UNITED STATES DEPARTMENT OF THE INTERIOR

GEOLOGICAL SURVEY

LITHOLOGY, PETROGRAPHY, AND GEOCHEMISTRY OF THREE CORES FROM THE GOLDFIELD MINING DISTRICT, NEVADA

By Roger P. Ashley and Russell C. Evarts

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF ILLUSTRATIONS

INTRODUCTION

BACKGROUND

Between July, 1968 and February, 1969, the U.S. Geological Survey drilled three exploration bore holes in the Goldfield mining district, Esmeralda County, Nevada. This activity was one component of a comprehensive study of the geology and geochemistry of the Goldfield district. The main objective of the drilling was to provide information on the geometry of fault systems in the Early Miocene volcanic rocks that host the gold deposits. Other objectives were to test the hypothesis that caldera collapse and resurgence produced several major structural features in the district, and to look for changes in the character of hydrothermal alteration with depth.

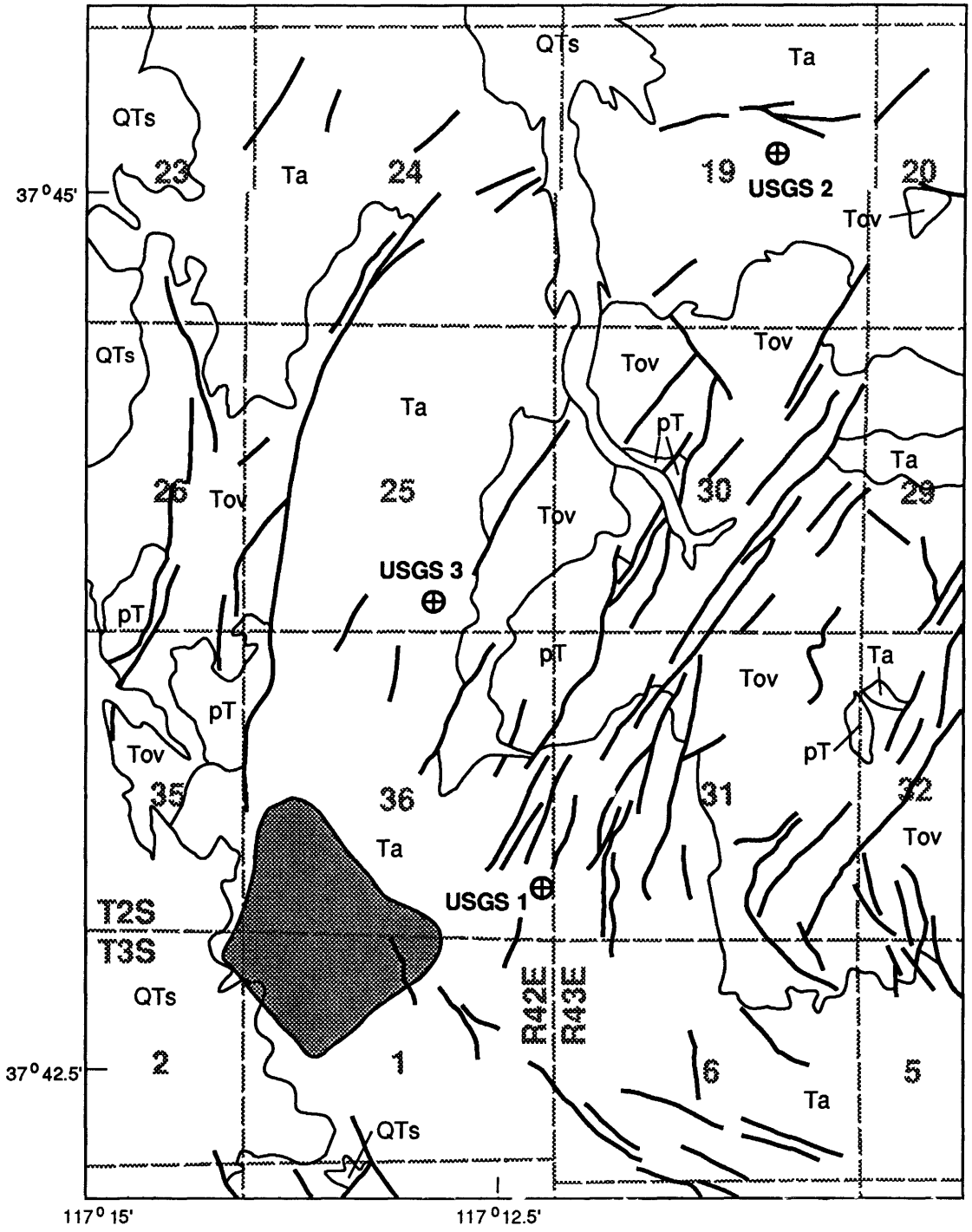
The purpose of this report is to present all the data we have obtained from cores from the Goldfield drill holes. These data include detailed descriptive logs based on visual examination of the cores, summary logs derived from the detailed logs, mineral assemblages based on petrographic observations for samples selected from the cores, and chemical analyses of core splits.

The drill hole locations are shown on a preliminary geologic map of the Goldfield district (Ashley, 1975). Each drill hole is included in a cross section that shows the stratigraphic units recognized in that hole and their relationships to other units in the vicinity. In this report all descriptions are in terms of lithology; stratigraphic assignments are not treated here.

PURPOSE OF INDIVIDUAL DRILL HOLES, AND SITE SELECTION

Locations of the three drill holes are shown on figure 1, and basic information about each hole is summarized in table 1. Except for relatively thin zones of colluvium at the surface, cores were obtained for the full lengths of all three holes.

The main productive vein system of the Goldfield district, located immediately northeast of the town of Goldfield, trends north and dips east. The dip of this vein system is about 45° near the surface, but decreases with increasing depth. In the Merger mine (fig. 1) at a depth of about 400 m (1300 ft), it lies on the contact between Tertiary volcanic rocks and pre-Tertiary metasedimentary rocks, and dips to the east at 10-15° (Ashley, 1974: Ransome, 1909). Goldfield USGS 1 was drilled to determine whether the main productive vein system extends eastward from the Merger mine at a low angle, either along or beneath the basement surface. A related question is whether the pre-Tertiary basement surface was a locus for hydrothermal alteration, indicating that it was a channel-way for solutions. Also of interest is whether mineralized east-dipping fractures exist in the volcanic section above a possible extension of the main vein system. Thus important objectives for this hole included determining depth to pre-Tertiary basement, and detecting altered and mineralized fracture zones both above and below this contact. To achieve the goals for this hole, we were prepared to drill as deep as 600 m (2000 ft).



EXPLANATION

QTs	Quaternary and Tertiary sedimentary and volcanic rocks and alluvium
Ta	Lower Miocene andesite and rhyodacite, locally intrusive
Tov	Oligocene silicic flows and tuffs
pT	Pre-Tertiary quartz monzonite, shale, and limestone
⊕	Drill hole location
	Area of major gold production

0 1 MILES

0 1 KILOMETERS

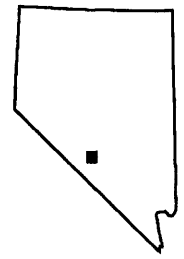


Figure 1. Geologic map of the Goldfield mining district, showing locations of USGS drill holes.

Table 1. Summary information for USGS drill holes at Goldfield, Nevada.

	Drill hole USGS 1	Drill hole USGS 2	Drill hole USGS 3
Location	SE 1/4, SE 1/4, Sec. 36, T. 2 S, R. 42 E	SW 1/4, NE 1/4, Sec. 19, T. 2 S, R. 43 E	SW 1/4, SE 1/4, Sec. 25, T. 2 S, R. 42 E
Bearing and inclination	Vertical at collar Vertical at 700 ft (213 m) S 62° W, -87° at 1500 ft (457 m)	N 10° E, -60° at collar N 9 1/2° E, -60° at 590 ft (180 m) N 9° E, -61° at 1100 ft (335 m)	Vertical at collar
Starting date; completion date	July 8, 1968; Oct. 9, 1968	Oct. 21, 1968; Jan. 6, 1969	Jan. 14, 1969; Feb. 7, 1969
Core size, interval	NC, 10-671 ft (3.0-204.5 m) NX, 671-1,505 ft (204.5-458.7 m)	NC, 14-969 ft (4.3-295.4 m) NX, 969-1,439 ft (295.4-438.6 m)	NC, 10-457 ft (3.0-139.3 m)

The site for USGS 1 was selected based on information from the Merger and other nearby mines (Ransome, 1909: Goldfield Consolidated Mines Corporation, unpub. data), and on surface geology (Ashley, 1975), which suggested that there might be a local depression in the pre-Tertiary basement surface. The exact site was adjusted to allow use of an existing secondary road.

The McMahon Ridge area (fig. 1) was productive, but far less so than the main area near Goldfield. Ransome (1909) gives an account of the character and orientation of veins in this area, which is summarized by Ashley (1974). The altered and mineralized faults and fracture zones trend east-west to northeast, and most show vertical or northerly dips, but these veins were developed to depths of only about 120 m (400 ft). Goldfield USGS 2 was designed to test whether the fracture system of McMahon Ridge dips to the south at depth, as might be expected if it formed above a buried caldera wall, and to see whether alteration and mineralization increased or decreased in intensity with depth. Depth to pre-Tertiary basement, and alteration at the Tertiary-basement contact were targets for this drill hole as well as USGS 1. Funds available for the project constrained this drill hole to a maximum depth of 460 m (1500 ft), assuming that USGS 1 would go to a depth of 600 m.

The site for USGS 2 was selected based on Ransome's subsurface information and surface geology (Ashley, 1975). A northerly-directed inclined borehole (-60°) was located 200 m south of the outcrop line of the McMahon Ridge vein system. The drill hole was oriented to detect structures dipping to the south at moderate angles, and to achieve at the same time considerable depth with the hope of reaching basement within the 1500-foot constraint.

The third drill hole, about three km northeast of the town of Goldfield, is located about 1 km east of the inferred western margin of the caldera, in post-collapse volcanic flows of early Miocene age. Immediately east of this location, caldera-related silicic tuffs and flows and pre-Tertiary rocks are exposed in what may be a resurgent core of the caldera. The structure in this area, however, is complicated by numerous north-northeast-trending, east-dipping normal faults. The blocks bounded by the faults are rotated to moderate westerly dips. This hole was drilled mainly to test whether an angular unconformity separates caldera-related and post-caldera units; such an unconformity could be the result of resurgence at the end of the caldera-formation cycle.

The site for USGS 3 was selected based on surface geology (Ashley, 1975), and adjusted to take advantage of existing secondary roads. Field mapping showed that the Oligocene units in the vicinity include bedded tuffs and welded ash flow tuffs that would make suitable structural markers.

METHODS OF INVESTIGATION

Site locations

Detailed geologic field mapping of the Goldfield mining district preceded this drilling program. Because an adequate large-scale base map was not available, we recorded geologic field data on aerial photographs, and located the drill hole sites initially on the same aerial photographs. We then located the sites in the field by inspection of the aerial photographs, and attempted to locate them with respect to

boundaries of patented claims by bearing-and-chain measurements from various monuments. Site locations were not surveyed.

Lithologic descriptions

We made preliminary descriptions of the core in the field at the time of drilling, using field methods. At the end of the project, the core was shipped to Menlo Park, California, where we examined all of it in more detail, making occasional use of a binocular microscope and X-ray diffractometer. The descriptions were later modified somewhat based on the results of detailed petrographic studies. The summary descriptions are derived entirely from the detailed logs.

Sampling methods

In the course of describing the core, we removed samples for petrographic study and chemical analysis. For petrography, we selected samples representative of the range of materials in a described interval. Because some intervals are more heterogeneous than others, some include only one sample, whereas others include several. In some cases, pairs of samples bracket notable changes in the core. The samples for petrography consist of splits of core 10-15 cm long. We examined conventional thin sections and X-ray diffractograms for all these samples.

We sampled the entire length of core from each drill hole for chemical analysis. Individual samples generally represent intervals between 2 and 3 meters long. The samples are composites consisting of splits of core 15-20 cm long taken at intervals of 60-80 cm. Thus a typical sample is a composite of four split pieces of core. Drill hole USGS 1 was sampled in detail between depths of 921 and 1083 feet; here samples are composites consisting of splits about 10 cm long taken at intervals of 25-30 cm. Analytical methods are given in the analytical data section.

Although the purpose of petrographic and chemical analyses was to characterize the cores lithologically and geochemically, results from these two types of analyses and the accompanying descriptions do not always correlate perfectly. The main sources of differences are that petrographic sampling sometimes does not cover all the variations in a described interval, and samples for chemical analysis generally, but not always, cover smaller intervals than petrographic samples.

Following detailed description and sampling, we condensed the core to about 10 percent of its original length by removing selected pieces of core about 8-10 cm long. The condensed core is stored in a core library maintained by the Nevada Bureau of Mines and Geology in Reno, Nevada.

SUMMARY LITHOLOGIC LOGS

Table 2. Summary log for drill hole USGS 1.

Feet	Meters	Summary description
0-10	0-3.0	Colluvium.
10-48	3.0-14.6	Soft white argillized rhyodacite.
48-118	14.6-36.0	Soft medium-gray to white argillized rhyodacite. Unoxidized with as much as 5 percent pyrite.
118-194.5	36.0-59.3	Hard dark-bluish-gray propylitized rhyodacite. Locally argillized.
194.5-238	59.3-72.5	Soft, locally moderately hard, pale-gray argillized andesite.
238-309	72.5-94.2	Hard medium-to dark-gray propylitized andesite, locally soft, argillized; poor relict texture. Abundant calcite veinlets.
309-429	94.2-130.8	Hard pale-green or pale-purple, propylitized latite, and soft pale-gray argillized latite. One percent pyrite throughout most of interval.
429-486	130.8-148.1	Hard deuterically altered latite. Very fine grained hematite gives bluish to purplish color. Good relict texture. Pyrite absent.
486-494.2	148.1-150.6	Moderately hard pale-green-purple latite, strongly fractured with soft white argillized material along fractures. Good relict texture.
494.2-617	150.6-188.1	Hard pale-green-purple to dark-purple propylitized latite, locally strongly fractured, argillized.
617-626.7	188.1-191.0	Soft white argillized latite.
626.7-633	191.0-192.9	Hard medium- to dark-gray siltstone, and fine-grained sandstone (Palmetto Formation). Upper part argillized; 5 percent pyrite.
633-731	192.9-222.8	Dense brittle dark-gray calcareous siltstone. Locally fractured and altered below 661.5 ft (201.6 m).
731-736	222.8-224.5	Soft black carbonaceous siltstone, intensely fractured and crushed.
736-748.4	224.5-228.1	Fault zone.
748.4-790	228.1-240.8	Soft black carbonaceous siltstone, intensely fractured and crushed.
790-813	240.8-247.8	Fault zone; poor core recovery.

813-905	247.8-275.8	Hard pale-gray crystalline limestone, locally brecciated.
905-926	275.8-282.2	Soft dark-gray to black locally calcareous carbonaceous siltstone, mostly brecciated.
926-942.5	282.2-287.3	White medium-grained quartz monzonite, soft to moderately hard, more or less argillized.
942.5-963.7	287.3-293.7	Hard pale- to medium-green feldspar-rich pegmatite, with mica-rich zone at 943.5-948 ft (287.6-289.0 m) and molybdenite visible 962.5-963.7 ft (293.4-293.7 m).
963.7-975	293.7-297.2	Soft to moderately hard white argillized quartz monzonite.
975-1,044.5	297.2-318.4	Hard mottled pale-pink and pale-gray marble, locally siliceous.
1,044.5-1,048.5	318.4-319.6	Fractured to brecciated gray marble; montmorillonite with pyrite in matrix.
1,048.5-1,069	319.6-325.8	Dense medium-olive-green epidote skarn. Minor molybdenite and chalcopyrite visible locally.
1,069-1,085.5	325.8-330.9	Hard to moderately soft pale-gray to white medium-grained quartz monzonite, more or less argillized.
1,085.5-1,121	330.9-341.7	Soft white argillized quartz monzonite.
1,121-1,142	341.7-348.1	Hard to soft pale-gray to white medium-grained quartz monzonite, more or less argillized.
1,142-1,185	348.1-361.2	Hard slightly propylitized quartz monzonite with pink potassium-feldspar and gray to green plagioclase.
1,185-1,223	361.2-372.8	Hard white to pale-gray weakly propylitized quartz monzonite.
1,223-1,341.5	372.8-408.9	Hard slightly propylitized quartz monzonite.
1,341.5-1,362.4	408.9-415.3	Hard pale-green-purple propylitized andesite, locally soft, argillized. Probably a dike.
1,362.4-1,448	415.3-441.4	Hard slightly propylitized quartz monzonite.
1,448-1,505	441.4-458.7	Hard pink (due to unaltered potassium feldspar) to soft white more or less strongly argillized quartz monzonite.

Table 3. Summary log for drill hole USGS 2.

Feet	Meters	Summary description
0-14	0-4.3	Colluvium.
14-119	4.3-36.3	Dark-green to purplish-green propylitized porphyritic andesite. Carbonate and zeolite veins and amygdules common.
119-160	36.3-48.8	Propylitized to weakly argillized andesite flow breccia (rock type same as above). Veins and amygdules persist.
160-296	48.8-90.2	Propylitized porphyritic andesite with much flow breccia. Unoxidized, with minor pyrite from 166 ft (50.6 m) down, but oxidized areas persist locally to 290 ft (88.4 m). Strongly crushed 290 to 296 ft (88.4-90.2 m). Veins and amygdules throughout.
296-497	90.2-151.5	Propylitized porphyritic andesite, unoxidized. Carbonate and zeolite veins and amydgules persist. Purplish zones several feet thick, with relatively abundant hematite in groundmass, scattered through interval 402 to 479 ft (122.5-146.0 m). Relatively abundant epidote, also many broken zones 479 to 497 ft (146.0-151.5 m).
497-572.5	151.5-174.5	Gray, propylitized to argillized, porphyritic andesite.
572.5-613	174.5-186.8	Gray, propylitized to weakly argillized, porphyritic andesite with vague relict texture, locally oxidized.
613-675	186.8-205.7	Pale-gray more or less intensely argillized andesite. Clay seams common, zeolites and carbonate rare.
675-796	205.7-242.6	Strongly argillized porphyritic andesite. Many fractured and crushed zones throughout. Breccia zones at 732 ft (223.1 m) and 738 ft (224.9 m).
796-971.5	242.6-296.1	Argillized andesite; locally propylitized, with poor relict texture. Fractured and crushed zones moderately abundant.

971.5-1,006.5	296.1-306.8	Light-gray argillized, andesitic lithic tuff; strongly fractured and crushed.
1,006.5-1,016	306.8-309.7	Light-gray propylitized, porphyritic andesite.
1,016-1,055	309.7-321.6	Light-gray argillized, andesitic tuff(?).
1,055-1,134.5	321.6-345.8	Argillized porphyritic andesite. Montmorillonite seams common.
1,134.5-1,158	345.8-352.9	Aphanitic to porphyritic andesite. Alternating zones of propylitic and argillic alteration. Intensely crushed and fractured.
1,158-1,164	352.9-354.8	Probable fault zone; no core recovered.
1,164-1,265	354.8-385.6	Porphyritic andesite, gray to purple propylitic in upper part grading down into light-gray argillized rock. Generally good relict texture.
1,265-1,278.5	385.6-389.7	Dark-gray to black argillized and pyritized montmorillonitic rhyodacite tuff.
1,278.5-1,337.5	389.7-407.7	Very poorly sorted lithic-crystal rhyodacite lapilli tuff; argillized.
1,337.5-1,395	407.7-425.2	Dark-gray to black argillized montmorillonitic rhyodacite tuff, lapilli tuff, sandstone, and conglomerate.
1,395-1,400.5	425.2-426.9	Amygdular propylitized porphyritic andesite containing inclusions of sedimentary rocks; probably intrusive.
1,400.5-1,437	426.9-438.0	Light- to dark-gray poorly sorted, argillized rhyodacite tuff and conglomerate.
1,437-1,439	438.0-438.6	Brecciated propylitized porphyritic andesite; possibly a dike or sill.

Table 4. Summary log for drill hole USGS 3.

Feet	Meters	Summary description
0-10	0-3.1	Colluvium.
10-94.5	3.1-28.8	Hard dark-bluish-gray propylitized rhyodacite.
94.5-120.5	28.8-36.7	Hard more or less intensely fractured to soft crushed propylitized and argillized rhyodacite. Olive brown to yellow brown due to limonite stain.
120.5-156.5	36.7-47.7	Hard locally fractured medium-bluish- to greenish-gray propylitized rhyodacite. Disseminated hematite gives bluish color.
156.5-172	47.7-52.4	Hard medium-gray-green propylitized rhyodacite.
172-214	52.4-65.2	Moderately hard to moderately soft, propylitized and argillized rhyodacite with many soft argillized zones.
214-220.5	65.2-67.2	Hard pale-greenish-gray propylitized and argillized rhyodacite. Unoxidized.
220.5-243.8	67.2-74.3	Soft crushed to moderately hard argillized and propylitized dacite.
243.8-249.7	74.3-76.1	Moderately hard pale-gray propylitized and argillized rhyodacite.
249.7-289	76.1-88.1	Hard fractured to soft crushed propylitized and argillized rhyodacite.
289-326	88.1-99.4	Hard pale-purple to pale-blue (nearly white) propylitized to argillized rhyodacite.
326-351	99.4-107.0	Soft white to light-gray argillized rhyodacite.
351-365	107.0-111.3	Moderately hard white argillized rhyodacite flow breccia.
365-381	111.3-116.1	Soft locally crushed to hard intensely fractured, white to pale-green, argillized and propylitized dacite.
381-383	116.1-116.7	Fault zone(?).
383-394.8	116.7-120.3	Hard locally strongly fractured propylitized and argillized rhyodacite flow breccia.
394.8-396	120.3-120.7	Soft dark-gray argillized volcanic conglomerate. Bedding dips 40°-45°.
396-399	120.7-121.6	Soft argillized latite tuff.
399-404.3	121.6-123.2	Soft argillized volcanic conglomerate.
404.3-421.6	123.2-128.5	Soft argillized latite tuff.
421.6-423	128.5-128.9	Soft argillized volcanic conglomerate.

423-424	128.9-129.2	Hard broken medium-green latite tuff.
424-428.4	129.2-130.6	Soft argillized fault breccia.
428.4-437	130.6-133.2	Very soft argillized latite tuff. Brecciated 430.5 to 437 ft (131.2-133.2 m).
437-449	133.2-136.9	Hard strongly fractured pale-green propylitized and argillized rhyodacite.
449-452	136.9-137.8	Very soft argillized latite tuff(?).
452-452.5	137.8-137.9	Fault zone.
452.5-457	137.9-139.3	Hard intensely fractured propylitized and argillized latite.

DETAILED LITHOLOGIC LOGS

DRILL HOLE USGS 1

Detailed description, intervals in feet (meters):

0-10 (0-3.0)
Colluvium.

10-48 (3.0-14.6)
Soft white montmorillonite-bearing argillized rhyodacite with good relict porphyritic texture; oxidized, with moderately heavy red and yellow-brown limonite stain locally. Thin white montmorillonite seams, dip 30°-70°, about one per 5 ft (1.5 m) of core. Few randomly oriented gypsum veinlets as much as 1 cm wide in the intervals 29 to 34 ft (8.8-10.4 m) and 36 to 38 ft (11.0-11.6 m).

48-118 (14.6-36.0)
Soft medium-gray to white montmorillonite-bearing argillized rhyodacite with moderately good relict porphyritic texture. Unoxidized except for yellow to red limonite-stained interval at 68 to 72 ft (20.7-21.9 m) and partial alteration of pyrite to limonite at 110 to 118 ft (33.5-36.0 m). Where color is gray, contains about 5 percent pyrite, both disseminated and replacing mafics; where white, pyrite is scarce, disseminated. Montmorillonite seams dipping 10°-65° appear at 83 to 88 ft (25.3-26.8 m) and 93 to 110 ft (28.3-33.5 m), one to ten per foot of core. Below 101 ft (30.8 m), rock becomes harder, with flow breccia zone 101.3 to 107 ft (30.9-32.6 m).

118-194.5 (36.0-59.3)
Hard dark-bluish-gray propylitized rhyodacite. About half the rock is weakly to moderately strongly argillized, moderately hard to soft, in the intervals 118 to 135.5 ft (36.0-41.3 m), 144.2 to 153 ft (44.0-46.6 m), 186.5 to 194.5 ft (56.8-59.3 m). Propylitized and argillized rock alternate at spacings of 3 in. to 1 ft (7.6-30.5 cm) in these intervals. Argillized areas have montmorillonite seams in diverse orientations. Intervals free of argillization 135.5 to 144.2 ft (41.3-44.0 m) and 153.0 to 186.5 ft (46.6-56.8 m) have thin calcite veinlets in diverse orientations, 1 to 3 per foot. Pyrite very scarce in propylitized rock, reaches 5 percent in argillized rock.

194.5-238 (59.3-72.5)
Pale-gray argillized andesite, soft to locally moderately hard, generally poor relict porphyritic texture (phenocrysts less than 0.5 mm diameter). Softer areas have moderately abundant montmorillonite seams; harder areas at 196.5 to 199 ft (59.9-60.7 m), 204 to 206 ft (62.2-62.8 m), 206.5 to 210 ft (62.9-64.0 m), 210.7 to 211.5 ft (64.2-64.5 m), and 225.5 to 228 ft (68.7-69.5 m) have no montmorillonite seams but contain several calcite veins to 1 mm wide per foot, in diverse orientations. Pyrite locally partly altered to limonite. Few discontinuous pyrite veinlets in diverse orientations, 204 to 211.5 ft (62.2-64.5 m), locally partly altered to limonite.

238-309 (72.5-94.2)

Hard medium- to dark-gray propylitized andesite with local soft argillized zones. Poor relict texture. Calcite veins to 3 mm wide in diverse orientations, several per foot throughout. Two to 5 percent very fine grained disseminated pyrite to 263 ft (80.2 m); below this, propylitized core is predominantly dark purplish gray with less than 2 percent pyrite and hematite seams; individual seams or zones with several seams occur every 5 ft (1.5 m). Patchy laumontite coatings on fractures, 248 to 262 ft (75.6-79.9 m). Pale to medium-gray soft argillized zones occur at 258.5 to 258.7 ft (78.8-78.9 m), 226 to 269 ft (68.9-82.0 m), 281 to 282 ft (85.6-86.0 m), 290 to 292.5 ft (88.4-89.2 m), 301.5 to 303 ft (91.9-92.4 m), 305.0 to 309 ft (93.0-94.2 m).

309-317 (94.2-96.6)

Moderately hard medium-green propylitized latite; locally argillized. Good relict texture. Argillized at 309 to 311 ft (94.2-94.8 m), 313 to 314.5 ft (95.4-95.9 m), 315.7 to 316 ft (96.2-96.3 m); pale green with some fractures coated with montmorillonite. Propylitized intervals intensely fractured with powdery calcite coatings on fractures. Pyrite absent; contains minor hematite (hornblende altered to hematite; biotite altered to white mica with minor hematite).

317-429 (96.6-130.8)

Hard pale-gray to very pale purple (nearly white) propylitized latite with good relict texture. Vague to moderately strong flow banding throughout, dips 25°-60°, generally 40°-55°, shown by slight color variations and locally by entrained elongate dark purple aphanitic inclusions. Contains some calcite and 1 percent pyrite (to 0.25 mm) throughout. Locally moderately soft to soft pale gray to white argillized zones, with poor relict texture, no calcite, 2 to 5 percent pyrite (to 0.1 mm), and some pale-gray montmorillonite seams. Argillized at 317 to 326 ft (96.6-99.4 m), 341.6 to 355.1 ft (104.1-108.2 m), 355.6 to 357.3 ft (108.4-108.9 m), 357.7 to 358.2 ft (109.0-109.2 m), 366 to 367 ft (111.6-111.9 m), 368.4 to 370.2 ft (112.3-112.8 m), 381 to 381.5 ft (116.1-116.3 m), 395.5 to 398 ft (120.5-121.3 m), and 399 to 401.5 ft (121.6-122.4 m). Contacts between argillized and propylitic rocks where visible dip 30°-50°. Propylitized intervals have irregular vugs as much as 7 cm across partly to completely filled with calcite (larger vugs usually elongate). Frequency of occurrence of calcite in any one of these forms is one every 1 to 2 ft (1.3 per m). Starting at 386 ft (117.7 m), rock becomes progressively darker purple in color with depth, and at 417.3 ft (127.2 m) contains a few hematite veinlets to 4 mm wide.

429-486 (130.8-148.1)

Hard to very hard medium-purple to pale-purplish-blue latite, deuterically altered (oxidized). Good relict texture. Mafics altered to magnetite; pyrite absent. Color due to fine-grained hematite in groundmass. Flow banding visible through most of interval, shown by minor color variations, dips 30°-50°, mostly 45°-50°. At 453 to 454.5 ft (138.1-138.5 m), irregular purple and pale-green flow bands are contorted and jumbled. Flow banding also shown locally by dark-purple, elongate, aphanitic bands and (or) ragged to subrounded inclusions to 1 cm wide. Fractures with diverse orientations occur with a frequency of one every

2 to 3 ft to 2 per foot (1-6 per m); most have coatings of calcite with some clay, except from 435 to 447 ft (132.6-136.2 m), where the calcite is accompanied by hematite instead. Locally there are scattered amygdules to 1 cm in diameter filled with calcite, at some places elongate parallel to flow banding. Zone of weak argillization at 469.2 to 469.6 ft (143.0-143.1 m) dips 45°.

486-494.2 (148.1-150.6)

Strongly fractured pale-green-purple weakly argillized latite, with soft white clay (mainly montmorillonite) along fractures. Good relict texture. Scarce very fine grained pyrite. Clay along fractures contains about 3 percent very fine grained pyrite. Fractures have diverse orientations, spacing usually less than 5 cm, maximum spacing about 15 cm.

494.2-617 (150.6-188.1)

Hard pale-green-purple to dark-purple propylitized latite, locally strongly fractured and weakly to moderately strongly argillized. Relict texture good where propylitized, poor where argillized. Flow banding, shown by mineral alinement and darker purple bands to 2 cm wide, dips 20°-65° generally 40°-60°. Locally poorly developed flow breccia zones parallel flow banding. Few scattered angular aphanitic dark-purple inclusions. At 494.2 ft (150.6 m) color is pale green purple; becomes more purple with depth, pale- to medium-purple below 503 ft (153.3 m). Pyrite absent to 552.5 ft (168.4 m). Becomes pale green again, locally with purplish tinge, 552.5 to 600 ft (168.4-182.9 m) and 615.5 to 617 ft (187.6-188.1 m). Purple color due to hematite after mafics and disseminated in groundmass. Fractures throughout are coated with calcite and clay; calcite is dominant in propylitized rock and montmorillonite is dominant in argillized rock. Argillized at 494.2 to 502 ft (150.6-153.0 m), 506 to 507 ft (154.2-154.5 m), 508 to 510.5 ft (154.8-155.6 m; sharp upper contact dips 50°), 535.5 to 535.6 ft (163.2-163.3 m), 540 to 541 ft (164.6-164.9 m; upper and lower contacts dip 60° and 65°, respectively), 550 to 551.5 ft (167.6-168.1 m), 556 to 557 ft (169.5-169.8 m), 561 to 562 ft (171.0-171.3 m), 562.5 to 563 ft (171.5-171.6 m), 584.5-587.5 ft (178.2-179.1 m), 588.2 to 599.5 ft (179.3-182.7 m), and 615 to 615.5 ft (187.5-187.6 m; may be a tectonic breccia; upper contact sharp, dips 30°, lower contact irregular). Below 552.5 ft (168.4 m), propylitized rock has 1 to 3 percent, locally 5 percent pyrite and argillized rock has 2 to 5 percent pyrite, replacing mafics and disseminated as 0.25 mm grains.

617-626.7 (188.1-191.0)

Soft bluish-white argillized latite. Relict texture vague. Montmorillonite seams with slickenside surfaces throughout. One to 2 percent pyrite throughout, grains less than 0.1 mm diameter. May also contain minor very fine grained disseminated hematite. Rock at 617 to 621.7 ft (188.1-189.5 m) is probably flow breccia, with a 5-cm limestone fragment at 620.4 ft (189.1 m). Rock at 621.7 to 626.7 ft (189.5-191.0 m) is also a breccia but fragments not rotated, flow banding dips 20°-30°. Basal contact sharp, depositional, dips 35°.

626.7-633 (191.0-192.9)

Hard medium- to dark-gray siltstone and fine-grained sandstone (Palmetto Formation, Ordovician age). Argillized at 626.7 to 629.2 ft (191.0-191.8 m), with fine to very fine montmorillonite seams. Five percent patchy fine grained pyrite. Bedding dips 35°. At 629.2 to 633 ft (191.8-192.9 m) rock is unaltered dark-gray massive siltstone with fine-grained sandstone interbeds to 1 cm thick, dipping 30°; medium- to coarse-grained sandstone interbeds at 632 to 633 ft (192.6-192.9 m).

633-731 (192.9-222.8)

Dense brittle dark-gray calcareous siltstone. Bedding shown by lighter colored 1 mm to 5 cm laminae every 10 to 30 cm, dips 0-25° (mostly 15°-20°). Below 664 ft (202.4 m), maximum thickness of light-colored laminae 2 cm; below 690 ft (210.3 m) maximum thickness 2 mm. Darker beds are carbonaceous. As much as 3 percent pyrite, disseminated and in thin films on fractures, maximum grain size 0.25 mm (much is smaller than 0.1 mm). Calcite veinlets to 3 mm wide with diverse orientations, about 15 to 20 per meter. At 641.5 to 641.8 ft (195.5-195.6 m) is breccia (fault zone or possible intraformational breccia) containing 20 to 30 percent pyrite; dip 10°. At 661.5 to 664 ft (201.6-202.4 m), is brecciated dolomitic siltstone (fault zone) with montmorillonite seams and montmorillonitic argillized matrix. Core broken and argillized at 677.8 to 680 ft (206.6-207.3 m), 681 to 682 ft (207.6-207.9 m), 684.7 to 685.7 ft (208.7-209.0 m), 694.5 to 695.3 ft (211.7-211.9 m), 696.8-697 ft (212.4-212.45 m), 700.2-701 ft (213.4-213.7 m), 702 to 702.3 ft (214.0-214.1 m), 703 to 704 ft (214.3-214.6 m), 706 to 707 ft (215.2-215.5 m); upper contact dips 65°, 718.5 to 719 ft (219.0-219.2 m); irregular lower contact dips 70°, 720 to 723.5 ft (219.5-220.5 m), and 727.8 to 730 ft (221.8-222.5 m). Other argillized breccia zones at 682.5 ft (208.0 m; 3 cm thick), and 690.8 ft (210.6 m; probably intraformational, with calcite cement, dips 20°). At 680.5 to 690 ft (207.4-210.3 m) is probable fault zone; rock is intensely fractured and core recovery poor. Veins of clear dolomite(?) rhombs, some open, irregular, and vuggy, in interval 683 to 686.5 ft (208.2-209.2 m; dip 60°), and at 692.6 ft (211.1 m), 693 ft (211.2 m), 694.5 ft (211.7 m), 699 ft (213.1 m), 719.5 to 720 ft (219.3-219.5 m; single 2-mm vein; dips 75°). In interval 714 to 719 ft (217.6-219.2 m), are small veinlets of yellow-brown calcite± montmorillonite with light-gray bleached halos to 2 cm diameter, 3 to 6 per meter.

731-736.5 (222.8-224.5)

Soft black carbonaceous siltstone, probably argillized. Core intensely fractured and broken to crushed. Some fragments throughout show lighter colored and probably slightly coarser grained laminae to 5 mm thick (generally less than 2 mm). Pyrite, disseminated and as veinlets, less than 1 percent throughout.

736.5-748.4 (224.5-228.1)

Fault breccia with abundant montmorillonite in cement. Poor core recovery. Lithology same as 731-736.5 ft.

748.4-790 (228.1-240.8)

Lithology same as 731 to 736.5 ft. Beginning at 752.5 ft (229.4 m), many fractures have thin discontinuous white coating of clay (probably kaolinite), and locally fragments of core have network of irregular quartz veinlets less than 1 mm wide. Bedding intact at 755 to 755.3 ft (230.1-230.2 m), dips about 10° and shows penecontemporaneous deformation, including breakage, rotation, and some pull aparts of lighter colored laminae as much as 5 mm thick. Bedding also intact at 764.3 to 770.8 ft (232.9-234.9 m), dips roughly 25°, irregular, probably due to penecontemporaneous deformation. At 783 to 786.5 ft (238.6-239.7 m) bedding is warped, dips 20°-50°. Fault zone at 773.5 to 775 ft (235.8-236.2 m); only 20 cm of crushed core recovered.

790-813 (240.8-247.8)

Fault zone. Lithology same as 731 to 790 ft. Only 70 cm crushed core recovered from this interval; material recovered probably represents harder breccia fragments in softer argillic matrix washed away by drilling fluid.

813-905 (247.8-275.8)

Hard massive light-gray limestone, locally dolomitic. Calcite grain size generally 0.5 mm or less, few grains to 1 mm. Pyrite 0-0.1 percent as disseminated grains less than 0.25 mm diameter. Locally, where pyrite occurs in thin veinlets, total pyrite reaches about 1 percent. Between 813 and 855 ft (247.8-260.6 m), about 25 percent of core has abundant interbeds of sandstone and siltstone, in sections 15 cm to 1 m long. Silty beds have as much as 5 percent fine-grained disseminated pyrite. Massive limestone shows coarse bedding by slight color changes. Between 854 and 888 ft (260.3-270.7 m) are a few 1-cm-thick coarse marble beds (or veins?) with calcite crystals to several millimeters in diameter. Between 888.5 and 905 ft (270.8-275.8 m), rock has finely laminated appearance. At 898 to 905 ft (273.7-275.8 m) is medium-gray fine-grained silty limestone or calcareous siltstone with upper contact gradational over 1 m. Bedding dips 10°-50°, mostly 30°-40°. Fractured or brecciated and altered at the following intervals: 813 to 815.5 ft (247.8-248.6 m), limestone and siltstone breccia with montmorillonite seams in matrix of siltstone breccia, locally with a network of quartz veinlets (<1 mm wide, and locally bleached and possibly kaolinite bearing, with lower contact dipping 25°); 819.4 to 820.3 ft (249.7-250.0 m), brecciated siltstone with montmorillonite seams in argillized matrix, and including 5 cm of soft white kaolinite(?)-rich material and 10 cm of fractured limestone with network of pyrite-bearing quartz veinlets (<1 mm wide), dips 30°-40°; 821 to 821.8 ft (250.2-250.5 m), montmorillonite-bearing argillized fractured siltstone, dips 40°-50°; 822.5 ft (250.7 m), 3 cm same as 821 to 821.8 ft, dips 40°; 824 to 825.5 ft (251.1-251.6 m) and 826.3 to 827.5 ft (251.8-252.2 m), fractured limestone with montmorillonite-bearing pyrite-rich material along fractures and powdery white calcite on some fractures; 834.7 to 835.6 ft (254.4-254.7 m), 840.5 to 842.3 ft (256.2-256.7 m), 847.1 to 848.5 ft (258.2-258.6 m), 853 to 854 ft (260.0-260.3 m), and 855.5 to 856 ft (260.7-260.9 m), intensely fractured to crushed soft light-gray argillized siltstone with montmorillonite seams, contacts irregular. Veinlets, in some cases forming networks, in following intervals: 815.5 to 819.4 ft (248.6-249.7 m), calcite veinlets, locally vuggy, to 2 mm wide; 819 to 830.5 ft (249.6-253.1 m) irregular wispy quartz veinlets <0.5 mm wide, with some pyrite,

becoming dense enough every 15 to 30 cm to form webby networks, and later generation of calcite veinlets to 1 mm wide; locally vuggy, 3 per meter; 830.5 to 838 ft (253.1-255.4 m), calcite veinlets to 2 mm, commonly vuggy, about 3 to 10 per meter; 832.7 to 833.1 ft (253.8-253.9 m) limestone breccia cemented by vuggy dolomite(?) in white rhombohedral crystals; 842.8 to 847 ft (256.9-258.2 m), irregular wispy dark-gray anhydrite veinlets, about 3 per meter; 849 to 852 ft (258.8-259.7 m) breccia cemented with vuggy dolomite(?); 852 to 853 ft (259.7-260.0 m), some vuggy calcite veinlets; 854 to 888 ft (260.3-270.7 m) black pyrite-bearing quartz(?) veinlets, generally 5 to 10 per meter, and calcite veinlets, locally vuggy, 1 to 3 per 10 cm, in diverse orientations.

905-926 (275.8-282.2)

Soft dark-gray to black mostly brecciated carbonaceous siltstone. Locally calcareous; includes fine-grained limestone with diversely oriented calcite veinlets at 908 to 910.5 ft (276.7-277.5 m). Larger siltstone fragments throughout contain calcite veins to 5 mm, occasionally 1 cm, wide. Bedding dips 20°-40°. Very fine grained disseminated pyrite less than 1 percent to 7 percent, relatively scarce in calcareous intervals. Brecciated from 906 to 906.5 ft (276.1-276.3 m); limestone fragments in powdery to vuggy calcite matrix at 906.5 to 926 ft (276.3-282.2 m), probably a fault zone; calcareous siltstone fragments in argillic matrix at 915 to 918 ft (278.9-279.8 m); siltstone fragments, mostly calcareous at 918 to 926 ft (279.8-282.2 m).

926-942.5 (282.2-287.3)

White soft to moderately hard medium-grained quartz monzonite. More or less argillized, with feldspar partly altered to clay, and 1 percent pyrite as disseminated grains to 0.5 mm. Pyrite tarnished, but limonite scarce. Upper contact is a fault, marked by breccia zone at 926 to 927.8 ft (282.2-282.8 m). Also crushed and brecciated zones at 932 to 933 ft (284.1-284.4 m) and 933.7 to 936.5 (284.6-285.4 m). All feldspar altered to clays at 927.8 to 932 ft (282.8-284.1 m). Below 932, partly altered plagioclase has pale yellow-green color. Between 929 and 932 ft (283.1-284.1 m) are two 1- to 3-mm-wide steeply dipping quartz-calcite veinlets with some pyrite.

942.5-963.7 (287.3-293.7)

Pale- to medium-green, locally white, hard feldspar pegmatite, and some mica-rich molybdenite-bearing greisen, as noted below. Feldspar includes plagioclase laths to 1 cm which form subradiating clusters. Plagioclase is pale olive green, saussuritized throughout. Five to 20 percent fine-grained gray interstitial quartz, and 0 to 3 percent pyrite. Greisen at 943.5 to 943.9 ft (287.6-287.7 m) and 944.3 to 948 ft (287.8-288.9 m) has 30 to 40 percent pale-brown mica in books 3 mm in diameter, occasionally to 1 cm in diameter, in light-gray feldspar matrix. One to 3 percent disseminated pyrite grains <0.25 mm diameter. Similar greisen at 962.5 to 963.7 ft (293.4-293.7 m) has about 15 percent aggregates of fine grained molybdenite to 2 mm diameter. Calcite veinlets occur throughout, about 3 per foot (10 per meter) and a few quartz veinlets at 942.5 to 943.5 ft (287.3-287.6 m). Fractured with minor clay (montmorillonite?) and thin calcite crusts coating fractures, in following intervals: 947 to 949 ft (288.6-289.2

m), 951.5 to 952 ft (290.0-290.2 m), 953.7 to 954 ft (290.7 to 290.8 m), 958 to 959 ft (292.0-292.3 m).

963.7-975 (293.7-297.2)

White soft to moderately hard medium-grained quartz monzonite. More or less strongly argillized, with as much as 1 percent pyrite, smaller than 0.25 mm, which forms scattered grains. Feldspar partly to completely altered except that potassium feldspar is only slightly altered at 970 to 973 ft (295.6-296.6 m). Contains calcite veinlets having diverse orientations, about 1 to 3 per foot (3-10 per meter). Mottled dark-gray and pink marble (grain size 1 mm) with 10 percent pyrite, as veinlets and patches, at 972.7 to 973.5 ft (296.5-296.7 m). Breccia zone at 974.5 to 975 ft (297.0-297.2 m), upper contact dips 50°. Lower contact irregular, dips about 40°.

975-1,044.5 (297.2-318.4)

Pale-pink and pale-gray locally banded mottled marble (grain size generally 1 mm). Calcite veins common, pyrite scarce (no more than 1 percent seen locally in grains smaller than 0.25 mm). Locally quartz-bearing; quartz probably formed by replacement, contains as much as 50 percent pyrite. Quartz at following intervals: 980 to 980.3 ft (298.7-298.8 m), contains about 20 percent pyrite; 984.8 to 989.7 ft (300.2-301.6 m) contains 15 to 20 percent pyrite, 30 to 40 percent in 2-cm-thick zone at lower contact; 1,008.8 to 1010.0 ft (307.5-307.8 m), contains 30 to 40 percent pyrite. Crushed zones at: 989.7 to 997.5 ft (301.6-304.0 m), contains soft montmorillonitic zone at 990.8 to 992 ft (302.0-302.3 m); 1,002.0 to 1,004.5 ft (305.7-306.2 m); 1,007 to 1,007.5 ft (306.9-307.1 m); 1,016.0 to 1,018 ft (309.7-310.3 m). Pink mottling gradually disappears over interval 1,012 to 1,017 ft (308.4-310.0 m).

1,044.5-1,048.5 (318.4-319.6)

Brecciated gray fine-grained marble. Montmorillonite moderately abundant in matrix, contains 5 percent fine disseminated pyrite.

1,048.5-1,069 (319.6-325.8)

Hard medium-olive-green banded skarn. Banding dips 20°-70°. Calcite veins throughout in diverse orientations, some epidote veinlets. Soft argillic crushed zones 1053.5 to 1054.5 ft (321.1-321.4 m) and 1,067.8 to 1,069 ft (325.5-325.8 m). Few chalcopyrite grains at 1,062.8 ft (323.9 m). Molybdenite veins at 1,059 ft (322.8 m) and 1,066.3 to 1,069 ft (325.0-325.8 m); pyrite locally abundant (10-20 percent) in lower 2.2 ft (0.7 m).

1,069-1,085.5 (325.8-330.8)

Hard to moderately soft pale-gray to white medium-grained biotite quartz monzonite, variably argillized. Relict texture good where orthoclase unaltered, otherwise poor. Soft breccia zone at 1,069 to 1,070.8 ft (325.8-326.4 m) is probably a fault. At 1,078.6 ft (328.6 m) is a 5-cm aplite dikelet, dips 45°.

1,085.5-1,121 (330.8-341.7)

Soft white argillized biotite quartz monzonite. Feldspar altered to montmorillonite and potassium mica. Few wispy quartz veinlets; pyrite

generally less than 1 percent. Argillaceous seam at 1,103.1 ft (336.2 m) and 1,119.8 ft (341.3 m) with very fine grained pyrite.

1,121-1,142 (341.7-348.1)
Hard to soft white to pale-gray biotite quartz monzonite, more or less argillized, harder zones propylitized. Pyrite generally less than 1 percent throughout, locally 1 to 2 percent. A few wispy quartz veinlets, less than 2 mm.

1,142-1,185 (348.1-361.2)
Hard slightly propylitized biotite quartz monzonite. Potassium feldspar unaltered, generally pink; plagioclase gray, locally partially altered to chlorite or potassium mica; biotite fresh to totally altered to potassium mica or chlorite. Pyrite absent.

1,185-1,223 (361.2-372.8)
Hard white to pale-gray weakly propylitized biotite quartz monzonite. Potassium feldspar and plagioclase generally partly altered to montmorillonite, biotite altered to chlorite or potassium mica. Pyrite disseminated, less than 1 percent. Upper and lower contacts with fresher quartz monzonite gradational over 1 ft (0.3 m). Small wispy quartz and (or) calcite veins every few feet. Few thin fractured or crushed zones.

1,223-1,341.5 (372.8-408.9)
Hard slightly propylitized biotite quartz monzonite, similar to 1,142 to 1,185 ft (348.1-361.2 m) interval. Soft, crushed, argillized zones at 1,238.5 to 1,240 ft (377.5-377.9 m), 1,245.3 to 1,247 ft (379.6-380.1 m), 1,267 to 1,267.2 ft (386.2-386.3 m), 1,267.6 to 1,267.7 ft (386.3-386.4 m), 1,267.9 to 1,270 ft (386.5-387.1 m), 1,272.5 to 1,273 ft (387.8-388.0 m), 1,277 to 1,285 ft (389.2-391.7 m), 1,301 to 1,304 ft (396.5-397.6 m), 1,330.4 to 1,333.8 ft (405.5-406.5 m). Little or no pyrite. Quartz veins, +/-pyrite, up to 3 cm, in intervals 1,223 to 1,236 ft (372.8-376.7 m), 1,267 to 1,285 ft (386.2-391.7 m), 1,294 to 1,301 ft (394.4-396.5 m), 1,304 to 1,340 ft (397.4-408.4 m); orientations diverse, but sets below 1,304 ft (397.4 m) dip 20° or less.

1,341.5-1,362.4 (408.9-415.2)
Hard pale-green-purple propylitized andesite, probably a dike. Porphyritic, with 10 percent 1- to 5-mm plagioclase phenocrysts and 10 percent 1- to 2-mm mafic phenocrysts. Weakly to moderately fractured. Local soft argillized zones at 1,349 to 1,350.5 ft (411.2-411.6 m), 1,359 to 1,361.2 ft (414.2-414.9 m). Less than 1 percent pyrite scattered throughout, locally up to 5 percent.

1,362.4-1,448 (415.2-441.3)
Very hard moderately propylitized biotite quartz monzonite. Pink potassium feldspar and gray plagioclase partially replaced by montmorillonite; biotite chloritized. Pyrite 0 to 0.5 percent. Quartz veins±pyrite, to 1 cm, occur every few feet throughout, typically have dips less than 20°. In interval 1,442-1,448 ft (439.5-441.3 m), rock becomes progressively more argillized, with feldspars replaced by montmorillonite and biotite by pyrite.

1,448-1,505 (441.3-458.7)

Hard, propylitized, to soft, argillized, biotite quartz monzonite. Pyrite scarce.

DRILL HOLE USGS 2

Detailed description, intervals in feet (meters):

0-14 (0-4.3)
Colluvium.

14-119 (4.3-36.3)
Porphyritic andesite with 15 to 30 percent plagioclase phenocrysts to 1 mm. Flow breccia texture visible locally, otherwise massive. Few scattered vesicles, partly filled with calcite, adularia, and zeolites. Propylitized except for a few weak argillized areas 0.5 to 2 ft (15-61 cm) thick. Color greenish gray, grayish purple where hematite moderately abundant. Scattered veinlets, wisps, and blobs of calcite. Oxidized, with minor limonite on fractures.

119-160 (36.3-48.8)
Porphyritic andesite flow breccia, locally with a few scattered vesicles. Propylitized, fractured, and weakly argillized; locally moderately strongly argillized. Color pale green due to removal of hematite by argillization. Locally propylitized only, not argillized, with calcite (±adularia) veins, wisps, and blobs, but calcite absent 130 to 160 ft (39.6-48.8 m). Limonite on scarce fractures. Soft core, moderately strongly argillized at 136.5-137 ft (41.6-41.8 m) and 142 to 144 ft (43.3-43.9 m).

160-296 (48.8-90.2)
Porphyritic andesite flow breccia, same as above. Well-developed flow banding, 194 to 195 ft (59.1-59.4 m), dips 40°. Flow breccia texture patchy, 214 to 247 ft (65.2-75.3 m). Propylitized, medium bluish gray, locally medium greenish gray where hematite scarce. Plagioclase saussuritized, and groundmass bears chlorite and minor epidote. A few scattered hornblende phenocrysts, which look unaltered, appear locally. Very minor pyrite present, but limonite stain persists on fractures (rock partly oxidized). Calcite and minor adularia and zeolite veinlets, wisps, and blobs form as much as 1 percent of core. Slightly argillized, with pale-olive color, 197.5 to 199.5 ft (60.2-60.8 m), and 212.8 to 214.1 ft (64.9-65.3 m). First coarse zeolite vein noted, 223.5 to 224.1 ft (68.1-68.3 m). Strongly crushed, with propylitized fragments in soft sandy moderately strongly argillized matrix, 290 to 296 ft (88.4-90.2 m).

296-365 (90.2-111.3)
Porphyritic andesite same as above but massive with a few angular cognate fragments to 2 cm scattered throughout. Propylitized, medium greenish gray to medium bluish gray. Very minor pyrite and minor epidote throughout (rock unoxidized). Locally a few scattered slightly altered or unaltered hornblende phenocrysts. Much of core fractured; thin halos of weak argillization follow fractures. Veinlets and wisps of calcite, zeolites, and possibly adularia.

365-497 (111.3-151.5)
Porphyritic andesite, same as above. Down to 478.5 ft (145.8 m), local vague mottling suggests poorly developed flow brecciation, and there are a few cognate

fragments to 1 cm. Several purplish zones 2 to 7 ft (0.6-2.1 m) thick, with somewhat larger and more abundant plagioclase phenocrysts, appear between 439.6 and 478.5 ft (134.0-145.8 m). Massive below 478.5 ft (145.8 m). Propylitized, grayish red purple. Plagioclase saussuritized, and minor epidote visible locally in groundmass. Scarce pyrite to 400 ft (121.9 m). Scattered calcite and adularia veinlets, and zeolite and calcite veinlets, blobs, and wisps. Fractures of diverse orientation throughout, with powdery calcite and kaolinite coating. Abundant zeolite and calcite pods and veins to 2 cm at 391.7 to 399 ft (119.4-121.6 m). Medium-red-purple zones 2 to 7 ft (0.6-2.1 m) thick, 402.5 to 478.5 ft (122.7-145.8 m), probably have less chlorite and more hematite. Calcite and zeolite veinlets are more abundant in red-purple material. Large vugs lined with quartz and calcite, 431.6-432 ft (131.6-131.7 m). Hornblende generally completely altered to epidote, 435 to 478.5 ft (132.6-145.8 m). From 478.5 to 497 ft (145.8-151.5 m), less hematite and more epidote than above. Epidote forms cores of saussuritized plagioclase, and partly replaces few scattered hornblende phenocrysts. Soft argillized rock with abundant montmorillonite seams, 478.5 to 479.5 ft (145.8-146.2 m).

497-572.5 (151.5-174.5)

Porphyritic andesite. Massive, same as 478.5 to 497 ft. Few probable cognate fragments to 1 cm below 548 ft (167 m). Propylitized, medium greenish gray to light bluish gray, with disseminated chlorite and scattered 1-mm patches of epidote. Relict texture generally poor. Two to 5 percent pyrite starting at 504 ft (153.6 m). Few hornblende phenocrysts starting at 533 ft (162.5 m), appear unaltered to 543 ft (165.5 m), but partly converted to pyrite below 543 ft (165.5 m). Few veinlets of zeolite and minor calcite. Fractures coated with powdery calcite and kaolinite, and small amounts of chlorite(?) occur on the walls of some. Argillized, crushed core, with seams of chlorite(?) along fractures, 497 to 506 ft (151.5-154.2 m) and 512 to 516.5 ft (156.1-157.4 m).

572.5-613 (174.5-186.8)

Same as above, massive. Weakly argillized, moderately hard but fractured, with many zones of crushed core. Minor clay on some fractures. Relict texture poor. Five percent pyrite, locally partly converted to limonite (rock partly oxidized). Few blobs of quartz, yellow calcite, and montmorillonite.

613-675 (186.8-205.7)

Same as above. Argillized, light gray to light bluish gray or light greenish gray. Strongly fractured to crushed throughout, soft to 640 ft (195.1 m) and below 664 ft (202.4 m), moderately hard mainly due to more abundant calcite from 640 ft (195.1 m) to 664 ft (202.4 m). Montmorillonite seams along fractures in soft areas. Scattered empty vugs in harder areas. Relict texture moderately good to poor. One to 5 percent pyrite, some probably replaces former hornblende phenocrysts; limonite halos on some pyrite grains. Propylitized from 659.5 ft (201.0 m) to 660.5 ft (201.3 m); hard, grayish red purple. Both upper and lower contacts gradational over 3 ft (1.0 m).

675-796 (205.7-242.6)

Porphyritic andesite flow breccia. Argillized, mostly moderately hard to 738 ft (224.9 m), mostly soft 738 ft to 768 ft (224.9-234.1 m), mostly moderately hard (due to more abundant calcite) 768 ft to 789 ft (234.1-240.5 m), mostly soft 789 ft to 796 ft (240.5-242.6 m), otherwise same as above. Several pockets as much as 1 cm in diameter, filled with kaolinite, 704 ft to 705 ft (214.6-214.9 m). From 738 ft to 768 ft (224.9-234.1 m), light greenish gray. Calcite, chlorite, pyrite, and minor epidote replace former hornblende phenocrysts at several spots. Fractures are coated with a thin crust of powdery white material containing minor calcite.

796-853 (242.6-260.0)

Porphyritic andesite. Flow breccia texture gradually dies out, absent below 807.5 ft (246.1 m). Only a few scattered cognate fragments persist to 832 ft (253.6 m). Argillized and propylitized, light to medium bluish gray, locally pale green. Relict texture generally poor to absent. Mostly hard, but moderately hard to soft 807.5 to 832 ft (246.1-253.6 m). Montmorillonite seams in soft areas, powdery crusts with minor calcite on fractures in hard areas. Small spots of limonite on some fractures. Two to 7 percent pyrite, some replacing hornblende along with leucoxene or chlorite. Locally, networks of small quartz veinlets with minor pyrite.

853-899 (260.0-274.0)

Porphyritic andesite flow breccia. Flow breccia texture dies out from 870 to 899 ft (265.2-274.0 m). Argillized, light bluish or greenish gray to medium bluish gray. Moderately hard, strongly fractured; much crushed core below 870 ft (265.2 m), with montmorillonite and rare zeolites on fractures. Relict texture generally poor, but locally good. Two to 3 percent pyrite. Hornblende phenocrysts rarely visible, converted to chlorite and pyrite. Locally few quartz phenocrysts or xenocrysts.

899-948 (274.0-288.9)

Porphyritic andesite. Massive except for 3-inch-thick flow breccia zones at 916.5 ft (279.3 m) (dip 40°) and 938.8 ft (286.1 m) (dip 60°). Propylitized, light to medium bluish gray. Fractured at several spots as much as 3 ft (90 cm) wide, with limonite patches on fractures. Several 1.5- to 3-ft (0.5-0.9-m) wide patches are weakly argillized. Poor relict texture. Five percent pyrite. The few scattered hornblende phenocrysts are converted to chlorite/montmorillonite, calcite, and pyrite to 934 ft (284.7 m); below 934 ft (284.7 m) they are unaltered or have minor epidote. Yellow and white zeolite and calcite veinlets, wisps, and blobs throughout.

948-971.5 (288.9-296.1)

Porphyritic andesite flow breccia. Propylitizied and argillized, light bluish gray. Argillized 948 to 953 ft (288.9-290.5 m) and 968.5 to 971.5 ft (295.2-296.1 m), otherwise propylitized and argillized. Relict texture poor to moderately good. Three to 5 percent pyrite. Some scattered 1- to 2-mm limonite-stained spots at 948 to 953 ft (288.9-290.5 m) are converted to pyrite and black material (magnetite?). Calcite and (or) zeolite veinlets throughout.

971.5-1,006.5 (296.1-306.8)

Andesitic lapilli tuff with abundant 1 mm to 6 cm angular to subrounded porphyritic andesite fragments. Every few feet, 0.5 to 2 ft (15-60 cm) bedded intervals appear. Bedding is produced by laminae of fine to coarse ash with a few lapilli-size fragments. Sharp upper contact dips 40°. Propylitized and argillized, medium bluish gray. Five percent pyrite. Some larger fragments have several percent mafic minerals, converted to pyrite and black material (magnetite? and calcite).

1,006.5-1,016 (306.8-309.7)

Porphyritic andesite with poorly developed flow breccia texture. Upper contact sharp, dips 55° to 60°. Similar to andesite above 971.5 ft (296.1 m), except hornblende phenocrysts smaller (less than 2 mm) and scarcer. Propylitized, light gray. Moderately good relict texture. Five percent pyrite. Five percent mafic minerals, probably hornblende, converted to pyrite and black material (magnetite?). Zeolite veinlets throughout.

1,016-1,100 (309.7-335.3)

Porphyritic andesite tuff(?). Down to 1,055.5 ft (321.7 m) plagioclase phenocryst content is relatively high (25-30 percent), and the rock has a sandy appearance: it is probably a coarse andesitic crystal tuff instead of a flow. From 1,055.5 to 1,079.5 ft (321.7-329.0 m) is poorly developed flow breccia with only a few cognate fragments to 1 cm, in interval from 1,061 ft to 1,073.5 ft (323.4-327.2 m). Below 1,079.5 ft (329.0 m), flow breccia texture is generally well developed. Argillized, light gray to bluish gray, and below 1,080 ft (329.2 m), light greenish gray. Moderately soft, strongly fractured, crushed in many places down to 1,055.5 ft (321.7 m). Moderately hard (due to more abundant calcite) below 1,055.5 ft (321.7 m). Moderately good relict texture. Two to 5 percent pyrite, and locally a few 1- to 2-mm-diameter patches of limonite stain. Hornblende altered to dark-grayish-green montmorillonite and minor pyrite and epidote to 1,055.5 (321.7 m), and to pale-olive-green chlorite/montmorillonite and minor pyrite below 1,055.5 (321.7 m); hornblende very scarce below 1,071 ft (326.4 m).

1,100-1,134.5 (335.3-345.8)

Porphyritic andesite flow breccia. Argillized, very light gray to light gray. Mostly very soft, with poor relict texture. Five percent pyrite, with a few 1- to 2-mm limonite-stained spots. Few percent mafics, altered to chlorite and (or) montmorillonite plus minor pyrite. Montmorillonite seams common.

1,134.5-1,158 (345.8-352.9)

Aphanitic to porhyritic andesite, probably a different flow from that above. Flow banding at top of flow, 1,134.5 to 1,135 ft (345.8-345.9 m), dips 20° to 30°. Poorly developed flow breccia texture at 1,137 to 1,137.7 ft (346.5-346.8 m). Flow is aphanitic at top; phenocrysts become gradually coarser with depth, reaching maximum phenocryst size at 1,156 ft (352.3 m), with 2-mm plagioclase phenocrysts (some to 4-5 mm) forming 25 percent of rock. Propylitized, medium bluish gray, to argillized, light gray. Propylitized and argillized rock form alternating zones 0.5 ft (15 cm) to 8 ft (2.4 m) wide. Intensely fractured where propylitized, crushed where argillized. Pyrite ranges from very scarce to as

much as 5 percent. Relict texture poor to very good (best in propylitized areas, with plagioclase nearly fresh to saussuritized). Veinlets of calcite, and calcite±clay(?) in propylitized rock. Argillized rock bears montmorillonite seams.

1,158-1,164 (352.9-354.8)
No core. Probable fault zone.

1,164-1,265 (354.8-385.6)
Porphyritic andesite, massive except for flow banding at 1,183.8 ft (360.8 m) (dip 30°), 1,194.5 to 1,196 ft (364.0-364.5 m) (dip 40°), and 1,262.5 ft (384.8 m) (dip 25°-30°), and poorly developed flow breccia at 1,233.8 to 1,237.5 ft (376.1-377.2 m), and 1,264.8 to 1,265 ft (385.5-385.6 m) (dip 25°). Finer grained than above material, with most plagioclase phenocrysts less than 1 mm diameter. Mafics and opaques total 5 percent or less, are very fine grained (less than 0.1 mm), and are observed only locally. Texture of above interval grades into this interval, 1,164 to 1,168 ft (354.8-356.0 m). Plagioclase and mafics become slightly coarser again, 1,233 to 1,265 ft (375.8-385.6 m). Dominantly propylitized in upper part, medium bluish gray to pale red purple, grading to dominantly argillized in lower part, light greenish gray. Bluish to purplish color in propylitized material is due to disseminated hematite. Good relict texture to 1,205.5 ft (367.4 m), poor to 1,223 ft (372.8 m), generally good below. In propylitized rock, plagioclase is nearly fresh and pyrite is absent above 1,181.5 ft (360.1 m). Below 1,181.5 ft (360.1 m), plagioclase saussuritized, rock has some small epidote patches (0.5 mm) and 3 to 5 percent pyrite. Where hematite is abundant (red-purple color), pyrite is scarce. Below 1,233 ft (375.8 m), mafics are converted to dark-green chlorite. Veinlets and vugs (to 2 cm) in propylitized rock are filled with calcite, quartz, and zeolite. Down to 1,197 ft (364.8 m) are several fractured and argillized zones, 1 to 7 ft (30 cm-2.1 m) thick. Argillization along 2- to 3-cm-thick crushed zones at 1,177 ft (358.7 m) (dip 65°-70°) and 1,184 ft (360.9 m) (dip 30°). Argillized rock predominant over propylitized rock in intervals 1,197 to 1,205.5 ft (364.8-367.4 m), and 1,223 to 1,265 ft (372.8 to 385.6 m), forming 0.5- to 3.5-ft (15 cm-1.1 m)-thick zones of soft core with abundant montmorillonite seams. Few gypsum veinlets, 1,262 ft to 1,265 ft (384.6-385.6 m).

1,265-1,278.5 (385.6-389.7)
Fine-grained rhyodacitic vitric-crystal tuff, with 20 percent plagioclase and quartz crystals as much as 2 mm diameter in a fine tuff matrix. Bedding shown by 1- to 3-in. (3-8 cm) layers of finer grained, better sorted tuff (plagioclase crystals to 1 mm) every few inches to 1 ft (30 cm), and a few coarser, more poorly sorted beds with some aphanitic lithic fragments to 1 cm (dip 20°-30°). Last 1.3 ft (40 cm) of interval contains two beds of rhyodacitic lapilli tuff containing quartz and plagioclase crystals and andesitic lithic fragments. Argillized, medium to dark gray. Dark-gray areas (predominant) are soft, have about 1 percent very fine grained disseminated pyrite (less than 0.1 mm), and abundant black montmorillonite seams. Medium-gray areas are moderately hard, have 5 to 10 percent pyrite. Relict texture good in medium-gray areas, poor in dark-gray areas.

1,278.5-1,337.5 (389.7-407.7)

Rhyodacitic lapilli tuff, very poorly sorted, with 20 percent fragments 4 mm to 4 cm diameter (most are less than 1.5 cm), including aphanitic and porphyritic volcanics, siliceous argillite (Palmetto Formation), and a few fragments of lithic-crystal tuff or volcanic sandstone. Matrix is fine ash with 30 percent coarse ash-size crystals, mostly feldspar, with as much as 5 percent of the coarse ash fraction being quartz. Local variations in sorting and maximum clast size reveal crude bedding, dips 30°-35°. Argillized, medium-gray, soft, and montmorillonite-bearing. One percent or less pyrite, very fine grained (less than 0.1 mm).

1,337.5-1,386 (407.7-422.4)

Mostly fine rhyodacitic tuff. Lapilli tuff texture is locally visible to 1,347 ft (410.6 m), and at 1,371 ft to 1,376.5 ft (417.9-419.5 m). Some coarse tuff with several inch-thick lapilli tuff interbeds (same as coarse tuffs and lapilli tuffs described in the two previous intervals, 1,390 to 1,395 ft (423.7-425.2 m). Argillized, medium gray, soft, with abundant montmorillonite forming closely spaced seams that obscure relict texture. One percent or less pyrite, very fine grained, as above.

1,386-1,395 (422.4-425.2)

Mostly tuffaceous rocks same as 1,400.5 to 1,420 ft (426.9-432.8 m) (see below). Bedding at 1,392 ft (424.3 m) dips 50°. Upper contact placed at first conglomerate bed. Interbeds of material similar to above interval at 1,390 to 1,391.5 ft (423.7-424.1 m) and 1,393 to 1,394 ft (424.6-424.9 m). Argillized, medium gray, soft, with abundant montmorillonite forming closely spaced seams obscuring original textures. Pyrite less than or equal to 1 percent and very fine grained, as above.

1,395-1,400.5 (425.2-426.9)

Amygdular porphyritic andesite with several inclusions of tuffaceous(?) volcanic sandstone and conglomerate (same as next interval below) varying from 1 cm to 10 cm: several of the larger ones occupy the entire core at 1,395.5 ft (425.3 m), 1,396 ft (425.5 m), and 1,397 ft (425.8 m). A partially fused quartz monzonite inclusion occurs as 1,399.5 to 1,400 ft (426.6-426.7 m). Stretched and alined amygdules at 1,398 (426.1 m) show flow orientation, dip 40°. Probably a dike or sill. Propylitized, light bluish gray, with altered plagioclase and small mafic grains (less than 0.5 mm) converted to chlorite, but tuffaceous(?) sedimentary rock inclusions appear to be argillized, medium gray. Strongly fractured to crushed throughout. Pyrite scarce. Amygdules filled with calcite and quartz.

1,400.5-1,420 (426.9-432.8)

Bedded fine rhyodacitic tuff to very coarse tuffaceous sandstone and conglomerate. Individual beds range in thickness from 0.5 in. to 1 ft (1-30 cm), the coarser beds being thicker. Sorting relatively poor throughout except for thin fine tuff beds. Clasts are 20 to 30 percent quartz, 15 to 30 percent feldspar, and 40 to 60 percent or more lithics, mainly aphanitic and porphyritic volcanics, plus a minority of chert and siliceous argillite fragments (Palmetto Formation) and a few possible fine-grained granitic fragments. Bedding attitude is quite variable: sedimentary structures that produce the variation include probable

crossbedding, loading structures around large clasts, and small folds, some recumbent, probably due to downslope movement. Argillized, medium light gray. Pyrite scarce in beds with coarse relict texture, but several percent very fine grained disseminated pyrite occurs in beds with fine-grained relict texture. Montmorillonite forms a few seams, and is abundant in tuff beds and in matrix of coarser sediments. Crushed zones 1.5 ft (46 cm) thick at 0.5- to 5-ft (15 cm-1.5 m) intervals throughout.

1,420-1,437 (432.8-438.0)

Tuff and epiclastic rocks, same as above. Argillized, medium gray, soft, with abundant montmorillonite forming networks of seams in matrix around relict clasts. Strongly fractured. One percent very fine grained disseminated pyrite. Upper contact gradational over 1 ft (30 cm). Crushed core, 1,436 to 1,437 ft (437.7-438.0 m).

1,437-1,439 (438.0-438.6)

Prophyritic andesite with a few amygdules. Looks very similar to andesite at 1,395 to 1,400.5 ft (425.2-426.9 m). May be another dike or sill. Propylitized, light bluish gray. Hard, strongly fractured; moderately good relict texture. Plagioclase altered to montmorillonite and calcite, with minor chlorite; mafics converted to pyrite and calcite. Few scattered amygdules are filled with calcite and quartz.

DRILL HOLE USGS 3

Detailed description, intervals in feet (meters):

0-10 (0-3.0)
Colluvium.

10-94.5 (3.1-28.8)
Hard dark-bluish-gray propylitized rhyodacite, with 25 percent saussuritized plagioclase phenocrysts (1-2 mm, few to 4 mm), 7 to 10 percent brassy biotite plus altered hornblende (with hematite rims) phenocrysts (0.5 mm), and 1 to 2 percent rounded, corroded, quartz phenocrysts (1-2 mm, locally to 4 mm; scarce below 28 ft (8.5 m)); biotite becomes coarser with depth (to 1 mm, below 50 ft (15.2 m)). Scattered white rounded fine-grained inclusions to 1 cm occur throughout. Flow breccia zone at 36 to 46 ft (11.0-14.0 m), bounded at bottom by 1-cm-thick flow band dipping 50°. Calcite veinlets, with diverse orientations, throughout; vugs common, up to 5 cm. Flow(?) breccia zones at 21.3 to 27 ft (6.5-8.2 m), 34 to 35 ft (10.4-10.7 m), 48 to 49.5 ft (14.6-15.1 m), 51.5 to 53 ft (15.7-16.2 m), and 60 to 94.5 ft (18.3-28.8 m) intervals healed with dark-green chlorite, quartz, calcite, and hematite.

94.5-120.5 (28.8-36.7)
Hard more or less intensely fractured to soft crushed propylitized to somewhat argillized rhyodacite with olive-brown to yellow color due to variable limonite. Plagioclase variably altered to montmorillonite; mafics altered to limonite, black goethite, leucoxene and chlorite(?). In 94.5-106.5 ft (28.8-32.5 m) interval, vugs to 2 cm, lined with calcite.

120.5-156.5 (36.7-47.7)
Hard locally fractured medium-bluish to greenish-gray propylitized rhyodacite flow breccia. Discrete breccia zones between 121 and 136 ft (36.9-41.5 m) dip 40°-60°. A few 1-cm fine-grained inclusions scattered throughout. Plagioclase saussuritized; hornblende altered to leucoxene±limonite, and rimmed by hematite; biotite replaced by yellow to white potassium mica; 1 to 2 percent hematite grains in groundmass replacing opaques; scarce quartz phenocrysts are unaffected by alteration. Groundmass pale purple to green depending on hematite content. Below 145.5 ft (44.3 m) are several strongly fractured zones up to 70 cm thick. Below 148 ft (45.1 m), relict texture locally poor, possibly due to strong propylitization and weak argillization combined; this represents transition to next interval below.

156.5-172 (47.7-52.4)
Hard medium-grayish-green propylitized rhyodacite, relict texture good to poor. Upper contact at point where groundmass hematite is no longer apparent. Locally strongly fractured with fracture coatings of limonite and montmorillonite. Patchy limonite stain throughout. Few scattered vugs to 1 cm, lined with calcite.

172-214 (52.4-65.2)

Moderately hard to moderately soft propylitized rhyodacite with many soft argillized zones. Moderately good relict texture. Plagioclase saussuritized to argillized. Abundant limonite forming stains and patches, probably replacing mafics. Softest areas are crushed, form about one-third of core in zones 2 cm to 1.0 m thick. About 25 percent of rock below 204 ft (62.2 m) is unoxidized, in patches with sharp contacts, containing 3 to 5 percent pyrite (to 0.25 mm) scattered throughout.

214-220.5 (65.2-67.2)

Hard pale-greenish-gray propylitized and argillized rhyodacite with good relict texture. Plagioclase, 20 to 25 percent, up to 5 mm, saussuritized to argillized; biotite, about 0.5 mm, altered to potassium mica or montmorillonite and leucoxene; hornblende, about 0.5 mm, altered to leucoxene; scarce quartz. As much as 3 percent pyrite scattered through groundmass.

220.5-243.8 (67.2-74.3)

Soft crushed to moderately hard argillized and propylitized rhyodacite. Plagioclase extensively altered to montmorillonite and calcite. Softer material contains numerous montmorillonite seams. Generally 2 percent pyrite as scattered grains or aggregates, to 0.5 mm. Minor limonite stains at 220.5 to 223 ft (67.2-68.0 m), 227.3 ft (69.3 m), and 241.5 to 243.6 ft (73.6-74.2 m).

243.8-249.5 (74.3-76.0)

Moderately hard fractured pale-gray propylitized and argillized rhyodacite. Plagioclase saussuritized, 20 percent, generally less than 2 mm; biotite, 5 percent, 0.25 to 1 mm, altered to potassium mica±hematite; few percent altered hornblende. Two percent pyrite (to 0.5 mm) and 2 percent hematite (replacing opaques?).

249.5-289 (76.0-88.1)

Hard fractured to soft crushed propylitized and argillized rhyodacite. Plagioclase phenocrysts to 2 mm, 30 to 35 percent; biotite to 0.5 mm, less than 5 percent; scarce quartz. Two percent pyrite, less than 0.5 mm; 1 percent hematite. Fine-grained mafic inclusion at 275.8 ft (84.1 m), rounded, with black iron oxide(?) replacing originally abundant hornblende(?); additional inclusions at 263.3 ft (80.3 m). Calcite-lined vugs at 272 to 274 ft (82.9-83.5 m). Montmorillonite seams locally abundant in interval 258.4 to 285.5 ft (78.8-87.0 m).

289-326 (88.1-99.4)

Hard pale-purple to blue (nearly white) propylitized to argillized rhyodacite; dacite flow breccia at 307 to 309 ft (93.6-94.2 m) and 314 to 326 ft (95.7-99.4 m). Relict texture poor. Pyrite 1 to 5 percent, generally 2 to 3 percent, in cubes to 0.5 mm. Thin wispy quartz veinlets to 1 mm, scattered throughout. Fine-grained mafic inclusions at 291 to 293 ft (88.7-89.3 m) and 309 to 326 ft (94.2-99.4 m). Montmorillonite seams common from 294 to 307 ft (89.6-93.6 m).

326-351 (99.4-107.0)
Soft but generally intact white to light-gray argillized rhyodacite. Relict texture poor. One to 3 percent pyrite (to 0.25 mm); 1 percent hematite (to 0.5 mm). Large vugs in interval 326 to 332 ft (99.4-101.2 m).

351-365 (107.0-111.3)
Moderately hard weakly to moderately fractured white argillized rhyodacite flow breccia. Relict texture poor.

365-381 (111.3-116.1)
Soft locally crushed, to hard intensely fractured white to pale-green argillized to propylitized rhyodacite. Pyrite 2 to 3 percent, hematite very minor.

381-383 (116.1-116.7)
Fault zone(?), poor core recovery.

383-394.8 (116.7-120.3)
Hard locally strongly fractured, argillized and propylitized rhyodacite flow breccia. Plagioclase phenocrysts, 30 percent, to 1.5 mm but a few to 1 cm, altered to montmorillonite or potassium mica; biotite, 3 to 5 percent, generally less than 0.5 mm, altered to leucoxene, pyrite, hematite; hornblende 3 to 10 percent, to 2 mm, altered to potassium mica+pyrite. Quartz to 1 mm, scarce. Groundmass mottled pale green and purple. Pyrite generally about 5 percent. Rock near bottom of interval fine grained, more strongly fractured. Few fractures, generally 75° to 90°, have pale-green montmorillonite and minor calcite.

394.8-396 (120.3-120.7)
Soft but mostly intact montmorillonitic volcanic conglomerate; poorly sorted, with 20 to 30 percent clasts (2 mm to 5 cm; generally less than 1 cm), including white, green, and medium-gray aphanitic silicic to intermediate(?) volcanic rocks, 5 to 10 percent porphyritic andesite and (or) latite fragments, and about 10 percent black siliceous shale or argillite and medium-gray to brown chert fragments (Palmetto Formation). Most fragments angular to subangular, but some argillite clasts are rounded/subrounded. Matrix is coarse sand: 50 percent quartz or chert, 15 to 20 percent feldspar, 30 percent lithics. Pyrite less than 1 percent. Vague bedding dips 40°-45° at 395 to 395.5 ft (120.4-120.5 m) and 40° at 401.5 to 402 ft (122.4-122.5 m). Interbeds of fine tuffaceous sandstone and siltstone occur at 394.8 to 395 ft (120.3-120.4 m) and 395.8 to 396 ft (120.6-120.7 m). Core broken, possibly due to fault, at 394.8 ft (120.3 m) and 396 ft (120.7 m).

396-399 (120.7-121.6)
Soft generally intact but locally crushed argillized latitic tuff. Relict texture very poor. Plagioclase phenocrysts 25 to 30 percent or more, to 2 mm; biotite 10 percent or more; euhedral, to 1 mm; no hornblende or quartz. Pyrite generally 3 percent, to 0.25 mm, but locally to 10 percent. Montmorillonite seams abundant. Bedding indicated by green streaks and vague relict foliation at 396 to 397 ft (120.7-121.0 m): 40°. Possibly part of the Kendall Tuff.

399-404.3 (121.6-123.2)
Soft argillized volcanic conglomerate, essentially identical to interval at 394.8 to 396 ft (120.3-120.7 m). Bedding at 401.5 and 402 ft (122.4-122.5 m) dips 40°.

404.3-421.6 (123.2-128.5)
Soft argillized latite tuff, essentially identical to interval at 396 to 399 ft (120.7-121.6 m). Bedding at 408 to 409 ft (124.4-124.7 m) dips 40°-50°; at 409 to 410.5 ft (124.7-125.1 m) dips 60° to 70°; at 411.5 to 413 ft (125.4-125.9 m) dips 40° to 55°. Interval 416.8 to 421.6 ft (127.0-128.5 m) completely crushed, has 7 percent pyrite and abundant montmorillonite seams with low dips (parallel to bedding?). At 420 ft (128.0 m) is 15-cm dark-green zone with abundant coarse pyrite as fracture coatings (large mafic fragment in tuff?).

421.6-423 (128.5-128.9)
Soft volcanic conglomerate with abundant montmorillonite-coated fractures. Intact in middle, crushed at top and bottom of interval.

423-424 (128.9-129.2)
Hard broken medium-green propylitized latite tuff(?) with abundant biotite altered to pale-pink potassium-mica+hematite.

424-428.4 (129.2-130.6)
Soft montmorillonite-rich fault breccia containing fragments of volcanic conglomerate and latite tuff(?).

428.4-437 (130.6-133.2)
Very soft but intact argillized latite tuff. Montmorillonite seams very abundant. Vague green splotches at 428.4 to 430.5 ft (130.6-131.2 m) may be cognate latite lapilli. Biotite locally abundant (20 percent) below 430.5 ft (131.2 m) and rock is similar to crystal tuffs northeast of Banner Mountain. Pyrite about 3 percent, less than 0.25 mm. Interval 430.5 to 437 ft (131.2-133.2 m) brecciated, probably due to faulting.

437-449 (133.2-136.9)
Hard pale-green propylitized and argillized rhyodacite. Intense fracturing at 437 to 443 ft (133.2-135.0 m), somewhat less intense below 443. Plagioclase phenocrysts about 20 to 25 percent, to 1.5 mm (few to 4-5 mm); biotite, 5 percent, generally less than 0.5 mm; hornblende, 2 to 5 percent, mostly less than 1 mm; quartz very rare. Pyrite, 3 percent to 0.25 mm. Patchy calcite coatings on some fractures.

449-452 (136.9-137.8)
Very soft montmorillonite-rich latitic crystal tuff(?) with 20 percent or more plagioclase phenocrysts (to 1 mm) and up to 20 percent biotite (to 2 mm). Granitic fragment at 451.9 ft (137.7 m).

452-452.5 (137.8-138.0)
Fault zone with massive coarse polycrystalline quartz and minor calcite. Two zones, 5 cm thick, separated by 2 to 3 cm of dark-gray montmorillonitic breccia;

all probably part of a granitic fragment from overlying latite tuff caught up in fault zone. About 3 percent pyrite.

452.5-457 (138.0-139.3)

Hard, intensely fractured, pale-green to white, propylitized and argillized latite. Relict texture very poor, no quartz apparent. Thirty percent saussuritized plagioclase phenocrysts, 5 percent biotite altered to calcite. Pyrite about 3 percent to 0.25 mm.

PETROGRAPHIC DATA

METHODS OF INVESTIGATION

We examined all samples by transmitted-light optical methods, using standard thin sections. To identify fine-grained secondary minerals, we subjected most samples to X-ray diffraction analysis. We obtained X-ray patterns using a diffractometer with output to a chart recorder. The emphasis in our study was to identify all minerals present, not to quantify abundances of major minerals. Consequently, we did not employ any methods meant to provide quantitative or semi-quantitative estimates of mineral abundances.

RESULTS

Drill hole USGS 1 penetrates rhyodacite, andesite, and latite flows of the Tertiary section, then siltstone and limestone of the Palmetto Formation of Ordovician age, and finally intrusive quartz monzonite of Late Jurassic age. Near the intrusive contact, the quartz monzonite contains some pegmatite and greisen. An andesite dike cuts the quartz monzonite. This dike is not clearly related to any flow in the overlying Tertiary section. Drill holes USGS 2 and 3 penetrate mainly volcanic rocks, including flows and tuffs of andesitic, rhyodacitic, and latitic composition. Conglomerate and sandstone seen in USGS 2 and 3 contain lithic clasts mainly of volcanic origin.

The pre-Tertiary sedimentary rocks penetrated in USGS 1 probably were subjected to regional greenschist-facies metamorphic conditions, and rocks near the quartz monzonite also underwent contact metamorphism. Hydrothermal activity produced argillic alteration, and probably at least some of the propylitic alteration that affects numerous intervals throughout all three drill holes. This hydrothermal alteration accompanied volcanism in Early Miocene time (Ashley and Silberman, 1976). Some propylitic alteration in both the quartz monzonite and Tertiary flows, however, may pre-date the main hydrothermal event. Paleozoic rocks in southwestern Nevada generally show greenschist-facies mineral assemblages, leading us to infer that chlorite, mica, and possibly some clay in the siltstone of USGS 1 probably was formed during regional metamorphism, but it is difficult to discriminate between metamorphic and hydrothermal minerals in these rocks. Limestone in USGS 1 is all more or less recrystallized, the result of both regional and contact metamorphism. In addition, the quartz monzonite contains an inclusion of skarn showing copper and molybdenum mineralization.

The petrographic data are given in the tables that follow. Because we have only qualitative estimates of mineral abundances, both primary and secondary minerals are listed in approximate order of decreasing abundance. The lists of primary and secondary minerals for each sample are independent of each other, so the most abundant secondary mineral in a sample may, for example, be more or less abundant than the most abundant primary mineral in the same sample. In rocks showing strong or intense alteration, the primary minerals, with the exception of quartz, are entirely altered, so the primary minerals shown represent the mineral assemblage inferred for the original rock, prior to alteration.

Table 5. Petrographic data for thin sections taken from Goldfield Drill Hole USGS 1.

[Alteration types: P, propylitic; A, argillic. W, weak alteration; most primary minerals remain. M, moderate alteration; groundmass largely to completely altered, and phenocrysts partly altered. S, strong alteration; no primary minerals remain but original textures preserved. I, intense alteration; primary minerals and textures completely obliterated. Mineral species codes are: Ab, albite; Ahy, anhydrite; B, biotite; Ba, barite; Brl, beryl; Cbn, carbonaceous material; Cc, calcite; Chb, chabazite; Chl, chlorite; Cor, corundum; Cpx, clinopyroxene (diopsite/augite); Dia, diaspore; Dol, dolomite; Ep, epidote; F, feldspar; G, goethite; Hbl, hornblende; Hem, hematite; J, jarosite; K, kaolinite; Kfa, adularia; Kfo, orthoclase; Kfs, sanidine; Km, potassium mica (includes muscovite); Lm, laumontite; Lx, leucoxene; M, montmorillonite; Mf, mafics, species indeterminant due to alteration; Mt, magnetite; Opx, orthopyroxene; Pl, plagioclase; Py, pyrite; Q, quartz; Sph, sphene; Vv, vesuvianite; Z, zeolite. Numbers in parentheses ( ) are visual estimates of modal percentages and refer to phenocrysts only; tr, trace; (vein), mineral is restricted to veins]

Depth ft	Depth m	Rock type	Alteration type	Degree of Alteration	Primary minerals (in order of decreasing abundance)	Secondary minerals (in order of decreasing abundance)
15.4	4.7	Rhyodacite	A	S	Pl (15), Mf (10), Q, (1), Mt (1)	M, Q, Km, Hem, Lx, Sph, G
74.5	22.7	do.	A	S	Pl (15), Mf (12), Q (2), Mt (1)	M, Q, Py, Km, Sph, Lx
94.2	28.7	do.	A	S	Pl (20), Mf (6), Q (2), Mt (1)	M, Q, Km, Py, Lx, Sph
132.2	40.3	do.	A	S	Pl (10), Mf (4), Q (2), Mt (1)	M, Q, Py, Km, Lx
142.1	43.3	do.	P	M	Pl (10), Mf (10), Q (2), Mt (1)	Chl, Q, Mt, Lx, Cc, Hem
176.5	53.8	do.	P	W	Pl (10), Hbl (6), B (4), Q (3), Mt (1), Cpx (1)	Chl, Cc, Lx, Mt
207.0	63.1	Andesite	A	M	Pl (20), Mf (10)	M, Py, Cc, Lx
251.0	76.5	do.	P	S	Pl (15), Mf (3)	M, Ab, Cc, Py, Lx, Chl
284.4	86.7	do.	P	W	Pl (20), Mf (10), Mt (2)	Chl, Cc, Hem, K(?), Ab
306.4	93.4	do.	A	S	Pl, Mf	M, Chl, Ab, Cc, Q, Lx, Kfa
312.0	95.1	Latite	P	S	Pl (25), Mf (8)	M, Q, Chl, Ab, Hem
315.3	96.1	do.	P	S	Pl (20), Mf (5)	M, Q, Chl, Ab, Hem
316.3	96.4	do.	P	S	Pl (17), Mf (6)	M, Q, Chl, Cc, Lx, Py, Hem, Kfa
332.3	101.3	do.	P, A	S	Pl (15), Mf (6)	M, Q, Ab, Chl, Km, Py
356.6	108.7	do.	A	I	Pl, Mf	M, Q, Chl, Ab, Km, Py
368.1	112.2	do.	P	M	Pl (10), B (4), Hbl (2)	M, Q, Ab, Cc, Chl, Py, Km, G
382.9	116.7	do.	P, A	I	Pl, Mf	M, Q, Py, Km, Chl, G
408.5	124.5	do.	P, A	S	Pl (15), Mf (10),Mt (1)	M, Ab, Cc, Hem, Chl, Q, Km, Py
425.5	129.7	do.	P, A	S	Pl (20), Mf (4), Mt (1), Kfs? (tr)	M, Ab, Cc, Q, Hem, Chl, Km, Py
466.9	142.3	do.	P, A	S	Pl (18), Mf (10), Mt (1)	M, Ab, Cc, Km, Hem, Q
470.8	143.5	do.	P	S	Pl (15), Mf (5)	Cc, Ab, Q, Km, Hem, Chl

Table 5. Continued

483.9	147.5	do.	P	S	Pl (14), Mf (7), Mt (2)	M, Ab, Cc, Hem, Q, Chl, Km
492.4	150.1	do.	A	I	Pl, Mf	Km, Q, Py, Cc
524.6	159.9	do.	P	I	Pl, Mf	M, Q, Cc, Py, Km
543.6	165.7	do.	P	I	Pl, Mf	M, Ab, Q, Cc, Hem, Chl
554.5	169.0	do.	P	S	Pl (20), Mf (3)	M, Q, Ab, Cc, Py, Km
585.0	178.3	do.	A	I	Pl, Mf	M, Q, Py, Cc, Km
611.5	186.4	do.	P	S	Pl, Mf	M, Ab, Hem, Py, Km
616.8	188.0	do.	P	S	Pl (16), Mf (7)	M, Q, Chl, Km, Hem
620.1	189.0	do.	A	I	Pl, Mf	M, Cc, Py
628.6	191.6	Siltstone	A	I	F, Q, Cc	M, Q, Chl, Py
644.0	196.3	do.	A	W	F, Q, Cc	Cc, M
663.0	202.1	do.	A	I	Dol, Q	Km, Py
703.4	214.4	do.	A	I	Cc, Q	M, Q
715.9	218.2	do.	A	I	Cc, Q, F	Cc, M, Ba
717.8	218.8	do.	A	S	Cc, Q, Vv	Cc, M
760.8	231.9	do.	A	S	Q, F, Cbn	Q, M, Km
789.0	240.5	do.	A	S	Q, F, Cbn	Q, M, Ep
821.8	250.5	Limestone	A	S	Cc, Q	M (vein), Py (vein), Z (vein)
843.5	257.1	do.	A?	W	Cc, Dol	Ahy (vein), Py (vein)
864.5	263.5	do.	A?	W	Cc	Py (vein)
892.0	271.9	do.	A?	W	Cc	Py (vein)
919.6	280.3	Siltstone	A	S	Q, F, Cbn	Q, M, Cc (vein)
930.4	283.6	Quartz monzonite	A	I	Q, F, Mf	M, Py, Km
938.0	285.9	do.	A	I	Q, F, Mf	M, Cc, Py, Hem, Z
942.9	287.4	Pegmatite	P	I	Q, F, Km, Brl	Cc, Chl, Ep, Sph, Hem
945.5	288.2	do.	P	I	Q, F, Km, Brl	Cc, Ba
954.4	290.9	do.	P	I	Q, F	Cc, M, Chl, Ep, Q, Py
969.5	295.5	Quartz monzonite	A	I	Q, F, Mf	M, Cc, Py
978.3	298.2	Limestone/marble	P	W	Cc	Py
985.6	300.4	do.	P	W	Cc	Py, Q

Table 5. Continued.

988.2	301.2	do.	P	I	Cc	M, Cc
995.4	303.4	do.	P	W	Cc	Py
1,000.6	305.0	do.	P	I	Cc	Q, Cc, Py, Cor
1,005.6	306.5	do.	P	W	Cc	Py
1,009.5	307.7	do.	P	I	Cc	Q, Cc, Py, Hem
1,053.1	321.0	Skarn	P	W	Cpx, Q	Cc, Py
1,060.7	323.3	do.	P	W	Vv, Cpx, Ep	Cc (vein)
1,111.5	338.8	Quartz monzonite	A	S	Q, F, Mf	M, Py, Km
1,128.6	344.0	do.	A	S	Q, F, Mf	M, Q, Py
1,148.0	349.9	do.	P	W	Q, Kfo, Pl, B, Mt	Km, M, Hem
1,153.9	351.7	do.	P	W	Q, Pl Kfo, B	M, Km, Py, Sph
1,168.0	356.0	do.	P	W	Q, Pl, Kfo	M, Cc, Py
1,176.2	358.5	do.	P	W	Q, Kfo, Pl, B	M, Km, Py
1,179.4	359.5	do.	P	W	Q, Kfo, Pl, B Chl	M, Py, Km
1,193.6	363.8	do.	P	S	Q, Kfo, Pl, B	M, Km, Py
1,196.2	364.6	do.	P	W	Q, Kfo, Pl	M, Cc (vein), Py (vein), Hem (vein)
1,197.2	364.9	do.	P	M	Q, Kfo, Pl	M, Py, Hem
1,200.4	365.9	do.	P	W	Q, Kfo, Pl	M, Chl, Cc, Py
1,207.3	368.0	do.	P	W	Q, Kfo, Pl	M, Py
1,213.9	370.0	do	P	I	Q, Kfo, Pl	Q, Py, Km
1,230.3	375.0	do.	P	W	Q, Kfo, Pl, B partially replaced by deuteric Chl	M, Cc
1,238.5	377.5	do.	A	S	Q, Kfo, Pl, Km	M, Py
1,260.2	384.1	do.	P	W	Q, Kfo, Pl, B partially replaced by deuteric Chl, Km	M, Km, Py, Cc
1,280.2	390.2	do.	A	M-S	Q, Kfo, Pl, Km	M, Km, Py
1,323.5	403.4	do.	P	W	Q, Kfo, Pl	M, Py
1,345.8	410.2	Andesite	P	W-M	Q, Kfo, Pl	M, Chl, Cc, Py, Sph
1,366.1	416.4	Quartz monzonite	P	S	Q, Kfo, Pl	M, Q, Dia, Py, Sph
1,375.0	419.1	Quartz vein	P	W	Q, Kfo, Pl	M, Py, G, Sph

Table 5. Continued.

1,393.4	424.7	Quartz monzonite	P	M	Q, Kfo, Pl, B, Chl	M, Cc
1,404.8	428.2	do.	P	M	Q, Kfo, Pl, B, Chl	M, Cc, Km, Chl, Q, Sph, Hem
1,417.6	432.1	do.	P	M	Q, Kfo, Pl, B, Chl, Mt	M, Cc
1,420.6	433.0	do.	P.	M	Q, Kfo, Pl, B, Chl, Mt	M, Cc
1,444.5	440.3	do.	P, A	S	Q, Kfo, Pl	M, Q, Py, Sph, Dia, K(?)
1,452.4	442.7	do.	A	S	Q, Kfo, Pl	M, Cc
1,476.4	450.0	do.	A	W	Q, Kfo, Pl, B, Chl	M, Km, Py
1,499.0	456.9	do.	A	M	Q, Kfo, Pl, B, Km(?)	M, Py, Km, Cc

Table 6. Petrographic data for thin sections taken from Goldfield Drill Hole USGS 2.

[Alteration types: P, propylitic; A, argillic. W, weak alteration; most primary minerals remain. M, moderate alteration; groundmass largely to completely altered, and phenocrysts partly altered. S, strong alteration; no primary minerals remain but original textures preserved. I, intense alteration; primary minerals and textures completely obliterated. Mineral species codes are: Ab, albite; Ahy, anhydrite; B, biotite; Ba, barite; Brl, beryl; Cbn, carbonaceous material; Cc, calcite; Chb, chabazite; Chl, chlorite; Cor, corundum; Cpx, clinopyroxene (diopsite/augite); Dia, diaspore; Dol, dolomite; Ep, epidote; F, feldspar; G, goethite; Hbl, hornblende; Hem, hematite; J, jarosite; K, kaolinite; Kfa, adularia; Kfo, orthoclase; Kfs, sanidine; Km, potassium mica (includes muscovite); Lm, laumontite; Lx, leucoxene; M, montmorillonite; Mf, mafics, species indeterminant due to alteration; Mt, magnetite; Opx, orthopyroxene; Pl, plagioclase; Py, pyrite; Q, quartz; Sph, sphene; Vv, vesuvianite; Z, zeolite. Numbers in parentheses ( ) are visual estimates of modal percentages and refer to phenocrysts only; tr, trace]

Depth		Rock	Alteration	Degree of	Primary minerals	Secondary minerals
ft	m	type	type	alteration	(in order of decreasing abundance)	(in order of decreasing abundance)
83.3	25.4	Andesite	P	S	Pl (15), Mf (2), Mt (1)	Chl, Ab, Cc, Q, Z, Kfa, Ep, Hem, Sph
203.1	61.9	do.	P	S	Pl (25), Mf (3), Mt (1)	Ab, Chl, Cc, Z, M, Ep, Kfa, Sph, Hem
280.9	85.6	do.	P	S	Pl (15), Mf (3), Mt (1)	Ab, K, Chl, Cc, Q, Kfa, Chb, Ep, Sph
401.3	122.3	do.	P	S	Pl (20), Mf (2), Mt (1)	Ab, Chl, K, Cc, Ep, Lm, Sph, Hem
535.8	163.3	do.	A	M	Pl (25), Mf (7), Mt (1)	K, M, Cc, Lx, Q, Py, Hem
557.4	169.9	do.	P	S-I	Pl (10?), Mf	M, Ab, Q, Py, Z (probably Lm), Kfa, Cc, Sph
578.1	176.2	do.	P	I	Pl, Mf	M, Ab, Py, Q, Cc, Ep, Sph
588.6	179.4	do.	A	I	Pl, Mf	M, Py, Lx, Cc
632.6	192.8	do.	A	I	Pl, Mf	M, Ab, Chl, Py, Cc, Ep, Sph
646.0	196.9	do.	A	I	Pl, Mf, Mt	M, Ab, Cc, Py, Sph
703.1	214.3	do.	A	S-I	Pl (20), Mf (2?)	M, Ab, Py, Q
747.7	227.9	do.	A	I	Pl, Mf	M, Ab, Py, Cc
782.5	238.5	do.	A, P	S	Pl (20), Mf (5)	Ab, M, Cc, Py, Q, Chl, Ep, Sph
818.6	249.5	do.	P	S	Pl (20), Mf (5)	Ab, Q, Chl, M, Py, Cc, Lx
846.8	258.1	do.	P, A	S	Pl (25), Mf (5)	M, Ab, Cc, Chl, Py, Km
847.5	258.3	do.	P, A	M	Pl (25), Mf (4)	Cc, M, K, Py, Chl, Q
863.6	263.2	do.	A	I	Pl, Mf	M, Ab, Cc, Chl, Q, Py, Sph
867.5	264.4	do.	A	I	Pl, Mf	M, Chl, Q, Ab, Cc, Py, Ep, Z
915.4	279.0	do.	P	I	Pl (15), Mf (10)	M, Cc, Ab, Chl, Q, Py, Sph, Z
915.7	279.1	do.	P	S	Pl (15), Mf (5)	M, Cc, Chl, Ab, Py, Q, Z, Lx

Table 6. Continued.

939.7	286.4	do.	A, P	W	Pl (15), Cpx (6), Opx (1), Mt (1), Hbl (1)	Chl, K(?), Cc, Ab, Q, Sph, Py, Z
964.9	294.1	do.	P	S	Pl (15), Mf	Chl, Cc, Ab, Sph, Py, Q, Z
987.6	301.0	Andesite tuff	A	S	Pl, Q, Mf	Chl, M, Ab, Q, Py, Lm, Cc, Sph
1,011.9	308.4	Andesite	P	I	Pl, Mf	M, Q, Py, Chl, Ab, Z, Cc, Ep, Km
1,034.5	315.2	Andesite tuff(?)	A	I	Pl, Mf	M, Ab, Q, Py, Cc, Sph, Ep
1,063.7	324.2	Andesite	A	S	Pl (15), Mf (1)	M, Ab, Q, Cc, Py, Chl, Km, Sph
1,089.3	332.0	do.	A	S	Pl (15), Mf (2)	M, Ab, Cc, Py, Q, Km, Sph, Chl
1,112.3	339.0	do.	A	I	Pl, Mf	M, Ab, Q, Py, Chl, Cc, Km, Sph, Lx
1,130.6	344.6	do.	A	S	Pl, Mf	M, Ab, Py, Cc, Chl, Q, Sph, Km
1,156.6	352.5	do.	P	S	Pl (10), Q (3), Mf	M, Ab, Cc, Q, Py, Chl, Sph, Km
1,178.2	359.1	do.	P	W	Pl (20), Cpx (5), Hbl (1), Mt (2), Opx (3)	M, Cc, Chl, Sph, Hem
1,194.0	363.9	do.	P	M	Pl (15), Mf (10), Mt (2)	M, Cc Ab, Chl, Q, Py, Z, Lm, Ep, Sph
1,200.1	365.8	do.	A, P	M	Pl (20), Mf (5), Mt (2)	M, Chl, Ab, Cc, Hem, Sph, Ep, Z
1,217.6	371.1	do.	A, P	M	Pl (20), Mf (8), Mt (2)	M, Chl, Sph, Cc, Hem, Z, Py
1,246.8	380.0	do.	P	S	Pl (20), Mf (5)	Chl, Ab, Cc, Sph, Py, Ep, Q, Hem
1,265.1	385.6	Rhyodacite tuff	A	S	F, Q, Mf	M, Chl, Q, Ab, Kfa, Cc, Py
1,267.5	386.3	do.	A	S	F, Q, Mf	M, Q, Py, Ab, Cc
1,278.5	389.7	Rhyodacite lapilli tuff	A	M	F, Q, Mf	M, Ab, Cc, Q, Py, Ba
1,290.4	393.3	do.	A	S	F, Q, Mf	Km, Q, Py, M, Cc, Ba
1,321.6	402.8	do.	A	S	F, Q, Mf	Q, Km, Py, Cc, Chl, Ab, Sph
1,378.3	420.1	Rhyodacite tuff	A	S	F, Q, Mf	Q, Km, Py, Cc, Ab, G
1,395.4	425.3	Andesite	P	S	Pl (15), Mf	Ab, Cc, M(?), Q, Py, Sph
1,398.0	426.1	do.	P	S	Pl (15), Mf	M, Cc, Ab, Chl, Q, Py, Sph, K(?), Hem
1,399.7	426.6	do.	P	S	Pl (15), Mf	M, Cc, Ab, Chl, Py, Sph, Q
1,402.9	427.6	Conglomerate	A	S	F, Q, Mf	Km, Cc, Q, Py, Lx
1,414.1	431.0	Rhyodacite tuff and sandstone	A	S	F, Q, Mf	Km, Cc, Q, Py
1,439.0	438.6	Andesite	P	S	Pl (15), Mf	M, Ab, Cc, Chl, Py, Q

Table 7. Petrographic data for thin sections taken from Goldfield Drill Hole USGS 3.

[Alteration types: P, propylitic; A, argillic. W, weak alteration; most primary minerals remain. M, moderate alteration; groundmass largely to completely altered, and phenocrysts partly altered. S, strong alteration; no primary minerals remain but original textures preserved. I, intense alteration; primary minerals and textures completely obliterated. Mineral species codes are: Ab, albite; Ahy, anhydrite; B, biotite; Ba, barite; Brl, beryl; Cbn, carbonaceous material; Cc, calcite; Chb, chabazite; Chl, chlorite; Cor, corundum; Cpx, clinopyroxene (diopsite/augite); Dia, diaspore; Dol, dolomite; Ep, epidote; F, feldspar; G, goethite; Hbl, hornblende; Hem, hematite; J, jarosite; K, kaolinite; Kfa, adularia; Kfo, orthoclase; Kfs, sanidine; Km, potassium mica (includes muscovite); Lm, laumontite; Lx, leucoxene; M, montmorillonite; Mf, mafics, species indeterminant due to alteration; Mt, magnetite; Opx, orthopyroxene; Pl, plagioclase; Py, pyrite; Q, quartz; Sph, sphene; Vv, vesuvianite; Z, zeolite. Numbers in parentheses ( ) are visual estimates of modal percentages and refer to phenocrysts only; tr, trace

Depth ft	Depth m	Rock type	Alteration type	Degree of alteration	Primary minerals (in order of decreasing abundance)	Secondary minerals (in order of decreasing abundance)
14.4	4.4	Rhyodacite	P	S-I	Pl (20), B (5), Hbl (1),	M, Q, Ab, Cc, Chl, Km, Hem, Sph, Ep Mt (1), Q (1)
66.9	20.4	do.	P	S	Pl (20), B (4), Hbl (1), Mt (1) Q (tr)	M, Q, Ab, Cc, Chl, Km, Hem
139.4	42.5	do.	P	I	Pl, B, Mt	M, Q, Ab, Cc, Chl, Km, Hem, Sph
151.6	46.2	do.	P	S	Pl (20), B (4), Hbl (2) Mt (tr)	M, Q, Cc, Ab, Chl, Km
190.9	58.2	do.	A	I	Pl (15), Mf (10), Mt (1), Q (1)	M, Q, Km, Ab, Chl, Hem, Sph
256.9	78.3	do.	A, P	I	Pl, Mf, Q, Mt	M, Cc, Q, Ab, Py, Km, Hem, Sph
275.9	84.1	do.	A, P	I	Pl, Mf, Q, Mt	M, Cc, Ab, Q, Py, Hem, Km, Ba
293.3	89.4	do.	P	S	Pl (20), Mf (5), Q, Mt (2)	M, Ab, Cc, Q, Py, Hem, Km, Chl, Sph
341.5	104.1	do.	A	I	Pl, Mf	M, Q, Py, Km, Sph
355.6	108.4	do.	A	S	Pl (25), Mf (5)	M, Ab, Py, Q, Km, J
386.8	117.9	do.	A, P	S	Pl (20), Mf (3), Q (tr)	M, Q, Ab, Py, Cc, Km, Sph, Hem
401.6	122.4	Conglomerate	A	S		M, Q, Km, Py, Cc, Lx
411.7	125.5	Latite tuff	A	I		Km, M, Py, Cc, Ab
435.4	132.7	do.	A	I		M, Q, Km, Cc, Py, Lx
443.9	135.3	Rhyodacite	A, P	M	Pl (20), Mf (5), Q (tr)	Ab, Q, Chl, Cc, Py, Km, Lx
454.4	138.5	Latite	A, P	M	Pl (30), B (5)	Ab, Cc, M, Q, Km, Py

GEOCHEMICAL DATA

ANALYTICAL METHODS

All samples were subjected to six-step semiquantitative emission spectrographic analysis (Grimes and Marranzino, 1968). Elements determined by this method (with lower detection limit in parentheses) include iron (0.05%), magnesium (0.02%), calcium (0.05%), titanium (0.002%), manganese (10 ppm), silver (0.5 ppm), arsenic (200 ppm), gold (10 ppm), boron (10 ppm), barium (20 ppm), beryllium (1 ppm), bismuth (10 ppm), cadmium (20 ppm), cobalt (5 ppm), chromium (5 ppm), copper (5 ppm), lanthanum (20 ppm), molybdenum (5 ppm), niobium (10 ppm), nickel (5 ppm), lead (10 ppm), antimony (100 ppm), scandium (5 ppm), tin (10 ppm), strontium (100 ppm), vanadium (10 ppm), tungsten (50 ppm), yttrium (10 ppm), zinc (200 ppm), and zirconium (10 ppm). Detection limits for arsenic, gold, bismuth, cadmium, antimony, tin, and tungsten are too high to yield useful data for most samples in this data set. Consequently gold was also determined by an atomic absorption method, using a cold hydrobromic acid extraction from 10-gram analytical portions (Thompson and others, 1968), with a reported sensitivity of 0.02 ppm. Arsenic was also determined by the Gutzeit colorimetric method (Ward and others, 1963), with a sensitivity of 10 ppm. Mercury was determined by a vapor atomic absorption method (Vaughn and McCarthy, 1964), with a sensitivity of 0.01 ppm.

Supplemental analyses were obtained for selected samples from drill hole USGS 1, including tellurium by an atomic absorption method, and antimony, molybdenum, and zinc by colorimetric methods (Nakagawa and Thompson, 1968; Ward and others, 1963). All samples were analyzed in laboratories of the U.S. Geological Survey, in Denver, Colorado, in 1968 and 1969.

RESULTS

Drill hole USGS 1

Tables 8 and 9 show analytical data for drill hole USGS 1. Elements listed above that are omitted showed no values above their respective detection thresholds. Figure 2 shows geochemical logs for the most interesting elements, including gold, silver, arsenic, mercury, copper, zinc, lead, bismuth, manganese, chromium, vanadium, barium, iron, magnesium, and calcium, for the entire length of the hole. Figure 3 shows geochemical logs for the 921-1083-ft (280.7-330.1-m) interval sampled in detail. Figure 3 includes plots for gold, tellurium, antimony, arsenic, mercury, copper, zinc, lead, silver, bismuth, molybdenum, tin, boron, beryllium, manganese, chromium, vanadium, barium, iron, magnesium, calcium, titanium and zirconium.

Altered zones below 680 ft (207 m) depth in USGS 1 show sporadic low gold values, just above the detection threshold. Otherwise there is little sign of mineralization related to hydrothermal alteration in this drill hole. Copper, chromium, and vanadium are relatively abundant in siltstones of the Palmetto Formation, and anomalous in some fault zones that cut the siltstones. Boron, beryllium, molybdenum, zinc, bismuth, tin, manganese, and barium are relatively

abundant in greisen or skarn, or both, found between 942.5 ft (287.3 m) and 1,069 ft (319.6 m). Detailed sampling and supplementary analyses of the interval from 921 ft to 1083 ft (280.7-330.1 m) show that anomalous amounts of tellurium, antimony, cobalt, and nickel are also associated with skarn, antimony and zirconium are also associated with greisen, and tellurium and antimony are associated with quartz veins that cut marble.

Relatively high iron concentrations are generally the result of abundant pyrite rather than differences in original rock type. The andesite dike at 1,341.5-1,362.4 ft (408.9-415.2 m), however, appears anomalous in iron because it has a higher mafic mineral content than the surrounding quartz monzonite. Magnesium and calcium vary in abundance depending both upon original rock type and intensity of hydrothermal alteration.

Figure 2A. Geochemical logs for gold and silver, drill hole USGS 1.

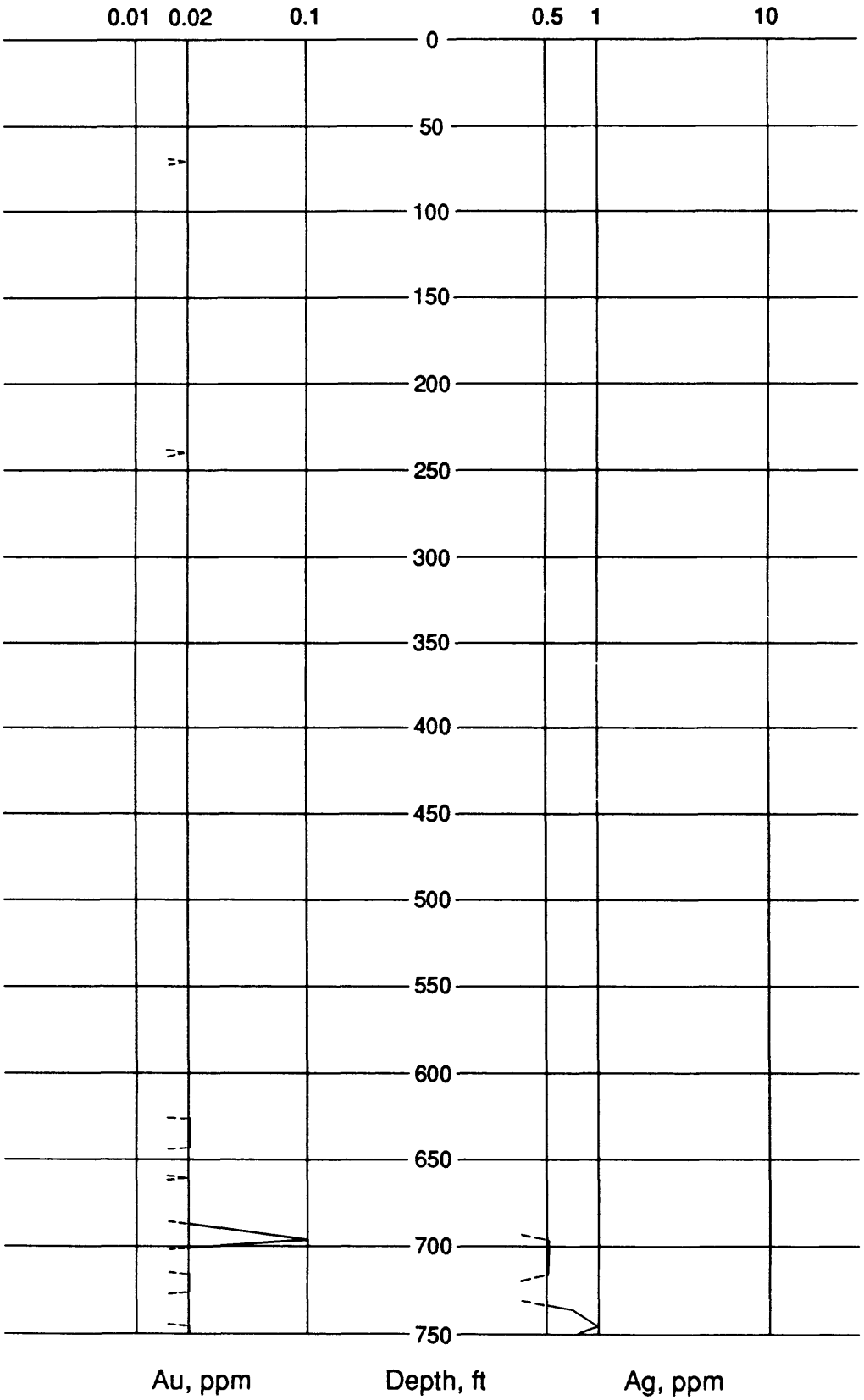


Figure 2A. Continued.

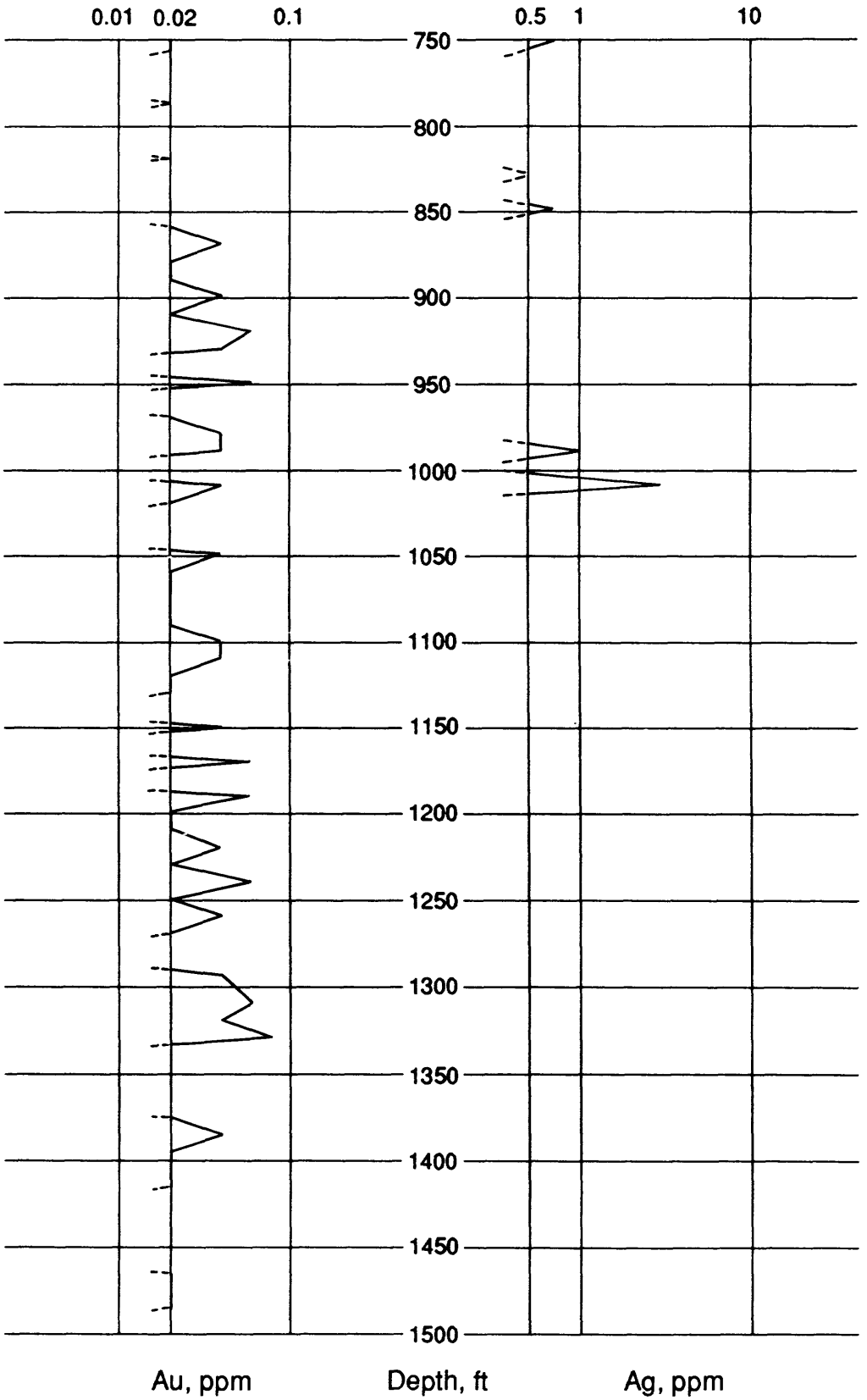


Figure 2B. Geochemical logs for arsenic and mercury, drill hole USGS 1.

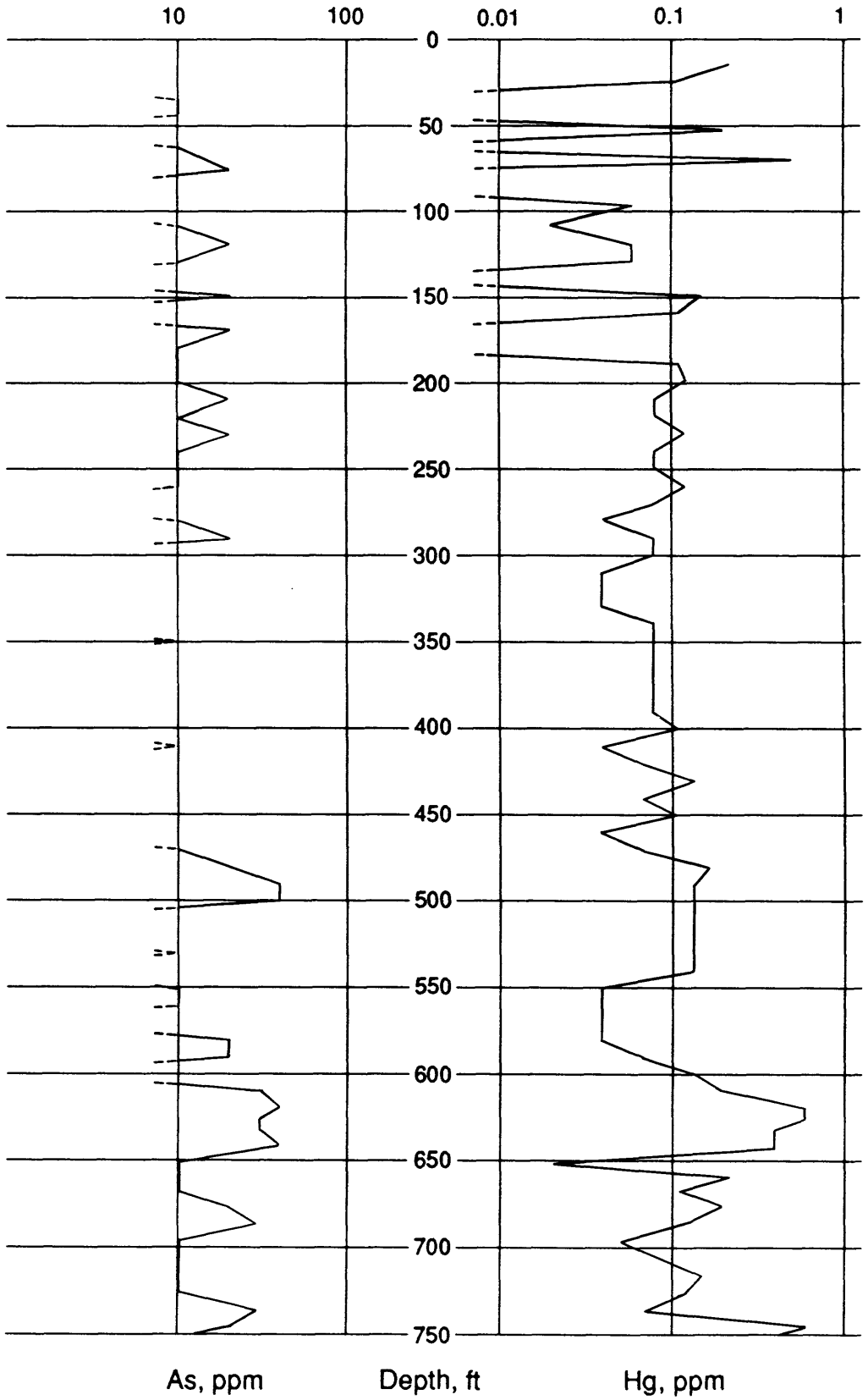


Figure 2B. Continued.

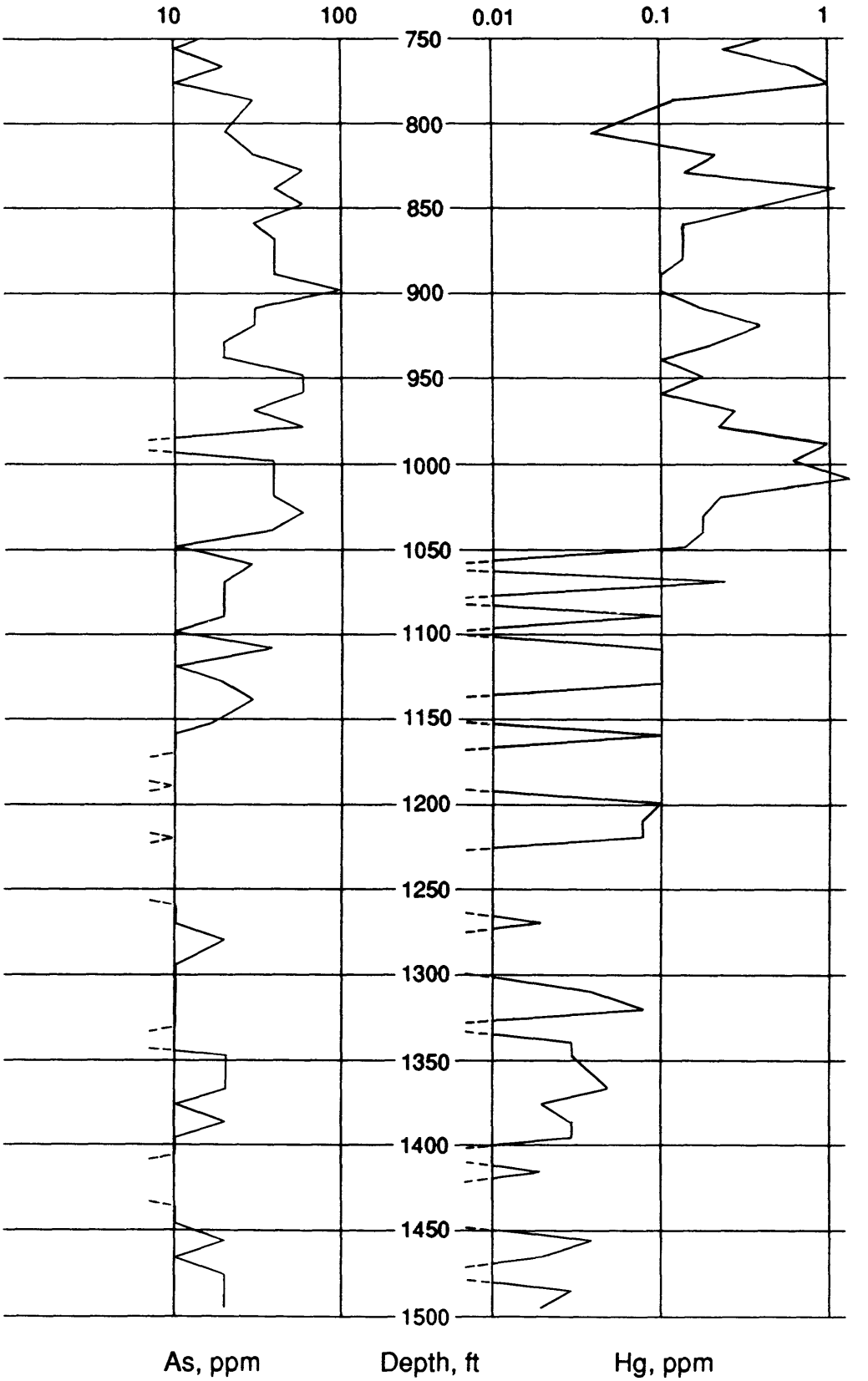


Figure 2C. Geochemical logs for copper and zinc, drill hole USGS 1.

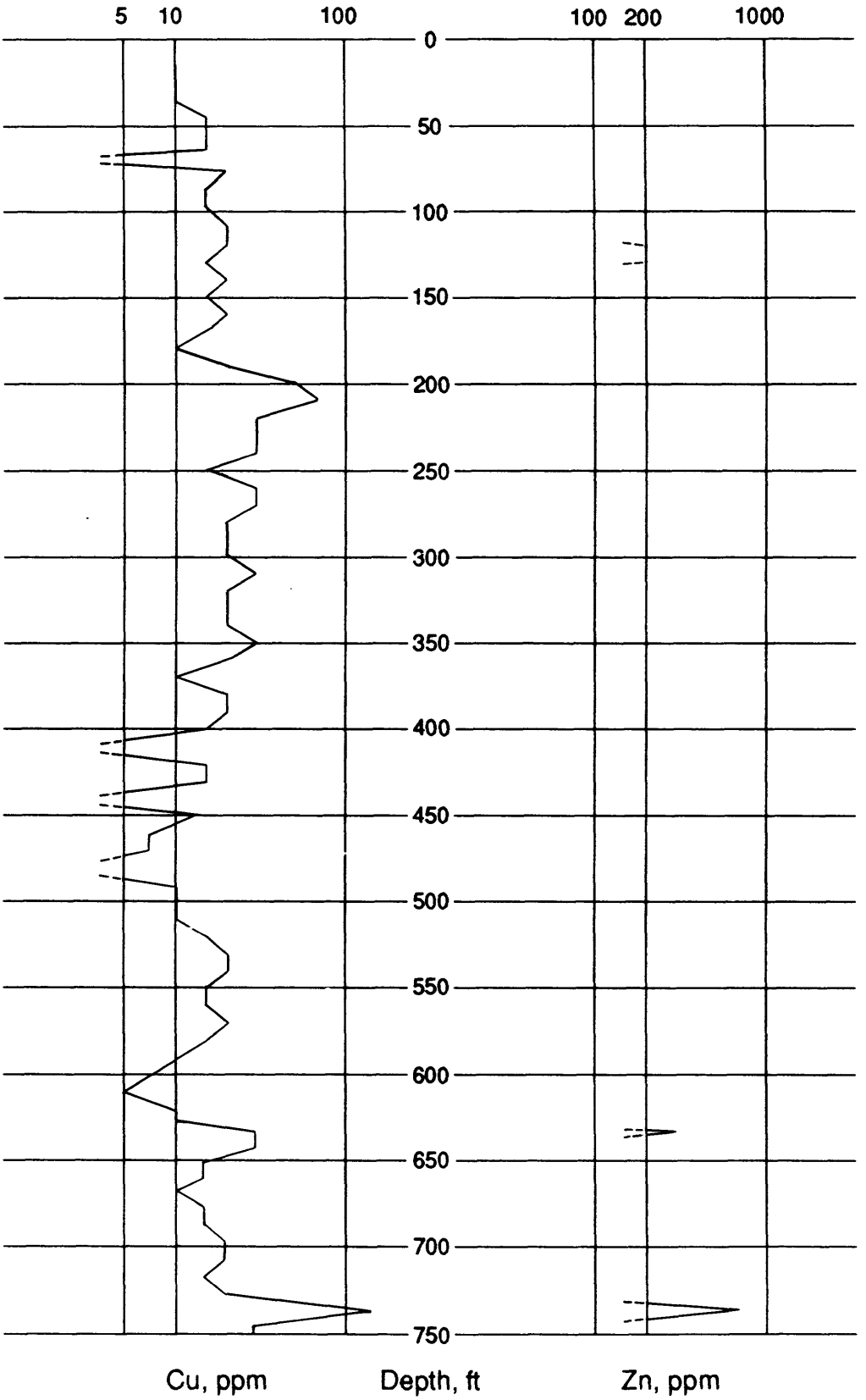


Figure 2C. Continued.

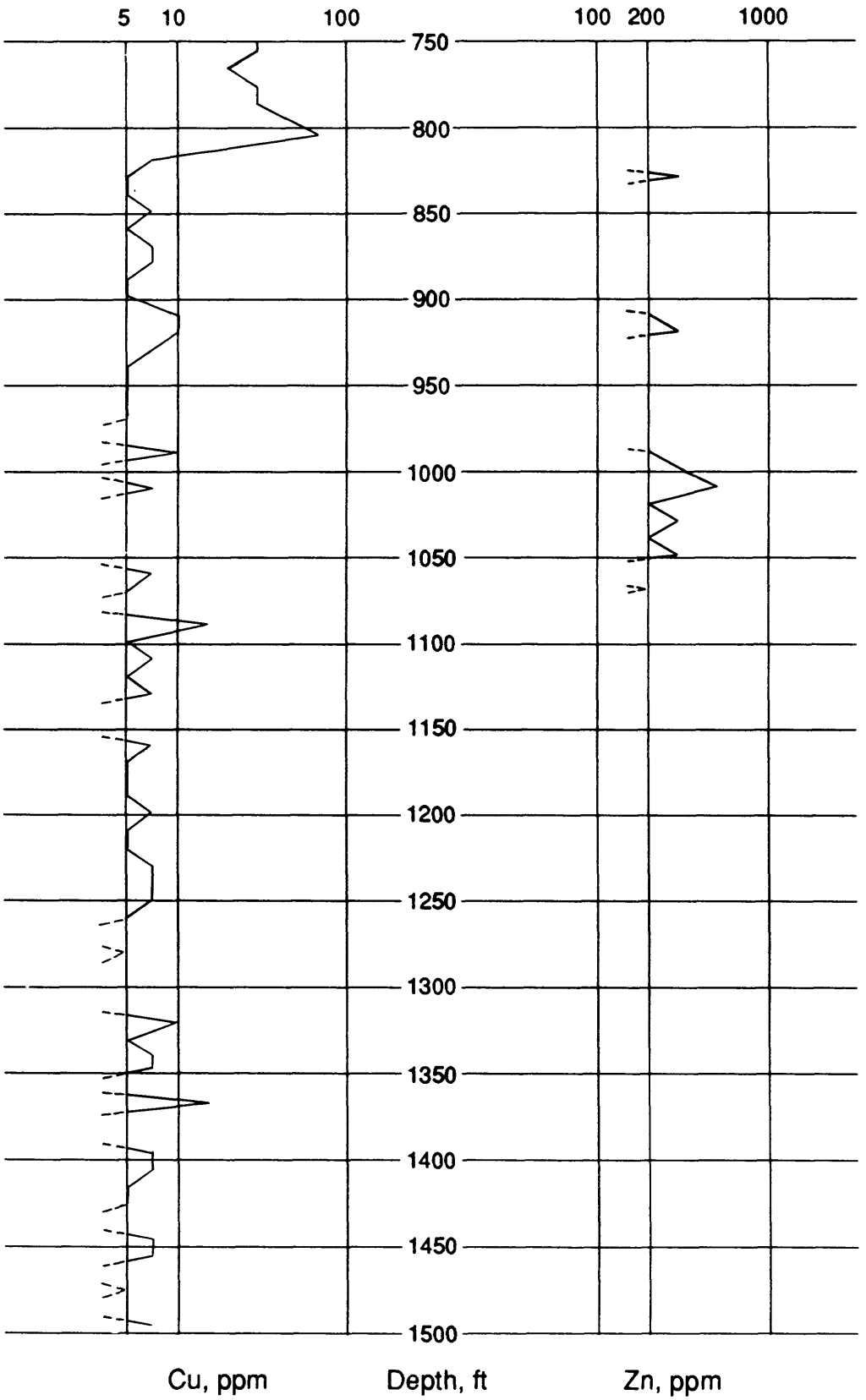


Figure 2D. Geochemical logs for lead and bismuth, drill hole USGS 1.

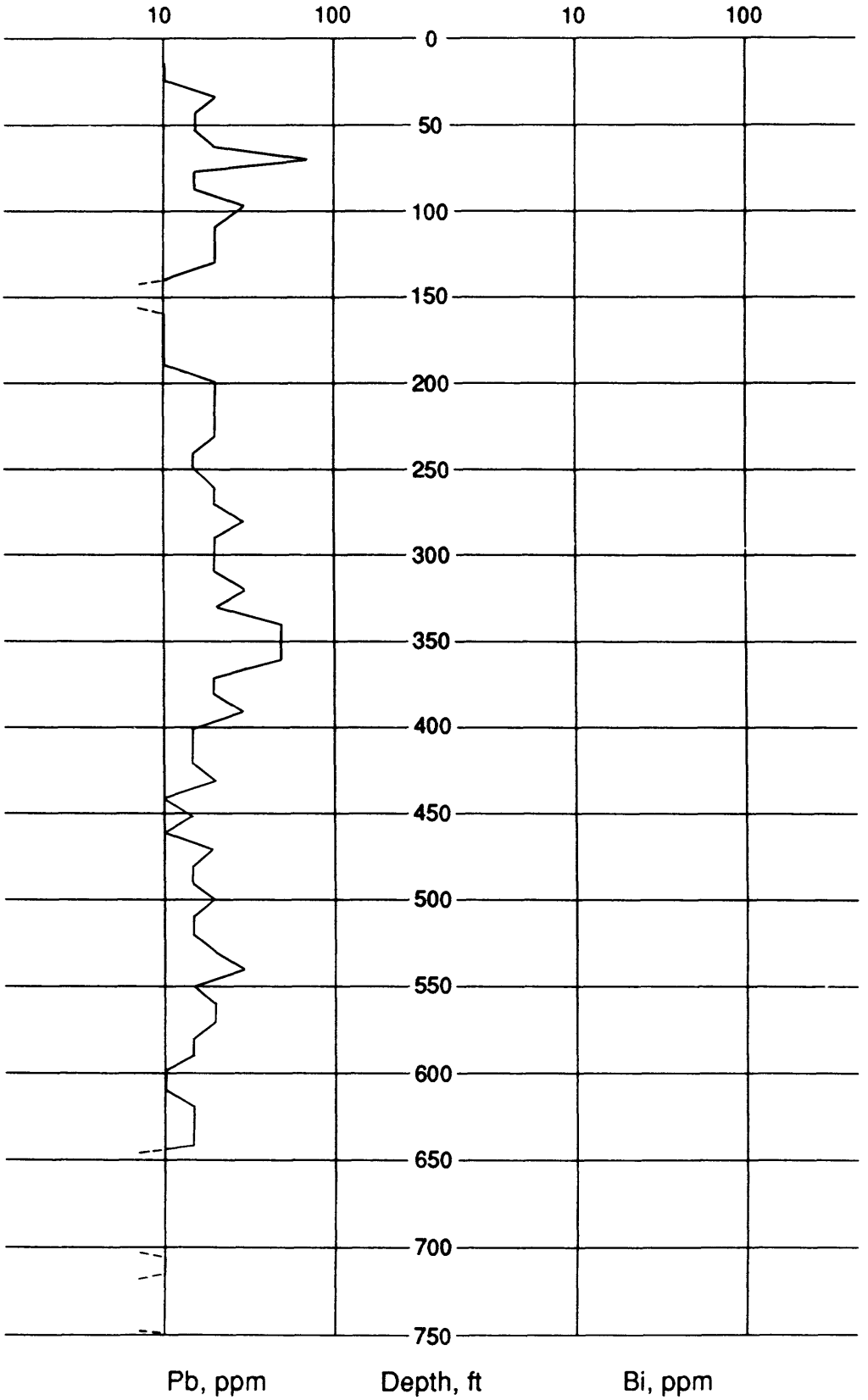


Figure 2D. Continued.

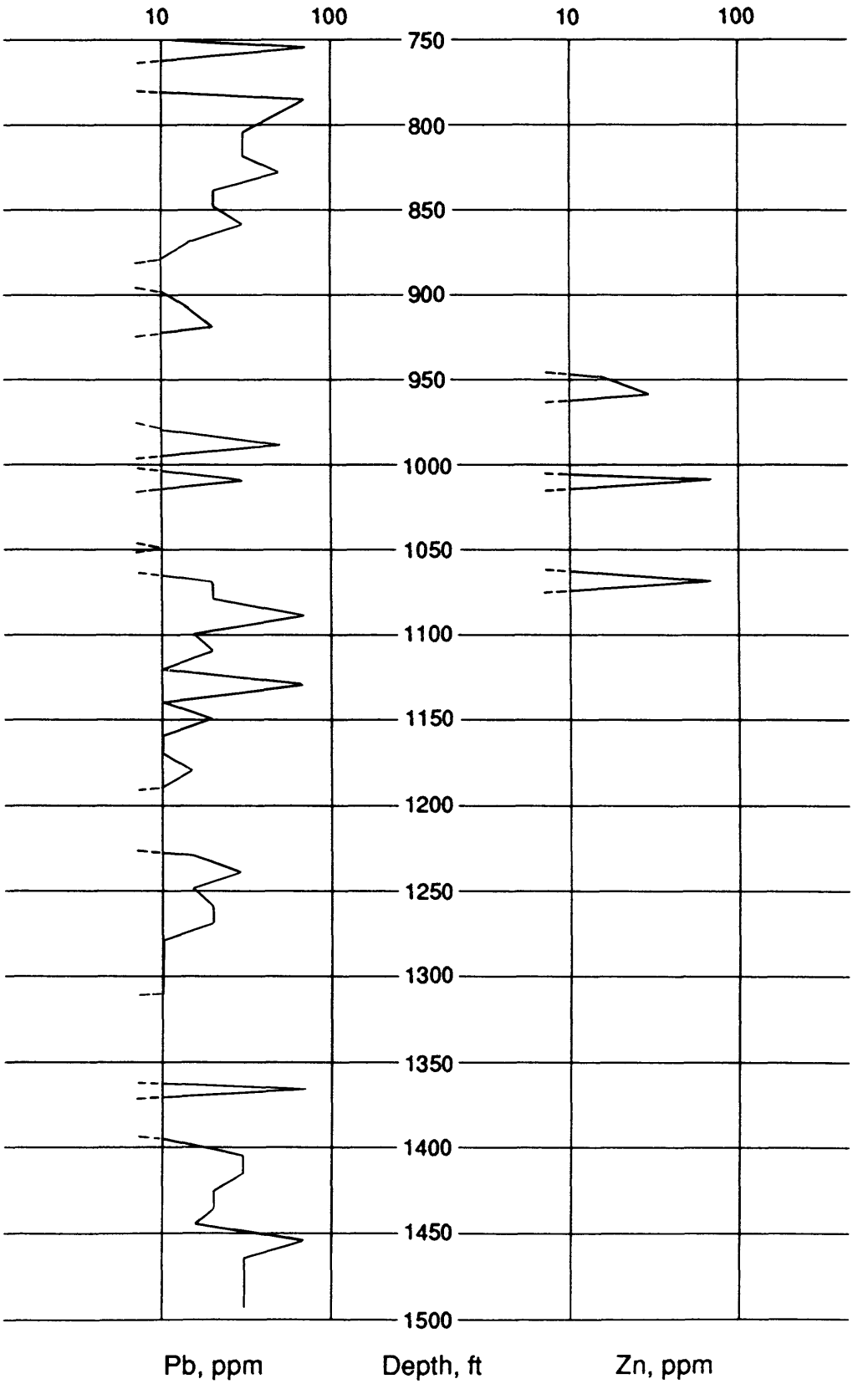


Figure 2E. Geochemical log for manganese, drill hole USGS 1.

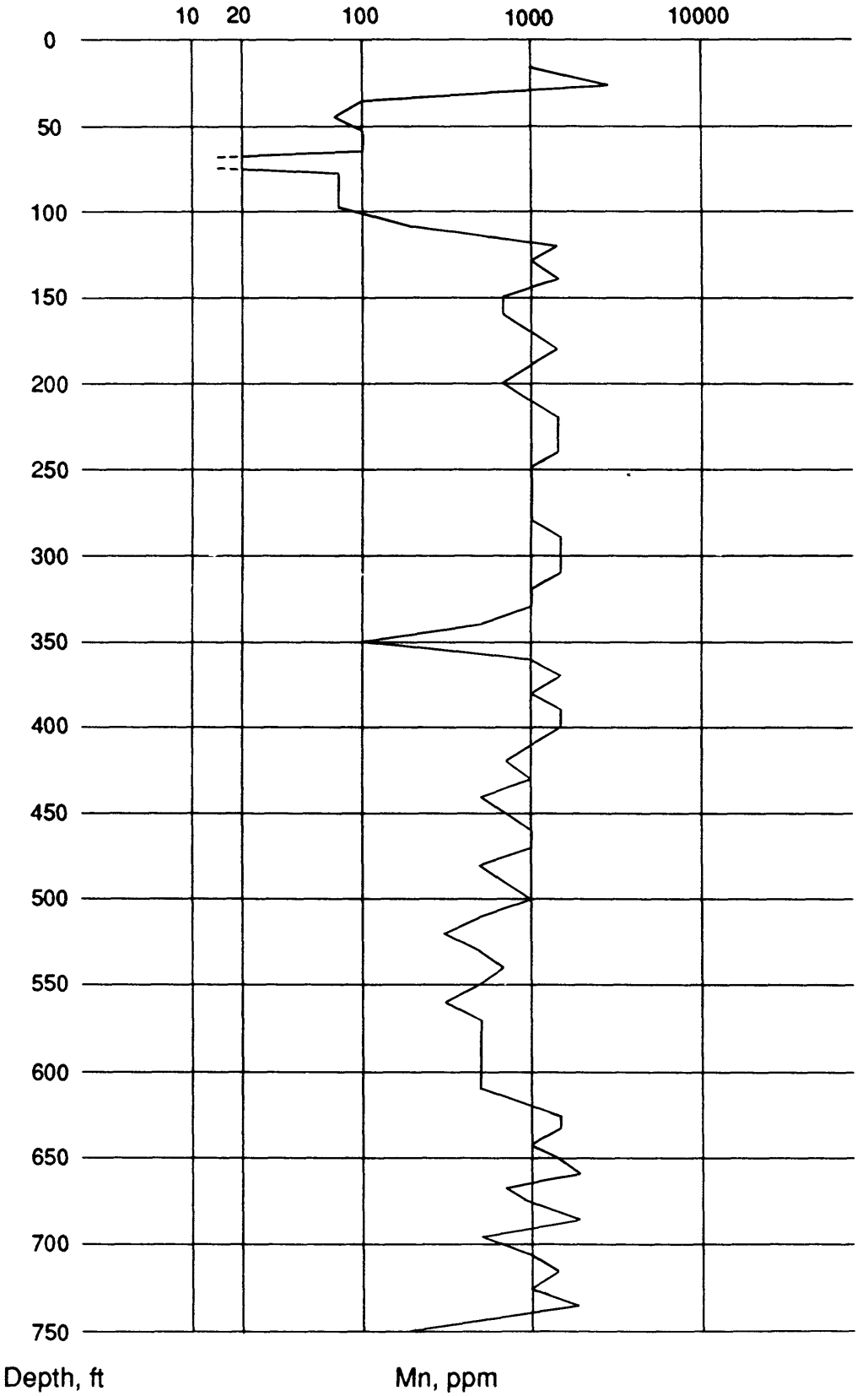


Figure 2E. Continued.

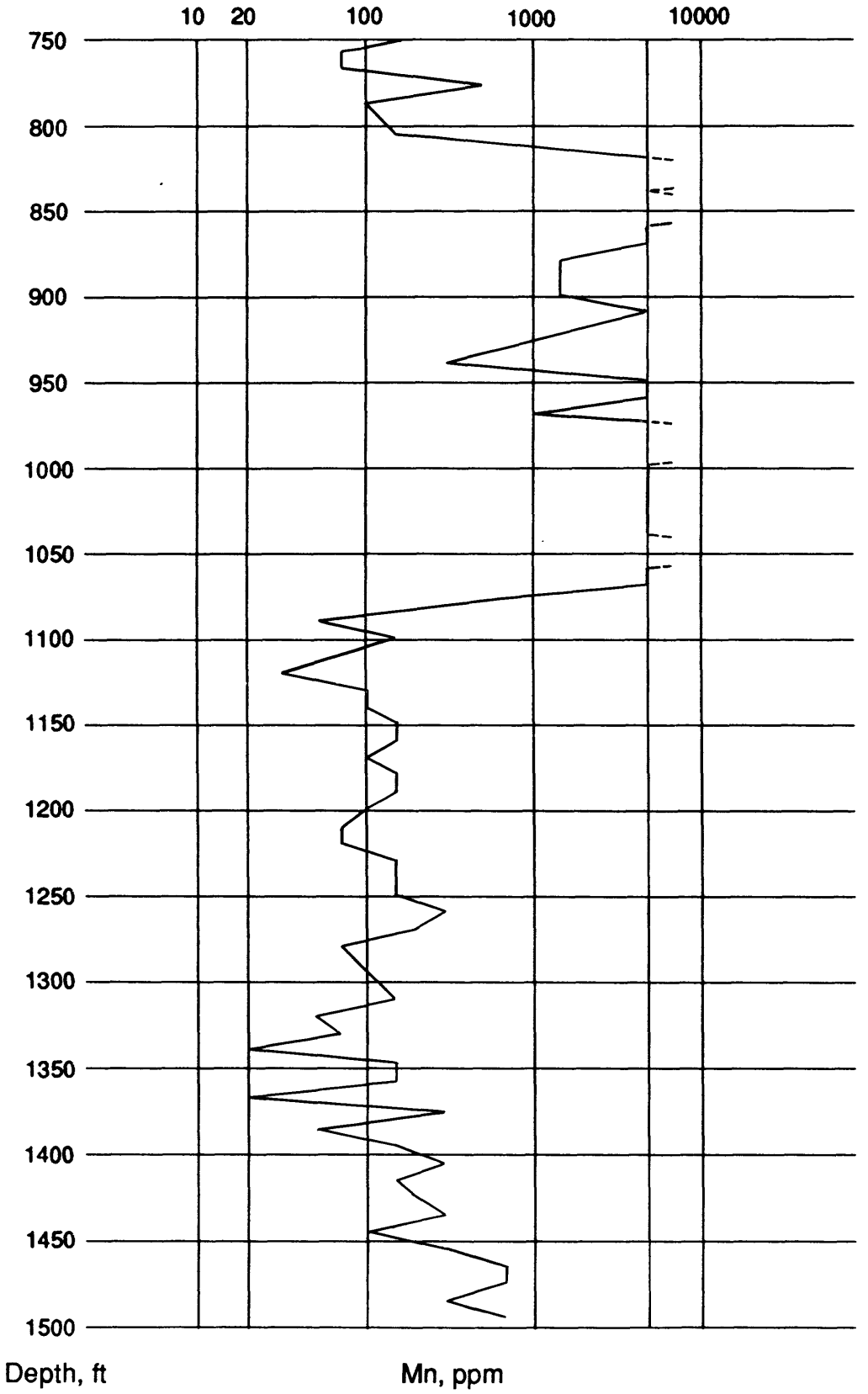


Figure 2F. Geochemical logs for chromium and vanadium, drill hole USGS 1.

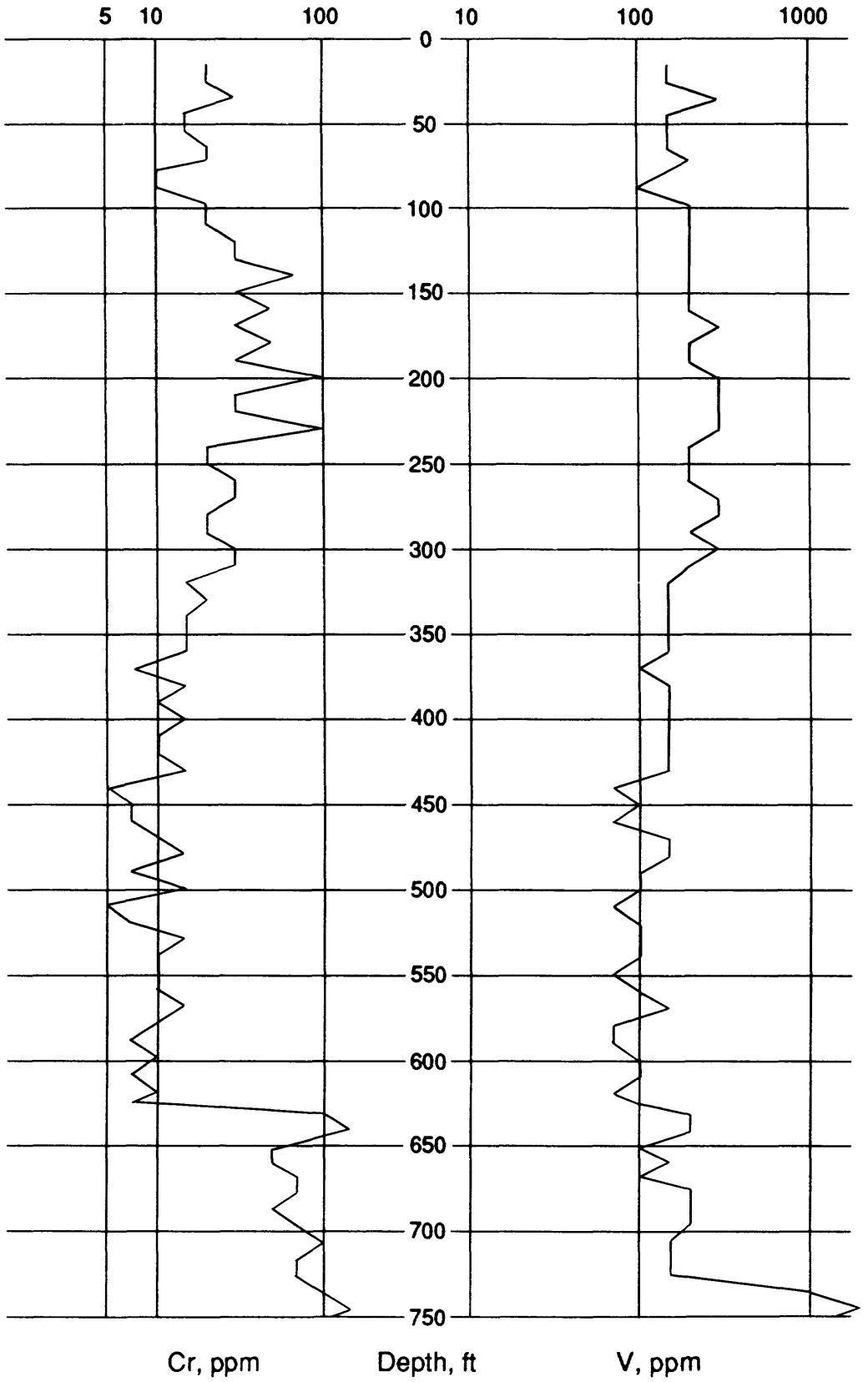


Figure 2F. Continued.

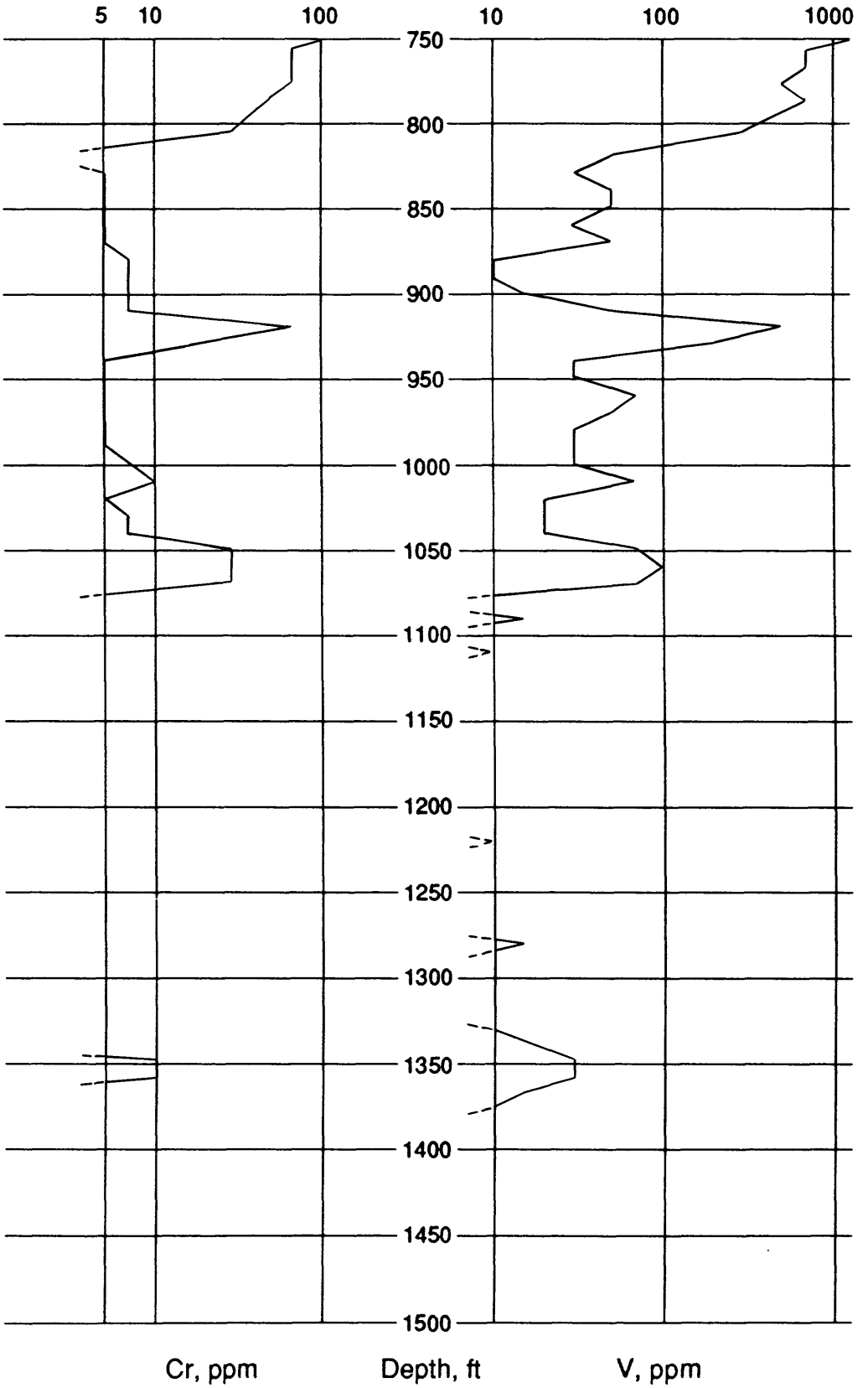


Figure 2G. Geochemical log for barium, drill hole USGS 1.

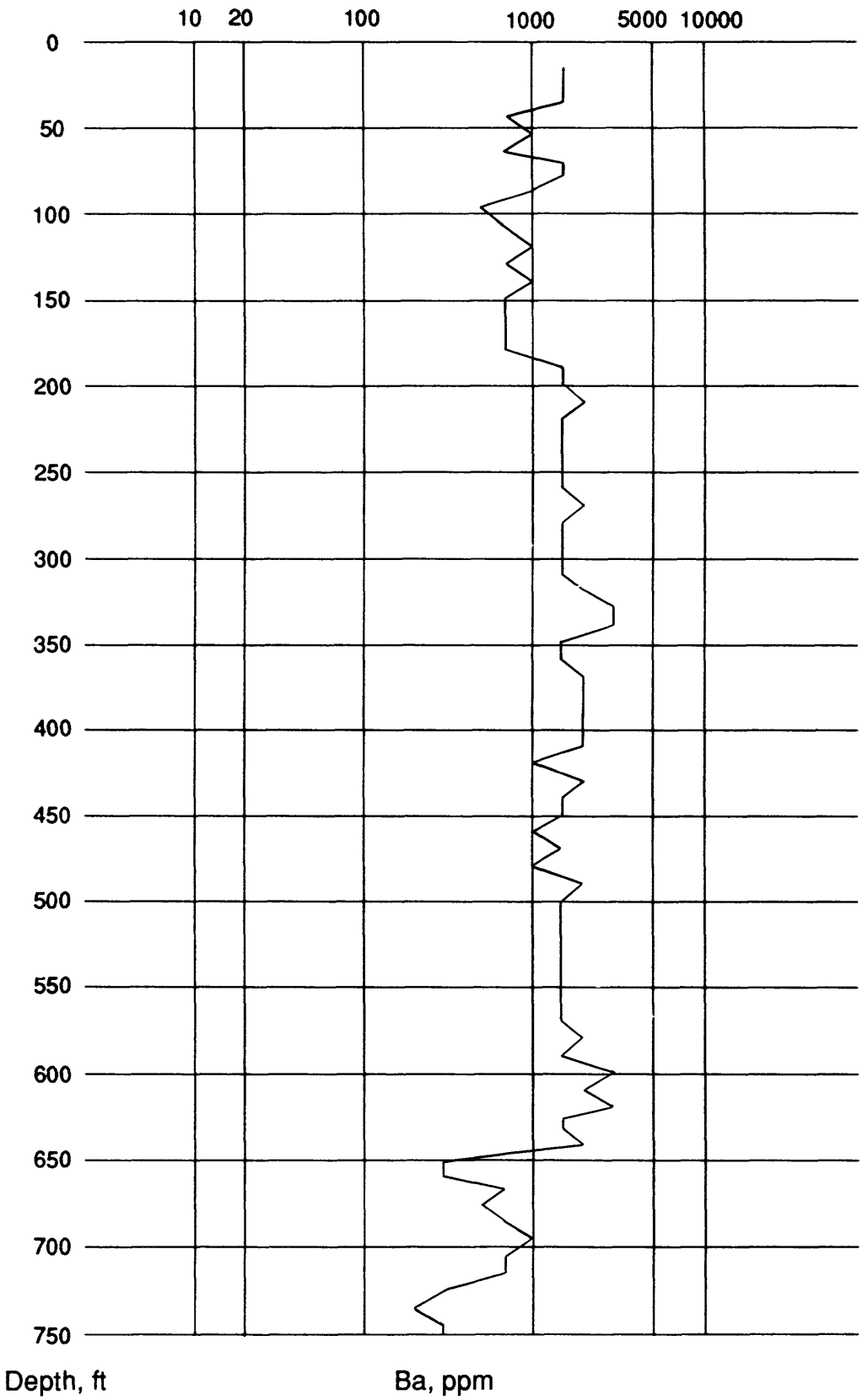


Figure 2G. Continued.

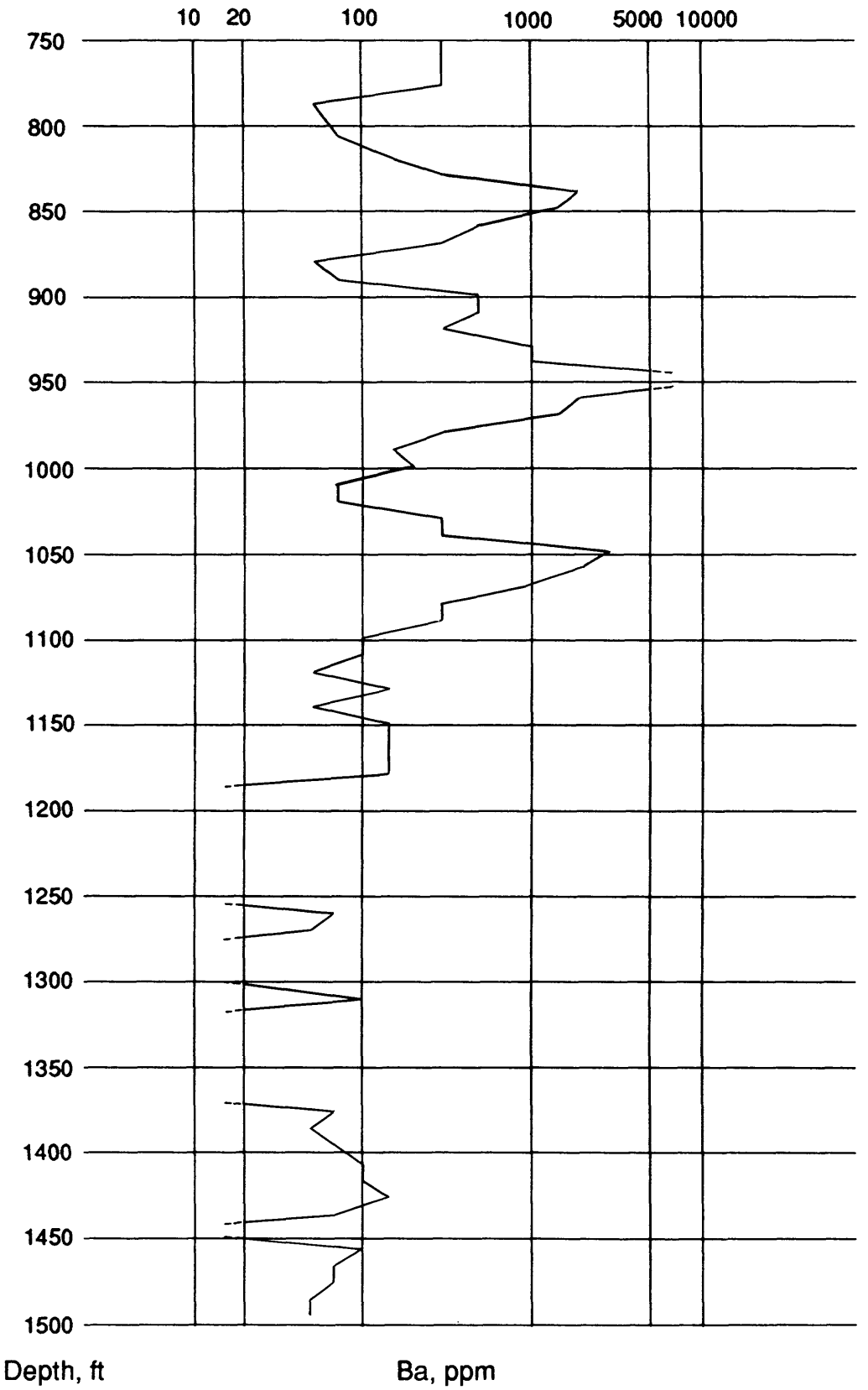


Figure 2H. Geochemical log for iron, drill hole USGS 1.

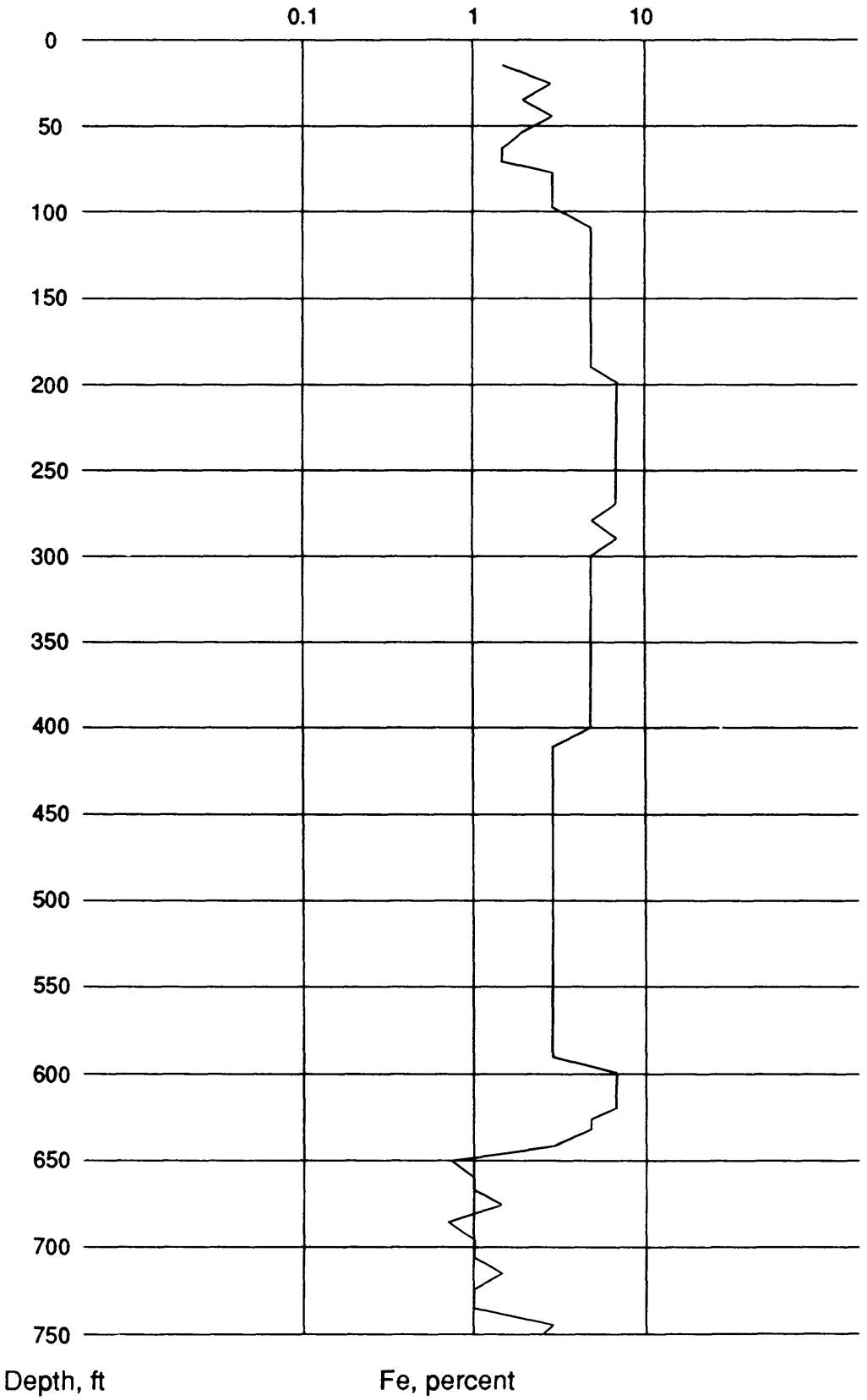


Figure 2H. Continued.

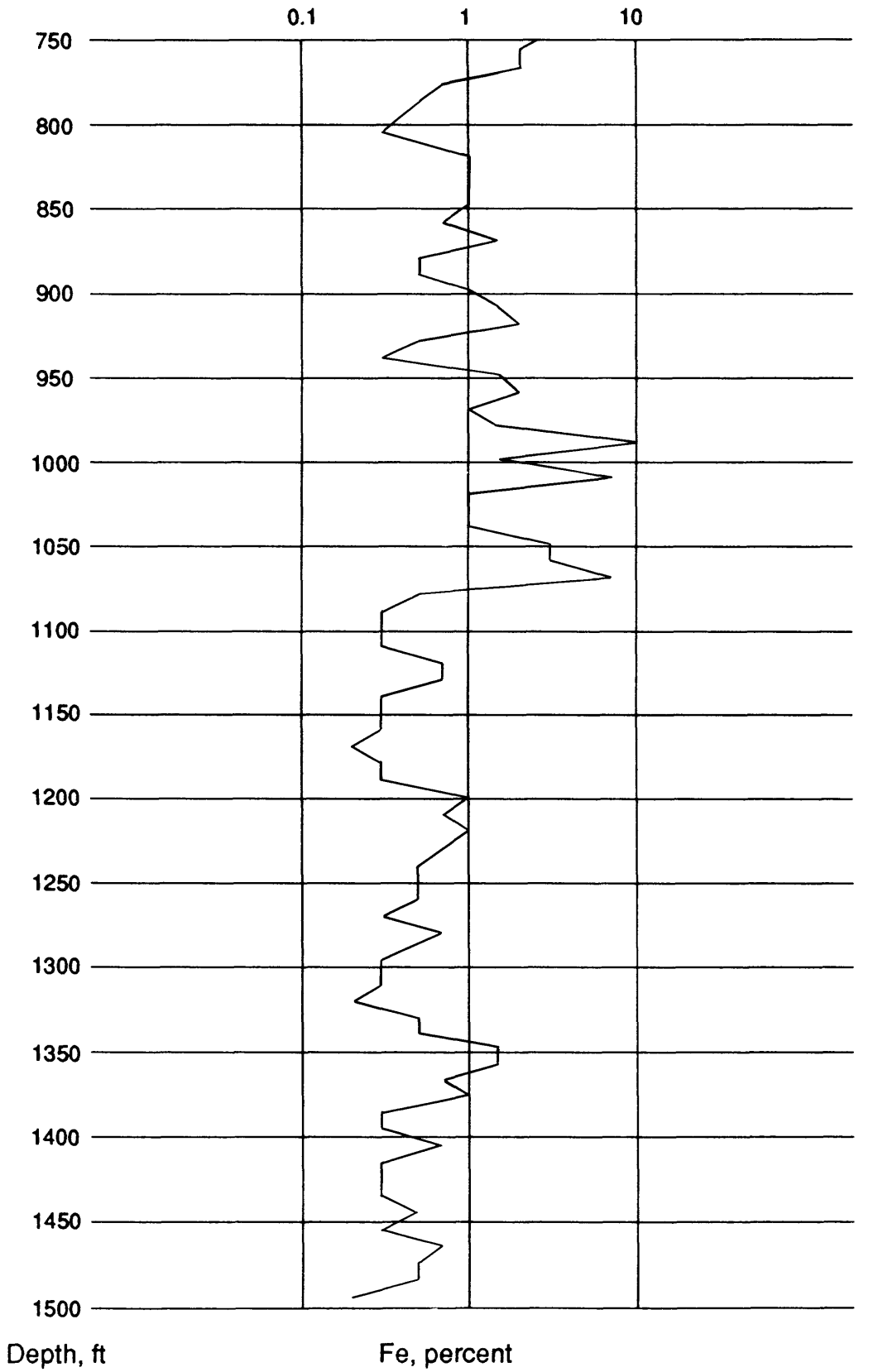


Figure 2I. Geochemical log for magnesium, drill hole USGS 1.

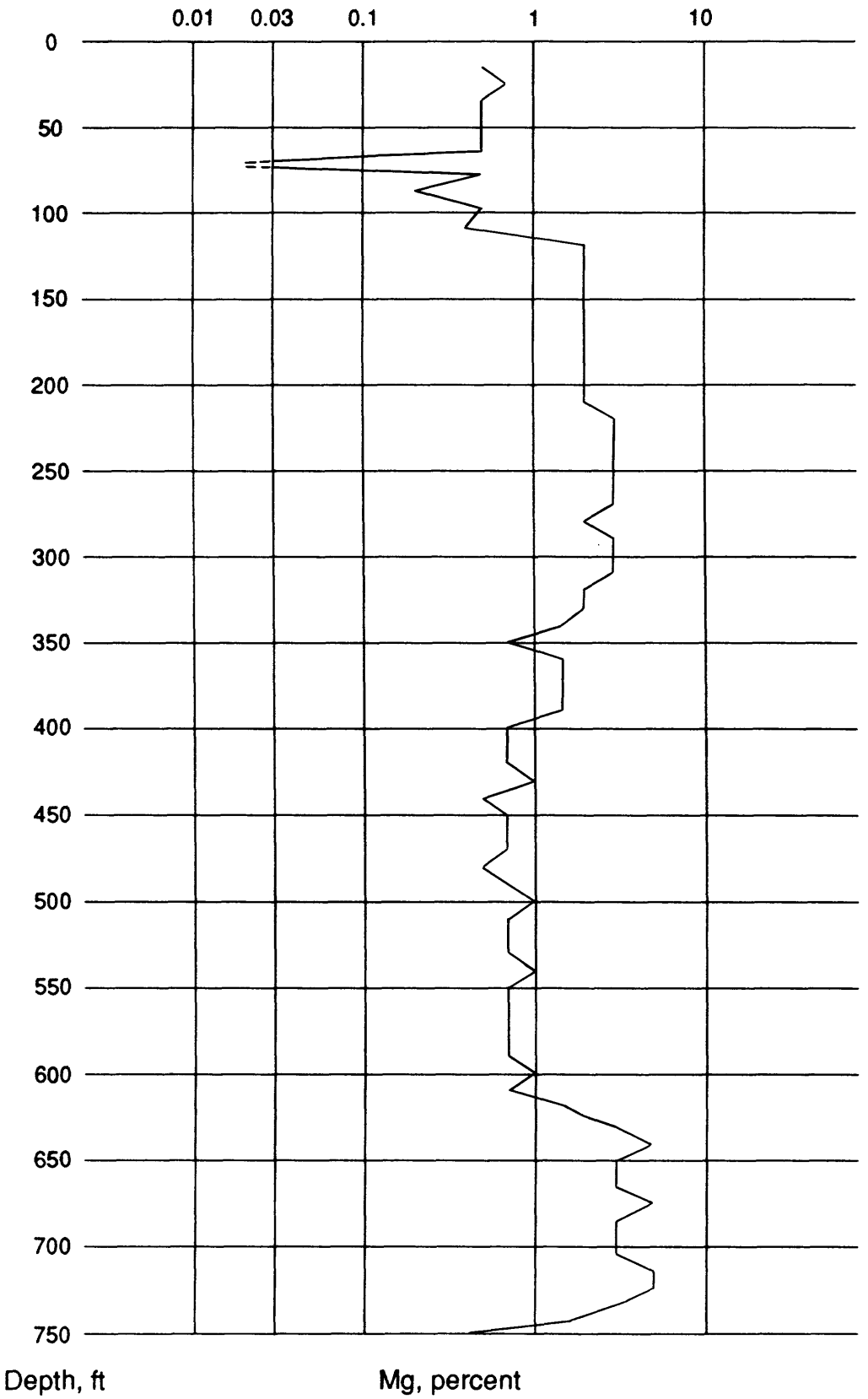


Figure 2I. Continued.

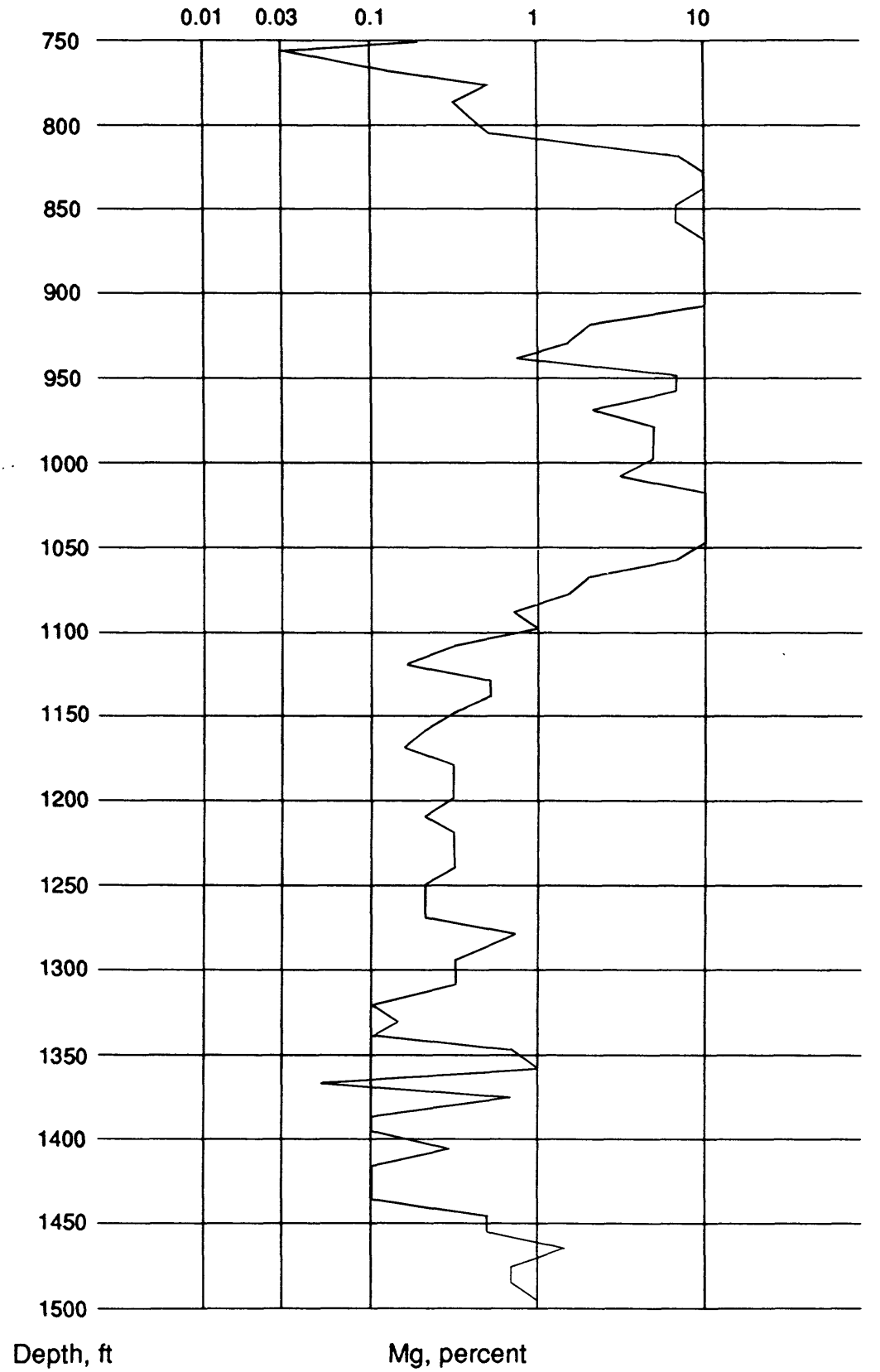


Figure 2J. Geochemical log for calcium, drill hole USGS 1.

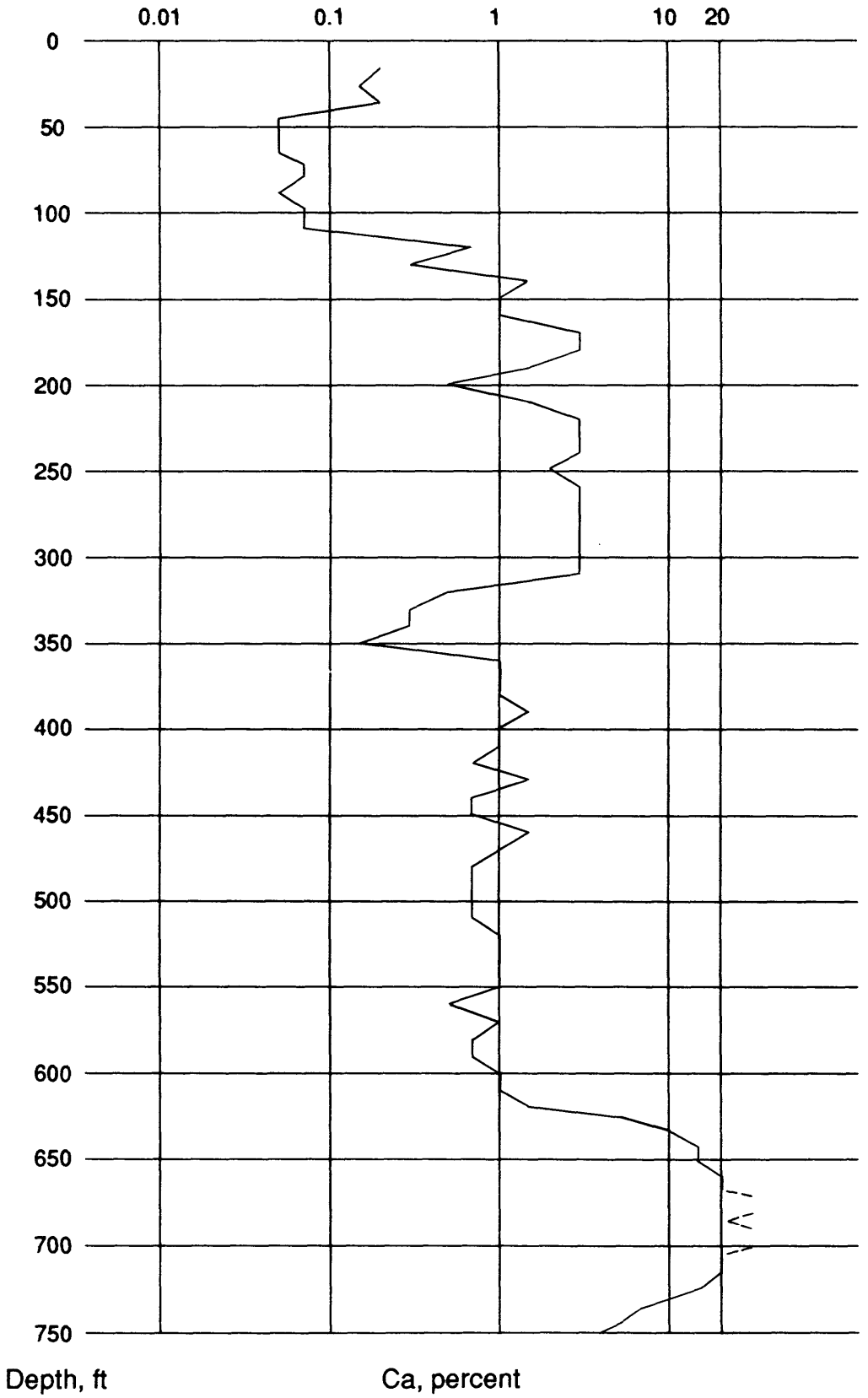


Figure 2J. Continued.

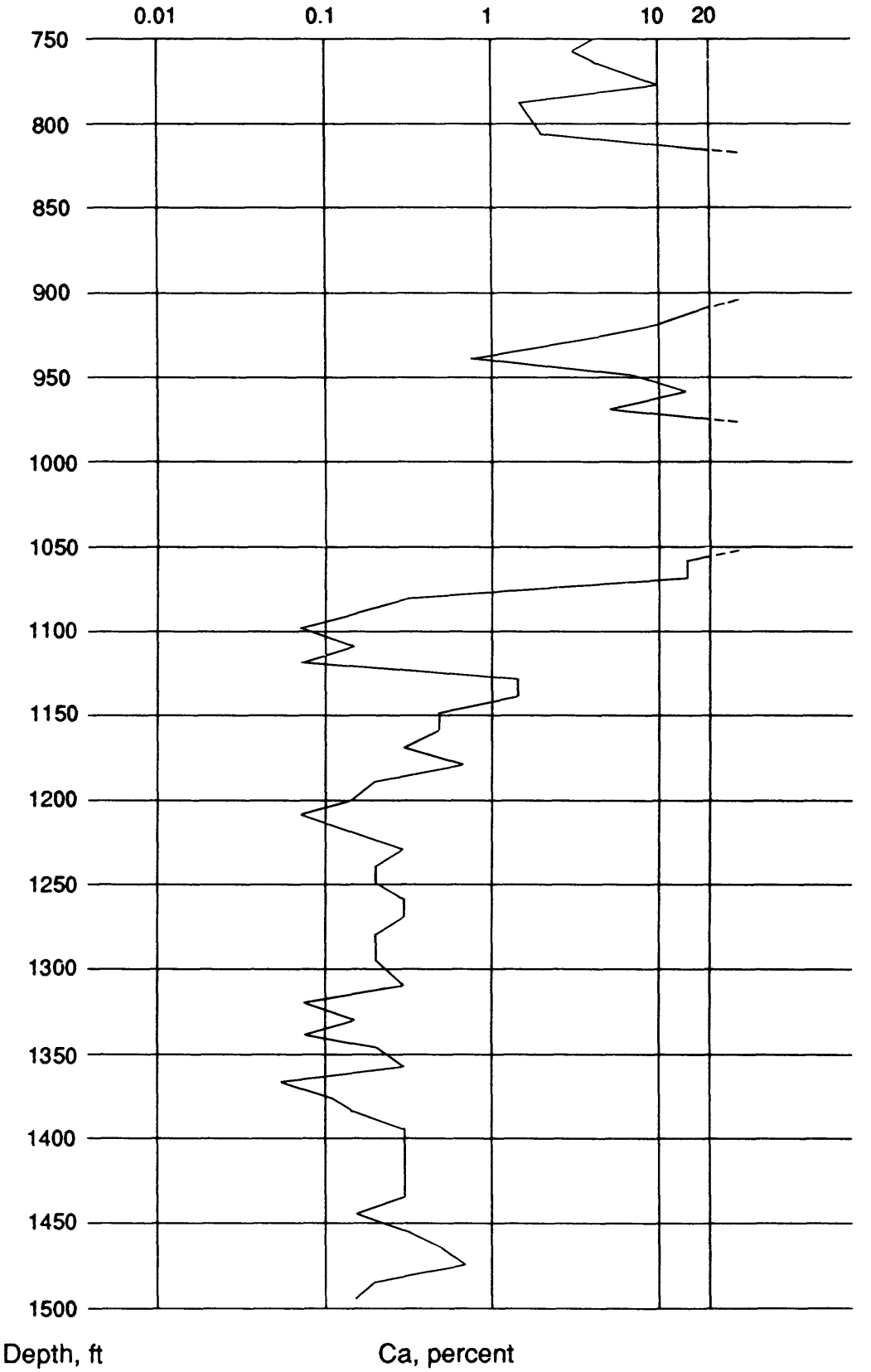


Table 8. Chemical data for drill hole USGS 1. Fe, Mg, Ca, and Ti in weight percent, all other elements in parts per million by weight. Au and Hg determined by atomic absorption spectrophotometry; As by a colorimetric method; all other elements by emission spectrometry. N, not detected; L, present, but below detection limit; G, greater than (value shown); M, missing.

Sample interval		Au	As	Hg	Fe	Mg	Ca	Ti	Mn
Feet	Meters								
10-20	3.0-6.1	N	N	0.22	1.5	0.5	0.2	0.3	1000
20-30	6.1-9.1	N	N	0.11	3	0.7	0.15	0.3	3000
30-39	9.1-11.9	N	10	N	2	0.5	0.2	0.3	100
39-48	11.9-14.6	N	10	N	3	0.5	0.05	0.2	70
48-58	14.6-17.7	N	N	0.2	2	0.5	0.05	0.3	100
58-68.5	17.7-20.9	N	10	N	1.5	0.5	0.05	0.3	100
68.5-72	20.9-21.9	0.02	15	0.5	1.5	L	0.07	0.15	N
72-82	21.9-25.0	N	20	N	3	0.5	0.07	0.2	70
82-92	25.0-28.0	N	N	N	3	0.2	0.05	0.15	70
92-102	28.0-31.1	N	N	0.06	3	0.5	0.07	0.2	70
102-114	31.1-34.7	N	10	0.2	5	0.7	0.07	0.3	200
114-124	34.7-37.8	N	20	0.06	5	2	0.7	0.2	1500
124-134	37.8-40.8	N	10	0.06	5	2	0.3	0.3	1000
134-144	40.8-43.9	N	N	N	5	2	1.5	0.3	1500
144-154	43.9-46.9	N	20	0.15	5	2	1	0.3	700
154-164	46.9-50.0	0.02	N	0.11	5	2	1	0.3	700
164-174	50.0-53.0	N	20	N	5	2	3	0.3	1000
174-184	53.0-56.1	N	10	N	5	2	3	0.2	1500
184-194	56.1-59.1	N	10	0.11	5	2	1.5	0.2	1000
194-204	59.1-62.2	N	10	0.12	7	2	0.5	0.7	700
204-214	62.2-65.2	N	20	0.08	7	2	1.5	0.7	1000
214-224	65.2-68.3	N	10	0.08	7	3	3	0.7	1500
224-234	68.3-71.3	N	20	0.12	7	3	3	0.7	1500
234-244	71.3-74.3	0.02	10	0.08	7	3	3	0.7	1500
244-254	74.3-77.4	N	10	0.08	7	3	2	0.5	1000
254-264	77.4-80.4	N	10	0.12	7	3	3	0.5	1000
264-274	80.4-83.5	N	N	0.08	7	3	3	0.7	1000
274-284	83.5-86.5	N	10	0.04	5	2	3	0.5	1000
284-294	86.5-89.6	N	20	0.08	7	3	3	0.7	1500
294-304	89.6-92.6	N	N	0.08	5	3	3	0.5	1500
304-314	92.6-95.7	N	N	0.04	5	3	3	0.5	1500
314-324	95.7-98.7	N	N	0.04	5	2	0.5	0.5	1000
324-334	98.7-101.8	N	N	0.04	5	2	0.3	0.5	1000
334-344	101.8-104.8	N	N	0.08	5	1.5	0.3	0.3	500
344-354	104.8-107.9	N	10	0.08	5	0.7	0.15	0.5	100
354-364	107.9-110.9	N	N	0.08	5	1.5	1	0.3	1000
364-374	110.9-114.0	N	N	0.08	5	1.5	1	0.3	1500
374-384	114.0-117.0	N	N	0.08	5	1.5	1	0.5	1000
384-394	117.0-120.1	N	N	0.08	5	1.5	1.5	0.3	1500
394-404	120.1-123.1	N	N	0.11	5	0.7	1	0.2	1500
404-414	123.1-126.1	N	10	0.04	3	0.7	1	0.5	1000
414-424	126.1-129.2	N	N	0.07	3	0.7	0.7	0.2	700
424-434	129.2-132.2	N	N	0.14	3	1	1.5	0.2	1000

Table 8. Continued.

Sample interval		Ag	B	Ba	Be	Co	Cr	Cu	La	Mo	Nb	Ni
Feet	Meters											
10-20	3.0-6.1	N	30	1500	1.5	15	20	10	30	N	10	10
20-30	6.1-9.1	N	15	1500	1	70	20	10	30	10	10	20
30-39	9.1-11.9	N	20	1500	1	15	30	10	50	5	10	10
39-48	11.9-14.6	N	10	700	L	L	15	15	30	N	L	L
48-58	14.6-17.7	N	15	1000	L	20	15	15	30	N	L	10
58-68.5	17.7-20.9	N	20	700	1	30	20	20	30	N	10	15
68.5-72	20.9-21.9	L	L	1500	N	N	20	L	30	N	L	L
72-82	21.9-25.0	N	10	1500	L	30	10	20	30	N	L	5
82-92	25.0-28.0	N	L	1000	L	30	10	15	20	N	L	7
92-102	28.0-31.1	N	15	500	1.5	20	20	15	30	N	L	50
102-114	31.1-34.7	N	L	700	L	20	20	20	20	N	L	30
114-124	34.7-37.8	N	10	1000	1	30	30	20	30	N	10	50
124-134	37.8-40.8	N	10	700	1	30	30	15	30	N	10	50
134-144	40.8-43.9	N	L	1000	L	20	70	20	20	N	10	30
144-154	43.9-46.9	N	10	700	L	20	30	15	20	N	10	30
154-164	46.9-50.0	N	10	700	L	20	50	20	30	N	10	30
164-174	50.0-53.0	N	L	700	L	20	30	15	30	N	10	20
174-184	53.0-56.1	N	L	700	L	15	50	10	20	N	10	20
184-194	56.1-59.1	N	L	1500	L	15	30	15	20	N	L	20
194-204	59.1-62.2	N	20	1500	1	15	100	50	30	N	N	15
204-214	62.2-65.2	N	20	2000	1	15	30	70	30	N	10	15
214-224	65.2-68.3	N	20	1500	1	20	30	30	30	N	10	15
224-234	68.3-71.3	N	20	1500	L	20	100	30	30	N	10	15
234-244	71.3-74.3	N	15	1500	L	20	20	30	30	N	10	10
244-254	74.3-77.4	N	15	1500	L	15	20	15	20	N	10	15
254-264	77.4-80.4	N	15	1500	L	15	30	30	30	N	10	10
264-274	80.4-83.5	N	10	2000	L	20	30	30	30	N	10	15
274-284	83.5-86.5	N	10	1500	L	15	20	20	20	N	L	10
284-294	86.5-89.6	N	10	1500	1	20	20	20	20	N	10	15
294-304	89.6-92.6	N	10	1500	L	20	30	20	20	N	L	15
304-314	92.6-95.7	N	15	1500	1	10	30	30	30	N	L	15
314-324	95.7-98.7	N	15	2000	1	10	15	20	50	N	10	7
324-334	98.7-101.8	N	L	3000	1	10	20	20	50	N	10	15
334-344	101.8-104.8	N	10	3000	1	5	15	20	50	N	10	10
344-354	104.8-107.9	N	15	1500	1	7	15	30	50	N	15	15
354-364	107.9-110.9	N	15	1500	1.5	7	15	20	50	N	15	10
364-374	110.9-114.0	N	L	2000	1	7	7	10	50	N	10	10
374-384	114.0-117.0	N	10	2000	1	7	15	20	50	N	10	10
384-394	117.0-120.1	N	L	2000	L	5	10	20	50	N	10	7
394-404	120.1-123.1	N	L	2000	L	10	15	15	30	N	10	5
404-414	123.1-126.1	N	L	2000	L	10	10	L	50	N	10	5
414-424	126.1-129.2	N	L	1000	L	10	10	15	30	N	10	5
424-434	129.2-132.2	N	L	2000	L	10	15	15	50	N	10	5

Table 8. Continued.

Sample interval		Pb	Sc	Sn	Sr	V	Y	Zn	Zr	Other
Feet	Meters									
10-20	3.0-6.1	10	7	L	500	150	20	N	200	
20-30	6.1-9.1	10	7	L	500	150	30	L	200	
30-39	9.1-11.9	20	10	L	1500	300	20	N	100	
39-48	11.9-14.6	15	7	N	500	150	L	N	70	
48-58	14.6-17.7	15	7	L	700	150	L	N	150	
58-68.5	17.7-20.9	20	7	L	700	150	L	N	150	
68.5-72	20.9-21.9	100	7	L	3000	200	L	N	100	
72-82	21.9-25.0	15	7	N	700	150	L	N	200	
82-92	25.0-28.0	15	5	N	300	100	10	N	100	
92-102	28.0-31.1	30	7	N	700	200	L	N	100	
102-114	31.1-34.7	20	10	N	1000	200	10	N	150	
114-124	34.7-37.8	20	15	N	500	200	20	200	150	
124-134	37.8-40.8	20	15	N	500	200	30	200	200	
134-144	40.8-43.9	10	15	N	700	200	20	N	200	
144-154	43.9-46.9	L	15	N	500	200	20	N	200	
154-164	46.9-50.0	10	15	N	700	200	30	N	150	
164-174	50.0-53.0	10	15	N	700	300	20	N	200	
174-184	53.0-56.1	10	15	N	700	200	20	N	150	
184-194	56.1-59.1	10	10	N	500	200	20	N	150	
194-204	59.1-62.2	20	7	N	700	300	15	L	200	
204-214	62.2-65.2	20	10	N	500	300	15	N	150	
214-224	65.2-68.3	20	15	N	700	300	15	L	200	
224-234	68.3-71.3	20	10	N	700	300	15	N	150	
234-244	71.3-74.3	15	15	N	700	200	20	N	200	
244-254	74.3-77.4	15	10	N	700	200	15	N	200	
254-264	77.4-80.4	20	15	N	700	200	15	N	150	
264-274	80.4-83.5	20	15	N	1000	300	20	N	200	
274-284	83.5-86.5	30	15	N	1000	300	15	N	150	
284-294	86.5-89.6	20	15	N	1000	200	20	N	200	
294-304	89.6-92.6	20	15	N	1000	300	20	N	200	
304-314	92.6-95.7	20	15	N	700	200	15	N	200	
314-324	95.7-98.7	30	15	N	500	150	30	N	300	
324-334	98.7-101.8	20	15	N	500	150	30	N	300	
334-344	101.8-104.8	50	10	N	500	150	20	L	200	
344-354	104.8-107.9	50	15	N	500	150	20	N	300	
354-364	107.9-110.9	50	10	N	500	150	20	N	300	
364-374	110.9-114.0	20	10	N	700	100	20	N	300	
374-384	114.0-117.0	20	15	N	700	150	20	N	300	
384-394	117.0-120.1	30	10	N	700	150	20	N	200	
394-404	120.1-123.1	15	10	N	500	150	20	N	150	
404-414	123.1-126.1	15	10	N	700	150	20	N	200	
414-424	126.1-129.2	15	7	N	500	150	20	N	200	
424-434	129.2-132.2	20	10	N	700	150	20	N	150	

Table 8. Continued.

Sample interval		Au	As(c)	Hg	Fe	Mg	Ca	Ti	Mn
Feet	Meters								
434-444	132.2-135.3	N	N	0.07	3	0.5	0.7	0.15	500
444-454	135.3-138.3	N	N	0.11	3	0.7	0.7	0.2	700
454-464	138.3-141.4	N	N	0.04	3	0.7	1.5	0.2	1000
464-474	141.4-144.4	N	10	0.07	3	0.7	1	0.2	1000
474-484	144.4-147.5	N	20	0.17	3	0.5	0.7	0.15	500
484-494	147.5-150.5	N	40	0.14	3	0.7	0.7	0.2	700
494-504	150.5-153.6	N	40	0.14	3	1	0.7	0.2	1000
504-514	153.6-156.6	N	N	0.14	3	0.7	0.7	0.15	500
514-524	156.6-159.7	N	N	0.14	3	0.7	1	0.2	300
524-534	159.7-162.7	N	10	0.14	3	0.7	1	0.3	500
534-544	162.7-165.8	N	N	0.14	3	1	1	0.2	700
544-554	165.8-168.8	N	10	0.04	3	0.7	1	0.2	500
554-564	168.8-171.9	N	10	0.04	3	0.7	0.5	0.2	300
564-574	171.9-174.9	N	N	0.04	3	0.7	1	0.2	500
574-584	174.9-177.9	N	20	0.04	3	0.7	0.7	0.3	500
584-594	177.9-181.0	N	20	0.07	3	0.7	0.7	0.2	500
594-604	181.0-184.0	N	N	0.013	7	1	1	0.7	500
604-614	184.0-187.1	N	30	0.2	7	0.7	1	0.5	500
614-624	187.1-190.1	N	40	0.6	7	1.5	1.5	0.5	1000
624-627	190.1-191.0	0.02	30	0.6	5	2	5	0.5	1500
627-637	191.0-194.1	0.02	30	0.4	5	3	10	0.15	1500
637-647	194.1-197.1	0.02	40	0.4	3	5	15	0.2	1000
647-655	197.1-199.6	N	10	0.02	0.7	3	15	0.1	1500
655-663	199.6-202.0	0.02	10	0.22	1	3	20	0.1	2000
663-671	202.0-204.5	N	10	0.11	1	3	20	0.15	700
671-681	204.5-207.5	N	20	0.2	1.5	5	G20	0.1	1000
681-691	207.5-210.5	0.02	30	0.12	0.7	3	20	0.07	2000
691-701	210.5-213.6	0.1	10	0.05	1	3	G20	0.15	500
701-711	213.6-216.6	N	10	0.09	1	3	20	0.15	1000
711-721	216.6-219.7	0.02	10	0.15	1.5	5	20	0.15	1500
721-731	219.7-222.7	0.02	10	0.12	1	5	15	0.15	1000
731-741	222.7-225.8	N	30	0.07	1	3	7	0.15	2000
741-751	225.8-228.8	0.02	20	0.6	3	1.5	5	0.3	300
751-761	228.8-231.9	0.02	10	0.24	2	0.03	3	0.2	70
761-771	231.9-234.9	N	20	0.6	2	0.1	5	0.15	70
771-781	234.9-238.0	N	10	1	0.7	0.5	10	0.15	500
781-791	238.0-241.0	0.02	30	0.12	0.5	0.3	1.5	0.15	100
797-813	242.8-247.7	N	20	0.04	0.3	0.5	2	0.15	150
813-823	247.7-250.8	0.02	30	0.22	1	7	G20	0.05	5000
823-832	250.8-253.5	N	60	0.14	1	10	G20	0.03	G5000
838-843	255.3-256.9	N	40	1.1	1	10	G20	0.03	5000
843-853	256.9-259.9	N	60	0.4	1	7	G20	0.07	G5000
853-863	259.9-263.0	0.02	30	0.14	0.7	7	G20	0.03	5000

Table 8. Continued.

Sample interval		Ag	B	Ba	Be	Co	Cr	Cu	La	Mo	Nb	Ni
Feet	Meters											
434-444	132.2-135.3	N	L	1500	L	7	5	L	30	N	10	5
444-454	135.3-138.3	N	L	1500	L	10	7	15	30	N	10	5
454-464	138.3-141.4	N	L	1000	L	7	7	7	50	L	10	5
464-474	141.4-144.4	N	L	1500	L	10	10	7	50	L	10	5
474-484	144.4-147.5	N	L	1000	L	7	15	L	30	N	10	5
484-494	147.5-150.5	N	L	2000	L	10	7	10	50	N	10	5
494-504	150.5-153.6	N	L	1500	L	10	15	10	50	N	10	5
504-514	153.6-156.6	N	L	1500	L	7	5	10	30	N	10	5
514-524	156.6-159.7	N	L	1500	L	10	7	15	50	N	10	5
524-534	159.7-162.7	N	L	1500	L	10	15	20	50	N	10	5
534-544	162.7-165.8	N	L	1500	L	7	10	20	50	N	10	5
544-554	165.8-168.8	N	L	1500	L	5	10	15	30	N	10	5
554-564	168.8-171.9	N	L	1500	L	7	10	15	30	N	10	5
564-574	171.9-174.9	N	L	1500	L	5	15	20	50	N	10	5
574-584	174.9-177.9	N	L	2000	L	7	10	15	50	N	10	5
584-594	177.9-181.0	N	L	1500	L	7	7	10	30	N	10	5
594-604	181.0-184.0	N	10	3000	L	7	10	7	70	N	L	5
604-614	184.0-187.1	N	L	2000	1	5	7	5	50	N	L	5
614-624	187.1-190.1	N	10	3000	1	7	10	10	50	N	L	5
624-627	190.1-191.0	N	15	1500	L	10	7	10	50	N	L	5
627-637	191.0-194.1	L	L	1500	1	5	100	30	50	N	N	30
637-647	194.1-197.1	L	L	2000	1	7	150	30	50	N	N	50
647-655	197.1-199.6	L	L	300	L	L	50	15	20	N	N	30
655-663	199.6-202.0	L	L	300	1	L	50	15	30	N	N	20
663-671	202.0-204.5	L	L	700	L	L	70	10	20	N	N	30
671-681	204.5-207.5	L	10	500	L	5	70	15	50	N	N	50
681-691	207.5-210.5	L	L	700	1	L	50	15	20	N	N	30
691-701	210.5-213.6	0.5	10	1000	L	5	70	20	30	N	N	30
701-711	213.6-216.6	0.5	L	700	1	7	100	20	30	N	N	50
711-721	216.6-219.7	0.5	10	700	L	7	70	15	30	N	N	50
721-731	219.7-222.7	L	20	300	1	5	70	20	20	N	N	50
731-741	222.7-225.8	0.7	L	200	1.5	10	100	150	30	N	N	70
741-751	225.8-228.8	1	10	300	1.5	15	150	30	70	L	10	150
751-761	228.8-231.9	0.5	L	300	L	5	70	30	100	N	L	100
761-771	231.9-234.9	L	L	300	2	7	70	20	100	N	L	70
771-781	234.9-238.0	L	L	300	1.5	5	70	30	70	N	N	70
781-791	238.0-241.0	N	N	50	1	L	50	30	30	L	10	70
797-813	242.8-247.7	L	N	70	1	L	30	70	30	L	10	70
813-823	247.7-250.8	L	N	150	L	L	L	7	L	N	N	30
823-832	250.8-253.5	0.5	L	300	L	5	5	5	L	7	N	50
838-843	255.3-256.9	L	L	2000	L	L	5	5	L	N	N	30
843-853	256.9-259.9	0.7	L	1500	1	L	5	7	L	N	N	30
853-863	259.9-263.0	L	L	500	N	L	5	5	L	N	N	30

Table 8. Continued.

Sample interval		Pb	Sc	Sn	Sr	V	Y	Zn	Zr	Other
Feet	Meters									
434-444	132.2-135.3	10	7	N	500	70	15	N	200	
444-454	135.3-138.3	15	7	N	500	100	15	N	150	
454-464	138.3-141.4	10	7	N	300	70	15	N	150	
464-474	141.4-144.4	20	7	N	500	150	20	N	200	
474-484	144.4-147.5	15	7	N	300	150	20	N	200	
484-494	147.5-150.5	15	7	N	300	100	20	N	200	
494-504	150.5-153.6	20	7	N	500	100	15	N	150	
504-514	153.6-156.6	15	7	N	300	70	15	N	150	
514-524	156.6-159.7	15	7	N	500	100	20	N	200	
524-534	159.7-162.7	20	7	N	500	100	15	N	150	
534-544	162.7-165.8	30	7	N	500	100	20	N	200	
544-554	165.8-168.8	15	7	N	300	70	15	N	150	
554-564	168.8-171.9	20	7	N	300	100	15	N	150	
564-574	171.9-174.9	20	7	N	500	150	20	N	150	
574-584	174.9-177.9	15	7	N	300	70	15	N	200	
584-594	177.9-181.0	15	7	N	200	70	10	N	150	
594-604	181.0-184.0	10	5	N	200	100	10	N	300	
604-614	184.0-187.1	10	7	N	300	100	15	N	300	
614-624	187.1-190.1	15	7	N	150	70	15	N	300	
624-627	190.1-191.0	15	7	N	L	100	15	N	200	
627-637	191.0-194.1	15	7	N	150	200	50	300	100	
637-647	194.1-197.1	15	7	N	200	200	50	N	200	
647-655	197.1-199.6	L	5	N	300	100	20	N	150	
655-663	199.6-202.0	L	5	N	300	150	30	N	150	
663-671	202.0-204.5	L	5	N	500	100	30	N	150	
671-681	204.5-207.5	L	7	N	500	200	30	N	150	
681-691	207.5-210.5	L	L	N	300	200	30	L	50	
691-701	210.5-213.6	L	5	N	700	200	30	N	100	
701-711	213.6-216.6	10	7	N	300	150	30	L	200	
711-721	216.6-219.7	10	7	N	300	150	30	N	300	
721-731	219.7-222.7	L	7	N	200	150	20	L	300	
731-741	222.7-225.8	L	7	N	N	1000	20	700	150	
741-751	225.8-228.8	L	30	N	500	2000	100	L	200	
751-761	228.8-231.9	70	7	N	1500	700	100	N	70	
761-771	231.9-234.9	L	7	N	2000	700	70	N	50	
771-781	234.9-238.0	N	7	N	700	500	70	N	100	
781-791	238.0-241.0	70	5	N	500	700	30	N	70	
797-813	242.8-247.7	30	5	N	200	300	20	L	70	W=200
813-823	247.7-250.8	30	L	N	150	50	L	L	20	
823-832	250.8-253.5	50	L	L	100	30	L	300	30	
838-843	255.3-256.9	20	L	N	100	50	10	L	30	
843-853	256.9-259.9	20	L	N	100	50	10	L	50	
853-863	259.9-263.0	30	L	L	70	30	L	L	15	

Table 8. Continued.

Sample interval		Au	As(c)	Hg	Fe	Mg	Ca	Ti	Mn
Feet	Meters								
863-873	263.0-266.0	0.04	40	0.14	1.5	10	G20	0.05	5000
873-883	266.0-269.1	0.02	40	0.14	0.5	10	G20	0.05	1500
883-893	269.1-272.1	0.02	40	0.1	0.5	10	G20	0.03	1500
893-903	272.1-275.1	0.04	100	0.1	1	10	G20	0.07	1500
903-913	275.1-278.2	0.02	30	0.18	1.5	10	20	0.07	5000
913-921	278.2-280.6	0.06	30	0.4	2	2	10	0.1	2000
923-933	281.2-284.3	0.04	20	0.22	0.5	1.5	3	0.15	700
933-943	284.3-287.3	N	20	0.1	0.3	0.7	0.7	0.15	300
943-953	287.3-290.4	0.06	60	0.18	1.5	7	7	0.15	5000
953-963	290.4-293.4	N	60	0.1	2	7	15	0.3	5000
963-973	293.4-296.5	0.02	30	0.28	1	2	5	0.3	1000
973-983	296.5-299.5	0.04	60	0.22	1.5	5	G20	0.1	G5000
983-993	299.5-302.6	0.04	L	1	10	5	G20	0.015	G5000
993-1003	302.6-305.6	N	40	0.6	1.5	5	G20	0.03	5000
1003-1013	305.6-308.7	0.04	40	1.3	7	3	G20	0.03	5000
1013-1023	308.7-311.7	0.02	40	0.22	1	10	G20	0.02	5000
1023-1033	311.7-314.8	N	60	0.18	1	10	G20	0.05	5000
1033-1043	314.8-317.8	N	40	0.18	1	10	G20	0.03	5000
1043-1053	317.8-320.8	0.04	10	0.14	3	10	G20	0.15	G5000
1053-1063	320.8-323.9	0.02	30	L	3	7	15	0.15	5000
1063-1073	323.9-326.9	0.02	20	0.24	7	2	15	0.2	5000
1073-1083	326.9-330.0	0.02	20	L	0.5	1.5	0.3	0.03	300
1083-1093	330.0-333.0	0.02	20	0.1	0.3	0.7	0.15	0.07	50
1093-1103	333.0-336.1	0.04	10	L	0.3	1	0.07	0.07	150
1103-1113	336.1-339.1	0.04	40	0.1	0.3	0.3	0.15	0.03	70
1113-1123	339.1-342.2	0.02	10	0.1	0.7	0.15	0.07	0.1	30
1123-1133	342.2-345.2	0.02	20	0.1	0.7	0.5	1.5	0.1	100
1133-1143	345.2-348.3	N	30	L	0.3	0.5	1.5	0.07	100
1143-1153	348.3-351.3	0.04	20	L	0.5	0.3	0.5	0.07	150
1153-1163	351.3-354.4	N	10	0.1	0.3	0.2	0.5	0.03	150
1163-1173	354.4-357.4	0.06	10	L	0.2	0.15	0.3	0.07	100
1173-1183	357.4-360.5	N	L	L	0.3	0.3	0.7	0.07	150
1183-1193	360.5-363.5	0.06	10	L	0.3	0.3	0.2	0.05	150
1193-1203	363.5-366.6	0.02	L	0.1	1	0.3	0.15	0.07	100
1203-1213	366.6-369.6	0.02	L	0.08	0.7	0.2	0.07	0.03	70
1213-1223	369.6-372.6	0.04	10	0.08	1	0.3	0.15	0.1	70
1223-1233	372.6-375.7	0.02	L	L	0.7	0.3	0.3	0.07	150
1233-1243	375.7-378.7	0.06	L	L	0.5	0.3	0.2	0.07	150
1243-1253	378.7-381.8	0.02	L	L	0.5	0.2	0.2	0.03	150
1253-1263	381.8-384.8	0.04	10	L	0.5	0.2	0.3	0.03	300
1263-1273	384.8-387.9	0.02	10	0.02	0.3	0.2	0.3	0.03	200
1273-1283	387.9-390.9	N	20	L	0.7	0.7	0.2	0.07	70
1283-1304	390.9-397.3	0.04	10	L	0.3	0.3	0.2	0.07	100

Table 8. Continued.

Sample interval		Ag	B	Ba	Be	Co	Cr	Cu	La	Mo	Nb	Ni
Feet	Meters											
863-873	263.0-266.0	L	L	300	L	5	5	7	L	L	N	50
873-883	266.0-269.1	N	L	50	L	N	7	7	L	L	N	20
883-893	269.1-272.1	N	L	70	N	N	7	5	L	N	N	7
893-903	272.1-275.1	L	10	500	L	L	7	5	L	N	N	30
903-913	275.1-278.2	L	L	500	3	5	7	10	L	N	N	30
913-921	278.2-280.6	L	L	300	1.5	5	70	10	20	L	N	100
923-933	281.2-284.3	N	30	1000	2	L	20	7	30	L	N	20
933-943	284.3-287.3	N	30	1000	2	N	5	5	30	N	N	15
943-953	287.3-290.4	N	30	G5000	30	N	5	5	30	N	N	20
953-963	290.4-293.4	N	500	2000	70	L	5	5	100	L	10	15
963-973	293.4-296.5	N	70	1500	10	N	5	5	50	7	10	5
973-983	296.5-299.5	L	30	300	2	N	5	L	L	5	L	15
983-993	299.5-302.6	1	20	150	1.5	15	5	10	20	7	L	20
993-1003	302.6-305.6	L	L	200	1	L	7	L	L	N	N	20
1003-1013	305.6-308.7	3	10	70	1.5	7	10	7	L	5	L	30
1013-1023	308.7-311.7	N	10	70	1	L	5	L	L	N	N	15
1023-1033	311.7-314.8	N	L	300	1.5	L	7	L	L	N	L	20
1033-1043	314.8-317.8	N	L	300	1.5	L	7	L	L	N	N	10
1043-1053	317.8-320.8	L	150	3000	2	7	30	L	20	5	L	70
1053-1063	320.8-323.9	N	300	2000	3	7	30	7	20	300	10	70
1063-1073	323.9-326.9	N	150	1000	7	5	30	5	30	30	10	70
1073-1083	326.9-330.0	N	N	300	2	N	L	L	30	N	15	5
1083-1093	330.0-333.0	L	L	300	2	N	L	15	30	N	15	L
1093-1103	333.0-336.1	N	N	100	1.5	N	L	5	30	N	10	L
1103-1113	336.1-339.1	L	10	100	1.5	N	L	7	50	N	10	L
1113-1123	339.1-342.2	N	10	50	1.5	5	N	5	20	N	20	L
1123-1133	342.2-345.2	L	L	150	1.5	N	N	7	30	N	20	L
1133-1143	345.2-348.3	N	N	50	1.5	N	N	L	L	N	10	N
1143-1153	348.3-351.3	N	N	150	2	N	N	L	50	N	15	N
1153-1163	351.3-354.4	N	N	150	1.5	N	N	7	30	N	10	N
1163-1173	354.4-357.4	N	N	150	2	N	N	5	20	N	10	N
1173-1183	357.4-360.5	N	N	150	2	N	N	5	30	N	10	N
1183-1193	360.5-363.5	N	N	L	1.5	N	N	5	30	N	10	N
1193-1203	363.5-366.6	N	L	L	1.5	15	N	7	L	N	10	10
1203-1213	366.6-369.6	N	N	L	1.5	N	N	5	20	N	10	L
1213-1223	369.6-372.6	N	N	L	1	L	N	5	L	N	L	L
1223-1233	372.6-375.7	N	N	L	1.5	N	N	7	20	N	L	N
1233-1243	375.7-378.7	N	N	L	1.5	N	N	7	30	N	10	N
1243-1253	378.7-381.8	N	N	L	1.5	N	N	7	20	N	10	N
1253-1263	381.8-384.8	N	N	70	1.5	N	N	5	L	N	L	N
1263-1273	384.8-387.9	N	N	50	1.5	N	N	L	L	N	L	N
1273-1283	387.9-390.9	N	L	L	1.5	L	N	5	20	N	10	L
1283-1304	390.9-397.3	N	N	L	1.5	N	N	L	L	N	10	L

Table 8. Continued.

Sample interval		Pb	Sc	Sn	Sr	V	Y	Zn	Zr	Other
Feet	Meters									
863-873	263.0-266.0	15	L	N	100	50	L	L	20	
873-883	266.0-269.1	10	L	N	70	10	L	L	30	
883-893	269.1-272.1	L	L	L	50	10	L	L	30	
893-903	272.1-275.1	10	L	N	100	15	L	L	50	
903-913	275.1-278.2	15	L	10	100	50	10	200	50	
913-921	278.2-280.6	20	5	10	50	500	30	300	70	
923-933	281.2-284.3	L	5	10	L	200	10	L	70	
933-943	284.3-287.3	L	5	10	50	30	10	L	70	
943-953	287.3-290.4	L	7	70	50	30	20	L	70	Bi=15
953-963	290.4-293.4	L	5	100	70	70	70	L	150	Bi=30
963-973	293.4-296.5	L	10	20	50	50	30	L	70	
973-983	296.5-299.5	10	10	20	100	30	30	L	70	
983-993	299.5-302.6	50	L	100	100	30	20	200	30	
993-1003	302.6-305.6	L	L	10	150	30	15	300	70	
1003-1013	305.6-308.7	30	L	70	70	70	15	500	50	Bi=70
1013-1023	308.7-311.7	L	N	10	100	20	10	200	30	
1023-1033	311.7-314.8	L	L	15	150	20	10	300	50	
1033-1043	314.8-317.8	L	L	15	150	20	10	200	30	
1043-1053	317.8-320.8	10	5	50	150	70	30	300	70	
1053-1063	320.8-323.9	L	7	50	70	100	50	L	70	
1063-1073	323.9-326.9	20	5	100	50	70	30	200	50	Bi=70
1073-1083	326.9-330.0	20	5	N	50	L	15	L	50	
1083-1093	330.0-333.0	70	5	L	50	15	20	L	70	
1093-1103	333.0-336.1	15	L	N	N	L	15	L	70	
1103-1113	336.1-339.1	20	5	N	70	10	15	L	70	
1113-1123	339.1-342.2	10	L	N	50	L	10	N	70	
1123-1133	342.2-345.2	70	5	N	L	L	15	L	70	
1133-1143	345.2-348.3	10	L	N	L	L	15	N	30	
1143-1153	348.3-351.3	20	L	N	50	L	30	N	70	
1153-1163	351.3-354.4	10	L	N	L	L	15	N	70	
1163-1173	354.4-357.4	10	L	N	L	L	15	N	50	
1173-1183	357.4-360.5	15	L	N	L	L	20	N	30	
1183-1193	360.5-363.5	10	L	N	L	L	20	N	30	
1193-1203	363.5-366.6	N	5	N	L	L	15	N	30	
1203-1213	366.6-369.6	N	L	N	L	L	15	N	30	
1213-1223	369.6-372.6	N	L	L	L	10	15	N	70	
1223-1233	372.6-375.7	15	L	L	L	L	15	N	30	
1233-1243	375.7-378.7	30	L	N	L	L	30	N	50	
1243-1253	378.7-381.8	15	L	N	L	L	15	N	70	
1253-1263	381.8-384.8	20	L	N	L	L	15	N	50	
1263-1273	384.8-387.9	20	L	N	L	L	15	N	30	
1273-1283	387.9-390.9	10	L	N	L	15	15	L	50	
1283-1304	390.9-397.3	10	L	N	L	L	15	N	50	

Table 8. Continued.

Sample interval		Au	As(c)	Hg	Fe	Mg	Ca	Ti	Mn
Feet	Meters								
1304-1314	397.3-400.4	0.06	10	0.04	0.3	0.3	0.3	0.07	150
1314-1324	400.4-403.4	0.04	10	0.08	0.2	0.1	0.07	0.03	50
1324-1334	403.4-406.5	0.08	10	L	0.5	0.15	0.15	0.05	70
1334-1342	406.5-408.9	N	L	0.03	0.5	0.1	0.07	0.03	20
1342-1352	408.9-412.0	N	20	0.03	1.5	0.7	0.2	0.2	150
1352-1363	412.0-415.3	N	20	0.04	1.5	1	0.3	0.3	150
1363-1370	415.3-417.4	N	20	0.05	0.7	0.05	0.05	0.07	20
1370-1380	417.4-420.5	0.02	10	0.02	1	0.7	0.1	0.15	300
1380-1390	420.5-423.5	0.04	20	0.03	0.3	0.1	0.15	0.03	50
1390-1400	423.5-426.6	0.02	10	0.03	0.3	0.1	0.3	0.05	150
1400-1410	426.6-429.6	0.02	10	L	0.7	0.3	0.3	0.07	300
1410-1420	429.6-432.7	0.02	L	0.02	0.3	0.1	0.3	0.05	150
1420-1430	432.7-435.7	N	L	L	0.3	0.1	0.3	0.05	200
1430-1440	435.7-438.8	N	10	L	0.3	0.1	0.3	0.03	300
1440-1450	438.8-441.8	N	10	L	0.5	0.5	0.15	0.07	100
1450-1460	441.8-444.9	N	20	0.04	0.3	0.5	0.3	0.07	300
1460-1470	444.9-447.9	0.02	10	0.02	0.7	1.5	0.5	0.07	700
1470-1480	447.9-451.0	0.02	20	L	0.5	0.7	0.7	0.07	700
1480-1490	451.0-454.0	0.02	20	0.03	0.5	0.7	0.2	0.07	300
1490-1505	454.0-458.6	N	20	0.02	0.2	1	0.15	0.07	700

Table 8. Continued.

Sample interval		Ag	B	Ba	Be	Co	Cr	Cu	La	Mo	Nb	Ni
Feet	Meters											
1304-1314	397.3-400.4	N	N	100	1.5	N	N	L	L	N	10	L
1314-1324	400.4-403.4	N	N	L	L	N	N	10	20	N	L	N
1324-1334	403.4-406.5	N	N	L	1	N	N	5	L	N	L	N
1334-1342	406.5-408.9	N	N	L	1	N	N	7	20	N	L	L
1342-1352	408.9-412.0	N	N	L	1	L	10	7	20	N	L	5
1352-1363	412.0-415.3	N	N	L	1	5	10	L	20	5	L	5
1363-1370	415.3-417.4	N	N	L	L	L	N	15	30	N	10	L
1370-1380	417.4-420.5	N	N	70	L	L	N	L	70	N	10	L
1380-1390	420.5-423.5	N	N	50	1.5	N	N	L	L	N	10	L
1390-1400	423.5-426.6	N	N	70	2	N	N	7	L	N	L	N
1400-1410	426.6-429.6	N	N	100	1.5	N	N	7	20	N	10	N
1410-1420	429.6-432.7	N	N	100	1.5	N	N	5	20	N	L	N
1420-1430	432.7-435.7	N	N	150	1.5	N	L	5	20	N	L	N
1430-1440	435.7-438.8	N	N	70	1.5	N	N	L	L	N	L	N
1440-1450	438.8-441.8	N	N	L	1	N	N	7	20	N	10	L
1450-1460	441.8-444.9	N	L	100	1.5	N	N	7	20	N	10	L
1460-1470	444.9-447.9	N	L	70	2	N	N	L	30	N	10	N
1470-1480	447.9-451.0	N	L	70	2	N	N	5	20	N	L	N
1480-1490	451.0-454.0	N	L	50	2	N	N	L	50	N	L	N
1490-1505	454.0-458.6	N	N	50	2	N	N	7	20	N	L	N

Table 8. Continued.

Sample interval		Pb	Sc	Sn	Sr	V	Y	Zn	Zr	Other
Feet	Meters									
1304-1314	397.3-400.4	10	L	N	50	L	15	N	30	
1314-1324	400.4-403.4	N	L	N	L	L	10	N	30	
1324-1334	403.4-406.5	N	L	N	L	10	20	N	70	
1334-1342	406.5-408.9	N	L	N	L	L	20	N	70	
1342-1352	408.9-412.0	N	5	N	50	30	10	N	100	
1352-1363	412.0-415.3	N	5	N	L	30	15	N	100	
1363-1370	415.3-417.4	70	L	N	150	15	20	N	100	
1370-1380	417.4-420.5	N	L	N	L	10	20	N	70	
1380-1390	420.5-423.5	N	L	N	L	L	20	N	50	
1390-1400	423.5-426.6	10	L	N	L	L	20	N	30	
1400-1410	426.6-429.6	30	5	N	50	L	15	N	30	
1410-1420	429.6-432.7	30	L	N	L	L	15	N	50	
1420-1430	432.7-435.7	20	L	N	L	L	15	N	70	
1430-1440	435.7-438.8	20	L	N	L	L	15	N	70	
1440-1450	438.8-441.8	15	5	N	L	L	30	N	50	
1450-1460	441.8-444.9	70	5	N	50	L	10	L	70	
1460-1470	444.9-447.9	30	5	N	L	L	15	N	70	
1470-1480	447.9-451.0	30	L	N	L	L	50	N	30	
1480-1490	451.0-454.0	30	L	N	L	L	20	N	30	
1490-1505	454.0-458.6	30	L	N	L	L	10	N	50	

Figure 3A. Geochemical logs for gold and tellurium, drill hole USGS 1 detailed sampling.

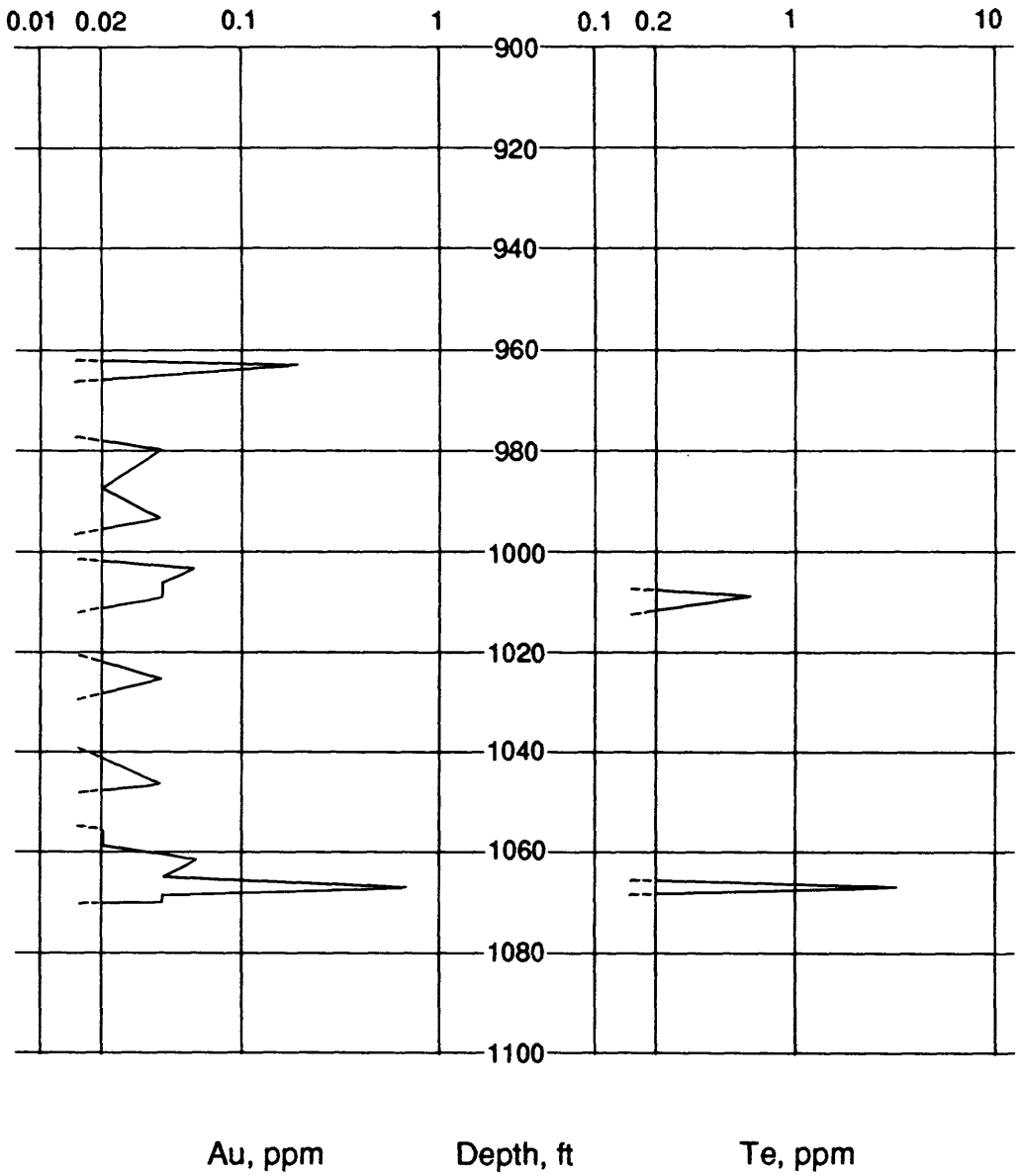


Figure 3B. Geochemical logs for antimony and arsenic, drill hole USGS 1 detailed sampling.

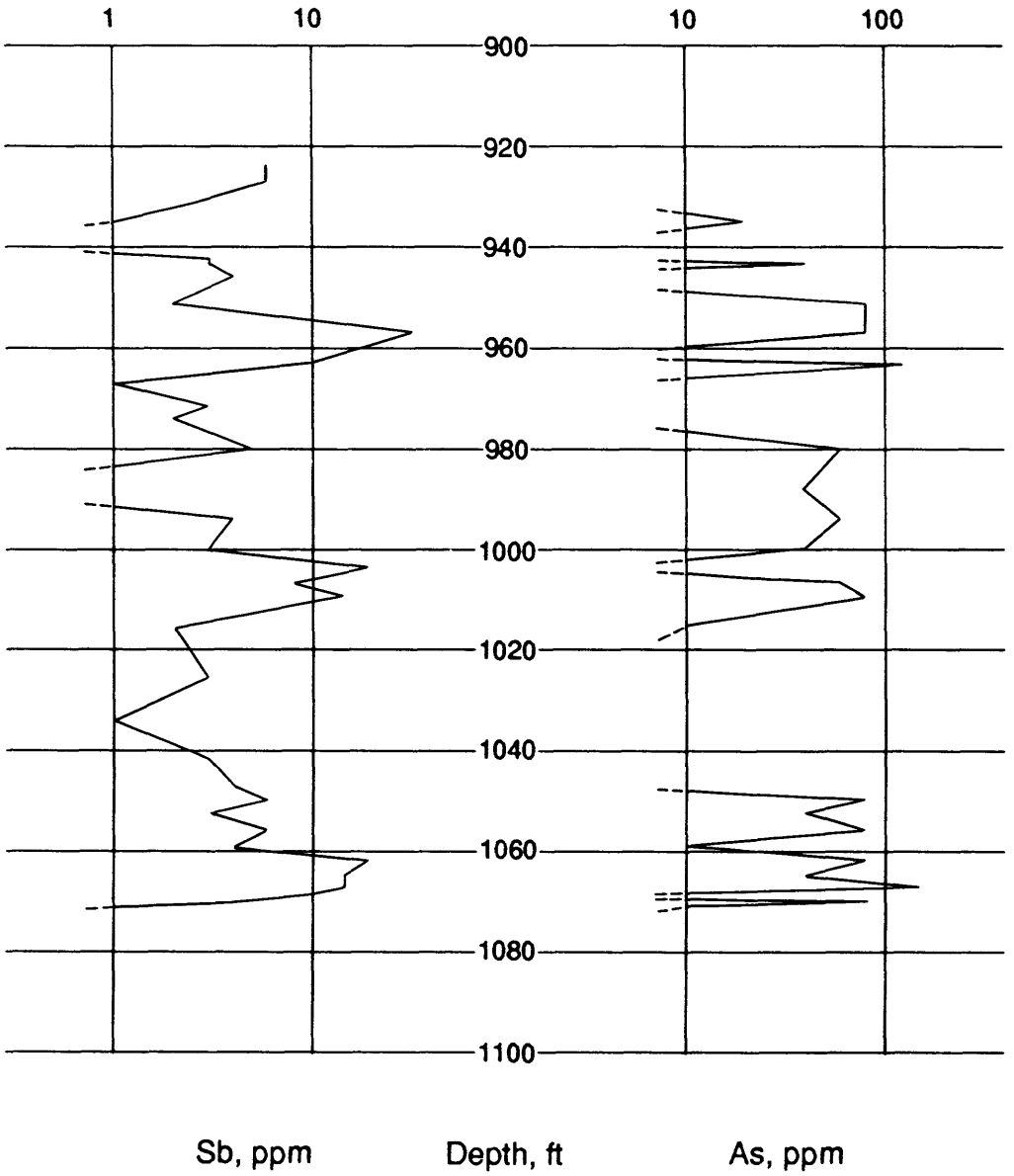


Figure 3C. Geochemical log for mercury, drill hole USGS 1 detailed sampling.

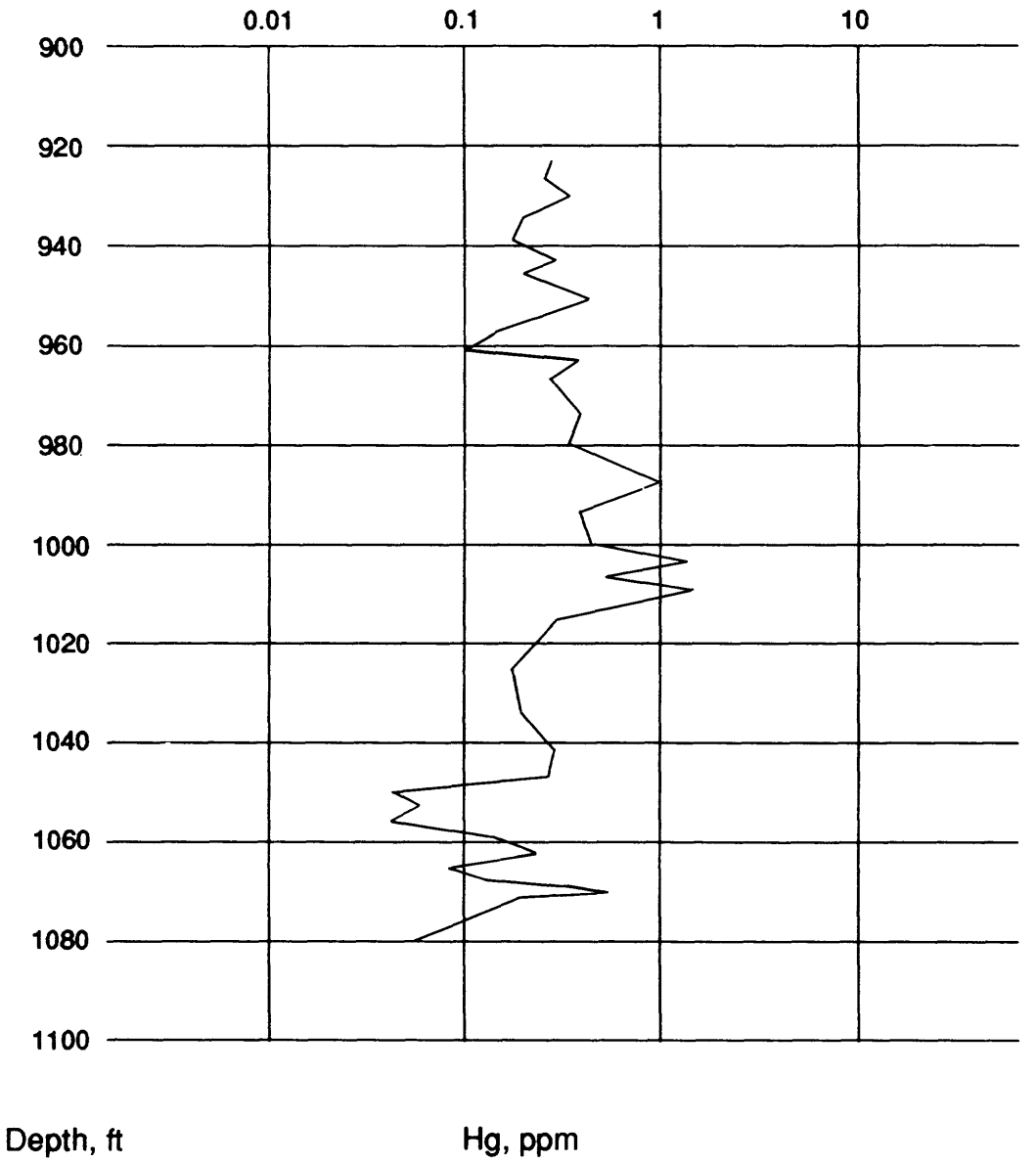


Figure 3D. Geochemical logs for copper and zinc, drill hole USGS 1 detailed sampling.

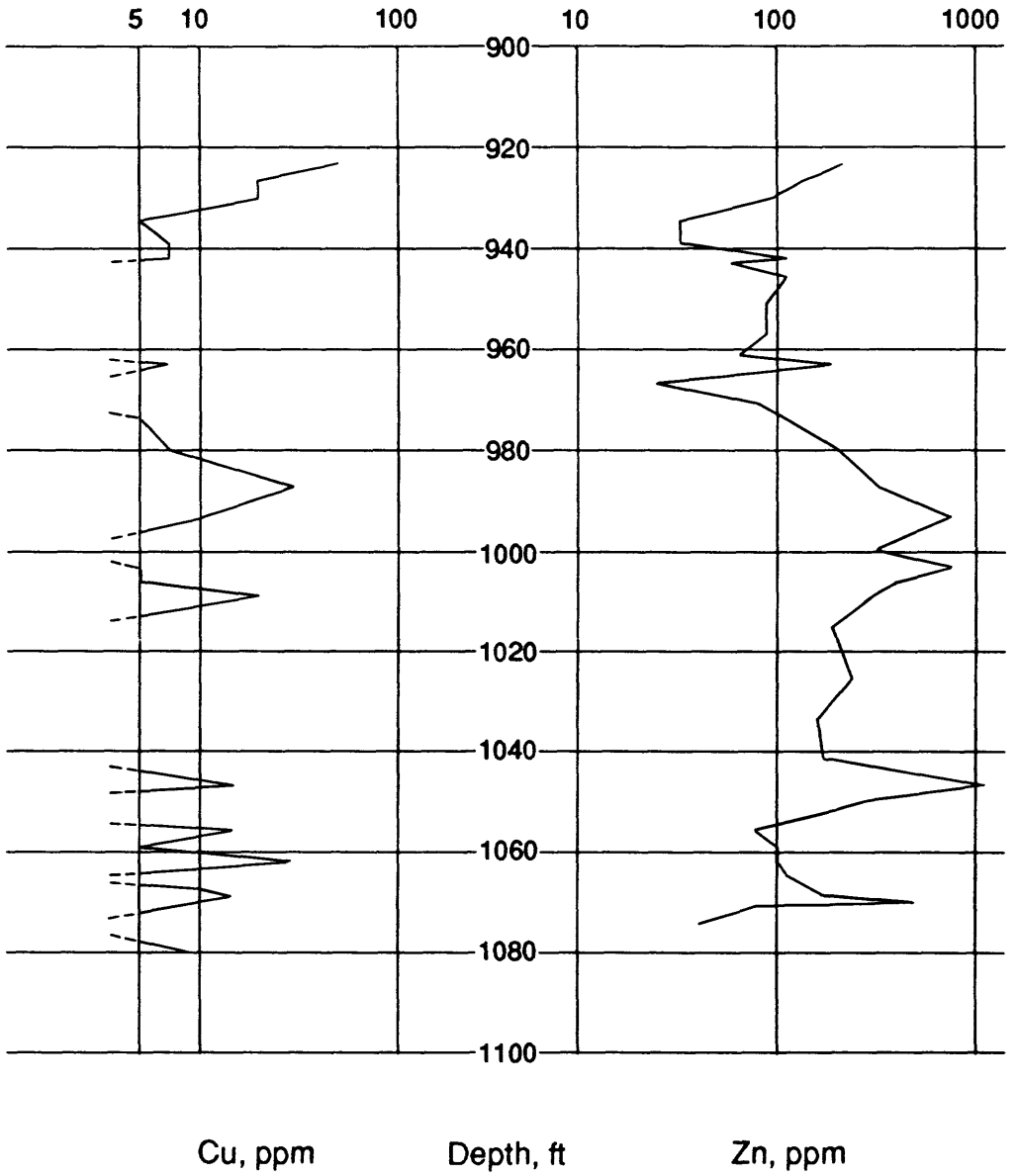


Figure 3E. Geochemical logs for lead and silver, drill hole USGS 1 detailed sampling.

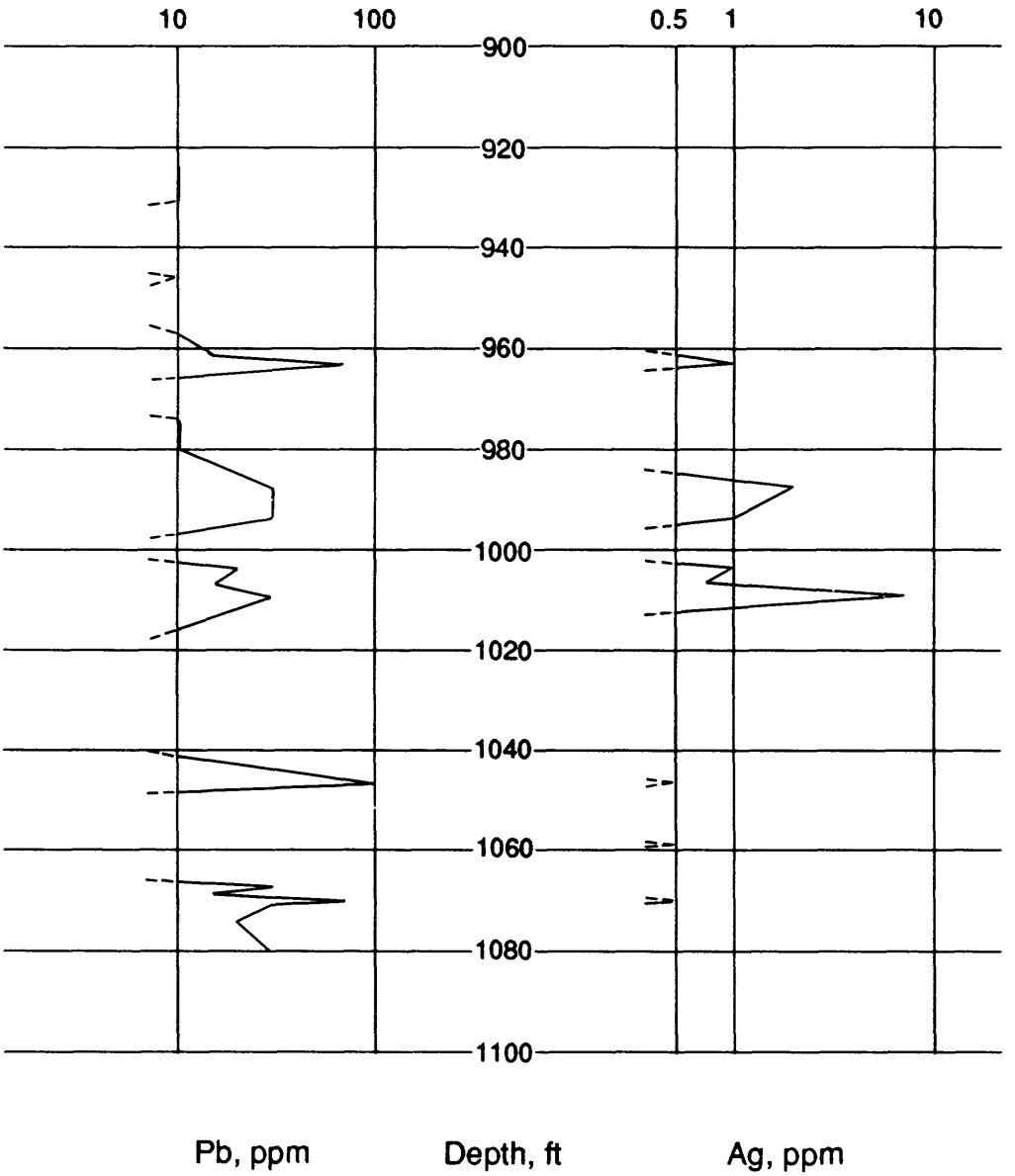


Figure 3F. Geochemical log for bismuth, drill hole USGS 1 detailed sampling.

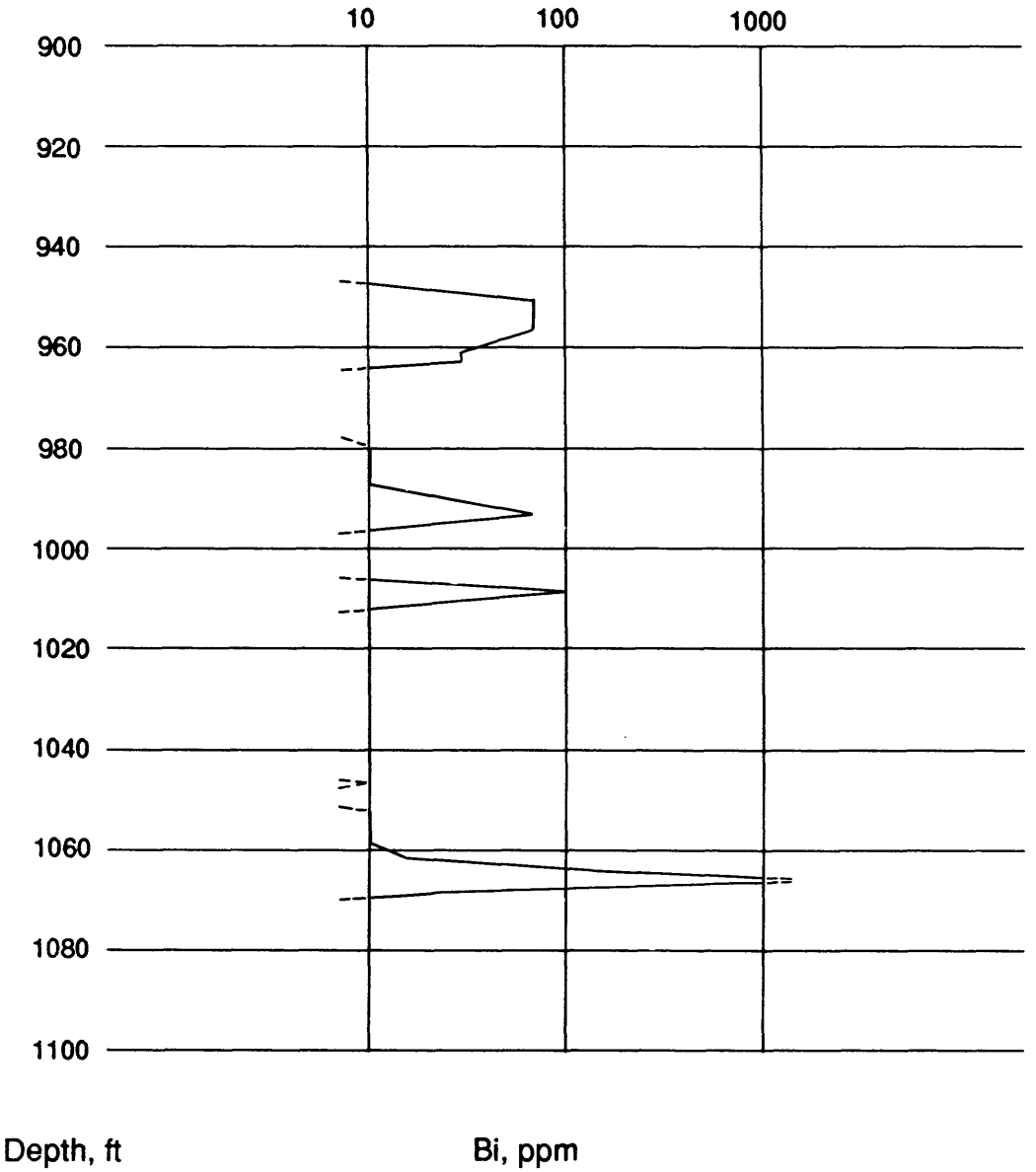


Figure 3G. Geochemical log for molybdenum, drill hole USGS 1 detailed sampling.

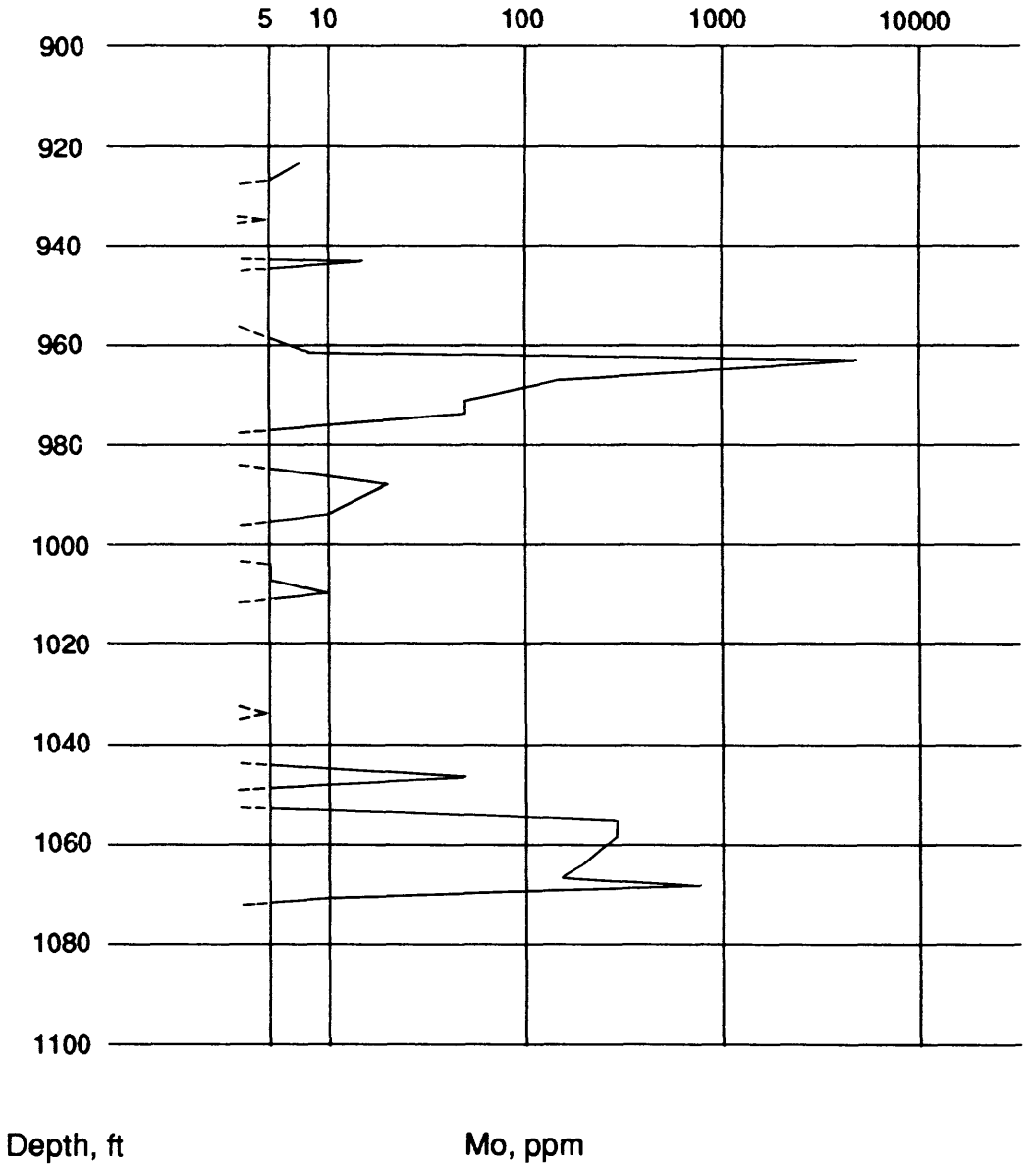


Figure 3H. Geochemical log for tin, drill hole USGS 1 detailed sampling.

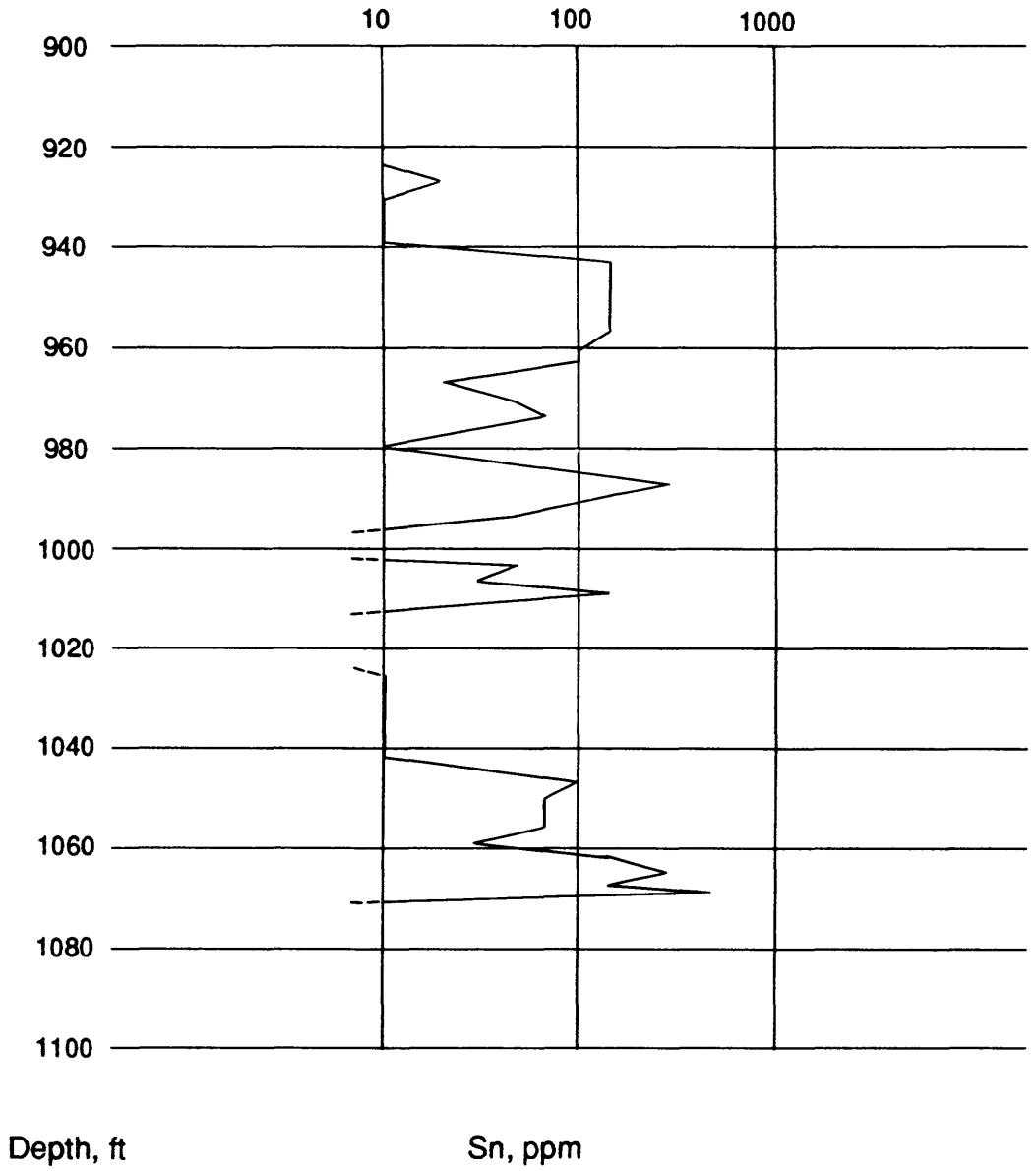


Figure 3I. Geochemical logs for boron and beryllium, drill hole USGS 1 detailed sampling.

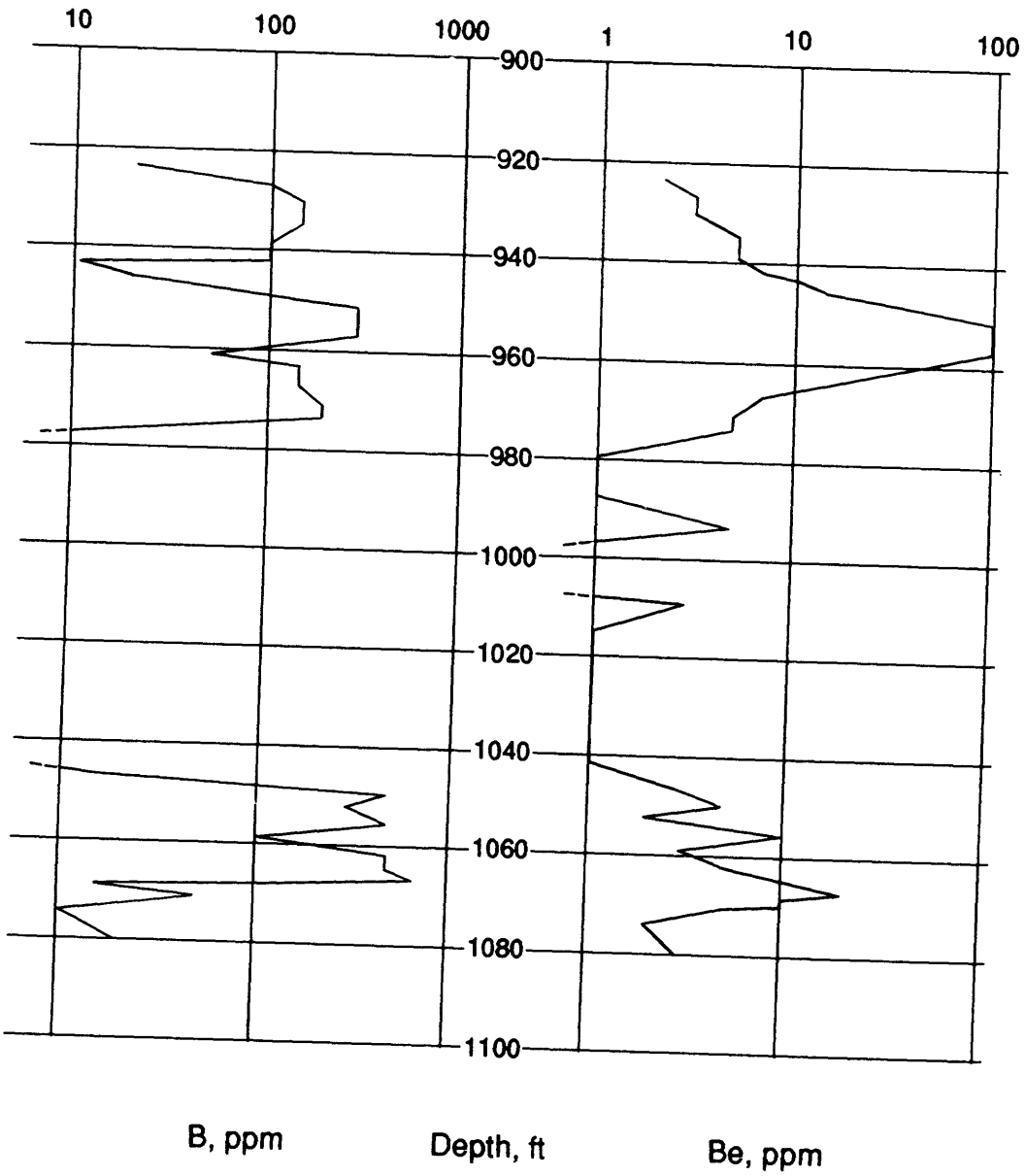


Figure 3J. Geochemical log for manganese, drill hole USGS 1 detailed sampling.

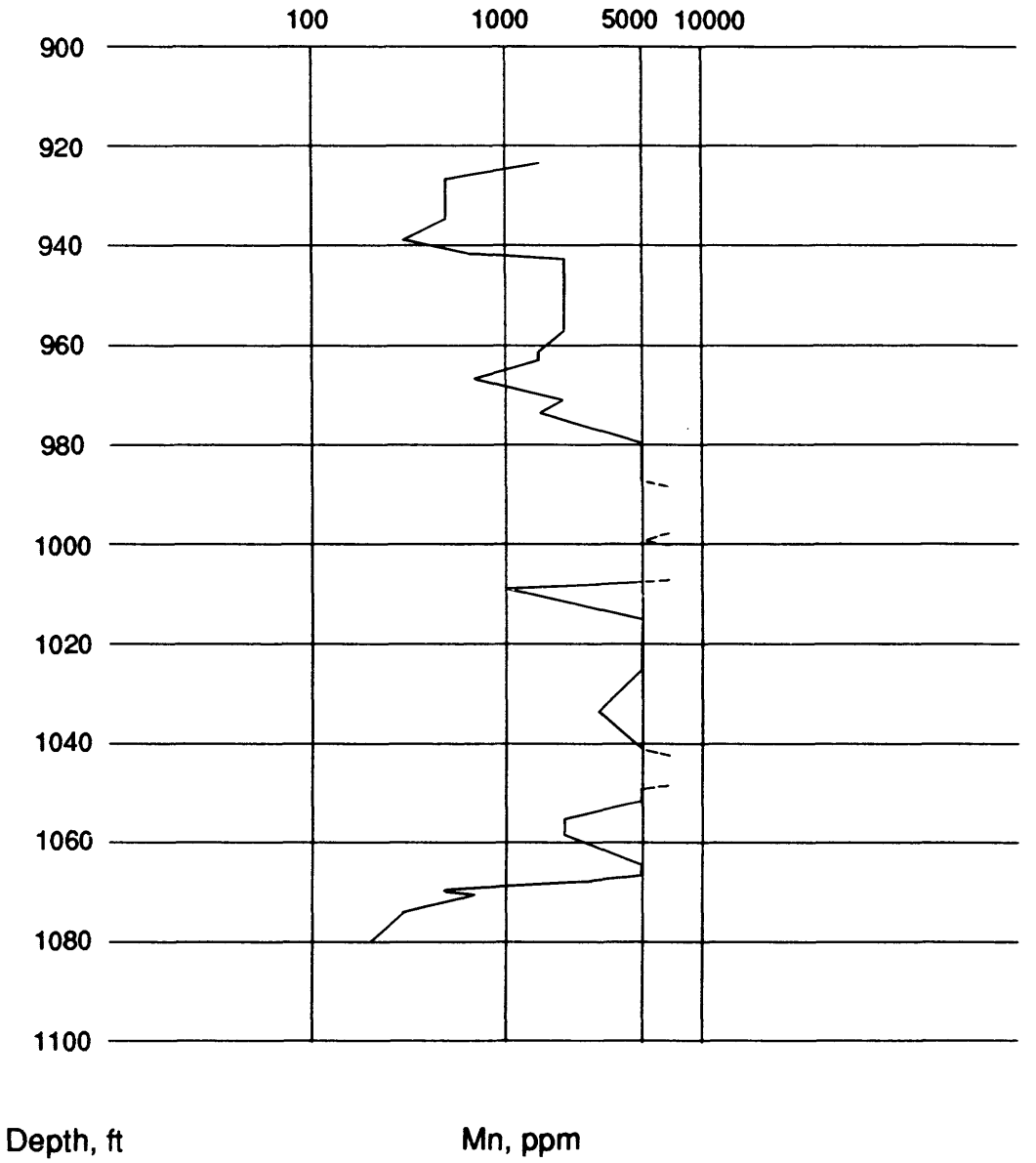


Figure 3K. Geochemical logs for chromium and vanadium, drill hole USGS 1 detailed sampling.

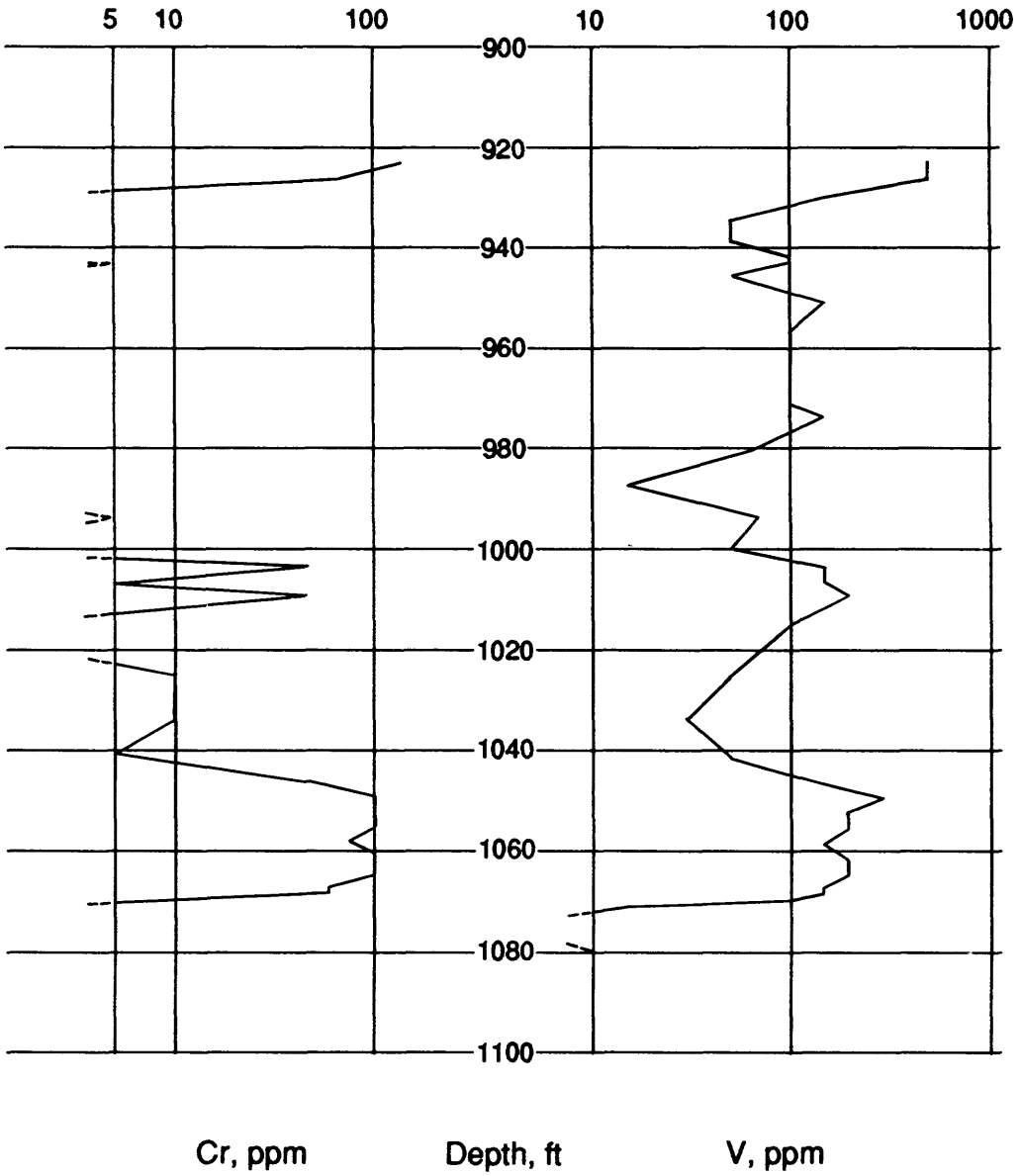


Figure 3L. Geochemical log for barium, drill hole USGS 1 detailed sampling.

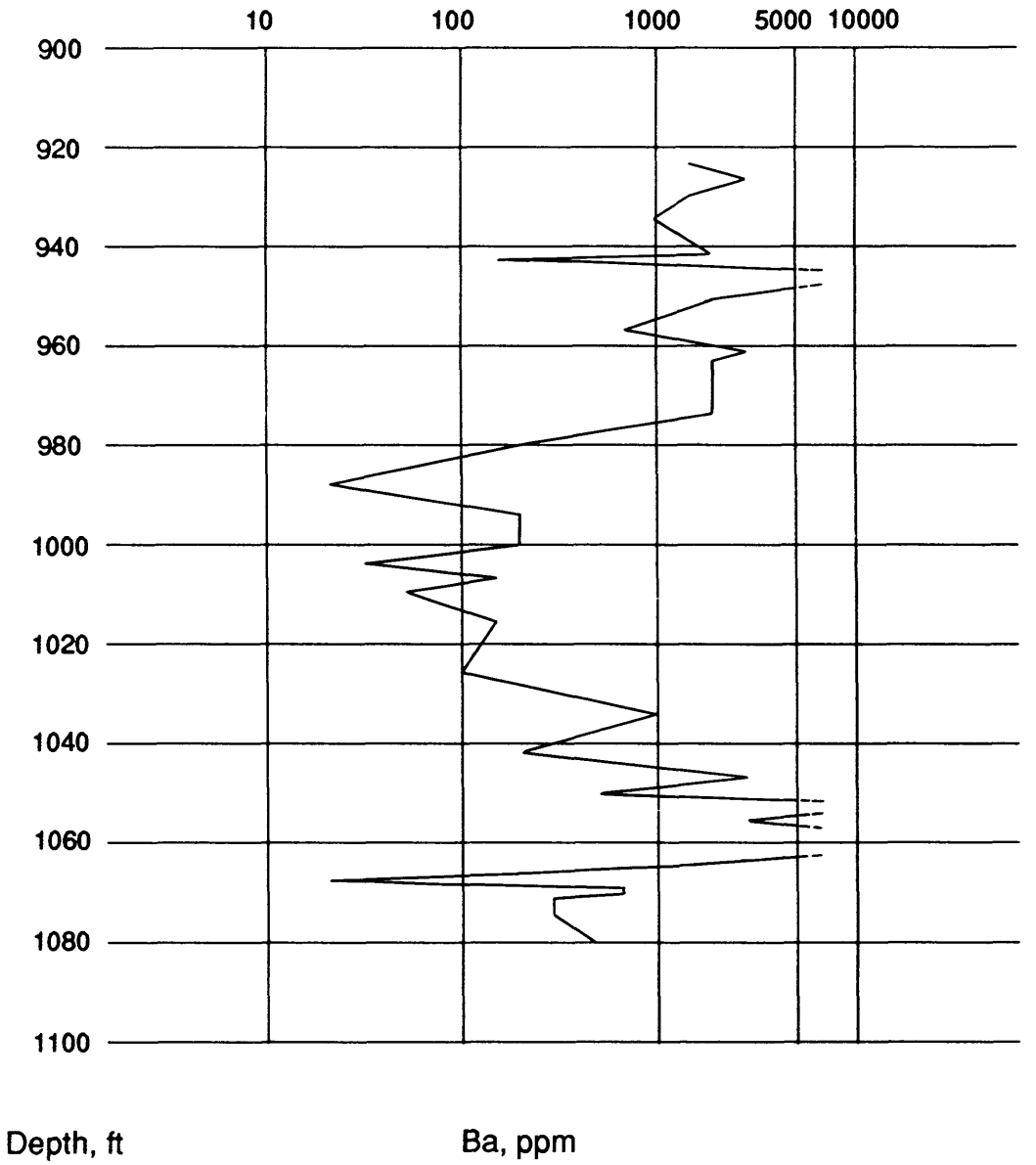


Figure 3M. Geochemical log for iron, drill hole USGS 1 detailed sampling.

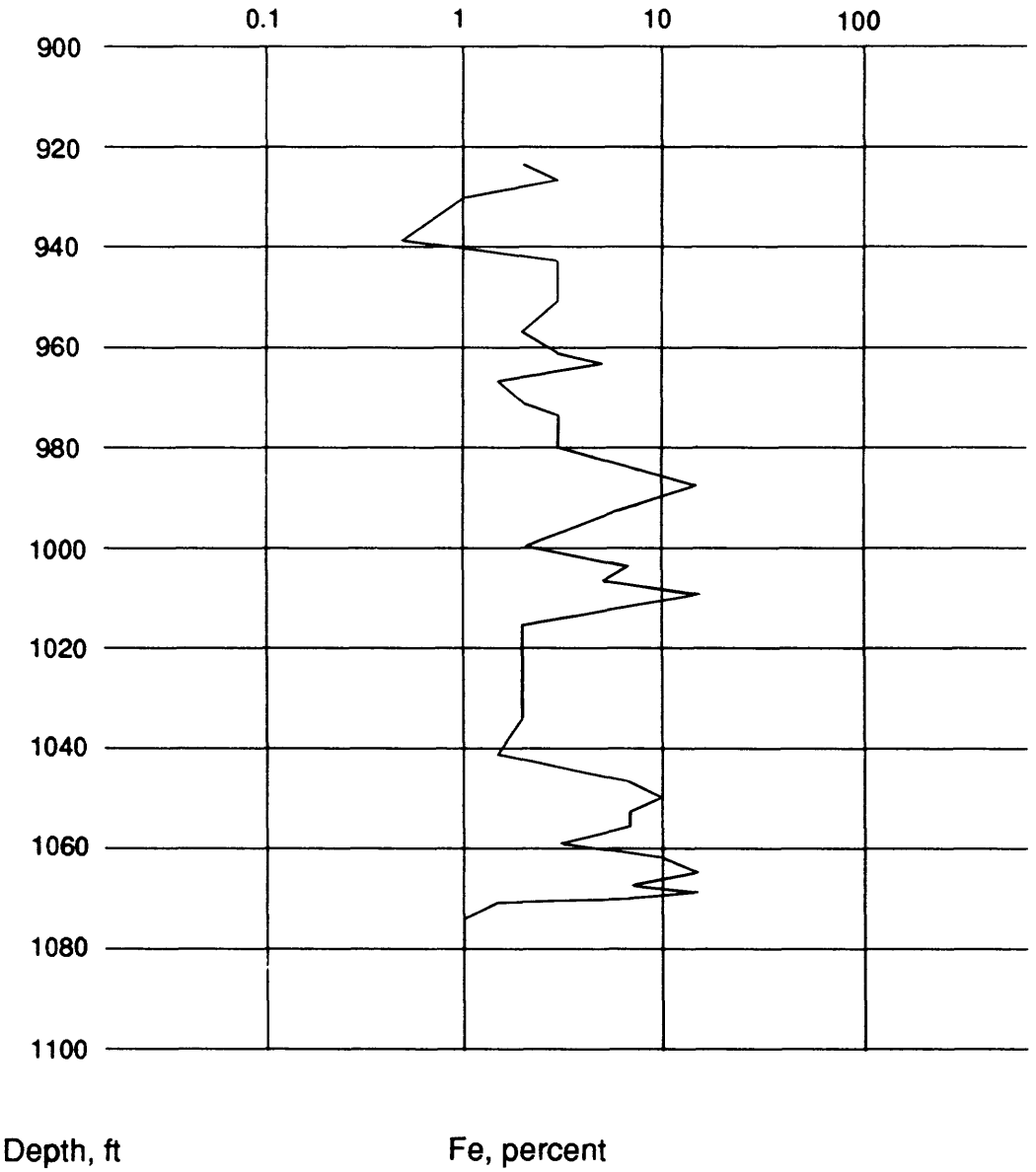


Figure 3N. Geochemical log for magnesium, drill hole USGS 1 detailed sampling.

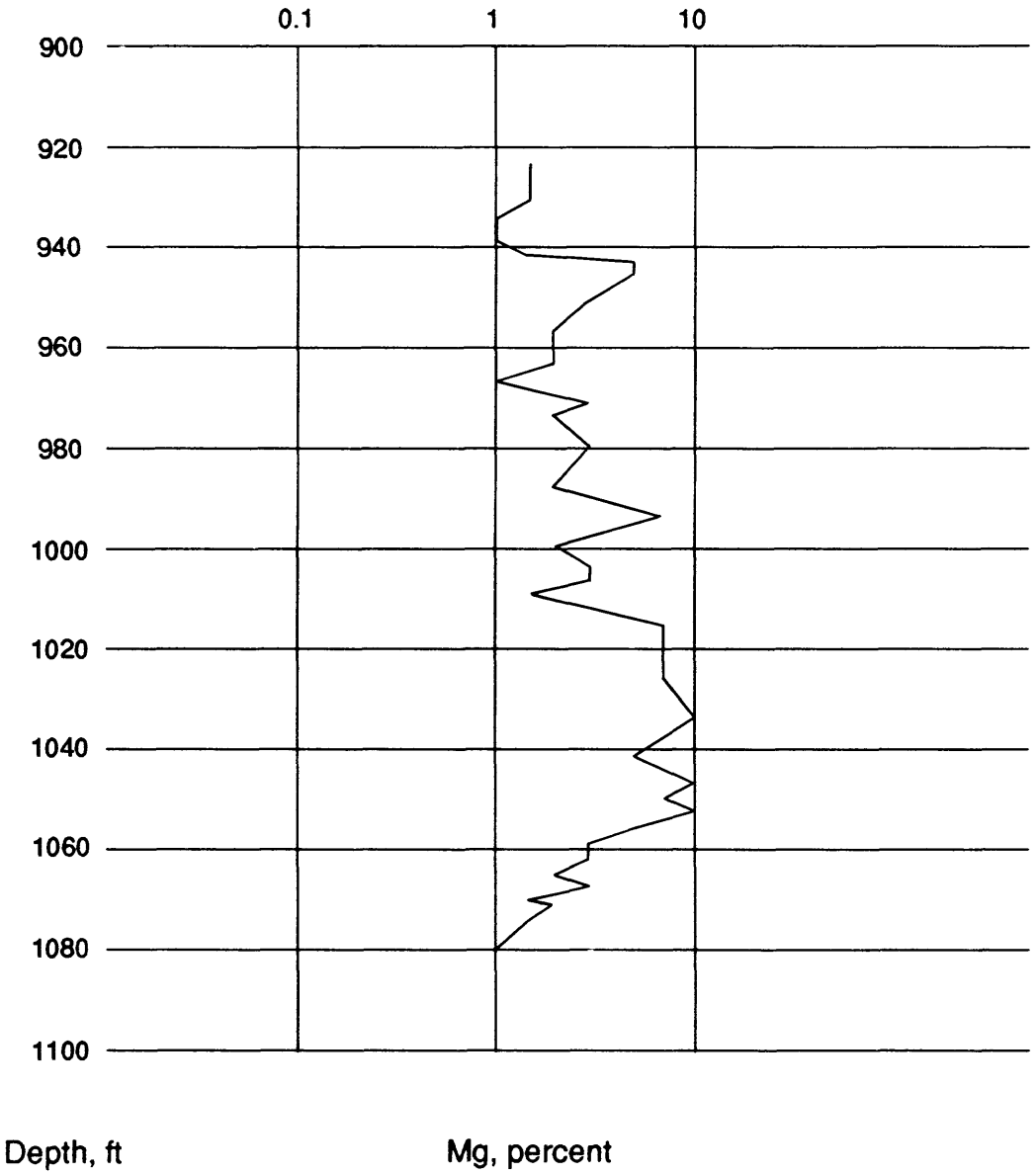


Figure 30. Geochemical log for calcium, drill hole USGS 1 detailed sampling.

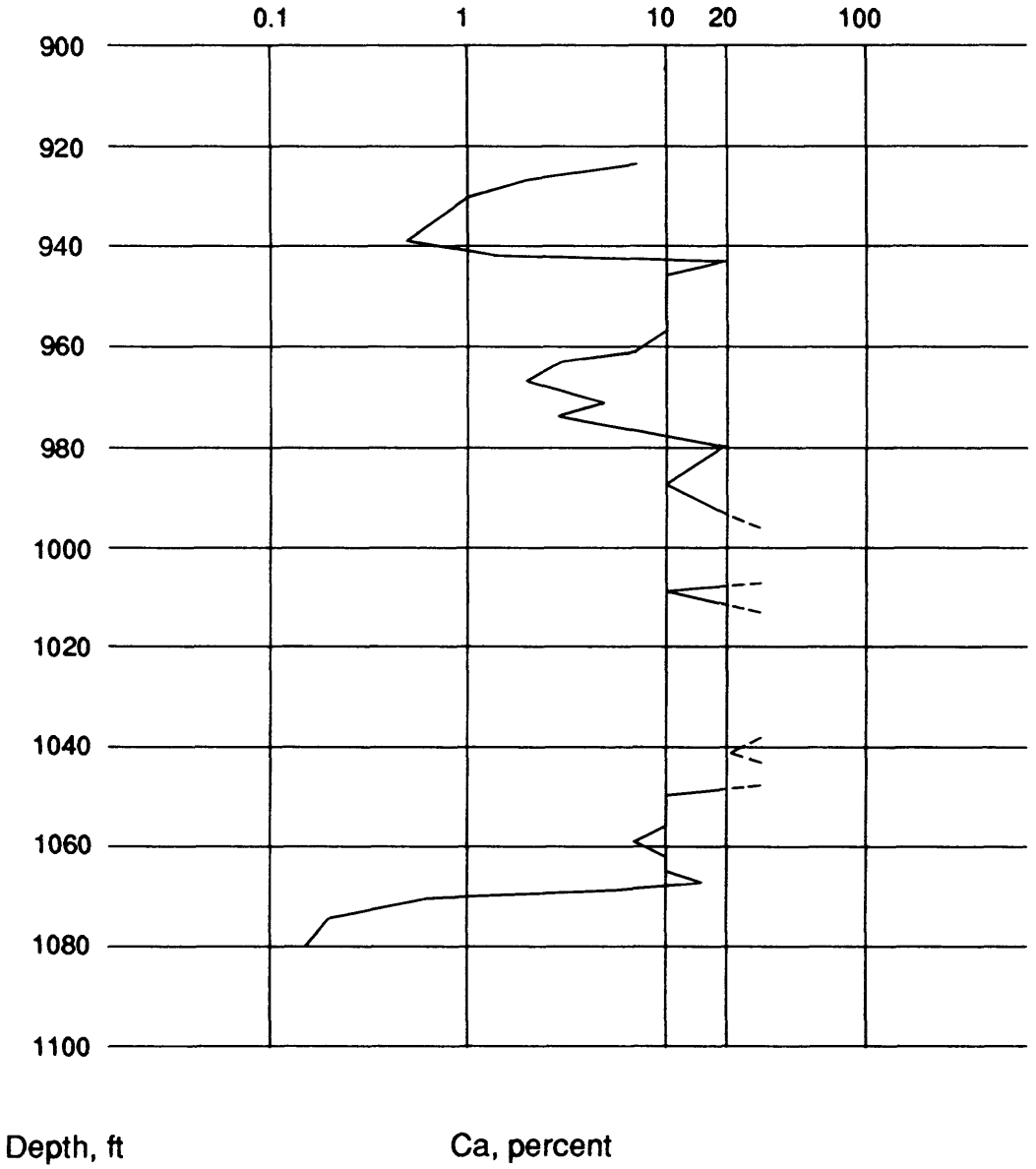


Figure 3P. Geochemical log for titanium, drill hole USGS 1 detailed sampling.

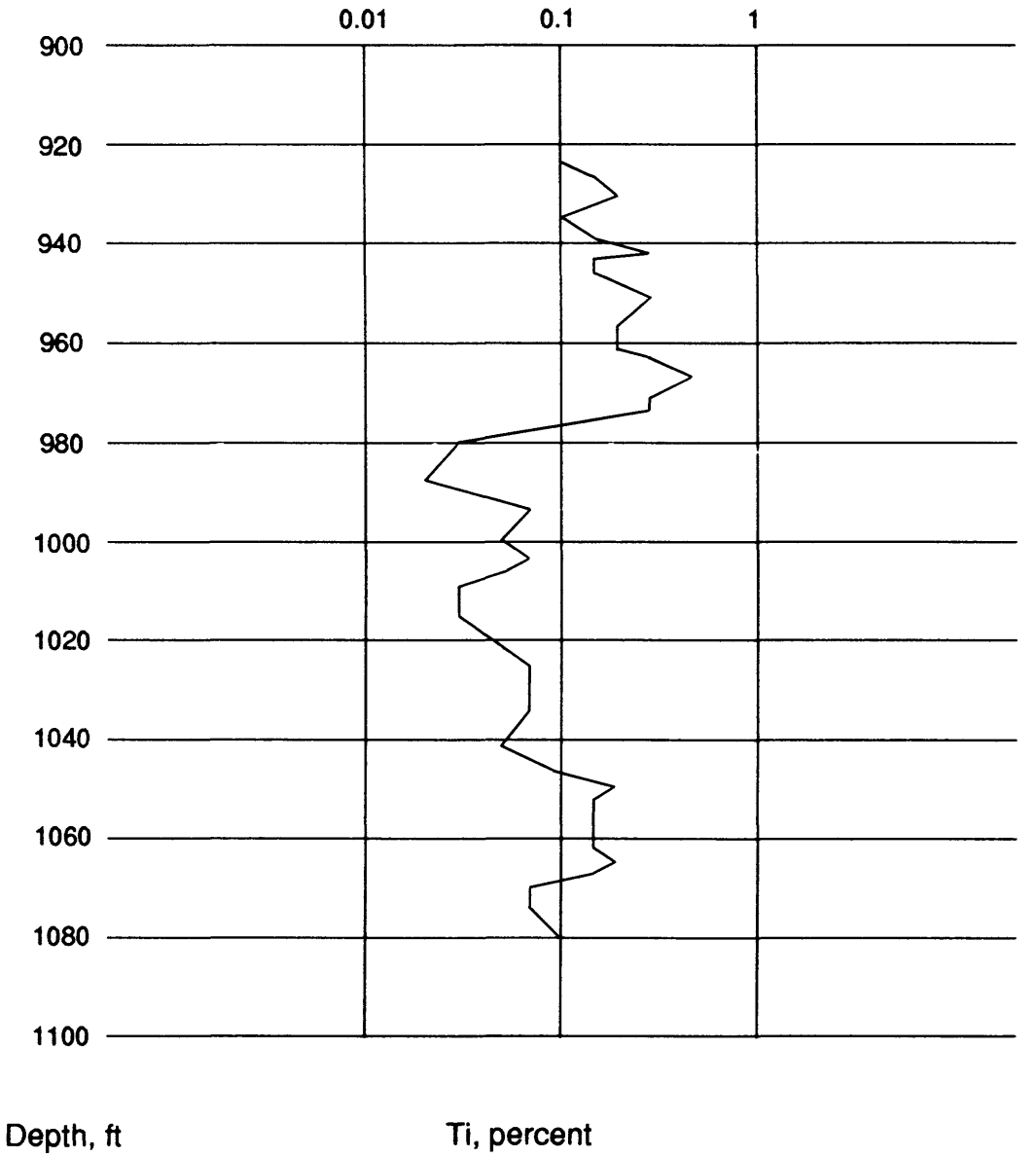


Figure 3Q. Geochemical log for zirconium, drill hole USGS 1 detailed sampling.

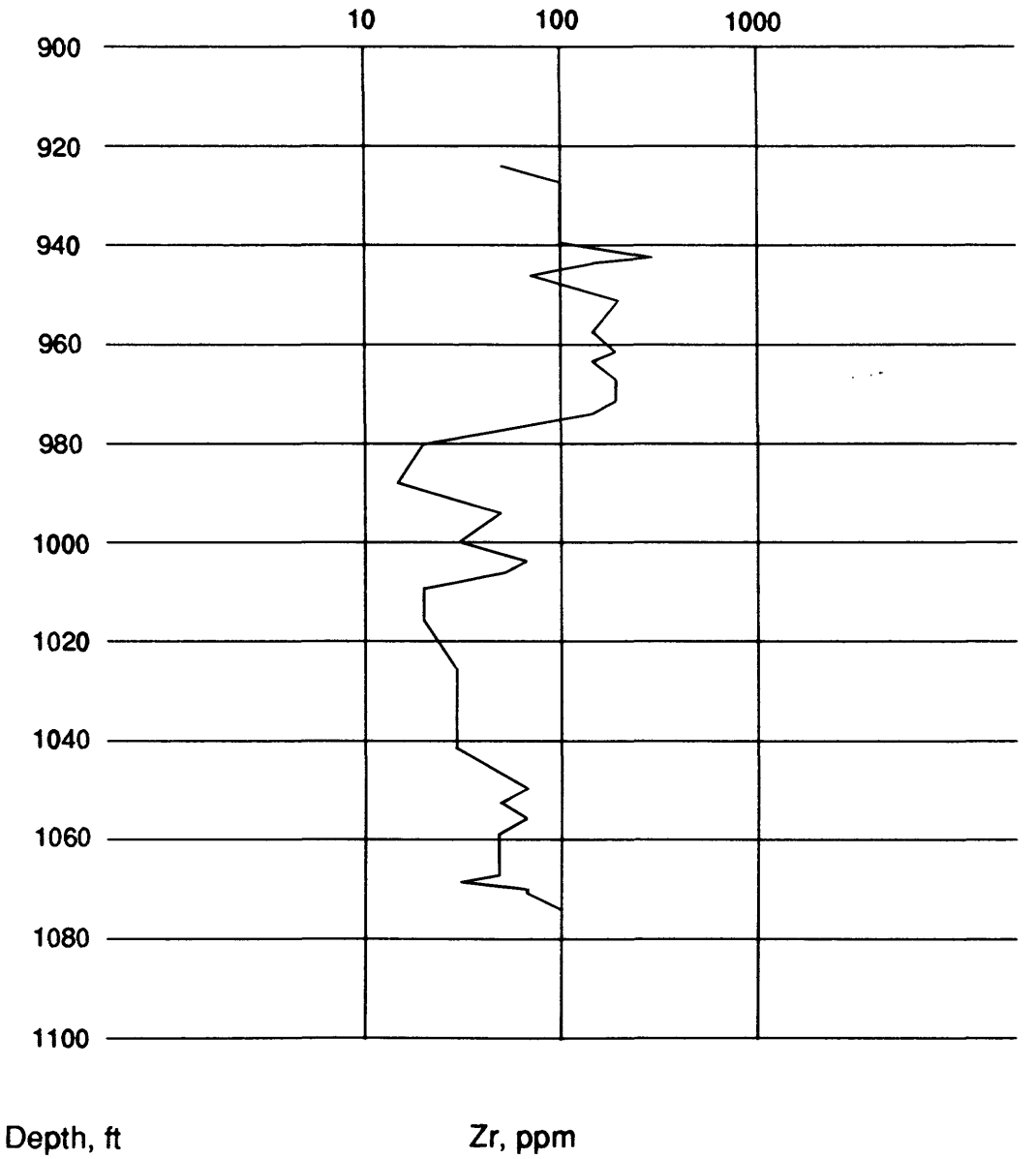


Table 9. Chemical data for drill hole USGS 1, detailed sampling. Fe, Mg, Ca, and Ti in weight percent, all other elements in parts per million by weight. Au, Hg, and Te determined by atomic absorption spectrophotometry; As, Mo(c), Sb(c), and Zn(c) by colorimetric methods; all other elements by emission spectrometry. N, not detected; L, present, but below detection limit; G, greater than (value shown); H, interference.

Sample interval		Au	As	Hg	Mo(c)	Sb(c)	Te	Zn(c)
Feet	Meters							
626.7-633	191.0-192.9	L	N	0.28				
633-638	192.9-194.4	0.04	N	0.05				
655-661.5	199.6-201.6	L	20	0.35		1	L	68
661.5-664	201.6-202.3	0.04	L	2.8		10	L	960
731-736.5	222.7-224.4	L	10	0.16		4	L	2300
736.5-743	224.4-226.4	L	10	0.14		4	L	840
748-754	227.9-229.7	0.08	L	0.22		2	L	64
754-761	229.7-231.9	L	20	0.28		2	L	32
797-803	242.8-244.7	L	L	0.1		N	L	L
810-813	246.8-247.7	L	10	0.16		3	L	2300
813-815.5	247.7-248.5	0.04	40	0.09		8	L	720
831.5-840.5	253.4-256.1	0.04	40	0.15				
840.5-842.3	256.1-256.6	0.06	40	0.35		6	L	240
842.3-847.1	256.6-258.1	0.02	20	0.26		3	L	150
847.1-854	258.1-260.2	0.08	80	0.28		4	L	76
901-905	274.5-275.8	0.02	60	0.09				
921-926	280.6-282.2	0.02	L	0.28		6	L	210
926-927.8	282.2-282.7	L	L	0.26		6	L	130
927.8-933	282.7-284.3	L	L	0.35		3	L	92
933-936.5	284.3-285.4	L	20	0.2		1	L	32
936.5-941.5	285.4-286.9	L	L	0.18		N	L	32
941.5-942.5	286.9-287.2	L	L	0.26		3	L	110
942.5-943.5	287.2-287.5	L	40	0.3	15	3	L	56
943.5-948	287.5-288.9	L	N	0.2	L	4	L	110
948-954	288.9-290.7	L	80	0.45	L	2	L	88
954-960	290.7-292.5	L	80	0.16	4	35	L	88
960-962.5	292.5-293.3	L	<10	0.1	8	15	L	64
962.5-963.7	293.3-293.6	H0.2	120	0.4	4800	10	L	190
963.7-970	293.6-295.6	L	L	0.28		1	L	25
970-972.5	295.6-296.3	L	L	0.35		3	L	80
972.5-975	296.3-297.1	L	L	0.4		2	L	110
975-984.8	297.1-300.1	0.04	60	0.35		5	L	200
984.8-989.7	300.1-301.6	0.02	40	1		N	L	330
989.7-997.5	301.6-303.9	0.04	60	0.4		4	L	760
997.5-1002	303.9-305.3	L	40	0.45		3	L	300
1002-1004.5	305.3-306.1	0.06	L	1.4		20	L	760
1004.5-1008	306.1-307.1	0.04	60	0.55		8	L	390
1008-1010	307.1-307.7	0.04	80	1.5		15	0.6	300
1010-1020	307.7-310.8	L	10	0.3		2	L	190
1020-1030	310.8-313.8	0.04	L	0.18		3	L	240
1030-1037.5	313.8-316.1	L	L	0.2		1	L	160
1037.5-1044.5	316.1-318.3	0.02	L	0.3		3	L	170

Table 9, continued

Sample interval Feet	Meters	Fe	Mg	Ca	Ti	Mn	Ag	B	Ba	Be
626.7-633	191.0-192.9	3	2	3	0.2	500	0.7	10	1500	2
633-638	192.9-194.4	2	3	10	0.15	700	0.5	10	1500	1.5
655-661.5	199.6-201.6	1	3	20	0.15	1500	N	L	700	1
661.5-664	201.6-202.3	10	2	5	0.2	1000	1	50	1000	1
731-736.5	222.7-224.4	2	5	7	0.3	2000	1	15	700	1.5
736.5-743	224.4-226.4	1.5	2	1	0.2	500	0.7	10	300	2
748-754	227.9-229.7	3	0.2	2	0.5	50	1	15	700	1
754-761	229.7-231.9	0.5	0.1	2	0.15	50	L	15	200	1
797-803	242.8-244.7	0.3	0.2	1	0.1	200	N	10	500	L
810-813	246.8-247.7	0.5	1	1.5	0.1	300	10	100	1500	1
813-815.5	247.7-248.5	5	7	3	0.15	3000	1	10	5000	2
831.5-840.5	253.4-256.1	2	10	20	0.03	2000	L	N	70	1
840.5-842.3	256.1-256.6	3	5	1	0.15	3000	0.5	20	2000	2
842.3-847.1	256.6-258.1	0.7	5	G20	0.05	5000	0.5	N	3000	N
847.1-854	258.1-260.2	2	2	2	0.07	1500	L	10	2000	2
901-905	274.5-275.8	2	10	20	0.15	700	L	100	70	1
921-926	280.6-282.2	2	1.5	7	0.1	1500	N	20	1500	2
926-927.8	282.2-282.7	3	1.5	2	0.15	500	N	100	3000	3
927.8-933	282.7-284.3	1	1.5	1	0.2	500	N	150	1500	3
933-936.5	284.3-285.4	0.7	1	0.7	0.1	500	N	150	1000	5
936.5-941.5	285.4-286.9	0.5	1	0.5	0.15	300	N	100	1500	5
941.5-942.5	286.9-287.2	2	1.5	1.5	0.3	700	N	100	2000	7
942.5-943.5	287.2-287.5	3	5	20	0.15	2000	N	10	150	10
943.5-948	287.5-288.9	3	5	10	0.15	2000	N	20	G5000	15
948-954	288.9-290.7	3	3	10	0.3	2000	N	300	2000	100
954-960	290.7-292.5	2	2	10	0.2	2000	N	300	700	100
960-962.5	292.5-293.3	3	2	7	0.2	1500	0.5	50	3000	30
962.5-963.7	293.3-293.6	5	2	3	0.3	1500	1	150	2000	20
963.7-970	293.6-295.6	1.5	1	2	0.5	700	N	150	2000	7
970-972.5	295.6-296.3	2	3	5	0.3	2000	N	200	2000	5
972.5-975	296.3-297.1	3	2	3	0.3	1500	N	200	2000	5
975-984.8	297.1-300.1	3	3	20	0.03	5000	N	N	200	1
984.8-989.7	300.1-301.6	15	2	10	0.02	5000	2	N	20	1
989.7-997.5	301.6-303.9	5	7	20	0.07	G5000	1	N	200	5
997.5-1002	303.9-305.3	2	2	G20	0.05	5000	N	N	200	L
1002-1004.5	305.3-306.1	7	3	G20	0.07	G5000	1	N	30	L
1004.5-1008	306.1-307.1	5	3	G20	0.05	G5000	0.7	N	150	L
1008-1010	307.1-307.7	15	1.5	10	0.03	1000	7	N	50	3
1010-1020	307.7-310.8	2	7	G20	0.03	5000	N	N	150	1
1020-1030	310.8-313.8	2	7	G20	0.07	5000	N	N	100	1
1030-1037.5	313.8-316.1	2	10	G20	0.07	3000	N	L	1000	1
1037.5-1044.5	316.1-318.3	1.5	5	20	0.05	5000	N	N	200	1

Table 9, continued

Sample interval		Bi	Co	Cr	Cu	La	Mo	Nb	Ni	Pb
Feet	Meters									
626.7-633	191.0-192.9	10	5	150	30	20	N	L	50	20
633-638	192.9-194.4	L	5	200	50	30	N	L	70	20
655-661.5	199.6-201.6	N	N	70	15	20	N	N	20	20
661.5-664	201.6-202.3	N	10	300	50	70	N	10	100	70
731-736.5	222.7-224.4	N	50	300	100	50	10	10	500	30
736.5-743	224.4-226.4	N	10	100	50	50	N	L	150	L
748-754	227.9-229.7	N	15	300	70	100	10	10	150	200
754-761	229.7-231.9	N	N	100	30	70	N	L	50	N
797-803	242.8-244.7	N	N	50	20	30	N	L	30	10
810-813	246.8-247.7	N	5	100	2000	20	10	30	1000	L
813-815.5	247.7-248.5	N	10	200	100	50	5	10	100	50
831.5-840.5	253.4-256.1	N	N	N	10	N	N	N	50	30
840.5-842.3	256.1-256.6	N	5	20	30	30	5	20	70	20
842.3-847.1	256.6-258.1	N	10	10	30	N	N	N	50	20
847.1-854	258.1-260.2	N	N	20	20	N	N	10	50	10
901-905	274.5-275.8	10	5	50	15	N	50	N	50	15
921-926	280.6-282.2	N	N	150	50	70	7	L	70	10
926-927.8	282.2-282.7	N	N	70	20	30	5	20	50	10
927.8-933	282.7-284.3	N	N	N	20	20	N	20	30	10
933-936.5	284.3-285.4	N	N	N	5	N	5	15	10	N
936.5-941.5	285.4-286.9	N	N	N	7	50	N	30	10	N
941.5-942.5	286.9-287.2	N	N	N	7	50	N	50	30	N
942.5-943.5	287.2-287.5	N	5	5	L	N	5	10	50	L
943.5-948	287.5-288.9	L	N	N	L	N	N	L	50	10
948-954	288.9-290.7	70	N	N	L	150	N	10	20	L
954-960	290.7-292.5	70	N	N	L	100	5	L	10	10
960-962.5	292.5-293.3	30	N	N	L	50	10	20	20	15
962.5-963.7	293.3-293.6	30	5	N	7	30	G2000	10	15	70
963.7-970	293.6-295.6	N	N	N	L	30	150	30	5	L
970-972.5	295.6-296.3	N	N	N	L	70	50	30	15	L
972.5-975	296.3-297.1	L	N	N	5	20	50	50	20	10
975-984.8	297.1-300.1	10	5	N	7	N	N	N	20	10
984.8-989.7	300.1-301.6	10	30	N	30	70	20	10	20	30
989.7-997.5	301.6-303.9	70	5	5	10	N	10	10	20	30
997.5-1002	303.9-305.3	N	N	N	L	N	N	N	15	L
1002-1004.5	305.3-306.1	N	10	50	5	N	5	10	50	20
1004.5-1008	306.1-307.1	10	15	5	5	N	5	L	50	15
1008-1010	307.1-307.7	100	15	50	20	N	10	10	50	30
1010-1020	307.7-310.8	N	N	N	L	N	N	N	20	10
1020-1030	310.8-313.8	N	N	10	N	N	N	N	20	N
1030-1037.5	313.8-316.1	N	N	10	L	N	5	N	10	N
1037.5-1044.5	316.1-318.3	N	5	5	L	N	N	N	20	10

Table 9, continued

Sample interval Feet	Meters	Sc	Sn	Sr	V	Y	Zn	Zr	Other
626.7-633	191.0-192.9	10	N	L	500	30	300	150	
633-638	192.9-194.4	10	N	150	300	50	200	100	
655-661.5	199.6-201.6	7	N	500	150	30	N	150	
661.5-664	201.6-202.3	15	N	1000	1000	100	1000	200	
731-736.5	222.7-224.4	15	N	N	1000	70	2000	300	
736.5-743	224.4-226.4	7	N	N	2000	50	500	150	Cd=200
748-754	227.9-229.7	15	N	700	2000	150	N	100	Cd=50
754-761	229.7-231.9	7	N	700	500	100	N	70	
797-803	242.8-244.7	L	N	100	200	30	N	50	
810-813	246.8-247.7	N	50	N	200	30	1500	20	
813-815.5	247.7-248.5	10	L	100	700	70	700	70	W=G10000
831.5-840.5	253.4-256.1	N	N	150	70	15	200	20	
840.5-842.3	256.1-256.6	7	10	N	200	30	300	100	
842.3-847.1	256.6-258.1	N	N	200	100	N	N	20	
847.1-854	258.1-260.2	N	N	N	150	20	N	50	
901-905	274.5-275.8	5	N	150	70	20	N	70	
921-926	280.6-282.2	10	10	N	500	50	200	50	
926-927.8	282.2-282.7	10	20	N	500	30	N	100	
927.8-933	282.7-284.3	7	10	N	150	15	N	100	
933-936.5	284.3-285.4	5	10	N	50	10	N	100	
936.5-941.5	285.4-286.9	5	10	N	50	10	N	100	
941.5-942.5	286.9-287.2	10	70	N	100	20	N	300	
942.5-943.5	287.2-287.5	15	150	100	100	30	N	150	
943.5-948	287.5-288.9	10	150	N	50	20	200	70	
948-954	288.9-290.7	15	150	N	150	70	N	200	
954-960	290.7-292.5	10	150	N	100	100	N	150	
960-962.5	292.5-293.3	15	100	N	100	70	N	200	Sb=100
962.5-963.7	293.3-293.6	15	100	N	100	30	N	150	
963.7-970	293.6-295.6	10	20	N	100	30	N	200	
970-972.5	295.6-296.3	10	50	N	100	50	N	200	
972.5-975	296.3-297.1	10	70	N	150	30	N	150	
975-984.8	297.1-300.1	N	10	100	70	20	200	20	
984.8-989.7	300.1-301.6	N	300	150	15	20	500	15	
989.7-997.5	301.6-303.9	L	50	100	70	30	700	50	
997.5-1002	303.9-305.3	N	N	200	50	20	300	30	
1002-1004.5	305.3-306.1	7	50	100	150	70	700	70	
1004.5-1008	306.1-307.1	N	30	100	150	30	500	50	
1008-1010	307.1-307.7	N	150	N	200	10	500	20	
1010-1020	307.7-310.8	N	N	200	100	20	300	20	
1020-1030	310.8-313.8	N	10	200	50	10	300	30	
1030-1037.5	313.8-316.1	N	10	300	30	10	200	30	
1037.5-1044.5	316.1-318.3	N	10	100	50	15	200	30	

Table 9, continued

Sample interval Feet	Meters	Au	As(c)	Hg	Mo(c)	Sb(c)	Te	Zn(c)
1044.5-1048.5	318.3-319.5	0.04	L	0.28		4	L	1100
1048.5-1050.5	319.5-320.1	L	80	0.04	L	6	L	290
1050.5-1053.5	320.1-321.0	L	40	0.06	L	3	L	180
1053.5-1057	321.0-322.1	0.02	80	0.04	300	6	L	76
1057-1060	322.1-323.0	0.02	10	0.15	300	4	L	100
1060-1063	323.0-323.9	0.06	80	0.24	240	20	L	100
1063-1066	323.9-324.8	0.04	40	0.08	200	15	L	110
1066-1067.8	324.8-325.4	0.7	150	0.13	160	15	3.2	140
1067.8-1069	325.4-325.7	0.04	N	0.35	800	10	L	170
1069-1070	325.7-326.0	0.04	80	0.55	80	4	L	480
1070-1070.8	326.0-326.3	L	10	0.2		1	L	76
1070.8-1077	326.3-328.2	L	L	0.13		N	L	40
1077-1083	328.2-330.0	L	10	0.05				

Table 9, continued

Sample interval Feet	Meters	Fe	Mg	Ca	Ti	Mn	Ag	B	Ba	Be
1044.5-1048.5	318.3-319.5	7	10	G20	0.1	G5000	0.5	15	3000	3
1048.5-1050.5	319.5-320.1	10	7	10	0.2	5000	N	500	500	5
1050.5-1053.5	320.1-321.0	7	10	10	0.15	5000	N	300	G5000	2
1053.5-1057	321.0-322.1	7	5	10	0.15	2000	N	500	3000	10
1057-1060	322.1-323.0	3	3	7	0.15	2000	0.5	100	G5000	3
1060-1063	323.0-323.9	10	3	10	0.15	3000	N	500	G5000	5
1063-1066	323.9-324.8	15	2	10	0.2	5000	N	500	1000	10
1066-1067.8	324.8-325.4	7	3	15	0.15	5000	N	700	20	20
1067.8-1069	325.4-325.7	15	2	5	0.1	2000	L	15	700	10
1069-1070	325.7-326.0	5	1.5	0.7	0.07	500	0.5	30	700	10
1070-1070.8	326.0-326.3	1.5	2	0.5	0.07	700	N	50	300	5
1070.8-1077	326.3-328.2	1	1.5	0.2	0.07	300	N	10	300	2
1077-1083	328.2-330.0	1	1	0.15	0.1	200	N	20	500	3

Table 9, continued

Sample interval Feet	Meters	Bi	Co	Cr	Cu	La	Mo	Nb	Ni	Pb
1044.5-1048.5	318.3-319.5	10	15	50	15	30	50	10	100	100
1048.5-1050.5	319.5-320.1	L	20	100	N	30	N	10	150	N
1050.5-1053.5	320.1-321.0	10	15	100	N	50	N	10	100	N
1053.5-1057	321.0-322.1	10	15	100	15	50	200	15	150	N
1057-1060	322.1-323.0	10	7	70	5	N	150	L	50	N
1060-1063	323.0-323.9	15	20	100	30	50	200	10	100	N
1063-1066	323.9-324.8	150	10	100	L	30	150	10	100	L
1066-1067.8	324.8-325.4	G1000	5	70	10	100	100	10	70	30
1067.8-1069	325.4-325.7	20	20	70	15	50	300	10	150	15
1069-1070	325.7-326.0	10	7	5	10	20	300	30	70	70
1070-1070.8	326.0-326.3	N	N	N	7	20	10	50	30	30
1070.8-1077	326.3-328.2	N	N	N	L	N	N	30	10	20
1077-1083	328.2-330.0	L	N	N	10	30	N	30	5	30

Table 9, continued

Sample interval Feet	Meters	Sc	Sn	Sr	V	Y	Zn	Zr	Other
1044.5-1048.5	318.3-319.5	5	100	200	150	50	1000	50	
1048.5-1050.5	319.5-320.1	10	70	N	300	50	500	70	
1050.5-1053.5	320.1-321.0	10	70	L	200	50	300	50	W=50
1053.5-1057	321.0-322.1	15	70	L	200	50	L	70	W=50
1057-1060	322.1-323.0	10	30	150	150	20	200	50	
1060-1063	323.0-323.9	15	150	100	200	30	200	50	
1063-1066	323.9-324.8	15	300	N	200	30	200	50	
1066-1067.8	324.8-325.4	15	150	100	150	50	300	50	
1067.8-1069	325.4-325.7	10	500	N	150	70	200	30	
1069-1070	325.7-326.0	N	30	N	100	30	500	70	
1070-1070.8	326.0-326.3	N	N	N	15	15	N	70	
1070.8-1077	326.3-328.2	N	N	N	L	15	N	100	
1077-1083	328.2-330.0	5	N	N	10	30	N	100	

Drill hole USGS 2

Low gold values, accompanied by anomalous amounts of arsenic, mercury, and molybdenum, characterize the tuffs and volcaniclastic sedimentary rocks that dominate the section from a depth of 1,265 ft (385.6 m) nearly to the bottom of the hole at 1,437 ft (438.0 m). As a result of hydrothermal alteration, these rocks are pervasively argillized. Base metals other than molybdenum show no variations that are clearly systematically related to hydrothermal alteration.

Iron, magnesium, calcium, and manganese are not significantly depleted in most rocks, and generally reflect abundances in the original rocks, in spite of the fact that much of the core from this drill hole shows strong to intense propylitic or argillic alteration. In the propylitized rocks, these elements are retained in chlorite, pyrite, calcite, zeolites, epidote, and in some cases montmorillonite. The argillic rocks in this drill hole are characterized by an alteration assemblage dominated by montmorillonite. Calcite is common, chlorite persists in many argillic rocks, and clays other than montmorillonite are scarce. Thus hydrothermal alteration produced minimal cation leaching of argillic rocks, and iron, magnesium, calcium, and manganese are retained in pyrite, montmorillonite, calcite, and often chlorite.

Figure 4 shows geochemical logs for gold, arsenic, mercury, copper, molybdenum, lead, barium, strontium, magnesium, iron, manganese, and calcium, for the entire length of drill hole USGS 2. Table 10 shows analytical data for this drill hole, omitting elements with no values above their respective detection thresholds.

Figure 4A. Geochemical logs for gold and arsenic, drill hole USGS 2.

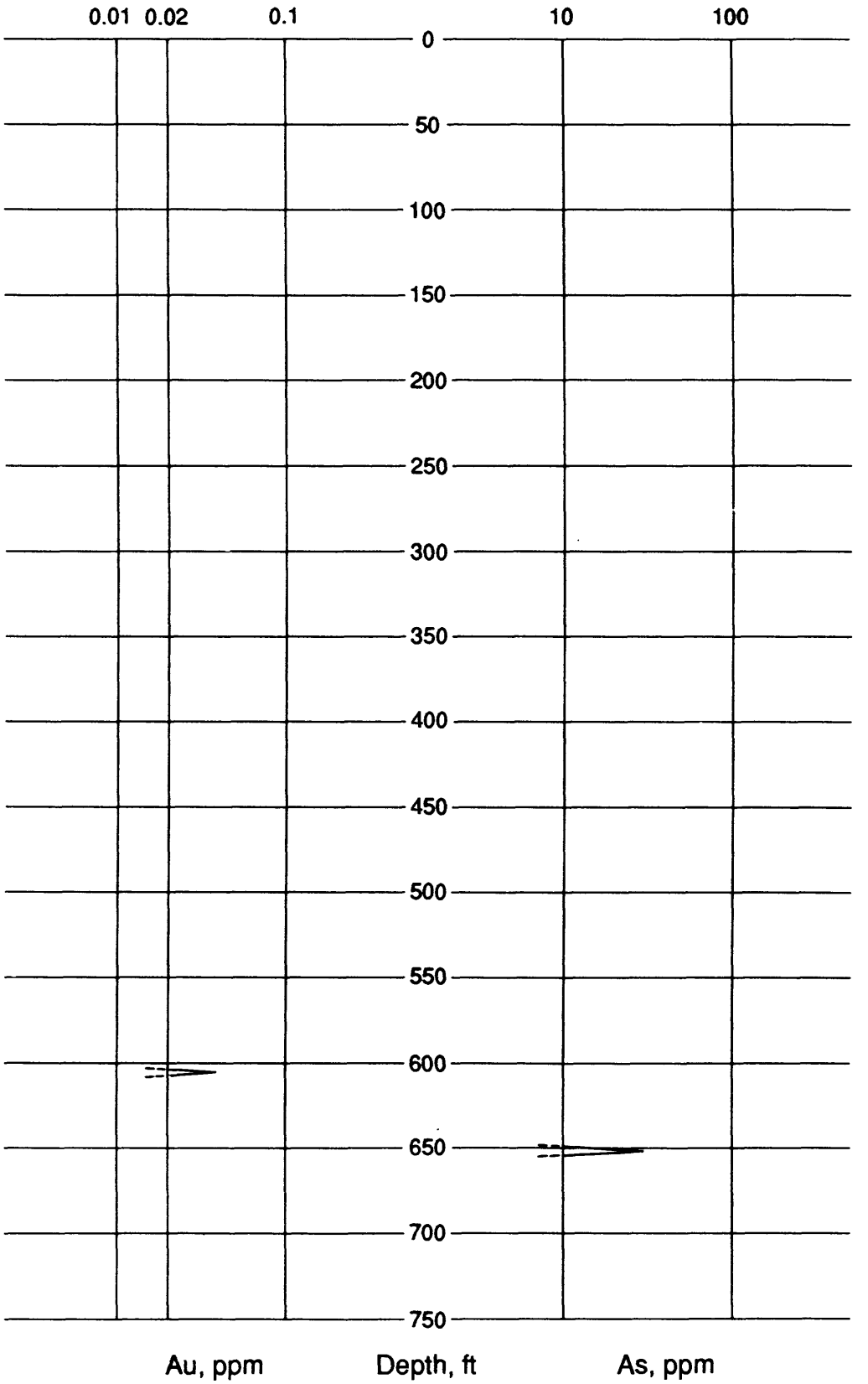


Figure 4A. Continued.

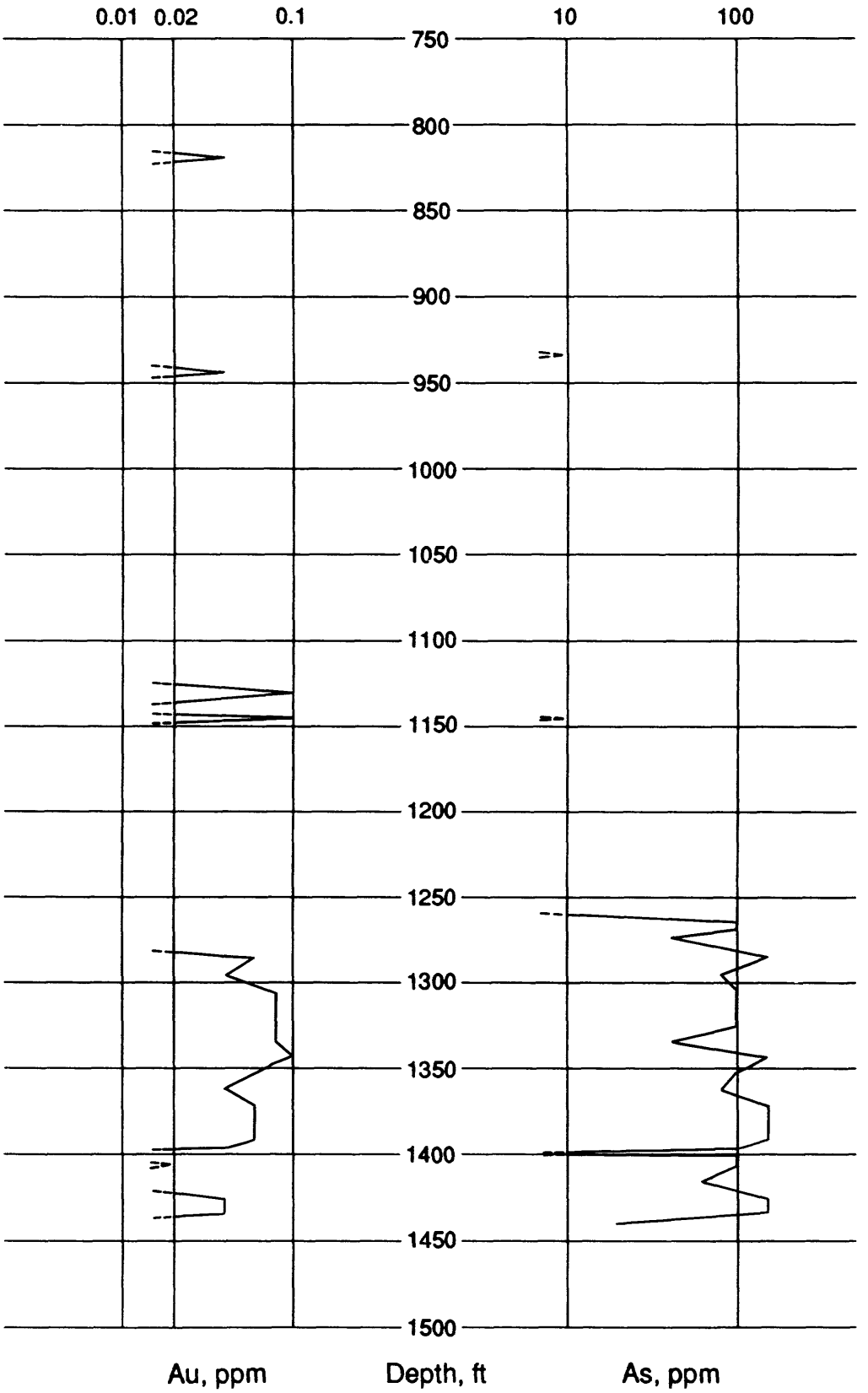


Figure 4B. Geochemical log for mercury, drill hole USGS 2.

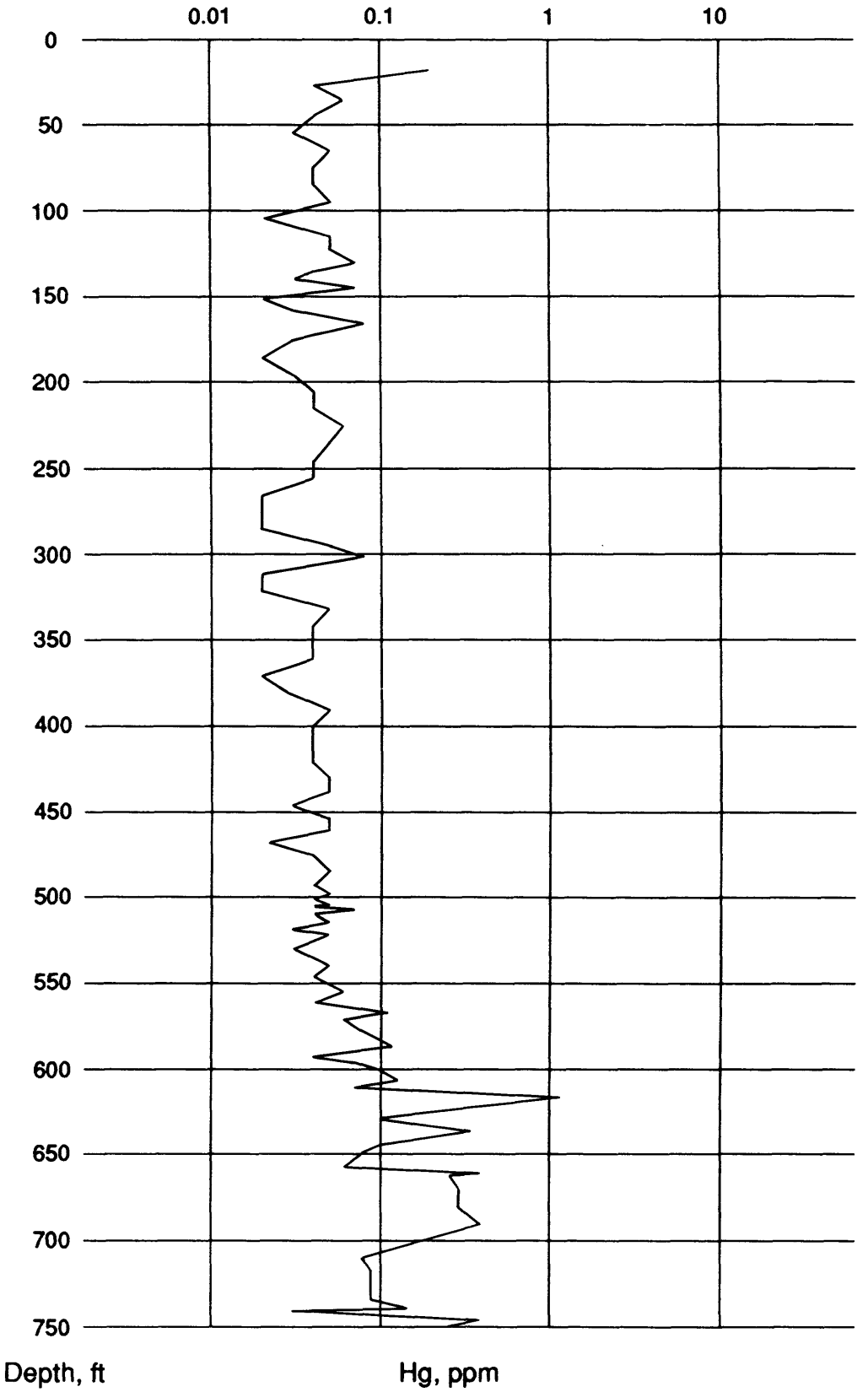


Figure 4B. Continued.

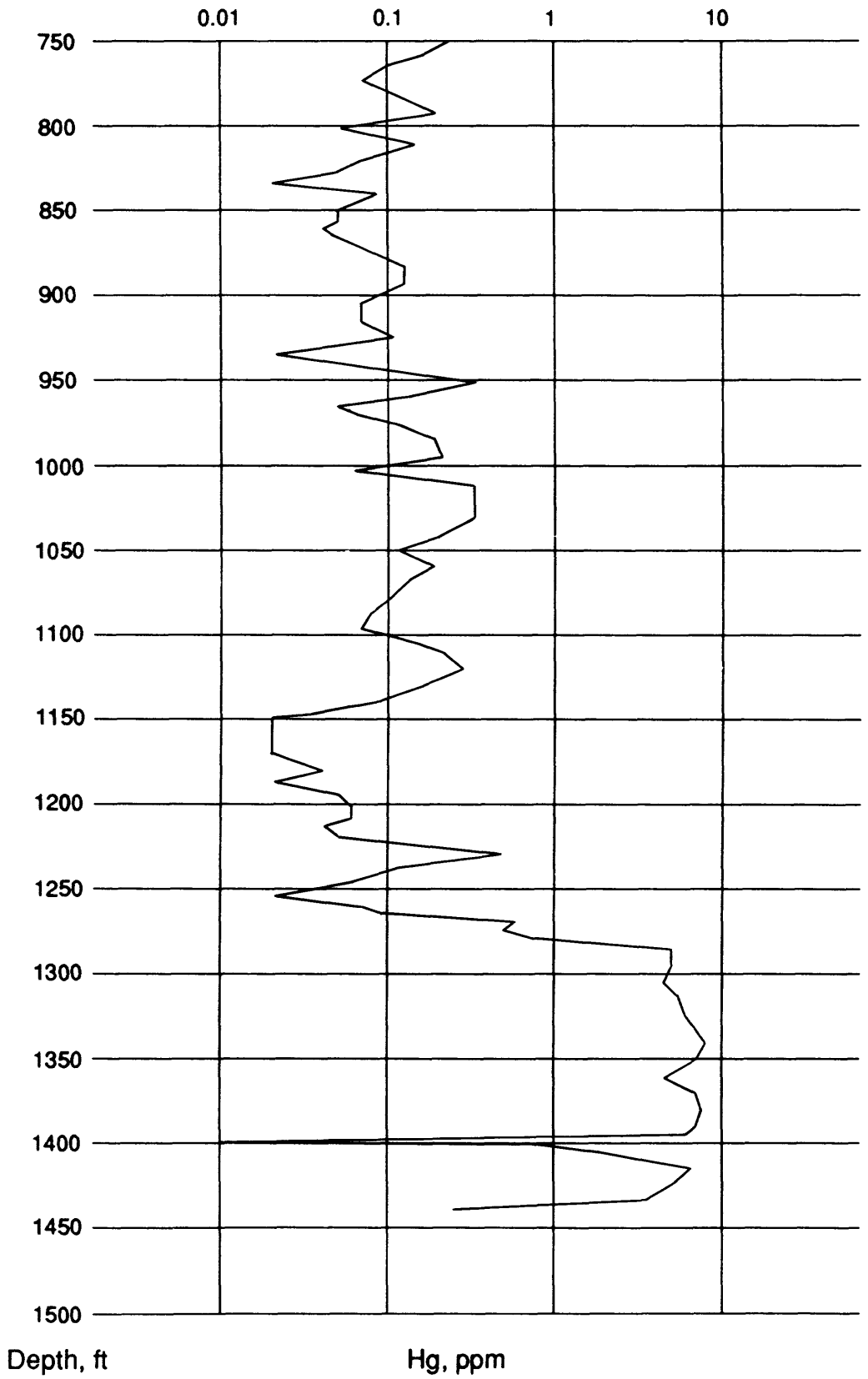


Figure 4C. Geochemical logs for copper and molybdenum, drill hole USGS 2.

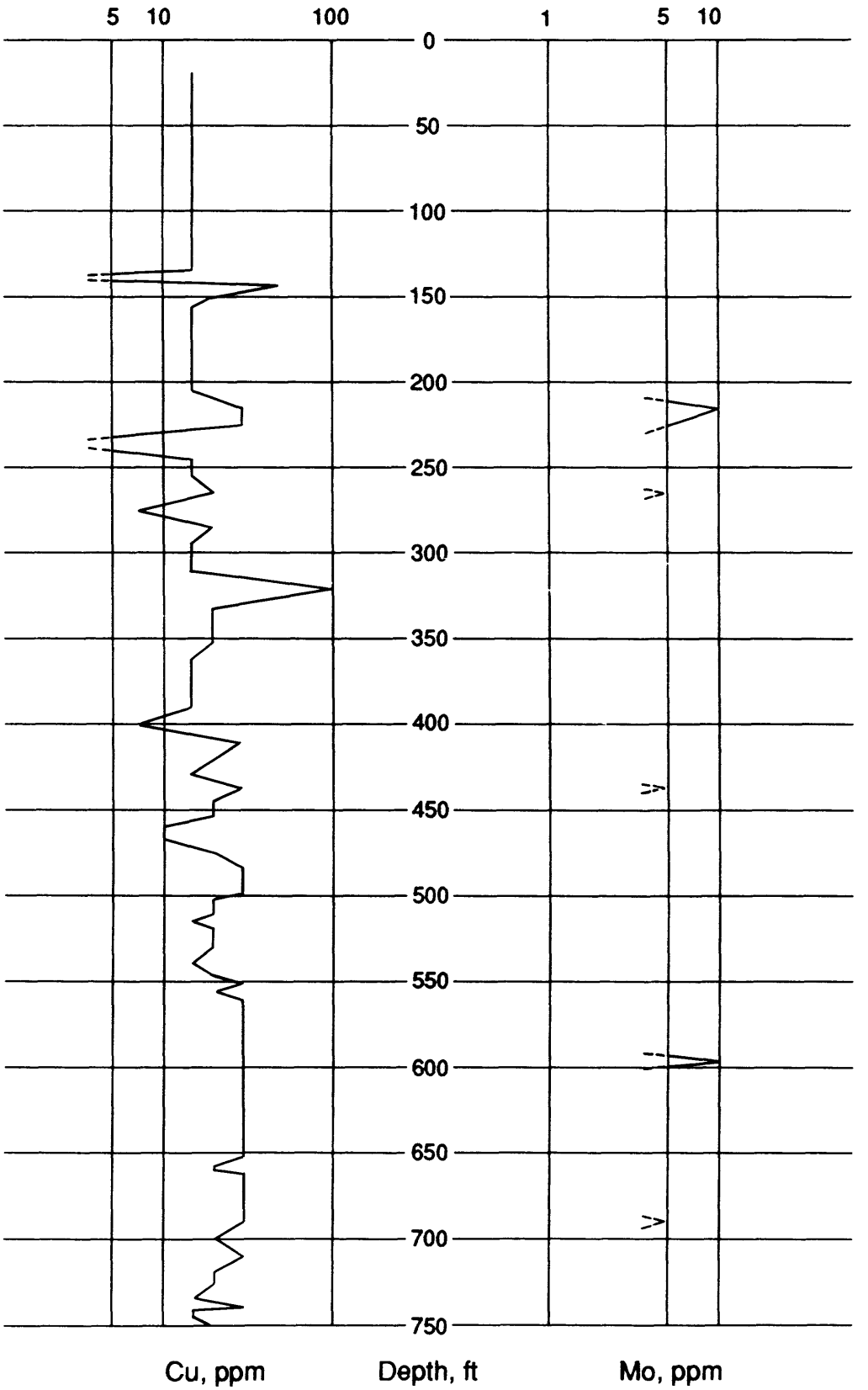


Figure 4C. Continued.

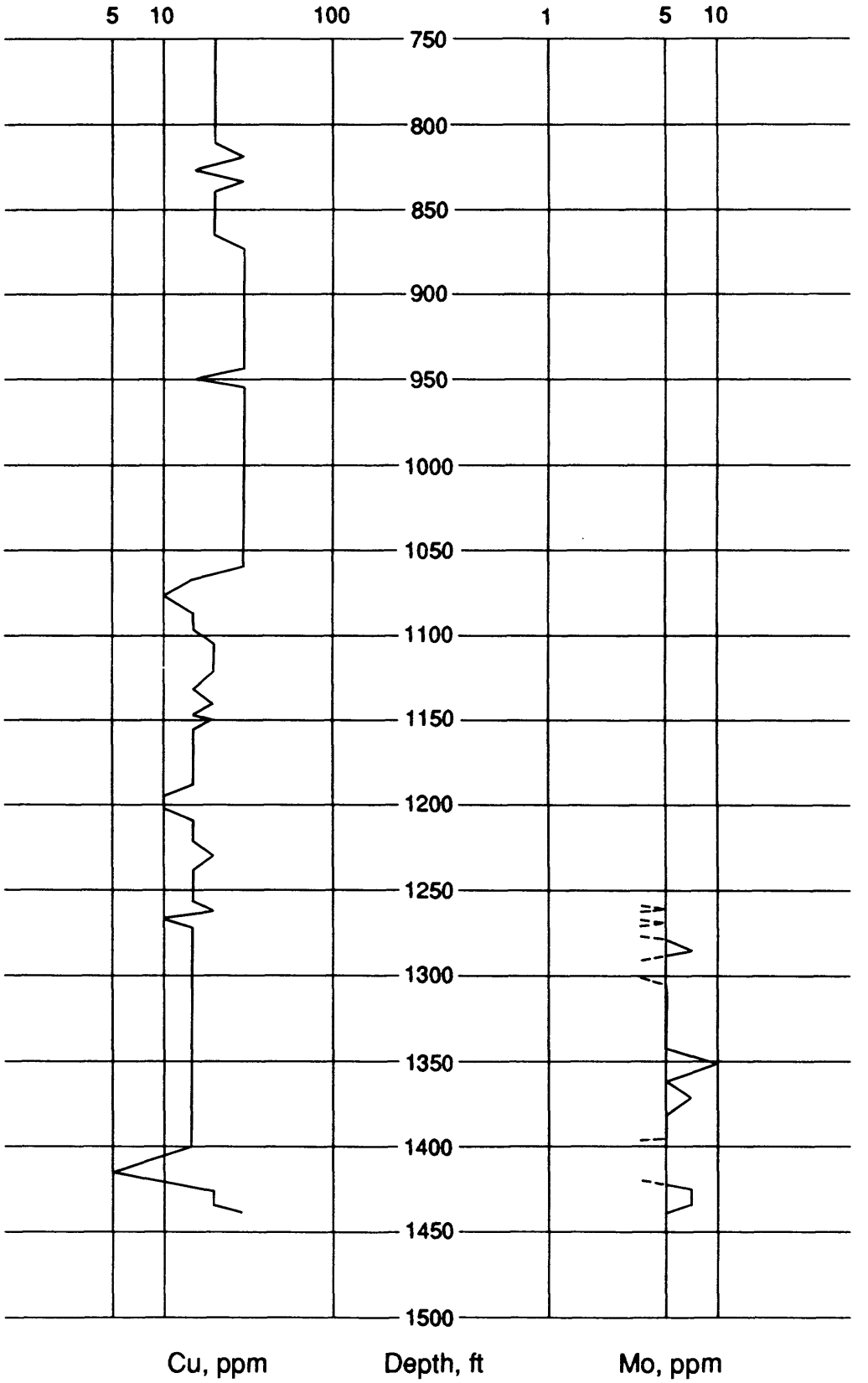


Figure 4D. Geochemical log for lead, drill hole USGS 2.

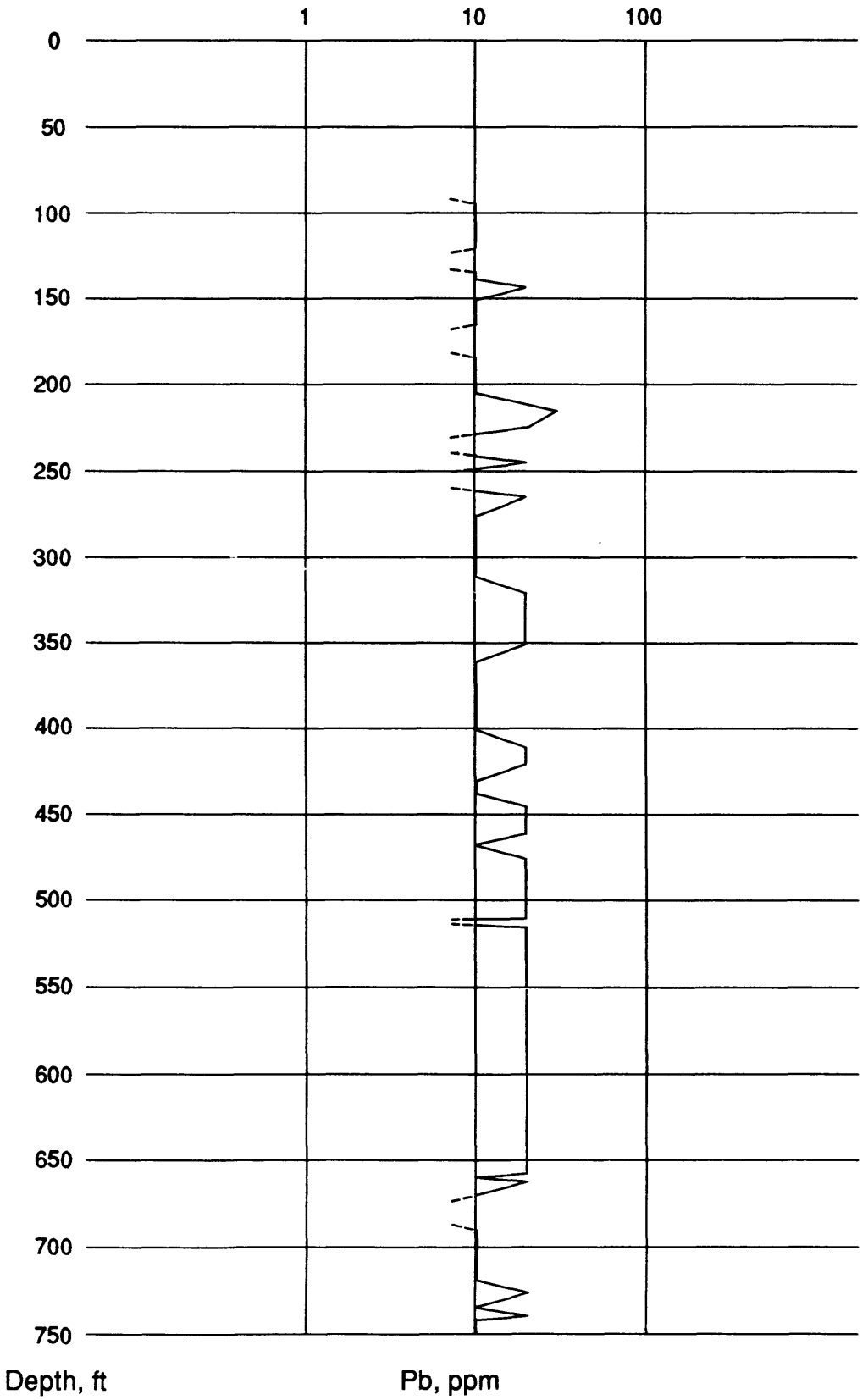


Figure 4D. Continued.

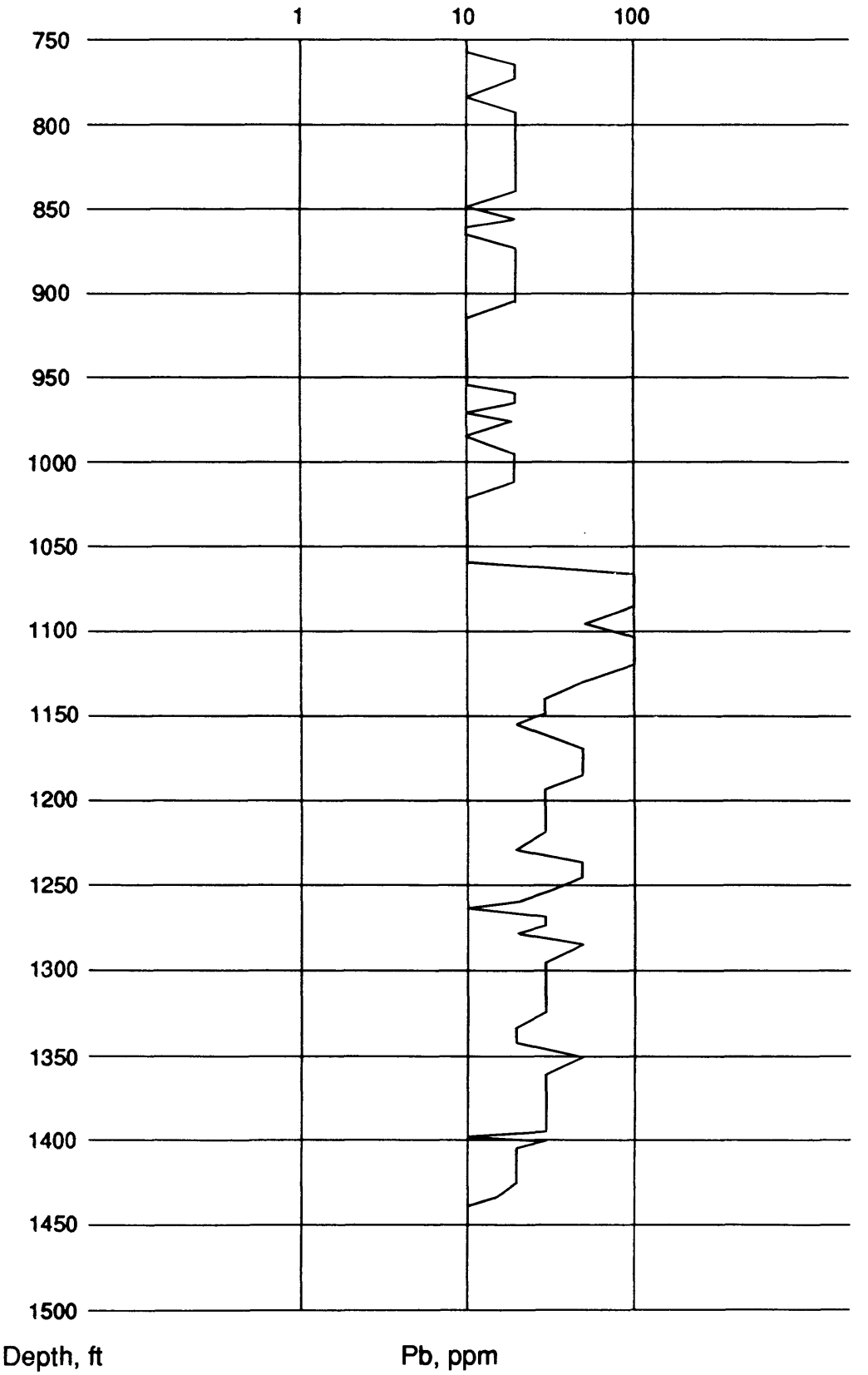


Figure 4E. Geochemical logs for barium and strontium, drill hole USGS 2.

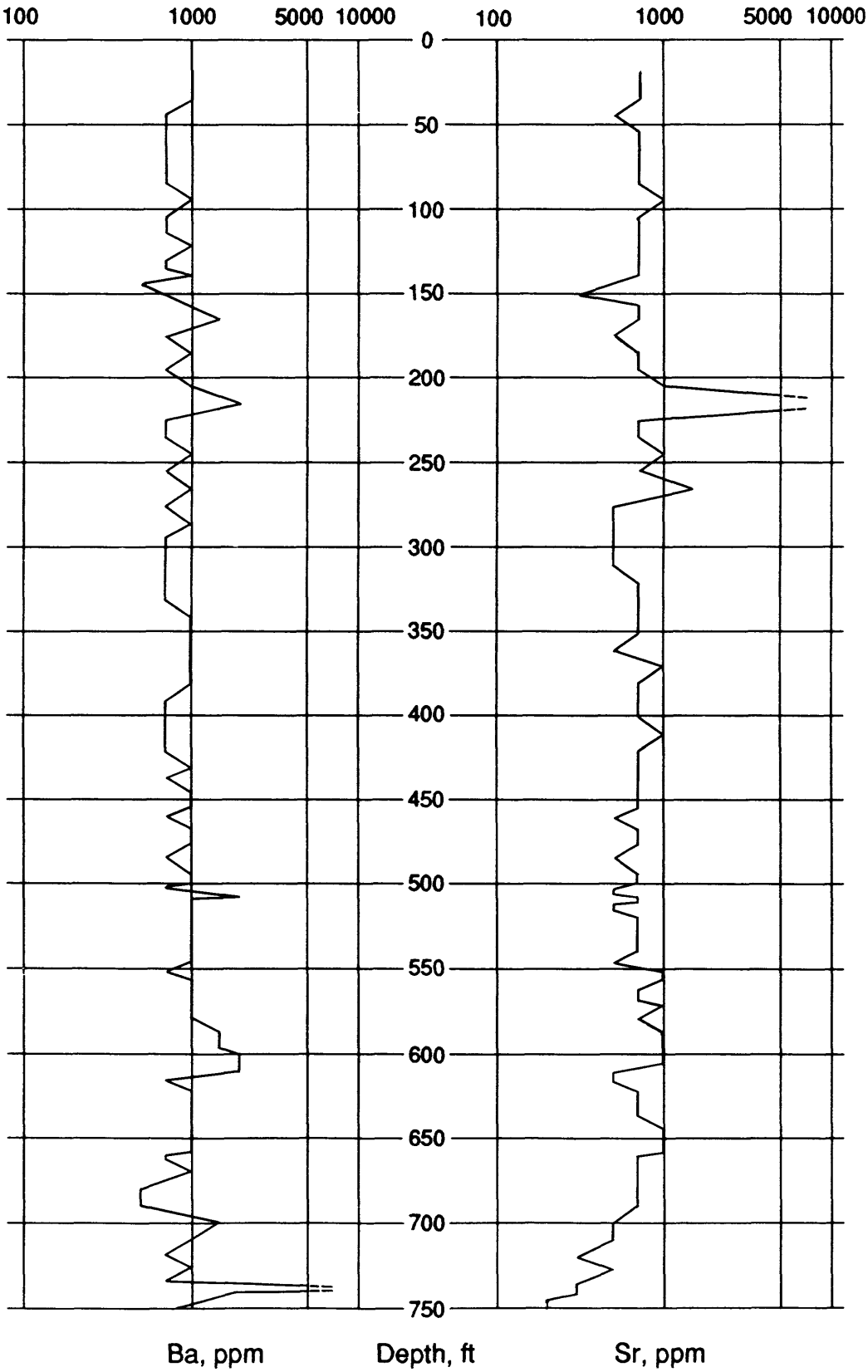


Figure 4E. Continued.

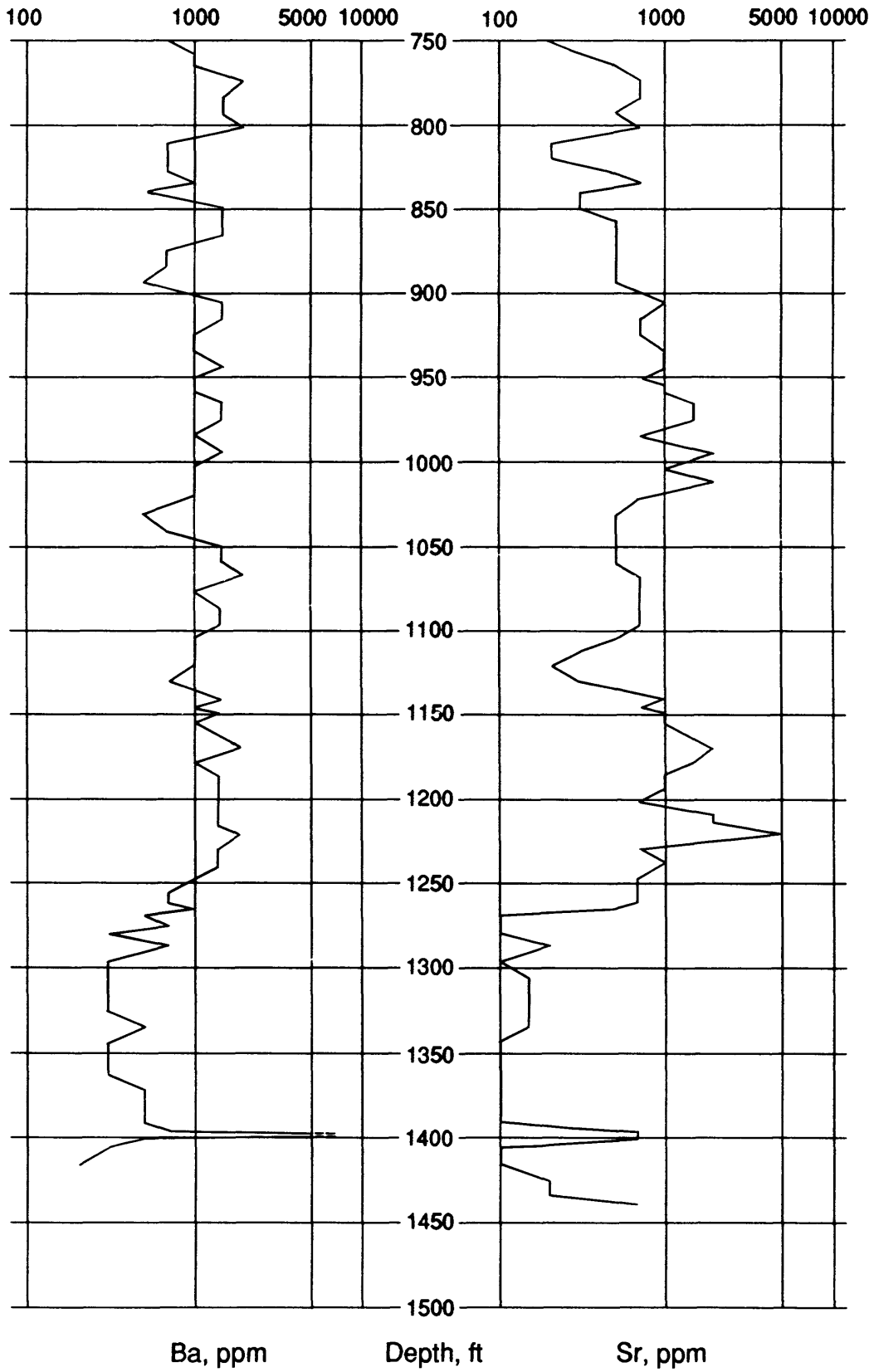


Figure 4F. Continued.

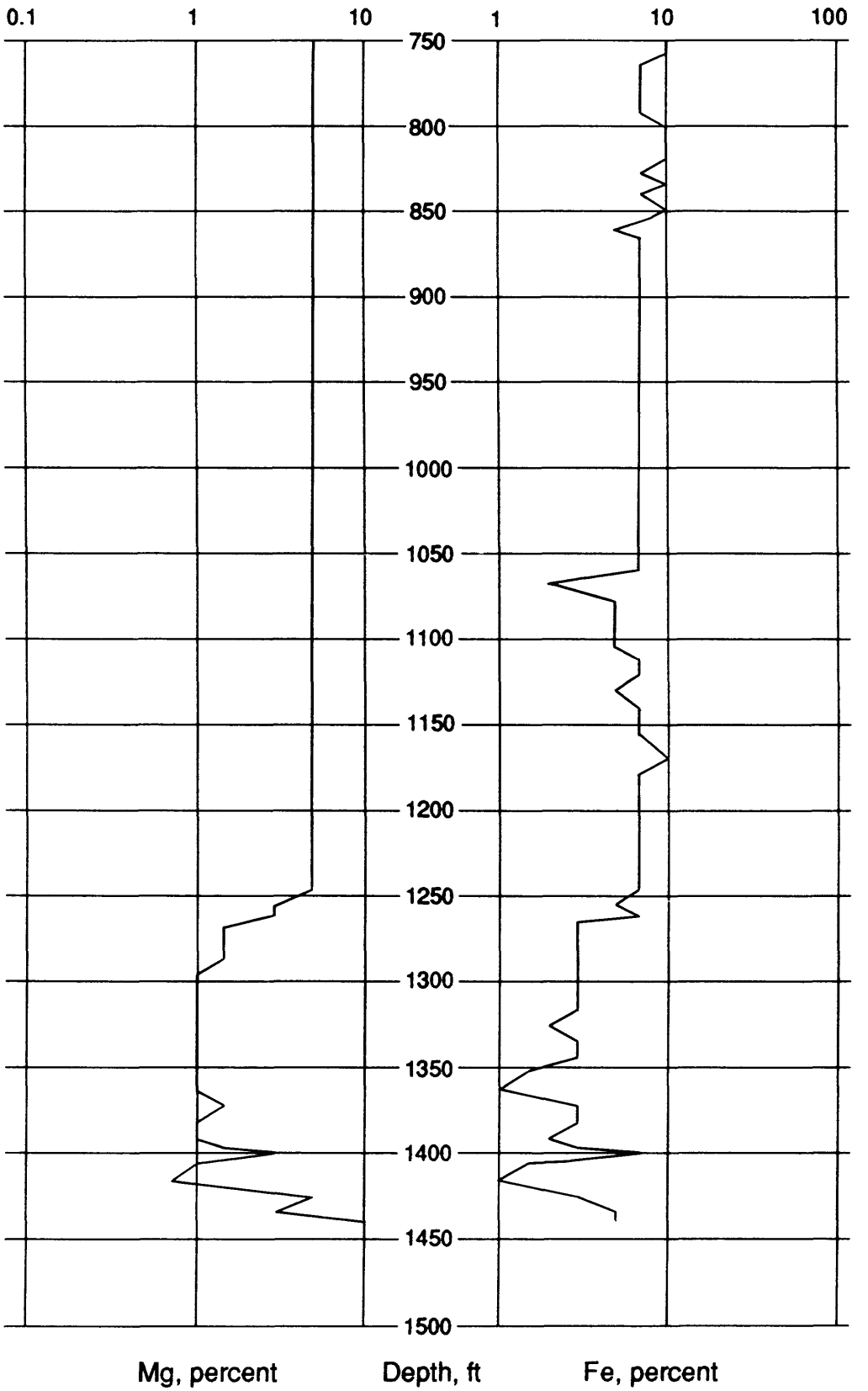


Figure 4F. Geochemical logs for magnesium and iron, drill hole USGS 2.

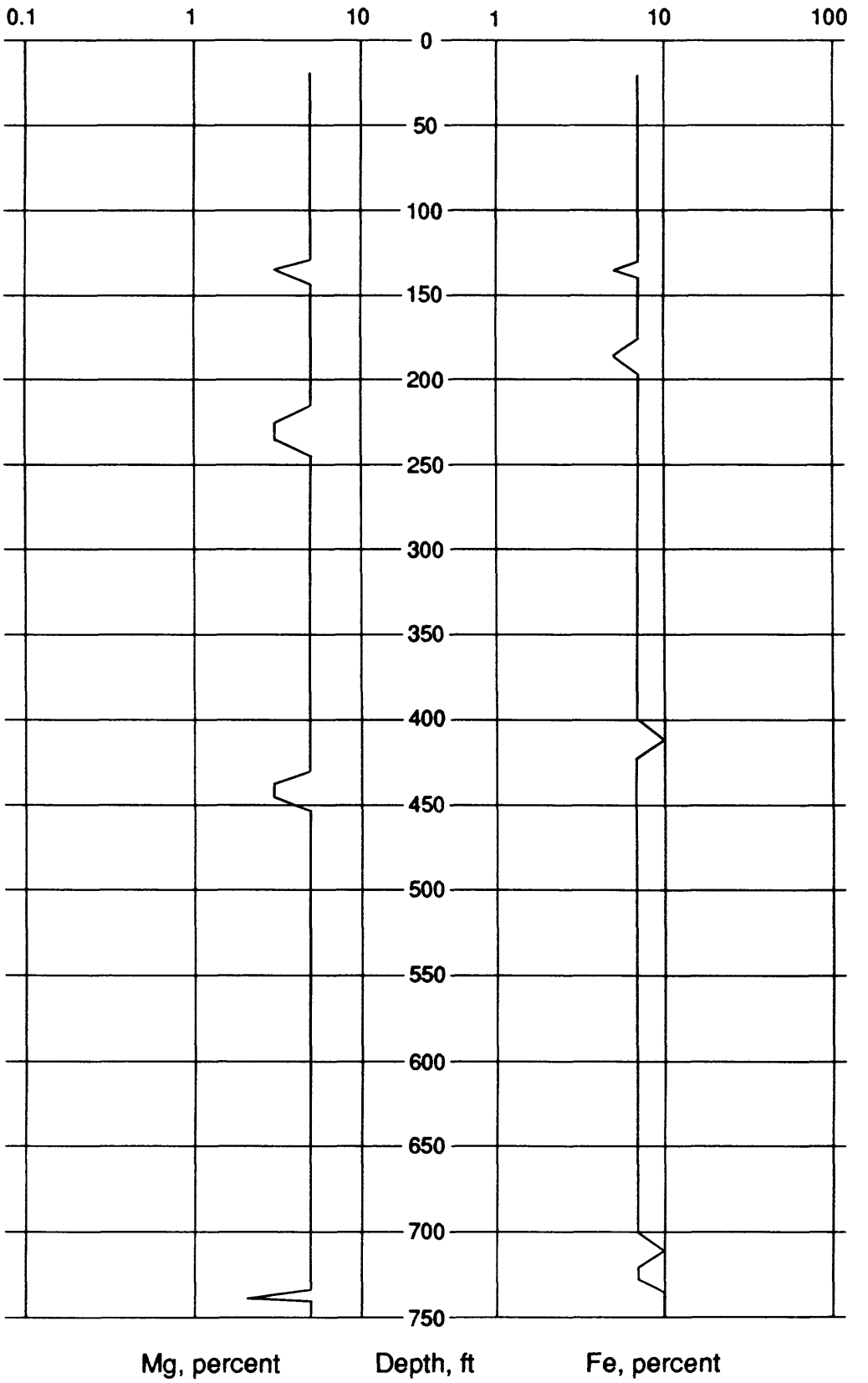


Figure 4G. Geochemical logs for manganese and calcium, drill hole USGS 2.

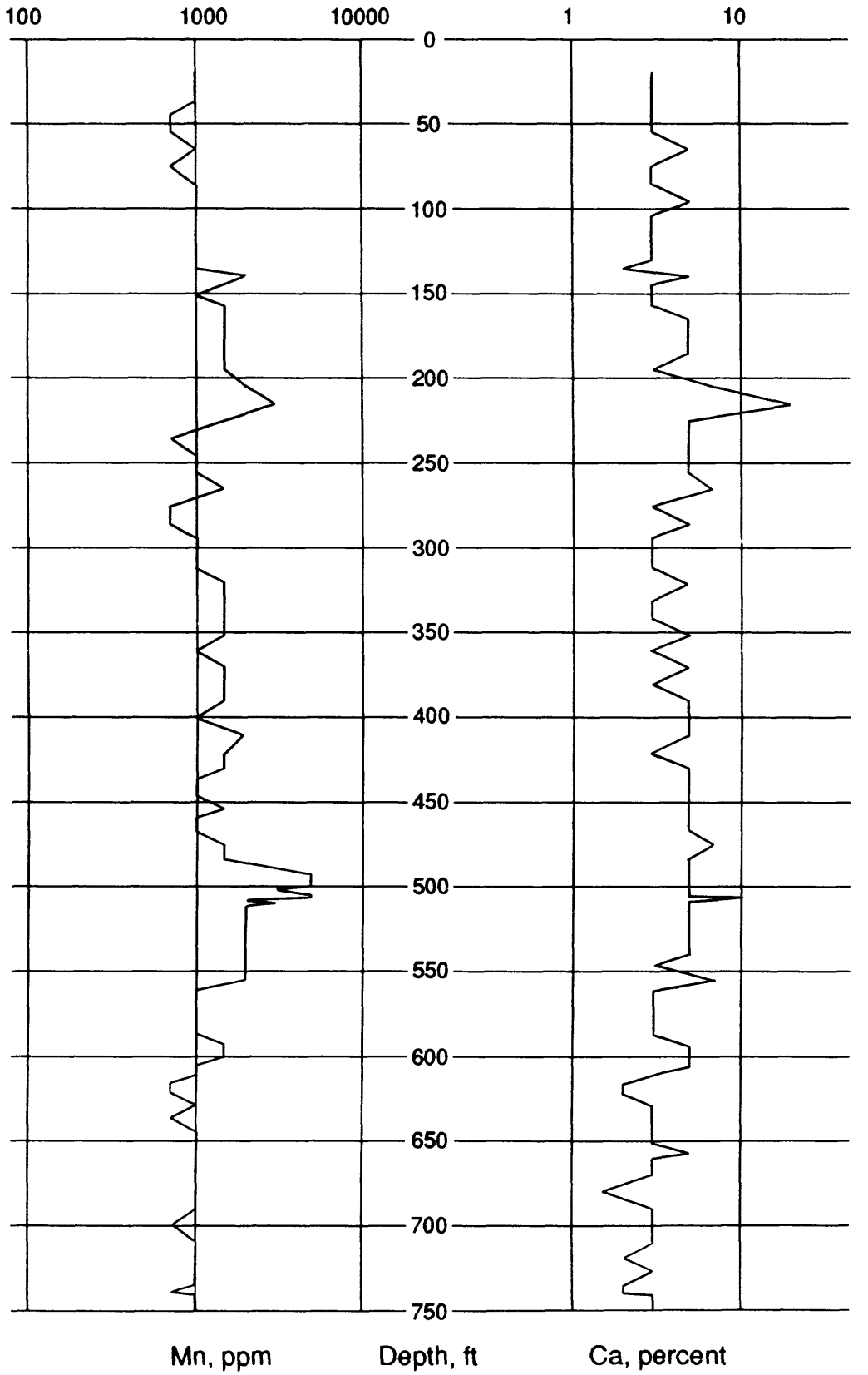


Table 10. Chemical data for drill hole USGS 2. Fe, Mg, Ca, and Ti in weight percent, all other elements in parts per million by weight. Au and Hg determined by atomic absorption spectrophotometry; As by a colorimetric method; all other elements by emission spectrometry. N, not detected; L, present, but below detection limit; G, greater than (value shown); M, missing.

Sample interval		Au	As	Hg	Fe	Mg	Ca	Ti	Mn
Feet	Meters								
14-23	4.3-7.0	L	N	0.2	7	5	3	0.5	1000
23-32	7.0-9.8	L	N	0.04	7	5	3	0.5	1000
32-40	9.8-12.2	L	N	0.06	7	5	3	0.5	1000
40-50	12.2-15.2	L	N	0.04	7	5	3	0.5	700
50-60	15.2-18.3	L	N	0.03	7	5	3	0.5	700
60-70	18.3-21.3	L	N	0.05	7	5	5	0.5	1000
70-80	21.3-24.4	L	N	0.04	7	5	3	0.5	700
80-90	24.4-27.4	L	N	0.04	7	5	3	0.5	1000
90-100	27.4-30.5	L	N	0.05	7	5	5	0.5	1000
100-110	30.5-33.5	L	N	0.02	7	5	3	0.5	1000
110-119	33.5-36.3	L	N	0.05	7	5	3	0.5	1000
119-125	36.3-38.1	L	N	0.05	7	5	3	0.5	1000
125-133.5	38.1-40.7	L	N	0.07	7	5	3	0.5	1000
133.5-137	40.7-41.7	L	N	0.04	5	3	2	0.5	1000
137-140	41.7-42.7	L	N	0.03	7	5	5	0.5	2000
140-147.5	42.7-44.9	L	L	0.07	7	5	3	0.5	1500
147.5-154	44.9-46.9	L	N	0.02	7	5	3	0.5	1000
154-160	46.9-48.8	L	N	0.03	7	5	3	0.5	1500
160-170	48.8-51.8	L	N	0.08	7	5	5	0.5	1500
170-180	51.8-54.8	L	N	0.03	7	5	5	0.5	1500
180-190	54.8-57.9	L	N	0.02	5	5	5	0.5	1500
190-200	57.9-60.9	L	N	0.03	7	5	3	0.5	1500
200-210	60.9-64.0	L	N	0.04	7	5	7	0.7	2000
210-220	64.0-67.0	L	N	0.04	7	5	20	G1	3000
220-230	67.0-70.1	L	N	0.06	7	3	5	0.5	1500
230-240	70.1-73.1	L	N	0.05	7	3	5	0.5	700
240-250	73.1-76.2	L	N	0.04	7	5	5	0.5	1000
250-260	76.2-79.2	L	N	0.04	7	5	5	0.5	1000
260-270	79.2-82.3	L	N	0.02	7	5	7	0.5	1500
270-280	82.3-85.3	L	N	0.02	7	5	3	0.5	700
280-290	85.3-88.4	L	N	0.02	7	5	5	0.5	700
290-296	88.4-90.2	L	N	0.05	7	5	3	0.5	1000
296-306	90.2-93.2	L	N	0.08	7	5	3	0.5	1000
306-316	93.2-96.3	L	N	0.02	7	5	3	0.3	1000
316-326	96.3-99.3	L	N	0.02	7	5	5	0.5	1500
326-336	99.3-102.4	L	N	0.05	7	5	3	0.5	1500
336-346	102.4-105.4	L	N	0.04	7	5	3	0.5	1500
346-356	105.4-108.5	L	N	0.04	7	5	5	0.5	1500
356-365	108.5-111.2	L	N	0.04	7	5	3	0.5	1000
365-375	111.2-114.3	L	N	0.02	7	5	5	0.7	1500
375-385	114.3-117.3	L	N	0.03	7	5	3	0.7	1500
385-395	117.3-120.4	L	N	0.05	7	5	5	0.5	1500
395-405	120.4-123.4	L	N	0.04	7	5	5	0.5	1000

Figure 4G. Continued.

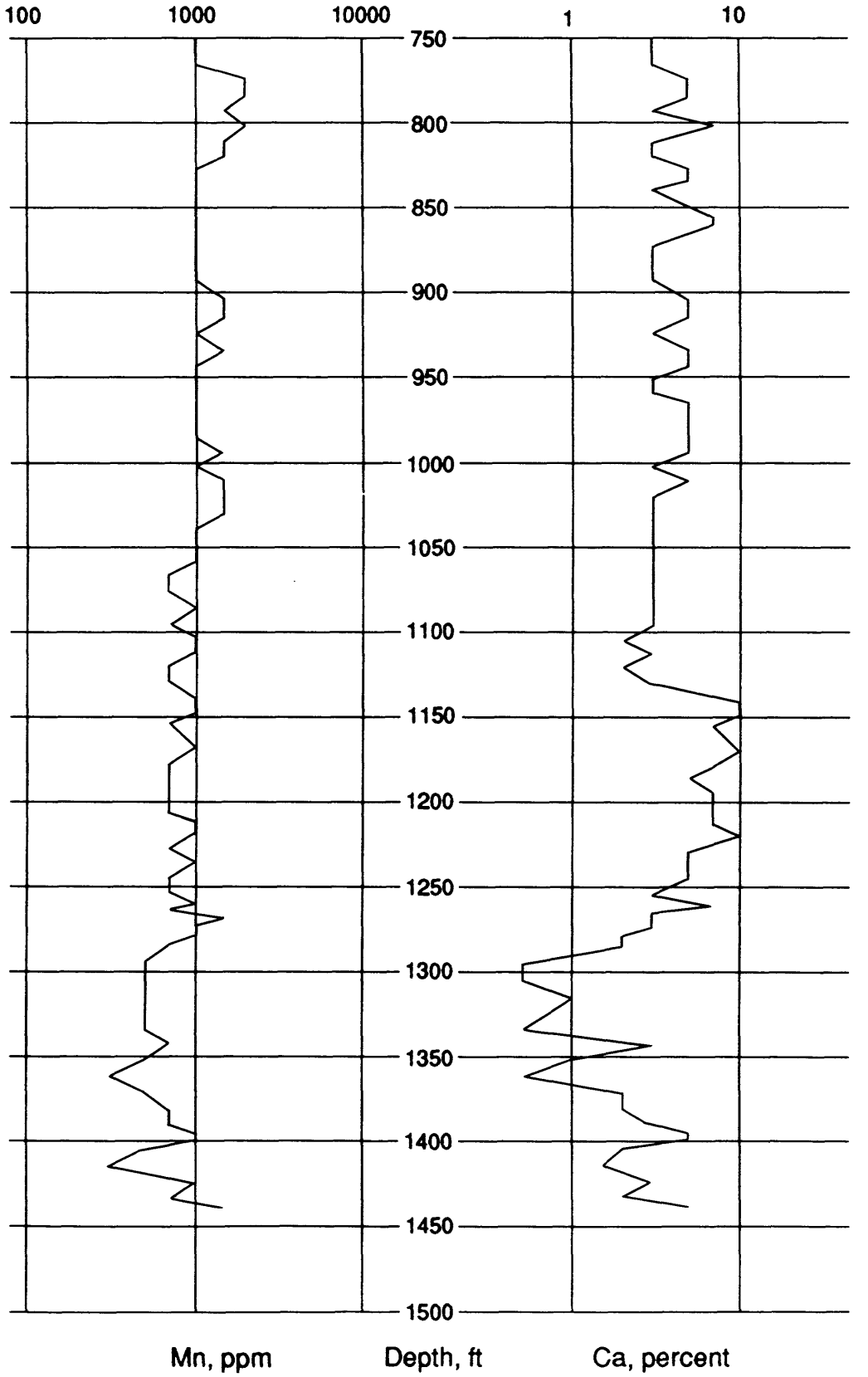


Table 10, continued.

Sample interval		Ag	B	Ba	Be	Co	Cr	Cu	La	Mo	Nb	Ni
Feet	Meters											
14-23	4.3-7.0	N	10	1000	L	15	50	15	50	L	10	15
23-32	7.0-9.8	N	10	1000	L	20	50	15	50	L	10	20
32-40	9.8-12.2	N	10	1000	L	20	30	15	L	L	10	20
40-50	12.2-15.2	N	10	700	L	20	30	15	L	L	10	15
50-60	15.2-18.3	N	10	700	L	20	30	15	L	L	10	20
60-70	18.3-21.3	N	L	700	L	15	30	15	50	L	10	15
70-80	21.3-24.4	N	10	700	L	20	50	15	L	L	10	20
80-90	24.4-27.4	N	10	700	L	20	30	15	50	L	10	20
90-100	27.4-30.5	N	10	1000	L	20	50	15	50	L	20	20
100-110	30.5-33.5	N	10	700	L	20	50	15	L	L	20	20
110-119	33.5-36.3	N	10	700	L	20	50	15	L	L	20	20
119-125	36.3-38.1	N	10	1000	L	20	50	15	L	L	20	30
125-133.5	38.1-40.7	N	10	700	L	20	30	15	L	L	10	30
133.5-137	40.7-41.7	N	10	700	L	20	15	15	L	L	10	20
137-140	41.7-42.7	N	10	1000	L	20	50	L	L	L	10	20
140-147.5	42.7-44.9	N	10	500	L	20	30	50	L	L	10	20
147.5-154	44.9-46.9	N	10	700	L	20	30	20	L	L	10	20
154-160	46.9-48.8	N	10	1000	L	20	50	15	L	L	10	20
160-170	48.8-51.8	N	10	1500	L	20	50	15	50	L	10	20
170-180	51.8-54.8	N	10	700	L	20	30	15	L	L	10	20
180-190	54.8-57.9	N	10	1000	L	15	30	15	50	L	10	15
190-200	57.9-60.9	N	10	700	L	20	30	15	L	L	10	20
200-210	60.9-64.0	N	20	1000	L	30	50	15	50	L	10	20
210-220	64.0-67.0	N	50	2000	L	50	70	30	70	10	20	30
220-230	67.0-70.1	N	20	700	L	50	70	30	L	5	20	20
230-240	70.1-73.1	N	L	700	L	50	70	L	L	L	15	20
240-250	73.1-76.2	N	10	1000	L	50	50	15	L	L	15	30
250-260	76.2-79.2	N	10	700	L	50	50	15	L	L	15	30
260-270	79.2-82.3	N	10	1000	L	30	50	20	70	5	20	30
270-280	82.3-85.3	N	10	700	L	30	50	7	L	L	10	20
280-290	85.3-88.4	N	10	1000	L	20	50	20	50	L	10	20
290-296	88.4-90.2	N	10	700	L	50	30	15	L	L	10	20
296-306	90.2-93.2	N	L	700	L	20	30	15	L	L	10	20
306-316	93.2-96.3	N	L	700	L	20	30	15	L	L	L	20
316-326	96.3-99.3	N	10	700	L	20	30	100	L	L	15	20
326-336	99.3-102.4	N	10	700	L	30	70	20	L	L	15	30
336-346	102.4-105.4	N	10	1000	L	30	70	20	L	L	20	30
346-356	105.4-108.5	N	10	1000	L	30	70	20	50	L	20	30
356-365	108.5-111.2	N	L	1000	L	20	70	15	L	L	10	30
365-375	111.2-114.3	N	10	1000	L	20	70	15	L	L	10	30
375-385	114.3-117.3	N	10	1000	L	30	50	15	L	L	10	30
385-395	117.3-120.4	N	L	700	L	20	50	15	L	L	10	20
395-405	120.4-123.4	N	10	700	L	20	70	7	L	L	10	20

Table 10, continued.

Sample interval		Pb	Sc	Sr	V	Y	Zr
Feet	Meters						
14-23	4.3-7.0	L	15	700	150	15	150
23-32	7.0-9.8	L	15	700	150	15	150
32-40	9.8-12.2	L	15	700	150	10	150
40-50	12.2-15.2	L	15	500	150	10	100
50-60	15.2-18.3	L	15	700	150	15	150
60-70	18.3-21.3	L	15	700	150	10	150
70-80	21.3-24.4	L	15	700	150	15	150
80-90	24.4-27.4	L	15	700	150	15	150
90-100	27.4-30.5	10	15	1000	150	15	100
100-110	30.5-33.5	10	15	700	150	15	100
110-119	33.5-36.3	10	15	700	150	15	150
119-125	36.3-38.1	10	15	700	150	15	150
125-133.5	38.1-40.7	L	10	700	150	15	150
133.5-137	40.7-41.7	10	10	700	150	10	100
137-140	41.7-42.7	10	15	700	150	15	150
140-147.5	42.7-44.9	20	15	500	150	15	150
147.5-154	44.9-46.9	10	15	300	150	10	150
154-160	46.9-48.8	10	15	700	150	15	150
160-170	48.8-51.8	10	15	700	150	15	150
170-180	51.8-54.8	L	10	500	150	15	150
180-190	54.8-57.9	10	10	700	150	15	100
190-200	57.9-60.9	10	15	700	150	10	100
200-210	60.9-64.0	10	20	1000	200	20	100
210-220	64.0-67.0	30	30	G5000	300	15	200
220-230	67.0-70.1	20	15	700	200	15	150
230-240	70.1-73.1	L	15	700	200	10	150
240-250	73.1-76.2	20	15	1000	200	15	100
250-260	76.2-79.2	L	15	700	150	20	150
260-270	79.2-82.3	20	15	1500	200	10	150
270-280	82.3-85.3	10	15	500	150	15	100
280-290	85.3-88.4	10	15	500	150	10	100
290-296	88.4-90.2	10	10	500	150	15	100
296-306	90.2-93.2	10	15	500	150	10	100
306-316	93.2-96.3	10	10	500	150	10	100
316-326	96.3-99.3	20	15	700	150	15	150
326-336	99.3-102.4	20	15	700	150	15	100
336-346	102.4-105.4	20	15	700	150	20	150
346-356	105.4-108.5	20	15	700	150	20	150
356-365	108.5-111.2	10	15	500	150	20	150
365-375	111.2-114.3	10	20	1000	200	20	150
375-385	114.3-117.3	10	15	700	200	10	150
385-395	117.3-120.4	10	15	700	150	20	100
395-405	120.4-123.4	10	15	700	150	20	100

Table 10, continued.

Sample interval		Au	As(c)	Hg	Fe	Mg	Ca	Ti	Mn
Feet	Meters								
405-415	123.4-126.5	L	N	0.04	10	5	5	1	2000
415-425	126.5-129.5	L	N	0.04	7	5	3	0.3	1500
425-434	129.5-132.2	L	N	0.05	7	5	5	0.5	1500
434-440	132.2-134.1	L	N	0.05	7	3	5	0.5	1000
440-450	134.1-137.1	L	N	0.03	7	3	5	0.5	1000
450-456	137.1-138.9	L	N	0.05	7	5	5	0.5	1500
456-463	138.9-141.1	L	N	0.05	7	5	5	0.5	1000
463-471	141.1-143.5	L	N	0.22	7	5	5	0.5	1000
471-478.5	143.5-145.8	L	N	0.04	7	5	7	0.5	1500
478.5-488	145.8-148.7	L	N	0.05	7	5	5	0.5	1500
488-497	148.7-151.4	L	N	0.04	7	5	5	0.5	5000
497-499	151.4-152.0	L	N	0.05	7	5	5	0.5	5000
499-505	152.0-153.9	L	N	0.04	7	5	5	0.7	3000
505-506	153.9-154.2	L	N	0.05	7	5	5	0.7	5000
506-507	154.2-154.5	L	N	0.04	7	5	10	0.7	5000
507-508	154.5-154.8	L	N	0.07	7	5	5	0.7	2000
508-510.7	154.8-155.6	L	N	0.04	7	5	5	0.7	3000
510.7-512	155.6-156.0	L	N	0.04	7	5	5	0.7	2000
512-516.5	156.0-157.4	L	N	0.05	7	5	5	0.7	2000
516.5-519	157.4-158.1	L	N	0.03	7	5	5	0.7	2000
519-526	158.1-160.3	L	N	0.05	7	5	5	0.7	2000
526-533	160.3-162.4	L	N	0.03	7	5	5	0.7	2000
533-543	162.4-165.5	L	N	0.05	7	5	5	0.7	2000
543-548	165.5-167.0	L	N	0.04	7	5	3	0.7	2000
548-553.5	167.0-168.7	L	N	0.05	7	5	5	0.7	2000
553.5-556.5	168.7-169.6	L	N	0.06	7	5	7	0.7	2000
556.5-566	169.6-172.5	L	N	0.04	7	5	3	1	1000
566-568.5	172.5-173.2	L	N	0.11	7	5	3	1	1000
568.5-572.5	173.2-174.4	L	N	0.06	7	5	3	1	1000
572.5-582	174.4-177.3	L	N	0.08	7	5	3	1	1000
582-590.5	177.3-179.9	L	N	0.12	7	5	3	1	1000
590.5-595.5	179.9-181.4	L	N	0.04	7	5	5	1	1500
595.5-598	181.4-182.2	L	L	0.07	7	5	5	1	1500
598-603	182.2-183.7	L	N	0.1	7	5	5	1	1500
603-608	183.7-185.3	0.04	N	0.13	7	5	5	1	1000
608-613	185.3-186.8	L	N	0.07	7	5	3	1	1000
613-619	186.8-188.6	L	N	1.2	7	5	2	1	700
619-625	188.6-190.4	L	N	0.35	7	5	2	1	700
625-631	190.4-192.3	L	N	0.1	7	5	3	1	1000
631-640	192.3-195.0	L	N	0.35	7	5	3	1	700
640-648	195.0-197.4	L	N	0.1	7	5	3	0.7	1000
648-656	197.4-199.9	L	30	0.07	7	5	3	1	1000
656-659	199.9-200.8	L	N	0.06	7	5	5	1	1000

Table 10, continued.

Sample interval		Ag	B	Ba	Be	Co	Cr	Cu	La	Mo	Nb	Ni
Feet	Meters											
405-415	123.4-126.5	N	10	700	L	20	70	30	L	L	10	30
415-425	126.5-129.5	N	L	700	L	15	30	20	L	L	L	20
425-434	129.5-132.2	N	L	1000	L	20	50	15	L	L	10	20
434-440	132.2-134.1	N	10	700	L	15	50	30	50	5	20	20
440-450	134.1-137.1	N	10	1000	L	15	70	20	30	L	20	20
450-456	137.1-138.9	N	10	1000	L	15	70	20	30	L	20	20
456-463	138.9-141.1	N	10	700	L	15	70	10	30	L	20	20
463-471	141.1-143.5	N	10	1000	L	15	70	10	30	L	20	20
471-478.5	143.5-145.8	N	10	1000	L	15	70	20	30	L	10	20
478.5-488	145.8-148.7	N	10	700	L	15	70	30	30	L	20	15
488-497	148.7-151.4	N	10	1000	L	15	70	30	30	L	20	20
497-499	151.4-152.0	N	10	1000	L	30	70	30	20	L	20	30
499-505	152.0-153.9	N	10	700	L	15	70	20	20	L	20	30
505-506	153.9-154.2	N	10	1500	L	15	70	20	30	L	20	20
506-507	154.2-154.5	N	10	2000	L	15	70	20	30	L	20	15
507-508	154.5-154.8	N	10	1000	L	15	70	20	30	L	20	15
508-510.7	154.8-155.6	N	10	1000	L	15	70	20	30	L	20	15
510.7-512	155.6-156.0	N	10	1000	L	15	70	20	30	L	20	15
512-516.5	156.0-157.4	N	L	1000	L	15	70	15	30	L	20	15
516.5-519	157.4-158.1	N	10	1000	L	15	70	20	30	L	20	15
519-526	158.1-160.3	N	10	1000	L	15	70	20	30	L	20	20
526-533	160.3-162.4	N	10	1000	L	20	70	20	20	L	20	20
533-543	162.4-165.5	N	L	1000	L	15	70	15	20	L	20	10
543-548	165.5-167.0	N	L	1000	L	15	70	20	20	L	20	10
548-553.5	167.0-168.7	N	10	700	L	15	70	30	30	L	15	20
553.5-556.5	168.7-169.6	N	L	1000	L	15	70	20	30	L	20	20
556.5-566	169.6-172.5	N	10	1000	L	20	30	30	50	L	10	20
566-568.5	172.5-173.2	N	10	1000	L	20	30	30	50	L	10	20
568.5-572.5	173.2-174.4	N	10	1000	L	20	50	30	50	L	10	20
572.5-582	174.4-177.3	N	10	1000	L	20	30	30	50	L	10	20
582-590.5	177.3-179.9	N	10	1500	L	20	30	30	50	L	10	20
590.5-595.5	179.9-181.4	N	10	1500	L	20	30	30	70	5	10	20
595.5-598	181.4-182.2	N	10	1500	L	20	30	30	50	10	10	20
598-603	182.2-183.7	N	10	2000	L	20	30	30	100	L	10	20
603-608	183.7-185.3	N	10	2000	L	20	30	30	50	L	10	20
608-613	185.3-186.8	N	10	2000	L	20	30	30	50	L	10	20
613-619	186.8-188.6	N	10	700	L	20	30	30	50	L	10	20
619-625	188.6-190.4	N	10	1000	L	20	30	30	50	L	10	20
625-631	190.4-192.3	N	10	1000	L	20	20	30	50	L	10	20
631-640	192.3-195.0	N	10	1000	L	20	30	30	50	L	10	20
640-648	195.0-197.4	N	10	1000	L	20	20	30	L	L	10	20
648-656	197.4-199.9	N	L	1000	L	15	20	30	50	L	10	20
656-659	199.9-200.8	N	10	1000	L	20	30	20	50	L	10	20

Table 10, continued.

Sample interval		Pb	Sc	Sr	V	Y	Zr
Feet	Meters						
405-415	123.4-126.5	20	15	1000	200	20	200
415-425	126.5-129.5	20	10	700	100	10	100
425-434	129.5-132.2	10	15	700	100	10	100
434-440	132.2-134.1	10	15	700	150	M	M
440-450	134.1-137.1	20	10	700	150	M	M
450-456	137.1-138.9	20	10	700	150	M	M
456-463	138.9-141.1	20	15	500	150	M	M
463-471	141.1-143.5	10	15	700	150	M	M
471-478.5	143.5-145.8	20	10	700	150	M	M
478.5-488	145.8-148.7	20	15	500	150	M	M
488-497	148.7-151.4	20	15	700	150	M	M
497-499	151.4-152.0	20	10	700	150	M	M
499-505	152.0-153.9	20	10	500	150	M	M
505-506	153.9-154.2	20	15	500	150	M	M
506-507	154.2-154.5	20	10	700	150	M	M
507-508	154.5-154.8	20	10	700	150	M	M
508-510.7	154.8-155.6	20	10	700	150	M	M
510.7-512	155.6-156.0	L	7	500	150	M	M
512-516.5	156.0-157.4	20	10	500	150	M	M
516.5-519	157.4-158.1	20	10	700	150	M	M
519-526	158.1-160.3	20	10	700	150	M	M
526-533	160.3-162.4	20	10	700	150	M	M
533-543	162.4-165.5	20	10	700	150	M	M
543-548	165.5-167.0	20	15	500	150	M	M
548-553.5	167.0-168.7	20	15	1000	150	M	M
553.5-556.5	168.7-169.6	20	15	1000	150	M	M
556.5-566	169.6-172.5	20	15	700	200	20	150
566-568.5	172.5-173.2	20	15	700	200	20	150
568.5-572.5	173.2-174.4	20	15	1000	200	15	150
572.5-582	174.4-177.3	20	15	700	200	20	150
582-590.5	177.3-179.9	20	15	1000	200	20	150
590.5-595.5	179.9-181.4	20	15	1000	200	20	150
595.5-598	181.4-182.2	20	15	1000	200	20	150
598-603	182.2-183.7	20	15	1000	200	20	150
603-608	183.7-185.3	20	15	1000	200	20	150
608-613	185.3-186.8	20	15	500	200	20	150
613-619	186.8-188.6	20	15	500	200	20	150
619-625	188.6-190.4	20	15	700	200	20	150
625-631	190.4-192.3	20	15	700	200	20	150
631-640	192.3-195.0	20	15	700	200	20	150
640-648	195.0-197.4	20	15	1000	150	15	150
648-656	197.4-199.9	20	15	1000	200	20	150
656-659	199.9-200.8	20	15	1000	200	20	150

Table 10, continued.

Sample interval		Au	As(c)	Hg	Fe	Mg	Ca	Ti	Mn
Feet	Meters								
659-660.5	200.8-201.3	L	N	0.4	7	5	3	0.7	1000
660.5-664	201.3-202.3	L	N	0.26	7	5	3	0.7	1000
664-675	202.3-205.7	L	L	0.3	7	5	3	0.7	1000
675-685	205.7-208.7	L	N	0.3	7	5	1.5	0.5	1000
685-695	208.7-211.8	L	N	0.4	7	5	3	0.7	1000
695-705	211.8-214.8	L	N	0.18	7	5	3	0.7	700
705-715	214.8-217.9	L	N	0.08	10	5	3	1	1000
715-723	217.9-220.3	L	N	0.09	7	5	2	0.7	1000
723-731	220.3-222.7	L	N	0.09	7	5	3	1	1000
731-738	222.7-224.9	L	L	0.09	10	5	2	0.5	1000
738-739.5	224.9-225.3	L	N	0.15	10	2	2	1	700
739.5-741.5	225.3-225.9	L	N	0.03	10	5	3	1	1000
741.5-748	225.9-227.9	L	L	0.4	10	5	3	1	1000
748-754	227.9-229.7	L	N	0.24	10	5	3	1	1000
754-761	229.7-231.9	L	N	0.18	10	5	3	1	1000
761-768	231.9-234.0	L	N	0.1	7	5	3	1	1000
768-779	234.0-237.4	L	N	0.07	7	5	5	1	2000
779-789	237.4-240.4	L	N	0.13	7	5	5	1	2000
789-796	240.4-242.5	L	N	0.2	7	5	3	1	1500
796-807.5	242.5-246.0	L	N	0.05	10	5	7	1	2000
807.5-815	246.0-248.3	L	N	0.15	10	5	3	1	1500
815-823	248.3-250.8	0.04	N	0.07	10	5	3	1	1500
823-832	250.8-253.5	L	N	0.05	7	5	5	0.5	1000
832-836	253.5-254.7	L	N	0.02	10	5	5	1	1000
836-845	254.7-257.5	L	N	0.09	7	5	3	0.5	1000
845-853	257.5-259.9	L	N	0.05	10	5	5	1	1000
853-860	259.9-262.0	L	N	0.05	7	5	7	1	1000
860-861.5	262.0-262.5	L	N	0.04	5	5	7	0.5	1000
861.5-870	262.5-265.1	L	N	0.05	7	5	5	0.7	1000
870-877	265.1-267.2	L	N	0.08	7	5	3	0.5	1000
877-886	267.2-270.0	L	N	0.13	7	5	3	0.5	1000
886-899	270.0-273.9	L	N	0.13	7	5	3	0.5	1000
899-909	273.9-277.0	L	N	0.07	7	5	5	0.5	1500
909-919	277.0-280.0	L	N	0.07	7	5	5	0.5	1500
919-929	280.0-283.1	L	N	0.11	7	5	3	0.5	1000
929-939	283.1-286.1	L	10	0.02	7	5	5	0.5	1500
939-948	286.1-288.9	0.04	N	0.11	7	5	5	0.5	1000
948-953	288.9-290.4	L	N	0.35	7	5	3	0.5	1000
953-955.3	290.4-291.1	L	N	0.26	7	5	3	0.5	1000
955.3-962	291.1-293.1	L	N	0.15	7	5	3	0.5	1000
962-968.5	293.1-295.1	L	N	0.05	7	5	5	0.5	1000
968.5-971.5	295.1-296.0	L	N	0.07	7	5	5	0.5	1000
971.5-979	296.0-298.3	L	L	0.11	7	5	5	0.5	1000

Table 10, continued.

Sample interval		Ag	B	Ba	Be	Co	Cr	Cu	La	Mo	Nb	Ni
Feet	Meters											
659-660.5	200.8-201.3	N	10	700	L	15	20	20	50	L	10	10
660.5-664	201.3-202.3	N	10	700	L	20	20	30	50	L	10	20
664-675	202.3-205.7	N	10	1000	L	20	20	30	50	L	10	20
675-685	205.7-208.7	N	10	500	L	20	20	30	L	L	10	20
685-695	208.7-211.8	N	10	500	L	20	30	30	50	5	10	20
695-705	211.8-214.8	N	10	1500	L	20	30	20	L	L	10	20
705-715	214.8-217.9	N	10	1000	L	20	30	30	50	L	10	20
715-723	217.9-220.3	N	L	700	L	20	20	20	50	L	10	10
723-731	220.3-222.7	N	10	1000	L	20	30	20	50	L	10	10
731-738	222.7-224.9	N	10	700	L	15	30	15	50	L	10	10
738-739.5	224.9-225.3	N	20	G5000	L	20	30	30	50	L	10	20
739.5-741.5	225.3-225.9	N	L	2000	L	15	30	15	50	L	10	20
741.5-748	225.9-227.9	N	10	1500	L	20	30	15	50	L	10	20
748-754	227.9-229.7	N	10	700	L	15	20	20	50	L	10	20
754-761	229.7-231.9	N	10	1000	L	15	30	20	50	L	10	20
761-768	231.9-234.0	N	10	1000	L	15	20	20	50	L	10	20
768-779	234.0-237.4	N	10	2000	L	15	30	20	50	L	10	15
779-789	237.4-240.4	N	10	1500	L	15	30	20	50	L	10	15
789-796	240.4-242.5	N	10	1500	L	20	30	20	50	L	10	15
796-807.5	242.5-246.0	N	10	2000	L	20	30	20	50	L	10	20
807.5-815	246.0-248.3	N	10	700	L	20	30	20	50	L	10	15
815-823	248.3-250.8	N	10	700	L	20	30	30	50	L	10	15
823-832	250.8-253.5	N	L	700	L	15	30	15	50	L	10	15
832-836	253.5-254.7	N	10	1000	L	20	30	30	50	L	10	15
836-845	254.7-257.5	N	L	500	L	10	20	20	L	L	10	10
845-853	257.5-259.9	N	L	1500	L	20	30	20	L	L	10	10
853-860	259.9-262.0	N	L	1500	L	15	30	20	50	L	10	10
860-861.5	262.0-262.5	N	10	1500	L	15	20	20	L	L	10	5
861.5-870	262.5-265.1	N	10	1500	L	15	30	20	50	L	10	10
870-877	265.1-267.2	N	10	700	L	20	30	30	50	L	10	20
877-886	267.2-270.0	N	10	700	L	20	30	30	50	L	10	20
886-899	270.0-273.9	N	10	500	L	20	30	30	50	L	10	20
899-909	273.9-277.0	N	10	1500	L	20	30	30	50	L	10	20
909-919	277.0-280.0	N	10	1500	L	20	30	30	50	L	10	10
919-929	280.0-283.1	N	10	1000	L	20	30	30	50	L	10	20
929-939	283.1-286.1	N	10	1000	L	20	30	30	50	L	10	20
939-948	286.1-288.9	N	10	1500	L	20	30	30	50	L	10	20
948-953	288.9-290.4	N	10	1000	L	20	30	15	50	L	10	20
953-955.3	290.4-291.1	N	10	1000	L	20	30	30	50	L	10	20
955.3-962	291.1-293.1	N	10	1000	L	20	30	30	50	L	10	20
962-968.5	293.1-295.1	N	10	1500	L	20	30	30	50	L	10	10
968.5-971.5	295.1-296.0	N	10	1500	L	20	30	30	100	L	10	10
971.5-979	296.0-298.3	N	10	1500	L	20	30	30	100	L	10	20

Table 10, continued.

Sample interval		Pb	Sc	Sr	V	Y	Zr
Feet	Meters						
659-660.5	200.8-201.3	10	10	700	150	15	100
660.5-664	201.3-202.3	20	15	700	200	15	150
664-675	202.3-205.7	10	15	700	200	15	150
675-685	205.7-208.7	L	10	700	100	10	150
685-695	208.7-211.8	10	15	700	150	20	150
695-705	211.8-214.8	10	15	500	150	15	150
705-715	214.8-217.9	10	15	500	200	20	150
715-723	217.9-220.3	10	15	300	150	15	150
723-731	220.3-222.7	20	15	500	200	15	150
731-738	222.7-224.9	10	15	300	200	15	150
738-739.5	224.9-225.3	20	15	300	200	15	150
739.5-741.5	225.3-225.9	10	15	300	200	15	150
741.5-748	225.9-227.9	10	15	200	200	15	150
748-754	227.9-229.7	10	15	200	200	15	150
754-761	229.7-231.9	10	15	300	200	15	150
761-768	231.9-234.0	20	15	500	200	15	150
768-779	234.0-237.4	20	15	700	200	20	150
779-789	237.4-240.4	10	15	700	200	20	150
789-796	240.4-242.5	20	15	500	200	20	150
796-807.5	242.5-246.0	20	15	700	200	20	150
807.5-815	246.0-248.3	20	15	200	200	15	150
815-823	248.3-250.8	20	15	200	200	15	150
823-832	250.8-253.5	20	15	500	150	10	100
832-836	253.5-254.7	20	15	700	200	15	150
836-845	254.7-257.5	20	15	300	100	10	100
845-853	257.5-259.9	10	15	300	150	15	150
853-860	259.9-262.0	20	15	500	150	15	150
860-861.5	262.0-262.5	10	15	500	100	10	100
861.5-870	262.5-265.1	10	15	500	150	15	150
870-877	265.1-267.2	20	15	500	150	20	150
877-886	267.2-270.0	20	15	500	150	20	150
886-899	270.0-273.9	20	15	500	150	20	150
899-909	273.9-277.0	20	15	1000	150	20	150
909-919	277.0-280.0	10	15	700	150	15	150
919-929	280.0-283.1	10	15	700	150	10	150
929-939	283.1-286.1	10	15	1000	150	20	150
939-948	286.1-288.9	10	15	1000	150	20	150
948-953	288.9-290.4	10	15	700	150	20	150
953-955.3	290.4-291.1	10	15	1000	150	20	150
955.3-962	291.1-293.1	20	15	1000	150	20	150
962-968.5	293.1-295.1	20	15	1500	150	20	150
968.5-971.5	295.1-296.0	10	15	1500	150	20	150
971.5-979	296.0-298.3	20	15	1500	150	20	150

Table 10, continued.

Sample interval		Au	As(c)	Hg	Fe	Mg	Ca	Ti	Mn
Feet	Meters								
979-989	298.3-301.3	L	N	0.2	7	5	5	0.5	1000
989-999	301.3-304.4	L	N	0.22	7	5	5	0.5	1500
999-1006.5	304.4-306.7	L	N	0.06	7	5	3	0.5	1000
1006.5-1016	306.7-309.6	L	N	0.35	7	5	5	0.5	1500
1016-1026	309.6-312.6	L	N	0.35	7	5	3	0.5	1500
1026-1036	312.6-315.7	L	N	0.35	7	5	3	0.5	1500
1036-1045	315.7-318.4	L	N	0.22	7	5	3	0.5	1000
1045-1055.5	318.4-321.6	L	L	0.12	7	5	3	0.5	1000
1055.5-1062	321.6-323.6	L	N	0.2	7	5	3	0.5	1000
1062-1072	323.6-326.6	L	L	0.14	2	5	3	0.5	700
1072-1082	326.6-329.7	L	N	0.11	5	5	3	0.5	700
1082-1092	329.7-332.7	L	N	0.08	5	5	3	0.5	1000
1092-1100	332.7-335.2	L	N	0.07	5	5	3	0.5	700
1100-1108	335.2-337.6	L	N	0.15	5	5	2	0.5	1000
1108-1116	337.6-340.0	L	N	0.24	7	5	3	0.5	1000
1116-1124	340.0-342.5	L	N	0.3	7	5	2	0.5	700
1124-1134.5	342.5-345.7	0.1	N	0.16	5	5	3	0.5	700
1134.5-1144.5	345.7-348.7	L	N	0.08	7	5	10	0.7	1000
1144.5-1146	348.7-349.2	0.1	10	0.04	7	5	10	0.7	1000
1146-1150	349.2-350.4	L	N	0.02	7	5	10	0.7	1000
1150-1158	350.4-352.8	L	N	0.02	7	5	7	0.7	700
1164-1173	354.7-357.4	L	N	0.02	10	5	10	1	1000
1173-1181.5	357.4-360.0	L	N	0.04	7	5	7	1	700
1181.5-1189	360.0-362.3	L	N	0.02	7	5	5	0.7	700
1189-1196	362.3-364.4	L	N	0.05	7	5	7	1	700
1196-1205.5	364.4-367.3	L	N	0.06	7	5	7	1	700
1205.5-1209.5	367.3-368.5	L	N	0.06	7	5	7	1	700
1209.5-1216	368.5-370.5	L	N	0.04	7	5	7	1	1000
1216-1223	370.5-372.6	L	N	0.05	7	5	10	1	1000
1223-1233	372.6-375.7	L	N	0.5	7	5	5	1	700
1233-1241	375.7-378.1	L	N	0.11	7	5	5	1	1000
1241-1250	378.1-380.9	L	N	0.06	7	5	5	1	700
1250-1259	380.9-383.6	L	N	0.02	5	3	3	0.3	700
1259-1262	383.6-384.5	L	20	0.07	7	3	7	0.5	1000
1262-1265	384.5-385.4	L	100	0.09	3	2	3	0.3	700
1265-1270	385.4-387.0	L	100	0.6	3	1.5	3	0.2	1500
1270-1276	387.0-388.7	L	40	0.5	3	1.5	3	0.2	1000
1276-1279.5	388.8-389.9	L	80	0.8	3	1.5	2	0.2	1000
1279.5-1290	389.9-393.1	0.06	150	5	3	1.5	2	0.3	700
1290-1300	393.1-396.1	0.04	80	5	3	1	0.5	0.2	500
1300-1310	396.1-399.2	0.08	100	4.5	3	1	0.5	0.2	500
1310-1320	399.2-402.2	0.08	100	5.5	3	1	1	0.3	500
1320-1330	402.2-405.3	0.08	100	6	2	1	0.7	0.2	500

Table 10, continued.

Sample interval		Ag	B	Ba	Be	Co	Cr	Cu	La	Mo	Nb	Ni
Feet	Meters											
979-989	298.3-301.3	N	10	1000	L	20	30	30	50	L	10	10
989-999	301.3-304.4	N	10	1500	L	20	30	30	50	L	10	10
999-1006.5	304.4-306.7	N	10	1000	L	20	30	30	50	L	10	10
1006.5-1016	306.7-309.6	N	10	1000	L	20	50	30	50	L	10	10
1016-1026	309.6-312.6	N	10	1000	L	20	50	30	50	L	10	10
1026-1036	312.6-315.7	N	10	500	L	20	50	30	50	L	10	10
1036-1045	315.7-318.4	N	10	700	L	20	30	30	L	L	10	10
1045-1055.5	318.4-321.6	N	10	1500	L	20	30	30	50	L	10	10
1055.5-1062	321.6-323.6	N	10	1500	L	20	30	30	50	L	10	10
1062-1072	323.6-326.6	N	L	2000	L	15	30	15	70	L	10	10
1072-1082	326.6-329.7	N	L	1000	L	10	20	10	50	L	10	5
1082-1092	329.7-332.7	N	L	1500	L	15	20	15	70	L	10	10
1092-1100	332.7-335.2	N	L	1500	L	15	20	15	70	L	L	5
1100-1108	335.2-337.6	N	L	1000	L	15	30	20	50	L	10	5
1108-1116	337.6-340.0	N	10	1000	L	20	30	20	100	L	10	5
1116-1124	340.0-342.5	N	L	1000	L	15	20	20	50	L	L	5
1124-1134.5	342.5-345.7	N	10	700	L	20	30	15	50	L	10	10
1134.5-1144.5	345.7-348.7	N	10	1500	L	20	50	20	100	L	10	20
1144.5-1146	348.7-349.2	N	L	1000	L	20	30	15	100	L	10	20
1146-1150	349.2-350.4	N	L	1500	L	20	30	20	70	L	10	20
1150-1158	350.4-352.8	N	L	1000	L	20	30	15	50	L	10	20
1164-1173	354.7-357.4	N	10	2000	L	20	50	15	100	L	10	20
1173-1181.5	357.4-360.0	N	L	1000	L	20	50	15	70	L	10	20
1181.5-1189	360.0-362.3	N	L	1500	L	20	50	15	70	L	10	20
1189-1196	362.3-364.4	N	L	1500	L	20	50	10	70	L	10	20
1196-1205.5	364.4-367.3	N	L	1500	L	20	50	10	70	L	10	20
1205.5-1209.5	367.3-368.5	N	L	1500	L	20	50	15	70	L	10	20
1209.5-1216	368.5-370.5	N	L	1500	L	20	50	15	100	L	10	20
1216-1223	370.5-372.6	N	10	2000	L	20	70	15	150	L	10	20
1223-1233	372.6-375.7	N	10	1500	L	20	50	20	100	L	10	20
1233-1241	375.7-378.1	N	L	1500	L	15	30	15	50	L	10	20
1241-1250	378.1-380.9	N	L	1000	L	15	30	15	50	L	10	20
1250-1259	380.9-383.6	N	L	700	L	10	20	15	70	L	10	20
1259-1262	383.6-384.5	N	L	700	L	20	20	20	50	5	10	20
1262-1265	384.5-385.4	N	L	1000	L	10	10	10	L	L	10	5
1265-1270	385.4-387.0	N	L	500	L	5	10	15	50	5	10	5
1270-1276	387.0-388.7	N	L	700	L	5	10	15	L	L	10	10
1276-1279.5	388.8-389.9	N	10	300	L	L	5	15	50	5	10	5
1279.5-1290	389.9-393.1	N	10	700	L	L	15	15	70	7	10	L
1290-1300	393.1-396.1	N	L	300	L	L	5	15	50	L	10	L
1300-1310	396.1-399.2	N	L	300	L	L	5	15	L	5	10	L
1310-1320	399.2-402.2	N	L	300	L	L	10	15	50	5	10	L
1320-1330	402.2-405.3	N	L	300	L	L	5	15	50	5	10	L

Table 10, continued.

Sample interval		Pb	Sc	Sr	V	Y	Zr
Feet	Meters						
979-989	298.3-301.3	10	15	700	150	20	150
989-999	301.3-304.4	20	15	2000	150	20	150
999-1006.5	304.4-306.7	20	15	1000	150	20	150
1006.5-1016	306.7-309.6	20	20	2000	200	20	150
1016-1026	309.6-312.6	10	20	700	200	20	150
1026-1036	312.6-315.7	10	20	500	200	20	150
1036-1045	315.7-318.4	10	15	500	150	20	150
1045-1055.5	318.4-321.6	10	15	500	150	20	150
1055.5-1062	321.6-323.6	10	15	500	150	20	150
1062-1072	323.6-326.6	100	15	700	150	15	150
1072-1082	326.6-329.7	100	10	700	150	10	150
1082-1092	329.7-332.7	100	15	700	150	15	150
1092-1100	332.7-335.2	50	15	700	150	15	150
1100-1108	335.2-337.6	100	15	500	150	10	150
1108-1116	337.6-340.0	100	15	300	150	15	150
1116-1124	340.0-342.5	100	10	200	100	10	150
1124-1134.5	342.5-345.7	50	10	300	150	15	150
1134.5-1144.5	345.7-348.7	30	20	1000	150	20	150
1144.5-1146	348.7-349.2	30	15	700	150	20	150
1146-1150	349.2-350.4	30	20	1000	150	20	150
1150-1158	350.4-352.8	20	15	1000	150	15	150
1164-1173	354.7-357.4	50	20	2000	200	20	150
1173-1181.5	357.4-360.0	50	15	1500	150	20	150
1181.5-1189	360.0-362.3	50	15	1000	150	15	150
1189-1196	362.3-364.4	30	15	1000	150	15	150
1196-1205.5	364.4-367.3	30	15	700	150	15	150
1205.5-1209.5	367.3-368.5	30	15	2000	150	15	150
1209.5-1216	368.5-370.5	30	15	2000	150	20	150
1216-1223	370.5-372.6	30	20	5000	200	20	150
1223-1233	372.6-375.7	20	15	700	150	20	150
1233-1241	375.7-378.1	50	15	1000	150	15	150
1241-1250	378.1-380.9	50	15	700	150	15	150
1250-1259	380.9-383.6	30	10	700	100	10	150
1259-1262	383.6-384.5	20	15	700	150	10	150
1262-1265	384.5-385.4	10	5	500	100	L	100
1265-1270	385.4-387.0	30	5	100	50	10	100
1270-1276	387.0-388.7	30	5	100	50	15	100
1276-1279.5	388.8-389.9	20	5	100	50	10	100
1279.5-1290	389.9-393.1	50	10	200	100	10	150
1290-1300	393.1-396.1	30	5	100	70	10	100
1300-1310	396.1-399.2	30	5	150	70	10	150
1310-1320	399.2-402.2	30	10	150	70	10	150
1320-1330	402.2-405.3	30	10	150	70	10	100

Table 10, continued.

Sample interval		Au	As(c)	Hg	Fe	Mg	Ca	Ti	Mn
Feet	Meters								
1330-1337.5	405.3-407.5	0.08	40	7	3	1	0.5	0.2	500
1337.5-1347	407.5-410.4	0.1	150	8	3	1	3	0.3	700
1347-1357	410.4-413.5	0.06	100	7	1.5	1	1	0.3	500
1357-1367	413.5-416.5	0.04	80	4.5	1	1	0.5	0.3	300
1367-1376	416.5-419.3	0.06	150	7	3	1.5	2	0.5	500
1376-1386	419.3-422.3	0.06	150	7.5	3	1	2	0.2	700
1386-1395	422.3-425.1	0.06	150	7	2	1	3	0.2	700
1396.1-1397	425.4-425.7	0.04	100	6	3	1.5	5	0.3	1000
1397-1399.5	425.7-426.4	L	L	0.01	7	3	5	0.5	1000
1400-1400.5	426.6-426.7	L	100	0.6	7	3	5	0.5	1000
1400.5-1410	426.7-429.6	0.02	100	1.8	1.5	1	2	0.2	500
1410-1420	429.6-432.7	L	60	6.5	1	0.7	1.5	0.2	300
1420-1430	432.7-435.7	0.04	150	5	3	5	3	0.5	1000
1430-1437	435.7-437.9	0.04	150	3.5	5	3	2	0.5	700
1437-1439	437.9-438.5	L	20	0.24	5	10	5	0.7	1500

Table 10, continued.

Sample interval		Ag	B	Ba	Be	Co	Cr	Cu	La	Mo	Nb	Ni
Feet	Meters											
1330-1337.5	405.3-407.5	N	L	500	L	L	5	15	50	5	10	L
1337.5-1347	407.5-410.4	N	L	300	L	L	5	15	50	5	10	L
1347-1357	410.4-413.5	N	L	300	L	L	5	15	L	10	10	L
1357-1367	413.5-416.5	N	10	300	L	L	5	15	L	5	10	L
1367-1376	416.5-419.3	N	10	500	L	L	15	15	50	7	10	L
1376-1386	419.3-422.3	N	L	500	L	L	10	15	50	5	10	L
1386-1395	422.3-425.1	N	L	500	L	L	5	15	L	5	10	L
1396.1-1397	425.4-425.7	N	L	700	L	5	10	15	50	5	10	10
1397-1399.5	425.7-426.4	N	L	G5000	L	15	20	15	L	L	10	30
1400-1400.5	426.6-426.7	N	L	500	L	15	20	15	L	L	10	30
1400.5-1410	426.7-429.6	N	L	300	L	L	L	10	L	L	10	L
1410-1420	429.6-432.7	N	L	200	L	L	L	5	L	L	10	L
1420-1430	432.7-435.7	L	10	?	5	10	20	20	100	7	10	5
1430-1437	435.7-437.9	L	10	?	5	10	20	20	100	7	10	5
1437-1439	437.9-438.5	L	10	?	L	30	50	30	50	5	10	50

Table 10, continued.

Sample interval		Pb	Sc	Sr	V	Y	Zr
Feet	Meters						
1330-1337.5	405.3-407.5	20	5	150	70	10	150
1337.5-1347	407.5-410.4	20	5	100	70	L	150
1347-1357	410.4-413.5	50	10	100	70	L	150
1357-1367	413.5-416.5	30	5	100	70	10	150
1367-1376	416.5-419.3	30	10	100	100	10	200
1376-1386	419.3-422.3	30	5	100	70	10	150
1386-1395	422.3-425.1	30	5	100	50	10	150
1396.1-1397	425.4-425.7	30	10	700	70	10	150
1397-1399.5	425.7-426.4	10	10	700	100	10	100
1400-1400.5	426.6-426.7	30	15	700	150	10	150
1400.5-1410	426.7-429.6	20	L	100	70	L	100
1410-1420	429.6-432.7	20	L	100	50	L	100
1420-1430	432.7-435.7	20	15	200	150	20	150
1430-1437	435.7-437.9	15	15	200	150	20	150
1437-1439	437.9-438.5	10	20	700	200	20	150

Drill hole USGS 3

The rocks from a depth of 326 ft (99.4 m) to the bottom of the hole at 457 ft (139.3 m) show sporadic anomalous amounts of gold, arsenic, mercury, molybdenum, and lead. The rocks in this part of the drill hole are dominantly argillized, whereas the rocks above 326 ft are dominantly propylitized, so these anomalies result from hydrothermal alteration. Although mineral assemblages are generally similar throughout the drill hole, calcium, magnesium, and manganese locally show depletion below 326 ft, suggesting that hydrothermal fluids that affected these rocks were somewhat more acid, and consequently alteration was more intense.

Figure 5 shows geochemical logs for drill hole USGS 3, for the same group of elements as shown in figure 4 for drill hole USGS 2, and table 11 shows analytical data for this drill hole, again omitting elements with no values above their respective detection thresholds.

Figure 5A. Geochemical logs for gold and arsenic, drill hole USGS 3.

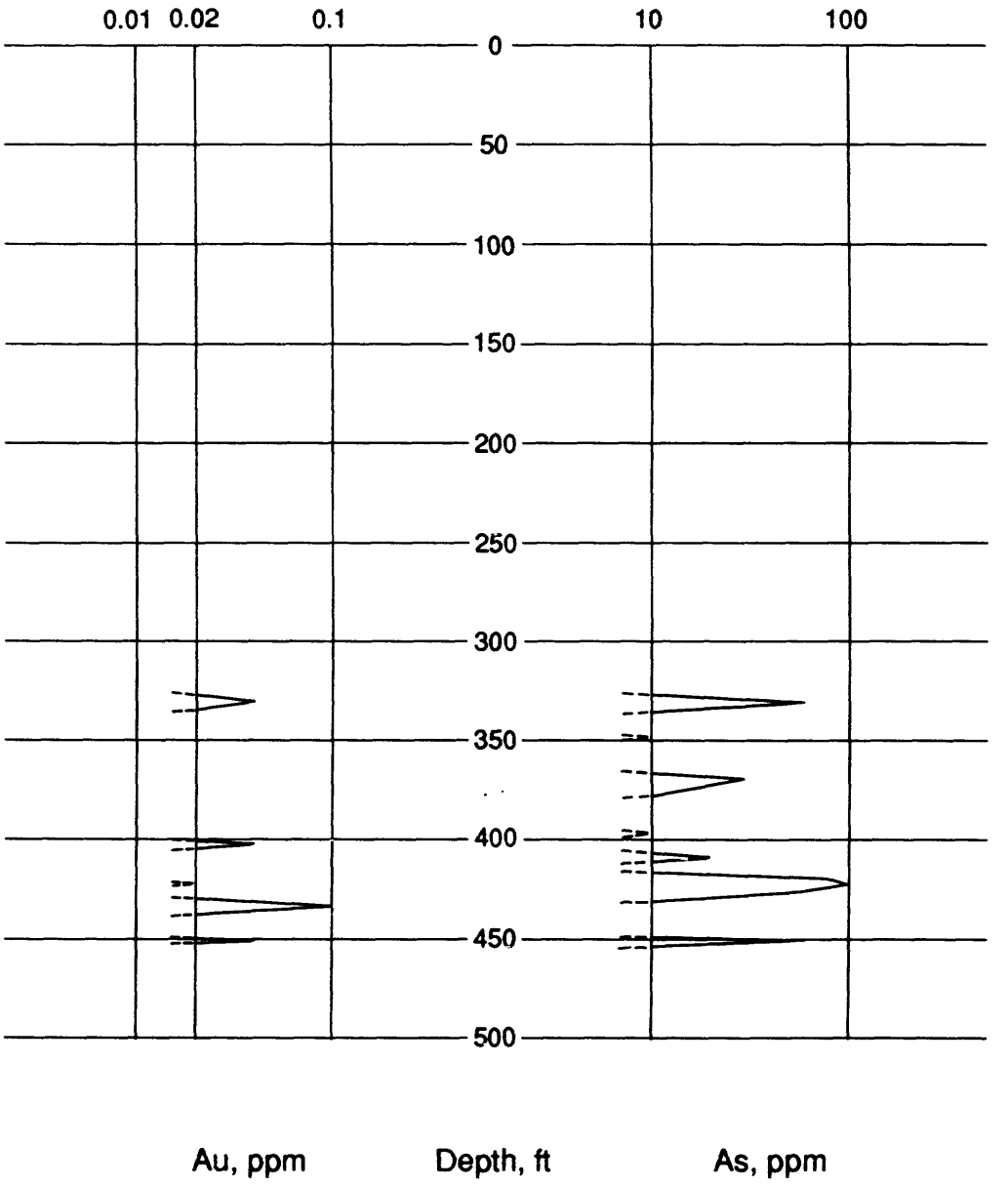


Figure 5B. Geochemical log for mercury, drill hole USGS 3.

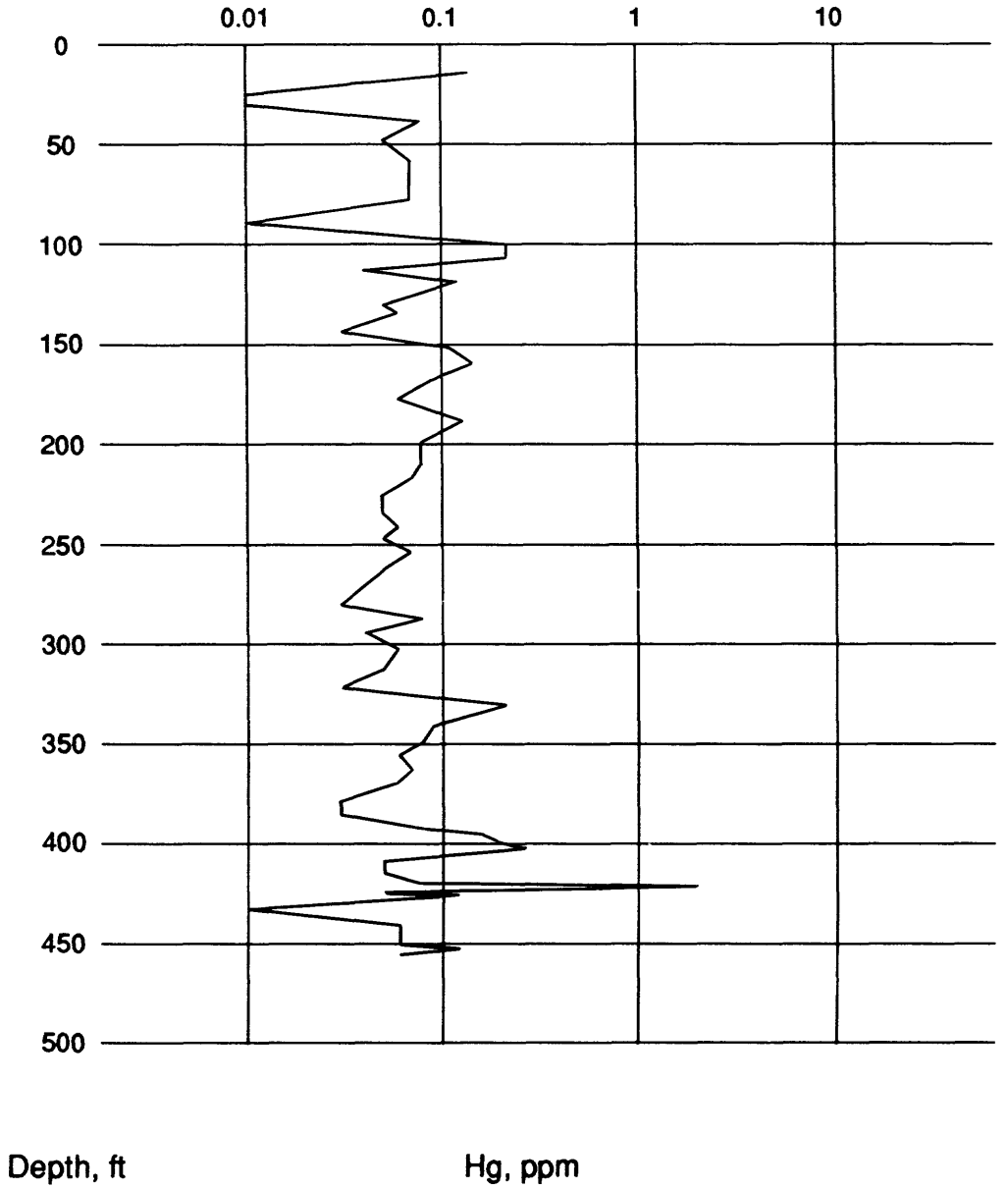


Figure 5C. Geochemical logs for copper and molybdenum, drill hole USGS 3.

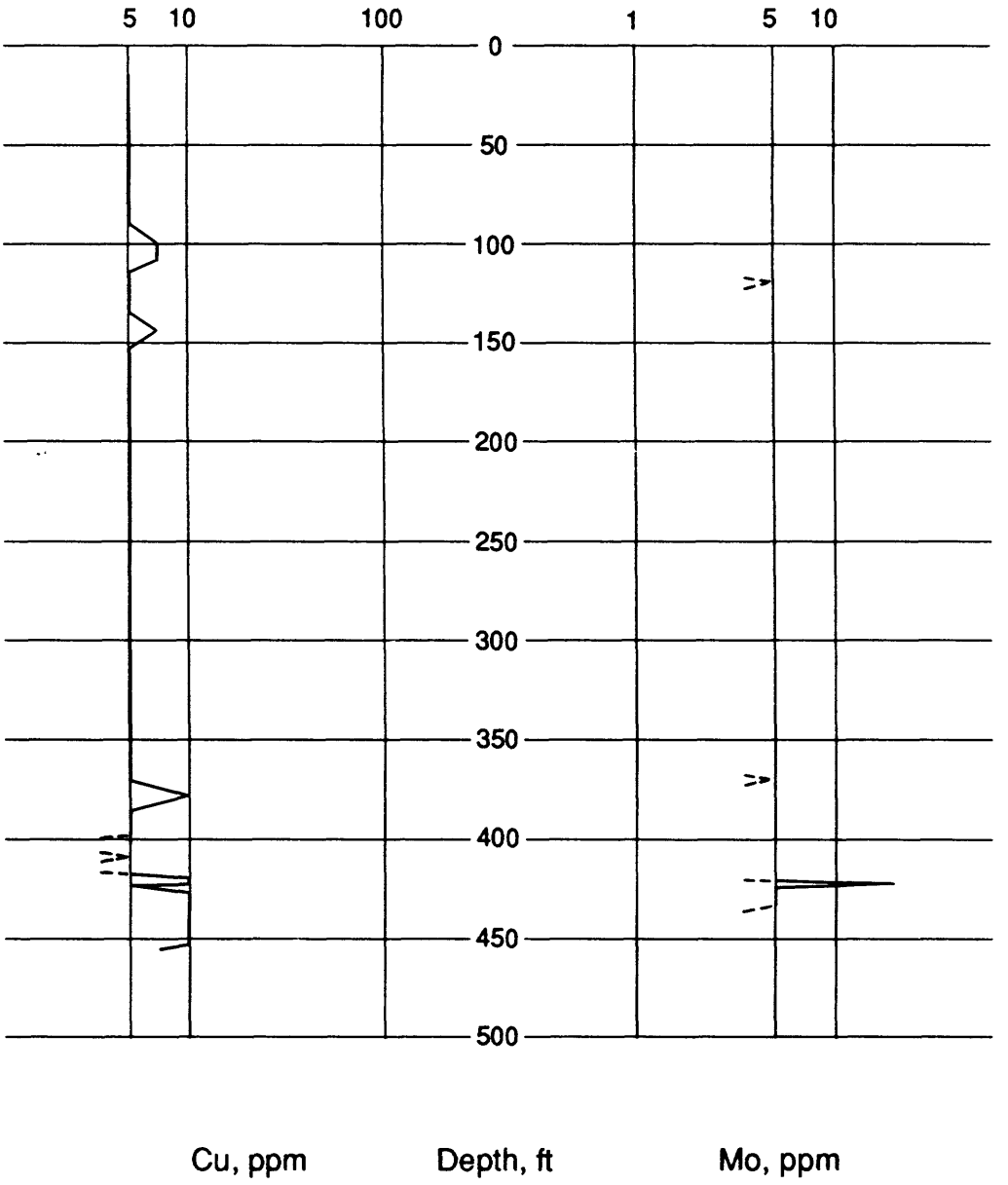


Figure 5D. Geochemical log for lead, drill hole USGS 3.

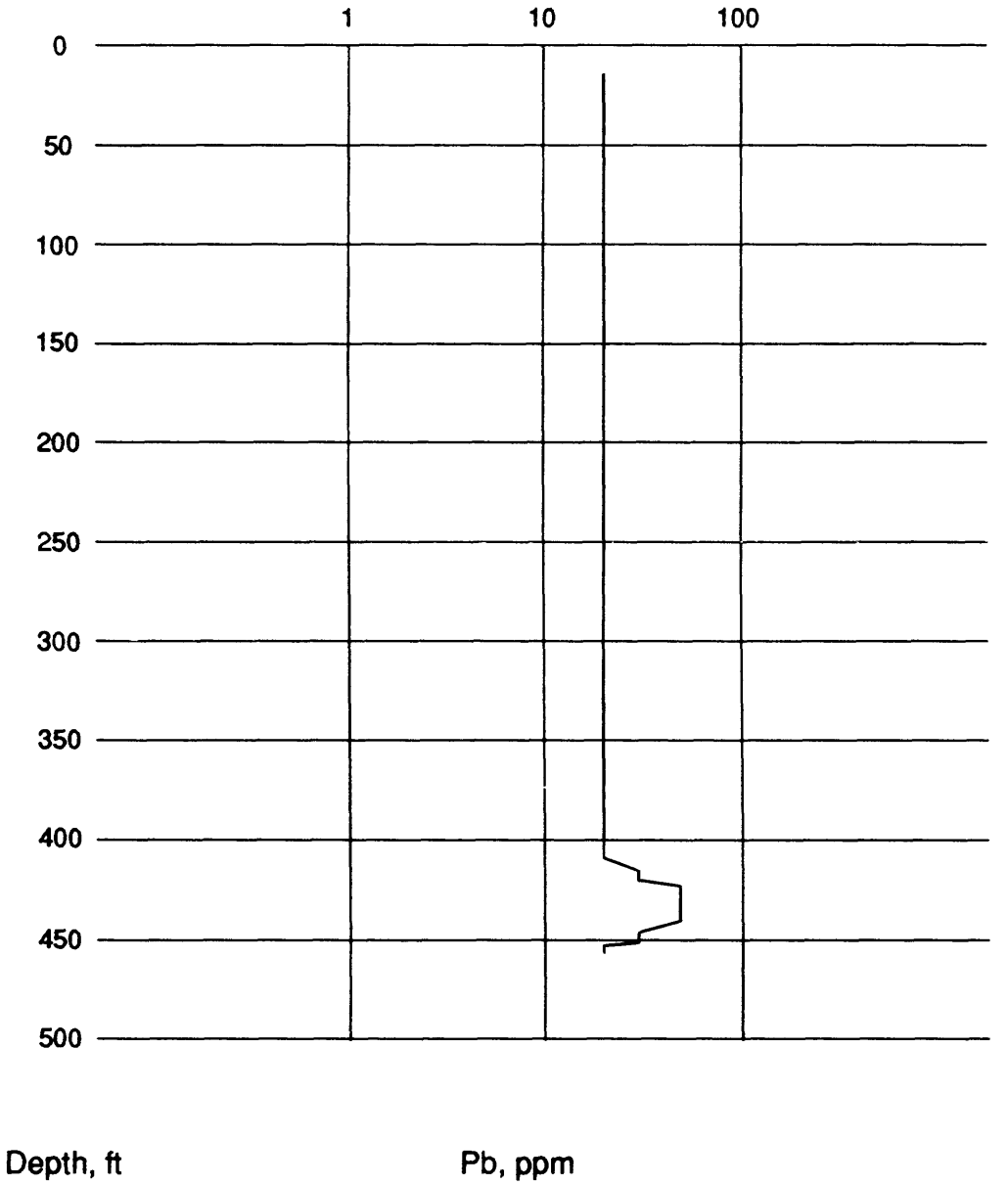


Figure 5E. Geochemical logs for barium and strontium, drill hole USGS 3.

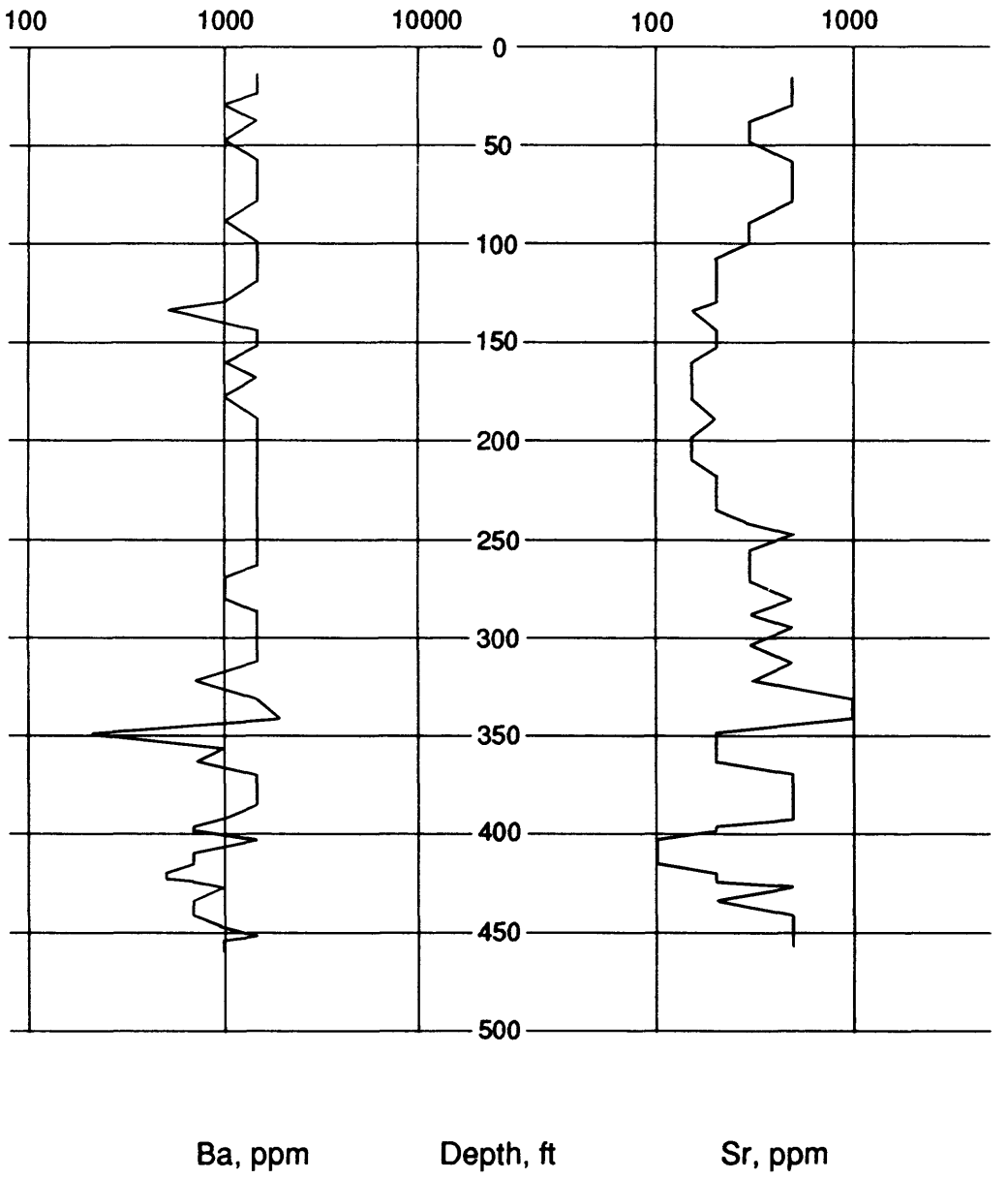


Figure 5F. Geochemical logs for magnesium and iron, drill hole USGS 3.

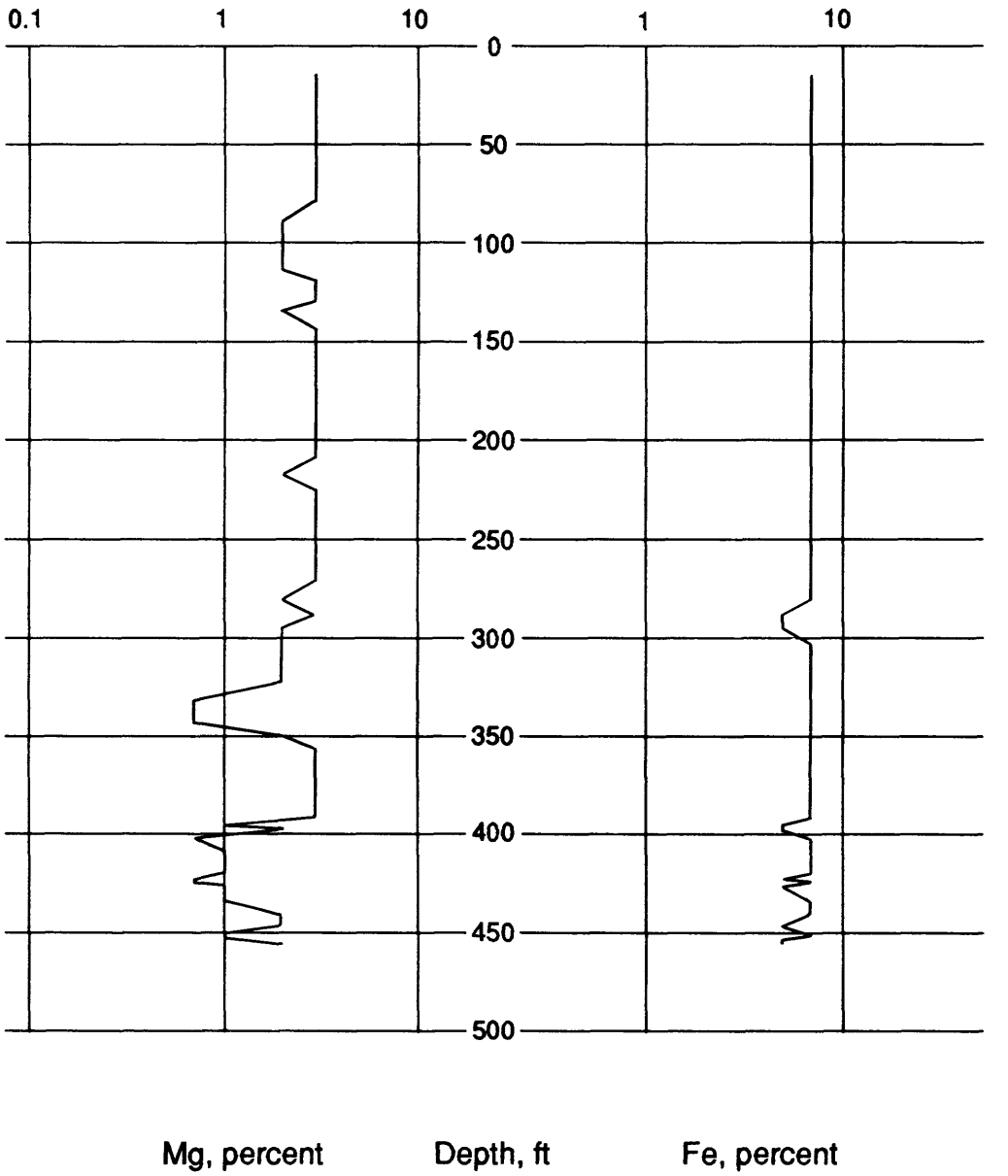


Figure 5G. Geochemical logs for manganese and calcium, drill hole USGS 3.

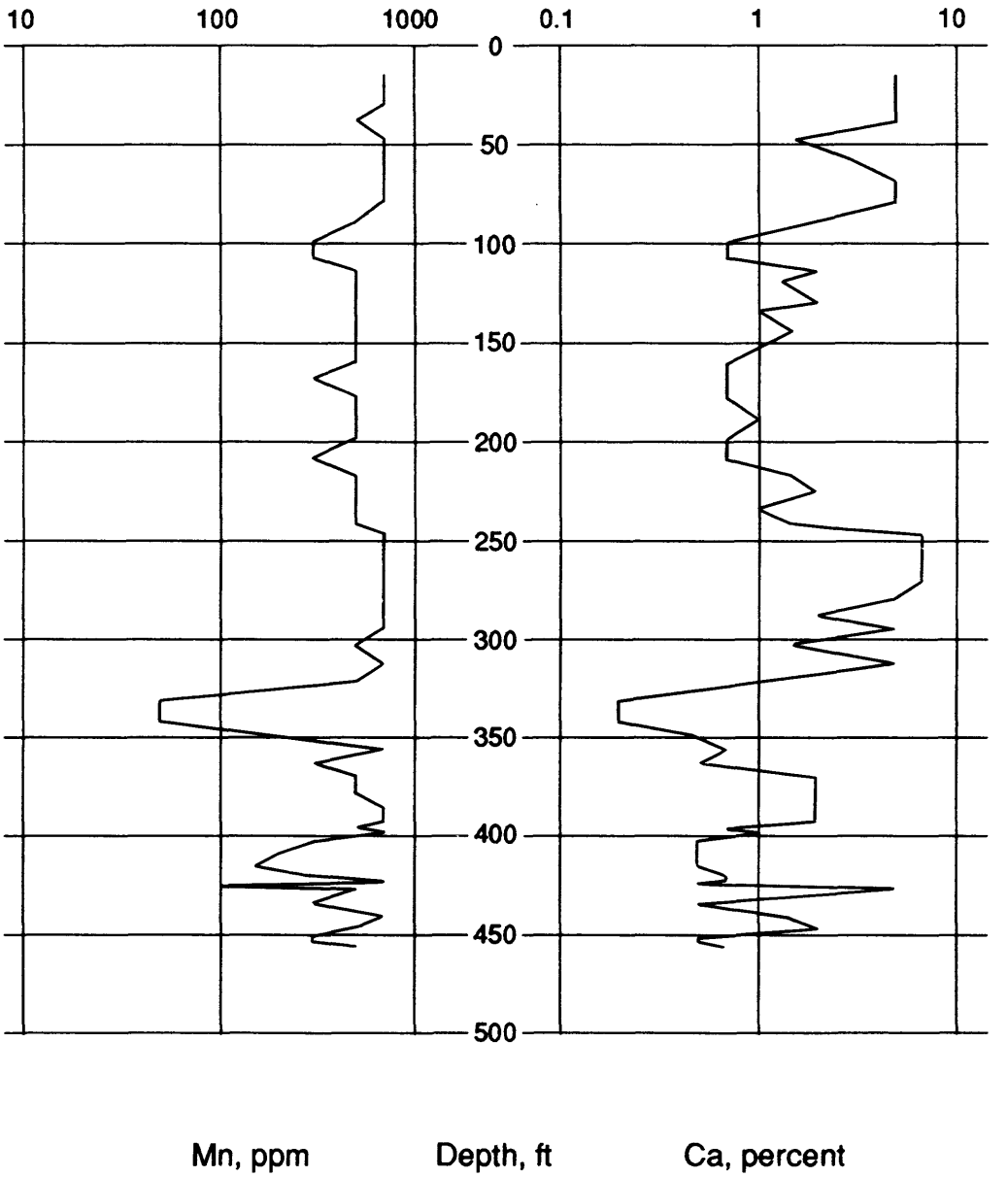


Table 11. Chemical data for drill hole USGS 3. Fe, Mg, Ca, and Ti in weight percent, all other elements in parts per million by weight. Au and Hg determined by atomic absorption spectrophotometry; As by a colorimetric method; all other elements by emission spectrometry. N, not detected; L, present, but below detection limit.

Sample interval		Au	As	Hg	Fe	Mg	Ca	Ti	Mn	B	Ba	Co
Feet	Meters											
10-20.5	3.0-6.2	L	N	0.14	7	3	5	0.3	700	10	1500	20
20.5-28	6.2-8.5	L	N	0.01	7	3	5	0.3	700	10	1500	20
28-33	8.5-10.1	L	N	0.01	7	3	5	0.3	700	10	1000	20
33-43	10.1-13.1	L	N	0.08	7	3	5	0.3	500	10	1500	20
43-53	13.1-16.1	L	N	0.05	7	2	1.5	0.2	700	10	1000	20
53-63	16.1-19.2	L	N	0.07	7	3	3	0.3	700	10	1500	20
63-73	19.2-22.2	L	N	0.07	7	3	5	0.3	700	10	1500	20
73-83	22.2-25.3	L	N	0.07	7	3	5	0.3	700	10	1500	20
83-94.5	25.3-28.8	L	N	0.01	7	2	2	0.3	500	10	1000	20
94.5-105	28.8-32.0	L	N	0.22	7	2	0.7	0.3	300	10	1500	20
105-110	32.0-33.5	L	N	0.22	7	2	0.7	0.5	300	10	1500	10
110-117	33.5-35.6	L	N	0.04	7	2	2	0.5	500	10	1500	30
117-120.5	35.6-36.7	L	N	0.12	7	3	1.5	0.5	500	10	1500	20
120.5-129	36.7-39.3	L	N	0.05	7	3	2	0.5	500	10	1000	20
129-139	39.3-42.4	L	N	0.06	7	2	1	0.3	500	10	500	20
139-148	42.4-45.1	L	N	0.03	7	3	1.5	0.5	500	10	1500	30
148-156.5	45.1-47.7	L	N	0.11	7	3	1	0.5	500	10	1500	30
156.5-164	47.7-50.0	L	N	0.15	7	3	0.7	0.5	500	10	1000	30
164-172	50.0-52.4	L	N	0.09	7	3	0.7	0.5	300	10	1500	10
172-183	52.4-55.8	L	N	0.06	7	3	0.7	0.5	500	10	1000	30
183-194	55.8-59.1	L	N	0.13	7	3	1	0.5	500	10	1500	20
194-204	59.1-62.2	L	N	0.08	7	3	0.7	0.3	500	10	1500	20
204-214	62.2-65.2	L	N	0.08	7	3	0.7	0.5	300	10	1500	20
214-220.5	65.2-67.2	L	N	0.07	7	2	2	0.3	500	10	1500	20
220.5-229	67.2-69.8	L	N	0.05	7	3	3	0.3	500	10	1500	20
229-239	69.8-72.8	L	N	0.05	7	3	1	0.3	500	10	1500	20
239-243.8	72.8-74.3	L	N	0.06	7	3	1.5	0.3	500	10	1500	20
243.8-249.5	74.3-76.0	L	N	0.05	7	3	7	0.3	700	10	1500	20
249.5-258.4	76.0-78.7	L	N	0.07	7	3	7	0.3	700	10	1500	20
258.4-267	78.7-81.4	L	N	0.05	7	3	7	0.3	700	10	1500	20
267-274	81.4-83.5	L	N	0.04	7	3	7	0.3	700	10	1000	20
274-285.5	83.5-87.0	L	N	0.03	7	2	5	0.3	700	10	1000	20
285.5-289	87.0-88.1	L	N	0.08	5	3	2	0.3	700	10	1500	20
289-297.5	88.1-90.6	L	N	0.04	5	2	5	0.3	700	10	1500	20
297.5-307	90.6-93.5	L	N	0.06	7	2	1.5	0.3	500	10	1500	20
307-317	93.5-96.6	L	N	0.05	7	2	5	0.3	700	10	1500	20
317-326	96.6-99.3	L	N	0.03	7	2	1	0.5	500	10	700	20
326-336	99.3-102.4	0.04	60	0.22	7	0.7	0.2	0.5	50	10	1500	20
336-346	102.4-105.4	L	N	0.09	7	0.7	0.2	0.3	50	10	2000	20
346-351	105.4-106.9	L	10	0.08	7	2	0.5	0.3	200	10	200	20
351-360	106.9-109.7	L	L	0.06	7	3	0.7	0.5	700	10	1000	20
360-365	109.7-111.2	L	L	0.07	7	3	0.5	0.3	300	10	700	20
365-373.5	111.2-113.8	L	30	0.06	7	3	2	0.3	500	10	1500	20

Table 11. Continued.

Sample interval		Cr	Cu	La	Mo	Nb	Ni	Pb	Sc	Sr	V	Y	Zr
Feet	Meters												
10-20.5	3.0-6.2	30	5	100	L	10	10	20	10	500	200	10	300
20.5-28	6.2-8.5	20	5	70	L	10	10	20	10	500	200	10	200
28-33	8.5-10.1	20	5	70	L	10	10	20	10	500	200	10	200
33-43	10.1-13.1	20	5	70	L	10	10	20	10	300	100	10	150
43-53	13.1-16.1	20	5	70	L	10	10	20	10	300	100	10	150
53-63	16.1-19.2	20	5	70	L	10	10	20	10	500	150	10	200
63-73	19.2-22.2	20	5	100	L	L	10	20	10	500	150	10	200
73-83	22.2-25.3	30	5	100	L	L	10	20	10	500	150	10	200
83-94.5	25.3-28.8	20	5	100	L	L	10	20	10	300	100	10	200
94.5-105	28.8-32.0	20	7	70	L	10	10	20	10	300	150	10	150
105-110	32.0-33.5	30	7	70	L	10	10	20	10	200	150	10	500
110-117	33.5-35.6	20	5	100	L	10	10	20	10	200	150	10	300
117-120.5	35.6-36.7	30	5	100	5	10	10	20	10	200	200	10	300
120.5-129	36.7-39.3	20	5	100	L	10	10	20	10	200	150	10	300
129-139	39.3-42.4	20	5	70	L	10	10	20	10	150	100	10	100
139-148	42.4-45.1	30	7	100	L	10	10	20	10	200	150	15	200
148-156.5	45.1-47.7	30	5	100	L	10	10	20	10	200	150	10	200
156.5-164	47.7-50.0	30	5	100	L	10	10	20	10	150	150	10	200
164-172	50.0-52.4	20	5	100	L	10	5	20	10	150	100	10	200
172-183	52.4-55.8	20	5	100	L	10	10	20	10	150	150	10	200
183-194	55.8-59.1	20	5	100	L	10	5	20	10	200	150	10	200
194-204	59.1-62.2	20	5	100	L	10	10	20	10	150	150	10	200
204-214	62.2-65.2	20	5	70	L	10	10	20	10	150	150	10	200
214-220.5	65.2-67.2	30	5	100	L	10	10	20	10	200	200	15	300
220.5-229	67.2-69.8	30	5	100	L	10	10	20	10	200	200	15	300
229-239	69.8-72.8	30	5	100	L	10	10	20	10	200	200	10	300
239-243.8	72.8-74.3	30	5	100	L	10	10	20	10	300	200	10	200
243.8-249.5	74.3-76.0	30	5	100	L	10	10	20	10	500	200	10	200
249.5-258.4	76.0-78.7	30	5	100	L	10	10	20	10	300	200	15	200
258.4-267	78.7-81.4	30	5	100	L	10	10	20	10	300	200	15	300
267-274	81.4-83.5	30	5	100	L	10	10	20	10	300	200	15	200
274-285.5	83.5-87.0	30	5	100	L	10	10	20	10	500	200	10	200
285.5-289	87.0-88.1	20	5	100	L	10	10	20	10	300	150	10	200
289-297.5	88.1-90.6	20	5	100	L	10	10	20	10	500	150	10	200
297.5-307	90.6-93.5	30	5	100	L	10	10	20	10	300	200	10	200
307-317	93.5-96.6	30	5	100	L	10	5	20	10	500	200	10	300
317-326	96.6-99.3	30	5	70	L	10	5	20	10	300	150	10	200
326-336	99.3-102.4	30	5	70	L	10	10	20	10	1000	200	10	200
336-346	102.4-105.4	20	5	100	L	10	10	20	10	1000	150	15	200
346-351	105.4-106.9	20	5	50	L	10	10	20	10	200	150	15	200
351-360	106.9-109.7	30	5	50	L	10	10	20	10	200	150	10	200
360-365	109.7-111.2	30	5	100	L	10	10	20	10	200	150	15	200
365-373.5	111.2-113.8	30	5	100	5	10	10	20	10	500	150	10	200

Table 11. Continued.

Sample interval Feet	Meters	Au	As	Hg	Fe	Mg	Ca	Ti	Mn	B	Ba	Co
373.5-381	113.8-116.1	L	10	0.03	7	3	2	0.3	500	10	1500	20
381-388	116.1-118.2	L	N	0.03	7	3	2	0.3	700	10	1500	20
388-394.8	118.2-120.3	L	N	0.08	7	3	2	0.5	700	10	1000	20
394.8-396	120.3-120.7	L	10	0.16	5	1	0.7	0.3	500	10	700	10
396-399	120.7-121.6	L	10	0.18	5	2	1	0.3	700	10	700	L
399-404.3	121.6-123.2	0.04	L	0.26	7	0.7	0.5	0.3	300	10	1500	20
404.3-411	123.2-125.2	L	20	0.05	7	1	0.5	0.3	200	20	700	20
411-416.8	125.2-127.0	L	L	0.05	7	1	0.5	0.3	150	20	700	20
416.8-421.6	127.0-128.5	L	80	0.08	7	1	0.7	0.3	300	20	500	30
421.6-423	128.5-128.9	0.02	100	1.5	5	0.7	0.7	0.3	700	20	500	20
423-424	128.9-129.2	L	80	0.05	7	0.7	0.5	0.3	100	20	700	20
424-428.4	129.2-130.5	L	60	0.12	5	1	5	0.3	500	20	1000	20
428.4-437	130.5-133.2	0.1	L	0.01	7	1	0.5	0.5	300	20	700	20
437-443	133.2-135.0	L	N	0.06	7	2	1.5	0.3	700	10	700	20
443-449	135.0-136.8	L	N	0.06	5	2	2	0.3	500	L	1000	20
449-452	136.8-137.7	0.04	60	0.06	7	1	0.5	0.5	300	20	1500	20
452-452.5	137.7-137.9	L	20	0.12	5	1	0.5	0.3	300	20	1000	15
452.5-457	137.9-139.2	L	N	0.06	5	2	0.7	0.3	500	L	1000	15

Table 11. Continued.

Sample interval Feet	Meters	Cr	Cu	La	Mo	Nb	Ni	Pb	Sc	Sr	V	Y	Zr
373.5-381	113.8-116.1	30	10	100	L	10	10	20	10	500	150	10	200
381-388	116.1-118.2	30	5	100	L	10	10	20	10	500	150	10	200
388-394.8	118.2-120.3	30	5	100	L	10	5	20	10	500	150	10	200
394.8-396	120.3-120.7	30	5	100	L	10	5	20	7	200	100	10	200
396-399	120.7-121.6	20	5	100	L	10	L	20	15	200	100	10	300
399-404.3	121.6-123.2	20	L	50	L	10	L	20	7	100	100	10	300
404.3-411	123.2-125.2	20	5	100	L	10	L	20	10	100	100	20	1000
411-416.8	125.2-127.0	20	L	100	L	10	L	30	15	100	150	30	500
416.8-421.6	127.0-128.5	20	10	150	L	10	L	30	15	200	150	50	500
421.6-423	128.5-128.9	30	10	100	20	10	5	50	10	200	150	10	200
423-424	128.9-129.2	20	5	150	5	10	5	50	10	200	100	50	300
424-428.4	129.2-130.5	20	10	100	5	10	5	50	10	500	100	20	200
428.4-437	130.5-133.2	20	10	150	5	10	5	50	10	200	150	20	300
437-443	133.2-135.0	30	10	100	L	10	5	50	10	500	150	20	300
443-449	135.0-136.8	30	10	100	L	10	5	30	10	500	150	20	300
449-452	136.8-137.7	20	10	100	L	10	5	30	10	500	150	20	300
452-452.5	137.7-137.9	20	10	100	L	10	5	20	10	500	150	20	700
452.5-457	137.9-139.2	20	7	100	L	10	5	20	10	500	150	10	200

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