REPORT TEI-792

LITHOLOGIC LOGS OF THREE EXPLORATION CORE HOLES, U15b AREA, CLIMAX STOCK, NEVADA TEST SITE, NYE COUNTY, NEVADA

By F. N. Houser

UNITED STATES DEPARTMENT OF THE INTERIOR

GEOLOGICAL SURVEY

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Washington 25, D. C.

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Mr. James E. Reeves
Assistant Manager for Test Operations
Albuquerque Operations Office
U. S. Atomic Energy Commission
P. O. Box 5400
Albuquerque, New Mexico

Dear Mr. Reeves:

Transmitted herewith are ten copies of TEI-792, "Lithologic logs of three exploration core holes, U15b area, Climax stock, Nevada Test Site, Nye County, Nevada," by F. N. Houser, August 1961.

We plan to release this report to the public in the open files.

Sincerely yours,

Edwin B. Eckel, for

V. E. McKelvey
Assistant Chief Geologist
Interagency Programs and
Supporting Activities

Errata sheet

TEI-792, "Lithologic logs of three exploration core holes, U15b area, Climax stock, Nevada Test Site, Nye County, Nevada

Page 6: Line 17 - 0.5 should read 5.0.

Line 19 - 2 should read 20.

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GEOLOGICAL SURVEY

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By

F. N. Houser

August 1961

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This report is preliminary and has not been edited for conformity with Geological Survey format.

*Prepared on behalf of the U. S. Atomic Energy Commission.

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LITHOLOGIC LOGS OF THREE EXPLORATION CORE HOLES, U15b AREA, CLIMAX STOCK, NEVADA TEST SITE, NYE COUNTY, NEVADA

By F. N. Houser

ABSTRACT

Three core holes were drilled in the Climax stock to determine the nature of the igneous rock to depths of 1,800 feet. Granodiorite was penetrated throughout all three holes except locally where inclusions and probable inclusions of quartz diorite as much as 34 feet thick were encountered. Textural variations of the granodiorite in the lower part of one hole suggest a possible nearby intrusive contact. Fractures are common in all holes and range from a hairline to tens of feet in width; their frequency decreases with depth.

Page 1 follows

INTRODUCTION

From mid-December 1960 to mid-March 1961, the three core holes GZ exploration, Exploration 1, and Exploration 2 were drilled in the Climax stock, in the north-central part of the Nevada Test Site (fig. 1) to determine the nature of the igneous rock to depths of 1,800 feet. The holes are 1,300 to 2,300 feet northeast and east-northeast of the U15a site; Nevada State coordinates are:

Hole	North	East
GZ exploration	903,065	677,436
Exploration 1	903,879	678,046
Exploration 2	902,570	678,355

Core recovery for the three holes is given in table 1.

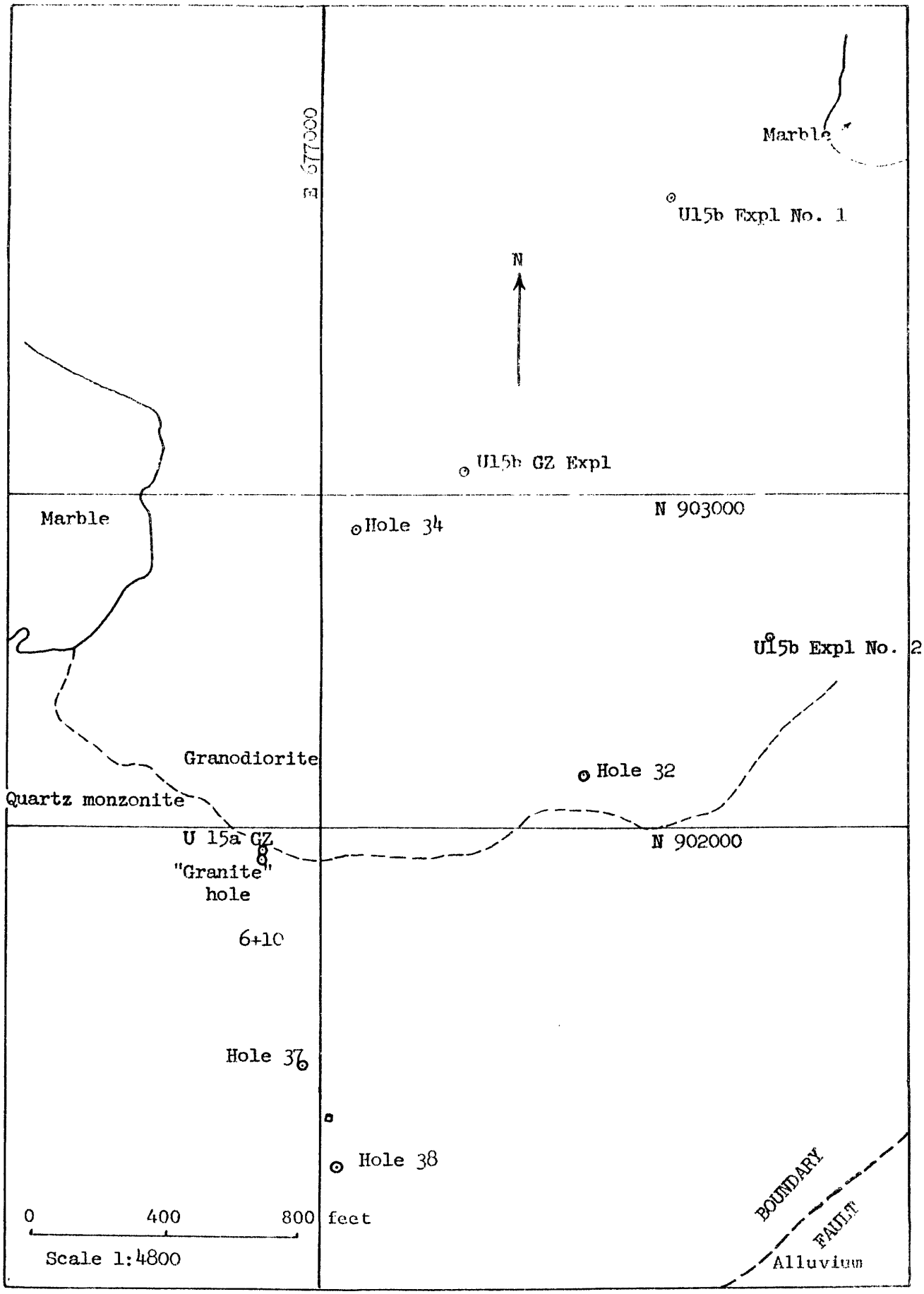

Figure 1.-- Index map for U15b exploration core holes
Climax stock, Nye County, Nevada

Table 1.--Core recovery, U15b exploration holes, Nevada Test Site, Nye County, Nevada

Interval (feet)	Percent recovery		
	GZ hole	Exploration hole 1	Exploration hole 2
40-100	84	73	72
100-150	89	74	76
150-200	70	93	77
200-250	94	100	92
250-300	85	98	80
300-350	94	87	85
350-400	97	82	91
400-450	85	77	94
450-500	95	99	96
500-550	90	87	91
550-600	82	84	89
600-650	59	100	87
650-700	74	97	100
700-750	97	76	97
750-800	100	91	99
800-850	94	87	85
850-900	87	65	100
900-950	97	60	100
950-1000	86	61	100
1000-1050	98	90	95
1050-1100	100	88	97
1100-1150	75	96	95
1150-1200	84	61	77
1200-1250	86	94	81
1250-1300	55	89	78
1300-1350	65	95	92
1350-1400	76	90	61
1400-1450	48	91	87
1450-1500	28	95	88
1500-1550	19	89	73
1550-1600	46	91	87
1600-1650	80	85	82
1650-1700	95	95	95
1700-1750	92	93	68
1750-1800	71	88	96

GENERAL GEOLOGY

The three core holes are in granodiorite that forms the northern part of the Climax composite stock (Houser and Poole, 1960). The granodiorite is light gray to greenish medium gray, equigranular, and predominantly medium grained. Its average composition, based on 19 modal analyses, is 28 percent quartz, 16 percent potassium feldspar, 45 percent plagioclase, and 9 percent biotite (Houser and Poole, in press).

Two fine-grained igneous rocks having approximate average mineralogic compositions of quartz diorite and granodiorite were penetrated by the drill holes. They make up less than 2 percent of the rock, except locally. The quartz diorite occurs as inclusions and as probable inclusions within the granodiorite. The fine-grained granodiorite occurs mainly in very gradational to sharp contact with the medium-grained granodiorite. Neither of the fine-grained rocks has been studied in detail.

The granodiorite contains sparse pseudophenocrysts of plagioclase which occur mostly as rectangular masses, some with pyramidal structures on the ends, and measure generally ½ to 1½ inches across. Megascopically, the pseudophenocrysts appear to be discrete plagioclase phenocrysts containing sparse quartz and biotite. Microscopically, it is seen that they consist of a core and a rind. The core has a granitic texture and is composed of plagioclase, quartz, potassium feldspar, and biotite. The rind ranges from 2 to 5 millimeters in width and is composed of small plagioclase crystals with longitudinal axes oriented parallel to the sides of the

pseudophenocryst. This texture of the pseudophenocrysts is markedly different from that of the typical potassium feldspar phenocryst found in the quartz monzonite that makes up the southern part of the stock.

The presence of pseudophenocrysts in the fine-grained quartz diorite inclusions suggests a genetic relationship to the main granodiorite mass. The ½-inch pseudophenocryst noted in the quartz diorite at a depth of 444 feet in the GZ hole within 2 inches of the contact with the granodiorite has the same mineralogic and textural features as those in the granodiorite. The size of the pseudophenocryst suggests further that its formation is not as advanced as those in the main granodiorite mass.

The width, frequency, and tightness of the youngest fractures in the granodiorite are of special interest because they strongly determine the structural anisotrophism of the rock. In the U12b drill holes, these fractures consist of both joints and faults. The prominent joints, fracture zones, and faults are noted in the lithologic logs of the core and have been divided into two groups, those that dip less than 45° and those that dip more than 45°. The low-angle (<45°) joints were formed mostly along older fractures that had been healed by quartz, pyrite, and secondary feldspar. The high-angle (>45°) fractures are not healed as the low-angle fractures, although many are closed by secondary calcite and clay minerals.

Most of the high-angle joints range from a hairline to 3 mm in width. They are generally lined and(or) filled with white secondary calcite and clay. Much of the badly broken core has resulted from weakness in the rock at intersections of two high-angle joints of

approximate normal orientation. These joints probably do not detract from the structural isotrophism of the rock as much as the broken core might suggest.

The high-angle faults and fracture zones range in width from a hairline to tens of feet. The large fault zone at the 1,500-foot level in the GZ hole probably dips an average 70° and is about 30 feet wide. Most of the youngest high-angle faults are thought to occur in high-angle zones of saussuritized granodiorite. Green-clay gouge showing slickensides is common in the faults.

The frequency of fractures measured in the core decreases with depth. The decrease seems to be greater for the low-angle than for the high-angle fractures. Also, the ratio of faults and probable faults to prominent joints or fracture zones appears to decrease from 2:3 in the interval of 200 to 600 feet to about 1:2 in the interval from 1,200 to 1,800 feet. In 3,000 feet of core from the U15b drilling, only about 150 distinct high-angle fracture zones or faults were recorded--an average of 0.5 for each 100 feet of core, or corrected for the angle of interception (about 15°) between the hole and fractures, an average of 2 per 100 feet. This compares with the six high-angle fracture zones and faults per 100 feet (perpendicular to the respective fracture sets) in the 1500 tunnel at a depth of about 800 feet. The ratio of 1:2 between faults and fracture zones in the tunnel is the same as that observed at depth in the three drill holes.

Most of the granodiorite in the U15b area is relatively unaltered, but selected minerals and large masses of the rock have been altered to chlorite, clay minerals, saussurite, feldspar, and sericite.

Quartz-pyrite veins (with rare molybdenite and probably copper and zinc sulfide minerals) fill fractures formed after most of the alteration was complete. Chlorite and clay minerals were formed in biotite and plagioclase, respectively. Saussurite is common in plagioclase and along the early high-angle fractures, which have been subsequently rejuvenated, particularly as faults. Feldspar is most abundant along the low-angle northeast-dipping joints. Results of preliminary mineralogic studies indicate that alteration of masses of rock to chlorite, feldspar, and sericite (sparse) along the prominent northwest-trending set of low-angle northeast-dipping joints was preceded by saussuritization of the granodiorite along the high-angle fractures. Only the prominent zones of alteration are noted in the lithologic logs.

SUMMARY

As a result of study of the core from the three holes, certain generalities were noted for the distribution of 1) granular differences in the granodiorite, 2) inclusions, 3) pseudophenocrysts, 4) dikes, and 5) secondary feldspar and chlorite alteration.

The granodiorite is medium grained throughout all the core with one exception. In the GZ hole the granodiorite is fine to medium grained in the bottom 50 feet. In the Exploration hole 1, it is fine to medium grained and fine grained for short intervals at approximately 600, 800, 1,060, 1,100, 1,375, 1,460, and 1,500 feet. From 1,685 to 1,800 feet there is much intermixing and interfingering of the fine- and medium-grained granodiorite. In the Exploration hole 2, the rock is medium grained throughout.

Inclusions and probable inclusions are most numerous throughout Exploration hole 2, the lower 700 feet of Exploration hole 1, and in the upper 500 feet of the GZ hole; they are largest between 438 and 518 feet in the GZ hole where one was penetrated for 34 feet.

Pseudophenocrysts are most common in the upper 500 feet of the GZ hole, and in the 650- to 1,200-foot interval of the Exploration hole 2. Elsewhere they are sparsely distributed.

Granitic dikes are relatively sparse, being recorded in the GZ hole at 260 and 1,745 feet, in the Exploration hole 1 from 1,200 to 1,800 feet, and in the Exploration hole 2 at 1,650 feet. The only pegmatite observed is at 1,665 feet in the Exploration hole 1, where it is about 1.5 feet thick.

The predominant form of alteration--zones of secondary feldspar and chlorite--seem to be most common in the GZ hole and Exploration hole 1.

Much petrographic work remains to be done before the petrologic significance of these and other variations can be clearly understood. The intermixed and interfingered fine- and medium-grained granodiorite, however, in the lower 115 feet of the Exploration hole 1 is similar to the interfingered fine- and medium-grained varieties of the quartz monzonite stock to the south where that stock is in intrusive contact with older rocks. This suggests that the bottom of Exploration hole 1 may be near an intrusive contact of the granodiorite. The greater abundance of aplite dikes in the lower part of the same hole than elsewhere in the core holes is also possibly indicative of a nearby contact, as such dikes are observed on the surface most commonly near contacts, particularly next to the marble country rock.

Lithologic log for the GZ exploration hole

Interval (feet)	Description All angles given are dips (measured from the horizontal) unless noted. All linear measurements refer to width unless noted.
0-25	No core.
25-104	Granodiorite, light-gray, streaked and banded with yellow limonite stain particularly along fractures; medium grained; consists of plagioclase that is intensely argillized, quartz, some as phenocrysts as much as one-half inch across, potassium feldspar, perhaps argillized, and sericitized, and biotite that is slightly to moderately chloritized; pyrite, which occurs in amounts of less than 1 percent, is almost completely weathered to limonite above 38 feet, but is at least partly fresh below that depth; rock is highly weathered to 104 although below 40 feet the rock between fractures is progressively less weathered; abundant fractures dip generally 15° to 40° and 70° to 85°, prominent high-angle clay-lined fracture zones are at 85 to 90 and 97 to 100 feet.
104-206	Granodiorite, light-gray, medium-grained; consists of argillized plagioclase, fresh quartz, potassium feldspar, relatively fresh biotite; fresh pyrite less than 1 percent, traces of molybdenite and galena; most sulfides occur in thin veins occupying low-angle joints but pyrite also is disseminated

Lithologic log for the GZ exploration hole--Continued

Interval (feet)	Description
104-206 (contd.)	interstitially around grains in unfractured rock secondarily altered with chlorite and feldspar (probably not exclusively potassium feldspar) along most low-angle and few high-angle ($\pm 50^{\circ}$) joints; sparse small hornblendic and biotitic inclusions (1/2 to 1 inch); generally equilateral pseudo-phenocrysts of feldspar with much included biotite.
104-161	Thin zones of secondary feldspar border, and quartz veins occupy, low-angle fractures and some high-angle (50°) with pyrite; pyrite also disseminated interstitially around grains in unfractured rock; biotite chloritized parallel to each quartz vein, some quartz veins have little or no border of secondary feldspar; elsewhere quartz veins cut secondary feldspar and may occur in center of zone or on either side transecting secondary feldspar; pyrite may occur in center of quartz vein or at its edge; sparse small fine-grained biotite- and hornblende-rich inclusions 1/2 to 1 inch across; square pseudo-phenocrysts of plagioclase and secondary(?) potassium feldspar with much incorporated biotite.
139-141	Secondary chlorite-feldspar zones, 1/2 to 1 inch thick, border joints (dip 20°) and are cut by quartz-feldspar zones (dip 40°) with medial quartz-

Lithologic log for the GZ exploration hole--Continued

Interval (feet)	Description
104-206 (contd.)	pyrite vein and with very thin bordering chlorite zones. Both zones and vein are cut by joints (dip 60°-80°) which are unlined by hydrothermal sulfide minerals.
153	Secondary feldspar-sericite zone, 1 inch thick, with thin or absent chlorite border zone and with medial 1/8 inch-thick pyrite vein with only traces of quartz. Secondary feldspar of this zone appears to have engulfed chlorite zone in places and to have passed beyond it in others. Sericite of zone was converted from chlorite and(or) biotite of original granodiorite host without addition of large amounts megascopic sericite in other minerals.
	Secondary chlorite-feldspar zone (15° dip) is cut by pyrite vein (50° dip) without border zones of secondary chlorite, feldspar nor quartz; both are cut by unmineralized fracture dipping 80°.
160	Secondary feldspar zone, thin, 60° dip, with medial 1/8 to 1/4 inch-thick quartz-pyrite vein.
161-174	Fault zone, badly broken granodiorite with much green-gray talclike clay, plagioclase saussuritized(?) in places, pyrite fresh, biotite extensively or completely altered probably to chlorite; dip about 80°. (Samples from 163, 165, and 170.)

Lithologic log for the GZ exploration hole--Continued

Interval (feet)	Description
104-206 (contd.)	174-195 Probable continuation of 161-174 fault zone, plagioclase saussuritized(?) in irregular areas, slickensides indicate large horizontal component of movement, biotite altered to chlorite and considerably stretched and smeared; dip about 80°.
	195-206 Secondary feldspar zone, 1 to 3 inches thick with medial 1/8 to 3/8 inch-thick quartz-pyrite vein; pyrite is confined largely to quartz vein where it occurs in center or at edge.
	200 Fine-grained biotite-rich inclusion, 1.5 inches across.
206-210	Quartz diorite, medium-gray, fine-grained; consists of plagioclase, some of which is small and euhedral, quartz, abundant chloritized fine biotite, common hornblende, sparse sphene; upper contact (206) with granodiorite is represented by clay and rock fragments in core, lower contact (210) ranges from sharp (measurable in tenths of a millimeter and millimeters) to gradational (measurable in centimeters); pyrite-quartz veins occupy joints (dip 35° to 45°) and are bordered by traces of secondary feldspar in places and irregular chloritized biotite zones that range from 0 to 1 inch wide. (Samples from 206 and 209.)

Lithologic log for the GZ exploration hole--Continued

Interval (feet)	Description
206-210 (contd.)	About 209 In general, the feldspar of secondary chlorite-feldspar zones is less abundant compared to similar zones in granodiorite and the chloritized biotite is more abundant.
210-438	Granodiorite, like that of 104-206.
	220 (Sample of granodiorite.)
	226 Pyrite abundant on joint (dip 85°).
	233 Quartz-pyrite vein (50° dip) is offset 1/8 inch along 45° fault now containing pyrite vein, 1/16 inch thick. Low-angle secondary chlorite-feldspar zone with medial quartz-pyrite vein is offset up to 1/2 inch. Three quartz-pyrite veins, 1/2 to 3/4 inch thick, dip 5°, 20°, and 50°; pyrite is sparse in 5° vein, all three are bordered by much secondary chlorite and sparse secondary feldspar.
	234 (Sample.)
	234-235 High-angle quartz-feldspar dike, 1/4 to 1 inch thick, dips as low as 65° both ways from vertical, contacts sharp (measurable in millimeters); contains little biotite (now chlorite or sericite); cut by secondary feldspar-chlorite zones, which develop more secondary feldspars where crossing; cut also by pyrite veins. Secondary chlorite-feldspar

Lithologic log for the GZ exploration hole--Continued

Interval (feet)	Description
210-438 (contd.)	zone and the quartz-feldspar dike are cut by a nonmineralized fracture which dips 87°.
	234-235 Pyrite vein, 1/16 inch thick, widens by replacement to 1/8 inch where it cuts 2-1/2 inch hornblendic quartz(?) diorite inclusion. Secondary chlorite zone also cuts same inclusion.
	236 Secondary chlorite-feldspar zone with medial quartz-adularia vein. Adularia of vein is euhedral to subhedral, lines walls, and extends 1/4 across vein, pyrite absent. Both zone and vein are cut by pyrite vein (40° dip) that is not bordered by secondary chlorite-feldspar zone and contains no pyrite where cutting quartz-adularia vein. Secondary chlorite zone without either a secondary feldspar border zone nor a medial quartz-adularia vein is also cut by same 40° pyrite vein.
	239 Pinkish-tan secondary feldspar in the form of a squarish mass, 3/4 inch across, is surrounded by chlorite zone, 1/8 inch thick.
	243 Secondary chlorite-feldspar zone, 3/8 inch thick, cut by pyrite veins, 1/32 inch thick.
	244 Secondary chlorite zone without secondary feldspar has medial quartz-adularia vein.

Lithologic log for the GZ exploration hole--Continued

Interval (feet)	Description
210-438 (contd.)	247-267 Fault zone, dip about 70°, with dark green-gray talclike clay-lined joints 1 to 8 inches apart, biotite smeared, slickensides at 259 indicate vertical, normal movement, whereas at 265 they indicate movement with pitch of 10° (angle measured from horizontal in plane of slickensided surface). 276-278 Fault zone, high-angle, similar to 247-267. 282-285 Fault zone, dip about 70°, slickensides indicate normal movement with pitch of 40°. 289 Secondary chlorite-feldspar zone, 1/2 to 3/4 inch thick, with medial straight-sided quartz-pyrite vein, 1/8 to 1/4 inch thick. Another secondary chlorite-feldspar zone, 3/4 to 1-1/2 inch thick, is without medial quartz-pyrite vein suggesting that the quartz-pyrite could have been formed later than secondary chlorite-feldspar zones which need not contain quartz-pyrite veins. Pseudophenocryst, about 3/4 inch across, cut by secondary chlorite-feldspar zone which appears to have little megascopic effect on the pseudophenocryst; zone is thicker in vicinity of pseudophenocryst. 301 (Sample of granodiorite.)

Lithologic log for the GZ exploration hole--Continued

Interval (feet)	Description
210-438 (contd.)	305 Thin secondary chlorite-feldspar zone cut by quartz-pyrite, 1/8 inch thick, with black fairly soft mineral and abundant epidote; although quartz of vein is absent where epidote is concentrated, the epidote appears to have replaced secondary feldspar and biotite some which may not have been previously chloritized.
	311-317 Fault, dips about 70° to 80°, slickensides in green-gray talclike clay.
	313 (Sample of granodiorite.) Mode: 32 percent quartz, 15 percent potassium feldspar, 38 percent plagioclase, 13 percent biotite and 2 percent minor constituents. Chemical analysis (rapid method, weight percent): SiO_2, 67.8; Al_2O_3, 16.1; Fe_2O_3, 1.9; FeO, 1.6; MgO, 0.86; CaO, 3.7; Na_2O, 3.0; K_2O, 3.0; H_2O, 1.3; TiO_2, 0.40; P_2O_5, 0.20; MnO, 0.04; CO_2, 0.05.
	315 Fine-grained biotite-rich inclusion, 1 inch across.
	317 Fine-grained biotite-rich inclusion, 1 inch across.
	334 Fine-grained biotite-rich inclusion, ovoid, 3 inches by 5 inches; cut by (a) secondary weak chlorite and intense feldspar zone, 1/2 inch thick, with medial quartz-pyrite vein, 1/4 inch thick, and by (b) quartz-pyrite vein, 1/16 inch thick (sample). The thickness of secondary feldspar zone (a) decreases to 1/16 inch

Lithologic log for the GZ exploration hole--Continued

Interval (feet)	Description
210-438 (contd.)	or is absent in inclusion. The vein of (b) is bordered by a secondary chlorite zone up to 1 inch thick in the inclusion. The pyrite of the veins increases from about 10 percent where they are in granodiorite to about 60 percent for vein (a) and about 90 percent for vein (b) where they are in the inclusion.
	335 Very pink secondary chlorite-feldspar zone, 1.5 inch thick, with medial quartz-pyrite vein, about 1/4 inch thick, that contains trace epidote and common blue-gray clay in quartz-pyrite vein (sample).
	348 Secondary chlorite-feldspar zone, 1/4 to 1/2 inch thick, with medial quartz-pyrite vein, 1/2 inch thick (sample).
	Several fine-grained biotite-rich inclusions.
	350 Secondary chlorite-feldspar zone (20° dip) cut by pyrite-molybdenite vein, 1/16 inch thick, 30° dip.
	353 (Sample of granodiorite.)
	355 Several pseudophenocrysts, white, squarish, 1/4 inch across.
	380 and 381. Fine-grained biotite-rich inclusions, 1 inch across, gradational to sharp contacts with granodiorite.
	381 Secondary chlorite-feldspar zone (20° dip) cut by pyrite vein (50° dip).

Lithologic log for the GZ exploration hole--Contineued

Interval (feet)	Description
210-438 (contd.)	406 Trace chalcopyrite(?) in pyrite vein (10° dip). 414 Quartz-pyrite vein, 1/2 inch thick (50° dip) with common molybdenite located in interior of vein, commonly next to pyrite. 425-433 Fracture zone, dips 60° to 85°.
438-472	Quartz(?) diorite, medium-gray, fine-grained; appeats to have same general composition as quartz diorite at 206 to 210; sharp to gradation upper contact with granodiorite at 438 dips 60°, lower contact at 472 is moderately sharp and dips 75° (sample from 438). 438 Secondary chlorite-feldspar zone with thin medial pyrite vein cuts both granodiorite and quartz(?) diorite, secondary feldspar of zone is thinner in quartz(?) diorite but chlorite of zone is same thickness. 439 Secondary chlorite-feldspar zone, most pink secondary potassium feldspar has replaced original plagioclase crystals only. 444 Contact of quartz diorite with medium-grained granodiorite is exposed for 8 inches along core, sharp to gradational. Secondary chlorite-feldspar zone cuts both rocks; decrease in amount of secondary potassium(?) feldspar of zone where in quartz(?) diorite appears due to

Lithologic log for the GZ exploration hole--Continued

Interval (feet)	Description
438-472 (contd.)	smaller amount of replaceable plagioclase. Pseudophenocryst, 1/2 inch across, in quartz diorite within 2 inches of contact with medium-grained granodiorite (sample).
	451.5-454 Fault, dip probably 70° to 80°, slickensides in green-gray clay indicate movement with 20° pitch; biotite streaked.
	455 (Samples of quartz diorite.) Preliminary mode: 26 percent quartz, 10 percent potassium feldspar, 47 percent plagioclase, 15 percent biotite, and 2 percent minor constituents. Chemical analysis (rapid method, weight percent): SiO_2, 64.9; Al_2O_3, 16.2; Fe_2O_3, 2.1; FeO, 2.4; MgO, 1.4; CaO, 4.2; Na_2O, 2.5; K_2O, 2.8; H_2O, 1.8; TiO_2, 0.67; P_2O_5, 0.23; MnO, 0.06; CO_2, 0.17.
	458 Fault, dip about 60°, slickensides indicate normal movement.
	459 (Sample of quartz diorite.)
	470 (Sample of quartz diorite.)
472-484	Granodiorite, like that of 104-206.
	474 (Sample of granodiorite.) Preliminary mode: 31 percent quartz, 17 percent potassium feldspar, 42 percent plagioclase, 8 percent biotite, and 2 percent minor constituents.

Lithologic log for the GZ exploration hole--Continued

Interval (feet)	Description
472-484 (contd.)	481-484 Fault zone, slickensides on green-gray clay, core is badly broken perhaps along $\pm 45^{\circ}$ dipping fractures, 6-inch piece of quartz(?) diorite in moderately sharp contact with granodiorite.
484-487	Quartz diorite like that of 206-210 and 438-472; top contact dips 60°, bottom contact dips 70°, both contacts are moderately sharp.
487-516	Granodiorite, like that of 104-206. 497-499 Fracture zone, dips 70°(?), lined with white clay. 502-505 Fracture zone like 497-499, core broken dips 80°. 506-507 Fracture zone like 497-499, dips 80°. 515.5 Secondary chlorite-feldspar zone, 1 inch thick in granodiorite, but zone contains less feldspar and more chlorite where in quartz diorite.
516-517.5	Quartz diorite, like previous rock 206-210, 438-472, and 484-487; top contact starts in core at 515, dips 80° but is irregular so that at 516 quartz diorite makes up entire core; grades to granodiorite at about 517.5.
517.5-535	Granodiorite, medium greenish-gray, medium-gray (sample from 517). 521 Secondary feldspar zone, may be 4 to 6 inches thick (incomplete core recovery), 65° dip.

Lithologic log for the GZ exploration hole--Continued

Interval (feet)	Description
517.5-535 (contd.)	525 Fracture, dips about 60°.
	527 Secondary feldspar (perhaps sodic plagioclase) zone, (80°) cut by at least two secondary chlorite-feldspar zones of low-angle dip and one thin pyrite vein; where low-angle zones cut 80° zone little chlorite is formed as the original biotite of the rock had previously been chloritized and sericitized in the 80° zone; low-angle zones include probable potassium feldspar. Low-angle secondary chlorite-feldspar zones and pyrite vein are cut by calcite vein (80° to 90° dip) 1/16 to 1/4 inch thick, that is paralleled by faults showing offsets of about 1/4 inch.
	528 Fracture, dip unknown.
535-1800	Granodiorite, medium-gray, medium-grained.
	536-538.5 Fracture zone, clay-lined, dip 80° to 85°.
	540 (Sample of granodiorite.)
	562 Secondary chlorite-feldspar zone, 1 inch thick, are cut by pyrite-quartz vein, 70° dip; thin medial quartz vein in the chlorite-feldspar zone may cut 70° pyrite-quartz vein.
	570-574 Fracture zone, clay-lined, dip about 50° to 60°.

Lithologic log for the GZ exploration hole--Continued

Interval (feet)	Description
535-1800 (contd.)	587 Secondary chlorite-feldspar zone, 3/4 to 1 inch thick, with medial 1/8 inch thick quartz-pyrite vein.
	591-593 Fault zone, dip about 75° to 80°, small slickensides in abundant white calcareous clay.
	594 Secondary chlorite-feldspar zone, 3/4 inch thick, cut by 1/16 inch thick quartz-pyrite vein.
	596 Fine-grained biotite-rich inclusions 1/2 inch across.
	602 Secondary chlorite-feldspar zone, 1/2 to 3/4 inch thick, with medial quartz-pyrite vein, 1/4 inch thick; may cut pyrite vein (70° dip).
	606 Fracture, dip 75°, lined with calcareous clay.
	613 Pyrite vein (5° dip) cut by quartz-pyrite vein (70° dip); both are without chlorite-feldspar border zones.
	614 (Sample of granodiorite.) Preliminary mode: 26 percent quartz, 11 percent potassium feldspar, 49 percent plagioclase, 13 percent biotite, and 1 percent minor constituents.
	634 Fracture, dip 80°, lined with calcareous clay.
	658 Secondary chlorite-feldspar zone (50° dip) with medial quartz-pyrite vein is cut and offset 1/8 inch by fracture (25° dip) now occupied by pyrite vein.
	675-683 Fracture zone, dip about 80° to 85°, core broken.

Lithologic log for the GZ exploration hole--Continued

Interval (feet)	Description
535-1800 (contd.)	685 Pseudophenocryst and fine-grained biotite-rich inclusion (sample). 687 Fine-grained biotite-rich inclusion (sample). 690 Secondary chlorite-feldspar (60° dip) with medial quartz-pyrite is cut by quartz-pyrite vein (25° dip). Secondary chlorite-feldspar zone (20° dip) is cut by quartz-pyrite vein (35° dip). 736 Two secondary chlorite-feldspar zones (15° dip) with medial quartz-pyrite veins cut by quartz-pyrite vein (60° dip) 1/2 inch thick. Stringer, probably stilbite with medial quartz-pyrite (20° dip). 746-830 Biotite shows marked planar orientation that dips 65°. 752 Secondary chlorite-feldspar zone (60° dip) with medial quartz-pyrite vein, 1/8-inch thick, is cut and offset 1/8 inch by fracture now occupied by quartz-pyrite vein (15° dip) with chlorite-feldspar border zone. 755 Secondary chlorite-feldspar zone (15° dip) is cut by chlorite-feldspar zone (50° dip) with medial 1/8-inch thick quartz-pyrite vein.

Lithologic log for the GZ exploration hole--Continued

Interval (feet)	Description
535-1800 (contd.)	759 Quartz-pyrite vein (10° dip) cut by quartz-pyrite vein (55° dip).
	760 Planar orientation of biotite dips 60°.
	769-777 Fracture zone, dip 85° to 90°, lined with calcareous clay.
	777 Planar orientation of biotite dips 60°.
	795 Planar orientation of biotite dips 70°.
	818 Secondary chlorite-feldspar zone (70° dip) cut by medial quartz-pyrite vein of chlorite-feldspar zone (20° dip).
	Planar orientation of biotite is vertical.
	838 Secondary chlorite-feldspar zone (20° dip) with medial quartz-pyrite vein, cut by quartz-pyrite vein (50° dip) 1/4 inch thick.
	860-863 Fracture zone, intersection of two fractures dipping 70° and 85°, lined with calcareous clay.
	875 Planar orientation of biotite dips 75°.
	880 Planar orientation of biotite dips 80°.
	908-910 Fracture zone dips 65°, lined with calcareous clay; cuts stilbite(?) (65° dip) and calcite vein.
	918 Planar orientation of biotite dips 80° to 90°.
	946 Secondary chlorite-feldspar zone (20° dip) with medial quartz-pyrite vein is cut by stilbite(?) vein (50° dip) with medial 1/16-inch thick calcite vein.

Lithologic log for the GZ exploration hole--Continued

Interval (feet)	Description
535-1800 (contd.)	956-958 Fracture zone dips 80°, lined with calcareous clay. 981 Planar orientation of biotite dips 75°. 1011 Fine-grained biotite-rich inclusion (sample). 1013 Planar orientation of biotite dips 80°. 1019 Several chlorite-feldspar zones (25° dip) and one quartz-pyrite vein (25° dip) cut by pyrite vein (60° dip). 1055 Secondary chlorite-feldspar zone (15° dip) with very thin medial quartz-pyrite vein is cut by quartz-pyrite vein (65° dip) 1/4 inch thick. 1060 Fine-grained biotite-rich inclusion, 0.4-foot thick is cut by chlorite-feldspar zone (25° dip) with medial quartz-pyrite; chlorite-feldspar zone is 0.06 foot thick in granodiorite and an average of 0.2 foot thick in inclusion (widening of ≤4x) (sample). 1074 Fine-grained biotite-rich inclusion, 2 inches thick. 1085 Secondary chlorite-feldspar zone (30° dip) with medial quartz-pyrite vein is cut by orange stilbite vein (70° dip) with medial quartz-pyrite vein (sample). 1087-1090 Fracture zone, dip 80°. 1096 Fracture zone, dip 75°. 1092 Planar orientation of biotite dips 80°. 1098 Secondary chlorite zone (50° dip) 2 inches thick (sample). 1098.5 Same as above.

Lithologic log for the GZ exploration hole--Continued

Interval (feet)	Description
535-1800 (contd.)	1114-1119 Fracture zone, dip 70°, lined with sparse calcite.
	1122.5-1127. Fracture zone, dip 65° to 80°, in highly saussuritized(?) granodiorite zone that strikes and dips same.
	1134-1164. Fracture zone, dip 70°(?) to 85°.
	1150 Planar orientation of biotite dips 70°.
	1177-1181. Fracture zone, dip 80°, lined with calcareous clay.
	1183-1185 Fracture zone, dip 80°.
	1187-1192 Fracture zone, dip 65° to 75°.
	1196-1206 Fracture zone, dip 70° to 85°, lined with calcareous clay.
	1207-1209 Fracture zone intersection of 65° and 90° dipping fractures; 90° fracture lined with calcareous clay, 65° fracture is not.
	1225-1226 Fracture zone, dip 70° to 80°(?).
	1260 Pseudophenocryst surrounded by biotite (sample).
	1262-1275 Probable fault zone, dip 70° to 80°, lined with green clay.
	1290-1295 Fracture zone, dip 85°, in parallel saussuritized granodiorite zone.
	1291. Secondary feldspar zone cuts saussuritized zone (sample).

Lithologic log for the GZ exploration hole--Continued

Interval (feet)	Description
535-1800 (contd.)	1320 Secondarily saussuritized zone (70° dip) thought to be cut by chlorite-feldspar zone (40° dip) with medial quartz-pyrite vein; secondary feldspar shows poorer development where cutting saussuritized zone (sample).
	1325-1335 Probable fracture or fault zone; 80 percent core missing; much of the 2 feet of core recovered is saussuritized granodiorite.
	1345 Secondarily saussuritized zone (70° dip) thought to be cut by two secondary chlorite-feldspar zones (30° dip) (sample).
	1350 Secondary chlorite-feldspar zone (85° dip) 1/2 inch thick, cut by quartz-pyrite vein (65° dip) and by chlorite-feldspar zone (10° dip) with medial quartz-pyrite vein.
	1358 Fine-grained biotite-rich inclusion 3 inches thick (sample).
	1400-1590 Resistivity curve show pronounced fracture zone in this interval.
	1410-1413 Fracture zone, dip probably 80°.
	1413 Planar orientation of biotite dips 90°.
	1416-1430 Fracture zone, dip 70° to 90°.

Lithologic log for the GZ exploration hole--Continued

Interval (feet)	Description
535-1800 (contd.)	1430-1432 Fracture zone, dip 75°; lined with calcareous clay; occupies 1-inch thick saussuritized zone.
	1433 Planar orientation of biotite is vertical.
	1439-1441 Fracture zone, dip 80° to 90°.
	1441-1444. When core oriented by means of N. 32° W., 22° NE. joint set, the high-angle calcite-filled fracture occupying, and parallel to, the saussuritized zone would strike about N. 30° E. and dip 80° NW.; approximately same strike noted at 1480 and 1487 but fractures dip southeast.
	1442 Planar orientation of biotite is vertical.
	1442-1466 Secondarily saussuritized zone (80° dip) probably about 6 inches thick, cut by quartz-pyrite vein (60° dip) 1/2 inch thick, which strikes approximately 90° from saussuritized zone.
	1466 Fault, dip 85°, 50° pitch and intersects 70° dipping fracture.
	1445-1467 Fracture zone, dip 75° to 90°, granodiorite much saussuritized in a zone (85° dip) that is thought to be cut by chlorite-feldspar zone (35° dip) with very thin medial quartz vein.
	1470 With oriented core as in 1441-1444, fractures strike northwest and dip 80° SW.; fractures lined with calcareous clay but not in saussuritized granodiorite.

Lithologic log for the GZ exploration hole--Continued

Interval (feet)	Description
535-1800 (contd.)	1472-1479 Fracture zone, dip 80°.
	1497-1554 Fault zone, dip 85° to 90°, slickensides indicate pitch of 5°; core much broken, clayey sandy gouge, rock much saussuritized and has fine-grained appearing texture; slickensides at 1550 indicate 10° to 15° pitch and southeast side up(?) (samples of gouge from 1535 and 1554).
	Note: From 1413 to 1553 there is little suggestion that the fault zone contains the fracture intersections so common in fracture zones elsewhere in the U15b cores. Rather, most core shows one fracture direction of high-angle dip and with a northeast strike.
	1482-1496 Fracture zone, dip 80° to 85°(?).
	1576 Secondarily saussuritized granodiorite zone cut by orange feldspar zone (60° dip).
	1577 Fault, dip 80°, in saussuritized granodiorite.
	1580 Stilbite zone (65° dip) 0.15-foot thick, with medial 1/4-inch thick pyrite-quartz vein in saussuritized granodiorite zone is offset along fault now occupied by calcite vein(?) 1/4 inch thick. All are cut by fault lined with green clay. Calcite-filled fractures are distorted in rock (sample).

Lithologic log for the GZ exploration hole--Continued

Interval (feet)	Description
535-1800 (contd.)	1592 Secondary pinkish feldspar zone, 50°, 0.5 foot thick, with medial 1/16-inch thick quartz-pyrite vein, cut by calcite vein (70° dip) 1/16 to 1/8 inch thick; all are occupying saussuritized granodiorite (sample).
	1602 Secondary quartz-pyrite vein (80° dip) 1/4 inch thick, changes attitude and joins pyrite vein (60° dip) 1/32-inch thick; elsewhere the bordering chlorite-feldspar zone widens at a fracture dipping 30°.
	1615 Planar orientation of biotite dips 65°.
	1625-1629 Fault zone, dip 85° to 90°, slickensides pitch 5° in calcareous clay.
	1636 Fine-grained biotite-rich inclusion, 2 inches across (sample).
	1646 Planar orientation of biotite dips 85° to 90°.
	1650 Planar orientation of biotite dips 75°.
	1658 Quartz-feldspar dike, 80°, 3/4 inch thick, strikes same as chlorite-feldspar zone, 70°, 1/2 inch thick; both are cut by chlorite-feldspar zone (30° dip) 1/4 to 3/8 inch thick. Dike has straight, sharp to moderately sharp contacts. Where chlorite-feldspar zone cuts dike, secondary feldspar formed in dike but as no biotite is present, secondary chlorite did not form.

Lithologic log for the GZ exploration hole--Continued

Interval (feet)	Description
535-1800 (contd.)	1661-1667 Fracture zone, intersection of 85° dipping fracture lined with calcareous clay with 80° dipping fracture of 30° to 50° different strike. 1662 Planar orientation of biotite dips 60°. 1676 Two low-angle secondary chlorite-feldspar zones strike same direction but dip in opposite directions. 1687 Secondary chlorite-feldspar zone (25° dip) 1/2 inch thick, with medial 1/8-inch thick quartz-pyrite vein. 1691 Secondary chlorite-feldspar zone (45° dip) 1/4 inch thick, with medial 1/4-inch thick quartz-pyrite vein. 1704 Fracture occupies saussuritized zone (80° dip) 1 inch thick that appears to be cut by low-angle chlorite-feldspar zone. 1713 Secondary chlorite-feldspar zone (30° dip) 1 inch thick. 1715 Pyrite-quartz vein (60° dip) 1/32 inch thick. Several chlorite-feldspar zones (20° to 35° dip). Planar orientation of biotite dips 70°. 1716 Secondary chlorite-feldspar zone (60° dip) with medial quartz-pyrite vein, 1/16 inch thick. 1720 Fracture zone, dip 70°, lined with calcareous clay.

Lithologic log for the GZ exploration hole--Continued

Interval (feet)	Description
535-1800 (contd.)	1725 Secondary chlorite-feldspar zone (35° dip) 3 inches thick, with medial sericite zone, 1/2 to 1 inch thick.
	1734 Pseudophenocryst, 1 inch across.
	1744-1755 Granodiorite is fine to medium grained, change is very gradational.
	1745 Dark-gray aphanitic rock in layer, 3/4 inch thick, dips 45°, cut by quartz-feldspar dike (sample).
	1746 Planar orientation of biotite dips 60°. Fracture, dip 85°, lined with sparse calcareous clay.
	1748 Dark-gray aphanitic rock in layer (50° dip) 3/4 inch thick, cut by chlorite-feldspar zone (40° dip) which shows a three times reduction in width through dark-gray zone (sample).
	1749 Mass of secondary chlorite and feldspar, 5 inches thick.
	1752 Irregular zones of gray aphanitic rock in layers, 1/4 inch thick (sample).
	1753 Planar orientation of biotite dips 60°.
	1755 Planar orientation of biotite dips 70°. Fine-grained biotite-rich inclusion, 1 inch across.
	1757-1758 Fracture zone, intersection of two fractures dipping 75° and 85°.

Lithologic log for the GZ exploration hole--Continued

Interval (feet)	Description
535-1800 (contd.)	1759 Planar orientation of biotite dips 70°.
	1760 Planar orientation of biotite dips 50°.
	1771. Secondary chlorite-feldspar zone (10° dip) cut by chlorite-feldspar zone (70° dip) with medial quartz-pyrite vein, 1/16 inch thick.
	1773 Fracture, dip 30°. Planar orientation of biotite dips 30° to 35° and probably offers a planar weakness for the localization of the parallel fracture above.
	1776-1778 Fracture zone, intersection of two fractures dipping 70° and 80°.
	1776 Planar orientation of biotite 55° to 70°.
	1782 Fracture, dip 65°.
	1784 Planar orientation of biotite dips 65°.
	1789 Planar orientation of biotite dips 60°.
	1796 Planar orientation of biotite dips 55°.
	1798 Fracture, dip 85°.

Total depth (driller) of core hole -- 1800 feet

Lithologic log for the Exploration Hole 1

Interval (feet)	Description
0-40	No core.
40-69.5	Granodiorite, very light gray with abundant limonite stain particularly along fractures; consists of plagioclase, intensely argillized, becoming less so downward, fresh, clear quartz, potassium feldspar, bleached biotite, and probably 1 percent pyrite now altered mainly to limonite; core partly broken.
69.5-88.8	Granodiorite, like that of 40-69.5 except that plagioclase is less argillized, biotite is fresher, less limonite and most is confined to fractures.
88.8-200	Granodiorite, light-gray, fine- to medium-grained; fine- and medium-grained rock intermixed at 170, and at 193 where contacts are moderately sharp (measurable in 3 to 6 mm) and biotite, is much comminuted (sample of fine-grained granodiorite, 125 and of contact, 193); limonite stain along fractures to 104, from 104 limonite is sparse to absent; secondary chlorite-feldspar zones occur along many 50° to 70° fractures as well as along low-angle fractures. Preliminary mode of sample 125: 26 percent quartz, 4 percent potassium feldspar, 55 percent plagioclase, 12 percent biotite, and 3 percent minor constituents.

Lithologic log for the Exploration Hole 1--Continued

Interval (feet)	Description
88.8-200 (contd.)	160 Fault, slickensides pitch 40° on 70° plane.
	170 Intermixed fine- and medium-grained granodiorite.
	183 Quartz-pyrite vein, 1/32 inch thick (50° dip) cut by quartz-pyrite vein, 1/16 inch thick (15° dip) that is bordered by secondary chlorite-feldspar zone, 1/2 inch thick.
	186 Secondary feldspar zone (10° to 25° dip) cut by pyrite vein, 1/16 inch thick (60° dip).
	187 Secondary feldspar zone (40° dip) with medial quartz-pyrite vein, cut by quartz-pyrite vein, 1/4 inch thick (55° dip). Both are cut by: Fracture, 70°, coated with calcareous white clay.
	188 Secondary feldspar zone (10° dip) with medial pyrite vein is cut by pyrite vein (70° dip); the 10° medial pyrite vein may be cut.
200-760	Granodiorite, like that of 88.8-200 but mostly medium grained, except 591-602.5 where it is fine to medium grained; at 602.5 contact between fine- and medium-grained rock is very gradational.
	204 One-half inch pseudophenocrysts and 1/2-inch fine-grained biotite(?)-rich inclusion.
	223 Secondary chlorite-feldspar zone, 2 inches thick, with two approximately medial quartz-pyrite veins, 1/4 inch thick.

Lithologic log for the Exploration Hole 1--Continued

Interval (feet)	Description
200-760 (contd.)	223 Secondary chlorite-feldspar zone, 2 inches thick, with two approximately medial quartz-pyrite veins, 1/4 inch thick.
	226 Secondary chlorite-feldspar zone, 1 to 1-1/2 inches thick with medial quartz-pyrite vein.
	227 Secondary chlorite-feldspar zone, 1 inch thick with medial quartz-pyrite vein, 1/2 inch thick (sample).
	237 Secondary chlorite-feldspar (40° dip) with medial quartz-pyrite vein; offset 1/4 inch along fault (50° dip) now occupied by quartz-pyrite vein.
	243 Secondary chlorite-feldspar zone (15° dip) cut by quartz-pyrite vein, 1 inch thick (40° to 45° dip) with molybdenite at edges. Center of quartz-pyrite vein is occupied by later seam of pyrite.
	259 Secondary chlorite-feldspar zone (45° dip) with medial quartz-pyrite vein, 1/4 inch thick, both cut by nearly flat quartz-pyrite vein, 1/16 inch thick.
	275 (Sample of granodiorite.)
	280-281 Probably fracture zone, dip possibly 75°, lined with green-gray clay.
	286-288 Fracture zone, dip 80°.
	298 Fracture zone, dip 80°.
	301-305 Fracture zone, dip 85°.

Lithologic log for the Exploration Hole 1--Continued

Interval (feet)	Description
200-760 (contd.)	307-312 Fracture zone, dip 80° to 85°.
	316-321 Fracture zone, dip 70° to 80°.
	322 Irregular mass of secondary feldspar.
	323-325 Fracture zone, dip 80°.
	331-336 Secondary feldspar zone, 4 inches thick (75° dip).
	350 Secondary chlorite-feldspar zone (45° dip) with medial quartz-pyrite vein.
	377-380 Fracture zone, dip 70° to 75°, lined with green-gray clay.
	392-404 Fault zone, dip 70°, some breccia, lined with green-gray clay.
	473 Secondary feldspar zone (50° dip) with medial pyrite vein.
	484 Secondary feldspar zone (45° dip) with medial pyrite vein.
	491 (Sample of granodiorite.)
	493 Secondary feldspar zone (55° dip) with medial pyrite vein.
	499 Secondary feldspar (20° dip) cut by quartz-pyrite (dip 50°) that occupies secondary feldspar zone.
	555-561 Fault zone, dip 85° to 90°; slickensides indicate vertical movement.

(39 follows)

Lithologic log for the Exploration Hole 1--Continued

Interval (feet)	Description
200-760 (contd.)	562 Secondary feldspar zone (50° dip) with medial quartz-pyrite vein.
	564 Same as 562.
	584 Same as 562.
	589 Secondary chlorite-feldspar zone, 1 inch thick, (50° dip) with medial quartz-pyrite vein, 1/8 inch thick, is offset 1/4 inch by fault now occupied by 10° dipping medial quartz-pyrite vein, 1/8 inch thick, of very thin (1/4 inch) secondary chlorite-feldspar zone (sample).
	594 (Sample of fine- to medium-grained granodiorite.)
	604 (Sample of granodiorite.) Preliminary mode: 28 percent quartz, 13 percent potassium feldspar, 51 percent plagioclase, 7 percent biotite, and 1 percent minor constituents.
	609 Several weak secondary chlorite-feldspar zones and low-angle quartz veins are cut by 60° dipping quartz-pyrite vein, 1/4 inch thick.
	610 Proportion of fine-grained granodiorite gradually increases downward in amount from here but does not become predominant.
	616 Pseudophenocryst, 1-1/2 inch across (sample).

Lithologic log for the Exploration Hole 1--Continued

Interval (feet)	Description
200-760 (contd.)	619 Secondary chlorite-feldspar zone, 2 inches, (45° dip) with medial quartz-pyrite vein, 3/4 inch thick.
	623 Thin secondary chlorite-feldspar zone, (50° dip) 3/8 inch thick, with medial quartz-pyrite vein.
	633 Quartz-pyrite vein, 1/4 inch thick (40° dip).
	637 Thin secondary chlorite-feldspar zone (45° dip) with medial quartz-pyrite, 1/2 inch wide.
	655 Quartz-pyrite vein, 1/2 inch thick (70° dip) with molybdenite? (sample).
	665 Fine-grained biotite-rich inclusion, 1/2 inch across.
	709 Same, 1 inch wide.
	723 Secondary chlorite-feldspar zone, (50° dip) with medial quartz-pyrite, 1/8 inch wide.
	740 Quartz-pyrite vein, (50° dip) 1/2 inch thick.
	742 Pseudophenocryst, 1/2 inch across.
760-1665	Granodiorite like that of 88.8-200.
	762 Secondary chlorite-feldspar zone, 1 inch thick (50° dip), with medial quartz-pyrite vein, 1/4 to 3/8 inch thick.
	778 Quartz-pyrite vein, 1/4 to 3/8 inch thick (40° dip).

Lithologic log for the Exploration Hole 1--Continued

Interval (feet)	Description
760-1665 (contd.)	801 (Sample of fine- to medium-grained granodiorite.) Mode: 26 percent quartz, 16 percent potassium feldspar, 50 percent plagioclase, 7 percent biotite and 1 percent minor constituents.
	805 Secondary chlorite-feldspar zone, 1/2 inch thick (20° dip) with medial quartz-pyrite vein, 3/8 inch thick.
	807-809 Fracture zone, dips possibly 80° to 85°, lined with small amounts of calcareous white clay.
	810 Low-angle secondary chlorite-feldspar zones cut by quartz-pyrite vein, 1/16 to 1/8 inch thick (60° dip).
	824 Fracture, dip 80°, cuts stilbite(?) zone.
	834-843 Fracture zone, dip 80°, sparse calcareous clay.
	858-865 Fracture zone, dip 80° to 85°.
	881 Secondary chlorite-feldspar zone (20° dip) with very thin quartz-pyrite vein is offset along 75° fracture now occupied by 1/16- to 1/8-inch quartz-pyrite vein.
	890-901 Fracture zone, dip 70° to 80°, sparse calcareous clay.
	941-944 Fracture zone, dip 80° to 85°.
	956-962 Fracture zone, dip $\pm 80^{\circ}$.

Lithologic log for the Exploration Hole 1--Continued

Interval (feet)	Description
760-1665 (contd.)	964-978 Fault, dip 65°, pitch 65°; probably cuts 70° joint that occupies and is parallel to older saussuritized zone.
	1006 Pseudophenocryst, 1.5 inches across.
	1010 Planar orientation of biotite dips 85°.
	1025-1027 Fault, dip 65°, pitch 65°; lined with calcareous clay; intersects 50° joint.
	1036-1040 Fracture zone, dip 70°.
	1041-1047 Fracture zone, dip 80° to 90°.
	1055 Stilbite(?) zone, 1 inch wide (70° dip) with medial quartz-pyrite vein (sample).
	1055-1057 Granodiorite is fine to medium grained.
	1056 Secondary chlorite-feldspar zone, 1 inch wide (70° dip) with medial quartz-pyrite vein (sample).
	1066 Planar orientation of biotite dips 60°.
	1067-1071 Fracture zone in saussuritized granodiorite, dip 75°.
	1085 Quartz-pyrite vein, 1/2 inch thick (60° dip).
	1078-1079 Granodiorite is fine grained.
	1097 Planar orientation of biotite dips 65°.
	1101-1102 Granodiorite is fine grained.
	1101 Secondary chlorite-feldspar zone (20° dip) cut by chlorite-feldspar zone, 1/4 inch wide (70° dip) with medial quartz-pyrite vein.

Lithologic log for the Exploration Hole 1--Continued

Interval (feet)	Description
760-1665 (contd.)	1103 Planar orientation of biotite dips 70°.
	1104-1109 Granodiorite is fine grained.
	1115 Quartz-pyrite vein, 1/4 inch thick (60° dip).
	1122 Secondary chlorite-feldspar zone, (20° dip) offset along 55° fracture now occupied by 1/4-inch quartz-pyrite vein.
	1124 Planar orientation of biotite dips 65°.
	1129 Quartz-pyrite vein, 1/4 inch thick (50° dip).
	1131 Quartz-pyrite vein, 1/2 inch thick (75° dip).
	1134-1137 Fracture zone, dip 60° to 70° (intersection of two fractures.
	1138 Planar orientation of biotite strikes about north and dips west(?).
	1139 Planar orientation of biotite dips 55°.
	1143 Fine-grained biotite-rich inclusion, 4 inch across (sample).
	1144 Quartz-pyrite vein, 1/2 inch thick (70° dip).
	1155 Stilbite(?) zone (sample), 1.5 inch thick (60° dip) now occupied by open fracture.
	1156 Fine-grained biotite-rich inclusion, 1 inch across.
	1160 (Sample of granodiorite.)
	1161-1163 Fracture zone, dip 70° and 75° (intersection).
	1164-1167 Fracture zone, dip 60° (intersection).

Lithologic log for the Exploration Hole 1--Continued

Interval (feet)	Description
760-1665 (contd.)	1189 Secondary chlorite-feldspar zone, 1/2 inch wide (55° dip) with medial quartz-pyrite vein, 1/8 inch thick.
	1202 Planar orientation of biotite dips 55°.
	1210 Fine-grained biotite-rich inclusion, 2 inch wide.
	1215 Secondary chlorite-feldspar zone, 3/8 inch wide (15° dip) with medial quartz-pyrite vein, cut by chlorite-feldspar zone, 1/2 inch wide (50° dip) with medial quartz-pyrite vein.
	1217 Secondary chlorite-feldspar zone, 1/4 inch wide (60° dip) offset slightly along 20° fracture now occupied by chlorite-feldspar zone.
	1224 Planar orientation of biotite dips 70°.
	1239 Two quartz-adularia veins, 20°.
	1242 Quartz-feldspar dike, 3/4 inch thick (70° dip) cut by several 15° quartz-adularia veins.
	1243 Planar orientation of biotite dips 60°.
	1248 Quartz-pyrite vein, 1/8 inch thick (50° dip).
	1258 Secondary chlorite-feldspar zone, 5 inches thick (sample).
	1261 Fine-grained biotite-rich inclusion, 1.5 inches wide. One foot of core is fine- to medium-grained granodiorite.

Lithologic log for the Exploration Hole 1--Continued

Interval (feet)	Description
760-1665 (contd.)	1272-1274 Fracture zone in saussuritized granodiorite, dip 70° (intersection).
	1277-1279 Fracture zone, dip 65° to 80°.
	1285 Secondary chlorite-feldspar zone, 5 inches wide (sample).
	1286 Quartz-feldspar dike, 1 inch thick (35° dip).
	1289-1290 Several prominent joints, dip 70° to 75°.
	1293 Quartz-feldspar dike with plagioclase, 3/8 inch thick (70° dip) is cut by secondary chlorite-feldspar zone, 3/4 inch wide (20° dip), with medial quartz-adularia vein, 1/16 inch thick.
	1302-1304 Fracture zone, dip 70° to 80°.
	1308 Quartz-pyrite vein, 3/4 inch thick (60° dip).
	1314 Secondary chlorite-feldspar zone, (65° dip) with medial quartz-pyrite vein, 1/4 inch thick.
	1320 Fine-grained biotite-rich inclusion, 1 inch thick.
	1323 Saussuritized granodiorite, 1 inch thick (75° dip) with medial open fracture.
	1343-1344 Saussuritized zone in granodiorite, (75° dip) with a medial chlorite-feldspar zone; a minimum of 5 inches thick.
	1354-1359 Fracture zone in saussuritized granodiorite, dip 60° to 75°.

Lithologic log for the Exploration Hole 1--Continued

Interval (feet)	Description
760-1665 (contd.)	1361 Planar orientation of biotite dips 60°.
	1365 Secondary chlorite-feldspar zone, 1/2 inch wide (70° dip) with medial quartz-pyrite vein, 3/8 inch thick.
	1366 Laminated fine-grained biotite-rich inclusion (sample).
	1374 Planar orientation of biotite dips 70° (sample of granodiorite).
	1376-1378 Intermixed fine- to medium-grained granodiorite.
	1385 Saussuritized zone, 1/2 inch thick (65° dip) with medial secondary chlorite-feldspar zone, 1 inch wide, with a medial open fracture.
	1388 Secondary chlorite-feldspar zone (50° dip) 1 inch wide, with medial quartz-pyrite vein, 1/4 inch thick.
	1390 Probably same 1/4-inch quartz-pyrite vein of 1388 reverses dip to 80° opposite direction.
	1392 Saussuritized zone (55° dip) 2 inches wide.
	1396 Saussuritized zone (60° dip) 3 inches wide, with medial calcareous clay vein, 1/2 inch thick, and chloritic gouge(?) seam, 1/16 inch thick.
	1397 Saussuritized zone, (55° dip) 0.5 foot thick with medial calcareous 1/8-inch clay vein; (sample).

Lithologic log for the Exploration Hole 1--Continued

Interval (feet)	Description
760-1665 (contd.)	1407 Saussuritized zone (65°) 2 inches wide.
	1416 (Sample of granodiorite.)
	1428 Secondary chlorite-feldspar zone, (50° dip) 3/4 inch wide with medial 1/4-inch thick quartz-pyrite vein.
	1431-1432 Fracture zone, dip 60° and 80° (intersection).
	1441 Fine-grained biotite-rich inclusion, 2 inches across, (sample).
	1443 Planar orientation of biotite dips 60°.
	1444 Pseudophenocryst, 1 inch across.
	1446 Fine-grained biotite-rich inclusion, 1 inch across (sample).
	1460 Secondary chlorite-feldspar zone (70° dip) 2 inches wide.
	1462-1464 Granodiorite is fine to medium grained.
	1465 Secondary chlorite-feldspar, (55° dip) with medial 1/8-inch thick quartz-pyrite vein.
	1477 Planar orientation of biotite dips 70°.
	1488 Pseudophenocryst, 3/4 inch across.
	1491 Chlorite-feldspar zone (55° dip) 3/4 inch wide, with medial 1/16 inch thick quartz-pyrite vein.
	1496 Secondary chlorite-feldspar zone (50° dip) 1.5 inches thick with medial 3/4-inch thick quartz-pyrite vein, with abundant calcareous clay.

Lithologic log for the Exploration Hole 1--Continued

Interval (feet)	Description
760-1665 (contd.)	1498 (Sample of fine- to medium-grained granodiorite.) 1499-1501 Probable fracture zone. 1502-1503 Intermixed fine- and medium-grained granodiorite. 1503 Secondary chlorite-feldspar zone (55° dip) 1.5 inches thick, with medial 1/4-inch thick quartz-pyrite vein. 1503-1509 Fracture zone, dip 60° and 80°, with slight lining of calcareous clay (intersection). 1511-1514 Granodiorite is fine to medium grained. 1520-1526 Fracture zone, dip 65° to 90°, slight amount of green-gray clay. 1530-1538 Fracture zone, dip 60° to 90°. 1539 Secondary chlorite-feldspar zone (75° dip) 1 inch wide with medial 1/4-inch thick quartz-pyrite vein. 1546 Laminated fine-grained biotite-rich inclusion, 3/4 inch across. 1548 Pseudophenocryst, 1/2 inch across. 1553-1558 Fracture zone, dip ±80°. 1563 Secondary chlorite-feldspar zone (55° dip) 3/4 inch thick, with medial 0 to 3/8-inch thick quartz vein.

Lithologic log for the Exploration Hole 1--Continued

Interval (feet)	Description
760-1665 (contd.)	1563-1565 Fracture zone, dip 60° and 90°, slight amount of calcareous clay (intersection).
	1567 Secondary chlorite-feldspar zone, (60° dip) 1/2 inch thick with 1/8-inch thick medial quartz-pyrite vein.
	1590 Fracture, dip 85°.
	1600 Quartz-feldspar dike, (20° dip) 0.45 foot thick (sample). (Lowest angle dike observed in core.)
	1605-1608 Fracture zone, dip 80° and 80° (intersection).
	1635-1642 Fracture zone, dip 75° and 80° (intersection), slight amount of calcareous clay.
	1637 (Sample of granodiorite.)
	1659 Rounded mass (8 inches) of granodiorite or quartz monzonite relatively low in biotite content; contacts are moderately sharp with the granodiorite; normal granodiorite appears to penetrate this mass.
	1659-1660 Fracture zone, dip 60° and 85° (intersection).
1665-1667	Pegmatite dike, upper contact dips 45° and is moderately sharp (measurable within width of 1/8 inch); lower contact is variable from 65° to 85° and is moderately sharp (measurable within width of 1/8 to 1/4 inch) (sample). Pegmatite shows the following zones from contact inward: 1) quartz-rich zone, 1/8 to 1/4 inch

Lithologic log for the Exploration Hole 1--Continued

Interval (feet)	Description
1665-1667 (contd.)	wide, sharp to gradational contact with 2) myrmekitic quartz, potassium feldspar, and sodic plagioclase zone 1/4 to 1 inch wide, euhedral in most places and rimmed with probable potassium feldspar; zone is in sharp though irregular contact with 3) coarse quartz zone which in places contains coarse euhedral potassium feldspar crystals. Sparse to common dark-gray to black thin books, 1/4 to 3/4 inch wide, of biotite are most numerous in zone 1 and although decrease inward, are present in zone 3. Muscovite is rare and confined mostly(?) to zone 3. Euhedral pyrite crystals are confined to zone 3. A 2-inch inclusion(?) of granodiorite occurs in center of zone 3 and has gradational borders with the surrounding border of myrmekite like that of zone 2.
1667-1686	Granodiorite, same as 760-1665. 1668-1671 Fracture zone, dip 85°, sparse calcareous clay. 1684 Saussuritized zone with medial chlorite-feldspar zone, 2 inches thick, is cut by quartz-pyrite vein (50° dip) 1/2 inch thick.
1686-1690	Granodiorite is fine to medium grained and fine grained; upper contact of fine-grained portion within this interval is very gradational, lower contact with fine to medium

Lithologic log for the Exploration Hole 1--Continued

Interval (feet)	Description
1686-1690 (contd.)	grained is moderately sharp (width is measurable within 1/4 inch.
1690-1705	Granodiorite is medium grained. 1691 Mass (4 inch across) of fine-grained granodiorite is surrounded by medium-grained granodiorite (sample). 1694 Planar orientation of biotite dips 25° to 30°. 1702-1705 Moderately sharp contact between fine-grained and medium-grained granodiorite dips 80° to 85° (sample of contact at 1703).
1705-1712	Granodiorite is medium grained with sparse intermixed fine-grained granodiorite.
1712-1718	Granodiorite is fine grained (sample).
1718-1719	Granodiorite is medium grained, moderately gradational contact dips 25°.
1719-1727	Granodiorite is fine grained with fingers of granodiorite that is medium grained. 1721-1722.5 Fine-grained granodiorite and finger of medium-grained granodiorite is cut by quartz-feldspar dike (75° dip) 1/2 inch thick, with sharp contacts (sample of dike). 1725 Mass (7 inches across) of medium-grained granodiorite with moderately gradational contact with fine-grained granodiorite.

Lithologic log for the Exploration Hole 1--Continued

Interval (feet)	Description
1727-1729	Granodiorite is medium grained.
1729-1743	Granodiorite is fine grained with fingers up to 6 inches thick of granodiorite that is medium grained (sample).
	1737-1743 Fracture zone, dip about 85° to 90°. Contacts of fine grained with medium-grained granodiorite range from moderately gradational to moderately sharp.
1743-1760	Granodiorite is medium grained but contains abnormal (high) amounts of biotite in irregular intermixed masses; contact of medium grained with fine-grained rock at 1743 is moderately sharp, the fine-grained rock shows abnormally high quartz content in first inch from contact. This interval contains a few fingers of fine-grained granodiorite. The contacts between all three varieties of rock--fine grained, medium grained, and medium grained with high biotite content--range from gradational (width measurable over 1 inch) to moderately sharp (width measurable over 1/8 inch).
	1744 Fine-grained biotite-rich inclusion, 1 inch across (sample).
1760-1800	Granodiorite is fine-grained, moderately sharp (width measurable over 1/8 inch) contact at 1760 dips 20° to 25°; fingers of medium-grained rock up to 6

Lithologic log for the Exploration Hole 1--Continued

Interval (feet)	Description
1760-1800 (contd.)	inches in width, (samples: fine-grained rock, 1791; medium-grained rock, 1792; and fine-grained rock, 1800).
	1768 Quartz-feldspar dike, 1/2 inch thick, fingers and branches out into fine-grained granodiorite.
	1769 Squarish fine-grained biotitic inclusion, 2 inches across, that grades into granodiorite (sample).
	1770.5-1771 Finger of medium-grained granodiorite, sharp contact at 1770.5 dips 55°, (sample of contact).
	1779 Irregular mass (6 inches across) of medium-grained granodiorite with gradational to sharp contacts.
	1782 Mass (4 inches across) of same with gradational contacts.
	1785 Mass (2 inches across) of same.
	1789 Finger of medium-grained granodiorite partly rich in biotite.
	1791-1793 Mass of medium-grained granodiorite shows contact with fine-grained rock dipping 75° to 80° at 1791, and 70° at 1793.
Total depth (driller) of core hole -- 1800 feet.	

Lithologic log for the Exploration Hole 2

Interval (feet)	Description
0-23	No core.
23-62.5	Granodiorite, pale yellowish-gray, medium-grained; consists of plagioclase intensely argillized, fresh quartz, potassium feldspar perhaps argillized (?), and black biotite but altered to sericite commonly, and pyrite, altered mainly to limonite; base of weathered interval at 62.5.
62.5-341	Granodiorite, like 23-62.5 but light gray, spotted with black, pyrite fresh, and thin seams of limonite along low-angle fractures in upper part.
	73 Fine-grained biotite-rich inclusion, 1-1/2 inches across.
	83 Pseudophenocrysts, 1-1/2 inches across, with pyrite in center (sample).
	86 Secondary chlorite-feldspar zone, 4 inches wide.
	92-94 Fracture zone, dip 88°, broken core.
	96 Quartz-pyrite vein, 1/2 inch thick, without appreciable secondary chlorite or feldspar border zone.
	97-109 Fracture zone, dip 80° to 85°, core badly broken; biotite fresh; minor clay.
	116-162 Fracture zone, dip 70° to 85°, minor clay and slight trace of limonite; pyrite and biotite fresh; core very badly broken 136-162.

Lithologic log for the Exploration Hole 2--Continued

Interval (feet)	Description
62.5-341 (contd.)	138 Fine-grained biotite inclusion, 3 inches across (sample).
	162-165 Fault zone; dip 65°; probably related to 116-162 zone; green-gray clay; slickensides indicate 0° to 20° pitch. (Sample of clay.)
	170-178 Fault zone, distorted granodiorite, common breccia of granodiorite fragments, 1/16 to 1 inch across, in green talclike matrix.
	184 Fine-grained biotite-rich inclusion.
	185-195 Fracture zone, dip ±75°; minor pale yellowish-gray clay mixed with common calcareous white clay.
	196 Secondary-chlorite feldspar zone, 0.7 foot wide. (Three samples.) Chemical analysis (rapid method, weight percent): SiO_2, 63.1; Al_2O_3, 18.7; Fe_2O_3, 1.1; FeO, 0.16; MgO, 0.36; CaO, 0.22; Na_2O, 0.74; K_2O, 13.1; H_2O, 1.2; TiO_2, 0.52; P_2O_5, 0.28; MnO, 0.01; CO_2, <0.05.
	197-198.6 Secondary feldspar zone, 1.6 feet wide.
	200-203 Fracture zone, dip ±70°; minor clay.
	213-214 Fine-grained biotite-rich ovoid inclusion, probably 6 inches by 1 foot (sample).
	227 Secondary chlorite-feldspar zone, with thin medial pyrite vein cuts ovoid fine-grained biotite-rich inclusion, 4 inches wide; zone composed mostly of chlorite and pyrite in inclusion.

Lithologic log for the Exploration Hole 2--Continued

Interval (feet)	Description
62.5-341 (contd.)	257 Secondary feldspar zone with medial pyrite vein cuts ovoid fine-grained biotite-rich inclusion, 3 inches across; feldspar of zone is virtually absent in inclusion whereas pyrite vein is thicker.
	260 Fine-grained, ovoid, biotite-rich inclusion, 3/4 inch across; chloritized; bordered by rim of secondary feldspar.
	266 Pseudophenocryst (sample).
	280 Pseudophenocryst (sample of granodiorite).
	288 Pseudophenocryst (sample of granodiorite).
	307 Fine-grained biotite-rich inclusion, 2 inches across.
	316 Quartz-pyrite vein, 3/4 inch thick (75° dip). Fault, dip 85°, green-gray clay; slickensides indicate near-horizontal pitch.
	323 Quartz-pyrite vein, 1/8 to 1/4 inch thick, cuts 3-inch biotite-rich inclusion; quartz and pyrite of vein maintains the same approximate thickness (sample).
	328-337 Fault zone, dip 80°(?); some green-gray clay; slickensides; pyrite fresh.
341-1800	Granodiorite, light- to medium-gray, medium-grained.
	346 Fine-grained biotite-rich inclusion, 1.5 inches by 3 inches.
	349-353 Fracture zone, dip 75° to 80°.

Lithologic log for the Exploration Hole 2--Continued

Interval (feet)	Description
341-1800 (contd.)	370-373 Fracture zones, dip 65° to 75° and 80°; lined with thin calcareous clay.
	379 Quartz-pyrite vein, 1/4 inch thick (60° dip).
	390-394 Fracture zone, dip 80°.
	397-400 Fracture zone, dip 80°.
	425-428 Fracture zone, dip 60° to 70°.
	433 Secondary chlorite-feldspar zone, 4 inches thick, medial quartz-pyrite vein.
	446-451 Fracture zone, dip 70° to 75°.
	459-463 Fracture zone, dip 65° to 85°.
	478 Secondary chlorite-feldspar zone, 1.5 inches wide, and medial quartz-pyrite vein.
	479-484 Fracture zone, dip 75° to 80°.
	497 Secondary chlorite-feldspar zone, 1.5 feet wide.
	499 Fine-grained biotite-rich inclusion, 3/4 inch across.
	508-523 Fracture zone, dip 60° to 80°.
	546-547.7 Fracture zone, dip 75°.
	574 (Sample of granodiorite.)
	584 Fine-grained ovoid biotite-rich inclusion, 4 inches across.
	585 Fine-grained ovoid biotite-rich inclusion, 1 inch across.

Lithologic log for the Exploration Hole 2--Continued

Interval (feet)	Description
341-1800 (contd.)	595 Fault, dip 75°, pitch horizontal; green-gray clay.
	610 Fault, dip 80°, slickensides indicate pitch of 20°; green-gray clay.
	620 Fine-grained biotite-rich inclusion with gradational boundaries (samples). Preliminary mode of granodiorite: 24 percent quartz, 11 percent potassium feldspar, 51 percent plagioclase, 12 percent biotite, and 2 percent minor constituents.
	627-638 Fault, dip 65° to 90° at 638, slickensides indicate horizontal pitch; much thin green-gray clay.
	677 Irregular pod of feldspathized granodiorite with irregular pyrite and very little chloritized biotite (sample).
	681 Pseudophenocryst (sample).
	698-713 Fracture zone, high-angle dip, sparse white calcareous clay; at one place horizontal pitch indicated by slickensides on 50° plane.
	721 Fine-grained biotite-rich inclusion, 1/2 to 4 inches across.
	722 Fine-grained biotite-rich inclusion, 1/2 to 4 inches across.
	722.5 Stilbite zone, 75° (sample).
	723 Fine-grained biotite-rich inclusion, 1 by 2 inches across.

Lithologic log for the Exploration Hole 2--Continued

Interval (feet)	Description
341-1800 (contd.)	751 Pseudophenocryst (samples). Preliminary mode of granodiorite: 23 percent quartz, 17 percent potassium feldspar, 48 precent plagioclase, 9 percent biotite. 1 percent hornblende, and 2 percent minor constituents.
	773 Secondary chlorite-feldspar zone.
	779-790 Two high-angle (about 80°) quartz veins, about 1/4 inch wide, with little or no pyrite; cut by thin low-angle pyrite and quartz-pyrite veins which contain less pyrite where in high-angle quartz veins; 1/4-inch offset of high-angle vein noted on one quartz-pyrite vein. Several secondary chlorite-feldspar, low-angle veins are cut by above high-angle quartz veins.
	794 Fine-grained biotite-rich inclusion, 3 inches wide.
	796 Pseudophenocryst, 1 inch across.
	818-820 Fault, dip 60°, thin green-gray clay; horizontal to near horizontal pitch.
	823 Fault, dip 60°, slickensides indicate 50° pitch.
	825 Stilbite vein and white calcite vein, 70°.
	829 Pyrite vein cut by stilbite vein.
	854 Fine-grained biotite-rich inclusion, 4 inches wide.
	863 Fault, dip 80°, but curves; calcareous clay and green-gray clay (sample); pitch 40° indicated in green clay.

Lithologic log for the Exploration Hole 2--Continued

Interval (feet)	Description
341-1800 (contd.)	872-874 Fault; dip 85° to 90°; green-gray clay; slickensides, cut and distort fractures dipping about 50° with stilbite and calcite.
	879-884 Fault, dip 50°; green-gray clay; slickensides indicate 50° pitch.
	903 Fracture, dip 75°.
	910 Ovoid fine-grained biotite-rich inclusion, 3 by 4 inches, cut by pyrite vein and pyrite greater in amount along vein and around quartz phenocrysts in inclusion.
	917 Fracture, 65°, calcite lined, cut by fracture, 85°, with much less calcite.
	940 Fracture, 60°, calcite lined (sample). Calcite and stilbite on 55° to 85° fracture.
	953 Fracture, dip 70°; calcite lined.
	956 Fracture, dip 70°; calcite lined.
	959 Fracture, 80°, with calcite and stilbite.
	968 Fine-grained biotite inclusion, 2 by 1.5 inches.
	973 Fine-grained biotite inclusion, 1 inch across.
	984 Fault, dip 85°; green-gray clay; slickensides indicate 5° to 10° pitch.
	990 Secondary chlorite-feldspar zone, 5 to 6 inches wide.

Lithologic log for the Exploration Hole 2--Continued

Interval (feet)	Description
341-1800 (contd.)	992 Fine-grained biotite-rich inclusion 1 by 1 inch.
	1007-1010 Fault, dip 80° to 85°; green-gray clay; slickensides indicate 10° pitch.
	1041 Pseudophenocryst, 3/4 inch across.
	1045 Pseudophenocryst, 1 inch by 1/2 inch.
	1053 Fine-grained biotite-rich inclusion, 1 by 4 inches, cut by quartz-pyrite vein in fault, 20°; along with 1/4-inch movement (sample).
	1069 A few small pseudophenocrysts, 1/2 by 3/4 inch.
	1119 Fine grained biotite-rich inclusion (sample). Preliminary mode: 10 percent quartz, 57 percent plagioclase, 23 percent biotite, 5 percent hornblende, 1 percent opaque Fe oxides, and 4 percent minor constituents.
	(Sample of granodiorite.) Preliminary mode: 28 percent quartz, 15 percent potassium feldspar, 50 percent plagioclase, 7 percent biotite, and traces of minor constituents.
	1123 Fault, dip 70°; calcite lined; slickensides on stilbite indicate 25° pitch.
	1136-1143 Fracture zone, dip 60° and 80° (intersection).
	1141 Fine-grained biotite-rich inclusion, 1.5 inches across.
	1145 Fine-grained biotite-rich inclusion, 3 inches across.

Lithologic log for the Exploration Hole 2--Continued

Interval (feet)	Description
341-1800	1148 Secondary chlorite-feldspar zone, 4 inches wide, (30° dip).
	1150 Pseudophenocryst, 3/8 inch across.
	1154 Fine-grained biotite-rich inclusion, 2 inches wide.
	1157 (Sample of granodiorite.)
	1162-1171 Fracture zone, dip 60° and 80° (intersection), slight amount calcareous clay.
	1179 Fine-grained biotite-rich inclusion, 3 by 5 inches.
	1189 Secondary chlorite-feldspar zone, 1 to 2 inches wide, (45° dip), with two occupying pyrite-quartz veins.
	1194-1197 Moderate to intense saussuritized granodiorite zone, 0.5 foot, 60°, with medial fracture.
	1201-1204 Fracture zone, dips about 60° and 80° (intersection); lined with calcareous clay.
	1207 Fine-grained biotite-rich inclusion, 2 inches across.
	1208-1217 Fracture zone, dip 65° to 75° in partly saussuritized, chloritized, and feldspathized granodiorite.
	1226 Saussuritized granodiorite zone, 1 inch thick (55° dip) with medial secondary chlorite-feldspar zone and quartz vein.
	1227 Saussuritized granodiorite zone, 55°, is cut by secondary chlorite-feldspar zone, 1/2 inch wide, with 1/4-inch thick medial quartz-pyrite zone, that strikes

Lithologic log for the Exploration Hole 2--Continued

Interval (feet)	Description
341-1800 (contd.)	perpendicular to strike of saussuritized zone.
	1228-1230 Fracture zone, dip 80°.
	1245 Secondary chlorite-feldspar zone, 1 inch wide (40° dip) with 1/4-inch medial quartz-pyrite zone.
	1251 Fine-grained biotite-rich inclusion, 2 inches across.
	1270-1275 Fracture zone, dip 65° to 85°, lined with calcareous clay.
	1315 Fine-grained biotite-rich inclusion, 1.5 inches across.
	1320 (Sample of granodiorite.)
	1328 Fault, dip 70°, pitch 40°.
	1337 Fine-grained biotite-rich inclusion, 1 inch across. Core missing from 1,347 to 1,360.8.
	1378-1383 Fault zone, dip 70°, intersected by joint that dips 40°, core broken, gouge common.
	1409 Faint planar orientation of biotite dips 60°.
	1410 Secondary chlorite-feldspar zone, 1.5 inches wide, (20° dip), with medial quartz-adularia vein.
	1413 (Sample.)
	1418 (Sample.)
	1432 Fine-grained biotite-rich inclusion, 0.5 inch across.

Lithologic log for the Exploration Hole 2--Continued

Interval (feet)	Description
341-1800 (contd.)	1440 Fault dips 65°, pitch 25° to 30°, along stilbite(?) zone (sample); calcareous clay-hematite lined.
	1449 Fine-grained biotite-rich inclusion, 1.5 inch across.
	1458 Saussuritized granodiorite zone, minimum 1 inch thick, (35° dip).
	1458-1462 Fault zone, dip 50° (40° to 60° at 1462) in saussuritized granodiorite zone, breccia and gouge common, pitch 15° at 1461.
	1463-1464 Fault zone, like that 1458-1462, in saussuritized granodiorite zone.
	1465 (Sample of granodiorite.)
	1468 Fine-grained biotite-rich inclusion, 1 inch across.
	1468-1470 Fault zone, dip 80°, pitch 10°, green-gray clay common.
	1479-1485(?) Fault zone, dip 75° to 80°, sparse green-gray clay.
	1493 Fine-grained biotite-rich inclusion, 1 inch across.
	1504 Two-fine-grained biotite-rich inclusions, 0.5 inch across each.
	1507 Fault(?) zone, dip 80°, green-gray clay common.
	1509.5 Fine-grained biotite-rich inclusion, 0.5 inch across.

Lithologic log for the Exploration Hole 2--Continued

Interval (feet)	Description
341-1800 (contd.)	1511-1544 Fracture zone, dip 65° to 75° and 80° to 90°, may be same fracture as above but contains green-gray clay.
	1556-1558 Fracture, dip 85°, lined with calcareous clay.
	1577-1579 Fracture zone, dip 85° and 85° (intersection).
	1581 Quartz vein, 1/4 inch thick (80° dip).
	1583-1588 Fracture zone, dip 70° to 85° (intersection), lined by calcareous clay.
	1594 Fine-grained biotite-rich inclusion, 1 inch across.
	1603 Fine-grained biotite-rich inclusion, 2 inches across.
	1605 Fine-grained biotite-rich inclusion, 1 inch across (sample). Pseudophenocryst, 1 inch across.
	1622 Fine-grained biotite-rich inclusion, 4 inches by 8 inches (sample).
	1636 Fine-grained biotite-rich inclusion, 1/2 inch across.
	1642-1647 Fracture zone, dip 65° and 85° (intersection), lined with calcareous clay.
	1652 Quartz-feldspar dike, 0.5 inch thick (75° dip).
	1657-1658 Fault, dip 35°, lined and(or) filled with gray clay.
	1659-1661 Fracture zone, dip 75° to 85°, lined with calcareous clay.

Lithologic log for the Exploration Hole 2--Continued

Interval (feet)	Description
341-1800 (contd.)	1666-1669 Saussuritized granodiorite zone dips 75°, with medial fracture.
	1681 Fine-grained biotite-rich inclusion, 1 inch across.
	1695 Saussuritized granodiorite zone, 65° with medial fracture.
	1700 Saussuritized granodiorite zone, 2 inches thick.
	1702-1703 Saussuritized granodiorite zone, dip 65° to 70°, with medial fracture.
	1705-1709 Saussuritized granodiorite zone, 70°, with medial fracture.
	1716 (Sample of granodiorite.)
	1739 Fine-grained biotite-rich inclusion, 1 inch across.
	1756 Fine-grained biotite-rich inclusion, 1 inch across.
	1758 Fine-grained biotite-rich inclusion, 1 inch across.
	1760 Planar orientation of biotite dips 60°.
	1768 Planar orientation of biotite dips 40° to 60°.
	1794 Fine-grained biotite-rich inclusion, 1 inch across.
	1800 (Sample of granodiorite.)

Total depth (driller) of core hole -- 1800 feet

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