Docket Number OME-6243
Contract Number 14-23-090-2150

# FINAL REPORT ON THE INVESTIGATION OF THE BENTON MAGNETITE PROSPECT

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Coring operations on this prospect were completed by December 31, 1962. A tabulation of the operating data follows:

| | |
|---|---|
| Feet drilled non-core | 4945.5 |
| Cost of drilling | $14,782.97 |
| Cost per foot of drilling | $3.60 |
| Feet cored | 2694.5 |
| Cost of coring | $14,347.81 |
| Cost per foot of coring | $5.32 |
| Related expenses | $765.50 |
| claimed Total cost of exploration | $29,896.28 |
| Total cost of one foot of core | $11.10 |

A careful study of the geophysical data and the rock encountered by the drill indicates that probably the magnetic and gravimetric anomalies are adequately explained by the presence of the ultra-basic pyroxenite plug found by the drill. No minerals of commercial concentration were found but several desirable minerals were encountered, including the following:

Magnetite
Titanium minerals
Fluorite
Molybdenum
Gold

A spectrographic analysis of each of the four rock types encountered revealed only those things normal to such rocks. Careful megascopic examination of the cores indicated no potential ore zones. Wet analyses of the best sections of the core showed unimportant quantities of magnetite. The data were reviewed by the exploration people of U. S. Steel and of the Bethlehem Steel Company, and they concurred in the conclusion that there is no commercial ore body present, and that the geophysical anomalies are adequately explained by the presence of the plug.

Each exploratory hole penetrated the bauxite horizon at the contact of the Wilcox and the Midway. No evidence of bauxite was found at any of these points.

ALPHA MINERAL COMPANY

By L. W. Minturn

L. W. Minturn, General Partner

Arkansas GEOLOGICAL COMMISSION
STATE CAPITOL ■ LITTLE ROCK, ARKANSAS

NORMAN F. WILLIAMS
STATE GEOLOGIST

September 20, 1963

Mr. Louis W. Minturn
Alpha Minerals Company
753 Creekside Drive
Houston - Texas

Dear Mr. Minturn:

Reported below are iron and titanim determinations on the magnetic fraction of certain samples from the drilling project which your company carried on in Saline County, Arkansas, last summer. Our laboratory number assigned to these samples is #2382.

| Hole & Footage | | %/sample magnetic | % Iron as $Fe_3O_4$ | % $TiO_2$ |
|---|---|---|---|---|
| Hole "B" 652-654.3 | 2 3 | 34.5 | 61.5 | 11.6 |
| Hole "B" 797.2-798.4 | 1 2 | 27.0 | 49.2 | 9.5 |
| Hole "B" 884.6-885.8 | 1 2 | 20.5 | 46.2 | 8.0 |
| Hole "B" 897.5-899.6 | 2 1 | 16.8 | 34.0 | 6.1 |
| EP1-1 671.7-673.1 | 1 4 | 39.5 | 51.2 | 9.0 |
| EP1-4 883.4-885.7 | 2 3 | 20.5 | 42.3 | 7.2 |
| Ep1-4 919-920 | 1 0 | 25.5 | 44.0 | 8.2 |

Yours very truly,

Norman F. Williams

NFW;pc

A

ALPHA MINERAL COMPANY
753 West Creekside
Houston 24, Texas

CORE DESCRIPTION

HOLE "A"

LOCATION - 1425 feet north and 165 feet west of southwest corner of Section 30, T2S-R14W, Saline County, Arkansas.

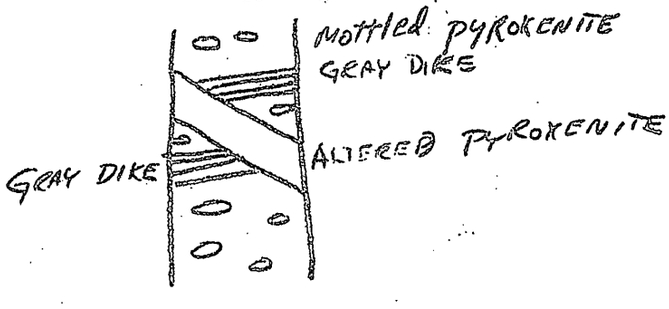
ELEVATION- 376 feet

CASING set in hard rock at 632 feet, probably 2'-4' in rock.

| DEPTH | DESCRIPTION | MAGNETISM |
|---|---|---|
| 0-632 | Overburden of unconsolidated sands and clays (Tertiary). | |
| | CORE 1 | |
| 632-634.6 | Medium-grained granular pyroxene. Dull black. Mosaic texture and incipient alteration (serpentinous) structure throughout. Calcite veins-2mm. @ 632.4, multiple @ 638.8-634, 2mm. @634.1. | 632-632.9 Strong with visible magnetite. 633.5-635.45 strong |
| 635.1 | Medium-to coarse-grained, dull black, sub-porphyritic with medium-to coarse-scattered bronze to black mica. Also brecciawork with multiple calcite veins. | |
| 636.7 | Medium-grained sub-porphyritic. Black. Pyrite. Scattered calcite veinlets, at 635.45, 635.8, 636.1. Serpentinized veinlet at 636.4. | |
| 639.4 | Medium-coarse porphyritic, black pyroxenite. Calcite veinlets 1mm. with slight alteration at 637.4, veinlets at 638.7, 639.1, 639.3. | 637.95-638.05 Strong |
| 644.4 | Medium-grained, sub-porphyritic. Locally scattered with sparse mica. All more lor less punky with dull luster on slightly altered minerals. Calcite veinlets-640.4,642.0 (Serpentinous), 643.9 | 643.3-643.5 Strong |
| 645.1 | Medium-coarse grained cut by feldspar-carbonate veinlets. Carbonate is dolomite. Serpentinous alteration along margins, narrow multiple veinlets 2-3mm. broad at 645.1 | |
| 645.4 | Medium coarse-grained. | |
| 646.2 | Medium grained granular. Very finely brecciated with hair-line fractures, interspersed calcite and feldspar-carbonate veins and veins with serpentinous alteration on surfaces. | |
| 646.7 | Medium-coarse-grained black phrphyry. Very coarse phenocrysts, also with bronze to black mica. | |
| 649 | Black, medium-grained granular pyroxenite. | 648.1-649.1 Mod. strong |
| 649.9 | Aphanitic, porphyritic gray dike (monchiquite) with euhedral phenocrysts 2mm. across. | |
| 650.1 | Medium to coarse-grained porphyritic pyroxenite with feldspar-carbonate veinlets 2-3mm., and bordering serpentinous alteration 2-4mm. Visible magnetite throughout on core surface. | |
| 651.1 | Similar to above but no veinlets. | 651-651.2 Mod. strong |
| 652 | Similar with abundant thin feldspar-carbonate veins and alteration on borders. Veins have a little scattered pyrite. Carbonate is dolomite. Scattered mica. | |
| | CORE 2 - 652-672 | |
| 652-653.3 | Medium coarse-grained pyroxenite. Porphyritic. Scattered veinlets. | 652.0-656.1 Weak to moderate Spotty. Strong at individual magnetite crystals |
| 654.2 | Same brecciated with abundant feldspar-carbonate vein material. Carbonate is dolomite. Scattered mica. | |
| 656.1 | Similar altered to soft green along feldspar-carbonate vein that runs down core. Veins and altered total 2cm. wide. No sulphide visible. | |

Hole "A"

| DEPTH | DESCRIPTION | MAGNETISM |
|---|---|---|
| 657.5 | Medium-grained coarse porphyrite. Pyrite, multiple fractures with thin carbonate veinlets. | 656.1-658 Locally strong in individual crystals. Otherwise very little. |
| 657.55 | Calcite vein. Slight serpentinization below. | |
| 658.6 | Same. Medium-coarse pyrite. | |
| 659.4 | Same vein. Mottled (replaced) with very fine-grained feldspar-carbonate material. Calcareous. | 658-661.5 Same as above |
| 659.43 | Calcite vein. | |
| 659.6 | Same pyroxenite. | |
| 659.9 | Medium-gray aphanitic porphyrites, dike 2.5cm. thick (monchiquite?) | |
| 660.2 | Heavy mica pyroxenite (ouachitite?) | |
| 661.5 | Coarse pyroxenite and feldspar-carbonate veins. Veins parallel to core. | |
| 664.1 | Mottled zone and related phenomena.<br>661.5-662 White mottled porphyry? Lucite rock?<br>662-662.3 Cross cutting pyroxenite and ouachitite (mica pyroxenite) dikes.<br>662.3-662.9 Strongly and irregularly mottled with gray irregular mottling and showing vestigial gray-green (ferronag) phenocrysts becoming dense gray downward.<br>663.5 Cut by 2" gray medium-grained feldspathic vein with mica and green soft altered pyroxenite dike. Gray dike offset 1". | 661.5-672 essentially none |




Some of mottled pyroxenite is fresh blue-gray fine-medium-grained. Hard. Doesn't fizz with HCl and contains minute disseminate black specks.

| | | |
|---|---|---|
| 665.2 | Coarse grained altered grayish pyroxenite cutting semi-breccia of gray fine-grained rock. | |
| 666.8 | Similar but much less gray rock. Here all cut by feldspar-carbonate veinlets. | |
| 667.6 | Feldspar-carbonate vein. Banded gray and blue-gray at bottom. (Might be complete altered mottled zone. Disseminated dark minerals, fine-grained zone, present.) | |
| 668.7 | Sheared pyroxenite with many feldspar-carbonate gash veinlets and some gray material. | |
| 669 | Strongly altered yellow green. Soft. With feldspar-carbonate veinlets. | |
| 670 | Breccia of gray-green pyroxenite. All cross cut by feldspar-carbonate veins. Local soft yellow-green within coarse mica pyroxenite. | |
| 671.1 | Coarse mica pyroxenite cut by feldspar-carbonate veins. Alteration very strong to yellow-green soft material. | |
| 671.9 | Gray and white soft feldspar-carbonate vein. Soft. Obviously partly brecciated. Disseminated fine-grained pyrite. | |
| 672 | Coarse light gray carbonate. Massive. Disseminated fine-grained pyrite. | |

CORE 3 - 672-692

| | | |
|---|---|---|
| 672-673.5 | Feldspar-carbonate vein. Massive and grained. White. With local massive pyrite and disseminated molybdenite. | 672-674.4 Essentially without appreciable magnetism |

Hole "A"

| DEPTH | DESCRIPTION | MAGNETISM |
|---|---|---|
| 674.5 | Altered pyroxenite, gray to yellow-green, soft. Partly disintegrated. Disseminated pyrite. | |
| 675 | Altered mica pyroxenite grading to less altered. Very coarse-grained. | |
| 676.3 | Very coarse-grained pyroxenite with swarms of feldspar-carbonate veinlets in sheared material. Rock partly altered.<br>675.8 feldspar-carbonate veinlet<br>676.3 feldspar-carbonate veinlet | |
| 679 | Coarse-grained pyroxenite. Pyroxene dull, locally light specks look like altered crystals. All mica bearing.<br>Calcite veins-medium coarse-grained<br>672.3 - 5mm.<br>672.5 - 8mm. | |
| 679.3 | Diagonal gray aphanitic dike or feldspar-carbonate vein with associated phenomena. Elsewhere called dike. 1" thick. Pyroxenite on both sides. | |
| 679.9 | Medium-grained dark-gray dike or schlieren. Fine-to medium-grained, black, with sparse mica. | Medium magnetic |
| 684 | Black to gray, greasy to dull, coarse-to very coarse-grained pyroxenite. Partly or incipiently altered. Locally with light gray spots. Mica very sparse.<br>680.7 calcite vein, 7mm.<br>681.9-692<br>682.2-682.3 Fine-grained zones with mica. | Weak to mod. Some visible magnetite. |
| 685 | Gray feldspathic (?) zones in pyroxenite. | 684 Slight increase of magnetite |
| 687.8 | Similar coarse to very coarse pyroxenite 686.5-687.8. Fine to medium-granular black dike with mica 10mm. thick. Cuts diagonally across core. 687.3-687.8 Very strong magnetite concentration along edges of dike. Note association of magnetite with margin of underlying ouachitite. | 687.3-687.8 Very strong |
| 692 | Coarse, granular, mica-rich ouachitite, somewhat rotten but not green. Feldspar-carbonate veinlets locally seen to cause parallel zone of fine-to medium-grained material. | 687.8-692 Ouachitite all moderate to moderately strong magneti |
| | CORE 4 - 692-703 | |
| 692-696 | Ouachitite type of coarse granular mica pyroxenite with gradually diminishing amount of mica. Locally strongly magnetite visible. All this rock is incipiently altered. Pyroxenite looks dull and has serpentine incrustations. Interstitial granular material not identified. Calcite veinlets-694.4, 695.4 (2-3mm.) 695.8. At 696-½" altered zone. | 692-696 Moderate to moderately strong throughout. Some good visible mag. crystals. |
| 696.9 | Relatively strong alteration. Pyroxene looks dull. Little or no mica. Coarse granular gray rock. | Relatively low magnetism. Weak to moderate. |
| 698 | Similar to above but less altered. Carbonate veins 697.5 (4mm.) 697.8 (4mm. banded) | Weak to mod. |
| 698.0 | Feldspar-carbonate on contact. | |
| 698.9 | Mixed coarse granular pyroxenite, black, with fine-to-medium-grained mica pyroxenite. | |
| 701.8 | Monchiquite dike. Moderate biotite and pyroxene phenocrysts in fine-to-medium granular ground mass-gray, not black. Feldspar-carbonate vein 700.3 (5mm.) and feldspathic light gray developement above it. 700-701.2 Similar feldspar-carbonate and banding. Green and gray bands. | Weak to mod. |
| 701.8 | Soft green monchiquite becoming disintegrated. | |
| 702.9 | Feldspar-carbonate vein. Locally massive pyrite. | |
| 703.3 | Disintegrated vein and green altered igneous rock. Vein mostly white not-grained carbonate with massive and disseminated pyrite crystals, locally with dark gray fine-grained aggregate. (Soft, molybdenite?) Possible rutile crystal observed. Locally vuggy. Cut by later calcite vein in lower part. | |

Hole "A"

| DEPTH | DESCRIPTION | MAGNETISM |
|---|---|---|
| | CORE 5 - 703-723 | |
| 703-704 | Yellow-green soft altered pyroxenite. Crumbles. | 703-710 |
| 705.4 | Coarse to very coarse granular gray-black pyroxenite. Pyroxene altered-dull. Local serpentinous material.<br>704.5 Calcite veinlet<br>705.4 Calcite veinlet | Weakly moderate magnetic. Generally a pretty low level except for a few isolated spots. |
| 705.8 | Same but with light gray mottling (not the typical mottling of referred to above.) These are masses of fine granular gray material that could be inclusions. | |
| 707.3 | Similar pyroxenite. Mottled on fractured surfaces. Several calcite veinlets at 707. | |
| 710 | Medium to coarse granular pyroxenite becoming less altered. Crystals probably spongy with many inclusions.<br>708.3-708.6 Fine to medium-grained mica bearing, dark gray dike or schlieren? Essentially a pyroxenite?<br>708 Banded calcite vein,<br>708.6 Calcite veinlet<br>709.5 Calcite veinlet-4mm.<br>709.7 Several calcite veinlets.<br>709.6-710 Transverse dike, fine to medium-grained with abundant biotite. | |
| 712 | Same as immediately above. Coarse to very coarse-same gray inclusions. Pyroxene is greenish bronze on thin cleavage fragment Veinlets 710.2 and between 710.9-711.3. Medium-grained calcite. Pyroxenite altered on surface by serpentinous material. Mica becoming apparent and increases downward to 721.3. | 710-712 Weak-moderate to moderate. |
| 721.3 | Ouachitite, coarse-grained.<br>Calcite veinlets 713.2, 713.3, group 713.9-714.1. Feldspar-carbonate veins 715.5, 715.6, 715.65, 715.75, 715.9 banded disseminate pyrite, rutile? | 712-723 Moderate magnetite not readily visible |
| 723 | Mica pyroxenite, medium coarse-grained. | |
| | CORE 6 - 723-743 | |
| 723-729 | Coarse grained black-greenish black ouachitite. All pyroxene and matrix dull, lusterless gray-green. Crystals visible but no life. | Weak-moderate to moderate |
| 729.4 | 2" dike of coarse pyrite penetrates diagonally across ouachitite. | |
| 730.3 | Ouachitite as above. | |
| 734.6 | Core consists of vaguely defined bands of mica-rich and normal coarse-grained pyroxenite running more or less parallel to core. | Mostly moderate Pyroxene locally and ouachitite locally. |
| 735.2 | Mostly ouachitite medium to coarse-grained. | |
| 736.3 | Repeating bands of ouachitite and coarse pyroxenite. Pyroxene dull green-gray. Mica in bands is medium-grained. Calcite veinlet running parallel to ouachitite band. | |
| 737.2 | Coarse pyroxenite becoming more strongly altered toward feldspar-carbonate vein 736.5 with relative abundance of calcite veinlets. | Weak to mod. |
| 737.35 | .03' strong gray altered band<br>.06 calcite with breccia fragments of pyroxenite (altered breccia)<br>.49 gray strongly altered pyroxenite.<br>736.5-4mm. calcite vein and smaller associates. | Weak to weak-moderate |
| 737.9 | Calcite vein continuous down core of pyroxenite with mica ouachitite (?) parallel to it. | Weak to weak-moderate |
| 738.4 | Coarse dark pyroxenite-altered. | |
| 738.5 | Strongly altered dark green pyroxenite. Coarse interstitial calcite. | |
| 738.7 | Coarse pyroxenite as above with strong visible magnetite. | Strong |
| 743 | Coarse dark pyroxenite. Green altered spots.<br>742.8-742.9, brownish green with calcite.<br>739-739.3 diagonally banded calcite veinlet (3-4mm.) | |

Hole "A"

| DEPTH | DESCRIPTION | MAGNETISM |
|---|---|---|
| | CORE 7 - 743-763 | |
| 743-748 | Coarse to very coarse pyroxenite. | 743.5 Strong |
| | 744.4-744.9 Dike, crosscuts diagonally, fine to medium-grained, 6-10mm. | Visible magnetite |
| | 745.2-745.4 Similar material | Strong |
| | 747.4-747.6 Very coarse pyroxenite with trace pyrite, interstitial calcite, and enclosed gree-black rods. (rutile?, tourmaline?) | Moderate to strong |
| 748.6 | Pyroxenite yielding to coarse ouachitite. | Strong in ouachitite |
| 749.3 | Diagonal dike with medium biotite phenolite-fine groundmass bordered by ouachitite top and bottom and conforming to ends of disrupted mica books. Approx. 0.3' thick, angle of dip about 65 degrees. | |
| 750.5 | Coarse to very coarse pyroxenite, some mica. All dull gray-green and altered. | Generally weak |
| 751.6 | Coarse to very coarse pyroxenite semi-brecciated, banded with feldspar-carbonate veins, very fine-grained pyrite in veins as well as aphanitic dar-gray and dark-green bands. Rock dull gray-green. Serpentinous. | Generally weak |
| 752.7 | Coarse to very coarse pyroxenite as above. | Generally weak |
| 753.3 | Medium-coarse pyroxenite as above. | Moderate |
| 754.2 | Steeply dipping dike (?) of medium-grained crisp black pyroxenite, upper 0.2' has 4 narrow gray feldspathic bands. Serpentinous on splits, dip about 70 degrees on lower contact. | Moderate strong |
| 755.1 | Coarse-grained mica pyroxenite grading to ouachitite (coarse-grained). | Moderate to strong |
| 762.2 | Ouachitite, coarse, green with black mica. Local hair-line fractures with dark green serpentinous altered abundant medium-grained black dike diagonally through and along side of core 761.3-762.2, 1cm. thick, dip 75-80 degrees. Feldspathic vein 4mm. 761.5-761, 761.3-762.2. Magnetite generally present and visible. | Strong |
| | CORE 8 - 763-782 | |
| 763-765 | Medium coarse ouachitite. | Moderate |
| 767.3 | Very coarse altered pyroxenite, 3 feldspar-carbonate or feldspathic veins at 765.1-765.3. Others sparse in this interval. At 766 few lines dip at 60 degrees. | |
| 767.7 | Multiple dikes 0.1' thick with biotite selvage. Gray medium-grained pyroxenite dips 65-70 degrees. | Weak-moderate |
| 770 | Coarse to very coarse black green pyroxene. Fresh carbonate veinlets 768.1, 769, 769.9. | Weak-moderate |
| 771.3 | Coarse to very coarse fresh pyroxenite with increasing mica grading to mixed ouacnite na mica pyroxenite. | Moderate Moderately-strong |
| 772.1 | Coarse-grained ouachitite and medium-coarse pyroxenite mixed. | Moderate to moderately strong |
| 772.8 | Mica pyroxenite cut by feldspar-carbonate vein diagonal to core. Dips 75 degrees. | Moderate to mod. strong |
| 777.8 | Mica pyroxenite coarse to very coarse and ouachitite blending continously to one another | Moderate to mod. strong |
| 778.2 | Altered dark aphanitic dike or vein? with medium-to coarse pyroxenite. | Moderate to mod. strong |
| 7.0 | Same coarse to very coarse mica pyroxenite and ouachitite blend. | Moderate |
| 781.5 | Same | |
| 781.5-782? (end of core) | Coarse to very coarse pyroxenite. Some mica. Fresh rock. | Moderate |
| | CORE 9 - 782-801 | |
| 782-783.7 | Coarse-grained with abundant mica biotite and altered veinlets. Hair-line. | Moderate disseminated |
| | 783.2 Altered veinlets. | magnetite |

Hole "A"

| DEPTH | DESCRIPTION | MAGNETISM |
|---|---|---|
| 785 | Medium-coarse-grained black and abundant medium-grained biotite. Intergrain alteration. | Weak to moderate |
| 786.2 | Medium-coarse grains with extremely abundant medium-grained biotite, almost ouachitite. Strongly altered to gray-green clay along diagonal fracture. Whole rock punky ouachitite. Steep dike runs down oneside of core. | Weak |
| 786.7 | Coarse-to very coarse- gray to black pyroxenite, ouachitite runs down one side. 786.2-787.3<br>Locally very slightly disseminated pyrite in pyroxenite. Green altered veinlets common, esp. 787.7. Calcite veinlet 787.9 1mm. | 786.2-787.3 Weak<br>787.3-788.7 Moderate-disseminated magnetite |
| 791.2 | Medium-to locally coarse-grained, locally with fine-grained biotite and trace of disseminated pyrite. Gray-green altered veinlets (hair-line) present throughout some areas. Spotted green. 3mm. calcite vein 791. Heavy massive magnetite at 790.2-790.5 | Gen. weak to mod., but mod. to strong 789.8-790.8 massive magnetite visible |
| 793.5 | Medium-grained granular pyroxenite (791.2-792.3) to medium-coarse grained 792.3-793.5 Medium-grained has very slight biotite, medium-coarse has little more biotite. Calcite veinlet (3mm.) banded at 792.3. Hair-line green-gray altered veinlets common in lower half. | Moderate strong 791.2-792 Mod. magnetite disseminated crystals. |
| 793.6 | Green altered zone with fine-grained feldspar-carbonate vein. | 793.5-793.6 Weak |
| 794 | Altered pyroxenite, biotite common. Altered veinlets. Solid rock. | Weak |
| 794.2 | Green altered zone with hard carbonate vein. | 794-796 |
| 794.3 | Altered pyrite with biotite common. | Weak |
| 795 | Medium-grained pyroxenite slightly altered. | |
| 796 | Ouachitite-down one side of core that is otherwise medium-coarse grained. Altered somewhat on splits and intergranular. | |
| 796.2 | Medium-grained altered pyroxenite. | |
| 796.9 | Gray-green clayey slightly altered biotite rich pyroxenite and feldspar-carbonate vein. Gray bands border feldspar-carbonate, contain minute disseminated gray sulphide (molybdenite?) and pyrite. Altered zone actually about 3 foot thick. | |
| 797.6 | Ouachitite medium-coarse grained type altered pyroxenite. Green and hair-line. | Weak |
| 797.9 | Feldspar-carbonate vein-gray with some calcite (3mm.) | |
| 798.2 | Medium-coarse granular pyroxenite altered to green at 798.2 adjacent to feldspar-carbonate vein (4mm.) | Weak-moderate disseminated magnetite. |
| 798.4 | Altered pyroxenite around dark gray feldspar-carbonate vein. | Weak moderate |
| 799.5 | Biotite rich medium-to coarse-grained granular pyroxenite and abundant biotite mica. | |
| 800.5 | Gray feldspar-carbonate vein. Numerous calcite filled fractures and disseminated pyrite scattered along vein. | Non-magnetic |
| 801 | Broken rock altered. CORE 10 - 801-813 | |
| 801.9 | Feldspar-carbonate vein white-gray mottled, disseminated fine-grained pyrite. Gray zones may take color from very very fine-grained disseminated material. | Non-magnetic |
| 802.5 | Green soft crumbled altered pyroxenite. | |
| 804.2 | Feldspar-carbonate vein as above. 803.1-803.4 fine-grained fluorite-no coarse spar masses. These are granular aggregate. | |
| 805 | Soft broken green altered pyroxenite. | |
| 805.95 | Medium-grained to coarse-grained gray-green pyroxenite with abundant veins of thin light gray calcite (rock and sub breccia) gray bands adjacent to veinlets. Pyrite common forms ground accessory disseminated through rock adjacent to veinlets. | |
| 806.5 | Medium-coarse-grained pyroxenite with abundant carbonate veinlets throughout.<br>806 Strong green altered vein<br>806.4 Carbonate<br>807.6 Feldspar-carbonate<br>807.9 Carbonate pyrite disseminated in pyroxenite close to some of veinlet. | 805.95-806 Weak<br>806-808.5 Weak-moderate locally visible magnetite crystals or granular masses only. |

Hole "A"

| DEPTH | DESCRIPTION | MAGNETISM |
|---|---|---|
| 810 | (on core, measures about 810.9 because of broken sections.) Coarse-very coarse grayish black pyroxenite with abundant feldspar-carbonate veinlets. These are gray fine-grained often having carbonate centers, slightly greenish altered along edges and with pyrite disseminated in wall rock. 809.1 Calcite vein 10mm. rock punky adjacent to vein. (810-810.9 measured) Feldspar-carbonate veinlets abundant. | Moderate disseminated grained magnetite visible |
| 813.2 | Feldspar-carbonate veinlets (gray) with pyrite. | 811.9-812.[illegible] Visible coarse grains and granular massiv magnetite |
| 811.5 | Medium-coarse, local concentration of calcite. | Weak-moderate |
| 813.2 | Coarse-to very coarse-granular pyroxenite trace of biotite with local alteration. | |
| 812.9 | Fine-grained with abundant biotite. | |
| 813.9 | Same as above with trace disseminated pyrite and calcite crystals, feldspar-carbonate veinlets (gray) and altered very common. | Weak |
| 814.2 | Brown-gray clay altered from pyroxenite. | Weak |
| | CORE 11 - 813-823 | |
| 813-814.4 | Coarse to very coarse granular black pyroxenite-locally scattered dark mica. 813-813.5 Clustered veinlets of calcite. Traces disseminated pyrite at 813.2. | Generally weak magnetism |
| 816.75 | Coarse to very coarse as above, little mica slightly altered adjacent to veins. Locally traces disseminated fine-grained pyrite. Calcite veinlets 3mm. 815.2 Calcite replacement vein some pyrite 15mm. 815.7 | 814.4-814.[illegible] Moderate strong 814.8-815.2 Strong 815.2-816.75 Coarse magnetit crystals and granulated masses through-out visible. Mod. strong |
| 819.2 | Same as above-also with traces of disseminated pyrite to fine-grained pyrite-slight calcite veinlet and altered veinlets (hair-line) | All mod. strong magnetite coars crystals and granular masses magnetite visibl scattered throughout. |
| 821.[illegible] | Very coarse black pyroxenite with slightly dark mica. Little or no ~~mic~~ pyrite. Local calcite in normal texture. Calcite vein 2mm. 819.4 | Mod. strong scatteredcoarse crystals and granular aggregates but not abundant as above. |
| 822.6 | Same as above. Rock somewhat altered, feels spongy to hammer, dull generally black instead of crisp. 822.3 Calcite veinlet 2mm. | Mod. strong with scattered magnetite veins and granular aggregates. |
| 8 2.75 | Altered pyroxenite | |
| 822.9 | Green altered pyroxenite with calcite veins. Rock altered soft with sparse disseminated pyrite. Trace of residual magnetite. | Not magnetite |
| 823 | Top of aphanitic dike, fractured and contains calcite veins. | |
| | CORE 12 - 823-830.4 | |
| 823-828.8 | Dark gray, aphanitic porphyritic dike (monchiquite?) Phenocrysts either light gray to white, sub-vitrous or kaolinitic or epidote green. Commonly pitted. Dike cut by numerous fractures and veinlets of calcite. Local strongly altered to veinlets makes rock punky gray-green. Altered material contains trace of pyrite altered at: 823.9-824, 824.2-824.3, 825.2, 826.7 | 823-828.3 Non-magnetic |

Hole "A"

| DEPTH | DESCRIPTION | MAGNETISM |
|---|---|---|
| 828.8 | Additional veinlets: 823.5, 823.7 breccia, 825.3, 825.6, 826.9, 827.4, 828. | |
| 829.2 | Coarse grained black pyroxenite crystal subhedral, hair-line green altered veinlets. Some strongly calcite. | 828.3-828.7 Mod. strong 828.7-829.2 Strong. Granular and massive granular magnetite present throughout whole interval est. 25-30% |
| 829.3 | Dark green clayey alteration of pyroxenite. | Non-magnetic |
| 830.5 | Feldspar-carbonate vein white no aphanitic gray (like). Vein appears to be replacing gray band at top. Has abundant disseminated fine-grained pyrite and bands of gray sub-metallic very fine-grained disseminated sulfide? (molybdenite). Local massive pyrite in carbonate vein. | |
| 830.6 | Actual measured driller says 830.4 could have picked up length in broken zone. Altered pyroxenite punky and broken. | |
| 830.4-832.2 | CORE 13 - 830.4-832.2 | |
| 832.2 | Top slightly harder than that below. Completely altered coarse granular rock (pyroxenite?) Some contains medium-grained biotite mica (maybe altered ouachitite.) Rock is dull gray-green, broken material only recovered. | Non-magnetic |
| | CORE 14 - 832.2-852.2 | |
| 832.2-832.3 | Altered green ouachitite. | |
| 832.7 | Feldspar-carbonate vein. Gray aphanitic. Trace purple flourescent color. Disseminated fine-to medium-pyrite cubes. Gray bands adjacent to vein. | |
| 833.5 | Feldspar-carbonate vein medium-to coarse-grained, vuggy with pyrite crystals and pyrite masses. Molybdenite? Finely disseminated and in local concentration with pyrite. Crystals maybe cubic, material soft, streak gray but not greenish (spangled under hand lens but seems granular rather than flaky) May be galena. | |
| 835.1 | Coarse-grained black pyroxenite with scattered coarse magnetite crystals and massive aggregates. Locally disseminated pyrite. Hair-line fractures with green alteration. 835.0 3mm. calcite veinlet | 833.5-834.7 Relative weak- to moderate but abundant coarse magnetite and massive very strong. Average strong. 834.7-835.1 Weak 835.1-836.4 Moderate, very slight magnetit 836.7-836.8 massive magneti 836.7-837.4 Moderate 837.4-837.55 Strong 837.55-837.75 Moderate 837.75-838.3 Mod. to strong magnetite visible |
| 837.55 | Coarse, very coarse-grained black locally heavy medium-to coarse biotitewith trace of disseminated pyrite. 837.3-837.55. Massive and coarse magnetite sparse throughout but relative abundant 837.3-837.15 Calcite veinlet 836.6 2mm. Green alteration fracture. Heavy biotite 835.3-835.6 | |
| 840 | Very coarse-grained black pyroxenite as above. Coarse magnetite common, traces some disseminated pyrite-serpentine altered on pyroxene dike. Scattered altered veinlets 836 5mm. veinlet serpentine and dolomite? Very fine grained disseminated pyrite close to vein, local masses. | |

Hole "A"

| DEPTH | DESCRIPTION | MAGNETISM |
|---|---|---|
| 840 | 839.5-839.6 2cm. feldspar-carbonate vein and slightly serpentinize and thin green alteration on margins. | 838.2-838.35 Strong coarse masses and crystals of magnetite. |
| 840.4 | Very coarse as above Trace of disseminated yellow sulfide (pyrite). | 838.85-839.6 Moderate-strong visible magnetit throughout. 839.6-840 Weak-moderate 840-840.4 Weak |
| 842.5 | Coarse grain black to greenish black pyroxenite with abundant biotite mica. Minor alteration veinlets 840-840.6, 841.6-842. Very heavy mica. | 840.4-840.8 weak to moderate. 840.8-841.4 mod. 841.4-841.9stron; magnetite gen. visible as dis-seminated or grain masses. |
| 842.7 | Coarse grained with abuddant biotite as above. | 842.5-842.7 mod. 842.7-843 weak 843-843.3 weak moderate |
| 844.9 | Coarse to very coarse-grained with relativeslight biotite and green to black pyroxenite with slight horizontal and inclined fracture with serpentine alteration. Slight alteration on cleavage of pyrox-enite. Granular masses of magnetite. Slight hematite staining in serpentine at 844.9. | 843.3-843.7 mod. strong 843.7-843.9stron; 843.9-844.4 mod. strong 844.4-844.9stron; strongly visible granular magneti and coarse grain. |
| 846.8 | Coarse to very coarse as above pyroxenite with feldspar and carbonated veinlets 846.4 | 844.9-845.6weak 845.6-846.2 weak to moderate. 846.2-846.8 weak 846.8-847.3no mag |
| 847.3 | Feldspar-carbonate vein, thickens to .5 foot., looks partly replaced by coarse carbonate and altered green | 847.3-847.95weak to moderate |
| 847 9 | pyroxenite crystals; and dark reddish brown rutile (coarse) near base altered serpentinous. | |
| 847.9 | Coarse to very coarse grained pyroxenite with gray-pinkish anhedral-subhedral crystals, semi-greasy lustre. Harder than 5.5, little or poor cleavage cleolite (?) scattered sparsely. | 847.95-848.1 mod. strong 848.1-848.9 mod 848.9-849.8 weak-moderate |
| 849.8 | Medium-grained black pyroxenite, trace of medium-grained biotite, quite fresh, locally some of pinkish crystals of above. | Disseminated and granular. |
| 850.6 | Medium-coarse grained with increasing abundance of medium biotite. | 849.8-851.5 mod. Disseminated magnetite |

| DEPTH | DESCRIPTION | MAGNETISM |
|---|---|---|
| 851.9 | Medium-coarse dark green-black ouachitite with biotite (bronze actually) intergrain alteration common throughout. | 851.5-851.8 Weak<br>851.8-852.2 Mod. Disseminated magnetite. |
| 852.2 | (Measures 852.4) Medium-coarse grained black pyroxenite-traces of dark mica. | |
| | CORE 15 - 852.2-872.4 | |
| 854.1 | Coarse-grained pyroxenite with scattered biotite and dull reddish black alteration of some minerals. Rock core dense and hard. Altered veinlet at 852.4, 853,853.3 and 853.8. Veinlets not over 2mm. | 852.2-852.4 Weak-moderate<br>852.4-853.2 Mod.-disseminated<br>853.2-854.2 Weak-moderate |
| 854.2 | Medium-coarse grained with mica. | 854.2-854.9 Mod. |
| 855.2 | Medium-coarse grained with black mica, intergrained serpentine altered with veinlets of calcite? 854.7 and 855.2 | 854.9-855.4 Weak<br>855.4-855.6 Weak-moderate |
| 856.7 | Coarse-grained green to black pyroxenite. 856-856.3 green and slightly altered with white dolomite crystals. | 855.6-856 Mod.<br>856-856.7 Mod. |
| 856.8 | Same as above, fractured and altered green. | 856.7-858.2 Essentially none |
| 858.2 | Dark gray dike (lamprophyre-monchiquite?) Light gray phenocrysts. | 858.2-858.9 Weak to moderate |
| 858.9 | Coarse-grained pyroxenite greenish black forming large pyroxene crystals with re lative abundant black mica-approahhing ouachitite type. Slightly altered at contact with dike. Calcite veinlet at 858.3. | 858.2-858.9 Weak-moderate |
| 860 | Coarse-grained with some biotite mica and medium-coarse grained pyrite. Some strong green alteration on fractures. Calcite and altered veinlets at 859.5. | 858.9-859.5 Mod.<br>859 5-859.9Mod-strong coarse massive and crys. of magnetite. |
| 861.4 | Very coarse grained pyroxenite dark green color. 860.8 Calcite veinlet. | 859.9-860.3 Weak-moderate<br>860.3-860.8 Weak to moderate. Some strong magnetic crystals.<br>860.3-861.25Mod. strong. Visible disseminated med. coarse crystallin magnetite.<br>861.25-861.4 Weak to moderate |
| 863.8 | Very coarse-grained pyroxenite as above. Medium-grained mica with local reddish staining hematite. | 861.4-863.3Slight to moderate,local concentrated magnetite between coarse pyroxene crystals<br>863.3-863.8 Mod. |

Hole "A"

| DEPTH | DESCRIPTION | MAGNETISM |
|---|---|---|
| 864.9 | Same as above. | 863.8-864.5 Light |
| 865.3 | Granular pyroxenite with biotite rich layers, essentially ouachitite medium-grained. | 864.5-865.1 Light to moderate inter grained magnetite 865.1-865.6 Mod. disseminated magnetite |
| 866.2 | Very coarse grained as above. 865.6 3mm. Calcite veinlet with serpentine. | 865.6-866.2 Mod. to strong, visible massive magnetite crystal and granular masses. |
| 866.9 | Very coarse-grained as above. | 866.2-866.9 Light to moderate local strong where magnetite is visible |
| 868 55 | Medium-grained to medium-coarse-grained black pyroxenite with small amount of biotite present Intergrowth of veinlets, altered serpentine | 866.9-868.55 Light moderate disseminated magnetite locally coarser at surface. |
| 869.6 | Medium-grained as above. | 868 55-869.6 Gen. low except mod.-strong disseminate band 869?-869.45 |
| 870. | Same. | 869.6-870 Low |
| 870.9 | Coarse-grained pyroxenite (greenish-black) | 870-870.9 Mod. Med. grained magnetite crystals Coarse pyroxene visible. |
| 872.4 | Coarse to very coarse pyroxenite greenish black. Sparse calcite crystals veinlets and serpentine calcite altered veinlets. Very sparse fine-grained disseminated yellow sulfides at 872. | 870.9-871.3 Mod. 871.3-871.6 Mod.-strong. 871.6-872.4 Mod. Spotty magnetite granuls visible |

CORE 16 - 872-884

Medium-grained black sub-porphyritic pyroxenite-crisp weathered subhedral black pyroxene with minor gray feldspar (?) Appreciable black to bronze mica. Pyroxene up to 10 mm long in finer matrix (1-2mm.) Varies to finer material.

875. Coarser type of above-sub-porphyritic.

878.5 Finer grained of above granular to sub-porphyritic- a few calcite veins (1-2 mm.) thick. Very slight alteration between grains 876.2--878.2. 878-878.2 local strong alterations 4mm. calcite vein and slight alteration 877.2.

879.9 Pyroxenite penetrated by medium-gray aphanite with indistinct ghosts of phenocrysts-now of lighter gray. Could be monchiquite or could be phonolite with altered leucite crystals? Dike runs vertically along one side of core. Strongly altered.

880.3 Coarser type of pyroxenite.

880.8 Strongly altered pyroxenite-dike material essentially unaltered.

880.9 Gray dike.

| DEPTH | DESCRIPTION | MAGNETISM |
|---|---|---|
| 881.5 | Strongly shattered dike with scattered very fine pyrite crystals. Lost some core? | |
| 881.9 | Partly shattered dike. | |
| 882.5 | Feldspar-carbonate (dolomite) vein, vuggy, fine pyrite. | |
| 883.8 | Carbonate vein | |
| 884 | Strongly altered. | |
| | CORE 17 - 884-904 | |
| 884.9 | Green altered mica being pyroxenite contains feldspar-carbonate vein. 2mm. thick. | |
| 886.7 | 10mm. pyroxenite phenocrysts in 1-2mm. ground mass. Black crisp slightly superficial alteration on hair-line fractures 886-886.75 contain visible magnetite crystals. Strongly magnetic crystals Other material slight. | |
| 886.85 | Feldspar-carbonate vein, medium to coarse dolomite and pyrite. Vein 0.75 inches thick. No alteration above or below. | |
| 891.6 | Medium grained granular (plus or minus 2mm. diameter) black crisp pyroxenite. Hard very brittle magnetite crystals locally visible on surface. Local and moderate magnetic. Otherwise generally low. 889.3 and 890.9 visible-strong magnetism. Rock cut by very thin carbonate veins in fractures. | |
| 891.7 | Feldspar-carbonate vein with pyrite, medium-grained white to pinkish. | |
| 893.8 | Medium-grained black pyroxenite with coarse medium-grained pyroxenite with coarsemedium-grained pyroxenite phenocrysts. Spotty magnetism with visible magnetic crystals. | |
| 894 | Medium-grained to coarse-medium nepheline syenite dike steeply inclined 0.1 inch thick slightly green alteration of contact. | |
| 894.6 | Dense medium-grained with abundant magnetite. | |
| 896 | Pyroxenite, medium to coarse with large pyroxene and biotite crystals. Some of ground mass is relative fine. | |
| 897.7 | Same with abundant magnetite plusorminus 20% visible on surface of core. | |
| 899.6 | Same pyroxenite as above with varying grain size and texture. 878.3-898.7 Strongly magnetic with visible magnetite streaks. | |
| 899.7 | Feldspar-carbonate vein. | |
| 900 | Altered serpentinous? Rock, relative hard. | |
| 900.3 | Feldspar-carbonate vein with visible green alteration. | |
| 904 | Moderate serpentinous pyroxenite with relative abundant bronze to black mica, could be ouachitite carbonate vein (thin at bottom) Only slightly to moderately magnetic. | |
| | CORE 18 - 904-924 | |
| 904.7 | Black coarse-grained with abundant medium coarse biotite (ouachitite). | 904-904.7 moderate |
| 906.1 | Same grading diagonally across core to coarse grained pyroxenite. | 904.7-905.7 Mod. local large crys 905.7-906.3 Weak moderate |
| 907.2 | Coarse-grained pyroxenite, black, hard calcite veinlets. 904.7-906.7 down core 1-2mm. Green altered at edge. Crossed veinlets. Calcite and green altered either side, total 4mm. Some disseminated pyrite in veinlets. | 906.3-907.2 Mod. strong. Dissem-inated local large crystals |

| DEPTH | DESCRIPTION | MAGNETISM |
|---|---|---|
| 908.3 | Variably, medium to coarse-grained pyroxenite, some biotite. Locally altered veinlets-rock greenish along fracture. Hematite-some disseminated with some red concentrated on intergrain. boundaries. Locally weak and disseminated pyrite 907.5-908. 908-908.7 Calcite vein 2-3mm. Some serpentine? | 907.2-907.6 Weak-moderate<br>907.6-907.9 Moderate-strong<br>907.9-908.35 Weak-moderate<br>908.35-908.85 Weak-moderate disseminated. |
| 909.8 | Medium-grained black pyroxenite. 909.3-909.8 Veinlet 2-3mm. Calcite with thin green serpentine(?) bands. | 908.85-909.8 Moderate, disseminated. |
| 910.9 | Medium-grained black as above, altered intergranular locally calcite veinlets diagonal 910-910.4. Two biotite cross bands medium-grained 910.6, 910.7. | |
| 911.2 | Medimm-coarse black altered serpentine on hair-line fractures. | 911.1-911.3 Moderate-strong |
| 911.8 | Coarse-grained with traces of coarse biotite. Magnetite visible, bright green altered with calcite and traces of disseminated pyrite. | 911.3-911.5 Strong |
| 912 | Medium-grained black-brownish iron altered over green black mica. | 911.5-911.7 Medium-strong<br>911.7-912.1 Medium |
| 914.2 | Medium-coarse grained pyroxenite with mino biotite 912.1-912.8 Pyroxenite slightly altered, hematite (dark) stain present. Trace very fine disseminated pyrite 912.8 2mm. veinlets of calcite and green altered and dark bands adjacent to molybdenite and abundant pyrite. Total thickness 0.04'<br>912.8-913.2 Splotchy green altered in pyroxenite. | 912.1-913.9 Moderate-strong Disseminated, some magnetite crystals.<br>913.9-914.6 Strong. Medium-coarse magnetite crystals and disseminated. |
| 914.6 | Coarse-grained pyroxenite with medium-coarse visible magnetite. | 914.6-915.4 Strong Disseminated and coarse magnetite crystals. |
| 915.4 | Same as above-abundant reddish hematite with greenish altered grains. | |
| 915.5 | Medium-grained with biotite obvious hematite spots. | 915.5-919.1 Weak |
| 917.1 | Medium-to coarse-grained pyroxenite with hematite spots. Calcite and serpentine veinlets to 5mm. 914.8-915.3. Brownish green altered with some dark banding. 915.8-916 Altered calcite veinlets. 916.9-917 Calcite veinlet 2mm. | |
| 919.5 | Medium-coarse to coarse-grained, mostly coarse-grained pyroxenite with scattered mica with large grains altered hematite red. 918.3 Scattered green altered grains, This is a good looking interval. | 917.1-917.6 Medium-strong Visible magnetite throughout.<br>917.6-917.75 Weak-moderate<br>917.75-918.5 Moderate-strong<br>918.5-918.8Strong almost massive magnetite<br>918.8-919.2 Moderate-strong Visible coarse magnetite. |

Hole "A"

| DEPTH | DESCRIPTION | MAGNETISM |
|---|---|---|
| | | 919.2-919.5 Moderate |
| 920.5 | Medium-grained with abundant medium-grained mica with some red hematite material. 920 Calcite vein-2mm. (Slickenside) | 919.5-920.9 Moderate Disseminated magnetite. |
| 922 | Coarse-grained pyroxenite 920.7-920.9 Coarse intergrain green alteration. | 920.9-921.1 Strong, coarse magnetite visible 921.1-921.6 Moderate strong coarse and disseminated magneti 921.6-922 Moderate disseminated |
| 923.1 | Coarse-grained black pyroxenite fine intergrains altered and hair-line fractures. | 922-923.7 Moderate Disseminated and some visible magnetite crystals. |
| 924 | Medium-coarse pyroxenite. Altered veinlets-3mm. greenish serpentine with some calcite | 923.7-924.3 Mod-strong. Some med. coarse visible magnetite crystal |
| 924.5 | (Core measures to 924.5) Very coarse grained. | 924.3-924.5 Moderate |
| | CORE 19 - 924-943.2 | |
| 925.2 | Medium-coarse sub-porphoritic black fresh pyroxenite | 924-924.3 Mod. 924.3-924.9 Mod. Strong, disseminated medium fine grained magnetite |
| 926 | Coarse to very coarse pyroxenite, with granular greenish black biotite. | 924.9-926.5 Mod. Both disseminated in medium grained rock and coarse crystals and massive coarse grained rock. |
| 926.5 | Medium-grained granular pyroxenite with dark green intergranular alteration. 926.2 Veinlet white and green banded which are often hair-line veinlets with green alteration. | |
| 926.7 | Medium-grained as above. | Weak-moderate |
| 927.4 | Coarse-grained granular with conspicuous black mica. | Modest-strong Medium coarse visible magnetite crystals concentrated along margi of mica rich zone |
| 928.85 | Medium-grained green fresh black pyroxenite with traces of medium-grained black mica. 928.8 Hair-line fractures and calcite veinlets (very narrow) 0.5mm. Altered brownish green on margin | Weak-moderate |

| DEPTH | DESCRIPTION | MAGNETISM |
|---|---|---|
| 929.1 | Medium-grained granular as above with trace of reddish spots described as hematite? | 928.8-929 Moderate |
| 930.1 | Coarse-tovery coarse-grained pyroxenite with huge pyroxene crystals. Coarse magnetite, trace of black mica, trace of pyrite with altered intergranular material. Pyroxene looks slightly greenish. At 930.1 some of reddish (hematite) seems to go with green alteration of pyroxene. | 929-929.8 Strong good visible coarse magnetite 929.8-930.1 Moderate-strong |
| 931.4 | Medium-grained granular black pyroxenite with trace black mica. Cross fiber calcite veinlets at 930.1, 931.2,1mm. wide, no appreciable alteration. | 930.1-930.6 Weak 930.6-931.2 Weak-moderate |
| 932 | Coarse-grained granular pyroxenite with abundant brown (hem?) material, some mica. | 931.2-932 Weak-moderate |
| 932.2 | Coarse-to medium-grained pyroxenite, altered with much brown, also calcite veinlet slightly banded and slightly serpentinous. | 932-932.2 Mod. Disseminated magnetite 932.2-932.5 Mod. Strong Disseminated magnetite |
| 933.7 | Medium-to coarse-grained sub-porphyritic black pyroxenite. Alteration common, fine-grained inter-granular (green-gray), with trace scattered mica. Calcite veinlet at 932.8 (2mm.). | 932.5-932.8 Mod. Disseminated magnetite 932.8-933.2 Moderate-strong Disseminated magnetite 933.2-933.7 Mod. Disseminated magnetite |
| 936.2 | Medium-to coarse-grained, sub-porphyritic black pyroxenite. Slight scattered black mica. At 934.2, cross veinlet, green margin, less than 1mm. wide. Similar veinlet at 936.0. | 933.7-934.1 Weak-mdderate 934.1-934.6 Moderate-strong Disseminated magnetite 934.6-935 Moderate-strong Disseminated and visible coarse masses. 935.5-936.2 Weak-moderate |
| 936.8 | Medium-grained, black pyroxenite with slight mica. Visible scattered medium-to coarse-grained magnetite. Veinlets at 936.5-936.8, calcite-serpentine 1-2mm. wide. At 938, alteration serpentinous veinlet with spotty disseminated pyrite. Disseminated coarse-to fine-grained mica band at 937.3 and 932.7. | 936.2-936.6 Weak. Coarse an disseminated magnetite. 937.5-938.4 Medium-strong 938.4-938.6 Mod. Disseminated magnetite. |

## Hole "A"

| DEPTH | DESCRIPTION | MAGNETISM |
|---|---|---|
| 939.3 | Same. Local spots altered. Some calcite and serpentine. Scattered pyrite. Wavellite? | 938.6-939.7 Mod. Disseminated magnetite |
| 939.8 | Medium-to coarse-grained pyroxenite. Large pyroxene crystals. Large masses magnetite. Some coarse biotite crystals and granular biotite. | 939.7-939.95 Mod-strong masses of magnetite. |
| 940.4 | Coarse-grained granular pyroxenite. | 939.5-940.4 Very strong. Large masses of magnetite. |
| 940.1 | Medium-grained pyroxenite with slight biotite. At 940-941.1 is calcite veinlet parallel to core, serpentinous alteration, slickensided. | 940.4-941.1 Moderate. Disseminated granular magnetite |
| 941.6 | Medium-grained pyroxenite with biotite. Also calcite vein as above alonge core. | 941.1-941.6 Weak 941.6-941.9 Mod. Medium-grained, more or less spotty magnetite. |
| 941.8 | Medium-to coarse-grained pyroxenite and medium biotite. | |
| 943.2 | Coarse-grained pyroxenite with biotite. Biotite abundant at 942-942.4. Calcite-serpentine veinlet at 942.1. Alteration to serpentine intergranularly common in rock. | 941.9-942.3 Medium-strong Magnetite as abov 942.3-943.2 Weak. Magnetite as above. |
| 945 | Coarse-grained, granular pyroxenite with abundant black mica medium-to coarse-grained. Pyroxene dull green, somewhat altered. Scarce hair-line fractures with calcite, greenish. | 943.2-944.1 Weak-moderate 944.1-945 Mod. Disseminate magnetite. |
| 947.4 | Same, except somewhat less altered and of crisper appearance. | 945-945.6 Mod. 945.6-946.6 Moderate-strong Disseminated medium-grained magnetite. |
| 949.9 | Medium-to coarse-grained granular pyroxenite with much reduced quantity of black mica. Rare dark red "hematitic" crystals. Scattered intergranular green serpentinous(?) alteration only locally and sparsely. Calcareous. At 941 are calcite veinlets, 2mm., banded, very scarce pyrite. Dark green alteration bands up to 5mm. adjacent to veinlets. | 947.4-948.2 Mod. 948.2-948.7 Moderate-strong 948.2-948.7 Moderate-strong 948.7-949.3 Mod. 949.3-949.9 Moderate-strong magnetite visibl as crystals. Some disseminated. |

Hole "A"

| DEPTH | DESCRIPTION | MAGNETISM |
|---|---|---|
| 952.2 | Medium-to coarse-grained pyroxenite. Granular to spotty sub-porphyritic. Black, with sparse medium- to fine-grained mica. Hair-line factures with calcareous-serpentine alteration, sparse, at 950.6, 950.8, 951.7. | 949.9-950.8 Mod. 950.8-951.1 Moderate-strong Generally disseminated med.-grained visible magnetite. 951.1-951.7 Mod. Strong in spots. 951.7-952.2 Disseminated medium-grained magnetite and medium-coarse crystals visible. |
| 952.8 | Medium-to coarse-grained porphyritic black pyroxenite, some fresh. Calcite veinlet 1mm., medium-grained, with sparse fine-grained pyrite. | 952.2-952.8 Weak-moderate 952.8-953.2 Moderate-strong Disseminated and visible medium-grained magnetite 953.2-953.6 Weak-moderate 953.6-954.7 Moderate. Generally disseminated magnetite. |
| 957.1 | Medium-to coarse-grained granular pyroxene with moderately abundant medium-to coarse-grained black mica. Locally, pyroxene slightly altered. | 954.7-955.4 Weak-moderate 955.4-956.1 Moderate-strong Visible crystals of, and disseminated magnetite. 956.1-957.1 Mod. Visible crystals and disseminated magnetite. |
| 959.6 | Coarse-grained granular pyroxenite with moderate medium-grained black mica. Intergranular alteration green, generally non-calcareous. Pyroxene greenish-brown in thin slivers. Calcareous veinlets along core at 957.1-857.8 (trace very fine-grained pyrite) and 958.8-959.6 | 957.1-958.3 Weak 958.3-959.1 Mod. Disseminated magnetite. 959.1-959.6 Moderate-weak. |
| 961.8 | Coarse-grained granular black pyroxenite with moderately abundant medium-to coarse-grained black mica. Calcite veinlet along core at 959.6-960.1 with small quantity of gray-yellow sulphide fine-grained along border. Calcite veinlet across core at 960.6, banded and 2-4mm. wide. Several calcite veinlets across core at 961.6-961.9, multiple, slightly greenish. | 959.6-960.5 Weak-moderate 960.5-961 Mod. Magnetite disseminated intergranularly. 961-961.6 Slight moderate. Magnetite as abou |

Hole "A"

| DEPTH | DESCRIPTION | MAGNETISM |
|---|---|---|
| 962 | Medium-grained granular black pyroxenite with scattered medium-grained black mica. | 961.6-962 Mod. Magnetite as above. |
| 962.65 | Medium-to coarse-grained granular black pyroxenite with medium-abundant black mica. Intergranular alteration visible. Banded calcite veinlet 2-3mm. wide at 962.2 with trace pyrite and green alteration along margin. At 962.4-062.6, rock grades to dense dark-gray and at 962.6-962.65 grades to pistachio green fine-grained alterationzone with prominent mica. | 962-962.65 Weak-moderate |
| 963.2 | Feldspar-carbonate vein. Medium-to fine-grained-carbonate is dolomite. Abundant massive pyrite along edges, some masses within. Vuggy in central zone. Bordered by very fine-grained gray bands 2-4mm. wide containing disseminated pyrite. | |
| 963.3 | Altered pyroxenite. | |
| 964 | Medium-to coarse-grained sub-porphyritic granular black pyroxenite with interspersed calcite and feldspar-carbonate . Veinlets of feldspar-carbonate are banded white and gray with pyrite and finely disseminated gray mineral. | 963.6-964.6 Moderate-strong Scattered magnetite visible |
| 964.5 | Predominantly coarse-grained pyroxenite. At 964.5 feldspar-carbonate veinlet with pyrite, medium-grained. | |
| 968 | Coarse-grained dark granular black pyroxenite. | 964.6-965.76 Weak-moderate 965.75-966 Strong Disseminated magnetite, some crystals visible. 966-968.5 Weak |
| 970 | Medium-to coarse-grained sub-porphyritic pyroxenite. Locally with mica. At 970, calcite veinlet 3mm. wide. | 968.5-968.7 Strong. Slightly visible magnetite 968.7-969 Weak-moderate 969-969.2 Strong Disseminated magnetite. 969.2-970 Weak |
| 975 | Medium-to coarse-grained pyroxenite. Slightly altered and with disseminated pyrite. Carbonate veinlets at 972. At 970.7, veinlets banded brown on edges. Total 10mm. thick. Rock grades to granular black pyroxenite coarse-grained, locally serpentinized on hair-line fractures. Slight bronze mica, scattered. | 970-970.45 Moderate-strong 970-970.45 Moderate-strong 970.45-970.55 Strong. Visible magnetite 970.55-970.8 Moderate-strong 970.8-972.2 Moderate-strong Locally many crystals very obvious. 972.2-974 Weak-moderate 974-974.45 Strong Disseminated magnetite. 974.45-975 Weak-moderate |

Hole "A"

| DEPTH | DESCRIPTION | MAGNETISM |
|---|---|---|
| 976.55 | Similar pyroxenite. | 975-975.95 Weak |
| 977.6 | Medium-grained pyroxenite. At 977.3 red mineral scattered through pyroxenite looks like hematite. | 975.95-970.6 Moderate-strong Generally disseminated. |
| 979.8 | Medium-grained sub-porphyritic pyroxenite with some mica. Granular rock, evident on outside of core. | 976.6-979.1 Moderate 979.1-981.6 Moderate to strong. Probably medium disseminated magnetite. |
| 981.6 | Medium- to coarse-grained pyroxenite | |
| 982 | Medium-grained pyroxenite. | 981.6-982 Weak |
| 983 | Medium-to coarse-grained granular sub-porphyritic pyroxenite. Calcite veinlet at 982.4, 2mm. | 982.-982.7 Medium-strong 982.7-982.9 Weak |
| 983.2 | Medium-to coarse-grained pyroxenite with mica. | 982.9-983.2 Mod. |

CORE 22 - 983.2-900.4

Core is appreciably magnetic throughout. Entire core is black, medium-grained granular to porphyritic pyroxenite. Phenocrysts are (a) subhedral to euhedral pyroxene or amphibole yellow-greenish in splinters, (b) books of bronze to black mica, or (c) locally coarse submetallic subhedral magnetite crystals. Pyroxene phenocrysts commonly up to 10mm. maximum dimension-a few greater. A little magnetite observed on broken surfaces to about same size. Mica generally not over 3-5mm. diameter. Groundmass is granular mosaic of anhedral dull black to greenish black grains, sparkling pyroxene (?), and small mica flakes. Plagioclase identified on one surface. Calcite veinlets to 1mm. thich sparsely scattered through core.

| | | |
|---|---|---|
| 983.9 | Relatively coarse pyroxenite. Visible magnetite | Strong |
| 985 | Mica-rich pyroxenite or ouachitite. Dike-like band. | Weak |
| 985.5 | Coarse-to medium-grained pyroxenite. Visible magnetite Streaks of magnetite to 0.2 feet long. | Strong |
| 991.1 | Medium-grained pyroxenite | Moderate |
| 992.1 | Medium-grained sub-porphyritic pyroxenite with visible coarse pyroxenite. | Strong |
| 995 | Medium-grained granular pyroxenite. Locally some magnetite visible. | Weak to spotty strong |
| 997 | Same. At 997 touch of feldspar-carbonate vein with pyrite mineralization and with weak alteration in green pyroxenite. | Weak |
| 1000 | Similar pyroxenite, locally altered on hair-line fractures. | Weak |
| 1003.4 | Medium-grained black pyroxenite with relatively abundant mica. | |

CORE 23 - 1003.4-1023.5

1023.5 Black medium-to very coarse-grained, granular to porphyritic pyroxenite. Some large crystals up to 5cm. long locally. Bright-vitreous crystals with good cleavage-pyrobole in groundmass of anhedral to subhedral dark gray grains with dull luster. Spotty magnetism with visible crystals on outside of core.

Hole "A"

| DEPTH | DESCRIPTION | MAGNETISM |
|---|---|---|
| 1025.2 | Very coarse-grained black pyroxenite. Hair-line fracture serpentinized. Pyroxene crystals to 3cm. in medium--grained groundmass. At 1024.3-1024.5, magnetite estimated 50% | Strong. Coarse visible magnetite. |
| 1025.7 | Medium-grained granular black pyroxenite | Strong. Coarse visible magnetite |
| 1026.5 | Coarse-grained pyroxenite | |
| 1027 | Medium-grained black pyroxenite with abundant mica flakes. 2mm. calcite veinlet across core. | |
| 1027.5 | Coarse-grained black pyroxenite. | Strong. Coarse, visible magnetite |
| 1028 | Medium-grained black pyroxenite with mica. Calcite veinlet at 1027.7 | |
| 1028.3 | Coarse-grained pyroxenite. | |
| 1028.6 | Slightly altered medium-grained pyroxenite | |
| 1028.9 | Medium-grained pyroxenite-calcite veinlet diagonally across core. | |
| 1029.8 | Medium-grained black pyroxenite-little mica. | Moderate. Fine-grained disseminated magnetite |
| 1030.8 | Coarse-to medium-grained dark gray pyroxenite. A trace of disseminated sulfide (?), Pyrite (?). Calcite veins at 1030.2 and 1030.5. | |
| 1031.5 | Medium-grained black pyroxenite with scattered mica. Serpentine on hair-line fractures. | |
| 1032.3 | Medium-grained black pyroxenite. Scattered mica. Serpentinous alteration on hair-line fractures. | Moderate. Fine-grained disseminated magnetite. |
| 1033.2 | Medium-to coarse-grained black pyroxenite. Coarse magnetite visible, disseminated minute pyrite (?) or other sulfide. | Strong. Locally 5-15% visible magnetite estimated. |
| 1033.4 | Green, soft, friable, altered zone with 6mm. veinlet feldspar-carbonate (slightly calcareous), banded white in center flanked by gray with minute disseminated pyrite or other meallic mineral. | |
| 1034.5 | Fine-grained feldspar-carbonate vein with distinct pyrite bands and pyrite. | |
| 1035.1 | Light green soft altered rock with feldspar-carbonate vein as above. | |
| 1035.6 | Massive white feldspar-carbonate vein with disseminated gray mineral and locally heavy pyrite. | |
| 1036 | Friable soft green completely altered zone. | |
| 1037.8 | Black pyroxenite, medium-grained granular with mica. A few calcite and calcite-serpentine veinlets and hair-line fractures. | |
| 1038.4 | Medium-grained black pyroxenite, essentially no mica. | |
| 1038.8 | Medium-to coarse-grained black pyroxenite. Magnetite visible on surface of core. | Strong. Scattered visible magnetite |
| 1040.8 | Medium-grained black pyroxenite with blended serpentinous calcite veinlets at 1040.2 and 1040.6. | |
| 1041.2 | Black, medium-to coarse-grained granular pyroxenite with mica-some coarse. | |

Hole "A"

| DEPTH | DESCRIPTION | MAGNETISM |
|---|---|---|
| 1041.6 | Coarse-grained pyroxenite with magnetite visible on surface of core and on broken end. Crystals up to 15mm. long. | Strong. Coarse, visible magnetite estimated at 15% |
| 1042 | Medium-grained granular pyroxenite with mica. | Strong. Coarse, visible magnetite estimated at 5% |
| 1042.2 | Medium-grained black granular pyroxenite. | |
| 1042.5 | Same with mica, some magnetite. | |
| 1043.6 | Medium-to coarse-grained pyroxenite with visible magnetite. | |
| 1046.3 | Very coarse-grained pyroxenite-visible magnetite intermittently on side and ends of core. | Strong. Visible spotted with coarse magnetite |
| 1046.6 | Medium-grained granular black pyroxenite with disseminated fine pyrite. Calcite and slightly serpentinized veinlets. | |
| 1050.1 | Very coarse-grained pyroxenite as above. | Strong to mod. |
| 1051 | Medium-grained granular, serpentinous black pyroxenite with mica. Carbonate veinlet runs length of core. | Variably visible coarse masses of magnetite. |
| 1051.6 | Medium-grained somewhat altered black pyroxenite with mica. | |
| 1053.8 | Rather strongly altered medium-grained pyroxenite. Near greenish-black. Calcite vein runds down core. | |
| 1055.5 | Medium-grained granular black pyroxenite. Hair-line splits with serpentinous calcite. | Strong. Fine-grained disseminated magnetite. |
| 1056.2 | As above, more less mica bearing. | |
| 1058.15 | Medium-to coarse-grained black pyroxenite. Magnetite visible on end of core as well as on side. | Strong. Fine-grained disseminated to locally visible fine-grained massive spots. |
| 1058.9 | Same | |
| 1059 | Medium-grained, otherwise same. | Same as above |
| 1059.3 | Medium-grained granular black pyroxenite. | |
| 1059.45 | White, banded gray feldspar-carbonate vein, disseminated pyrite. | |
| 1062 | Black medium-grained granular to porphyritic pyroxenite. Most shows some mica. Some visible massive aggregate of fine-grained magnete. | |
| 1063.9 | Rock becoming more pronouncedly porphyritic and at 1063 becomes very coarse-grained with visible magnetite in coarse grains on surface of core. (Black granular pyroxenite above is all slightly calcareous in pin point spots). | Mod. magnetic to spotted strong where magnetite crystals visible on surface of core |
| 1065.2 | Medium-grained black granular pyroxenite at 1065.1, 3mm. calcite veinlet diagonally across core. | Moderate to strong Locally visible magnetite |
| 1066.4 | Medium-to coarse-grained black sub-porphyritic, visible magnetite. Small calcite veinlets with local alteration adjacent. | Same as above |

Hole "A"

| DEPTH | DESCRIPTION | MAGNETISM |
|---|---|---|
| 1067 | Black, medium-grained, granular pyroxenite. | Same as above |
| 1067.1 | Small fine-grained black dike with medium-grained biotite. Ouachitite? | |
| 1067.8 | Very coarse-grained granular pyroxenite. | |
| 1068.3 | Black medium-grained sub-porphyritic pyroxenite. Calcite veinlet at 1068.3. Hair-line fractures have green alteration. | |
| 1070 | Medium-to coarse-grained sub-porphyritic pyroxenite with abundant visible magnetite. | |
| Gap(?) 1072.7-1073 | Black medium-grained granular pyroxenite with abundant biotite. | |
| 1073.9 | Medium-grained granular black pyroxenite. | |
| 1074.1 | Feldspar-carbonate vein, gray, finely disseminated pyrite. | |
| 1076.5 | Medium-to coarse-grained black pyroxenite, locally a little mica. | Mod. strong. Scattered med.-grained magnetite crystals visible |
| 1079.05 | Coarse-grained gray-black pyroxenite with abundant magnetite at 1077.6-1078.3, very strong magnetism, very coarse and many magnetite crystals, some places massive, estimated 45-50% magnetite. At 1078.85-1079.05, strong magnetism, some visible medium-grained magnetite. | Moderate-strong Fine-to medium-grained magnetite visible. |
| 1079.9 | Medium-grained, black, sub-porphyritic, with mica. At 1079.4, feldspar-carbonate vein 4mm. wide. | |
| | CORE 28 - 1079.9-1083 | |
| 1081.6 | Medium-grained granular black pyroxenite. Trace mica. ~~At 1079~~ Trace visible magnetite. | Weak to moderate throughout. |
| 1081.8 | Same with slight brecciation and calcite veinlets. Serpentinized contacts. | |
| 1083 | Same with local fine-to medium-grained mica flakes. At 1082.9, calcite vein 3-5mm. Finely disseminated medium-grained pyrite in vein. Lost core in this interval by grinding in barrel. Recovered 2.8 feet. | |
| 1083.3 | Soft, green altered pyroxenite with veinlets. At 1083.3 feldspar-carbonate vein with disseminated pyrite, some massive. | |
| 1085.7 | Very hard dense fine-grained rock with disseminated pyrite. Feldspar-carbonate vein at 1083.6-1083.9 and 1084.1-1084.2 Trace fluorite (?) at 1085.4. | |
| 1086.3 | Feldspar-carbonate vein with massive and disseminated pyrite. | |
| 1087 | Green altered pyroxenite with calcite vein running length of core. Vein open in middle locally. | |
| 1087.8 | Green soft altered pyroxenite. | 1087.5-1088.9 Moderate to stron 1088.9-1089.6 Weak to moderate 1089.6-1093 Mod. |
| 1090.5 | Interspersed carbonate vein. Temperature effervescence, may be dolomite. Vein contact has abundant pyrite coating. | |
| 1095 | Medium-to coarse-grained porphyritic pyroxenite, looks crisp. Under lens slightly altered scattered hair-line carbonate veinlets. | 1093-1096.6 Weak to moderate |
| 1098.3 | Medium-grained black pyroxenite. | 1096.6-1098.3 Mod. throughout |

Hole "A"

| DEPTH | DESCRIPTION | MAGNETISM |
|---|---|---|
| 1098.7 | Carbonate vein, coarse-grained, pink, a little scattered pyrite at edges. | |
| 1099.6 | Fine-grained brittle gray dike-calcareous. Is this a gray feldspar-carbonate vein? | |
| 1100.2 | Medium gray, fine-grained, compact, slightly calcareous. Either igneous aphanite or gray feldspar-carbonate vein. | |
| 1100.45 | White to light g ray feldspar-carbonate vein, dolomitic with disseminated molybdenite (or graphite), some pyrite. | |
| 1100.7 | Pyroxenite banded with feldspar-carbonate veinlets parallel to major vein-and brown bands (siderite). | |
| 1101 | Medium-grained black pyroxenite. | |
| 1101.2 | Pyroxenite and feldspar-carbonate vein and replacement phenomena. | |
| 1101.6 | Coarse-grained granular black pyroxenite. | Weak to moderate Fine-grained disseminated magnetite visible |
| 1102.1 | Medium-grained granular to sub-porphyritic black pyroxenite. | |
| 1102.5 | Coarse-grained pyroxenite with abundant mica. Essentially an ouachitite. | 1102.1-1102.8 Weak |
| 1104.5 | Coarse-grained granular black pyroxenite with minor calcite veinlets. At 1102.6, scaly, fine-grained (?) fine-grained pyrite on fresh fracture surfaces. At 1103.55, pyrite (granular?) scattered abundantly on hair-line calcite veinlets surfaces. At 1104.4-1104.5, altered with minute green veinlets. | 1102.8-1103.6 Moderate 1103.6-1104.3 Relatively weak Scattered visible medium-grained magnetite crystal 1104.3-1104.5 Weak to moderate |
| 1104.8 | Coarse-grained, granular, slightly altered, greenish black pyroxenite. | |
| 1105 | Biotite-rich, black, coarse-grained ouachitite. | 1104.5-1105.7 |
| 1106.4 | Coarse-grained granular black pyroxenite with some black mica. At 1105.8, 2mm. calcite veinlet. At 1106, coarse-grained with brown, relatively soft (less than 5) cleavable material. Might be siderite, too soft for perovskite. Calcite veinlet at 1105.8, 1196.3 | Moderate to strong spotty. Some visible massive fine-grained magnetite. 1105.7-1106.9 Weak |
| 1106.5 | Coarse, biotite rich band (ouachitite?) | |
| 1106.9 | Coarse-grained, slightly altered, greenish black pyroxenite. | |
| 1108.4 | Medium-to coarse-grained, greenish-black pyroxenite with abundant biotite. Locally very abundant at 1106.6, 1106.9, 1107.9-1108.1. Scattered greenish alteration in bands 1106.3-1106.5 Green mineral along calcite vein (colo&tion) Suggest copper. Associated siderite. At 1106.7-1106.9, with ouachitite and at 1107.9-1108.1 with ouachitite, and lower part of core. | 1106.3-1107.6 Weak to moderate 1107.6-1108.75 Moderate to strong. |
| 1108.75 | Medium-grained granular black pyroxenite. | |
| 1111 | Medium-grained granular black pyroxenite. Three veinlets between 1109.5-1109.9, calcite, serpentinous, green. | 1108.75-1109.6 Moderate to strong 1109.6-1110.3 Weak to moderate |

Hole "A"

| DEPTH | DESCRIPTION | MAGNETISM |
|---|---|---|
| 1111.2 | Medium-to coarse-grained pyroxenite with abundant mica (ouachitite). | 1109.3-111.2 Moderate to stron<br>111.2-111.6 Moderate |
| 1111.5 | Coarse ouachitite, cut by diagonal feldspar-carbonate vein ( banded through rock) adjacent rock all altered green. Mineral in vein includes traces of pyrite and minute needles of rutile(?). | |
| 1112.4 | Coarse-grained granular black pyroxenite, generally fresh. | 111.6-1112.6 Moderate to stron Visible medium-coarse magnetite spotty. |
| 1112.7 | Coarse-grained, biotite heavy, pyroxenite. | |
| 1113 | Medium-to coarse-grained pyroxenite with scattered mica. | 1112.6-1113 Moderate |
| 1115.1 | Medium-grained granular black pyroxenite, locally mica-rich fine-grained. Slight fine-grained sulfide disseminated at 1114.8. Yellowish, may be pyrite. Calcite veinlets (1-2mm.) at 1113.25, 1114, 1114.8. | 1113-1113.4 Mod. to strong Disseminated<br>1113.4-1113.6 Strong. Medium coarse magnetite visible.<br>1113.6-1115 Mod. to strong Disseminated |
| 1115.9 | Medium-grained porphyritic black pyroxenite. | 1115-1117.1 Mod. Disseminated |
| 1116.6 | Medium-to coarse-grained, subporphyritic, with medium-grained dark mica. | |
| 1117 | Medium-grained granular pyroxenite. | 1117.1-1117.3 Strong. Locally with large crystal of magnetite. |
| 1117.3 | Medium-to coarse-grained, sub-porphyritic pyroxenite. | |
| 1120 | Coarse-grained granular, dark green-black pyroxenite. At 1117.5, several serpentinous calcite veinlets. | 1117.3-1117.8 Weak<br>1117.8-1118.5 Weak<br>1118.5-1118.8 Mod.<br>1118.9-1119.6 Weak<br>1119.6-1120 Mod. |
| 1122.75 | Coarse-grained, locally medium-to coarse-grained, porphyritic black to greenish-black pyroxenite, with local calcite and serpentine calcite veinlets. Red Hematite (?) fine-grained material sparsely disseminated throughout. At 1122.3, calcite and serpentine(?) visible, veinlet showing slickensides. At 1122.5-1122.75, with fine-grained mica. | 1120-1120.1 Weak to moderate with local strong at local medium, magnetite.<br>1121.65-1121.95 Strong with semi-massive localized magnetite.<br>1121.95-1122.75 Weak to moderate. |

Hole "A"

| DEPTH | DESCRIPTION | MAGNETISM |
|---|---|---|
| 1125.3 | Variable medium-to coarse-grained generally sub-porphyritic pyroxenite to coarse-grained granular Slightly altered 1122.75-1123.5. Serpentinous calcite vein at 1123.9. Slight veinlet and alteration at 1124 and adjacent strong mica. At 1124.8-1125.2, slight greenish alteration. Strongly mica-bearing at 1123.6-1123.7, 1124.1-1124.3, and slight mica at 1124.3-1125.2. At 1125.2, trace disseminated finely granular yellow sulfide, pyrite? | 1122.75-1123.2 Weak<br>1123.2-1123.4 Weak to mod.<br>1123.4-1123.7 Weak<br>1123.7-1124.9 Weak to moderate<br>1124.9-1125.2 Weak<br>1125.2-1125.3 Weak to moderate. Magnetite above generally disseminated with relatively strong spots locally. |
| 1128 | Medium-to coarse-grained, sub-porphyritic black pyroxenite with biotite scattered throughout. Sparsely scattered fine-grained masses and/or disseminated red hematite staining throughout. Strong coarse magnetite crystals at 1125.8-1127.2. A few hair-line serpentinous calcite veins with slickensides. At 1126.05, trace of yellow sulfide, fine-grained, (pyrite?) At 1127.2, calcareous, serpentinous slickensides. | 1125.3-1125.8 Weak<br>1125.8-1127.3 Weak with scattered strong Coarse-grained locally abundant magnetite.<br>1130.2-1130.4 Moderate to strong with local abundant medium-coarse magnetite crystals. |
| 1130.4 | Medium-grained granular black pyroxenite with generally sparse scattered mica flakes. Calcite veinlet (4mm.) at 1128. Very slight trace of minute black flakey grains (Molybdenite or graphite?) Serpentine veinlet along edges of calcite vein, locally pink (hematite?). At 1129.6, alteration along veinlet generally green, fine-grained, 2mm. wide. | |
| 1132.8 | Medium-grained granular black pyroxenite as above. Scattered mica flakes. At 1132.2, diagonal calcite veinlet with serpentinous borders and slickensides. | 1130.4-1130.6 Moderate to strong as immediately above<br>1130.6-1133 Weak Some disseminated magnetite. |
| 1134 | Medium-grained granular gray black pyroxenite. Veinlet down core, slightly altered. | Weak |
| 1137.1 | Dike. Aphanitic, porphyrtic. Tiny green phenocrysts, dark gray, lamprophyre (monchiquite?). Has sparsely disseminated pyrite. Breccia at base shows intrusive character. Several cross-cutting calcite veinlets. | Non-magnetic |

Hole "A"

| DEPTH | DESCRIPTION | MAGNETISM |
|---|---|---|
| 1139.3 | Medium-grained granular black pyroxenite. | Low |
| 1139.9 | Medium-to coarse-grained, sub-porphyritic black pyroxenite. Some mica. | Low to moderate Some scattered visible magnetite on core surface. |
| 1140 | Medium-grained granular black pyroxenite. | Low |
| 1141.2 | Same. Locally considerable mica. | 1140-1140.6 Moderate to strong |
| 1141.6 | Same with calcite veins, multiple and thin. Rock generally altered slightly greenish. | 1140.6-1141.5 Moderate 1141.5-1141.8 Strong. Abundant visible coarse magnetite. |
| 1142.7 | Medium-grained granular black pyroxenite. Locally strong visible medium-coarse magnetite. At 1142.61, old, healed brecciation and serpentine veinlets. | |
| 1143.4 | Medium-to coarse-grained pyroxenite with relatively abundant mica. | 1142.5-1142.8 Moderate 1142.8-1143.6 Weak |
| 1145.1 | Medium-grained granular to locally coarse-grained porphyritic pyroxenite, black, with intermittent old hair-line veinlets with minute alteration. Locally conspicuous magnetite crystals. | 1143.6-1144.5 Mod. to strong Good visible magnetite to 20% locally. 1144.5-1145.1 Moderate |
| 1145.7 | Medium-grained granular black pyroxenite. Carbonate vein associated with fine-grained gray vein in brecciated zone, 3mm. maximum thickness. | 1145.1-1145.8 Moderate |
| 1146.6 | Medium-grained granular pyroxenite. Good visible medium-grained magnetite. | 1145.8-1146.6 Moderate to strong. Visible magnetite. Coarse locally to 20% |
| 1146.6 | Medium-grained granular pyroxenite. Good visible medium-grained magnetite. | |
| 1147.1 | Breccia zone in medium-grained granular pyroxenite. Calcite vein with associated fine-grained mineral within and along edges. Trace pyrite in calcite. | 1146.6-1147.1 Weak |
| 1147.65 | Medium-grained granular black pyroxenite | 1147.1-1147.5 Moderate to stron Good visible magnetite |
| 1147.9 | Aphanitic dense light gray feldspar-carbonate vein or dike. Disseminated pyrite sparse. Local crystals about 2mm., fluorite? | |
| 1149.6 | Intermittent medium-grained granular to porphyritic black pyroxenite with some medium-to coarse-grained. Rock heavy, cut by fine-grained green-gray serpentinized hair-line fracture. | Rapidly fluctuating Weak to mod. to strong. Generally moderat |

Hole "A"

| DEPTH | DESCRIPTION | MAGNETISM |
|---|---|---|
| 1153 | Medium-grained granular black pyroxenite, locally with a little mica. | Mostly moderate with disseminated magnetite. Probably essentially uniform throughout. |
| 1154 | Medium-grained granular-black pyroxenite. Trace mica. | Strongly magnetic Abundant visible magnetite estimated 20-25% |
| 1154.4 | As above, with visible magnetite. | Moderate |
| 1155 | Medium-to coarse-grained pyroxenite with mica. Locally altered to dark green on hair-line fractures. | Moderate |
| 1155.5 | Same, with calcite veinlet diagonally across core. Calcite contains pink areas. Surfaces serpentinized, all slickensided. | Moderate |
| 1157.1 | Medium-grained granular black pyroxenite. Locally altered, some green, some brown. Visible medium-grained magnetite. Core heavy. | Moderate |
| 1158.3 | Medium-grained granular black pyroxenite. Locally with mica. At 1157.3, 1157.8, scattered visible magnetite. | Weak to moderate Locally strong. |
| 1158.8 | Coarse-grained pyroxenite, mica bearing. | Moderate |
| 1159.5 | Coarse-grained black pyroxenite, scattered visible magnetite. | Moderate to strong |
| 1159.9 | Similar, with at 1159.9, cross veinlet, calcite, slickensided, serpentinized. | Moderate to strong |
| 1160 | Similar, with mica. | 1159.9-1160.1 Moderate to strong |
| 1161.8 | Medium-grained granular pyroxenite. Local mica Slight alteration. A few calcite veinlets. | 1160.1-1161.3 Weak to moderate 1161.3-1161.7 Locally strong. Strong visible magnetite' |
| 1164 | Medium-grained granular pyroxenite. Local mica. At 1162, calcite veinlet, serpentinized surfaces. | 1161.8-1162.4 Moderate 1162.4-1163.1 Weak 1163.1-1164.3 Moderate, locally strong. |
| 1164.3 | Medium-grained porphyritic pyroxenite. Pyroxene phenocrysts. | |
| 1165.6 | Medium-to coarse-grained porphyritic pyroxenite, local narrow zones with mica. Wavellite? At1166 along calcite veinlet. Local healed fracture zones with narrow alteration of crystals. Greenish appearance. | Weak to moderate throughout. Local patches strong where magnetite crystals clustered (small) |
| 1166.9 | Altered pyroxenite-greenish, with abundant mica. | Moderate |
| 1168.8 | Light gray aphanitic dike, calcite along fractures carries disseminated pyrite, isolated crystals and aggregates. Local small dark spots are purple when moistened. May be fluorite. | |
| 1169 | Altered greenish to black medium-grained pyroxenite with mica. | Moderate |
| 1169.3 | Medium-grained pyroxenite, slightly altered, trace mica. | 1169-1170.2 Weak to moderate |
| 1170 | Same. Calcite veinlets, some serpentinous | 1170.2-1171.4 |

Hole "A"

| DEPTH | DESCRIPTION | MAGNETISM |
|---|---|---|
| 1170.7<br>1170.9<br>1171.4<br>1172.5 | Medium-grained granular black pyroxenite<br>Similar but porphyritic.<br>Medium-grained granular black pyroxenite.<br>Medium-grained granular black pyroxenite. Slight scattered mica. At 1172.5, calcite veinlet 1mm. with marginal green alteration. | Moderate. More or less disseminated magnetite. Moderate to strong inlast 0.1 foot. Med-grained disseminated magnetite. |
| 1174<br>1176.5 | Medium-grained granular black pyroxenite.<br>Generally medium-grained granular black pyroxenite. At 1175, coarse mica. Alteration on hair-line fractures is green throughout. At 1174.4, calcite veinlet, 2mm., serpentinized, slickensided. At 1175.2, calcite veinlet, serpentinized, slickensided, and with pink patches. | 1174-1174.2 Mod.<br>1174.2-1175.9 Weak to moderate<br>1175.9-1186.2 Mod. to strong Visible magnetite scattered through core. |
| 1178.9 | Mostly medium-grained granular black pyroxenite, with hair-line fractures and green alteration. Biotite scattered sparsely throughout. Scattered fine-to medium-grained magnetite visible. At 1177.8-1178.1, coarse-grained magnetite. | 1176.45-1177.8 Weak to moderate<br>1178.1-1178.9 Moderate |
| 1181.1 | Medium-grained granular black pyroxenite. Calcite veins, mica present at 1181. Calcite vein at 1178.6, 1180.5 (blended) | Generally weak<br>1180.6-1181.1 Weak to moderate Little magnetite visible |
| 1181.5 | Medium-to coarse-grained granular pyroxenite, with calcite vein material somewhat altered. | Weak |
| 1182 | Medium-grained granular pyroxenite | Weak |
| 1183.5 | Fresh, medium-grained granular black pyroxenite. | Weakly magnetic except 1182-1183. 1183.5, moderate with visible coarse magnetite crystals. |
| 1184.5 | Medium-grained granular black pyroxenite, becomes crumbly. Recovered 2.5 ft. out of 4, blocked core barrel, soft core, probably represents vein and alteration picked up below 1186.2 | 1183.5-1184.3 Moderate. Some coarse magnetite visible on surface of core. |
| 1186.2 | Blocked bit. | |
| 1189 | Soft, strongly altered, medium-to coarse-grained biotite-rich pyroxenite. Calcite veins travel down core, largely green and serpentinous. Abundant pyrite in vein and rock. | Little to no magnetism |

T.D. 1189

Robert H. Arndt,
Petrographer

ALPHA MINERAL COMPANY
753 W. Creedside Drive
Houston 24, Texas

CORE DESCRIPTION

HOLE "A"

| LITHOLOGY | | MAGNETIC PROPERTIES |
|---|---|---|
| 964.5-968 | Pyroxenite, coarse-grained, granular greenish black. | 964.6-965.75<br>Weak to moderate<br>965.75-966<br>Strong, disseminated magnetite, some visible<br>966-968.5<br>Weak |
| 968-970 | Pyroxenite, medium to coarse-grained, subporphyritic, locally with dark mica. | 968.5-968.7<br>Strong, slight visible magnetite<br>968.7-969<br>Weak to moderate<br>969-969.2<br>Strong, disseminated magnetite<br>969.2-970<br>Weak |
| 970-976.6 | Pyroxenite, greenish-black, coarse-grained, granular; sparse bronze mica scattered throughout; locally altered green (serpentine?) along hairline fractures. | 970-970.45<br>Moderate to strong<br>970.45-970.55<br>Strong, visible medium magnetite crystals.<br>970.55-970.8<br>Moderate to strong<br>970.8-972.2<br>Moderate to strong, magnetite crystals very obvious<br>972.2-974<br>Weak to moderate<br>974-974.45<br>Strong, disseminated magnetite<br>974.45-975<br>Weak to moderate<br>975-975.95<br>Weak |
| 976.6-977.6 | Pyroxenite, greenish-black, medium-grained, granular. 977.3 red mineral of indistinct properties (hematite?) sparsely scattered. | 975.95-977.6<br>Moderate to strong, disseminated magnetite |
| 977.6-979.8 | Pyroxenite, medium-grained, subporphyritic, sparse bronze to black mica. | 977.6-979.1<br>Moderate |

## Hole "A"

| | LITHOLOGY | MAGNETIC PROPERTIES |
|---|---|---|
| 979.8-981.4 | Pyroxenite, medium-grained, granular to medium-to coarse-grained, subporphyritic, locally scattered books of dark mica. | 979.1-981.6 Moderate to strong, disseminated magnetite |
| 981.4-981.6 | Pyroxenite, medium-to coarse-grained, granular. | |
| 981.6-982 | Pyroxenite, medium-grained, granular | 981.6-982 Weak |
| 982-983 | Pyroxenite, medium-to coarse-grained, granular to subporphyritic. 982.4 2mm calcite veinlet. | 982-982.7 Moderate to strong<br>982.7-982.9 Weak |
| 983-983.2 | Pyroxenite, medium-to coarse-grained granular, with dark mica. | 982.9-983.2 Moderate |
| 983.2-1000 | GENERAL DESCRIPTION<br>Mostly pyroxenite, black, medium-grained, granularto subporphyritic. Phenocrysts are subhedral to euhedral pyroxene, books of bronze to black mica, and subhedral magnetite crystals. The groundmass is a granular mosaic of anhedral, dull black grains and sparkling pyroxene (?), plus small mica flakes. Calcite veinlets to 1mm thick are sparsely scattered through the core. | |
| 983.2-983.9 | Relatively coarse | Strong; visible magnetite |
| 983.9-985.0 | Mica pyroxenite; or ouachitite. | Weak |
| 985-985.5 | Pyroxenite with streaks of magnetite up to 0.2' long. | Strong |
| 985.5-991.1 | Pyroxenite | Moderate |
| 991.1-992.1 | Pyroxenite, medium-grained, subporphyritic, with visible coarse magnetite. | Strong |
| 992.1-995 | Pyroxenite, medium-grained, granular, locally some visible magnetite | Weak to spotty strong |
| 995-997 | Same as above. At 997 trace of feldspar-carbonate vein with trace of pyrite, and with weak alteration in pyroxenite. | Weak to spotty strong |
| 997-1000 | Same as above with local alteration on hairline fractures | Weak |

Robert H. Arndt,
Petrographer

ADOLPH LEGSDIN
Professor
Missouri School of Mines and Metallurgy
Metallurgy Department
Rolla, Missouri

COPY

December 12, 1962

Dr. Norman F. Williams
State Geologist
Room #446
State Capitol Building
Little Rock, Arkansas

Re: Report on Magnetic, Non-magnetic Contents in Core Drill Samples

## Report

Purpose. On November 19, 1962 a representative from your office submitted to me in Rolla seven core drill samples to be analysed for magnetic and non-magnetic contents in these samples.

Samples. The samples were identified as "Alpha, Hole A". Each sample was the composite of core chips from 5 ft. hole intervals, starting with depth at 965-970 and ending with 995-1000.

Test Procedure. The full quantities of the samples submitted were used for the magnetic, non-magnetic separations. The weights of the individual samples submitted varied from 90 grams to 160 grams.

Each sample was carefully crushed separately in a gyratory and in rolls. It is improbable that any stray iron was introduced in the samples from the crushers. Each sample from the rolls discharge was then ground in agate mortar to pass 35-mesh screen. Microscopic check confirmed that the minerals were reasonably satisfactorilyunlocked at that size. The major portions of each ground sample were finer than 65-mesh, so that a practically acceptable state of unlocking of the constituent minerals had been reached.

The separation of the magnetic minerals from the non-magnetic minerals was done in a Davis Tube magnetic separator with 3 amperes D.C. current in the magnetizing coils. The magnetic field thus generated is equal to, or even stronger than the magnetic field available in most powerful industrial magnetic separators.



Samples: Alpha, Hole A

| | Compos. Sample | Percent Magn. | Percent Non-magn. |
|---|---|---|---|
| 1) | 965-970 | 13.5 | 86.5 |
| 2) | 970-975 | 14.5 | 85.5 |
| 3) | 975-980 | 14.5 | 85.5 |
| 4) | 980-985 | 19.0 | 81.0 |
| 5) | 985-990 | 13.8 | 86.2 |
| 6) | 990-995 | 20.3 | 79.7 |
| 7) | 995-1000 | 8.4 | 91.6 |

Discussion of Results

The magnetic separation was normal, clear-cut, sharp. The magnetic minerals are black. The non-magnetic fraction consisted of black and gray minerals. On recheck, only a negligible fraction of magnetic minerals was found in the rejects.

During grinding of the samples it was observed that some of the black minerals on breaking produced cleavage surfaces that appeared gray. Further check indicated that these were black colored minerals with vitreous lustre, deceiving gray color in reflected light. These minerals were non-magnetic.

Although the assigned project did not call for an analysis of the elements present in the products, it seemed to be of some interest to you to have a general idea regards the chemical composition of the products. So two samples were analysed with a spectrograph.

Spectrographic Analysis

The magnetic and non-magnetic products of the samples #1(965-970) and #6(990-995) were analysed spectrographically. The results from both products were substantially identical.

The magnetic portion consists of:
Major constituent - Iron
Minor constituents (roughly over 1/2%)-Ti, Si, Mg, Ca, Al, Mn.

The non-magnetic, black minerals consist of:
Major constituents: Fe, Mg, Ca, Ti
Minor constituents: Al, Si, Mn

The non-magnetic, gray minerals consist of:
Major constituents: Fe, Mg, Ca
Minor constituents: Mn

Oxygen and carbon cannot be evaluated spectrographically. The impurities in the magnetic material, probably, are due to ferruginous Ca-Mg-Silicates, or Ilmenite. If a silicate has a high iron content, the Davis Tube is apt to pull it out as a magnetic mineral. The titanium may also be present due to minute inclusions of Rutile or Brookite.

The black, non-magnetic minerals, probably consist of Rutile, Brookite and ferruginous Ca-Mg-Silicates.

The light non-magnetic fraction could be iron bearing silica or dolomite.

For accurate chemical analyses we usually engage the services of Bruce Williams Laboratory in Joplin, Missouri.

I am sending you also several samples of the products obtained, should you be interested to examine them.

Respectfully,

(signed) A. Legsdin

AL:bad
COPY

X

B

ALPHA MINERL COMPANY
753 West Creekside
Houston 24, Texas

CORE DESCRIPTION

HOLE "B"

LOCATION - 1560 feet north, 185 feet west of southeast corner of Section 30, T2S-R14W, Saline County, Arkansas.

ELEVATION- 376 est.

CASING set at 626 feet.

| DEPTH | DESCRIPTION |
|---|---|
| (0-626) | (Overburden) |
| 491-506 | Intermittent alternating black shale and white lime shells. |
| 516 | Sample muddy. Looks like shale. |
| 526 | Soft rock - shale - sample primarily gray. |
| 531 | Drilled easily except for very thin hard spots below 529. |
| 536 | Dark gray clayey shale. Very few hard spots. |
| 541 | Upper 2 feet as above. Lower 3 feet tough drillin., nothing hard. |
| 546 | Black and gray shale. Black makes good thin chips. |
| 618 | Started drilling hard. Mica present, some clear calcite. |
| 623 | Slightly magnetic cuttings. |
| 626 | Pyroxenite fragments. |

Casing set at 626 feet.

| | |
|---|---|
| 626.7 | Weak to moderate magnetism. Black, medium-grained altered pyroxenite. Serpentine between grains. Scattered magnetite. Hair-line calcite veinlets. |
| 627.3 | Weak to moderate magnetism. Coarse-grained pyroxenite with trace biotite running down side of core. (Core as above). Calcite vein(2mm) 626.9-627, (3mm) 627.2. |
| 627.7 | Medium-strong magnetism. Locally strong magnetite possibly to 35 or 40 percent. Medium-to coarse-grained granular pyroxenite with some serpentine alteration. Locally coarse biotite. |
| 628.4 | Weak to moderate magnetism. Black medium-grained pyroxenite with slight biotite. Abundant serpentine alteration between grains. Calcite veinlets 627.7 (2mm) and 628.1 (3mm). |
| 628.7 | Weak magnetism. Medium-to coarse-grained granular punky black pyroxenite. |
| 629 | Weak to moderate magnetism. Medium-to coarse-grained, sub-porphyritic, black pyroxenite. Extensive serpentinization along calcite veinlets. |
| 630 | Weak to moderate magnetism. Gray-green, medium-grained granular pyroxenite. Locally strong intergranular serpentinization and serpentine alteration along hair-line veinlets. Calcite vein 3mm. wide at 630.6. |
| 630.8 | Weak to moderate magnetism, locally moderate. Dark gray medium-grained granular pyroxenite. Locally sub-porphyritic with pyroxene crystals up to 2mm. in length. |
| 631.7 | Weak to moderate magnetism. Medium-to coarse-grained, locally porphyritic pyroxenite-large pyroxene phenocrysts, considerable serpentine alteration of crystals as well as intergranularly. Small amount biotite. Black to gray-green. Calcite veinlets 631.2, 631.3, 631.4, 631.6. |
| 632.4 | Weak to moderate magnetism. Coarse-grained pyroxenite, black to gray-green, some biotite, brecciated with very abundant hair-line fractures and calcite veinlets. At 631.9-632.4 vey strong alteration band 1cm. thick, dips 70 degrees. |
| 633.4 | Moderate magnetism. Medium-to coarse-grained, granular to sub- porphyritic gray-green pyroxenite, extensive serpentinization. Calcite veinlets 632.7 (2mm) 632.9 (2mm). |
| 633.5 | Feldspar carbonate vein and associated alteration. Bunded with dark gray parallel to vein. Vein is horizontal. |
| 633.6 | Weak to moderate magnetism. Coarse black pyroxenite and altered. |

Hole "B"

| DEPTH | DESCRIPTION |
|---|---|
| 633.8 | Weak to moderate magnetism. Medium-to coarse-grained granular black pyroxenite, mica at 633.8. |
| 634 | Weak to moderate magnetism. Medium-grained dense pyroxenite, calcite veins. |
| 635 | Weak to moderate magnetism. Medium-grained, granular, extensively altered, gray-green pyroxenite, cut by alteration veinlet with calcite core, dip 60 degrees. Alterati n veinlet cut and oifset by calcite veinlet, dip 20 degrees. |
| 635.1 | 8mm. feldspar carbonate vein. Post alteration veinlets? |
| 635.6 | Weak to moderate magnetism. Medium-grained to sub-porphyritic altered gray-green pyroxenite. Banded alteration veinlets 635.1-635.4, light in center, gray on edges, cross core at plus or minus 70 degrees. |
| 635.9 | Weak magnetism. Visible slight magnetite locally. Medium-to coarse-grained granular greasy gray-green pyroxenite. |
| 636.2 | Moderate magnetism. Medium-coarse grained granular gray-green pyroxenite. Pyroxene serpentinized on fractures and cleavage surfaces. Feldspar-carbonate vein at 636, 5mm. wide, gray-green, fine-grained. |
| 637 | Weak to moderate magnetism. Similar to above. Relatively strongly altered. Feldspar-carbonate vein at 636.8. |
| 638.1 | Moderate to strong magnetite. Locally visible magnetite. Coarse, dark gray pyroxenite. Pyroxene serpentinized, rock generally moderately altered. Calcareous veinlets at 637.5, 637.7. Alteration veinlets at 637.2-637.4, relatively abundnt. |
| 639 | Moderate to strong magnetism. Rock similar to above. Alteration veinlets, calcareous, with serpentine contacts, very thin at 638.5-638.8, dips 75 degrees. Thin coatings of very black fine-grained vitreous mineral unidentified on fracture surface. Pyroxene heavily serpentinized. |
| 639.6 | Essentially no magnetism. Light gray medium-grained granular essentially feldspathic rock. Might be nepheline syenite dike. Gray crystals set amidst abundant fine-grained light buff alteration. Non-calcareous. With trace pyrite and metallic gray mineral, all in fine grains. Dips 70 degrees, essentially parallel to veinlet above. |
| 640.6 | Weak to moderate magnetism. Coarse-grained altered pyroxenite, punky. All veinlets about parallel to overlying 70-75 degrees (syenite?) and altered veinlet. |
| 640.9 | No to weak magnetism. Coarse-to very coarse-grained altered pyroxenite, greasy gray-green. |
| 641.1 | No magnetism. Feldspar carbonate zone white, massive fine-grained,-- coarse vitreous black mineral banded locally parallel to walls, red hematite stain. |
| 641.5 | Low to moderate magnetism. Medium-grained granular punky black pyroxenite, 3-5mm. white calcite veinlet right across core. |
| 642.5 | Medium-grained granular punky black pyroxenite-hair-line alteration veinlets. Calcite vein at 642.5 (2mm.) |
| 645.7 | Top of light colored aphanite. Medium-gray dense, fractured, with medium-grained calcite. Pyrite disseminated in aphanite. Locally slight concentrations of pyrite. Calcite vein across core 642.9, 643, 643.4, 2-4 mm. wide at 643.2, aphanite contains small white specks (vague phenocrysts?). At 643.5, pyroxenite down one side of core gives way to soft, altered serpentinious rock, core lost inhole at 644.8, back into aphanite. At 644.8 to 645.7, relatively good broken, gray aphanite core. |
| 647.5 | Core broken, ground, and prtly lost. Gray aphanite. |
| 648 | Altered pyroxenite cut by many gray to buff massive aphanitic veins and alteration zones. |
| 648.4 | Gray aphanite with fine white phenocrysts? |
| 648.6 | Top of pyroxenite. Dip of contact about 70 degrees. |
| 649.1 | Transition zone. Pyroxenite cut by numerous veins of feldspar-carbonate, parallel to contact with aphanite. |
| 650 | Weak to moderate magnetism. Medium-grained granular altered pyroxenite, gray-green to black. Abundant serpentine. |
| 650.5 | Similar to above ranging to coarse sub-porphyritic. |
| 651 | Moderate magnetism. Trace visible magnetite. Coarse-to very coarse-grained dark green-black pyroxenite, cut by numerous fractures with calcite. Trace moderately fine-to medium-grained biotite. Calcite veinlet 654.8, 2mm. Trace pyrite. Serpentinious alteration intergranular and on cleavage. |

Hole "B"

| DEPTH | DESCRIPTION |
|---|---|
| 652 | Same as above, very little biotite. |
| 653 | Strong magnetism. Strong coarse visible magnetite crystals, estimated 30% of core. Rock same as above. |
| 654.3 | Magnetism very strong down one side of core. Coarse visible magnetite crystals estimated at 30% of core. Rock as above. |
| 656.2 | Moderate magnetism. Rock as above. |
| 657.2 | Weak to moderate magnetism. Calcite veinlet (2mm.) crosses core in this interval. Appreciable biotite in the coarse pyroxenite adjacent to veinlet. Some pyrite crystals and relatively coarse calcite masses (crystals) in what looks like normal igneous texture. |
| 658.6 | Moderately strong magnetism, slight visible magnetite. Similar coarse- to very coarse-grained granular gray-green pyroxenite. Essentially no biotite. Trace pyrite. Calcite crystals in normal(?) texture. Calcite veinlet (3mm.) at 660.9, 90 degrees across core. |
| 660.6 | Moderate magnetism. Similar to above. Relatively strongly serpentinized in lower part of segment. Hair-line calcite veinlet at 661.8 across core. |
| 662.2 | Moderate magnetism. Similar to above. Brecciated down from 664 with hair-line facture containing calcite. Calcite crystals in igneous(?) texture very obvious in surface of core. Feldspar-carbonate veinlet at 664.7 banded gray at edges (total width 3mm.). Gradual change 660.5-661. Rock becomes very coarse-grained and harder, less altered, dore polishes when cut. |
| 662.7 | Weak to moderate magnetism. Coarse pyroxenite and abundant fractures with calcite veinlets to 2mm. thick. |
| 663 | Weak magnetism. Mostly hard dark gray rock, dense with enclosed coarse to very coarse pyroxene crystals. Relatively abundant small massses of granular pyrite? Some in thin veins. Pyroxene red dull, some of rock has purple-red tinge, suggesting the presence of disseminated hematite. |
| 665 | Weak to moderate magnetism. Coarse to very coarse-grained granular black pyroxenite with calcite in igneous(?) texture. Relatively fresh and crisp. Calcite veinlets 663.6, 663.9, 664.6, each about 2mm. |
| 665.3 | Moderate magnetism. Similar to above. Locally medium-grained. |
| 667.4 | Moderate magnetism. Medium-to coarse-grained granular greenish black pyroxenite. Cut along length of core by calcite veinlet, alteration stronger adjacent to veinlet. Multiple cross veins 661-661.6. Trace biotite locally. Coarse calcite masses locally. |
| 668.3 | Moderate magnetism. Trace visible magnetite. Medi m-to coarse-grained granular generally black pyroxenite somewhat altered. |
| 668.9 | Similar but with abundant calcite veinlets at 668.3 (13mm.) 668.6 (4mm.), 668.8 (2mm), 668.9 (2mm.). |
| 670.5 | Moderate magnetism. Scattered strong magnetism. No magnetite visible. |
| 671.5 | Medium-to coarse-grained granular green-black to greenish gray pyroxenite. Strongly altered rock gives dull thud when struck. Calcite veinlets, essentially across core but some branches between veinlets, at 669 (hair-line), 669.4 (2mm.), 669.8 (4mm. with alteration banding adjacent), 670.1 (6mm.) and 670.3 (2mm.). 670.5-671 weak magnetism, 671-671.3 moderate magnetism with slight visible magnetite. 671.3-671.5 weak to moderate magnetism. Coarse-to very coarse-grained dull green-black altered pyroxenite. Very punky when struck. Becomes progressively less altered downward. Calcite veins 670.5 (1mm.), 670.9 (3mm., branching), 671.3 (3mm. banded gray in center) |
| 673 | Weak to moderate magnetism 671.5-672.2. Moderately strong magnetism 672.2-672.6. Moderate magnetism 672.6-673. Medium-to coarse-grained granular pyroxenite grades from partly altered to relatively fresh and crisp green black pyroxenite. Biotite locally toward bottom of interval. Calcite veinlets 671.9 (3mm.), 672.5 (5mm.), 672.3 (2mm.). |
| 674.4 | Moderate magnetism. Trace magnetite visible. Medium-to coarse-grained granular green black pyroxenite, fresh at top becoming more altered downward. Scattered trce medium biotite. Trace pyrite. Abundant calcite veins at 673.1, 673.5-674.2 (10 veins 1-3 mm. wide). |
| 674.8 | Moderate magnetism. Pyroxenite crossed by dark green vein, fine-grained with bands of clear calcite within the zone, vein 4-8 mm. thick. |

Hole "B"

| DEPTH | DESCRIPTION |
|---|---|
| 675.5 | Weak to moderate magnetism. Coarse to very coarse-grained granular dark green pyroxenite with biotite, serpentinous. Calcite veins 2mm. thick at 675.1 and 675.3, both across core, and at 675-675.5 parallel to core. |
| 677.4 | Moderate magnetism 675.5-676.7. Weak to moderate magnetism 676.7-677.4. Medium to coarse-grained gray-green to greenish-black pyroxenite with abundant calcite veinlets. Biotite fine-to medium-grained throughout, in sparse to moderate amounts. Calcite veins and veinlets at 675.6 (10 mm.), 675.7 (multiple, greenish), 676 (alteration, 1mm.), 676.8 (3mm.). Essentially veinlets cross core but some parallel. |
| 677.45 | .05 feet of dense green black dike or alteration vein cross core. |
| 677.9 | Weak to moderate magnetism. Local visible coarse crystals. Coarse-to very coarse-grained pyroxenite. Greenish black with scattered biotite. Local deep red spots indicate magnetite to hematite? |
| 678.3 | Moderate to strong magnetism. Rock as above. |
| 679.9 | Moderate magnetism. Dense black dike, fine grained, dipping about 75-80 degrees. Fractured with calcite veinlets throughout. |
| 684.7 | Moderate magnetism with locally strong visioly magnetite crystals 679.9-683.1. Weak to moderate magnetism, strongest where magnetite crystals are visible on surface from 682.1-684.7. Coarse-to very coarse-grained green black pyroxenite, moderately altered with abundant alteration and calcite veinlets throughout. At 680.9, calcite and altered zone, thin. At 681.1, calcite veinlet, at 681.7 and 682.2, calcite and alteration veinlet. At 682.2, calcite veinlet. At 682.6, calcite nd alteration vein. At 683.9, coarsely crystalline calcite vein 6mm. wide. At 684.1 and 684.6, calcite veins, each 2mm. |
| 685.1 | Moderate magnetism. Light gray-green alteration zone, medium-grained, granular, with calcite veins along bottom edge. Dense, black, fine-grained material locally above this and below. Biotite present in altered zone. Looks like contact between underlying ouachitite and overlying coarse-to very coarse grined pyroxenite. |
| 685.4 | Weak to moderate magnetism. Ouachitite with abundant black biotite, coarse-grained, granular. |
| 687.7 | Weak to moderate magnetism. Locally visible magnetite crystals. Coarse-grained mica pyroxenite, soft, altered, many minute hair-line fractured with calcite. |
| 690 | Weak magnetism. Gray green, strongly altered, coherent, medium-coarse grained mica pyroxenite cut by numerous calcite veins. Coarse veins cross core, minute, through-going abundant fractures prallel to core. Veinlet at 687.8-4mm., 687.8-688.7 abundant vertical minute veins. 689-689.2 calcite veins with dense fine-grained alteration parallel. |
| 691.3 | Similar altered mica pyroxenite with dense medium-to coarse-grained mica, extremely abundant parallel calcite hair-line veinlets throughout. Rock apparently has a primary foliation along which the fractures developed. Dip 70 degrees. |
| 692 | Coarse, altered, mica pyroxenite over dense, dark gray, less altered rock (dike) that dips parallel to hair-line fractures. Upper contact vague, mixed with abundant coarse pyroxenite. Lower contact relatively shapp nd marked by relatively abundant calcite. Calcite veinlets 3mm. wide at 691.3 across core, past dense material. |
| 692.3 | Altered mica pyroxenite-almost has ouachitite-band with dense nd mixed coarse pyroxenite below. Lower contact marked by 3mm. coarse calcite band. Contact parallel to overlying structure. |
| 693.8 | Mixed dense dark gray and altered coarse pyroxenite, dark gray more or less down one side of core but contact seems transitional. Hair-line parallel veinlets continue abundant but seem to cross large pyroxene crystals at right angles. This may be secondry structure control. |
| 696.8 | Coarse-grained gray green altered mica pyroxenite s above, with extensive angular calcite masses (original texture?). Calcite vein across core at 699.4-7mm. wide, coarse-grained, extends into hair-line fractures-calcite veins at 695.1 (1mm., across core), 695.2 (hair-line, across core?), 696.2 (hair-line), 696.5 (2mm.). Alteration distinct but progressively less downward. Abundance of mica similarly reduced. By 695 this is no longer a mica pyroxenite but coarse pyroxenite and some mica. |

Hole "B"

| DEPTH | DESCRIPTION |
|---|---|
| 697 | Fine grained gray green rock with abundant medium-grained biotite (looks possibly like a fine-grained ouachitite). Sharp contacts with adjoining coarse pyroxenite. Dip of dike 40 degrees in the same general direction as overlying calcite veins. |
| 698.5 | Gray mediumpto coarse-grained pyroxenite, very little mica. Calcite veins across core at 698.2 (10mm.) 698.5 is contact with underlying rock. Vague, dips 10 to 15 degrees. |
| 700.2 | Coarse-grained, dark gray, somewhat altered pyroxenite with medium-grained bronze mica, locally almost ouachitite, hair-line calcite veinlets. |
| 701.4 | Trace magnetite at 700.5. Coarse-grained pyroxenite with biotite. Calcite veinlet at 700.6 (5mm.), 701.4 (3mm.). Alteration veinlets at 701.2. |
| 701.8 | Medium-to coarse-grained granular pyroxenite. |
| 702.6 | Same, coarse-grained with biotie. |
| 702.9 | Medium-to coarse-grained. Same as above minus mica. |
| 703.45 | Multiple carbonate veinlet zone. Compact greenish black alteration of pyroxene adjacent to carbonate veinlets completely altered but not broken up. |
| 704.6 | Coarse-grained granular pyroxenite, with intermittent calcite veinlet, abundant scattered dark gray alteration adjacent to calcite. Veinlets at 703.8, 704-704.2, 704.4-704.5. |
| 705 | Coarse-grained granular dark gray to black partly altered pyroxenite, slight biotite. Dip 50 degrees. |
| 706.3 | Magnetite visible on exterior of core. Coarse-grained, granular, as above. Calcite veinlets across core at 705.6. All somewhat altered. |
| 708.2 | Coarse-grained granular dark gray relatively crisp pyroxenite with some biotite. |
| 708.4 | Straight, course biotite zone in coarse pyroxenite. Dips 80 degrees. |
| 710 | Coarse, gray black pyroxenite, intermittent moderate biotite. Intergranular alteration. Serpentinous. Calcite veinlet across core at 709.4 (1mm.) |
| 711.7 | Local visible magnetite on surface of core. Coarse-grained granular pyroxenite, gray to gray black, little or no biotite. Calcite veinlet 710.6-711.2. |
| 712.5 | Soft green altered pyroxenite with residual mica. |
| 713.8 | Soft white to gray altered granular rock. No mica . Calcareous, locally with gray streks and very fine-grained disseminated metllic crystals (sparse). Slacks when wet. |
| 715.6 | Coarse-grained carbonate vein with scattered coarse pyrite crystals and very sparce, very fine-grained unidentified blade crystals. Trace of black, soft, gummy mineral (unidentified). |
| 715.6 | Contact with underlying fine-grained, dense gray dike rock containing sparse disseminated pyrite and scattered sparse fine-grained gry mineral. Dips 40 degrees same direction as upper contact. |
| 716.8 | Gray dike cut by calcite veins. Relatively soft, altered in lower part. Becomes soft and light gray. |
| 717.1 | Abundant calcite vein material adjacent to altered dike, mixed vein and dike. |
| 718 | Gray dike with coarse fractures containing soft carbonate nd clayey gray alteration substance(measurements from top of core to drillers depth of core at 718 don't quite agree- 717.1-718 actually is 717.1-719 measured). Fine-grained di seminated pyrite common and relatively abundant. |
| 718.6 | Same, strongly fractured and altered on fractures. Core broken. |
| 720.3 | Same, less fractured. Sparse disseminated pyrite. |
| 720.9 | Same, strongly brecciated, scattered sparse pyrite. Thin splits and alteration. |
| 722 | Same with disseminated pyrite. |
| 722.3 | Fine-grained gray rock porphyritic with abundant light gray medium-grained phenocrysts. Pyrite extremely scrce. |
| 723.4 | Fine-grained granular gray dike, relatively abundant disseminated fine grained pyrite. |

Hole "B"

| DEPTH | DESCRIPTION |
|---|---|
| 725 | Strongly altered coherent soft yellow green alteration zone runs diagonally down core and cross it to 725. Above is fine-grained gray with disseminated pyrite. Below is medium-to coarse-grained hard mica bearing pyroxenite. Alteration contains mica flakes and probably is altered pyroxenite. Contact dips about 80 degrees. No carbonate veins with this altered zone. Some of dike strongly brecciated with calcite veinlets. |
| 727 | Moderate magnetite visible on surface of core locally. Hard, dark gray coarse-grained pyroxenite with moderate medium-grained biotite. Section contains blue gray-black fine-grained igneous material scattered through pyroxenite as irregular and semi-globular masses. Looks somewhat like overlying fine-grained dike but with no specific continuity. |
| 728.1 | Similar pyroxenite medium-to coarse-grained. Sparse mica. Some of coarse pyroxene has iridescent cleavage surfaces. |
| 728.3 | 1" dike of fine-grained gray material-irregular contacts. |
| 732 | Coarse-grained pyroxenite with calcite vein running length of core (vein 2mm. thick). Pyroxenite altered and serpentinous, essentially without mica except fine-grained biotite at 730.9-731.2. |
| 733.8 | Coarse-grained black pyroxenite. Fresh. |
| 734.5 | Visible magnetite. Granular magnetite dispersed in medium-grained pyroxenite. Band dips 75 degrees. Calcite veinlets wander through core. Could be magnetite schlieren. |
| 735. | Visible magnetite strong. Coarse-grained pyroxenite. Scattered coarse-grained mgnetite crystals and aggregates. |
| 737.1 | Visible magnetite, scattered. Coarse-to very coarse-grained crisp black pyroxenite, trace biotite. Some pyroxenite altered greenish, intergranular. Calcite veinlet 736.3, across core, 3mm. wide. Other hair-line veinlets scattered. |
| 738 | Slight fine-grained magnetite. Some with locally abundant medium-grained biotite. |
| 740.5 | Same with abundant calcite veinlets nd large irregulr masses of light gray to buff feldspar-crbonate(??? reaction to acid slow but positive), fine-grained. Masses at 738.4-738.6, 738.9-739.1. Calcite cross veinlets at 740.5 (2mm.) |
| 741.3 | Same, but becoming increasingly altered downward. |
| 743.5 | Massive, medium-grained carbonate veinlet. Same fine-grained pyrite, trace of yellow mineral (carbonate, rare earth?) |
| 743.5 | Contact crbonate vein material and fine-grained gray dike (?). Dips 75 degrees. |
| 747.1 | Light gray fine-grained granular dike rock, lightly disseminated fine-grained pyrite. Pyrite(?) on hair-line fractures, intermittent calcite veins. Rock brittle and extensively fractured. Also fine-grained unidentified dark metallic crystals (small). Calcite veins at 745.2 (8mm.), 745.5 (5mm.), 745.7 (2mm.), and 746.3-747.1 (parallel to core). |
| 750 | Very fine-grained almost aphanitic dark gray dike sparsely disseminated fine-grained pyrite. Calcite veins distributed throughout with trace dark gray to black unidentified mineral. Altered intermittently down side of core to grayish yellow-soft. |
| 750.9 | Similar but bleached to lighter gray. Medium-grained calcite veins 750.4 (10 mm.), 750.6 (5mm.). |
| 751.8 | Same but with altered granular pyroxenite (yellow gray) containing fine-grained mica down one side of core. Dike aphanitic next to pyroxenite, becomes very fine-grained away from contact. Suggest that extensive expanse of dike is really core passing down essentially vertical section of dike. |
| 759 | Uniformly very fine-to fine-grained medium gray dike with disseminated fine-grained pyrite and hard calcite veinlets. Suggestion of grain size changing from very fine-grained to fine-grained systematically across core as though chilled border involved. Brecciation in altered pyroxenite shows dike defintely intrusive. |
| 759.1 | Altered coarse-grained pyroxenite, light gray green, punky. Contact dips 40 degrees. |

Hole "B"

| DEPTH | DESCRIPTION |
|---|---|
| 760.8 | Medium-to coarse-grained granular, gray black pyroxenite, essentially no mica. Intergranular serpentinous alteration. |
| 762.2 | Trace visible magnetite. Coarse-to very coarse-grained, gray-black pyroxenite, no mica. Calcite veinlet at 761.5 (1mm.), 761.8 (5mm.). |
| 762.9 | Visible magnetite moderately heavy. Medium-to coarse-grained black pyroxenite. Four hair-line calcite veinlets at 762.5-762.6. |
| 763.4 | Coarse-grained black pyroxenite. |
| 763.7 | Altered zone, gray green coherent pyroxenite with multiple alteration veinlets. At 763.6 heavy alteration veinlet 10mm. wide. Calcite veinlet at 763.4 (3mm.) across core. |
| 764.1 | Medium-to coarse grained pyroxenite. Alteration veinlet at 764.1. |
| 766.6 | Coarse-grained black pyroxenite, local sparse white calcite spots at 765.4, pink, hard mineral in spots, eloeonite. Calcite veinlets at 764.4, 764.8, 765.5 (diffuse calcite no alteration veinlets), 766.1 (1mm.). |
| 768.6 | Strong visible magnetite 766.6-767. Same as above, calcite veinlet parallel to core. Band contains abundant medium-grained biotite, dips 80 degrees, may be schlieren, or segration band in primary fraction. Adjacent pyroxenite medium-grained. Prominent magnetite 767.1-768.6. Coarse-grained black pyroxenite becomes more altered downward. Calcite veinlets at 767.5, 768.2 (2mm., dip 80 degrees). Alteration veinlet at 768.5. |
| 768.7 | Altered coherent gray-green pyroxenite (10 mm.). Calcite veinlet 768.7 (5mm., at horizontal contact with underlying dike). |
| 768.8 | Blck aphanitic rock. |
| 769.3 | Dark gray fine-grained granular dike. Calcite veinlet at 769.3. |
| 772.6 | Black, aphanitic to fine-grained porphynitic monchiquite with medium-grained euhedral pyroxene phenocrysts. |
| 773.2 | Fine-grained, porphyritic to granular black monchiquite. Some disseminated pyrite and thin vein near bottom. |
| 773.3 | 6-10mm. calcite vein, medium-grained, along contact with pyroxenite. |
| 775 | Medium visible magnetite, granular masses. Black, medium-to coarse-grained subporphynitic mica pyroxenite-fresh medium-grained biotite. |
| 775.8 | Strong visible magnetite. Coarse-grained, black mica pyroxenite. Calcite veinlet, medium-grained, 6mm. wide. |
| 776.8 | Medium-to coarse-grained mica pyroxenite, locally medium alteration-rock dull green black. Calcite veinlet at 776.3. Mica zones cut core, dip at approximately 50 degrees. Primary structure? |
| 779.1 | Visible magnetite throughout. Medium-to coarse-grained black pyroxenite, generally fresh. Deep red hematite? Material with serpentine alteration at 778.2. Green alteration vein 77o.4-779. |
| 779.4 | Coarse-with medium-coarse black pyroxenite. Pink spots on surface of core-hematite? |
| 780.1 | Coarse-grained, black, relatively crisp pyroxenite. No biotite. |
| 781.5 | Medium-to medium-coarse granular black pyroxenite. Calcite veinlets at 780.3 (3mm.), 780.8 (6mm.). Altered 7o0.6-781.2, rock pretty dark green, dull lustre. |
| 783 | Visible strong magnetite at 782. Coarse-grained black pyroxenite. Calcite veinlet at 781.8 (3mm.). Calcite and alteration veinlets at 782.2-782.8, relatively abundant. Alteration veinlets are green. |
| 783.5 | Strong visible magnetite at 783. Medium-grained granular black pyroxenite. |
| 783.8 | Medium-to coarse-grained black pyroxenite. |
| 785.7 | Strong magnetite 784.6-784.8. Magnetite streak dips 30 degrees. Coarse-grained to very coarse-grained granular black pyroxenite. Calcite veinlet 784.6 (1mm.), 784.9 (1mm.). |
| 787.7 | Sparse magnetite crystals visible. Coarse-to very coarse-grained granular black pyroxenite, angular calcite masses visible on surface of core. Calcite vein 786.6 (10mm.) white, medium-grained, open. |
| 788 | Medium-grained pyroxenite with abundant medium-grained biotite diagonally across core, dip 80 degrees. |
| 788.2 | Coarse-grained black pyroxenite. |
| 7o8.5 | Strong scattered magnetite crystals. Medium-to coarse-grained granular pyroxenite. |

Hole "B"

| DEPTH | DESCRIPTION |
|---|---|
| 789.4 | Scattered medium-grained visible magnetite. Coarse-to very coarse-grained pyroxenite. |
| 790.5 | Medium strong fine-grained magnetite 790.2-790.5. Medium-to coarse-grained black pyroxenite. |
| 790.7 | Very coarse-grained massive granular magnetite abundant in core. |
| 792 | Intermittent magnetite-coarse-grained black crisp to generally black altered pyroxenite. Calcite vein-open space fill at 791.6, 10mm. |
| 793 | Scattered magnetite. Coarse-grained granular black crisp pyroxenite. |
| 794.7 | Obvious magnetite crystals at 794.4-794.7. Medium-to coarse-grained subporphyritic black crisp pyroxenite with slight intergranular alteration. Biotite zone at 793 dips 35 degrees. |
| 795.1 | Visible magnetite. Medium-to coarse-grained sub-porphyritic, black, crisp pyroxenite. |
| 795.3 | Calcite-rich salt and pepper zone, calcite around pyroxene, dip 50 degrees. |
| 797.2 | Sparse visible magnetite. Medium-to coarse-grained granular black pyroxenite with medium-to coarse-grained biotite running in thin vein down core. Some hematite around altered grains. Calcite veinlets at 796.9, 797.2, 1-2mm. |
| 798.4 | Strong visible magnetite 20-30% estimate. Coarse-to very coarse-grained black pyroxenite. Locally biotite. Mica veinlet down core. |
| 800.3 | Slight visible scattered magnetite. Medium-grained granular, crisp, black, pyroxenite. Calcite veinlet at 798.7 (2mm.), 799 (1mm.). |
| 800.9 | Strong visible magnetite. Coarse-grained pyroxenite. |
| 801.3 | Very strong, visible magnetite masses. Medium-to coarse-grained granular pyroxenite. At 800.9, local green and calcite zone with trace pyrite. |
| 801.9 | Medium-grained granular black pyroxenite. Diagonal multiple calcite veins with green alteration and trace biotite. Dips 80 degrees. |
| 802.3 | Strong granular magnetite masses. Medium-grained granular black pyroxenite. |
| 803 | Scattered coarse magnetite crystals. Coarse-grained granular black pyroxenite. Strong hematite red spots locally. |
| 805 | Scattered moderately abundant magnetite crystals throughout. Coarse-grained granular black pyroxenite, relatively crisp. |
| 806.2 | Coarse-grained granular black pyroxenite with biotite throughout. |
| 806.3 | Carbonate veinlet, 11mm., white and medium-grained. Some pinkish carbonate. Crystalline pyrite common. Green altered border. Vein dips 60 degrees. |
| 806.9 | Trace magnetite. Coarse-grained, granular, only trace pyrite. |
| 807.2 | Strong, visible, magnetite masses. Coarse-grained, granular, black pyroxenite. |
| 808.2 | Sparse, scattered, magnetite crystals. Coarse-grained, granular, pyroxenite with trace biotite, locally with bright red hematite stain intergranularly. |
| 808.6 | Diagonal vein or mass (dike) of fine-to medium-grained black pyroxenite and some biotite. Dip 50 degrees. Cross calcite veinlet (2mm.) |
| 810 | Scattered visible magnetite crystals. Locally relatively abundant. Coarse-grained granular black to green-black pyroxenite with biotite streaks running down core. At 809.3-809.2 green alteration veinlet 4mm. wide diagonally across core. At 808.6, 3mm., diagonal veinlet dips 40 degrees. |
| 810.3 | Magnetite quite abundant. Coarse-grained black pyroxenite gives way to medium-grained granular pyroxenite. |
| 811.4 | Very strong magnetite 810.7-811.1. Medium-to coarse-grained granular black pyroxenite, trace mica. Green alteration veins at 810.5-810.6, 811.1. |
| 812 | Magnetite relatively abundant, scattered. Medium-to coarse-grained, granular to sub-porphyritic pyroxenite. Green intergranular alteration common. Trace biotite. Angular calcite masses locally. |
| 812.7 | Medium-grained granular pyroxenite, extensive green intergranular alteration. Trace biotite. |
| 814 | Moderately strong visible magnetite crystals. Coarse-grained granular black pyroxenite. Interspersed areas of green, intergranular alteration. |

Hole "B"

| DEPTH | DESCRIPTION |
|---|---|
| 816.5 | Good scattered visible magnetite. Coarse crystals throughout. At 816-816.5 band of magnetite crosses core, dip 80 degrees. Coarse-grained granular black pyroxenite. Spots of green alteration and extensive intergranular serpentine alteration. Alteration veinlets across core at 816.1 and 816.3, both 1mm. |
| 817.6 | At 816.5, 2mm. calcite veinlet, coarse-grained granular, at 816.8-817.2, medium-grained, granular band diagonally across core. Calcite vein parallel to band and within it. Band dips 70 degrees across trend of overlying magnetite band. Slickensides and cross flow structure are almost horixontal in plane of vein. |
| 818.2 | 5-14mm. band of magnetite, solid, across core, dips 10 degrees, at 818.1. Good magnetite scattered throughout interval. Medium-to coarse-grained granular black pyroxenite. Intergranular alteration. |
| 820 | Strong magnetite at 818.4. Otherwise sparse scattered magnetite crystals. Intermingled coarse-and medium-grained granular black pyroxenite, locally porpyritic with extensive intergranular alteration and serpentine developed on pyroxene cleavage planes. |
| 820.4 | Fine-to medium-grained granular pyroxenite with alteration specks in lower part. Trace biotite, black. Calcite vein parallel to core on one edge with serpentine alteration adjacent. |
| 822 | Scattered magnetite crystals. Coarse-grained granular black pyroxenite with extensive intergranular alteration. Trace biotite at 822. |
| 824.1 | Weak scattered magnetite crystals. Coarse-to very coarse-grained granular pyroxenite. Trace hematite in serpentine alteration throughout. Calcite veinlet at 822.2. Other hair-line veins throughout. |
| 824.8 | Scattered sparse magnetite. Coarse-to very coarse-grained pyroxenite with intergranular alteration. Large angular calcite masses in texture. Trace biotite. |
| 826.4 | Trace magnetite. Medium-to coarse-grained black pyroxenite with abundant biotite. Medium-grained down one side of core, granular down other. Isolated green alteration spots. Small feldspar-carbonate vein, banded, irregular, with fine to medium pyrite crystals. Adjacent pyroxenite altered to dead olive green aggregate. Dips 50 degrees. |
| 827 | Strong magnetite, coarse masses. Coarse-grained, granular pyroxenite, altered greenish gray to black. |
| 827.9 | Strongly altered, gray-green to yellow-green. Soft but coherent. Altered along fractures and between fractures. |
| 829.6 | Trace fine magnetite. Medium-to coarse-grained granular, black pyroxenite. Numerous fractures with serpentine alteration. Also very thin calcite veinlets. |
| 829.9 | Calcite vein in above pyroxenite, 11mm. thick, slight pyrite, altered at edges. |
| 831 | Magnetite local stringer just above biotite splits. Medium-grained granular black pyroxenite. Double biotite splits parallel to core 830.3-830.9. Fine-grained calcite along some of split. Rock fractured, with intermittent calcite-alteration veinlets. |
| 831.3 | Strongly altered to green-gray along fractures, medium-to coarse grained pyroxenite. |
| 831.6 | Strongly fractured black coarse-grained granular pyroxenite, with alteration along fractures. Several sets of fractures offset against one another. |
| 832.3 | Coarse-grained pyroxenite with hair-line altered fractures, biotite in splits. Grayish spots to 1mm. Across with concentric structure. Gray carries some hematite staining. Non-calcareous. Alteration veins dip 80 degrees. |
| 832.6 | Calcite vein 5mm. wide crosses alteration veins and is later. Strongly altered zone, coherent, yellow-gray. |
| 833 | Medium-grained granular black pyroxenite. Fractured and altered. Thin calcite veinlets, irregular contacts, common. |
| 834.2 | Medium-grained granular black pyroxenite. From 833.3-833.5 and 833.7-833.9 are altered zones-yellow to yellow-gray, coherent. Altered on multiple parallel dipping fractures. Locally tabular white calcite core to altered zones, banded gray on edges, dip 55 degrees. |

Hole "B"

| DEPTH | DESCRIPTION |
|---|---|
| 834.6 | Medium-to coarse-grained pyroxenite with biotite zone. Changes to coarse-grained below biotite zone, which dips 75 degrees and strikes approximately parallel to alteration vein above, but dips in opposite direction. |
| 835.5 | Coarse-grained black pyroxenite, crisp, hard. Alteration veinlet banded gray 835-835.5, dips more steeply than above but in essentially same direction. |
| 835.8 | Trace magnetite. Black, medium-grained granular pyroxenite, some calcite in texture. |
| 837.5 | Coarse-to very coarse-grained black pyroxenite, trace pyrite, calcite locally in texture, crisp, fresh. Calcite veinlet (3mm.) across core at 837.5. A few hair-line veinlets diagonally across core, dip 70 degrees. |
| 838.5 | Coarse-to medium-grained granular black pyroxenite. Calcite vein (2mm.) across core at 837.6, and one at 837.8. Diagonal gray thin alteration veinlets. Calcite veinlets at 838.4. |
| 838.9 | Trace magnetite. Coarse-grained black pyroxenite with coarse black mica. |
| 840.4 | Coarse-grained granular black pyroxenite. Calcite vein across core at 839.4. Alteration zone and veinlet diagonal at 840.1-840.4. White spots at 840 look like filled vesicles, are essentially spherical to oblate. |
| 841 | Coarse-grained granular pyroxenite. Carbonate vein 840.6 (4mm.) banded. |
| 842.6 | Strong magnetite 841.1-841.2, massive. Otherwise rare. Mixed medium- and coarse-grained granular black pyroxenite. Trace biotite 841.8-842.1. Alteration veinlets common with calcite 841.5-842. Double, banded calcite veinlet 842.4-842.5. |
| 843.9 | Light gray rock, massive in center of interval. At top and bottom appear to be replacement of pyroxenite. Replacement is selective-mica veinlets are not replaced. Looks like subhedral to euhedral crystals with pyroxenite matrix. Locally pyroxenite bands seem to transect gray, but these are probably residual. Even magnetite crystals locally enclosed in gray. |
| 844.5 | Coarse-grained granular pyroxenite and trace mica. |
| 845 | Some mottled gray medium-grained granular biotite black pyroxenite. Gives way downward to more coarse-grained pyroxenite. Calcite vein 5mm. |
| 845.3 | Strong magnetite massive to scattered 845.1. Coarse-grained black pyroxenite with abundant magnetite, trace mica. |
| 845.5 | Strong magnetite. Medium-to coarse-grained black pyroxenite, trace biotite. |
| 846.7 | Medium-grained granular, black pyroxenite, medium, medium-grained mica. Cut by alteration veinlets and calcite. |
| 847 | Strongly brecciated zone with intersecting carbonate veins and pyrite (fine-grained and massive). Residual pyroxenite between veins may be partly feldspar because effervescence is light. Scattered minute gray crystals also present. |
| 847.7 | Similar medium-grained pyroxenite and biotite and feldspar carbonate veins with pyrite and pyrite in rock. |
| 847.9 | Soft yellow green altered pyroxenite. |
| 848.2 | Aphanitic gray dike, cut by veinlets, dike altered and locally soft. Vuggy where altered and also where vein dissolved. Contains minute disseminated pyrite. |
| 848.4 | Altered yellow green, soft. |
| 849.3 | Carbonate vein, massive, disseminated pyrite. Possible encrustation of chalcopyrite on fractures. Lower boundary marked by sub-metallic gray band. Some elongate, needle-like crystals, very small, in gray band-could be rutile? Band to 3mm. thick. Carbonate locally vuggy. |
| 849.8 | Altered yellow, soft but coherent zone. |
| 852.9 | Generally coarse-grained-locally very coarse-grained black pyroxenite with intergranular alteration and scattered biotite, none strong enough to make this mica pyroxenite. At 851-851.2 gray alteration spots (mottled) abundant. Feldspar-carbonate veinlets or alteration veinlets common but thin at 851.4, 851.6, 852.4, 852.6-all parallel and dip 75 degrees. |
| 854.2 | Medium-grained black pyroxenite, biotite moderately abundant throughout, alteration veins intermittently. |

Hole "B"

| DEPTH | DESCRIPTION |
|---|---|
| 854.8 | Sparse visible magnetite. Same rock as above. |
| 856.5 | Magnetite visible 855.5-855.7. Medium-to coarse-grained granular black pyroxenite. Fractures appear medium-grained but coarse where cleavage is properly oriented. Feldspar-carbonate vein at 855.7-4mm. |
| 858 | Medium-grained granular black pyroxenite. |
| 860.5 | Scattered visible magnetite. Strong magnetite 860.1-860.3. Coarse-grained porphyritic pyroxenite with very coarse pyroxene phenocrysts. Calcite vein at 858 (3mm.). Sparse biotite streaks. Streak biotite crystals at 859.7. |
| 861.6 | Medium-grained granular black pyroxenite. |
| 863.3 | Scattered visible magnetite crystals. Strong magnetite 862.5-862.7. Coarse-to very coarse-grained granular black pyroxenite with angular white calcite masses. |
| 864.2 | Scattered magnetite crystals. Coarse-to medium-grained granular pyroxenite, trace red hematite stain intergranular. |
| 864.5 | Coarse-grained granular pyroxenite with coarse abundant biotite, ouachitite. |
| 866.7 | Scattered sparse magnetite. Medium-grained granular black crisp pyroxenite, scattered biotite. |
| 870.1 | Aphanitic to very fine-grained blue-gray dike. Slightly porphyritic with light colored lath-like minute phenocrysts. Disseminated very fine-grained pyrite common but abundant below 869. |
| 872.6 | Same as above. Slight pyrite 870.1-870.3, 872.4-872.6. Rock appreciably calcareous, but this may be from inor hair-line calcite veinlets. |
| 873.5 | Same as above. Lighter gray zones carry more pyrite than dark gray. This may be an alteration bleach effect. |
| 874.3 | Mixed aphanitic dike and intermittent carbonate vein to 6mm. thick with selvedge of mica (4mm.), dense dark gray to black material (3mm.), then green altered pyroxenite at bottom. |
| 875.1 | Mixed green alteration of pyroxenite and medium-to coarse-grained granular black pyroxenite, intergranular alteration. |
| 875.5 | Same with carbonate vein crossing diagonally. 12 mm. Alteration zone-soft yellow, dips 70 degrees, strikes about 40 degrees to overlying vein. |
| 877 | Medium-grained granular black pyroxenite, locally with very coarse-grained pyroxene phenocrysts (876.6-877) crossed throughout by greenish alteration veinlets. Visible scattered magnetite 876.2-877. At 877, contact with dark gray aphanitic dike, dips 15 degrees. |
| 878 | Aphanitic to very fine-grained gray dike, generally medium to dark gray. Scattered pyrite fine-grained. 2 calcite veinlets. Slightly porphyritic with fine lath-like gray phenocrysts and white calcite specks (small and sparse). |
| 878.5 | Yellow-green coherent altered pyroxenite with residual medium-grained mica flakes. Thin calcite veinlet near top, dark selvedge of mica locally along bottom. Dips about 65 degrees. |
| 879.8 | Gray dike. Generally very fine-grained to aphanitic at top. Becomes very fine-to fine-grained downward. White fine-grained calcite spots common below 879.5. Intermittent, disseminated very fine-grained pyrite. |
| 882.2 | Same. Relatively abundant fine-to medium-grained light spots 882.5, 882.7, 882.9, 881.7, 881.9. Calcite veinlets 880.5, 881, 881.4. |
| 884 | Same, light gray. |
| 884.6 | Dike changes from fine-grained to aphanitic and from dark gray to almost black. Contact at 884.6 dips 10-15 degrees. |
| 885.8 | Good visible magnetite 884.6-885.2. Core heavy. Medium-to coarse-grained granular black pyroxenite. Trace of medium-grained biotite in |
| 886.4 | streaks. |
| 886.4 | Coarse-grained granular calcite veinlet down core accompanied by green alteration band on each side 2mm. thick. Trace biotite. |
| 888.3 | Scattered medium-grained magnetite throughout. Medium-grained granular pyroxenite, locally some coarse-grained granular black pyroxenite. Alteration splits common but not really abundant, all are greenish. |

Hole "B"

| DEPTH | DESCRIPTION |
|---|---|
| 889 | Magnetite as above. Medium-grained granular black pyroxenite-abundant biotite, especially in schlieren (?) Could be mica pyroxenite. Some coarse spongy pyroxene crystals. |
| 890.6 | Magnetite as above. Coarse-grained visible magnetite at 890.5. Medium-grained granular black pyroxenite. Black is more steel gray as there is appreciable intergranular alteration. Abundant biotite, almost mica pyroxenite. |
| 891.3 | Intermittent medium-grained visible magnetite. Coarse-to medium-grained granular pyroxenite with biotite. |
| 891.7 | Magnetite as above. Medium-to coarse-grained pyroxenite with biotite. Alteration common, rock becoming dull gray black. |
| 893.8 | Coarse-to very coarse-grained dull gray black mica pyroxenite. Abundant alteration intergranular and intragranular. Abundant angular calcite masses. External core green. |
| 895.5 | Same. Contact at bottom dips 60 degrees. |
| 895.7 | Fine-to medium-grained granular black pyroxenite. |
| 896.7 | Good visible magnetite crystals throughout. Medium-grained granular black pyroxenite. |
| 896.9 | Increasing grain size in pyroxenite, black with alteration locally. Biotite abundant. |
| 897.5 | Coarse-grained dull black pyroxenite with coarse mica, almost mica pyroxenite. This is a bleached zone above contact with underlying rock contact dips 25 degrees. |
| 899.6 | Strong magnetite throughout, especially in upper part. Core heavy. Magnetite crystals scattered. Coarse-grained dark greenish-gray pyroxenite. Extensive intergranular alteration. Trace mica. Calcite veins with alteration at 898.6,899.3. |
| 900 | Medium-grained granular but otherwise as above. |
| 900.4 | Some magnetite at top. Coarse-grained granular black pyroxenite. |
| 901.3 | Aphanitic to fine-grained dike, bleached light gray at top. |
| 903.4 | Seem, darker gray but bleached parallel to fractures and calcite veinlets. White fine-to medium grained spots, look like sparse phenocysts. Pyrite fine-grained, disseminated sparsely. At 903 bleached on one side in contact with sliver of altered pyroxenite. |
| 904 | Bleached light gray rock. Pyrite abundant and grain size increasing downward. |
| 905.5 | Similar light gray fine-grained rock. White and dark phenocrysts at 904.6-905.3. Calcite veinlet (2mm.) at 904.5. Others up and down core. Core only very slightly calcareous. |
| 908.2 | Same as above. Mostly light gray. Spotted at 906.1, 906.4-906.7, Calcite veinlets 906.1, 907, 908, all with pyrite. |
| 908.7 | Very light green, fine-grained, almost chalky-looks altered, no pyrite. |
| 910.4 | Medium gray rock, fine-grained disseminated pyrite fairly abundant. Calcite spots and veinlets relatively abundant. |
| 911 | Gray-green soft altered zone (aphanite). White spots or phenocrysts. Rock looks like vesicular flow or dike. |
| 912.2 | Light gray, fine-grained to aphanitic at bottom at contact. Sparse seams carry thin layers of fine-to medium-grained pyrite. |
| 913.5 | Pyroxenite, ½ inch yellow alteration at top. Lower zone 5 inches between relatively fresh pyroxenite, except down one side. At bottom, 6-10mm. carbonate vein with local mica selvedge. Upper contact relatively flat, lower dips 75 degrees. |
| 914 | Fine-grained medium to light gray aphanite, extensively fractured. |
| 915 | As above. Some fine-grained pyrite. |
| 915.6 | Fragments only. Soft gray to dense dike and calcite vein-pyrite relatively heavy, some medium-grained. |
| 917.2 | Feldspar-carbonate or carbonate vein, medium-grained granular calcite, appreciable medium-grained pyrite, some masses. In lower part, some of carbonate is brownish-red, may be iron stain or other type of carbonate. Fine-grained granular black mineral on fractured surface near bottom unidentified. |
| 917.4 | Altered pyroxenite, banded dark against the carbonate contact dips 70 degrees. |
| 917.6 | Altered soft green pyroxenite. |

Hole "B"

| DEPTH | DESCRIPTION |
|---|---|
| 918.3 | Medium-grained magnetite visible throughout. Black, hard, medium- to coarse-grained pyroxenite. Intragranular and intergranular calcite and serpentine common. Salt and pepper in places. Fine-to medium-grained biotite common and locally abundant. |
| 919 | Magnetite as above. Medium-grained granular black pyroxenite and biotite. Hair-line veinlets with alteration. |
| 920 | Magnetite visible to 919.5. Coarse-grained granular pyroxenite visible green intergranular alteration. |
| 921.5 | Medium-grained granular black pyroxenite. Locally coarse grains give porphyritic texture. Biotite moderate throughout. Alteration common, intergranular and in zones. Scattered sparse magnetite crystals. Local clots of fine-grained magnetite. Carbonate veinlet 920.2-920.4. |
| 922.4 | Trace magnetite. Coarse-grained black pyroxenite, with slight biotite. Intergranular alteration, some calcite veinlets. Pink hematite staining(?) with some of alteration. |
| 923.7 | Multiple magnetite streaks dip 30 degrees at 922.3-922.5. Coarse-grained granular black pyroxenite. Calcite veinlet down core 922.4-923. Alteration sparse in lower part. |
| 924.9 | Mgnetite schlieren dip 55 degrees at 923.8-924.1. Strike slightly off that above. Streak granular magnetite scattered, 924.5-924.9. Medium-grained granular black pyroxenite. Alteration on splits-little intergranular calcite veinlets 924.1-924.3. |
| 926.1 | 925.1-925.3 several thin horizontal bands of granular magnetite. Otherwise probably disseminated. Medium-grained granular, fresh, black pyroxenite. Alteration veinlet at 925. |
| 927.2 | Sparse, medium-grained magnetite crystals. Coarse-to very coarse-grained granular black pyroxenite, trace biotite. Cleavage of pyroxene shows alteration. Banded calcite veinlet at 926.2-926.5 diagonally across core. Core greenish on surface. |
| 928.8 | Magnetite crystals banded throughout. Same as above, appreciable intergranular and intragranular alteration, sparse biotite. |
| 930 | Medium-grained granular black pyroxenite. No mica, no alteration. |
| 930.2 | 4mm. calcite veinlet and green altered pyroxenite. Veinlet at 70 degrees. |
| 930.5 | Medium-to coarse grained granular black pyroxenite, trace mica. |
| 931.4 | Medium-grained pyroxenite as above. Trace mica. |
| 931.8 | Medium-to coarse-grained granular pyroxenite and band mica. Considerable dull green alteration. |
| 932.2 | Coarse-grained, granular blck pyroxenite. Green alteration intergranularly and on cleavage. |
| 933.3 | Coarse-grained granular black pyroxenite, fresh to slightly altered. Biotite zone at 933.3. |
| 934.6 | Magnetite crystals scattered throughout interval. Medium-grained, granular, black pyroxenite. Trace to no biotite. |
| 935 | Medium-to coarse-grained granular black pyroxenite. Trace biotite. Surface of core suggests coarse-to very coarse-grained, but fractured surface is medium-to coarse-grained. |
| 936.7 | At 935.9-936.7 strong visible magnetite crystal clusters. Otherwise scattered magnetite. Coares-grained granular pyroxenite. Dark green alteration on fractures. Pyroxene generally quite fresh. Sparse biotite. |
| 936.9 | Magnetite crystals scattered. Biotite schlieren (?) in coarse-grained black pyroxenite, two parallel, dip 30 degrees. |
| 937.6 | Trace magnetite. Black, coarse-grained magnetite, locally altered. Calcite veinlet at 937.6 with slight pyrite both in veinlet and pyroxenite. |
| 938.6 | Top of medium-grained granular black pyroxenite. Contact dips 80 degrees. Coarse continues down side of core to approximately 938.6, with main bed of medium-grained at 938.6. |
| 939.3 | Good magnetite scattered throughout. Medium-grained granular black pyroxenite. Abundant fine-grained interstitial and intragranular calcite. Core effervesces readily. |
| 939.8 | Magnetite and pyroxenite as above. At 939.8 is contact with coarser phase (surficially). Dips 45 degrees. |
| 941 | Fine-to medium-grained magnetite visible, scattered. Surface of broken core somewhat medium-grained-outer surface of core shows coarse-grained granular. Dull green black, altered. Scattered biotite. Locally almost mica pyroxenite. |
| 941.6 | Magnetite not generally apparent. Fractured texture more toward medium-grained granular but biotite still present. At 941.5 diagonal altered zone about 10mm. wide, carbonate in middle. Pyrite with carbonate and altered material. |

Hole "B"

| DEPTH | DESCRIPTION |
|---|---|
| 944.1 | Fine-to medium-grained magnetite scattered along contact but quite strong at 942.7-944.1. Biotite zone essentially splits core lengthwise. Fine-grained dense black pyroxenite on one side, medium-hard coarse-grained pyroxenite with biotite on other. Calcite veinlet 942.7. Alteration zones 943.7-943.9. |
| 945.4 | Medium magnetite crystals visible 944.2-944.6. Same rock condition prevails but rock quite crisp. Only a few fractures. Is this a crystal orientation phenomenon or does it indicate an almost vertical contact or flow? 944.2-944.6, abundant alteration veinlets. Calcite vein (3mm.) at 945.4 across core. |
| 946.5 | Sparse scattered magnetite, medium-grained. Coarse to very coarse grained granular black pyroxenite. Pyroxene shows intergranular and intragranular alteration. Very thin calcite veinlets accompany some of the alteration materials. |
| 947.3 | Sparse scattered visible magnetite. As above, angular calcite masses locally, calcite veinlet 947. |
| 947.9 | Fine-to medium-grained magnetite crystals visible throughout. Medium-to coarse-grained sub-porphyritic black pyroxenite. |
| 948.5 | Interstitial magnetite, scattered, sprse. Coarse-grained granular black pyroxenite, trace calcite, pyrite with calcite. (948.5 labelled 950 bottom. Does not fit underlying piece. Core may have been lost here.) |
| 950 | Lost interval or some left in hole. |
| 950.5 | Medium-grained granular black pyroxenite. Trace biotite. Vertical calcite veinlet. Slight alteration. |
| 951.1 | Coarse-grained pyroxenite. Biotite band at 951.1, dips 55 degrees. Alteration veinlets above. |
| 951.8 | Medium-to coarse-grained black pyroxenite, slight intergranular alteration. |
| 952.6 | Biotite band at top gives way to corse-grained granular pyroxenite. |
| 954.9 | Scattered visible magnetite. Moderately strong at 953.8-954.2. Medium-to coarse-grained granular to subporphyritic pyroxenite. Calcite in between is medium-grained. Core crisp. |
| 955.2 | Scattered sparse magnetitie except good at 954.9. Medium-grained granular black pyroxenite. Calcite veinlet (2mm.) parallel to core. |
| 955.6 | Sparse magnetite. Same as above, trace biotite. |
| 955.8 | Fine-to medium-grained pyroxenite with selectively serpentinized euhedral crystals that give the rock a spotted appearance. |
| 956.9 | Medium-to coarse-grained pyroxenite (surface of core shows coarse crystals) serpentinized in zones. Adjacent to alteration veins. |
| 957.6 | Very sparse magnetite crystals. Coarse-grained granular black pyroxenite, biotite streaks, alteration to serpentine common. At 957.3 alteration in speckled vein with calcite. Calcite vein 957.5. |
| 958.9 | Scattered very sparse magnetite crystals. Coarse-grained granular black pyroxenite, gray-green on numerous alteration veins. Trace biotite. Calcite in texture. |
| 959.6 | Sparse magnetite. Medium-grained granular pyroxene. Biotite streaks. Calcite veinlet 769-769.5 diagonally across core. Conspicuously altered locally. |
| 960.6 | Blue-gray medium-grained granular pyroxenite with altered medium-to coarse-grained crystals. Crystals take on blue-gray color on fractured surface, light gray on core surface. Appreciable biotite. |
| 961.6 | Biotite rich zone dips 75 degrees. Medium-grained sunchitite. |
| 962.5 | Coarse-grained granular black, crisp pyroxenite. Local alteration veinlet . Trace pyrite, biotite. |
| 962.7 | Same, but intersecting alteration veinlets produce considerable bleaching. Grain size giving way to medium-grained. |
| 962.9 | Medium-grained pyroxenite. |
| 963 | Biotite zone immediately above carbonate vein. Essentially sunchitite. |
| 963.5 | Vein zone, white, medium-to coarse-grained, 4mm. thick. Pyrite massive parallel to upper contact, scattered parallel to lower contact. Yellow to pinkish color locally in carbonate. May be iron stain or other mineral. Thin mica zone below. |

Hole "B"

| DEPTH | DESCRIPTION |
|---|---|
| 964.2 | Medium-grained granular mica pyroxenite. Strongly bleached and locally altered areas. |
| 965.5 | Visible magnetite, sparsely scattered. Coarse-grained granular black to steel-gray pyroxenite. Middle part of interval contains bleached grains that produce semi-mottling. Calcite vein 4mm. at 765.1. |
| 966.2 | Top of bleached, altered, clay-like zone. Altered pyroxenite. |
| 966.3 | Banded in gray and buff-soft-numerous repetitions. Fine-grained pyrite sparse throughout. |
| 966.8 | Massive carbonate vein, medium-grained. Scattered medium-grained pyrite crystals and aggregates. |
| 967.6 | Vuggy (cavernous) carbonate vein. Heavy pyrite 766.8-767. |
| 968 | Massive medium-grained light gray carbonate with disseminated pyrite. |
| 970 | Light gray aphanitic dike. |
| 970.8 | Becomes blue gray, very fine-grained, slightly porphyritic with phenocrysts detected by reflection on cleavage planes. Lower contact at 970.8 dips 55 degrees. |
| 970.9 | Banded zone below contact. Thin calcite vein with pyrite and altered pyroxenite below. Some of altered material stained red. (Hematite?) |
| 971.6 | Sparse magnetite crystals. Medium-to coarse-grained granular pyroxenite. Many alteration veinlets to 5mm. wide. Most dip parallel to above contact. |
| 972.7 | Fine-to medium-grained magnetite crystals in aggregates. Moderate at 972-972.7. Same as above but coarse-grained. Alteration veinlets parallel to contact abundant. |
| 973.8 | Strong magnetite 973.6-973.8. Visible magnetite. Same rock as above. |
| 975.4 | Disseminated magnetite visible throughout. Goes to strong, but fine- to medium-grained. Mixed coarse-grained and medium-grained granular pyroxenite. Medium-grained pyroxenite has abundant mica. |

TD 975 (Lost hole)

X

HM-1

ALPHA MINERAL COMPANY
753 W. Creekside Drive
Houston 24, Texas

CORE DESCRIPTION

HOLE HM-1

| DEPTH | DESCRIPTION |
|---|---|
| 578-580 | Pyroxenite. Black coarse-grained rock containing mostly pyroxene and some magnetite. |
| 581 | Ouachitite dike. |
| 596.5 | Pyroxenite. |
| 597.3 | Feldspar-carbonate vein. Medium-grained light colored rock containing mostly calcite. |
| 599.5 | Pyroxenite. Cut by numerous white calcite seams. |
| 600 | Feldspar-carbonate vein. Barren. |
| 603.6 | Pyroxenite. |
| 603.9 | Feldspar-carbonate vein. Barren |
| 630.3 | Pyroxenite. |
| 631.3 | Carbonate vein. Coarse-grained. Mostly dolomite with some pyrite and few sphalerite grains. |
| 635 | Pyroxenite. 3.5% magnetite. |
| 635.3 | Calcite vein. Some pyrite. |
| 651.7 | Pyroxenite. Contains narrow bleached patches. |
| 662.8 | Phonolite dike. Fine-grained hard rock. Abundant fine-grained pyrite. Trace gold. |
| 664 | Carbonate vein. Coarse-grained rock with much pyrite, possibly some rutile. |
| 681.7 | Pyroxenite. Much of this core is composed almost entirely of very coarse-grained pyroxene. |
| 682.4 | Dike. Very fine-grained very dark dike rock. |
| 704.8 | Pyroxenite. 1" calcite vein at 693. 3" dolomite vein at 698.9. Thin Section A-5 at 695. |
| 708.3 | Carbonate vein/altered pyroxenite. Cut along contact. Some pyrite. |
| 709.5 | Dike. Dark gray very fine-grained. |
| 716 | Pyroxenite. |
| 721.5 | Calcite vein. Mostly pure coarsely crystalline calcite with minor pyrite and sphalerite along vein boundaries. |
| 726.8 | Pyroxenite. |
| 728.3 | Calcite vein. Few scattered grains of sphalerite. |
| 746.5 | Pyroxenite. 12.0% magnetite. |
| 756 | Pyroxenite (?). Fresher with more biotite than above rock. Thin Section A-4 at 753. |
| 759 | Pyroxenite. |
| 765 | Phroxenite. Same as 746.5-756. |
| 779.2 | Pyroxenite. |
| 829.8 | Pyroxenite. Narrow zone at 819.2 high in magnetite. 1.8% magnetite. |
| 781.2 | Calcite pyrite vein. |
| 831.5 | Carbonate-pyrite vein. Flesh colored biotite along contact. |
| 834.3 | Pyroxenite. 5.9% magnetite. |
| 837.5 | Calcite pyrite vein. Some biotite as above. |
| 843.5 | Pyroxenite. |
| 846 | Calcite-pyrite vein. Trace of sphalerite. |
| 849.6 | Pyroxenite. Thin Section A-6 at 847. |
| 850.1 | Calcite-pyrite vein. Trace of sphalerite and titanium minerals. |
| 854 | Pyroxenite. |
| 855 | Calcite-pyrite vein. |
| 865.1 | Pyroxenite. |

Hole HM-1

| DEPTH | DESCRIPTION |
|---|---|
| 866.7 | Phonolite porphry dike. |
| 867.7 | Altered pyroxenite. Dark green rock slightly softer than the unaltered rock. |
| 953 | Pyroxenite. 1"-2" calcite veins at 871.3 and 875. 2.8%-7.0% magnetite. |
| 954.3 | Phonolite dike. Dark gray fine-grained rock. |
| 1013.6 | Pyroxenite. Brecciated zone with calcite 992-994. 3.8% magnetite. |
| 1019 | Magnetite rich rock. Essentially magnetite and pyroxene. 3.3% magnetite. |
| 1023 | Pyroxenite. Contains moderate amount of magnetite. |
| 1025 | Magnetite rich rock. |
| 1026 | Pyroxenite. |
| 1027 | Altered (bleached) pyroxenite. |
| 1028 | Calcite vein. Contains some ilmenite and pyrite. |
| 1060 | Pyroxenite. Thin Section A-7 at 1042.2. |
| 1061.4 | Magnetite rich rock. Thin Section A-8 at 1061. 12.3% magnetite. |
| 1149.2 | Pyroxenite. 1" calcite vein at 1062.7 contains sparse sphalerite. At 1112.4, 2" calcite-pyrite vein with trace of sphalerite. |
| 1154.2 | Calcite vein. Some pyrite and a white fibrous mineral. |
| 1163.4 | Pyroxenite. Brecciated, bleached along fractures. |
| 1194.2 | Pyroxenite. 3" calcite-pyrite at 1184.8. 2.7%-12.4% magnetite. |
| 1194.2 | Total Depth. |

LOCATION- 2590 feet north and 815 feet west of the southeast corner of Section 30, T2S-R14W, Saline County, Arkansas.

ELEVATION- 360' est.

Drew Holbrook,
Geologist, Arkansas State
Department of Geology
and Conservation

ALPHA MINERAL COMPANY
753 W. Creekside Drive
Houston 24, Texas

CORE HOLE HM-1

Specific gravity and Magnetite determinations.

| DEPTH | SPECIFIC GRAVITY | %MAGNETITE |
|---|---|---|
| 633 | | 3.5 |
| 646 | 3.17 | |
| 652 | 2.72 | |
| 716 | 2.73 | |
| 732 | | 12.0 |
| 760 | | |
| 775 | 2.79 | |
| 785 | | 1.8 |
| 833 | | 5.9 |
| 871 | 3.15 | |
| 895 | 3.27 | |
| 902 | 3.24 | 7.0 |
| 905 | 3.22 | |
| 954 | 2.78 | |
| 948 | 3.24 | 2.8 |
| 962 | 2.68 | |
| 977 | 3.30 | 3.8 |
| 994 | 2.81 | |
| 996 | 3.21 | |
| 999 | 2.98 | |
| 1008 | 3.07 | |
| 1014 | 2.97 | 3.3 |
| 1025 | 3.04 | |
| 1040 | 3.14 | |
| 1054 | 3.10 | |
| 1060 | 2.84 | 12.3 |
| 1075 | 3.12 | 1.4 |
| 1083 | 3.30 | 24.0 |
| 1095 | 3.89 | 22.0 |
| 1138 | 3.22 | |
| 1149 | 2.73 | |
| 1154 | 2.94 | |
| 1162 | 3.30 | |
| 1174 | 3.27 | |
| 1178 | 3.23 | 8.8 |
| 1189 | 3.28 | 12.4 |
| 1192 | 3.20 | |
| 1194 | 3.21 | 2.7 |
| Average | 3.10 | 8.2 |

L. W. Minturn

X

EP1-1

ALPHA MINERAL COMPANY
753 W. Creekside Drive
Houston 24, Texas

CORE DESCRIPTION

HOLE EP1-1

LOCATION - 1675 feet north and 270 feet east of southwest corner of Section 29, T2S-R14W, Saline County, Arkansas.

ELEVATION- 378' est.

| DEPTH | DESCRIPTION |
|---|---|
| 626.5-634.4 | Cellular carbonate vein down core with some alteration. Coarse-grained pyroxenite almost all the way down. This is essentially a vertical vein. Pyroxenite commonly brecciated and veined.<br>Vein has banded edges, most of which have prominent red (hematite or sidenite bands), some glassy hard mineral with conchoidal fracture (quartz?) and locally abundant pyrite masses or disseminated crystals. Grain size in carbonate medium to coarse. Locally a little green stain in core might be copper? or nickel?<br>Later white carbonate vein cut completely across structure of main vein in many places. |
| 634.9 | Altered coarse pyroxenite. |
| 637.3 | Massive gray feldspar-carbonate zone, obviously originally brecciated for carbonate is banded throughout, particularly around residual pyroxenite masses. Could be partly a replacement phenomenon.<br>Fine-grained pyrite disseminated abundantly.<br>Lower portion shows good local vein structure with parallel banding. |
| 638 | Brecciated altered coarse-grained pyroxenite abundantly veined with gray alteration veinlets (calcareous, fine-grained). Gives way to more massive carbonate vein. |
| 639.3 | Carbonate as above. Abundant disseminated pyrite. Local hematite stain. |
| 639.6 | Breccia partly assimilated, altered pyroxenite and carbonate material. |
| 640.2 | Carbonate as above. Local coarse pyroxenite. Abundant hematite stain at 640. |
| 640.5 | Brecciated pyroxenite, partly replaced. |
| 642.5 | Massive carbonate with local pyrite masses. |
| 645.8 | Medium-grained, granular black altered pyroxenite and interlayered mica pyroxenite-massive rock. Yellow colored alteration veinlets common down core. |
| 648.8 | Medium-to coarse-grained black pyroxenite, altered, punky.<br>645.8-646.5, visible magnetite.<br>Several thin diagonal veinlets of medium-gaained black pyroxenite between 646.5 and 647. Dip 65 to 70 degrees, somewhat biotitic.<br>645.8-647.3. Several diagonal calcareous yellow-gray alteration veinlets, steeply diagonal in core. |
| 651.6 | Medium-grained granular black pyroxenite. Moderate biotite. Magnetite crystals associated with coarse zones. Coarse zone at 650-650.4. Calcareous alteration vein 5mm. wide, diagonal at 649. |

Hole EP1-1

| DEPTH | DESCRIPTION |
|---|---|
| 652.6 | Coarse-grained black pyroxenite. |
| 652.9 | Fine-to medium-grained pyroxenite with biotite. |
| 654 | Medium-to coarse-grained black pyroxenite. Altered and punky. Calcareous alteration veinlet 5mm. wide at 653.4. |
| 655.4 | Medium-to coarse-grained pyroxenite as above. Coarse magnetite crystals locally visible. Calcareous veinlets at 657, 657.7. Coarse spots at 655.7-655.8, 657.3-657.5,658-658.3. |
| 661.5 | Coarse-grained black pyroxenite. Very coarse 660.5-661.5 with diagonal multiple calcareous alteration veins. 661 (4mm. thick) and with trace biotite. Magnetite relatively abundant. Coarse crystals at 659-660. |
| 665.2 | Medium-to coarse-grained black pyroxenite. Local traces of biotite. Very coarse 663-663.8. Sparse calcite veinlets. |
| 667.5 | Medium-grained granular black pyroxenite. Locally coarse at 666.4-666.7. Calcareous alteration veinlets (2-3mm.) and white calcite veinlets interspersed throughout. Scattered medium-grained magnetite. |
| 669.4 | Sparse disseminated medium-grained magnetite crystals. Medium-grained granular black pyroxenite. Altered with intergranular serpentine locally. 669-gray calcareous alteration and bleached zone, multiple hair-line veinlets (16mm.) 669.2-669.4-Multiple alteration veinlets. Calcareous. Parallel to underlying contact. |
| 669.8 | Aphanitic black dike, abundant green alteration. Contact dips 10-15 degrees. |
| 671.3 | Medium-grained granular black pyroxenite. Sparse disseminated medium-grained magnetite crystals. Green partly altered and punky 669.8-670.4. Thin calcite veinlets across core 669.8-671.3 |
| 671.4 | Black aphanitic dike(?) alteration veinlet above and below, calcareous. |
| 673.2 | Medium-grained granular black pyroxenite. Abundant granular magnetite masses. 35-40 percent magnetite from 671.7-673.1. Locally coarse-grained pyroxenite mixed in at 672.7-673.5. |
| 674.3 | Black medium-grained black pyroxenite. Might even be called fine-to medium-grained. |
| 676 | Medium-grained granular black pyroxenite. Crisp, hard. Locally traces biotite. |
| 676.7 | Medium-grained porphyritic black pyroxenite. Coarse-grained pyroxene phenocrysts, euhedral. Trace magnetite. |
| 677.6 | Medium-grained granular black pyroxenite. Scattered visible magnetite. |
| 678.5 | Coarse-to very coarse-grained granular black pyroxenite. Some angular calcareous white masses. Lenses and irregular masses granular magnetite visible throughout. |
| 679.2 | Medium-grained granular black pyroxenite. Crisp. |
| 679.7 | Medium-to coarse-grained granular black pyroxenite. Crisp. |
| 680 | Coarse-grained black pyroxenite, trace biotite. |
| 680 | T. D. |

Robert H. Arndt
Petrographer

ALPHA MINERAL COMPANY
753 W. Creekside Drive
Houston 24, Texas

OVERBURDEN

HOLE EP1-2

| DEPTH | DESCRIPTION |
|---|---|
| 0-5 | Top soil and sandy clay |
| 15 | Gray to red, sandy clay |
| 195 | Chocolate brown, sandy to silty, micaceous clay with lignite and siderite lenses. |
| 338 | Brown and gray silty, clays with siderite lenses. |
| 348 | Gray, silty, kaolinic clay |
| 353 | Mottled clay. |
| MIDWAY | |
| 365 | Blue, plastic clay with few brn. sh. lenses. |
| 456.5 | Blue, clay to shale with thin hard calc. lenses. |
| 480 | Blue to black sh. with hard calc. lenses. |
| 615 | Blue to black sh. with hard calc. lenses and some gray silty clay. |
| 620.5 | --Igneous--Started coring @ 620.5 |
| | CORE LOG |
| 667 | Greenish, med. grained, slightly calc., slightly magnetic pyroxene with minor biotite. |
| 668 | White, hard (approx. 4) non-calc. phono. ($CaF_2$)?? |
| 673 | Green, med. grained, calc., mag., pyroxene |
| 676 | Green, med. grained, altered, friable, pyroxene. |
| 678 | White, fine-grained, non-calc., pyt. phono. dike. |
| 684 | Pyroxene |
| 687 | White, hard, pyrite-phonolite. |
| 692 | Green, friable, altered, slightly cal. pyrox. with approx. 20 percent biotite |
| 700 | Green, hard, pyroxene. |
| 701.2 | Green, soft, altered pyroxene. |
| 702.3 | White, hard, fine-grained, non-calc., pyt.-phono. |
| 708.1 | Green, hard, slightly calc., slightly mag., pyrox. |
| 711.0 | Green, soft, altered pyrox. |
| 711.5 | White, hard, pyrite-phonolite. (Check $CaF_2$) |
| 713.5 | Green, firm pyrox. (some pyt. and biotite) |
| 714.5 | Blue, hard phonolite, minor pyrite |
| 719 | Greenish, friable, slightly magnetic, pyrox. |
| 721 | Greenish, friable, slightly calc., altered pyrox. |
| 722 | White, hard, phonolite. |
| 744.5 | Greenish, altered to unconsolidated, pyroxenite. Few minor 1/2 to 3 in. hard stringers of phonolite and harder pyroxenite. |
| 747.2 | Gray to bluish, friable, pyritic, non-calc., pyrox. |
| 749 | Blue and white, Lazurite-phonolite. |
| 753 | Gray, hard, friable, altered pyroxenite with vert. solution channels. No rec. in soft zones. |
| 756 | Bluish gray, hard, pyrite-phonolite. |
| 765.8 | Gray to green, altered, "non-calc.", pyroxenite. |
| 770 | Greenish, unaltered, slightly magnetic pyrox. |
| 773.2 | White to gray, hard, slightly calc., phonolite |
| 778.3 | Pale green, friable, altered, pyritic pyroxenite. |
| | BOTTOM OF HOLE |
| | Drilling below this point would require reaming and setting more casing. Also, the altered zone in the pyroxenite is surely steeply dipping and may not be very thick. Angle hole???? |

ALPHA MINERAL COMPANY
753 W. Creekside Drive
Houston 24, Texas

CORE DESCRIPTION

HOLE EP1-2

LOCATION - 1700 feet north and 85 feet east of the southwest corner of Section 29, T2S-R14W, Saline County, Arkansas.

ELEVATION- 389'

| DEPTH | DESCRIPTION |
|---|---|
| 620.5-621.7 | Pyroxenite (dark greenish black coarse-grained rock containing mostly pyroxene with some magnetite and biotite) Cut by numerous thin stringers of calcite. |
| 621.8 | Altered pyroxenite-Soft gray-green rock mostly serpentine and biotite with some pyroxene, magnetite and pyrite. |
| 629.1 | Feldspar-carbonate vein-medium-grained hard light colored rock containing fine-grained pyrite, calcite and feldspar. |
| 629 | Pyroxenite. |
| 667 | Pyroxenite. Contains biotite rich zone 633.4-633.7, half inch feldspar-carbonate vein 640. Thin section A-1 cut at 656. |
| 667.5 | Altered pyroxenite. Olive green soft rock containing mostly serpentine (?) and clay minerals with some magnetite and biotite. Some magnetite has been partially altered to hematite. |
| 668.08 | Feldspar-carbonate vein. Hard white coarsely crystalline rock mostly dolomite with much fine-grained pyrite and trace of molybdenite. |
| 668.4 | Altered pyroxenite. |
| 673.3 | Pyroxenite. Slightly altered along seams. |
| 675.8 | Altered pyroxenite. |
| 679 | Feldspar-carbonate vein. |
| 683.2 | Pyroxenite. Altered along seams. |
| 686.5 | Feldspar-carbonate vein. Mostly coarse-graineddolomite, some fine-grained pyrite, trace of molybdenite. Thin Section A-3 at 685. 0.10 oz. gold at 684. |
| 692.5 | Altered ouachitite dike. Gray coarse-grained rock abundant biotite. |
| 695.3 | Pyroxenite. Altered along cracks and cut by carbonate seams. |
| 700 | (No description received) |
| 701.3 | Altered pyroxenite. |
| 705 | Feldspar-carbonate vein. Fine-grained, carries some pyrite. |
| 705.3 | Altered pyroxenite. |
| 708.1 | Pyroxenite. Altered along cracks. |
| 709.2 | Feldspar-carbonate vein. Possibly molybdenite at 709.2. |
| 710 | Altered pyroxenite. |
| 711.2 | Feldspar-carbonate vein. |
| 713.5 | Altered pyroxenite. |
| 719 | Monchiquite dike. Hard dark porphyritic rock with amphibole or olivine phenocrysts. |
| 721.5 | Altered monchiquite dike. |
| 721.8 | Monchiquite dike. |
| 722.3 | Feldspar-carbonate vein. Coarse-grained with traces of fine-grained opaque minerals that might be titanium or molybdenum minerals. |

Hole EP1-2

| DEPTH | DESCRIPTION |
|---|---|
| 725 | Feldspar-carbonate vein. Cut along contact. Contains altered nepheline syenite wall rock. Nepheline syenite is friable light green granular rock. |
| 725.3 | Feldspar-carbonate vein. Contains pyrite with some molybdenum and titanium minerals. |
| 728 | Phonolite. Hard fine-grained greenish rock with much fine-grained pyrite. |
| 731.4 | Altered phonolite. |
| 741.5 | Altered phonolite. Soft green friable fine-grained rock. Cut by a few veins of feldspar-carbonate containing sparse molybdenite and possibly rutile. Entire interval sacked due to friable condition of core. |
| 747.8 | Altered phonolite. Interval 744.5-747.8 hard and vuggy with abundant pyrite and some rutile (?). |
| 749.3 | Feldspar-carbonate vein. Hard medium-grained rock with much fluorite. |
| 757.6 | Feldspar-carbonate vein. Vuggy medium-grained rock with much pyrite and rutile. |
| 764.8 | Altered nepheline syenite. Coarse-grained altered friable green igneous rock. |
| 770 | Pyroxenite. Slightly altered along seams and cracks. |
| 773 | Feldspar-carbonate vein. Contains much pyrite and some molybdenite. Thin section A-2 at 772.7. |
| 778 | Altered nepheline syenite. |

Drew Holbrook
Geologist, Arkansas State
Department of Geology
and Conservation

0-503
(March 1947)

Bur. of Mines, Reg. IV
Room 206 Federal Bldg.
Bartlesville, Oklahoma

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF MINES
Salt Lake City, Utah

No. 1

Report to Mr. Raymond R. Stroud

Chemical Laboratory Report

Date received 11/27/62

Date reported 12/10/62

| Serial No. | DESCRIPTION | Lot No. | Spectrographic |
|---|---|---|---|
| 3056 | EPI-2 | 1 | * |
| 57 | " | 2 | * |
| 58 | " | 3 | * |
| 59 | " | 4 | * |

***Spectrographic Report attached.**

Added by Alpha Mineral Company: SAMPLE DATA HOLE EPI-2

Sample #1 A composite of all the feldspar-carbonate veins encountered in the drill cores. The veins varied in width from 0.5 to 10 feet. The depth intervals maybe seen in the accompanying log of the drill hole. The carbonates are mostly dolomite, and the feldspar is unknown at this time.

Sample # 2 A composite of all altered pyroxenite encountered in the drill hole. Minerals probably mostly pyroxene, serpentine chlorite, clay minerals, biotite and pyrite. (see log for depth intervals)

Sample #3 A composite sample of the pyroxenite from 620.5'-673.5'. The rock is comparatively fresh and consists mostly of pyroxene (?) with verying amounts of magnetite and biotite.

Sample #4 A composite sample of altered ouachitite dike from 686.5' to 692.5, probably consists mostly of serpentine, chlorite, pyroxene, and coarse biotite.

U.S. GOVERNMENT PRINTING OFFICE : 1960 O—566747 10—63553-6

Signed Heber E. Peterson

Bur. of Mines, Reg. IV
Room 206 Federal Bldg.
Bartlesville, Oklahoma

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF MINES
Salt Lake City, Utah

Submitted by Raymond R. Stewart

Date Submitted 11/27/62

Date Reported 12/10/62

REPORT OF SPECTROGRAPHIC ANALYSIS

| Serial No. | Lot No. | Spectro No. | ELEMENTS | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Ag | Al | As | Au | B | Ba | Be | Bi | Ca | Cd | Ce | Co | Cr | Cs | Cu | Fe | Ga | Ge | Hf | Hg | In | Ir |
| 2056 | 1 | 2070 | - | B | - | - | - | C | - | - | A | - | C | D | E | - | E | A | E | - | - | - | - | - |
| 57 | 2 | 71 | - | B | - | - | - | D | - | - | B | - | D | D | D | - | E | A | E | - | - | - | - | - |
| 58 | 3 | 72 | - | B | - | - | - | D | - | - | A | - | - | D | D | - | E | A | E | - | - | - | - | - |
| 59 | 4 | 73 | - | B | - | - | - | C | - | - | A | - | - | D | E | F | E | A | E | - | - | - | - | - |
| | | | K | La | Li | Mg | Mn | Mo | Na | Nb | Ni | Os | P | Pb | Pd | Pt | Rb | Re | Rh | Ru | Sb | Sc | Si | Sn |
| | | | C | C | E | B | C | D | C | D | D | - | - | C | - | - | F | - | - | - | - | E | A | - |
| | | | C | D | E | B | C | D | C | E | D | - | - | D | - | - | F | - | - | - | - | D | A | - |
| | | | C | - | F | B | C | - | C | - | D | - | - | E | - | - | F | - | - | - | - | D | A | - |
| | | | B | - | E | B | C | - | C | - | D | - | - | E | - | - | E | - | - | - | - | E | A | - |
| | | | Sr | Ta | Te | Th | Ti | Tl | U | V | W | Y | Zn | Zr | Nd | Pr | Pb | Sm | Sn | Cd | Er | | | |
| | | | C | - | - | - | C | - | - | D | - | E | - | E | C | - | E | - | - | - | - | | | |
| | | | D | - | - | - | B | - | - | D | - | E | - | E | D | - | E | - | - | - | - | | | |
| | | | D | - | - | - | B | - | - | D | - | - | - | E | - | - | E | - | - | - | - | | | |
| | | | D | - | - | - | B | - | - | D | - | - | - | E | - | - | E | - | - | - | - | | | |

- Not detected
A Probably > 10 percent
B Probably 1 - 10 percent
C Probably 0.1 - 1 percent 10%
D Probably 0.01 - 0.1 percent 1
E Probably 0.001 - 0.01 percent
F Probably 0.0001 - 0.001 percent
I Indeterminate

1- Carbonate veins
2- Altered pyrox.
3- Pyrox.
4- Carbonatite dike

Signed Heber E. Peterson

X

ALPHA MINERAL COMPANY
753 W. Creekside Drive
Houston 24, Texas

OVERBURDEN

HOLE EP1-3

| DEPTH | DESCRIPTION |
|---|---|
| 0-5 | Top soil and varicolored clays. |
| 60 | Brown, sandy to silty clays |
| 215 | Brn., sky., to silty clays with thin lignite. |
| 220 | Bluish gray, silty clay. |
| 230 | Gray, silty clay. |
| 280 | Choc. brn., silty, mic. clay with small lignite and siderite lenses. |
| 300 | Bluish gray, silty, plastic clay. |
| 305 | Bluish gray, silty to sdy., micaceous clay. |
| 310 | Bluish gray, silty, micaceous clay. |
| 325 | Gray, silty, mic. clay with 2"-4" lig. lenses. |
| 330 | Gray, silty, kaolinic clay. |
| 335 | Gray, silty clay.--no bauxite-- |
| MIDWAY | |
| 424 | Blue, plastic clay. |
| 424.5 | Tan ls. lense. |
| 430 | Blue, silty clay. |
| 450 | Blue to black clay and shale. |
| 498 | Shale, with hard, thin, consolidated, calc. lenses. |
| 510 | Bluish, sdy. shale with thin brn., non-calc. lenses. |
| 535 | Gray, silty, to fine sandy clay. |
| 560 | Gray, silty clay and shale. |
| 592 | Bluish gray, silty shale with 1 to 2 in., calc. Len. |
| 595 | Gray, hard, calcareous shale. |
| 602 | Lt. gray, kaolinic clay (?) |
| 610 | Gray and greenish, limy shale. Marl |
| 618 | Blue and brn. sh., with some gray clay |
| 620 | Gray clay with some igneous fragments |
| 622 | Igneous-Started coring at 622 feet. |
| | CORE LOG |
| 623.5 | Greenish, slightly magnetic, slightly calc. ig. |
| 623.7 | Band of hematite. |
| 634 | Green, med. grained, slightly magnetic, mic. ig. |
| 635.5 | White, slightly calcareous phonolite dike. May contain $CaF_2$. |
| 653.6 | Greenish, very hard, slightly magnetic, pyroxene. |

Drilled overburden with 4.3/4 inch roller bit and set 590 feet of N casing. Casing stuck before getting on bottom. Casing could not be driven or pulled.
Cut 31.6 feet of NX core with plus 95 percent recovery.

Unable to pull casing. Retrieved top 30 feet.

ALPHA MINERAL COMPANY
753 W. Creekside Drive
Houston 24, Texas

CORE DESCRIPTION

HOLE EP1-3

LOCATION - 1630 feet north and 385 feet east of southwest corner of Section 29, T2S-R14W, Saline County, Arkansas.

ELEVATION- 378'est.

| DEPTH | DESCRIPTION |
|---|---|
| 0-622 | Overburden. |
| 623 | Altered black coarse-grained pyroxenite, largely yellow-green. Rock brecciated. Coarse residual magnetite. |
| 623.4 | Strong alteration in top of feldspar carbonate vein. Yellow-green. |
| 623.5 | Also down side of core to 626. Cellular light gray vein zone, locally calcareous. Liberally stained with limonite. Fine-grained residual fragments, gray, associated with vein. |
| 624 | Strongly altered pyroxenite. Yellow-green and banded with limonite zones and gray alteration bands. |
| 624.7 | Brecciated and vein. Altered coarse-grained granular pyroxenite. |
| 625.5 | Medium-to coarse-grained granular black altered pyroxenite. Locally abundant biotite clots, coarse size. |
| 625.7 | Green altered pyroxenite. |
| 627.3 | Coarsely brecciated and altered coarse-grained pyroxenite. Magnetite scattered throughout. |
| 629 | 629-2mm. calcite veinlet, white to greenish. |
| 629.4 | Altered vein, dark green, dull, with calcite veinlets throughout. Scattered magnetite. |
| 629.7 | Medium-grained granular black mica pyroxenite. |
| 630.7 | Medium-grained granular mica pyroxenite with steep diagonal carbonate vein (5mm.). Mica banded paralled to vein in multiple bands. |
| 631.5 | Fine-to medium-grained black pyroxenite, dense. Only lightly altered. Scattered masses of fine-grained magnetite. |
| 632 | Same 632 is top of very steeply dipping carbonate dike. |
| 636 | Extent of dipping carbonate vein, top to bottom. Medium-to coarse-grained granular pyroxenite with pyrite band within and along edge. Contact zone about 18-20mm. thick. Multiple banding in gray and reddish hematite and white carbonate. Reddish might be siderite. Pyroxenite along side of core for almost entire length. |
| 639.8 | Fine-to medium-grained granular massive black pyroxenite. Scattered granular masses of magnetite. |
| 639.9 | Multiple alteration veinlets in 0.1 foot band. Gray-green. |
| 640.9 | Fine-to medium-grained black pyroxenite. |
| 649.8 | Same, traces of biotite below 645. Traces of pyrite, chalcopyrite, or pyrrhotite at 642-644. Contact between fine-grained and medium-grained about 646. Almost vertical in core. |
| 653.6 | Same. Some calcite veinlets. T. D. |

Robert H. Arndt
Petrographer

X

EP1-4

ALPHA MINERAL COMPANY
753 W. Creekside Drive
Houston 24, Texas

OVERBURDEN

HOLE EP1-4

| DEPTH | DESCRIPTION |
|---|---|
| 0-15 | Red and gray, fine sandy clay. |
| 90 | Brown, sandy clay. |
| 260 | Chocolate brown, silty, lignitic clay. |
| 265 | Choc. brn., silty clay with minor qtz. sand and lig. |
| 275 | Choc. brn., silty clay with minor lignite. |
| 295 | Gray, silty clay. (no siderite) |
| 298 | Choc. brn, silty clay. |
| 305 | Gray, silty clay. Cleaned hole @ 303. |
| 314 | Pale blue, firm, plastic clay. |
| 316 | Choc. brn., silty, lignitic clay. |
| 318 | Lignite. |
| 335 | Lt. gray, silty clay. |
| 338 | Lt. gray, silty clay with detrital syenite. |
| 342 | Lt. gray to white, hard, kaolinic clay (Bx zone) |
| 355 | Lt. gray, kaolinic clay with some detrital syn. |
| 356 | Red clay |
| 360 | Red and gray, mottled clay. |
| MIDWAY | |
| 452 | Blue, plastic clay. |
| 495 | Blue clay with sh. and minor calc. lenses. |
| 580 | Blue shale with hard calcareous lenses. |
| 598 | Blue and gray clay with sh. and hard calc. lenses |
| 599 | Red, iron stained sand. |
| 603.5 | Lt. gray clay and saprolite. Contact zone. |
| | CORE LOG |
| | Core log will follow upon completion. |

ALPHA MINERAL COMPANY
753 W. Creekside Drive
Houston 24, Texas

CORE DESCRIPTION

HOLE EP1-4

LOCATION - 1680 feet north, 125 feet west of southeast corner of Section 30, T2S-R14W, Saline County, Arkansas.

ELEVATION- 395 feet

Casing set at 603.5 feet.

| DEPTH | DESCRIPTION |
|---|---|
| 0-15 | Red and gray fine, sandy clay. |
| 90 | Brown sandy clay. |
| 260 | Chocolate brown, silty, lignitic clay. |
| 265 | Chocolate brown silty clay with minor quartz sand and lignite. |
| 275 | Chocolate brown silty clay with minor lignite. |
| 295 | Gray silty clay (no siderite). |
| 298 | Chocolate brown silty clay. |
| 305 | Gray silty clay. Cleaned hole at 303. |
| 314 | Pale blur firm plastic clay. |
| 316 | Chocolate brown silty lignitic clay. |
| 318 | Lignite. |
| 335 | Light gray silty clay. |
| 338 | Light gray, silty clay with detrital syenite. |
| 342 | Light gray to white, hard, kaolinitic clay. (Bauxite zone). |
| 355 | Light gray kaolinitic clay with some detrital syenite. |
| 360 | Red clay. |
| | Midway Formation |
| 452 | Blue plastic clay. |
| 495 | Blue clay with shale and minor calcareous lenses. |
| 580 | Blue shale with hard calcareous lenses. |
| 598 | Blue and gray clay with shale and hard calcareous lenses. |
| 599 | Red, iron-stained sand. |
| 603.5 | Light gray clay and saprolite. Contact zone. |
| | Casing set. |
| 611 | Mixed materials. Syenite especially in pebble form. Conglomerate clearly distinct at 605. Other pebbles scattered throughout. 611 is soft, broken, light gray to gray-green. First mica in large pieces conspicuous about 609. This is a basal zone (probably) over igneous rock. |
| 613.2 | Yellow-gray to yellow-green, dense to crumbly. Altered locally with conspicuous biotite. Probably altered mica pyroxenite in part. |
| 615.7 | Clayey in upper part, gives way to yellow-green altered material, with distinct igneous texture at base. Very crumbly. Brown stain 613.4-615 associated with marcasite. Efflorescent white minerals also present. Some fine-grained gray mineral material could be rutile. |
| 616.3 | Represented by gray-green plug, crumbly, with enclosed rock fragments. Could be cave-in, could be altered zone. |
| 617 | Massive carbonate vein, white, with pyrite, locally vuggy, very coarse-grained. Dolomitic. Upper end ground off. |
| 618.1 | Yellow-green altered igneous. Some mica near top. Scattering of dark minerals with vitreous to submetallic luster. Could be rutile. Crystals small, sparse. |
| 622.7 | Highly altered light gray-green ouachitite. Medium-to coarse-grained. |
| 623.5 | Fragmental materials encased in gray-green clay. This may be cave plug or fragmented material may have jammed and plugged in coring |
| 629.6 | Light green altered igneous, soft but coherent, scattered coarse biotite and appreciable fine-grained light mica as coatings on fracture zones. |

Hole EP1-4

| DEPTH | DESCRIPTION |
|---|---|
| 629.6 | Light green altered igneous, soft but coherent, scattered coarse biotite and appreciable fine-grained light mica as coatings on fractures zones.<br>Coarse biotite at 624.<br>625-625.5. Searched vein, partly calcareous, white. Some also at 626.<br>Scattered magnetite crystals, dull black but partly hematitized (martite) |
| 631 | Coarse to very coarse black mica pyroxenite. Abundant calcite and serpentine alteration. Coarse mica. |
| 632 | Black medium-to coarse-grained pyroxenite. Serpentine on fractures and cleavages. |
| 633 | Similar but biotitic and more strongly altered with alteration veinlet to 4mm.<br>Carbonate vein 12mm. White. Sparse scattered minute black crystals. Light colored mica (?) flakes. Dip 20 degrees. Open spaces between crystals. |
| 633.5 | Medium-grained granular black pyroxenite, altered on fractures. Visible medium-grained magnetite. |
| 634 | Black biotite pyroxenite. Heavy calcite (coarse) at base Coarse-grained granular. |
| 635.7 | Coarse-to very coarse-grained granular black pyroxenite with biotite (coarse). Extensive calcite masses at 635 with coarse biotite. Alteration veinlets with serpentine and light mica. |
| 637 | Medium-grained granular black extensively altered pyroxenite with calcite veinlet (discontinuous) and adjacent altered zone running length of core. Total 5mm. thick. |
| 637.8 | Similar with stronger alteration (almost one half of core) light greenish with pinkish carbonate lenses as part of altered vein structure. |
| 638.2 | Similar giving way to complete alteration. Residual biotite quite obvious. (Not mica Pyroxenite) |
| 639 | Altered soft green with mica. |
| 639.8 | (639 measured 638.4) Core follows driller's calls. Altered pyroxenite, light green. Coherent visible black biotite and scattered magnetite altering to hematite. |
| 640.3 | Banded carbonate vein zone. White and brown in brecciated center, gray bands along edges. Coarse-grained. Pinkish brown carbonate may be exotic mineral. Doesnot look like siderite. |
| 640.6 | Dense slickensided clayey mass below carbonate. Light gray green. |
| 642.2 | Green altered pyroxenite as above vein. |
| 643.2 | Contact with dense dark gray aphanitic dike, slightly altered on fractures, a few carbonate veins. Dip on contact about 50 degrees. |
| 644 | Altered dike, yellow green, coherent, lower part porphyritic with phenocrysts leached out.<br>Change from N to B size core |
| 644.5 | Gray green altered porphyritic monchiquite, phenocrysts leached out, aphanitic ground mass. |
| 646.3 | Generally fresher monchiquite, some phenocrysts left. At 645 phenocrysts replaced by white substance (calcareous) |
| 646.5 | Altered greenish gray monchiquite. |
| 646.6 | Calcite vein. Open cavities drusy. |
| 647 | Monchiquite-phenocrysts altered green. |
| 647.5 | Aphanitic monchiquite with medium-grained pyroxene (?) phenocrysts. Calcite vein 20mm. Open space in middle. Drusy. Pyroxene phenocrysts above and below are altered green. |

Hole EP1-4

| DEPTH | DESCRIPTION |
|---|---|
| 647.7 | Generally unalterd porphyritic monchiquite as above. |
| 648.3 | Altered monchiquite with leached phenocrysts and partial alteration of ground mass to yellow-gray. |
| 649.5 | Relatively fresh monchiquite. Calcite vein 649-2mm., 649.3-3mm. |
| 649.8 | Altered monchiquite, phenocrysts leached out. |
| 650.3 | Brecciated zone in monchiquite with feldspar-carbonate vein material throughout. Vein material is fine-grainedclayey with interspersed fine-grained carbonate crystals. 650.3-carbonate vein. Open spaces are drusy. 8mm. across vein. Essentially no alteration. |
| 651 | Aphanitic monchiquite with phenocrysts. Phenocrysts leached out. |
| 652.1 | Strongly altered pyroxenite, yellow, soft, coherent. Local strong biotite. Sparse granular magnetite altering to martite. Core strongly brecciated and intricately laced with calcite veinlets. Partly mica pyroxenite. |
| 652.5 | Medium-to coarse-grained granular black pyroxenite. Medium-grained visible magnetite. Some magnetite slightly hematitic. |
| 653 | Medium-to coarse-grained granular mica pyroxenite. Black visible magnetite scattered. Some alteration is hematite stained at 653. |
| 653.6 | Medium-to coarse-grained black mica pyroxenite. Locally strong granular magnetite masses. |
| 654.5 | Medium-to coarse-grained mica pyroxenite. Black, scattered magnetite. Mica strong at 654. 2mm. veinlet all down length of core. |
| 655.2 | Coarse-grained green black mica pyroxenite. Scattered granular magnetite with dark bluish to reddish-black spots that may be martite. |
| 656.3 | Medium-to coarse-grained granular black mica pyroxenite. Visible scattered magnetite on surface. |
| 657 | Coarse-grained black pyroxenite. Scattered feldspathic(?) gray alteration veinlets. Scattered visible magnetite. Calcite vein at 657-Open spaces with medium-grained drusy surfaces. |
| 657.7 | Medium-grained black pyroxenite with visible scattered magnetite. |
| 658.7 | Coarse-grained pyroxenite. With angular calcite masses. Strong visible magnetite. Calcite and alteration veinlets (very thin) |
| 659.1 | Medium-grained pyroxenite. |
| 659.8 | Medium-grained granular mica pyroxenite. Some calcite veinlets 1mm. wide along core. Serpentine alteration on some veins. Visible magnetite. |
| 660.2 | Medium-grained granular black pyroxenite. 12mm. calcite vein and slightly banded alteration vein with mica at 659.8 Multiple calcite veins 10mm. wide with drusy open spaces at 660 Banded calcite vein at 660.2 |
| 660.5 | Medium-grained granular black pyroxenite. Visible magnetite. |
| 661 | Coarse-grained black mica pyroxenite. Coarse scattered visible magnetite. |
| 662.5 | Medium-to coarse-grained black mica pyroxenite with scattered alteration veinlets (serpentine) and sparse thin carbonate veinlets. Scattered medium-grained magnetite crystals. |
| 663 | Medium-to coarse-grained black pyroxenite. Locally coarse magnetite crystals. |
| 663.1 | Coarse-grained similar to above. |
| 664 | Mixed medium-and medium-to coarse-grained black pyroxenite. Appreciable biotite but not sufficient to make mica pyroxenite. Mottled calcite and alteration veinlets. Veinlets at 861.4 and 861.7. |

Hole EP1-4

| DEPTH | DESCRIPTION |
|---|---|
| 665 | Coarse-grained granular black pyroxenite. Mottled calcite and alteration veinlet 3mm. wide across core at 664.1. Calcite veins at 664 and 664.7. 4mm. wide. Open and drusy in center. |
| 665.6 | Medium-to coarse-grained black pyroxenite with biotite. Calcite and alteration veinlet at 665.3 |
| 666.2 | Medium-grained granular black pyroxenite. Scattered very thin alteration veinlets. |
| 670 | Coarse-grained granular black pyroxenite. Very little mica. Calcite and alteration veinlets 666-667. 667.2-667.7 is breccia zone with extensive serpentine alteration Calcite vein 5mm. wide at 668.3 |
| 670.7 | Black mica pyroxenite. Fracture and breccia zone with extensive yellow gray alteration. |
| 671 | Medium-to coarse-grained granular black pyroxenite. |
| 671.1 | Same as above, except medium-grained, 671.7-672.1 is multiple fracture zone with greenish gray alteration veins up to 6mm. thick. Scattered sparse pyrite crystals. |
| 672.7 | Coarse-grained granular pyroxenite with streak of abundant coarse-grained biotite, which dips 65 degrees. Extensive alteration (serpentinous) and calcite. |
| 673.4 | Medium-grained granular black pyroxenite. Alteration veinlets at 672.7 and 672.9. |
| 673.8 | Medium-grained granular black mica pyroxenite. |
| 674.5 | Coarse-grained granular pyroxenite. Godd visible magnetite. |
| 675.2 | Medium-to coarse-grained granular pyroxenite. Strongalteration veins at 674.8 and 675. Slightly calcareous. Some scattered magnetite. |
| 675.5 | Altered ouachitite. Biotite in serpentine matrix. |
| 676.1 | Coarse-grained black pyroxenite. Mica pyroxenite down one side of core. Alteration veins-green serpentine-up to 5mm. thick. |
| 676.4 | Irregular mass. Smokey gray greasy luster massive, hard, grainless (Chalcedony?, zenolith?, hydrothermal?) Associated with altered mica pyroxenite, yellow green and soft, but coherent. |
| 680.8 | Coarse-grained black pyroxenite with some mica, strongly altered throughout, but concentration of alteration essentially with fracture zones and stronger mica zones. Peach color common in yellow green alteration. Thin calcite veins also present along veins. Strong zone 677.7-677.9 Diagonal calcite gash veins 679-679.5. Cross vein calcite and alteration at 679.7. Green strong alteration at 680.2-680.8. |
| 681.8 | Coarse-grained altered pyroxenite. Serpentine on cleavage planes of pyroxene common. Rock gray to dark green gray. Some biotite. 14mm. wide coarse calcite and alteration vein at 680.9 6mm. wide calcite veinlet and alteration-bandedpat 681.5. |
| 682.9 | Coarse-grained granular pyroxenite. Some angular calcite spots on cleavage plane. Alteration gives rock dark green color. Slight visible magnetite. |
| 683.3 | As above with biotite. Slight visible magnetite |
| 685.7 | Mica pyroxenite, coarse-grained. Locally almost ouachitite. Calcite around mica. Serpentine alteration in pyroxene cleavage. 685.3-5mm. wide white medium-grained calcite vein. |

Hole EP1-4

| DEPTH | DESCRIPTION |
|---|---|
| 686.5 | Brecciated and altered zone in medium-to coarse-grained granular black pyroxenite. Diagonal reddish brown-peach alteration vein at 655.7 (5mm.) Cross vein (14mm.) yellowish gray alteration vein with traces calcite at 686 Other diagonal veins abundant. |
| 689.5 | Black coarse-grained granular, relatively crisp pyroxenite. Coarse biotite zone directly down side of core for entire length of section. Appears to be swinging gradually across the core. (Extends to 690.5) Calcite veinlets abundant diagonally and across core at 686.5-687. Mottled calcite and alteration veinlet 6mm. at 687. Mottled alteration veinlet at 687.6. Diagonal multiple calcite and alteration veinlets at 688.1-688.7, dipping 75 degrees. Fracture across core in other direction (makes 60 degrees with major direction). |
| 690.7 | Medium-grained granular black pyroxenite with ouchitite (?) zone down core. Coarse residual magnetite (partly altered) at 690.5-690.7. 690.3-690.5-brecciated with thin alteration veinlets. |
| 691.6 | Soft altered zone. Coherent banded yellow-peach at top, thin discontinuous calcite veinlets throughout. Black mica conspicuous. |
| 693.2 | Altered pyroxenite. Yellow-green, coherent but clayey residue partly altered. Magnetite crystals, medium-grained, black scattered throughout. Sparse ~~what~~ white carbonate and peach colored alteration veinlets visible. Original texture may have been coarse-granular. Magnetite abundant at 693. |
| 694.3 | Mostly altered medium-to coarse-grained black to yellow altered pyroxenite. Brecciated and alteration veined. No crisp rock. Magnetite conspicuous locally. |
| 695.3 | Completely yellow-green, altered pyroxenite. Gash vein of calcite at 695.1. Sparse residual altered magnetite. |
| 695.5 | Partly altered black pyroxenite and yellow-green altered material. |
| 696.4 | Coarse-grained black pyroxenite. Biotite streak at 695.9-696.2. Mottled altered vein (5mm.) at 696, dips 60 degrees. |
| 697.4 | Partly to completely altered pyroxenite. Locally black, remainder green-yellow. RElatively abundant residual magnetite in alteration zone. Strong magnetite at base. |
| 698.2 | Medium-grained biotite pyroxenite and altered material. Magnetite relatively haevy with mica zone. Calcite gash veins in altered material near base of section. |
| 698.4 | Medium-grained granular-partly altered pyroxenite. |
| 699.7 | Coarse-grained ouachitite, matrix all soft yellow-green. |
| 700.3 | Black coarse-grained pyroxenite with cleavage alteration. |
| 700.7 | Medium-grained black pyroxenite, loaR faint hematite stain in intergranular alteration. White calcite cross veins 700.3 (3mm.) and 700.4 (3mm.). Altered vein across core at 700.7. |
| 701.5 | Visible magnetite. Black coarse-grained granular pyroxenite. Strong biotite 701.1 locally. Altered vein with calcite core across at 701.2. Some angular white calcite masses. |
| 702 | Coarse-grained blakk granular mica pyroxenite, white calcite angular masses. Intergranular and intragranular alteration. |
| 702.4 | Scattered magnetite crystals. Medium-to coarse-grained mica pyroxenite. 702.1-702.4 angular fragment of greasy to glassy dense material (looks like novaculite) surrounded by peach colored alteration. Actually shows hematite staining in alteration. White calcite vein (5mm.) across core. |

Hole EP1-4

| DEPTH | DESCRIPTION |
|---|---|
| 703.1 | Coarse-grained granular mica pyroxenite. |
| 703.7 | Coarse-grained granular black pyroxenite, trace biotite. |
| 703.8 | Calcite vein, fine-to medium-grained. |
| 703.9 | Very coarse mica. |
| 705.5 | Relatively fresh coarse black granular pyroxenite. Some mica. |
| 706 | Similar but with extensive intergranular and intragranular alteration and yellow alteration veinlets. |
| 706.4 | Mica pyroxenite ranging to completely altered yellow-green clayey substance. |
| 711 | Completely altered, yellow-green clayey substance with local concentration of mica and magnetite.<br>Mica about 707.5-708.1<br>Hard spot at 709.4-Similar to previous inclusions? |
| 711.7 | Completely altered as above. |
| 712.7 | Carbonate vein, white to purple gray, some brownish zones in calcite. Some massive pyrite. Massive green fluorite 712.1-712.5. |
| 721 | Recovered only 4.2 feet of yellow-green alteration material containing sparse scattered magnetite and black mica flakes. Strong biotite zone just above 721. |
| 722.4 | Scattered visible magnetite. Medium-to coarse-grained granular black pyroxenite. Some intergranular alteration. |
| 722.7 | Altered zone, yellow coherent, residual sparse biotite. |
| 724.3 | Coarse magnetite 723.4-723.6. Broken and altered medium-grained granular to coarse-grained mica pyroxenite, intricately veined. |
| 725 | Trace magnetite. Coarse granular pyroxenite extensively altered. Trace biotite. Calcite veinlets. |
| 725.7 | Coarse-grained granular as above, calcite veins (3-5mm.) run steeply down core. Extensive alteration starts with vein at 725.3. Vein runs down length of core to 730. Heavy magnetite bands diagonally across core at 725.3 and 725. Seem to dip about 55 degrees. Purplish cast in magnetite suggests partly altered to hematite. |
| 726.8 | Similar pyroxenite and altered zone down core. |
| 727.8 | Completely altered pyroxenite. All yellow-green. Calcite vein down core. Strong biotite at 727.3-727.5. |
| 730.1 | Visible residual magnetite. Medium-grained granular black pyroxenite with alteration down one side. Locally alteration penetrates into pyroxenite and selectively alters some of grains. |
| 731 | Same, mostly altered. Calcite vein down core. |
| 731.5 | Coarse-grained, brecciated and intricately veined with altered material. |
| 733.1 | Medium-grained granular black pyroxenite. At 732.2-732.6 are numerous veinlets and massive local alteration to yellow-green. |
| 733.7 | Granular and coherent. Completely altered. |
| 734.8 | Completely altered, yellow-green, coherent pyroxenite. Scattered sparse magnetite, slightly altered |
| 735.6 | Same, but with two thin diagonal ouachitite zones, dipping 78 degrees. Seems to be thin carbonate veinlet down center of ouachitite.. |
| 735.7 | Peach to buff fine-grained carbonate vein, banded gray at edges. 20mm. wide. |
| 736 | Coarse-grained black pyroxenite, mottled alteration vein at 735.8. |
| 736.5 | Brecciated zone, mica pyroxenite, altered along fractures extending into rock. |
| 737.7 | Partly altered pyroxenite along grain boundaries and within. |
| 738.3 | Extensively altered. |
| 739.5 | Coarse-grained pyroxenite |
| 740.1 | Biotite-rich zone on top and bottom with alteration white carbonate zone in center has sparse pyrite crystals and very fine- |

Hole EP1-4

| DEPTH | DESCRIPTION |
|---|---|
| | grained black granular mineral. Coarse biotite at base with coarse magnetite crystals. This carbonate zone extends downward in thin vein to 740.7. |
| 740.7 | Mica pyroxenite. |
| 741.5 | Coarse black pyroxenite altered in veinlets and intergranular on cleavage. Strongly altered with peach veinlet at 741.2-741.5. |
| 741.9 | Slightly altered mica pyroxenite. |
| 742.5 | Coarse-grained pyroxenite, some alteration veinlets. |
| 743.3 | Magnetite visible in altered material. Mica pyroxenite grading downward into completely altered (yellow mica pyroxenite at 743.) |
| 744 | Completely altered yellow-green pyroxentie, with slight calcite veinlets. Sparse residual magnetite. |
| 744.3 | Biotite pyroxenite completely altered yellow green. 30 degrees dip. |
| 745.7 | Completely altered coherent pyroxenite, yellow. Trace calcite veinlets. Sparse thin biotite seams. |
| 746.8 | Altered pyroxenite with fine-grained carbonate vein, white to peach, gray band containing minute black hard crystals, local pyrite. Vein runs down core. Total about 25mm. thick. |
| 751.7 | Crumbled yellow altered pyroxenite. Mostly lost. |
| 758.5 | All crumbled yellow altered material. No solid core. Probably was fine-grained pyroxenite, because mica is all fine-grained and very sparse magnetite crystals and also fine-grained. |
| 762.8 | Yellow-green altered material. Slickensided. Contains trace of black fine-grained mineral not magnetite. Essentially no mica. Cannot identify original material. Could have been very fine-grained to aphanitic dike. Trace pyrite. All crumbly. |
| 763 | Vein zone. Fine-grained white carbonate (?only low effervescence) thin with gray bands as above. Slight pyrite. Could be dolomite veins |
| 763.6 | Massive white rock, traces of purple (could be fluorite) fine-grained. Locally coarse pyrite masses. |
| 763.9 | Altered. |
| 764.3 | Gray porphyritic-aphanitic-bleaches gray downward and gets softer and crumbly. Dissemn ated fine-grained pyrite. |
| 764.8 | Gray to white clayey with slickensides. |
| 765 | Gray with white phonolite-altered aphanitic dike? |
| 765.5 | White, clayey, slickensided, grades downward to light gray porphyritic at 765.5. |
| 767.3 | Light gray aphanitic with white pheocrysts. Altered seam at 767.5. Disseminated fine-grained pyrite throughout. |
| 768 | Altered green. Fine-grained carbonate in material. |
| 770.2 | Breccia zone. Carbonate vein filling residual but surrounding pyroxenite. All altered to soft yellow-green. Carbonate slowly to moderately effervescent, fine-grained. Heavy coarse black mica against edges of vein locally. Magnetite scattered residual in altered zone and some fine mica. Carbonate locally peach colored. Gray banding along edge of carbonate almost universal. |
| 771.8 | Coarse-grained pyroxenite, black with mica. White calcite veinlets diagonally across core at 770.8-771.3. Grayish calcareous altered zone 771.5. Very coarse pyroxenite 771.6-771.8. Alteration commonly intragranular and intergranular. Trace visible magnetite. |
| 772.3 | Coarse ouachitite dips 35 degrees. |
| 775 | Coarse-grained black pyroxenite. Conspicuous magnetite, partly red hematitic, at 773. Green altered zone with conspicuous coarse biotite at 773.3. Greenish-yellow alteration veins, calcareous, 773.5-775.8. Others across core. |

Hole EP1-4

| DEPTH | DESCRIPTION |
|---|---|
| 776 | Medium-grained black pyroxenite, increasingly fractured and altered downward. Trace biotite. |
| 776.6 | Vein and altered zone-white carbonate with dark gray selvedge. Multiple carbonate veins, up to 5mm. wide. Lower portion are peach-colored fine-grained carbonate vein. Other material soft yellow-green. |
| 777.9 | Medium-to coarse-grained granular green black pyroxenite, trace biotite. In lower part some sub-angular spots with reddish borders that look like altered feldspar crystals. |
| 778.6 | Coarse-grained ouachitite. Matrix altered to medium-gray-green. Magnetite visible in ouachitite. |
| 780.3 | Coarse-grained granular green black pyroxenite. Local traee biotite. A few light altered spots as above. Scattered visible magnetite crystals. |
| 780.6 | Coarse-grained granular calcite in angular masses. Dark green black. |
| 782.4 | Medium-grained granular black pyroxenite. |
| 783.1 | Mica pyroxenite, coarse-grained. Appreciable yellow-green alteration along abundant diagonal fractures. Some vein material-whate calcite-some peach fine-grained carbonate. |
| 785.9 | Essentially coarse-grained ouachitite with altered green-gray matrix, lustrous black mica. Locally grades to mica pyroxenite. Calcite masses, heavy locally, more intensely altered in adjacent rock at 784.8-785.1 |
| 786.4 | Medimm-to coarse-grained granular partly altered black pyroxenite. |
| 786.5 | Yellowish alteration mass minutely brecciated and veined with hematite |
| 786.7 | Coarse-grained ouachitite. |
| 788 | Medium-grained granular black pyroxenite, cut by white to green calcite vein parallel to core. Thin biotite layer at 788. |
| 789 | Fine-to medium-grained biotite pyroxenite(?) mostly altered to soft yellow green. |
| 789.6 | Yellow green alteratio zone with carbonate vein material, massive, fine-grained, and banded dark at the edges. Locally altered and minutely veined with hematite. |
| 790 | Altered to fresh mica pyroxenite. |
| 792 | Medium-grained, granular black pyroxenite. Altered generally along veinlets throughout length. All zones narrow. Grades to coarse-grained at 792. |
| 792.5 | Coarse-grained granular black pyroxenite. Many thin calcite alteration veinlets. |
| 793.1 | Strong alteration band across and down core connecting a complete alteration band at 793. Intervening material medium-grained to coarse-grained pyroxenite, some biotite. |
| 794.3 | Medium-to coarse-grained granular pyrodenite, scattered alteration. Coarse biotite at 793.5. |
| 797.2 | Coarse-grained granular black pyroxenite. Diagonal seam of coarse biotite at 796.3-796.5. Yellow gray alteration down side of core to 796.7 White calcite center zone in all veins. |
| 799.7 | Coarse-grained granular pyroxenite, locally biotite. Calcite veins running down core to 799.2 Alteration on fractures is yellowish. |
| 800 | Medium-coarse granular pyroxenite with increasing amount of biotite. Yellow-green alteration veins abundant. |
| 899.5 | Medium-grained granular pyroxenite, locally biotite. Abundant alteration veins and calcite. |

Hole EP1-4

| DEPTH | DESCRIPTION |
|---|---|
| 800.8 | Medium-grained granular pyroxenite. Vein daigonal at 800.3-800.8. Carbonate in middle, gray to reddish gray bands on edges, probably hematitic. 6mm. thick. |
| 801.9 | Coarse-grained granular black pyroxenite. |
| 802.4 | Black medium-to coarse-grained granular pyroxenite. Alteration vein at 801.8. |
| 803.5 | Medium-to coarse-grained granular black pyroxenite. |
| 804.5 | Yellow green altered pyroxenite. Visible residual magnetite edtends down core to 804.5. Associated pyroxenite is medium-grained granular black with black mica. |
| 805.5 | Medium-grained granular pyroxenite. |
| 806.9 | Thin biotite zone at top. Rock below goes to medium- to coarse-grained granular black pyroxenite. Conspicuous scattered magnetite. |
| 809.2 | Pyroxenite as above. 807.4-807.9, Alteration veinlets and yellow alteration replacement of selected grains. Top of diagonal alteration zone 808.7. Extends to 809.9. Yellow residual biotite locally. |
| 809.6 | Yellow alteration zone, soft, with biotite, backed by pyroxenite as above. |
| 810.5 | Coarse-grained pyroxenite. |
| 812.2 | Medium-grained granular black pyroxenite with strong local alteration to yellow gray. 811.1-811.3 strong yellow alteration with local hematite staining. |
| 812.5 | Coarse-grained ouachtite. |
| 814.4 | Altered vein down core, multiple bands white calcite and yellow gray alteration. 6mm. wide. Mixed mica pyroxenite and medium-to coarse-grained black pyroxenite along vein. |
| 814.8 | Almost completely altered mica pyroxenite, intersecting veins. |
| 815.1 | Medium-grained mostly altered mica pyroxenite. |
| 817 | Medium-grained black pyroxenite. Slight biotite at 816.1. Yellow 2mm. vein 816.8-817. Scattered magnetite. |
| 817.8 | Medium-to coarse-grained granular black pyroxenite. Feldspar-carbonate vein 5mm. wide, yellow to calcite white, banded gray on edges. Dip 60 degrees. |
| 819 | Coarse-grained black pyroxenite. Good scattered magnetite. |
| 820.5 | Medium-grained granular black pyroxenite. Good scattered magnetite. |
| 820.8 | Coarse-grained pyroxenite with angular carbonate masses between mica crystals. Visible magnetite. |
| 821.6 | Coarse breccia with white feldspar-carbonate masses between fragments of coarse pyroxenite. |
| 822 | Medium-grained granular black mica pyroxenite. |
| 822.4 | Feldspar-carbonate vein and coarse mica crystals. |
| 824.1 | Good scattered magnetite. Medium-grained granular black pyroxenite, trace of coarse-grained crystals. Locally slightly porphyritic. |
| 824.4 | Coarse-grained pyroxenite. At 824.2-824.4 feldspar-carbonate vein with very coarse biotite crystals along egge. |
| 825 | Medium-grained granular black mica pyroxenite. Coarsens 825.9-826. Angular calcite masses and greenish color prominent in this zone. |
| 826.5 | Abundant magnetite, especially 825.5-826. Coarse-grained granular black pyroxenite. |
| 826.7 | Medium-grained granular black pyroxenite. |

Hole EP1-4

| DEPTH | DESCRIPTION |
|---|---|
| 828 | Very good scattered magnetite. Medium-grained granular black pyroxenit with mica. 3mm. calcite vein 827.5. Selective alteration of grains to yellow gray at 827.7. |
| 828.6 | Good scattered magnetite, especially just under contact. Coarse-grained granular black pyroxenite. Contact dip 35 degrees. Scattered coarse angular carbonate masses with coarse mica. |
| 828.9 | Fine-grained dense feldspar-carbonate vein bordered by coarse pyroxene and mica. Looks almost like fill of very coarse cavity. Some pyrite with vein. Contact phenomena should be studied to determine nature of filled space. |
| 830.3 | Visible scattered magnetite. Coarse-grained granular pyroxenite to 830, then grading to medium-grained granular to contact at 830.3 |
| 831.8 | Visible coarse-grained mica pyroxenite, almost ouachitite. |
| 832.7 | Medium-to coarse-grained granular black mica pyroxenite. Locally angular white calcite patches. |
| 832.9 | Moderate magnetite 832-833. Same type feldspar-carbonate zone, bordered by coarse biotite books projecting into feldspar-carbonate. |
| 835 | Locally coarse-to medium-grained magnetite masses and crystals. Medium-to coarse-grained granular crisp black pyroxenite. Trace biotite. |
| 835.2 | Medium-grained granular pyroxenite. |
| 835.4 | Coarse-grained pyroxenite with calcite and mica. |
| 836.7 | Medium-to coarse-grained black pyroxenite. |
| 836.9 | Multiple vein, calcite veinlets and fine-grained yellow-gray and gray banded. Fine-grained pyrite and black granular mineral sparsely scattered along some bands. Dip 60 degrees. Vein 14mm. thick, micaceous locally above altered vein. Cross calcite veinlets 835.7 and 836. |
| 837.5 | Medium-grained granular black pyroxenite with local biotite clots. |
| 838.7 | Medium-to coarse-grained black pyroxenite locally with biotite, locally with angular calcite, top of fracture zone with carbonate and alteration veins and veinlets that extend down to 840.8. |
| 840 | Medium-grained granular black pyroxenite. |
| 840.8 | Some visible magnetite. Coarse-grained granular pyroxenite, local coarse-grained angular calcite, and coarse biotite crystals. 839.9-840.3 is zone of multiple thin calcite veins and alteration with gray bands. Zone dips 60 degrees. Coarse biotite above. |
| 842.2 | Coarse-grained granular mica pyroxenite with angular calcite spots and coarse mica books, almost ouachitite. Obvious intra-granular alteration. |
| 842.7 | Black mica pyroxenite. Coarse-grained, granular. Intragranular alteration abundant. |
| 845 | Strong magnetite, crystals and masses scattered throughout. Medium-grained granular, crisp, black pyroxenite. Contact with above vague but grain-size change quite obvious. Becomes gradually coarser downward. |
| 846.4 | Coarse-grained granular generally black pyroxenite-quite crisp but with thin films of alteration on cleavage. 845.5-845.6-Coarse mica books adjacent to very coarse masses of fine-to medium-grained white calcite. 845.9-846.2-Similar, white carbonate relatively hard, may be feldspar-carbonate mixture. Effervesces in cold and could be partly dolomite. |
| 848.4 | Scattered medium-grained magnetite crystals, especially at 847-847.5. Medium-to coarse-grained granular black pyroxenite, crisp. Zone of coarse angular carbonate and coarse mica at 846.7-846.8. |

Hole EP1-4

| DEPTH | DESCRIPTION |
|---|---|
| 849.1 | Coarse-grained mica pyroxenite and angular carbonate, almost ouachitite. |
| 851.5 | Scattered sparse magnetite crystals. Medium-grained granular black pyroxenite-crisp. Few vague alteration veins, gray-green. 845.7-845.8, ooarse pyroxenite with coarse mica. |
| 852.2 | Coarse-grained black generally fresh pyroxenite. Scattered visible magnetite crystals sparse. |
| 852.7 | Medium-grained pyroxenite as above. Same magnetite. |
| 853.7 | Coarse-grained pyroxenite as above. Same magnetite numerous diagonal cross veinlets, carbonate center, yellowish gray altered zone along edge, about 2-4 mm. Brecciated zone. |
| 854.6 | Scattered visible magnetite. Medium-grained black mica pyroxenite. |
| 856.9 | Coarse scattered magnetite crystals. Moderately strong 857.5-858. Medium-coarse sub-porphyritic, black pyroxenite, altered only along thin diagonal fracture. Otherwise crisp. |
| 858 | Scattered magnetie. Predominantly medium-grained granular black crisp pyroxenite with a few coarse crysals locally. At 857 is irregular mass fine-grained carbonate. Some hematite stain in adjacent rocks. |
| 859.4 | Medium-to coarse-grained granular black pyroxenite, some biotite, scattered magnetie. Gray alteration crystals locally. A few gray-green zones with medium-coarse biotite books. |
| 859.8 | Vein, banded, 5mm. carbonate center, fine-grained banded yellow to gray adjacent. Gives way to reddish gray bands on edges. Fine-grained pyrite principally with carbonate. Carbonate veinlet and fine mica across core at top of zone. |
| 860.6 | Very coarse magnetite crystal at 859.8. Medium-grained granular pyroxenite. Relatively abundant hair-line splits and alteration. Some biotite 860.2-860.4, diagonal vein 6mm. wide gray carbonate center-yellow, generally altered along margins- Approximate dip from vein above approximately same strike. |
| 862 | Coarse crystal magnetite at 861.3. Medium-grained granular pyroxenite with conspicuous band of coarse mica pyroxene down core. |
| 863.1 | Medium-grained granular black pyroxenite. Diagonal white calcite vein at 863. |
| 864.7 | Coarse-grained granular black pyroxenite. Local coarse mica. |
| 865.7 | Medium-grained granular black pyroxenite. Locally a little fine-grained mica. |
| 866.2 | Medium-to coarse-grained black mica pyroxenite. |
| 866.7 | Mixed medium-grained granular mica pyroxenite and coarse-grained pyroxenite containing visible magnetite. Split down core. |
| 868.7 | Medium-grained black mica pyroxenite. 867.3 white calcite cross veinlet 3mm. wide. At 867.9-868.1 is white carbonate and coarse mica books. |
| 869.2 | Coarse, crisp granular black pyroxenite. |
| 870 | Zone mixed coarse pyroxenite and massive white carbonate and very coarse euhedral (?) biotite books. Pyrite in carbonate. |
| 871.8 | Scattered medium-grained magnetite crystals. Coarse-grained granular black pyroxenite. Local very sparse calcite masses. Veinlets of carbonate at 871-871.7 (segeral 1-2mm.) and 871.8. |
| 873 | Changing to medium-to coarse-grained granular black pyroxenite Local coarse biotite 872.5-873 with a little coarse angular carbonate. |
| 874.5 | Good visible magnetite 874.3-874.5. Medium-grained granular black crisp pyroxenite. |

Hole EP1-4

| DEPTH | DESCRIPTION |
|---|---|
| 875.5 | Same with increasing amount medium-grained biotite. |
| 876.4 | Medium-grained mica pyroxenite, greenish black. |
| 877 | Coarse-to very coarse-grained pyroxenite with carbonate mass 876.5-7 bounded by very coarse biotite books. Below this are angular carbonate masses with biotite in pyroxenite. |
| 877.9 | Scattered magnetite. Coarse-grained pyroxenite with mica at top and bottom. |
| 879.2 | Mixed very coarse biotite and massive fine-to medium-grained carbonate. |
| 879.8 | Medium-to coarse-grained ouachitite. |
| 881.7 | Massive fine-grained carbonate and euhedral very coarse pyroxene and biotite crystals. Fine-grained pyrite present. |
| 881.9 | Very coarse biotite. |
| 882.4 | Very coarse pyroxenite with very coarse biotite and carbonate. |
| 882.6 | Medium-grained granular black pyroxenite, slight biotite. Intergranular alteration locally with some hematite stained light spots. |
| 883.4 | Massive white carbonate and euhedral coarse-to very coarse-grained mica and pyroxenite. Carbonate mass mottled gray locally, fine-to medium-grained pyrite present, gray material non-calcareous but not hard. (Could use several thin sections of these zones). |
| 885.7 | Core heavy. Magnetite not particularly conspicuous but probably scattered throughout. Mostly medium-grained granular pyroxenite. Between 884.5 and 885.7 are several spots with coarse-grained biotite and some coarse pyroxene. A few scattered thin (1-2mm.) carbonate veinlets. Alteration on faint fracture is green. Locally medium-sized grains are altered light gray. Hematite gives black rock slight reddish cast below 884.5. |
| 887.2 | Good visible magnetite 886.5-887. Medium-grained granular black pyroxenite. Trace coarse mica and carbonate 886.5. |
| 887.5 | Coarse-grained becoming altered downward. |
| 888.9 | Yellow-green coherent altered pyroxenite. Residual magnetite gone to hematite. Scattered hematite red specks throughout. |
| 890.1 | Brecciated light gray, fine-grained rock with white carbonate. All calcareous. Scattered fine-grained pyrite throughout. |
| 891.9 | Core disintegrated to crumbly soft mass with abundant fine-to medium-grained biotite. Probably was fine-grained mica pyroxene or ouachitite. |
| 893.2 | Medium-grained mica pyroxenite or ouachitite cut by abundant carbonate veins and veinlets. Matrix completely altered. Core coherent. |
| 893.7 | Core completely crumbled. Mica pyroxenite or ouachitite as above. |
| 894 | Same with carbonate veins and veinlets throughout. |
| 894.3 | Disintegrated rock. Probably was pyroxenite or ouachitite. |
| 895.3 | Altered pyroxenite-yellow green, coherent. Residual medium-grained magnetite scattered through (sparse). |
| 895.6 | Visible magnetite. Medium-grained granular pyroxenite. Carbonate veinlets and alteration. |
| 896.4 | Visible magnetite. Coarse-grained granular pyroxenite. |
| 899 | Scattered visible magnetite crystals. Medium-grained granular black pyroxenite. Diagonal carbonate veinlets (4mm.) at 896.5, 896.9-894.3, and 898-899. Several hair-line to 4mm. at 898-899 irregular small masses with hematite alteration present. Globular and up to about 8mm. diameter. Hematite looks almost like hematite reaction rim. |

Hole EP1-4

| DEPTH | DESCRIPTION |
|---|---|
| 899.8 | Visible magnetite. Similar. Still with light alteration spots and hematite boundaries. |
| 901 | Local relatively strong magnetite concentrations. Coarse-grained granular pyroxenite, black, with hair-line alteration and light fine-grained spots with hematite staining. |
| 902.7 | Visible scattered magnetite. Fine-to medium-grained granular black pyroxenite. |
| 903.6 | Coarse -grained black pyroxenite. At 903-903.6 diagonal 2mm. carbonate veins associated with abundant hematite masses to 10mm. diameter. Masses irregular. Looke like displaced but altered breccia fragments. Might be inclusions. Masses are cut by late veins. |
| 904 | Good show magnetite 903.9. Medium-to coarse grained granular black pyroxenite. |
| 904.7 | Visible magnetite. Fine-to medium-grained granular black pyroxenite. |
| 906.4 | Fine-to medium-grained black pyroxenite with mica pyroxenite, split. Carbonate veinlet 3-5mm. with pyrite follows down core to bottom. Essentially no alteration. Alteration veinlets parallel to carbonate vein below 906. Hematite stains visible in some biotite 905.8-906. |
| 907 | Medium-grained black pyroxenite. Calcite vein 4-5mm. wide down core contains pyrite, selvedge of mica and dark gray alteration all down vein. |
| 907.8 | Visible magnetite. Medium-to coarse-grained black pyroxenite. Abundant carbonate veins down core, partly altered. |
| 908.3 | Medium-grained granular black pyroxenite. |
| 909.2 | Medium-to coarse-grained black mica pyroxenite. Abundant carbonate veins diagonal. |
| 910 | Fine-to medium-grained granular black pyroxenite. |
| 912 | Coarse-grained granular black relatively crisp pyroxenite. |
| 913.7 | Coarse-grained granular pyroxenite changing from crisp to completely altered. White. |
| 916 | Similar altered pyroxenite returning to gray-green. |
| 917 | Crisp black medium-grained granular pyroxenite. |
| 917.6 | Banded zone with 22mm. carbonate zone in middle. |
| 919 | Trace magnetite visible. Massive black medium-grained granular pyroxenite. |
| 920 | Visible magnetite-core heavy. Medium-grained black sub-porphyritic pyroxenite. At 917 mica zone dips 60 degrees. |
| 920.5 | Fine-to medium-grained granular black crisp pyroxenite. |
| 921.3 | Medium-grained sub-porphyritic as above. Strong magnetite 920.8-921. |
| 922.2 | Medium-coarse magnetite visible. Medium-grained granular black pyroxenite becoming coarser. Coarse hematite masses 921.7. |
| 922.6 | Coarse-grained granular pyroxenite with black mica. |
| 924.2 | Good visible magnetite 923.3-923.8 Coarse-grained granular crisp black pyroxenite locally cut by a few hair-line carbonate veinlets. |
| 926.7 | Magnetite in moderate amounts visible throughout. Crystals medium to coarse. Coarse-grained granular black pyroxenite. Diagonal carbonate vein 924.2-924.6. Calcite cross veinlet (2mm.) 926.2. |

Hole EP1-4

| DEPTH | DESCRIPTION |
|---|---|
| 928.6 | Massive very strong magnetite 927.7-928.1. Core generally heavy throughout. Fine-to medium-grained granular pyroxenite-slight increase in coarseness downward. Rock crisp, black. Considerable intergranular calcite. Traces of greenish solid veins of rock-forming mineral(vague). |
| 929.9 | Visible magnetite crystals. Medium-grained crisp black pyroxenite. |
| 932.4 | Visible coarse-grained greenish black pyroxenite. From 930.3-931.7 many calcite veins run diagonally down core or across, 4-5mm. thick with some banding. Grayish alteration locally along edges. |
| 933.9 | Visible magnetite at 932.7. Medium-grained black pyroxenite. Intermittent veinlets of calcite and grayish-green alteration zone. |
| 934.8 | Coarse-grained granular black pyroxenite. |
| 936.6 | Conspicuous magnetite 935.5-935.7. Medium-grained granular black pyroxenite.Alteration veinlets at 935.8 and 936.3. Cash calcite veins 935.8-936.3. |
| 937.7 | Locally visible magnetite, strong. Coarse-grained granular black pyroxenite. Some biotite, at 936.8 is odd gray calcareous mass, not vein. Looks almost like inclusion. Calcite mass running length of core. |
| 938.8 | Coarse-grained ouachitite. 75 degree dip. |
| 939.8 | Magnetite at 939.5-939.8. Visible. Medium-to coarse-grained granular pyroxenite, altered on hair-line fractures. |
| 940.4 | Medium-grained granular black pyroxenite. Abundant gray-green hard alteration and calcite veinlets. |
| 940.6 | Medium-grained granular altered pyroxenite. |
| 941.5 | Soft green to white mica pyroxenite or ouachitite, altered |
| 942.5 | White to pale green altered pyroxenite with residual magnetite and biotite. Steeply dipping contact with banded white and gray vein material-dip 80 degrees. |
| 945.5 | Massive, coarse-grained white carbonate vein, some gray banding and pyrite disseminated and in local aggregates. |
| 946.7 | Yellow green, soft, crumbled, altered biotite pyroxenite probably. |
| 949.9 | Solid ouachitite, yellow green altered matrix, coarse-grained rock. Contact with pyroxenite. 5mm. Calcite vein along contact. |
| 950.9 | Visible sparse magnetite. Medium-to coarse-grained granular pyroxenite, appreciably altered intergranularly and intragranularly. |
| 951.2 | Fine-to medium-grained black mica pyroxenite. |
| 953.4 | Scattered visible magnetite crystals. Fine-to medium-grained black pyroxenite. Altered calcite veinlet at 951.3-951.5. Multiple calcite veinlets 950.6-953.4. |
| 954.6 | Black, medium-tocoarse-grained pyroxenite, granular to sub-porphyritic. Altered on hair-line fractures. Scattered calcite veinets. At 953.7-954, light gray fine-grained spots with hematite stain, relatively abundant. |
| 955 | Multiple gray to white banded feldspar-carbonate zone diagonally across core. Local coarse biotite pyroxenite altered to yellow green below vein. |
| 956.2 | Mixed medium-grained black pyroxenite and medium-to coarse-grained biotite pyroxenite. Matrix in mica pyroxenite yellow green and essentially altered. Lower 0.2 feet altered to yellow. |
| 966.7 | Top of gray aphanitic dike. Carbonate veinlet along contact. Becomes very fine-grained porphyritic downward. Phenocrysts white, soft, and altered. Phenocrysts appear at 957. (Tabular, probably altered, feldspar). Fine-grained material also has very fine black to gray spots. Fine-grained disseminated pyrite and some granular aggregates appear below 963. At 965.5 rock becomes essentially white aphanitic. |
| 969 | Similar porph yry with pyrite. |
| or 970 | The bottom. |

X

EP1-5

ALPHA MINERAL COMPANY
753 W. Creekside Drive
Houston 24, Texas

SPECIFIC GRAVITY DETERMINATIONS

HOLE EP1-5

| | | |
|---|---|---|
| 1069.1-1069.3 | Av.(2) 3.463 | Black, fine-to medium-grained, granular pyroxenite. |
| 1084.4-1084.5 | Av.(2) 3.412 | Black, fine-to medium-grained, granular pyroxenite, trace of biotite. |
| 1105.35-1105.5 | Av.(2) 3.474 | Black, medium-to coarse-grained, porphyritic. Sparse coarse pyroxene crystals in matrix of medium-grained, granular pyroxene. Visible magnetite. |
| 1140.15-1140.3 | Av.(2) 3.402 | Black, coarse-grained, granular pyroxenite. Sparse dark bronze mica. Locally visible magnetite. Sparse, disseminated bright yellow-gold pyrite (?). |
| 1161.1-1161.25 | Av.(2) 3.422 | Black, fine-to medium-grained, granular pyroxenite. Appreciable disseminated bright yellow-gold pyrite (?). Visible magnetite. Trace of biotite. |
| 1182.6-1182.7 | Av.(2) 3.449 | Black, fine-to medium-grained, granular pyroxenite. Trace dark mica. |
| 1191.3-1191.4 | Av.(2) 3.363 | Black, fine-to medium-grained, granular pyroxenite. Local interstitial calcite (?) and pale brass yellow pyrite. |
| 1198.6-1198.7 | Av.(2) 3.345 | Black, medium-grained, granular pyroxenite. |

The following determinations are from part of the section sampled and tested for magnetite content. Lithologic descriptions were included in data of 12/5/62.

| | | |
|---|---|---|
| Sample 4, 980-985 | 980 - 3.493 | Average 3.437 |
| | 981 - 3.491 | |
| | 982 - 3.39 | %Magnetite-19 |
| | 983 - 3.434 | |
| | 984 - 3.375 | |
| Sample 5, 985-990 | 985 - 3.249 | Average 3.333 |
| | 986 - 3.371 | |
| | 987 - 3.423 | %Magnetite-13.8 |
| | 988 - 3.215 | |
| | 989 - 3.406 | |
| Sample 6, 990-995 | 990 - 3.428 | Average 3.412 |
| | 991 - 3.347 | |
| | 992 - 3.430 | %Magnetite-20.3 |
| | 993 - 3.426 | |
| | 994 - 3.428 | |

Robert H. Arndt
Petrographer

ALPHA MINERAL COMPANY
753 W. Creekside Drive
Houston 24, Texas

CORE DESCRIPTION

HOLE EP1-5

LOCATION - 1520 feet north and 680 feet east of the southwest corner of Section 29, T2S-R14W, Saline County, Arkansas.

ELEVATION- 378' est.

| DEPTH | DESCRIPTION |
|---|---|
| | Core 1 - 646-655 |
| 655 | Altered pyroxenite, medium-grained, punky. Bottom not solid. Some calcite veins and alteration veinlets. |
| | Core 2 - 655-667.5 |
| 667.5 | Fine-to medium-grained pyroxenite. Altered, but less than above. All tested shows some magnetism. Little medium-to coarse-grained magnetite visible. Localized feldspar-carbonate veins. Bottomed in yellow-green soft alteration material with disseminated pyrite. Structure and flow lines parallel to core. |
| | Core 3 - 667.5-685 |
| 685 | Bottom of alteration zone above. 1 1/2" total. Medium-grained pyroxenite below is altered, becoming progressively less altered downward. Becomes moderate to coarse pyroxenite toward 685. New set of veinlets encountered. Vertical or steeply inclined veins (mostly carbonate) throughout upper four feet. Alterations are stronger adjacent to veins from middle of core to bottom. All relatively appreciably magnetic. No interesting minerals obvious in veins. |
| | Core 4 - 685-705 |
| 685-699.8 | Green fine-to medium-grained pyroxenite (?) upper front fresh, altered below to dike. 1.2 foot aphanitic dark gray dike. Altered below for one foot. Feldspar-carbonate vein in middle of core in relatively crisp fine-grained pyroxenite. All appreciably magnetic. |
| 700.5 | Medium-grained carbonate broken by vertical gray veins 0.15' thick. Veins contain both massive pyrite and disseminated fine-grained cubes of pyrite as well. A very fine-grained, disseminated, gray, unidentified mineral. |
| 701.6 | Massive, white medium-to coarse-grained dolomite with disseminated, minute, sparkling fine-grained cubes of pyrite, and disseminated, minute, sparkling, chunky, black crystals, probably rutile or brookite. |
| 702.7 | Same as above but with vertical fracture along which there isclayey material with granular texture. Clay contains disseminated pyrite and rutile or brrokite. |
| 705 | Very meagre residue of very fine-grained, granular clay probably represents about 2.3 feet of soft material (altered granular rock?) that was either ground out or washed out of the core barrel. |
| | Core 5 - 705-719 |
| 709 | Feldspar-carbonate vein, mottled gray and white, medium-grained, locally very vuggy, mostly dolomite. Disseminated pyrite and minute rutile-brookite crystals common 706-707. |

Hole EP1-5

| DEPTH | DESCRIPTION |
|---|---|
| | Fine-to medium-grained yellow, lavender, and purple mineral that appears to be cubic or pseudo-cubic on drusy surfaces and may be fluorite is scattered between 707 and 709. Some of the purple mineral turns the knife blade and might be amethystine quartz or chalcedony. Strong gray bands that are parallel to the core (708.9-709) may be caused by minute, disseminated, gray minerals in the carbonate. |
| 713 | Recovered 2 feet of core including 1 foot of gray, clayey substance with residual granular texture. This grades to a foot of greenish-gray, medium-grained, altered pyroxenite. Last core may come from the gray clayey substance. |
| 719 | The rock is mostly coherent, altered pyroxenite with distinct residual texture, grading downward to unaltered pyroxenite. All stands firmly when cored. Feldspar vein at 718.5-2,3 inches, with pyrite and gray mineral. |
| | **Core 6 - 719-735** |
| 722 | Ouachitite vein. |
| 728.5 | Coarse-to very coarse-grained pyroxenite. |
| 729 | Feldspar-carbonate vein. Locally massive fine-grained pyrite. |
| 734.4 | Partly and decreasingly altered for 2 feet below vein. Contains abundant visible magnetite. |
| 735 | Dense gray fine-grained porphyritic lamprophyne dike. |
| | **Core 7 - 735-755** |
| 735.5 | Altered pyroxenite and feldspar-carbonate vein. |
| 737.5 | Medium-grained and partly altered black pyroxenite. |
| 742.5 | Medium-to coarse-grained pyroxenite. Abundant visible magnetite. |
| 743.5 | Very coarse-grained pyroxenite. |
| 747.2 | Coarse pyroxenite with scattered thin feldspar-carbonate veins. Scattered visible magnetite. |
| 755 | Coarse-to very coarse-grained pyroxenite more or less uniformly disseminated medium-grained magnetite throughout. |
| | **Core 8 - 755-775** |
| 757 | Coarse pyroxenite. |
| 760 | Fine pyroxenite. Near vertical flow lines. |
| 767 | Coarse pyroxenite. |
| 772 | Variable medium-to coarse-grained pyroxenite. Scattered visible magnetite. |
| 775 | Fine-to medium-grained pyroxenite. |
| | **Core 9 - 775-795** |
| 776 | Medium-grained pyroxenite. |
| 777 | Medium-to coarse-grained pyroxenite, biotite rich. |
| 779 | Medium-to coarse-grained pyroxenite with biotite. Vertical carbonate-feldspar vei |
| 779.5 | Very coarse pyroxenite and mica. |
| 782.5 | Very coarse pyroxenite. Black and hard. At 781.5, 1 1/2" fine-to medium-grained dark gray dike. Visible magnetite scattered throughout. |
| 784.5 | Coarse pyroxenite banded with medium-grained rock. At 783.8-784.4, cut by diagonal feldspar-carbonate veins about 0.1 foot thick. Visible magnetite scattered throughout. |
| 786 | Very coarse pyroxenite. |
| 787.5 | Coarse pyrite with biotite. |

Hole EP1-5

| DEPTH | DESCRIPTION |
|---|---|
| 788.5 | Coarse pyrite with biotite. |
| 789.5 | Black medium-grained pyroxenite |
| 793 | Mixed coarse-and medium-grained black pyroxenite and some mica. Banding and mottling result. Feldspar-carbonate veins 8mm. at 792.5 |
| 795 | Medium-to coarse-grained pyroxenite, mica-rich. Complexly broken and veined with feldspar-carbonate veinlets. 2" band at 793.5. |
| | Core 10 - 795-813 |
| 797.8 | Ouachitite, coarse blades and greenish. |
| 798.8 | Fine-to medium-grained dark gray dike. |
| 799 | Feldspar-carbonate vein. |
| 801 | Ouachitite. |
| 801.5 | Dark medium-grained dike. |
| 803 | Coarse-to very coarse-grained pyroxenite. 2 calcite veinlets. |
| 812 | Fine-to medium-grained black dike. Many vertical splits with carbonate veins. |
| 813 | Coarse-to very coarse-grained pyroxenite. |
| | Core 11 - 813-833 |
| 819 | Medium-grained pyroxenite. |
| 819.5 | Fine-grained dark dike. |
| 820.5 | Coarse-grained pyroxenite and strong visible magnetite. |
| 828 | Medium-grained pyroxenite. Local slight visible magnetite, some biotite. Altered slightly at 823.5. |
| 832 | Medium-grained pyroxenite, intermittent abundant biotite. Feldspar-carbonate vein 8mm wide along core 827-832. Altered strongly adjacent to vein. |
| 833 | Pyroxenite-heavy mica almost ouachitite. |
| | Core 12 - 833-842 |
| 837 | Medium-to coarse-grained pyroxenite and abundant mica (ouachitite), becoming increasingly altered downward. Vein at 834.5 |
| 841 | Same but strongly altered. Now green but with fractures. 838-839 purple and red minerals in core-quite obvious. 840.5, feldspar-carbonate vein 1cm. wide. |
| 842 | Very strongly altered, green pyroxenite with multicolored veinlet at 841.8. |
| | Core 13 - 842-862 |
| 844.5 | Similar to above (mica pyroxenite) strongly altered with alteration vein 842-844. |
| 845.8 | Medium-grained altered pyroxenite. |
| 853.5 | Monchiquite dike with chilled borders. |
| 856.5 | Coarse-grained altered pyroxenite. Blue minerals visible. |
| 857.8 | Grades to buff, pink, and green soft and strongly altered material with some included pyroxenite. |
| 860 | Fine-to medium-grained altered pyroxenite. Abundant thin veins. |
| 862 | Coarse-grained pyroxenite. Strongly altered. Spots of blue mineral. |

## Hole EP1-5

| DEPTH | DESCRIPTION |
|---|---|
| | **Core 14 - 862-882** |
| 864 | Medium-to coarse-grained pyroxenite with abundant feldspar-carbonate veins. |
| 866.5 | Coarse-grained pyroxenite. |
| 868.5 | Soft creamy white altered zone. |
| 875.5 | Coarse-to very coarse-grained pyroxenite, slightly altered. Spotted with angular feldspar-carbonate (?) interstitial material. |
| 877 | Fractured as above with veinlets very dense. |
| 879 | As above with increasing quantity of mica, light gray veinlets-looks like replacement. |
| 882 | Dense light gray abundant veins with feldspar-carbonate and mottled. |
| | **Core 15 - 882-902** |
| 900 | Dense light gray mottled rock, fine-grained. Tinguaite? |
| 902 | Gives way to coarse-grained pyroxenite and magnetite. (Slight alteration) |
| | **Core 16 - 902-913** |
| 906 | Medium-to coarse-grained pyroxenite, slightly altered. Some gray crystals (replacement?) |
| 908 | Medium-grained strongly altered with soft alteration vein 907-908. |
| 910 | Gray altered coarse pyroxenite, low density. |
| 913 | Strongly altered medium-to coarse-grained pyroxenite with abundant narrow veinlets in mares' tails. Rock green and punky. |
| | **Core 17 - 913-931** |
| 930 | Coarse-grained pyroxenite with scattered biotite, mildly altered. |
| 931 | Pyroxenite with abundant biotite ouachitite. |
| | **Core 18 - 931-951** |
| 951 | Coarse-grained pyroxenite with abundant biotite. Generally altered. Alteration strong locally below 943 with abundant calcite veinlets. |
| | **Core 19 - 951-971** |
| 954 | Altered coarse pyroxenite. Edges of monchiquite dike parallel to core and carbonate veins. |
| 955 | Monchiquite dike. |
| 955.5 | Broken pyroxenite, clay block. |
| 960 | Core ground up? |
| 962 | Altered pyroxenite. |
| 966 | Black dense pyroxenite and abundant veinlets. |
| 971 | Coarse pyroxenite. |
| | **Core 20 - 971-985** |
| 981 | Coarse pyroxenite. |
| 982 | Fine-to medium-grained rock, dense, medium gray. |
| 985 | Coarse pyroxenite. |

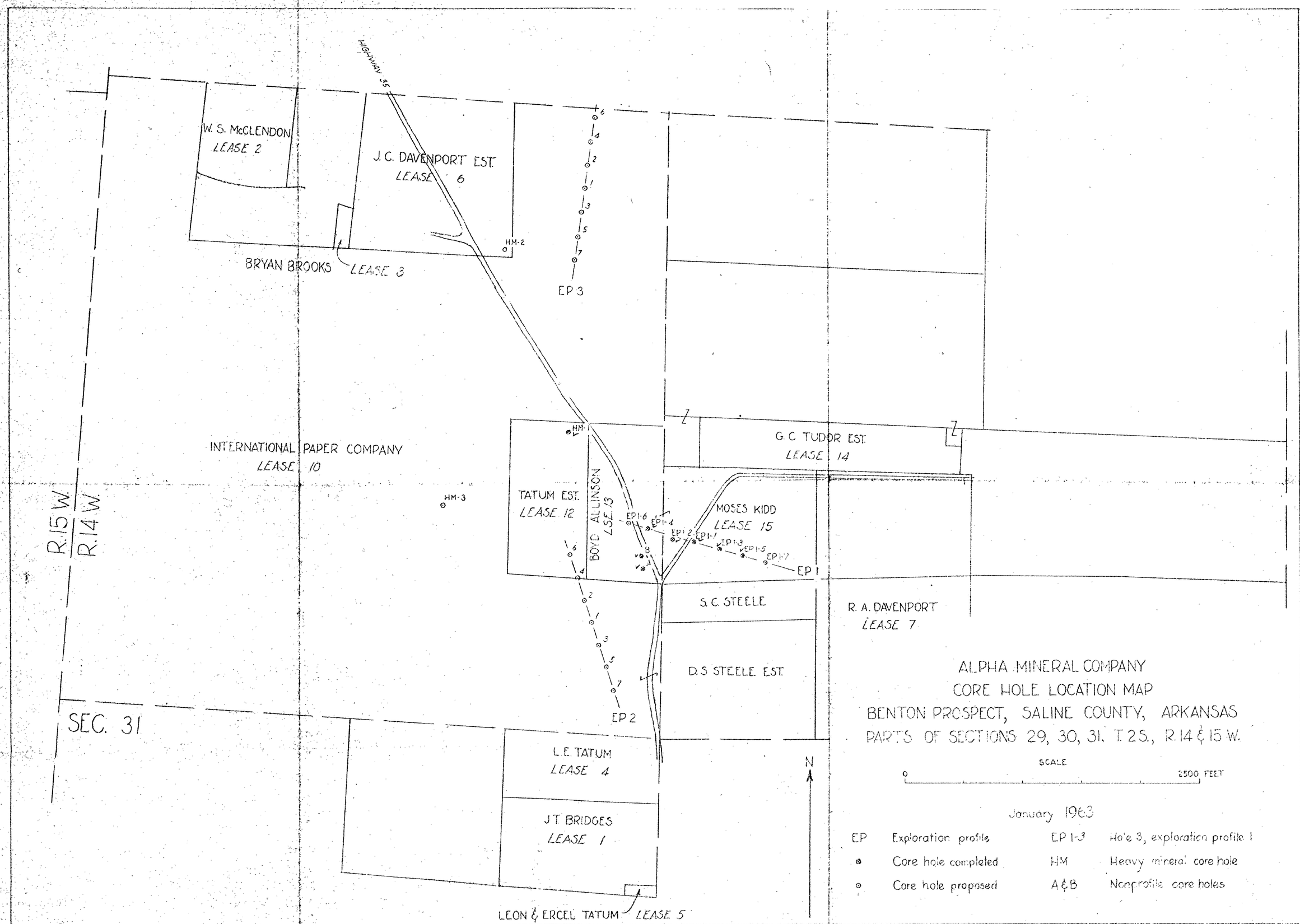
Hole EP1-5

| DEPTH | DESCRIPTION |
|---|---|
| | Core 21 - 985-995 |
| 995 | Coarse pyroxenite. Much appreciably magnetic. Some biotite. |
| | Core 22 - 995-1015 |
| 998 | Coarse pyroxenite, somewhat altered intergranularly. |
| 1005 | Ouachitite. |
| 1007 | Coarse pyroxenite and mica. More or less magnetic. |
| 1015 | Same as above. |
| | Core 23 - 1015-1035 |
| 1020 | Coarse pyroxenite. |
| 1026 | Coarse pyroxenite and fine-grained black-gray granular rock. |
| 1028 | Spot of vein extending down core to 1028. |
| 1032 | Aphanitic gray rock becoming coarser to 1030 where it is medium-to coarse-grained pyroxenite and mica. Gradation zone seems to have replacement or segregation veins with disseminated pyrite. |
| 1035 | Mixed coarse and mostly fine-grained altered gray rock with slight disseminated pyrite. |
| | Core 24 - 1035-1055 |
| 1036 | Mixed coarse and fine-grained pyroxenite. |
| 1055 | Alternating coarse and fine-to medium-grained pyroxenite, gradational. Fine-to medium-grained rock is appreciably magnetic: very hard core. Surface of core almost polished. |
| | Core 25 - 1055-1075 |
| 1057 | Fine-grained pyroxenite. Hard. |
| 1064 | Coarse-grained pyroxenite and abundant biotite. |
| 1074 | Mixed coarse and medium pyroxenite. |
| 1075 | Aphanitic dark gray dike. |
| | Core 26 - 1075-1091 |
| 1075 | Same dike as above. |
| 1084 | Fine-to medium-grained granular black pyroxenite. At 1084, 1" vein across core. |
| 1091 | Fine-to medium-grained dark granular pyroxenite. Appreciably magnetic. |
| | Core 27 - 1091-1106 |
| 1106 | Same as above. Vein material at 1093 and 1105. |
| | Core 28 - 1106-1123 |
| 1113 | Fine-to medium-grained pyroxenite. Granular. Black, little alteration. |
| 1119 | Fine-to medium-grained pyroxenite as above. Good magnetism at 1115. |
| 1121 | Medium-to coarse-grained as above. |
| 1123 | Fine-to medium-grained, granular to porphyritic as above, a little mica. All of Core 28 moderate to moderately strong magnetism. Locally sparse pyrite. Veinlet at 1122 with slight green alteration at edges. |

## Hole EP1-5

| DEPTH | DESCRIPTION |
|---|---|
| | **Core 29 - 1123-1142** |
| 1142 | Fine-to medium-grained pyroxenite. Locally for very short interval very coarse. Locally porphyritic. Rock shows little alteration. Good black. 1135-1142 locally pyrite disseminated in rock. All core moderately magnetic. |
| | **Core 30 - 1142-1160** |
| | (This is actually 20 feet of core. Discrepancy in measurement) Core mostly fine-to medium-grained pyroxenite. Locally porphyritic. All black, no alteration except on sparse hair-line fractures. |
| 1145 | Medium-to coarse-grained pyroxenite. |
| 1154 | Carbonate vein banded gray at edges. Total 0.1 feet pyrite and trace of very fine-grained gray mineral. |
| 1160 | Coarse-grained pyroxenite with mica. Core moderate to moderately-strong magnetism. Some magnetite visible locally. Mostly disseminated. Stronger at 1152. |
| | **Core 31 - 1160-1180** |
| 1163 | Coarse-to medium-grained pyroxenite. |
| 1170 | Medium-to fine-grained pyroxenite, locally porphyritic. |
| 1172 | Fine-grained pyroxenite. |
| 1180 | Fine-to medium-grained pyroxenite, locally with coarse phenocrysts. 1178-1179 intergranular alteration veinlet. |
| | **Core 32 - 1180-1196** |
| 1186 | Fine-to medium-grained black pyroxenite, trace biotite. Moderate magnetism. |
| 1191.4 | Same as above. |
| 1195 | Fine-to coarse-grained matrix with coarse-grained pyroxene crystals. Moderate to moderately strong magnetism. |
| 1196 | Fine-grained pyroxenite. Moderate to moderately strong magnetism. |
| | **Core 33 - 1196-1197** |
| 1196.8 | Black lamprophyre dike. Aphanitic. |
| 1197 | Pyroxenite. |
| | **Core 34 - 1197-1204** |
| 1201.5 | Black pyroxenite. Fine-to medium-grained. Semi-porphyritic locally. Some biotite. |
| 1202 | Coarse-grained granular pyroxenite. |
| 1203 | Shattered zone. |
| 1204 | Pyroxenite? Gray black. Looks feldspathic? Moderate magnetism. |

Robert H. Arndt,
Petrographer


HIGHWAY 35
W. S. McCLENDON
LEASE 2
J. C. DAVENPORT EST.
LEASE 6
BRYAN BROOKS
LEASE 3
HM-2
EP 3
INTERNATIONAL PAPER COMPANY
LEASE 10
HM-1
HM-3
TATUM EST.
LEASE 12
BOYD ALLINSON
LSE. 13
MOSES KIDD
LEASE 15
EP 1
G. C. TUDOR EST.
LEASE 14
S. C. STEELE
D. S. STEELE EST.
R. A. DAVENPORT
LEASE 7
EP 2
L. E. TATUM
LEASE 4
J. T. BRIDGES
LEASE 1
LEON & ERCEL TATUM
LEASE 5
R.15 W.
R.14 W.
SEC. 31
N
ALPHA MINERAL COMPANY
CORE HOLE LOCATION MAP
BENTON PROSPECT, SALINE COUNTY, ARKANSAS
PARTS OF SECTIONS 29, 30, 31, T. 2 S., R. 14 & 15 W.
SCALE
0
2500 FEET
January 1963
EP Exploration profile
Core hole completed
Core hole proposed
EP 1-3 Hole 3, exploration profile 1
HM Heavy mineral core hole
A & B Nonprofile core holes

MAP I