541-1551 1/2	PC pegmatoid
1551 1/2-1557	$PO_{7-12}C$
1557-1564	PC pegmatoid
1564-1564 1/2	$PO_{7-12}C$
1564 1/2-1566	PC pegmatoid
1566-1577 1/2	PC; fine-grained with 1-5% pyroxene, 1-3% oxide, some thin zones with disseminated olivine; a pegmatoidal zone occurs at the base.
1577 1/2-1606	$PO_{5-10}C$; medium- to coarse-grained with olivines 7-12 mm; rock is slightly more coarser grained and contains less olivine than a typical medium-grained homogeneous troctolite; olivine occurs in large clots; gradational lower contact.
1606-1608	$PO_{3-5}C$; medium- to coarse-grained; similar to overlying troctolite, but slightly less olivine-rich.
1608-1643	$PO_{7-10}C$; medium- to coarse-grained.
1643-1643 1/2	PC pegmatoid
1643 1/2-1644	$PO_{7-10}C$; medium- to coarse-grained.
1644-1644 1/2	PC pegmatoid
1644 1/2-1645 1/2	$PO_{7-10}C$; medium- to coarse-grained.
1645 1/2-1646	PC

Interval	Description
1646-1732	$PO_{7-12}C$; becomes finer grained and slightly olivine-richer downward so that it changes from coarser grained troctolite to typical homogeneous, medium-grained troctolite. 6-inch PC layer at 1729; 2-inch thick layer at $1723\frac{1}{2}$; syenite at 1661 and 1654; gradational lower contact.
1732-$1732\frac{1}{2}$	PC
$1732\frac{1}{2}$-$1734\frac{1}{2}$	PC pegmatoid; sharp lower contact.
$1734\frac{1}{2}$-1739	$PO_{7-12}C$; medium-grained.
1739-1740	PC pegmatoid
1740-1742	$PO_{7-12}C$
1742-$1742\frac{1}{2}$	PC pegmatoid
$1742\frac{1}{2}$-1765	$PO_{7-12}C$; medium- to fine-grained; typical homogeneous troctolite.
1765-1779	$PO_{10-15}C$; medium- to coarse-grained with pyroxenes 3-10 mm, olivines 4-8 mm, oxides 3-8 mm; grades upward sharply into finer grained POC.
1779-1781	$PO_{2-5}C$; medium-grained; a transition zone.
1781-1785	$PO_{1-3}C$ to PC; medium- to fine-grained; most is PC but 3-inch thick layers occur with some disseminated olivine; sharp lower contact.
1785-1801	$PO_{10-20}C$; medium- to coarse-grained; some almost pegmatoidal zones, but most is homogeneous in texture; abrupt upper contact with finer grained PC; sharp lower contact; syenite at 1795.

Interval	Description
1801-1801^{1}/2	PC pegmatoid; sharp lower contact.
1801^{1}/2-1804	$PO_{10-20}C$; medium- to coarse-grained.
1804-1804^{1}/2	PC pegmatoid; sharp upper and lower contacts.
1804^{1}/2-1805	$PO_{7-12}C$
1805-1806	PC pegmatoid
1806-1818	$PO_{7-12}C$; medium- to coarse-grained with 2-inch thick pegmatoidal zones at 1808^{1}/2 and 1812; monzonite at 1816; sharp lower contact.
1818-1818^{1}/2	PC; fine-grained.
1818^{1}/2-1819	$PO_{7-12}C$; medium-grained homogeneous troctolite.
1819-1820	PC
1820-1826	$PO_{7-12}C$
1826-1831	PC to $PO_{2-5}C$; disseminated olivine occurs as 5-7 mm grains which may be cumulate; they form 2- to 3-inch thick layers; most of the rock is medium- to fine-grained PC with 2-3% pyroxene and 1-2% oxide; gradational lower contact.
1831-1838	$PO_{7-12}C$; medium- to coarse-grained, with pyroxenes to 10 mm and olivines to 7 mm; in places almost pegmatoidal; gradational upper and lower contacts.
1838-1841^{1}/2	PC; some disseminated olivine, biotite, pyroxene and oxide; sharp lower contact.
1841^{1}/2-1846	$PO_{7-12}C$; medium-grained with some coarse-grained intervals; 2-inch thick PC at 1845; gradational lower contact.
1846-1847	PC
1847-1848	PC pegmatoid; sharp lower contact.
1848-1849	$PO_{1-3}C$; medium-grained; gradational lower contact.

Interval	Description
1849-1888	PC to $PO_{1-3}C_{x_{1-4}}z_{t-1}b_t$; a sequence dominantly of plagioclase rock which contains scattered amounts of cumulate olivine. Brecciated monzonitic intrusion at 1871 1/2. Fractured, serpentinized and sheared between 1879 and 1899; shears dip 60° with nearly vertical slickensides. Plagioclase rock is locally brecciated and recemented along faults.
1888-1909	$PO_{5-7}C_{x_{3-5}}z_{t-1}b_t$; medium- to coarse-grained; gradational lower contact.
1909-1911	PC; interlayered with $PO_{1-2}C$; sharp lower contact.
1911-1915 1/2	$PO_{7-12}C_{x_{1-5}}z_{t-2}b_t$; medium-grained with zones of coarse interstitial pyroxene; sharp lower contact.
1915 1/2-1916	$PO_{7-12}C$; very fine grained; sharp lower contact; possibly an inclusion.
1916-1918	POC; gradational lower contact.
1918-1925	$PO_{1-6}C_{x_{2-3}}b_t z_t$; medium- grained; a plagioclase-rich rock which appears to decrease in olivine content downward; silicified sheared zone at 1923; gradational lower contact.
1925-1952 1/2	$PO_{1-2}C$ or PC; very fine grained; olivine less than 1 mm; pyroxenes 0-2 mm; oxides 0-2 mm; predominantly a fine-grained plagioclase-rich rock with less than 2% pyroxene, 2% olivine, and 1% oxide. Between 1952 and 1954 it is faulted; fault dips 70° and shows horizontal motion.
1952 1/2-1955	$PO_{2-7}C$; medium- to fine-grained; gradational lower, sharp upper contacts.

Interval	Description
1955-1956	PC
1956-1957^{1}/2	$PO_{7-12}C$; sharp lower, gradational upper contacts.
1957^{1}/2-1958	PC; sharp lower contact.
1958-1959	$PO_{7-12}C$; medium-grained.
1959-1960	PC; gradational upper and lower contacts.
1960-1963	$PO_{7-12}C$; medium- to coarse-grained, brecciated with monzonitic intrusion at 1961.
1963-1965	PC; sharp lower contact, gradational upper contact; fine-grained rock with layers defined by variations in cumulus pyroxene.
1965-1981	$PO_{7-12}C_{x_{2-5}z_{t-1}b_{t-1}}$; medium- to coarse-grained; some coarse-grained zones that are 1- to 3-inches thick are marked by 10-15 mm pyroxenes. A 2-inch PC occurs at 1967; has sharp upper contact; monzonite brecciated at 1971.
1981-1988	Sheared and silicified zone with 60° dipping fractures that have nearly vertical direction of motion; rock is mostly a PC, strongly silicified and locally brecciated.
1988-1995	PC to $PC_{x_{1-2}z_{t-1}}$; medium-grained; silicified between 1994 and 1996.
1995-1998	$PO_{7-12}C$; medium-grained, serpentinized with altered olivines; fractures dipping 60° with slickensides raking 70°; gradational lower contact.
1998-1999^{1}/2	PC; fine-grained; trace of interstitial pyroxene and oxide; gradational lower contact.

Interval	Description
1999[1]/2-2011	Transitional zone, dominantly of $PO_{5-10}C_{x_{1-2}}z_t b_t$; medium- to fine-grained with interlayers of PC or olivine-poor POC; gradational upper and lower contacts.
2011-2120	$PO_{7-12}C$ grading downward into a $PO_{15-20}C$; medium- to slightly coarse-grained; homogeneous; vertical faults occur at 2029 with horizontal slickensides, serpentinized zones occur at 2042.
2120-2242[1]/2	$PO_{7-12}C$; medium-grained; gradational transition from slightly more olivine-rich material to typical medium-grained troctolite; syenites occur at 2233, 2219, 2208, 2186, 2176, and 2121[1]/2; monzonite at 2237 and 2239[1]/2.
2242[1]/2-2243[1]/2	PC; pegmatoidal towards bottom; gradational upper contact, sharp lower contact.
2243[1]/2-2247	$PO_{7-12}C$; medium-grained; typical troctolite.
2247-2250	$PO_{20-25}C$; coarse-grained, olivines 3-8 mm; well-laminated with lamination intersecting drill core at 30°; sharp upper and lower contacts; a distinctive coarse-grained troctolitic layer.
2250-2252	$PO_{5-7}C$; medium- to coarse-grained; gradational sharp lower contact.
2252-2253	PC; large masses of intercumulus pyroxene and oxide.
2253-2259	PC pegmatoid; sharp lower contact. This represents the base of a depositional sequence that starts at 2259, grades up into medium-grained troctolite, and then into the coarse-grained olivine-rich troctolite at 2248.

Interval	Description
2259-2260	$PO_{7-12}C$; medium-grained; sharp lower contact.
2260-2261	PC pegmatoid; sharp lower contact.
2261-2269	$PO_{7-12}C$; medium-grained; sharp lower contact.
2269-2269 1/4	PC pegmatoid
2269 1/4-2271	$PO_{50}C$; coarse-grained picritic zone; sharp upper contact, gradational sharp lower contact.
2271-2295	$PO_{7-12}C$; medium-grained; syenitic masses at 2275 and 2286.
2295-2297	$PO_{5-7}C$; medium- to coarse-grained; almost pegmatoidal.
2297-2371	$PO_{7-12}C$; medium-grained; grades upward to a coarse-grained pegmatoidal material. Syenite at 2304 and 2314 to 2315, gradational lower contact.
2371-2373	$PO_{5-7}C$; gradational upper and lower contacts.
2373-2426	$PO_{7-12}C$; typical medium-grained troctolite; syenite at 2402 and 2385.
2426-2448	$PO_{7-12}C$; medium- to coarse-grained; syenite at 2429; serpentinized shear at 2431 with slickensides raking 40°.
2448-2449	OPC; gradational upper and lower contacts.
2449-2455	$PO_{7-12}C$; medium- to coarse-grained.
2455-2455 1/4	OPC
2455 1/4-2455 1/2	$PO_{7-12}C$
2455 1/2-2456	PC; sharp upper contact, gradational lower contact.
2456-2456 1/2	POC to OPC; medium- to coarse-grained with olivine-rich zones; gradational lower contact.
2456 1/2-2494	$PO_{7-12}C$

Interval	Description
2494-2494^{1}/4	PC pegmatoid; sharp lower contact.
2494^{1}/4-2556	$PO_{7-12}C$; medium-grained; syenite at 2546 and 2531; 60° dipping shear at 2514 with slickensides raking 45°.
2556-2569	$PO_{10-20}C$; medium- to coarse-grained; grades upward into slightly less olivine-rich troctolite.
2569-2598	$PO_{7-12}C$; medium-grained.
2598-2600	$PO_{5-8}C$; medium- to coarse-grained; grades upward to slightly olivine-rich troctolite.
2600-2603^{1}/2	Syenitic intrusion; partially brecciated.
2603^{1}/2-2619	$PO_{7-12}C$; medium- to coarse-grained; typical medium-grained troctolite.
2619-2635	$PO_{10-15}C_{x_{t-2}}z_{t-1}b_{t}$; medium- to coarse-grained; syenite between 2623 and 2624^{1}/2.
2635-2719	$PO_{5-10}C$; medium-grained; typical troctolite grades upward into the slightly more olivine-rich material.
2719-2719^{1}/2	OPC; gradational upper and lower contacts.
2719^{1}/2-2721	$PO_{7-12}C$; medium-grained; gradational lower contact.
2721-2724	$PO_{5-10}C$; medium- to coarse-grained; slightly pegmatoidal; grades upward into the finer grained, slightly more olivine-rich material.
2724-2795	$PO_{5-10}C_{x_{3-6}}$; medium- to coarse-grained; slightly less olivine than the typical medium grained troctolite.
2795-2795^{1}/2	$PO_{1-2}C$; pegmatoid.
2795^{1}/2-2811	POC
2811-2812	Syenitic lens.

Interval	Description
2812-2855	$PO_{7-12}C_{x_{2-5}}z_{t-1}b_t$; medium-grained troctolite; syenite at 2813 1/2 and 2843-2843 1/2; extensively sheared and serpentinized between 2845 and 2853; shears dip 75-80°; slickensides rake 20°; some shears show an older set of slickensides raking 70° and a younger set raking 20°.
2855-2857	Pegmatoidal $PO_{1-2}C$; gradational upper and moderately sharp lower contacts.
2857-2882	$PO_{5-10}C$; coarse-grained in the upper part, becoming medium-grained toward the lower part; a 2-inch thick PC at 2878.
2882-2884	$PO_{20-30}C$; medium- to fine-grained; sharp upper and lower contacts.
2884-2893	$PO_{7-12}C$; medium- to coarse-grained; syenite at 2887.
2893-2895 1/2	$PO_{10-15}C$; extremely fine grained; sharp upper and lower contacts; probably an inclusion.
2895 1/2-2896	$PO_{25-35}C$; medium-grained.
2896-2897	Fine-grained troctolitic layers, interlayered with coarse-grained $PO_{20-30}C$; layers are 2 inches thick; contacts are sharp. The fine-grained material are probably inclusions.
2897-2897 1/2	$PO_{30-40}C$; medium- to coarse-grained.
2897 1/2-2899 1/2	Fine-grained troctolitic rock with sharp upper and lower contacts; probably an inclusion.
2899 1/2-2917	$PO_{7-12}C_{x_{3-7}}z_{1-3}b_t$; medium- to coarse-grained; syenite between 2910 and 2911; sharp lower contact.
2917-2927	$PO_{20-35}C$; medium- to fine-grained; sharp lower contact.

Interval	Description
2927-2929	$PO_{7-12}C$; medium-grained.
2929-2931	$PO_{20-30}C$; medium-grained; gradational lower contact.
2931-2934	$PO_{7-12}C$
2934-2935	$PO_{20-30}C$; gradational upper, sharp lower contacts.
2935-2935 1/2	Fine-grained inclusion; sharp upper and lower contacts.
2935 1/2-2938	$PO_{7-12}C$; gradationally sharp lower contact.
2938-2939	$PO_{20-35}C$; medium- to fine-grained; gradational lower contact, sharply gradational upper contact.
2939-2943 1/2	$PO_{7-12}C$; gradational lower contact.
2943 1/2-2948 1/2	$PO_{20-35}C$; medium- to fine-grained; gradational lower contact.
2948 1/2-2951 1/2	$PO_{7-12}C$; medium-grained.
2951 1/2-2952	$PO_{20-30}C$; medium- to fine-grained; gradational upper and lower contacts.
2952-2953 1/2	$PO_{7-12}C$; medium-grained; gradational upper and lower contacts.
2953 1/2-2954	Fine-grained $PO_{25-35}C$; gradational upper and lower contacts.
2954-2960 1/2	$PO_{7-12}C$; medium- to coarse-grained.
2960 1/2-2961	Fine-grained POC; sharp lower contact; probably an inclusion.
2961-2961 1/2	$PO_{7-12}C$; medium-grained.
2961 1/2-2963 1/2	Fine-grained $PO_{15-25}C$; gradational lower contact.
2963 1/2-2964	$PO_{7-12}C$; medium-grained.
2964-2966	Syenitic intrusion.
2966-2967	POC_{7-12}; medium-grained.
2967-2968	$PO_{25-35}C$; gradational upper and lower contacts.
2968-2969	$PO_{7-12}C$; medium-grained.

Interval	Description
2969-2971	$PO_{25-35}C$; medium-grained; gradational upper and lower contacts.
2971-2972	POC; medium-grained.
2972-2973	Syenite
2973-2974	$PO_{7-12}C$; medium-grained.
2974-2975	$PO_{25-35}C$; medium- to fine-grained; gradational upper and lower contacts.
2975-2978	$PO_{7-12}C$; medium-grained.
2978-2983	$PO_{25-40}C$; medium- to fine-grained; sharp lower contact, sharply gradational upper contact.
2983-2993	$PO_{7-12}C$; medium-grained.
2993-3000 1/2	$PO_{25-35}C$; medium- to fine-grained; sharply gradational lower and upper contacts.
3000 1/2-3001 1/2	$PO_{7-12}C$; medium-grained.
3001 1/2-3003	$PO_{25-35}C$; medium- to fine-grained.
3003-3004	$PO_{7-12}C$; medium- to fine-grained; sharp lower contact.
3004-3005	$PO_{25-35}C$; medium-grained; sharp upper contact.
3005-3007	$PO_{7-12}C$; medium-grained troctolite.
3007-3009	$PO_{30-40}C$; medium- to fine-grained; sharp upper and lower contacts.
3009-3009 1/4	$PO_{7-12}C$; gradational lower contact.
3009 1/4-3009 1/2	$PO_{30-40}C$
3009 1/2-3010	$PO_{7-12}C$; gradational lower contact.
3010-3012	$PO_{30-40}C$
3012-3013	$PO_{7-12}C$; sharp lower contact.
3013-3019 1/2	$PO_{30-40}C$; medium- to fine-grained; gradational lower contact.

Interval	Description
3019 1/2-3020	$PO_{7-12}C$; gradational lower contact.
3020-3028	$PO_{25-40}C$; medium-grained.
3028-3035 1/2	$PO_{35-50}C$; medium-grained; gradational upper, sharp lower contacts.
3035 1/2-3036	$PO_{7-12}C$; medium- to coarse-grained.
3036-3037	$PO_{40-50}C$; medium- to fine-grained; sharp upper, gradational lower contacts.
3037-3037 1/2	$PO_{7-12}C$; medium- to fine-grained; gradational lower contact.
3037 1/2-3045	$PO_{30-45}C$; medium- to coarse-grained; gradational lower contact:
3045-3047	$PO_{7-12}C$; medium- to fine-grained; gradational lower contact.
3047-3049	$PO_{30-40}C$; medium-grained; gradational lower contact.
3049-3054	$PO_{7-12}C$; medium-grained.
3054-3056	$PO_{25-35}C$; medium- to coarse-grained; gradational lower contact.
3056-3057	$O_{70}PC$; gradational lower contact.
3057-3058	$PO_{30-40}C$; medium-grained.
3058-3058 1/2	$PO_{7-12}C$; medium-grained.
3058 1/2-3059	$PO_{30-50}C$; medium-grained; gradational upper and lower contacts.
3059-3061	$PO_{7-12}C$; medium-grained; gradational lower contact.
3061-3064 1/2	$PO_{30-40}C$; medium- to fine-grained; gradational lower contact.
3064 1/2-3065	$O_{60}PC$; fine-grained; gradational lower contact.
3065-3067	$PO_{20-30}C$; medium-grained; gradational lower contact.
3067-3071	$PO_{30-40}C$; medium-grained; gradational lower contact.
3071-3075	$PO_{5-12}C$; medium- to coarse-grained; sharp lower contact.
3075-3075 1/2	$PO_{35-50}C$; medium-grained; gradational lower contact.

Interval	Description
3075 1/2-3076 1/2	$PO_{7-12}C$; medium-grained.
3076 1/2-3078	$PO_{30-40}C$; medium-grained; gradational lower, sharp upper contacts.
3078-3079 1/2	$PO_{7-12}C$; medium-grained; sharp lower contact.
3079 1/2-3080	OPC
3080-3084	$PO_{40-50}C$; medium- to coarse-grained.
3084-3087	$PO_{10-20}C$; medium- to coarse-grained; gradational upper, sharp lower contacts.
3087-3088	OPC; gradational lower, sharp upper contacts.
3088-3090	$PO_{7-12}C$; medium- to coarse-grained; sharp lower contact.
3090-3090 1/2	$PO_{30-40}C$; fine-grained; gradational lower contact.
3090 1/2-3103	$PO_{7-12}C$; medium- to coarse-grained.
3103-3104	$PO_{30-40}C$; medium- to fine-grained.
3104-3105	$PO_{7-12}C$
3105-3105 1/2	$PO_{30-40}C$; gradational lower contact.
3105 1/2-3111	$PO_{7-12}C_{x_{3-6}z_{2-4}}$; coarse-grained; gradationally sharp upper contact with finer grained troctolite; grain size increases downward; gradational lower contact.
3111-3115	$PO_{1-3}C_{x_{3-6}}$; coarse-grained.
3115-3117	$PO_{25-30}C$; medium- to fine-grained; gradational lower and upper contacts.
3117-3120	$PO_{2-5}C$; medium- to coarse-grained with pegmatoidal zones.
3120-3120 1/2	$PO_{30-40}C$; medium- to fine-grained; gradational upper and lower contacts.
3120 1/2-3122	PC pegmatoid

Interval	Description
3122-3123	$PO_{25-30}C$; medium-grained; gradational lower contact.
3123-3126	$PO_{25-30}C$; fine-grained; sharp lower contact.
3126-3130 1/2	$PO_{1-2}C$; medium- to coarse-grained.
3130 1/2-3131	OPC
3131-3134	$PO_{20-30}C$
3134-3184 1/2	PC pegmatoid; sharply gradational upper contact, gradational lower contact.
3184 1/2-3193	$PO_{1-5}C$; medium- to coarse-grained, pegmatoid.
3193-3194	PC pegmatoid; gradational upper and lower contacts.
3194-3213	$PO_{1-4}C$; medium- to coarse-grained, pegmatoid; sharp lower, gradational upper contacts.
3213-3213 1/2	$PO_{30-40}C$; fine-grained; sharp upper and lower contacts; possibly an inclusion.
3213 1/2-3215	POC; coarse-grained.
3125-3126	Syenite
3126-3217 1/2	$PO_{1-2}C$; coarse-grained.
3217 1/2-3218	Fine-grained inclusion.
3218-3219 1/2	PC pegmatoid
3219 1/2-3220	$PO_{1-3}C$; coarse-grained; gradational sharp upper contact.
3220-3221	$PO_{30-40}C$; medium- to very-fine grained; sharp lower, gradational upper contacts.
3221-3222	$PO_{1-3}C$; medium- to coarse-grained.
3222-3223	PC pegmatoid
3223-3225	$PO_{1-3}C$; medium- to coarse-grained.

Interval	Description
3225-3230	$PO_{7-12}C$; medium-grained.
3230-3230^{1}/2	$PO_{30-40}C$; medium-grained; gradational upper and lower contacts.
3230^{1}/2-3234	$PO_{7-12}C$; medium-grained; has little intercumulus pyroxene.
3234-3235	Fine-grained hornfels inclusion with sharp upper and lower contacts.
3235-3237	$PO_{7-12}C$; medium-grained.
3237-3241	$PO_{7-10}M_{3-5}C$; medium- to fine-grained; oxides as small euhedral grains; rock has a spotted texture; gradational lower and upper contacts.
3241-3242	$PO_{5-7}C$; medium- to coarse-grained.
3242^{1}/2-3243	PC pegmatoid; sharp lower contact.
3243-3257	$PO_{1-4}C$; medium-grained; very little olivine, pyroxene 3%, trace of oxides.
3257-3259	$PO_{15-25}C$; medium-grained; sharp upper and lower contacts.
3259-3260	$PO_{20-30}C$; fine-grained; sharp upper and lower contacts; possibly an inclusion.
3260-3263^{1}/2	$PO_{5-10}C$; medium- to coarse-grained.
3263^{1}/2-3275	$PO_{30-40}C$; fine-grained; sharp lower and upper contacts.
3275-3281	$PO_{5-10}C$; medium- to coarse-grained.
3281-3285	$PO_{5-10}C$; fine-grained; sharp lower and upper contacts; possible inclusion.
3285-3295	$PO_{7-12}C$; medium-grained; gradational lower contact.
3295-3296	PC pegmatoid

Interval	Description
3296-3300 1/2	$PO_{10-15}C_{x_t}b_0z_t$; medium-grained; equant 3-5 mm olivines; abundant disseminated sulfides.
3300 1/2-3302 1/2	$PO_{30-50}C$; medium- to fine-grained; plagioclase laths are well-foliated; sharp upper and lower contacts; a probable inclusion; contains very few sulfides.
3302 1/2-3321	$PO_{30-40}C$; equant, 3-7 mm olivine grains.
3321-3323	$PO_{1-3}C$; gradational upper and lower contacts; contains disseminated sulfides.
3323-3327	$PO_{10-15}C$
3327-3330	OPC; medium- to coarse-grained; contains disseminated sulfides.
3330-3341	Medium- to fine-grained rock with virtually no sulfide; probably an inclusion; well-foliated.
3341-3341 1/2	PC pegmatoid; large pyroxenes and biotite.
3341 1/2-3344	Fine-grained $PO_{30-40}C$; contains few sulfides.
3344-3347	$PO_{7-12}C_{x_{2-3}z_t}$; medium- to coarse-grained; contains sulfides.
3347-3350 1/2	Fine-grained picritic rock; olivine about 30-40%; disseminated sulfides are scarce; sharp upper and lower contacts; possible inclusion.
3350 1/2-3352	$PO_{3-5}C$; medium-grained; contains disseminated sulfides.
3352-3356	Fine-grained picritic rock with disseminating sulfides; contacts not exposed.
3356-3356 1/2	MC; a rock composed mostly of magnetite with some scattered plagioclase and disseminated sulfides.
3356 1/2-3357 1/2	$PO_{5-7}C$; medium-grained with disseminated magnetite and sulfides.

Interval	Description
3357 1/2-3361	Fine-grained picritic rock with disseminated sulfides.
3361-3361 1/2	A fine- to medium-grained picritic rock with about 30% olivine, very little disseminated sulfide; probably an inclusion; distinct from the overlying rock because of its generally larger grain size and absence of sulfides.
3361 1/2-3363	Fine-grained picritic rock containing about 30-40% olivine; sharp lower contact.
3363-3364	PC pegmatoid
3364-3366	$PO_{5-10}C$; medium- to fine-grained; disseminated sulfides; extremely abrupt upper contact with pegmatoid; gradational lower contact.
3366-3376	An interlayered sequence of fine-grained $PO_{30-40}C$ and slightly coarser grained $PO_{10-20}C$; disseminated masses of oxides are present.
3376-3379	PC pegmatoid; contains some disseminated sulfides.
3379-3385	$PO_{3-5}C$; medium-grained; becomes slightly more olivine-rich toward top of interval; abrupt contact with overlying pegmatoid.
3385-3392	$PO_{20}C$; medium- to fine-grained; sharp upper and lower contacts; no sulfides; probably an inclusion.
3392-3394	$PO_{30-50}C$; medium-grained; gradational lower contact.
3394-3395	$PO_{5-10}C$; medium-grained; sharp lower contact.
3395-3396	$PO_{30-50}C$; medium-grained; sharply gradational lower contact.
3396-3397	$PO_{5-10}C$; medium-grained; sharp lower contact.
3397-3399	$PO_{30-50}C$; medium- to fine-grained; gradationally sharp lower contact.

Interval	Description
3399-3403^{1}/2	PC; grades downward into pegmatoidal PC; sharp lower contact. Marks the base of a depositional sequence which starts at 3404^{1}/2 and goes up to troctolite at 3399. This troctolite contains two sections of medium-grained, olivine-poor troctolite; sulfides occur throughout this section, but are less abundant in the most pegmatoidal and plagioclase-rich zones.
3403^{1}/2-3407	$PO_{15-30}C$; medium- to coarse-grained with good euhedral olivines; sharp lower contact.
3407-3408	Medium- to fine-grained sulfide-free inclusion with about 15% olivine.
3408-3408^{1}/2	$PO_{30-40}C$; medium-grained, grades sharply downward.
3408^{1}/2-3411	$PO_{1-5}C$; medium- to coarse-grained.
3411-3412	PC pegmatoid; extremely sharp lower contact.
3412-3413	$PO_{40-50}C$; medium-grained; gradationally sharp lower contact.
3413-3413^{1}/2	PC; becomes pegmatoidal toward base; sharp lower contact.
3413^{1}/2-3414^{1}/2	$PO_{30-60}C$; medium- to fine-grained; gradational lower contact.
3414^{1}/2-3415	PC pegmatoid
3415-3418	$PO_{3-6}C$; medium-grained; sharp upper and lower contacts.
3418-3419	Fine-grained sulfide-free inclusion; contains about 30% finely disseminated olivine; sharp lower contact.
3419-3420	PC pegmatoid
3420-3420^{1}/2	OPC; grades down into OC.
3420^{1}/2-3421^{1}/2	PC pegmatoid; sharp lower contact.

Interval	Description
3421 1/2-3426 1/2	$PO_{3-5}C$; medium-grained; olivine content decreases downward.
3426 1/2-3426 3/4	PC pegmatoid; sharp lower contact, gradational upper contact.
3426 3/4-3443	$PO_{7-12}C$; medium-grained; homogeneous typical troctolite; contains disseminated sulfides.
3443-3444	PC; medium- to coarse-grained.
3444-3445	PC pegmatoid; sharp lower contact; contains disseminated sulfides.
3445-3450	$PO_{7-12}C$; medium- to fine-grained; sharp lower contact.
3450-3452 1/2	Fine-grained hornfels inclusion; sulfide-free; sharp lower contact.
3452 1/2-3455	PC pegmatoid
3455-3459	$PO_{7-12}C_{z\ 3-6}{}^{x}{}_{2-5}$; medium-grained; gradational sharp lower contact.
3459-3459 1/2	PC pegmatoid
3459 1/2-3480	$PO_{5-10}C$; medium- to fine-grained; very little pyroxene, trace of oxides. Contains virtually no sulfide; sharp upper and lower contacts; probably an inclusion, although slightly coarser grained than most other inclusions.
3480-3481	PC pegmatoid
3481-3484	Fine-grained sulfide-free inclusion.
3484-3485	PC pegmatoid; contains sulfides.
3485-3486	Fine-grained sulfide-free inclusion; sharp upper and lower contacts.
3486-3492	$PO_{40-50}C$; medium-grained with sparse sulfides.
3492-3493	Mixed zone of pegmatoidal and fine-grained $PO_{30-40}C$; contains large coarse sulfide masses.
3493-3495	$PO_{20-30}C$; medium-grained.

Interval	Description
3495-3495 1/2	PC pegmatoid
3495 1/2-3496	Fine-grained sulfide-free inclusion.
3496-3501	$PO_{35-40}C$; fine-grained; contains few sulfides.
3501-3503	Fine-grained inclusion; sharp lower contact.
3503-3503 1/2	PC pegmatoid; contains few sulfides.
3503 1/2-3526	Heterogeneous zone of medium-grained $PO_{5-15}C$, and medium- to fine-grained $PO_{30-40}C$; both occur in about equal proportions.
3526-3529	Fine-grained sulfide-free inclusion.
3529-3531	PC pegmatoid
3531-3537	$PO_{20-30}C$; medium- to fine-grained.
3537-3542	$PO_{5-15}C$; medium- to coarse-grained.
3542-3545	$PO_{30-50}C$; medium- to fine-grained.
3545-3545 1/2	PC pegmatoid
3545 1/2-3557	$PO_{30-40}C$; medium- to fine-grained.
3557-3559	PC pegmatoid
3559-3573	$PO_{30-40}C$; medium-grained.
3573-3575	Fine-grained sulfide-free inclusion.
3575-3576	PC pegmatoid
3576-3577 1/2	$PO_{15-25}C$; medium- to fine-grained; contains few sulfides.
3577 1/2-3580	PC pegmatoid
3580-3581	$PO_{1-3}C$; medium-grained.
3581-3589	PC pegmatoid
3589-3601	$PO_{20-30}C$; medium- to fine-grained; contains abundant disseminated sulfide.

Interval	Description
3601-3603	Fine-grained sulfide-free inclusion.
3603-3605	$PO_{40-50}C$; medium- to fine-grained.
3605-3605^{1}/2	MC; entirely magnetite.
3605^{1}/2-3618	PC pegmatoid; sharp lower contact.
3618-3627	$PO_{25-60}C$; medium-grained with euhedral olivines; some thin interlayers of medium- to coarse-grained $PO_{5-15}C$.
3627-3628	MC; 80% magnetite, some with good octahedral habit.
3628-3631	$PO_{40-60}C$; medium-grained.
3631-3647	Fine-grained, sulfide-free hornfels with a 2 inch sulfide-bearing pegmatoid at 3639.
3647-3649	$PO_{30-50}C$; sharp upper and lower contacts; contains sulfides.
3649-3651	Fine-grained sulfide-free hornfels.
3651-3661	$PO_{15-25}C$; medium- to coarse-grained; gradational lower contact.
3661-3663	PC pegmatoid; gradationally sharp lower contact.
3663-3668	$PO_{25-35}C$; medium-grained.
3668-3670	$PO_{60-80}C$; medium- to coarse-grained.
3670-3683	$PO_{60-80}C$; medium-grained.
3683-3686	$PO_{3-7}C$; coarse-grained, pegmatoidal; sharp lower contact.
3686-3690	$PO_{40-60}C$; medium-grained with distinct euhedral olivines.
3690-3697	$PO_{30-60}C$; wispy olivine clots; mixed with some layers of
3697-3711	$PO_{7-15}C$; medium-grained.
3711-3715	PC or $PO_{1-5}C$; coarse-grained; some thin layers of $PO_{10-15}C$; sharp lower contact.

Interval	Description
3715-3718	$PO_{20-30}C$; medium- to fine-grained; gradational lower contact.
3718-3738	Fine-grained sulfide-free hornfels; gradational lower contact.
3738-3945	Granitic rock of the Giants Range batholith.
3945-bottom	End of hole

Summary of Duvall drill hole #16

From 4-601 is dominantly a monotonous sequence of uniform troctolite. There are some plagioclase-rich and olivine-rich layers but it is unlikely that they are laterally extensive. The most intriguing layers are the picrites with sharp lower contacts and gradational upper contacts. These may represent turbidite-like layers. A fine example of this type of modal layering extends from 601 in olivine-rich rocks up to more typical troctolite at 574. Prominent fault zones near 446 indicate strike-slip displacements because they have subhorizontal slickensides. There is a good OC at 524 1/2. Between 601 and 633 the rocks are more plagioclase-rich. PC layers mostly have gradational contacts and a troctolite that contains usually less than 10% olivine. Contacts between troctolite and anorthosite are gradational.

A distinctive sequence which should be laterally correlative begins with a plagioclase-rich zone at 641-662 that grades into a fine-grained plagioclase- and magnetite-rich zone, which in turn grades downward into a fine-grained plagioclase-magnetite cumulate which extends to 703. Other PC layers occur within troctolite at 799-811, and 934-966. Contacts with troctolite are gradational.

966 to 1182 is mostly troctolite. A pegmatoidal zone at 1197 1/2 defines the base of a depositional sequence which grades upwards into PC and then into the overlying troctolite at 1161. Pegmatoidal rocks at 1312 and PC at 1359 mark the bases of two other similar successions of rocks. Troctolite below 1359 is typical $PO_{7-12}C$ which extends to 1445.

Between 1445 and 1475 is a PC-rich zone which extends down to a fault zone near 1475. Below this fault are troctolites which contain a well-developed OC at 1489 1/2. Below the troctolite are more plagioclase rich rocks which extend to 1502. Between 1502 and 1577 are a number of pegmatoidal zones which are mixed with troctolite. Some of these appear to mark breaks in depositional sequences that have PC bottoms and POC tops. There is monzonite between 1535 and 1545. Below 1577 is a slightly different type of troctolite that is somewhat coarser grained, less olivine-rich, and has a more "splotchy" appearance than the typical medium-grained troctolite. This rock extends to 1653 where it grades into typical troctolite. The contacts are gradational. This troctolite contains some thin pegmatoidal zones and locally becomes coarse-grained, but extends as a fairly continuous sequence to 1846.

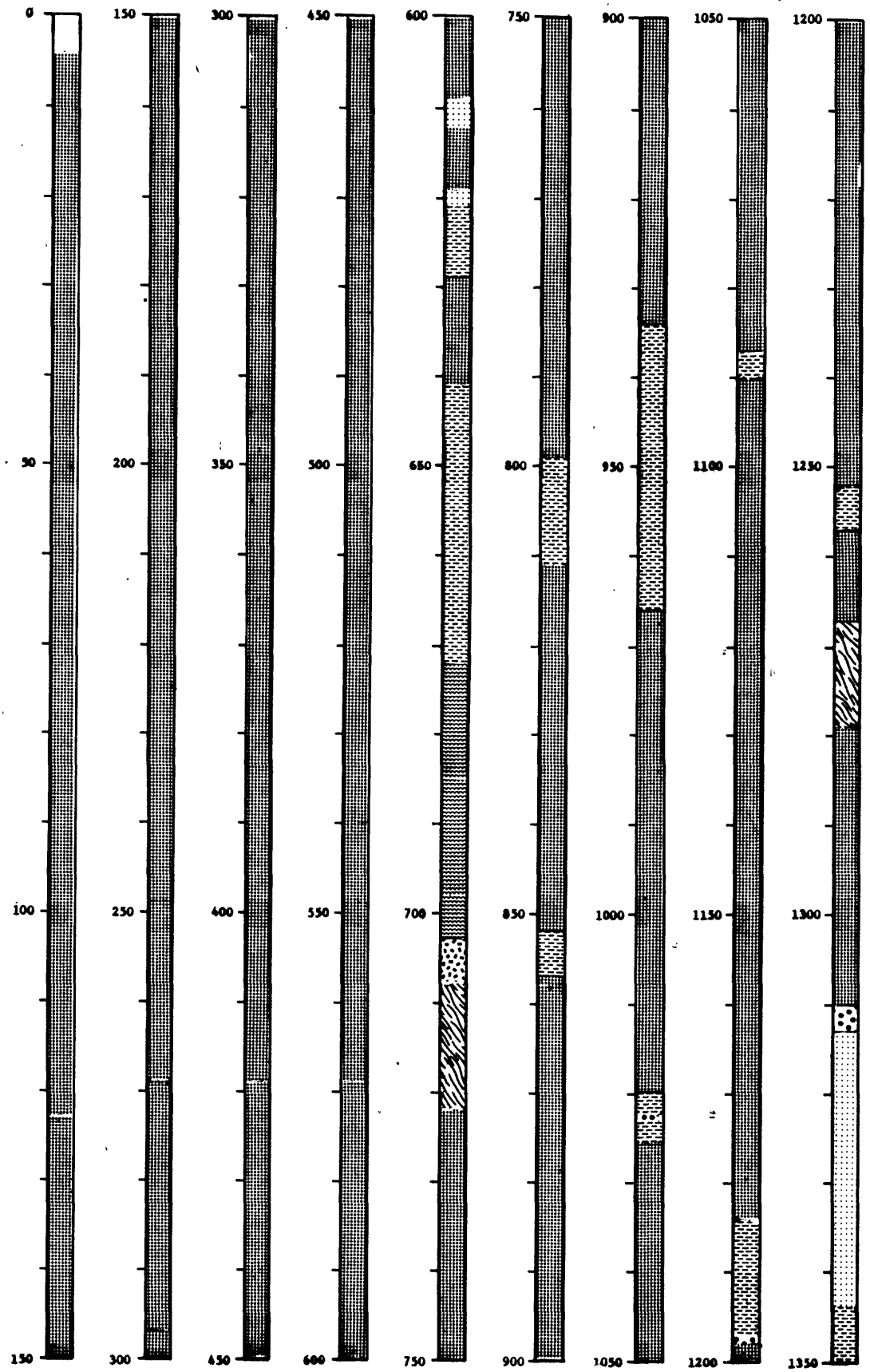
Thin PC layers occur at 1826-1831 and 1838-1841 1/2. There is a thick PC or a plagioclase-rich zone between 1846 and a fault at 1887. Between 1887 and 1984 is fairly homogeneous POC with some thin PC layers. Below 1984 is a PC which at 2003 grades into a POC that becomes olivine-rich at 2023 and then grades back into a typical medium-grained POC at about 2130. Troctolite extends down to more plagioclase-rich material which ends at 2259 in a pegmatoid olivine-rich rock at 2269 and grades down to finer grained, less olivine-rich troctolite that has a coarse-grained, almost pegmatoidal base at 2295. Homogeneous troctolite extends to 2880 with minor picritic zones at 2446, 2449, and 2719 1/2. Below 2880 there are a number of thin, very fine grained layers with sharp upper and lower contacts. These have a "salt and pepper" texture and appear to be inclusions. There are also a number of olivine-rich layers which have sharply

gradational contacts with overlying and underlying troctolite. These do not appear to be country rock inclusions but may represent partially crystallized xenoliths of intrusive rock.

This sequence of interlayered fine- to medium-grained, olivine-rich troctolites and picrites extends to 3103. Below this point, rocks become both coarser grained and more feldspathic. At 3134, there is a thick pegmatoidal zone which may correlate with the sequence logged between 2610 and 2680 in the Duvall Hole #12. This zone contains some fine-grained inclusions. Its lower contact is not sharp as it is interlayered with some olivine-rich layers. The basal contact of this pegmatoidal unit occurs near 3225. The section from 3225 to 3134 is thus a major unit that is characterized by coarse-grained to pegmatoidal olivine-poor rocks. Below 3225 the dominant rock type is a spotted $PO_{7-12}C$ that locally becomes a $PO_{20-40}C$. It is different from the typical troctolite in that it has little intercumulus pyroxene or oxides and often has large olivines. Further, sulfides become abundant below 3225, whereas they are relatively rare above this point. The troctolite below 3225 is interlayered with some fine-grained picritic material that may be inclusions because of their sharp contacts. Some pegmatoidal zones occur at 3243, 3297, and 3242. There is also a magnetite-olivine cumulate at 3239. Fine-grained rocks between 3264 and 3275 and between 3281 and 3285 may also be inclusions as they contain very little sulfide in contrast to the surrounding sulfide-rich troctolite.

The troctolite extends to 3399 with some well-developed pegmatoids at 3363 and 3376. At 3399, there is a well-developed pegmatoid that appears to mark a break in deposition. Troctolite below this point is generally more olivine-rich and often has abundant inclusions and numerous thin pegmatoidal zones. Prominent pegmatoids occur at 3570 and 3610; these pegmatoids often have abundant sulfides. Below the pegmatoid which ends at 3618, the core is almost a monotonous sequence of intermixed medium-grained PO_{30-50}, finer grained $PO_{60-80}C$, medium- to coarse-grained $PO_{10-20}C$, and some thin pegmatoidal zones. There are also ubiquitous hornfels inclusions. Magnetite-rich horizons occur between 3627 and 3628. The bottom contact is not located with certainty as the rock grades into fine-grained hornfels, which then grades into pinkish rocks of the Giants Range batholith.

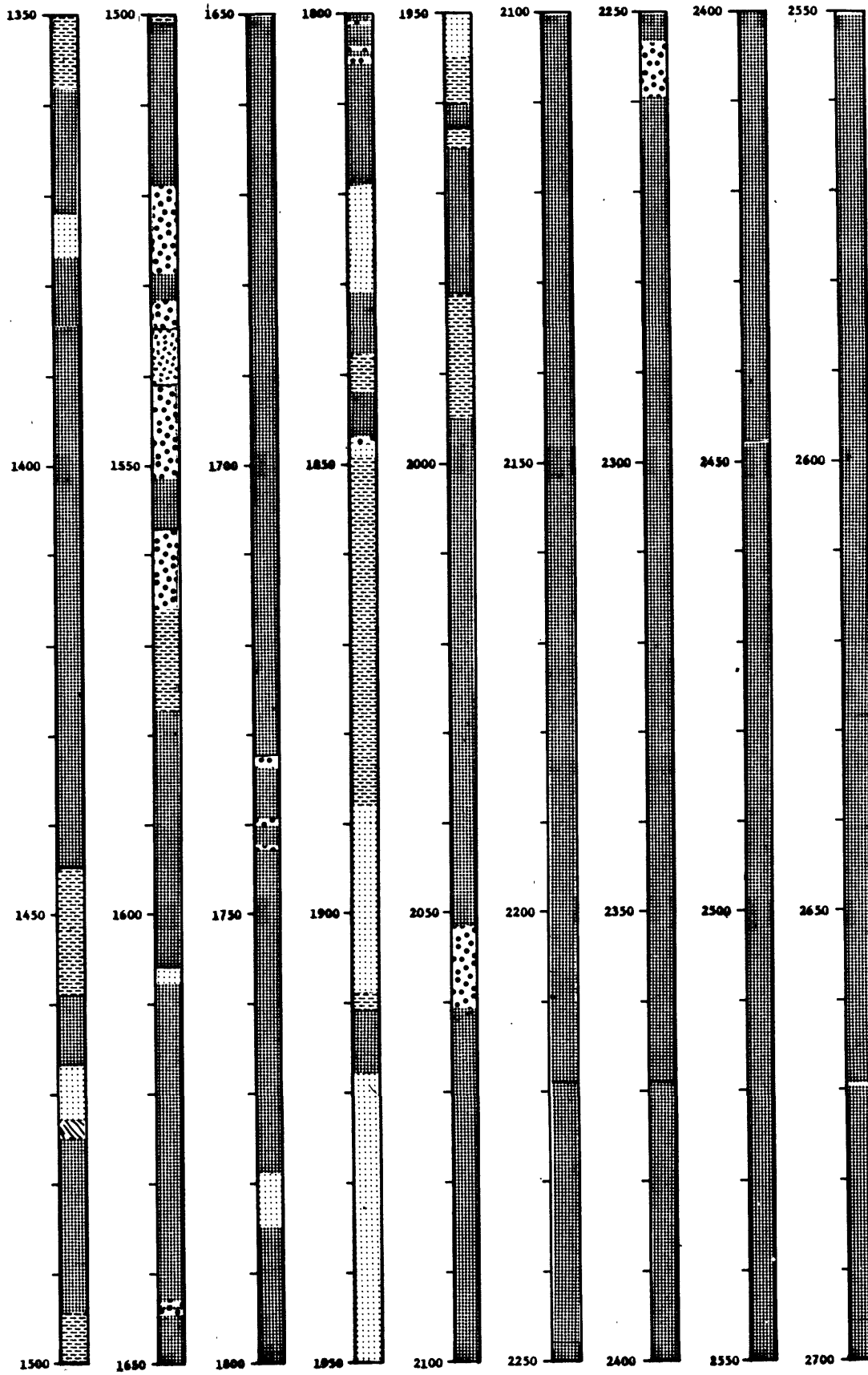
DRILL HOLE DU-16



EXPLANATION OF PATTERNS

- Plagioclase-rich pegmatoid
- Plagioclase cumulate
- Olivine-poor troctolite
- Troctolite to olivine-rich troctolite
- Olivine cumulate or olivine-rich cumulate
- Magnetite-rich cumulate
- Hornfels
- Monzonite
- Granitic Country Rock
- Fault or shear

DRILL HOLE DU-16



EXPLANATION OF PATTERNS

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- Plagioclase cumulate
- Olivine-poor troctolite
- Troctolite to olivine-rich troctolite
- Olivine cumulate or olivine-rich cumulate
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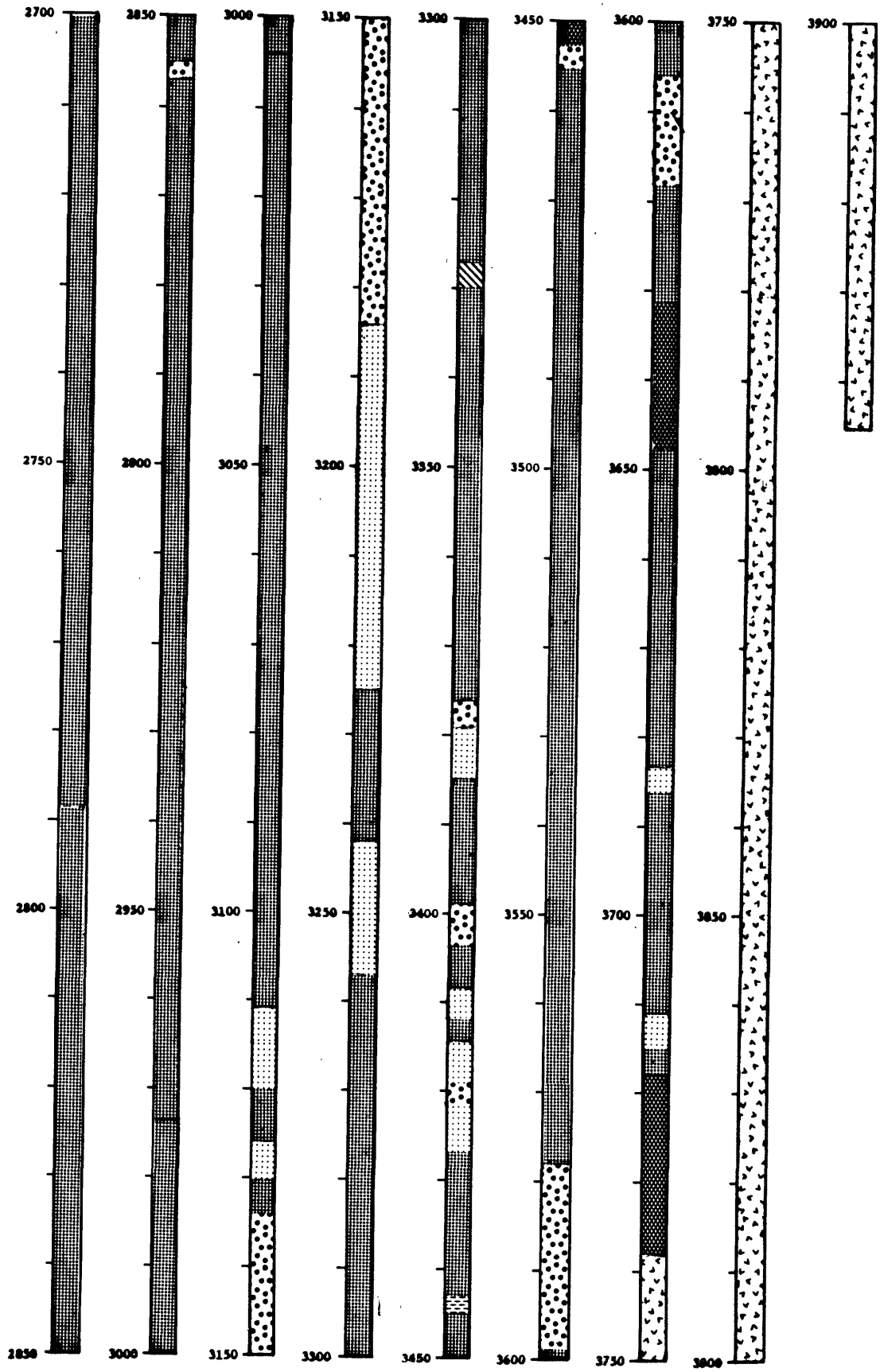
- Hornfels
- Monzonite
- Grenitic Country Rock
- Fault or shear

DRILL HOLE DU-16



EXPLANATION OF PATTERNS

- Plagioclase-rich pegmatoid
- Plagioclase cumulate
- Olivine-poor troctolite
- Troctolite to olivine-rich troctolite
- Olivine cumulate or olivine-rich cumulate
- Magnetite-rich cumulate
- Hornfels
- Monzonite
- Granitic Country Rock
- Fault or shear

DUVALL DRILL HOLE DU-17

Interval (ft.)	Description
0-225 feet	No core recovered.
225-268	$PO_{1-3}C_{x_{t-1}}z_{1-2}b_t$; medium-grained; very gradational lower contact.
268-295	PC; gradational lower contact.
295-366	$PO_{2-5}C_{x_{1-3}}z_{t-1}$; medium-grained; very gradational lower contact.
366-375	PC
375-459	$PO_{7-12}C_{x_{3-6}}z_{1-3}b_{t-1}$; medium- to coarse-grained; gradational upper contact, very gradational lower contact; typical medium-grained troctolite.
459-579	$PO_{7-12}C_{x_{3-7}}z_{1-3}$; medium- to coarse-grained; grain size and pyroxene content appear to increase in this latter zone over the zone above although contact is subjective and very gradational; rock is coarser grained; two-inch PC at 540.
579-581	$PC_{x_{2-5}}z_{1-2}$; gradationally sharp upper and lower contacts.
581-583	POC
583-584	PC; gradational contacts.
584-625	$PO_{7-12}C_{x_{3-5}}z_{1-2}$; medium-grained troctolite.
625-627	PC; gradational upper, sharp lower contacts.
627-646	$PO_{7-12}C$; two-inch PC at 645 and at $628^1/2$; gradational lower contact.
646-652	$PO_{40-50}C_{x_{5-10}}z_{1-2}$; medium-grained; olivine-rich zone; gradational upper and lower contacts.

Interval	Description
652-653	$PO_{5-7}C_{x_{3-5}z_{1-2}}$; medium-grained; gradational lower contact.
653-654	PC; gradational upper and lower contacts.
654-664	$PO_{7-12}C_{x_{1-2}z_{t-1}}$; medium-grained, appears to be slightly more plagioclase-rich than typical PC or POC seen above at 628; two-inch thick PC layers at 658 and 662.
664-664 1/2	PC
664 1/2-665	POC
665-665 1/2	PC
665 1/2-671	$PO_{5-10}C_{x_{2-5}z_{t-2}b_t}$; four inch plagioclase at 668; two-inch plagioclase at 670; gradational lower contact.
671-675	PC; gradational lower and upper contacts.
675-683	$PO_{3-5}C_{x_{2-5}z_{t-1}}$; medium-grained; gradational lower contact.
683-685	PC
685-695	$PO_{7-12}C_{x_{2-5}z_{t-1}}$; medium-grained troctolite.
695-733	PC; interlayered with some $PO_{1-2}C_{x_{1-3}z_{t-1}}$; very gradational lower, sharply gradational upper contacts.
733-738	$PO_{7-12}C_{x_{2-3}z_{t-1}}$; medium-grained; gradational lower contact.
738-787	$PC_{x_{t-1}z_{t-1}b_t}$; moderately sharp lower contact.
787-799	$PO_{7-12}C_{x_{3-5}z_{t-1}}$; medium-grained with two-inch plagioclase at 791; gradational sharp lower contact.
799-801	PC
801-802	$PO_{7-12}C$
802-803	PC

Interval	Description
803-806	$PO_{7-12}C_{x_{3-5}}z_{t-2}$; medium- to fine-grained.
806-808	$PO_{1-2}C$
808-810	$PO_{7-12}C$
810-812	PC; moderately sharp lower contact.
812-834	$PO_{7-12}C_{x_{3-5}}z_{1-2}$; medium-grained troctolite.
834-835	PC
835-1205	$PO_{7-12}C_{x_{2-5}}z_{1-2}b_t$; medium-grained troctolite; a homogeneous, monotonous sequence; marked by some thin zones in which the olivine content decreases slightly; a 70° dipping fault at 1027 with vertical slickensides; syenitic dike at $1166^1/2$, two-inch PC at $1198^1/2$.
1205-1265	$PC_{x_{1-3}}z_{t-1}b_{t-1}$; medium-grained; gradational upper and lower contacts.
1265-1273	$PO_{5-7}C_{x_{t-2}}z_{t-1}$; fine-grained.
1273-1275	PC
1275-1370	$PO_{7-12}C_{x_{3-5}}z_{t-1}$; medium- to medium coarse-grained; gradational upper contact; typical troctolite; material below the plagioclase-rich horizon grades down into coarser, more pyroxene-rich troctolite through zones of finer grained olivine-poor troctolite; two-inch PC at 1363.
1370-1373	PC; gradational upper, moderately sharp lower contacts.
1373-1380	$PO_{7-12}C$; two-inch PC at $1374^1/2$.

Interval	Description
1380-1485	$PO_{t-2}C_{x_{1-3}}z_{t-2}$; medium- to fine-grained; the olivine in disseminated clots may be oikocrysts and it is questionable if it is actually cumulate; rock is basically PC; upper contact is not exposed.
1485-1486	PC pegmatoid
1486-1487	PO_1C
1487-1488	PC pegmatoid
1488-1494	$PO_{3-7}C_{x_{3-5}}z_{t-2}$; medium-grained; gradational upper and lower contacts.
1494-1496 1/2	PC pegmatoid; extremely sharp, well-defined lower contact; a good cycle extends from 1496 up through some interlayered troctolite into plagioclase-rich rock and ultimately into troctolite.
1496 1/2-1501	$PO_{7-12}C_{x_{3-5}}z_{1-2}$; typical medium-grained troctolite.
1501-1502	PC pegmatoid
1502-1599	$PO_{7-12}C_{x_{3-5}}z_{1-2}$; typical medium-grained troctolite; homogeneous sequence.
1599-1601	PC; gradational upper contact, gradational and poorly defined lower contact.
1601-1605	$PO_{1-5}C_{x_{3-7}}z_{1-3}$; medium- to coarse-grained.
1605-1607	$PO_{3-5}C_{x_{3-7}}z_{1-3}$; coarse-grained.
1607-1608	$PO_{1-3}C_{x_{2-3}}z_{t-1}$; medium-grained; moderately sharp lower contact.
1608-1610	$PO_{3-7}C$; medium-grained; gradational lower contact.

Interval	Description
1610-1612	$PO_{1-2}C_{x_{3-5}z_{1-2}}$; coarse-grained, almost pegmatoidal.
1612-1612^{1}/2	$PO_{2-5}C$
1612^{1}/2-1629	$PO_{1-2}C_{x_{t-1}z_{t-1}}$; medium- to fine-grained; gradational lower contact.
1629-1632	$PO_{3-7}C_{x_{t-2}z_{t-1}}$; medium-grained; gradational lower contact.
1632-1644	$PO_{5-10}C_{x_{3-5}z_{t-2}}$; medium-grained.
1644-1649	$PO_{1-2}C_{x_{1-5}z_{1-3}}$; medium- to coarse-grained.
1649-1656	PC pegmatoid.
1656-1659	$PO_{3-7}C_{x_{2-5}z_{t-2}}$; medium-grained; gradational lower contact.
1659-1661	PC
1661-2020	$PO_{7-12}C_{x_{2-5}z_{t-2}}$; medium-grained; typical troctolite; syenite two inches thick at 1842^{1}/2; a three-inch pegmatoidal zone of slightly less olivine-rich rock at 1877.
2020-2021	$PO_{2-5}C_{x_{2-5}z_{1-2}}$; gradational upper and lower contacts.
2021-2036	$PO_{7-12}C$
2036-2170	PC to $PO_{t-1}C_{x_{t-2}z_{t-1}}$; medium-grained plagioclase cumulate; some thin zones occur in which pyroxene content increases to 2% to 3%; olivine if present occurs in disseminated masses that may be intercumulus.
2170-2220	$PO_{1-2}C_{x_{2-3}z_{t-1}}$; upper contact is very gradational and subjective; rock is basically the same type of PC as above, but with slightly more olivine; some appearing as good cumulate grains, and pyroxene content increases; there

Interval	Description
2170-2220 (cont'd)	are however many zones in which the rock appears to be good PC.
2220-2230	PC to $PO_{t-1}C_{x_{t-7}}z_t$; medium- to coarse-grained; some almost pegmatoidal zones.
2230-2240	$PO_{1-2}C$; gradational upper and lower contacts.
2240-2254	$PO_{5-7}C_{x_{2-3}}z_{t-1}$; medium-grained; gradational lower contact.
2254-2267	$PO_{1-3}C_{x_{t-2}}z_{t-1}$; medium-grained; gradational lower and upper contacts.
2267-2301	$PO_{7-12}C_{x_{2-5}}z_{1-2}$; medium-grained; typical troctolite; gradational upper and lower contacts.
2301-2335	$PO_{1-2}C_{x_{t-1}}z_{t-1}$; gradational upper and lower contacts.
2335-2357	$PO_{7-12}C$; typical medium-grained troctolite.
2357-2361	$PO_{1-2}C_{x_{2-3}}z_{1-2}$; medium-grained; gradational upper and lower contacts.
2361-2374	$PO_{7-12}C$; moderately sharp lower contact.
2374-2376 1/2	PC
2376 1/2-2396	$PO_{7-12}C$; medium-grained troctolite. Syenite two inches thick at 2388.
2396-2398	$PO_{1-2}C$; gradational upper and lower contacts.
2398-2402	$PO_{7-12}C_{x_{3-5}}z_{1-2}$; medium- to coarse-grained troctolite; gradational lower contact.
2402-2405	$PO_{1-2}C_{x_{2-3}}$; medium-grained; gradational upper and lower contacts.
2405-2424	$PO_{7-12}C_{x_{2-3}}z_{t-1}b_t$; medium-grained; gradational lower contact.

Interval	Description
2424-2426	PC; gradational lower contact.
2426-2488	$PO_{7-12}C_{x_{3-5}z_{t-1}}$; medium-grained typical troctolite.
2488-2488^{1}/2	PC; moderately sharp lower contact, very gradational upper contact.
2488^{1}/2-2491	$PO_{25-30}C_{x_{2-3}z_{t-1}}$; medium-grained; noticably more olivine-rich than the troctolite above the thin PC.
2491-2491^{1}/4	$PO_{15-60}C$; medium-grained; gradational upper and lower contacts.
2491^{1}/4-2504	$PO_{25-30}C_{x_{2-3}z_{1-2}b_{t-1}}$; medium-grained; gradational sharp lower contact.
2504-2511	$PC_{x_{2-3}z_{1-2}}$; gradational lower contact.
2511-2594	$PO_{7-12}C_{x_{3-5}z_{t-2}b_{t-1}}$; medium- to medium-coarse-grained troctolite; gradational lower contact.
2594-2597	PC to $PO_{1-2}C$; very gradational lower contact.
2597-2709^{1}/2	$PO_{7-12}C_{x_{3-5}z_{t-1}}$; medium- to medium-coarse-grained troctolite; syenite at 2654 and 2680^{1}/2.
2709^{1}/2-2710^{1}/2	PC; moderately sharp upper contact, gradational lower contact.
2710^{1}/2-2736	$PO_{2-5}C_{x_{2-5}z_{1-2}}$; medium-grained; olivine-poor troctolite; gradational upper and lower contacts.
2736-2758	$PO_{7-12}C_{x_{3-5}z_{t-1}b_{t-1}}$; medium-grained troctolite.
2758-2759	PC; gradational lower and upper contacts.
2759-2767	$PO_{30-40}C_{x_t z_t b_t}$; medium- to fine-grained; very sharp lower contact; a distinctive rock because of its fine-grained and mottled appearance. The olivine occurs in discrete

Interval	Description
2759-2767 (cont'd)	masses that are 3 to 5 millimeters across and generally separated by 2 to 15 millimeters from other olivine masses.
2767-2774	Fine-grained hornfels. It appears that the rock between 2759 and 2767 is a transitional zone in which part of the hornfels has been assimilated by the overlying troctolite.
2774-2786	PC; sharp overlying contact with hornfels; gradational lower contact.
2786-2859	PC to $PO_tC_{x_{2-4}}z_{1-2}$; contains disseminated sulfides in sparse amounts; distinct from the PC above 2786 in its greater pyroxene content.
2859-2873	$PO_{5-8}C_{x_{2-4}}z_{1-2}$; medium-grained; gradational upper contact.
2873-2993	$PO_{7-12}C_{x_{3-5}}z_{1-2}$; medium- to coarse-grained; 1-inch syenite dike at 2906. The rock is distinguished from overlying troctolite by its coarser grain size. The contact is extremely gradational.
2993-2994	$PO_{3-5}C_{x_{5-10}}z_{t-1}$; extremely coarse grained, pegmatoidal; gradational upper contact, gradationally sharp lower contact.
2994-2994 1/2	$PO_{7-12}C_{x_{2-3}}z_{1-2}$; medium-grained; gradational lower contact.
2994 1/2-2995	PC pegmatoid; sharp lower contact.
2995-3024	$PO_{7-12}C_{x_{3-5}}z_{t-1}$; medium-grained; typical troctolite; gradational lower contact, gradationally sharp upper contact.

Interval	Description
3024-3031	PC to $PO_1C_{x_{3-5}}z_{2-3}$; medium-grained, coarsening downward.
3031-3033	PC pegmatoid; extremely coarse pyroxene; moderately sharp lower contact.
3033-3067	$PO_{7-12}C_{x_{3-7}}z_{t-2}$; typical medium-grained troctolite; gradational lower contact.
3067-3072	PC; gradationally sharp upper contact, extremely sharp and well-defined lower contact.
3072-3074	$PO_{5-20}C_{x_{2-3}}z_{t-1}$; medium- to fine-grained; gradational lower contact.
3074-3114	$PO_{7-12}C_{x_{3-5}}z_{1-2}$; medium-grained, grain size coarsens downward.
3114-3122	$PO_{5-10}C_{x_{3-5}}z_{t-1}$; medium- to very coarse grained; gradational lower and upper contacts.
3122-3134	PC to $PO_{1-3}C$; pegmatoidal zone; pyroxene is 5 to 15 percent of rock, oxides 2 to 5 percent; some disseminated sulfides; moderately sharp lower contact.
3134-3144	$PO_{3-5}C_{x_{5-15}}z_{2-4}$; medium- to coarse-grained with good cumulate olivine; texturally this appears to be an extension of the overlying pegmatoidal zone.
3144-3202	$PO_{2-5}C_{x_{t-3}}z_{1-2}$; medium-grained, olivine-poor troctolite; distinct contact with the overlying coarser grained olivine-poor troctolite.
3202-3204	$PO_{1-2}C$
3204-3251	$PO_{5-10}C_{x_{2-4}}z_{1-2}$; medium-grained troctolite; 1-inch PC at 3230.

Interval	Description
3251-3254	$PO_{10-15}C_{x_{2-3}z_t}$; medium- to very fine grained; gradational upper and lower contacts.
3254-3258	$PO_{1-2}C_{x_{5-10}}$; medium-grained.
3258-3258 1/2	$O_{70-90}PC$; medium-grained; very gradational upper and lower contacts.
3258 1/2-3260	$PO_{2-5}C_{x_{2-3}}$; medium-grained.
3260-3271	$PO_{3-12}C_{x_{2-3}z_{t-2}}$; fine-grained and medium-grained zones are intergradational.
3271-3298	$PO_{7-12}C_{x_{3-5}z_{t-2}}$; medium-grained with a $PO_{3-7}C$-poor zone between 3291 and 3293.
3298-3299	PC pegmatoid; gradational sharp upper and lower contacts.
3299-3323	$PO_{7-12}C_{x_{3-5}z_{1-3}}$; medium-grained troctolite with a half-inch pegmatoidal zone at 3304 1/2 and a two-inch pegmatoidal zone at 3310.
3323-3323 1/2	$PC\text{-}PO_{2-5}C_{x_{1-5}z_{t-3}}$; medium- to coarse-grained.
3323 1/2-3324	$PO_{1-2}C$; medium-grained.
3324-3331	$PO_{3-12}C_{x_{t-5}z_{t-1}}$; a mixed zone composed of medium- to fine-grained, mottled rock interlayered with good medium- to fine-grained troctolite; gradational upper and lower contacts.
3331-3334	PC; fine-grained with wispy stringers of pure oxide and olivine.
3334-3432	$PC\text{-}PO_{1-2}C_{x_{t-4}z_{t-1}}$; a uniform sequence of plagioclase-rich rock with some possibly cumulate olivine; abundant horizonal fractures.

Interval	Description
3432-3440 1/2	PC pegmatoid; lower contact is quite abrupt, the upper contact is gradational. This marks the base of an extremely well-developed cycle. The pegmatoidal PC is clearly not gradational with the underlying troctolite but is gradational into the overlying plagioclase-rich rocks which then grade up into troctolitic rocks.
3440 1/2-3604	$PO_{7-12}C_{x_{2-3}z_{t-1}}$; medium-grained, typical troctolite with a 6-inch PC layer with gradational upper and lower contacts at 3484 and a one-inch PC layer with gradational upper and lower contacts at 3531.
3604-3605	PC pegmatoid; moderately sharp upper and lower contacts.
3605-3607	$PO_{7-12}C$
3607-3607 1/2	PC pegmatoid
3607 1/2-3613	$PO_{7-12}C$
3613-3614	PC pegmatoid
3614-3691	$PO_{7-12}C_{x_{3-5}z_{t-1}}$; typical medium-grained troctolite; three-inch pyroxene pegmatoidal zone at 3685.
3691-3692 1/2	PC pegmatoid; gradational upper and lower contacts.
3692 1/2-3734	$PO_{7-12}C_{x_{3-5}z_{t-1}}$; medium-grained troctolite; gradational sharp lower contact.
3734-3745	PC pegmatoid; a coarse-grained well-developed pegmatoidal zone with pyroxenes 2 to 5 centimeters long, oxides up to 1 centimeter in length; gradational sharp upper and lower contacts.

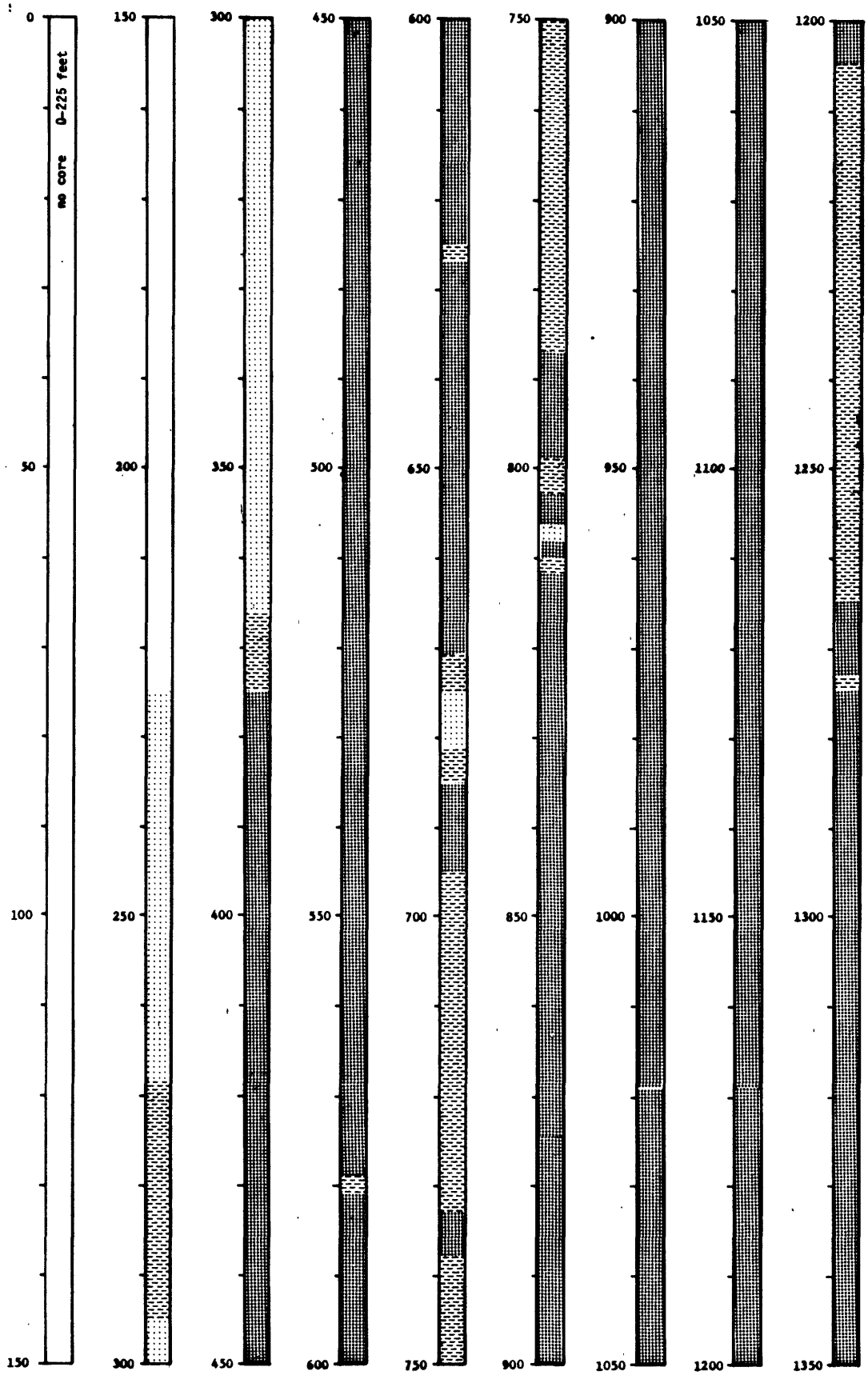
Interval	Description
3745-3854	$PO_{7-12}C_{x_{3-5}}z_{t-1}$; typical medium-grained troctolite; one-foot thick syenite between 3831 and 3832; gradational sharp lower contact.
3854-3864	$PO_{1-2}C$; pegmatoidal zone; medium- to coarse-grained one-centimeter oxides and 1/2-centimeter pyroxenes. Some biotites are one centimeter across; gradational lower contact.
3864-3868	$PO_{3-7}C_{x_{2-5}}z_{1-3}$; medium-grained; very gradational upper and lower contacts.
3868-3873	PC; mixed with $PO_{3-5}C$.
3873-3883	PC pegmatoid; coarse-grained pyroxenes up to 4 centimeters long and oxides masses up to one centimeter across.
3883-3893	$PO_{3-5}C_{x_{3-5}}z_{t-3}$; medium- to coarse-grained; plagioclase-rich troctolite; an extension of the overlying pegmatoidal PC.
3893-3900	PC; some coarse interstitial pyroxene, biotite, and oxides; moderately sharp lower contact.
3900-3909	$PO_{7-12}C_{x_{5-7}}z_{t-1}$; medium-grained troctolite.
3909-3913	Serpentinized zone injected with syenitic material, primary rock type cannot be determined.
3913-3931	$PO_{7-12}C_{x_{3-5}}z_{t-1}$; medium-grained troctolite.
3931-3934	$PO_{2-3}C$ to $PC_{x_{2-3}}z_{1-2}$; medium-grained plagioclase-rich rock.
3934-3950 1/2	PC pegmatoid; large masses of interstitial pyroxenes and oxides; gradational sharp lower contact.

Interval	Description
3950[1]/2-3969	$PO_{3-10}C_{x_{2-4}z_{t-1}}$; medium-grained with coarsening grain size downward and some development of coarse intertstitial pyroxene.
3969-4001	PC pegmatoid; mixed with thin zones of $PO_{5-7}C$; medium-grained ; core is split; contains disseminated sulfides. At least 85% of the core here is of the pegmatoidal type; gradational upper contact.
4001-4003	$PO_{25-40}C$; containing some cumulate magnetite; olivines are medium- to fine-grained.
4003-4005	PC pegmatoid
4005-4046	$PO_{25-50}C$; medium-grained with distinct good euhedral olivines.
4046-4048	PC pegmatoid
4048-4080	$PO_{5-7}C$ with $PO_{40-70}C$; medium- to coarse-grained; abundant disseminated sulfides; good euhedral olivines.
4080-4088	Hornfels inclusion; fine-grained; sulfide-poor.
4088-4127	$PO_{5-7}C_{x_t z_t}$; medium-grained, plagioclase-rich troctolite with some disseminated sulfides.
4127-4136	Inclusion; fine-grained; sulfide-poor.
4136-4265	$PO_{5-7}C$; some areas of $PO_{30-50}C_{x_t z_t}$; medium-grained with disseminated sulfides.
4265-4284	Fine-grained transition zone; sulfide-free.
4284-4559	Granitic rock.

Summary of DU-17

Plagioclase-rich rocks above 375 give way to typical POC which is interlayered with thin PC layers down at 1205. The plagioclase-rich zone between 695 and 786 may be a traceable layer. Between 1205 and 1277 is a second plagioclase-rich zone. 1277 to 1380 is a second homogeneous POC sequence which is underlain by another plagioclase-rich layer that ends in a pegmatoidal zone at 1496. This contact is sharp and clearly shows the troctolite to be unconformably overlain by the plagioclase-rich sequence. POC below the pegmatoid grades down into another plagioclase-rich zone between 1599 and 1661. Between 1661 and 2036 is uniform troctolite. Below 2036 to 2240, the rock is plagioclase-rich with disseminated clots of olivine. From 2240 to 2767, the rock is typical troctolite with some thin PC layers. Hornfels occurs at 2767 and is underlain by PC that then grades into POC which extends to 3025. The first pegmatitic zone occurs at 3294 in this sequence. Below 3025, the rock becomes much more plagioclase-rich and grades into a prominent pegmatoid between 3031 and 3033. This marks the base of a distinct cycle that should be traceable. Its lower contact is sharp; this is the first good pegmatoid in this section. Below the pegmatoid, several other cycles have POC tops and plagioclase-rich or pegmatoidal bottoms. These cycles have bottoms at 3072 and 3144. Below 3144, the rocks are less olivine-rich and are finer grained than troctolites above. This troctolite extends to 3324 where it becomes plagioclase-rich and at 3432 is an 8-10 foot thick pegmatoidal zone which marks the base of a distinct cycle. Below this pegmatoid is another uniform troctolitic zone which extends to 3738 but has several thin pegmatoidal zones at 3604. Pegmatoid occurs at 3738 and forms a distinct zone. Homogeneous troctolite extends below this pegmatoid to 3900 and is underlain by another pegmatoidal zone that is about 50 feet thick. Below this pegmatoid, rocks are generally finer grained troctolites with a number of thin pegmatoidal zones and a thick pegmatoidal layer at 3940. The core below 3969 has disseminated sulfides. Much of this lower sulfide-rich section is pegmatoidal and is mixed with olivine-rich troctolite and hornfels. A fine-grained transition zone occurs just above the granitic country rock.

DRILL HOLE DU-17



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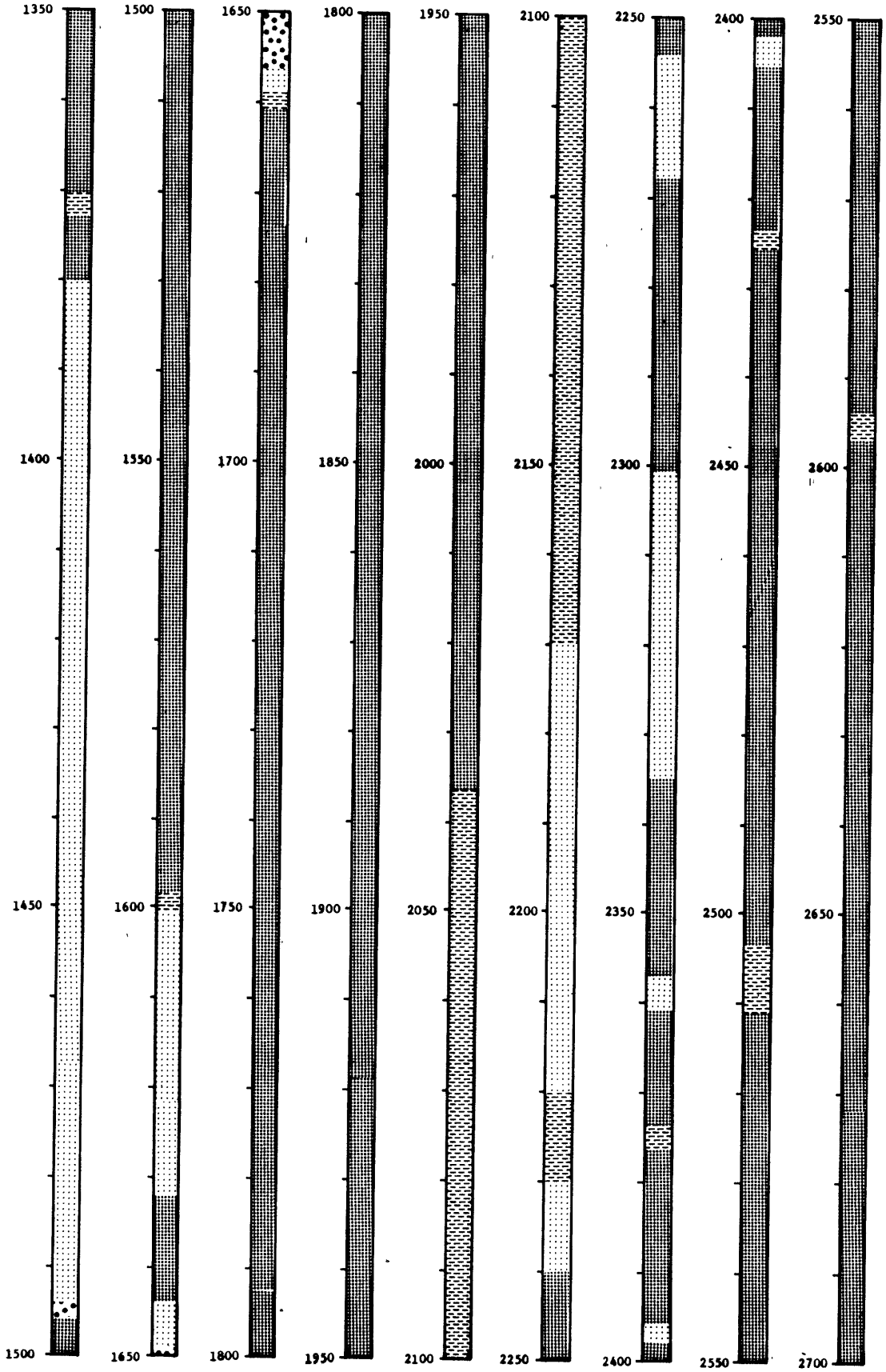

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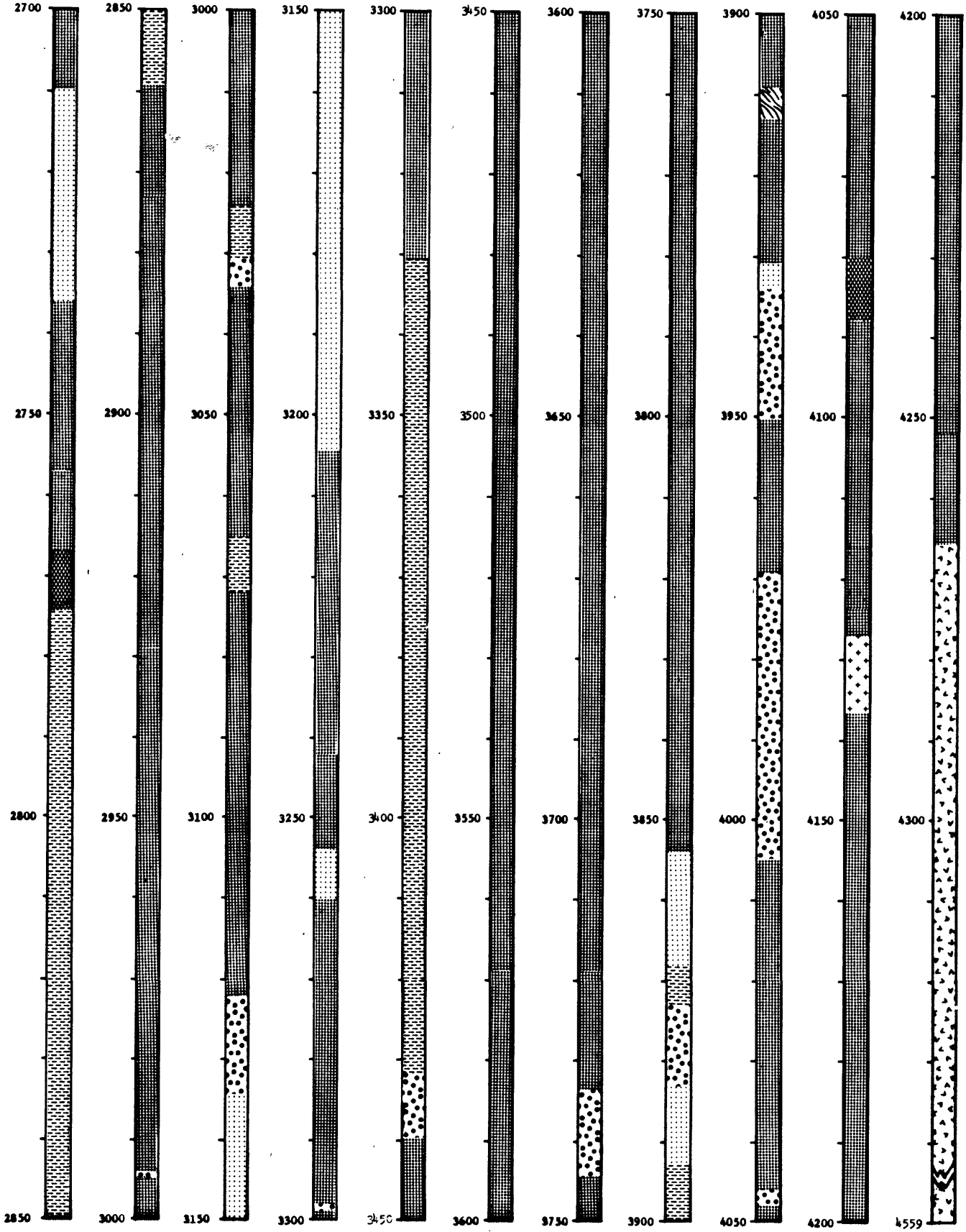
DRILL HOLE DH-17



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