R. I. 4512

AUGUST 1949

UNITED STATES
DEPARTMENT OF THE INTERIOR
J. A. KRUG, SECRETARY

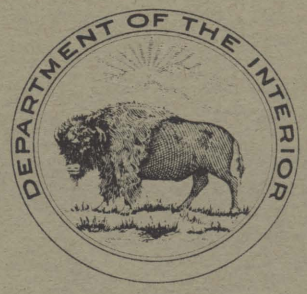
BUREAU OF MINES
JAMES BOYD, DIRECTOR

REPORT OF INVESTIGATIONS

INVESTIGATION OF CASPER MOUNTAIN CHROMITE DEPOSITS, NATRONA COUNTY, WYO.

BY

F. W. HORTON AND PAUL T. ALLSMAN

1849  1949

A Century of Conservation

R. I. 4512,
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UNITED STATES DEPARTMENT OF THE INTERIOR - BUREAU OF MINES

INVESTIGATION OF CASPER MOUNTAIN CHROMITE DEPOSITS NATRONA COUNTY, WYO.[1]

By F. W. Horton[2] and Paul T. Allsman[3]

CONTENTS

ILLUSTRATIONS

1/ The Bureau of Mines will welcome reprinting of this paper, provided the following footnote acknowledgment is made: "Reprinted from Bureau of Mines Report of Investigations 4512."

2/ Former Mining engineer, Bureau of Mines. (Deceased.)

3/ Chief, Salt Lake City Branch, Mining Division, Bureau of Mines.

APPENDIXES

INTRODUCTION AND SUMMARY

Investigation of an extensive deposit of chromite-bearing actinolite-talc schist situated on the summit of Casper Mountain, 10 miles south of Casper, Wyo., was one of the first projects undertaken by the Bureau of Mines under the Strategic Materials Act (Public 117, 76th Cong., Ch. 190, 1st sess.), for which an appropriation became available August 9, 1939. During the previous summer, the Geological Survey made a magnetometrical survey of the area in which the schist occurred. It was exposed in several small lenses and two larger ones aggregating about 19 acres in area. Although the occurrence of chromite here had been known for many years, the only work done on the deposit was the digging of a few shallow pits on some of the more promising outcrops.

From August 23 to December 3, 1939, the Bureau of Mines investigated the larger of the two main schist bodies. Twenty-four trenches having a total length of 8,073 feet were dug across the deposit, and its subsurface extension was explored by 3,623 feet of diamond drilling. Over 32 tons of samples were shipped to the Metallurgical Division of the Bureau of Mines at Reno, Nev., for reduction, analyses, and ore testing. In all, there were 853 individual samples. Geological maps, based upon examination of outcrops, trenches, and drill cores, as well as a contour map of the area were made by the Geological Survey.

ACKNOWLEDGMENTS

This report was prepared for publication by the Mining Division, Lowell B. Moon, chief, under the supervision of Paul T. Allsman, chief, Salt Lake City Branch. The project work was done by the late F. W. Horton, mining engineer, under the supervision of the late Chas. F. Jackson, former chief of the Mining Division, and E. D. Gardner, supervising engineer of the Southwest Experiment Station, at the time the work was done.

The project engineer acknowledges the assistance of R. R. Trengove, mining engineer, who spent a month organizing and supervising diamond drilling, and Kirk Stephenson, of Princeton University, and E. L. Stephenson, geologist for the Geological Survey, who conducted the magnetometrical survey, prepared maps of the area, and logged the cores.

LOCATION AND PHYSICAL FEATURES

The Casper Mountain chromite deposit is situated 10 miles by road south of Casper, Wyo., just over the crest of Casper Mountain, on its southern slope, in secs. 16, 17, and 20, T. 32 N., R. 79 W., 6th P.M. Its altitude is about 8,000 feet, or 3,000 feet higher than the city of Casper, from which

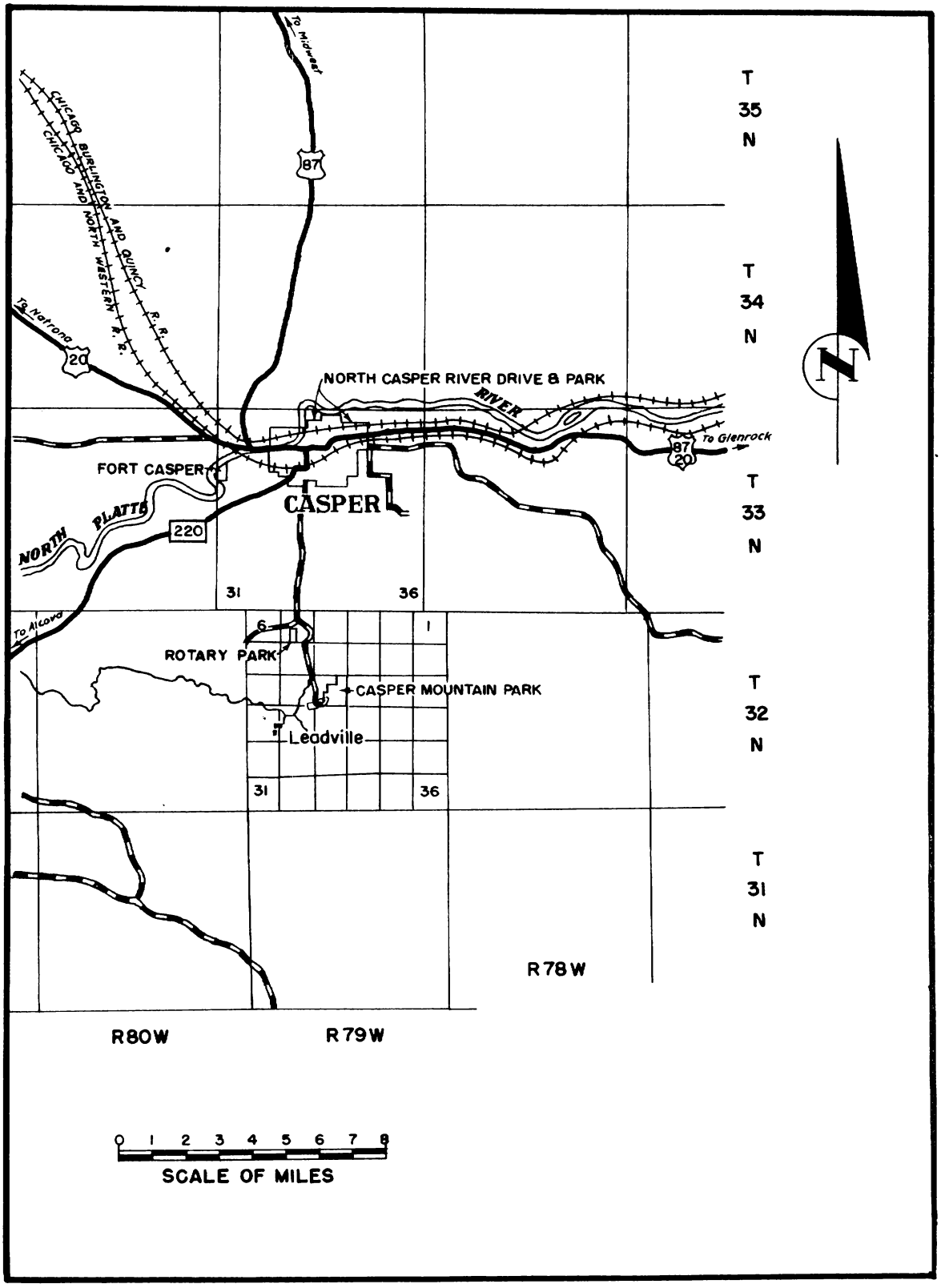


Figure 1. - Index map showing location of Casper Mountain chromite deposits, Natrona County, Wyo.

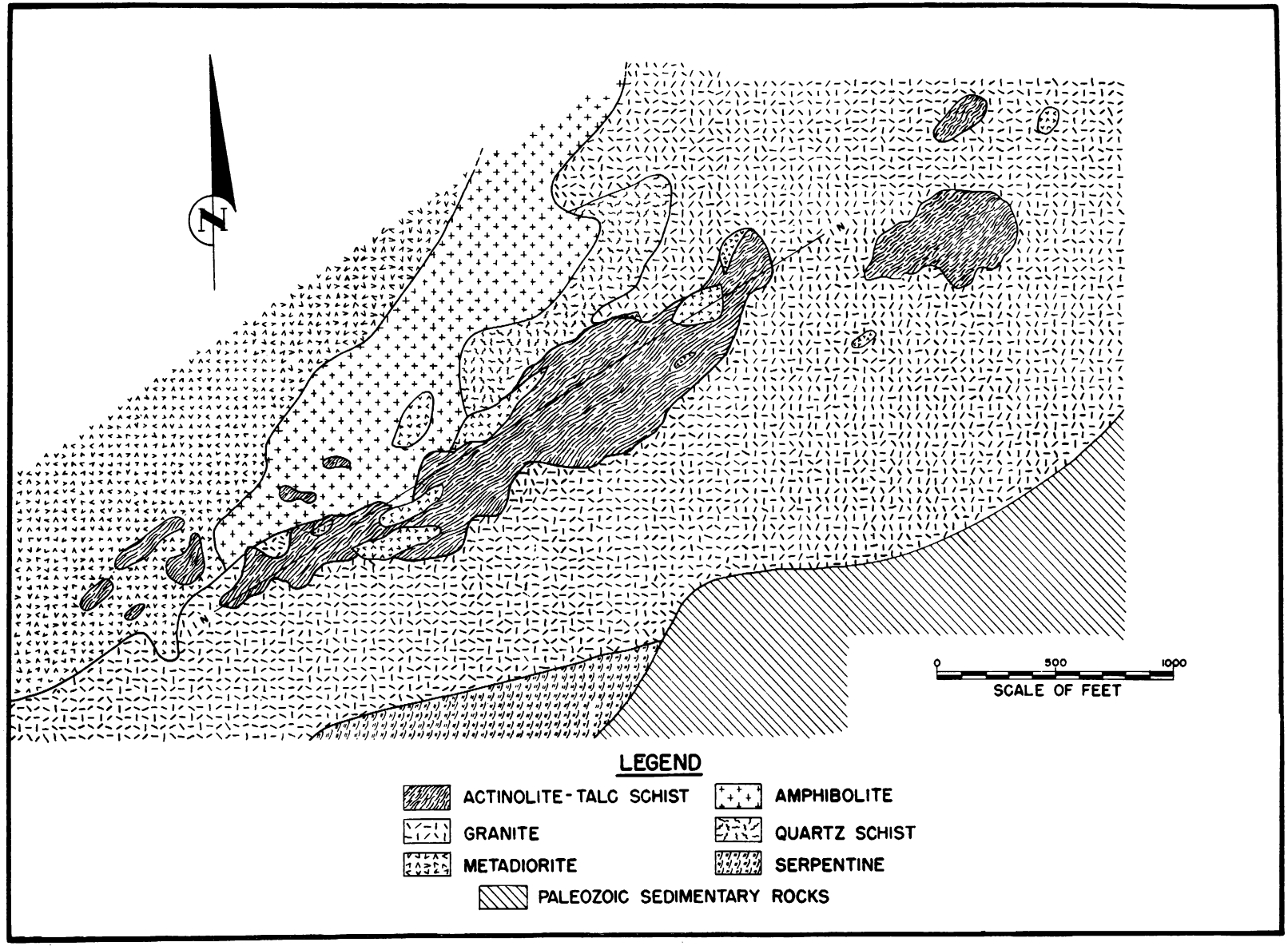


Figure 2. - Map of areal geology, Casper Mountain chromite deposits.

it is reached by an excellent secondary road that is wide enough for automobiles to pass, even on the steep grades on the north face of the mountain. Normally only 30 to 35 minutes are required to reach the deposit by automobile from Casper. Figure 1 shows the location of the deposit with reference to Casper and the road by which it is reached. The north escarpment of the mountain is steep, whereas the south slope is gently rolling country intersected by shallow valleys. The surface of the deposit slopes with an average grade of 5 to 6 percent toward Elkhorn Creek, which flows along the southeast side of the deposit. Here, at its headwaters, this stream is so narrow that one can step across it, and its flow is hardly large enough to supply the water required for diamond drilling. The deposit is covered with a heavy growth of lodgepole and jack pines and by an overburden of soil and hardpan up to 12 feet in depth. The few outcrops are of minor extent.

DESCRIPTION OF THE DEPOSITS

Figure 2 shows the areal geology of the deposit and the adjacent country. The chromite-bearing rock is an actinolite-talc-chlorite schist that occurs in a series of lenses, consisting of two larger and several smaller ones, that extend along the summit of Casper Mountain for about a mile in a general N. 60° E. direction. These lenses form part of a pre-Cambrian complex, exposed locally, which is composed principally of granite and granitic pegmatite but contains minor areas of metadiorite, quartz-mica schist, amphibolite, and the chromite-bearing schist already mentioned. Apparently the schists are the oldest of these rocks and have been intruded (1) by the metadiorite and (2) by the granite. However, the relationship of these rocks has not been definitely established. The pre-Cambrian complex is overlain by Paleozoic sediments, and the whole has been elevated by faulting 2,500 to 3,000 feet above exposures of Cretaceous rocks along the northern base of the mountain. R. H. Beckwith[4/] describes the general geology as follows:

> Casper Mountain is a strongly unsymmetric westward-trending anticline, of Paleozoic beds with a gently dipping south flank and a steeply dipping north flank. At the north of the mountain pre-Cambrian and Paleozoic rocks lie on Upper Cretaceous beds along a southward-dipping thrust fault.

It is thought likely that the chromite-bearing schist lenses are roof pendants. The main schist lens is about 2,500 feet long, 500 feet in maximum width, and has an area of approximately 15.6 acres. About 400 feet east of it is another lens 750 feet long, 350 feet in maximum width, and having an area of about 3.7 acres. The larger lens is essentially a tabular body dipping about 75° to 80° northwest. It is bordered on the south and partly on the north by a medium coarse-grained pink granite composed of quartz, microcline, plagioclaze, and very minor quantities of biotite or other dark minerals. In places the granite has developed pegmatitic facies. Along the remainder of its north side the lens is bordered by quartz-mica schist, amphibolite, and metadiorite.

4/ Beckwith, R. H., Asbestos and Chromite Deposits of Wyoming: Geol. Survey of Wyoming, Bull. 29, 1939, p. 823.

This lens is intruded by irregular masses of both granite and metadiorite, and diamond drilling has shown that the width and frequency of these intrusions increase with depth. The maximum depth to which the schist extends is unknown, but drill hole 7 has proved its presence to a vertical depth of at least 500 feet. Because of the extreme irregularity of the lens, it is impossible to determine its volume, even approximately, from the data at hand. The schist is cut by basic and granitic dikes, probably derived from the granite and metadiorite. These dikes are generally narrow, ranging from less than 1 foot to about 10 feet in width. The granite-pegmatite dikes usually occur at or near the granite contacts of the lens.

The schist is foliated parallel to its dip and has in general been deeply weathered, the steeply dipping foliation cracks affording easy access to water and other weathering agencies. In the work done by the Bureau of Mines, this deep weathering of the schist made it necessary to case diamond-drill holes for a distance of 50 to 100 feet from the surface, and it was often necessary to excavate trenches to a depth of 10 feet before consolidated rock was uncovered.

MINERALOGY

The chromite-bearing schist was originally an ultrabasic rock, probably peridotite, which has been metamorphosed to its present form by serpentinization followed by steatization. The principal minerals composing it are actinolite, tremolite, chlorite, talc, and chromite, but it also contains a few other secondary minerals such as vermiculite, asbestos, a little hematite, and minor serpentine.

The succession of tremolite-chlorite-talc is well known in the steatization of ultrabasic igneous rocks and serpentine by younger acid intrusions such as occur in this deposit.5/

The chromite occurs as disseminated grains throughout the schist in sufficient quantity to give it an average content of approximately 2 percent Cr_2O_3. These grains, however, are often concentrated in lenses, stringers, and bands of considerable width that occasionally contain 5 to 25 percent Cr_2O_3. Usually these richer bands are roughly parallel to the contacts of the schist lens. The chromite also occurs disseminated in flattened nodules or pods resembling large augen from 1 or 2 inches to 2 feet in thickness. Figure 3 is a photograph of such a pod taken by E. L. Stephenson of the United States Geological Survey. According to Diller,6/ a distribution of the chromite similar to that in this deposit is characteristic of deposits believed to have been formed by early crystallization of the chromite from magma.

5/ Hess, H. H., The Problem of Serpentinization and the Origin of Certain Chrysoltile Asbestos, Tab, and Soapstone Deposits: Econ. Geol., vol. 28, 1933, pp. 634-657.

6/ Diller, J. S., Recent Studies of Domestic Chromite Deposits: Trans., A.I.M.E., vol. 63, 1919, p. 120.

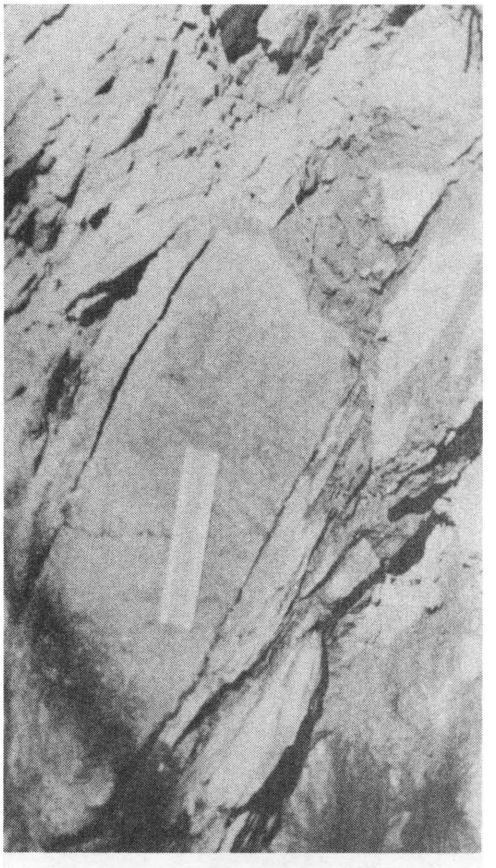


Figure 3. - Small lens or pods of chromite in trench.

Many of the chromite grains show well-developed octahedral faces, and some of them are 1/16 inch in diameter. Analyses show that the chromite is variable in composition and is generally high in iron. Analyses by H. F. Eppson[7] on concentrates of this chromite show 46.6 percent Cr_2O_3 and 36 percent FeO in one sample and 26.6 percent Cr_2O_3 and 63 percent FeO in another. In both samples the total iron was calculated as FeO. A more complete analysis of concentrates, furnished by E. L. Stephenson of the U. S. Geological Survey, follows:

Analysis of chromite concentrates from Casper Mountain

	Percent
Cr_2O_3	44.74
Al_2O_3	12.28
Fe_2O_3	18.22
FeO	18.05
MgO	5.24
MnO	0.19
CaO	0.20
SiO_2	0.64
TiO_2	0.24
	99.80

Magnetic measurements indicate that magnetite in varying percentages is intimately mixed with the chromite, rendering some of it so magnetic that it can be lifted by an ordinary hand magnet, whereas other grains are but slightly magnetic and require a much stronger magnetic field to attract them. The color of the chromite also varies notably. Generally it is the characteristic black, but much of it ranges from dark to light reddish brown.

Freedom of the schist from other minerals of comparable specific gravity, and the granular form of the chromite make the latter very easy to concentrate by ordinary gravity methods such as tabling.

WORK BY THE BUREAU OF MINES

August 17 to 22 was spent in preparing for the investigation and in obtaining permission to prospect from Homer T. Darlington and Minal E. Young, the Consolidated Mining Co., the City of Casper, the Wyoming Baptist Convention, and Albert N. Zuill, all of Casper, and from Willard C. Brinton, Croton-on-Hudson, N. Y., and George H. Houston, Greenwich, Conn., all of whom held interests in the area covered by the deposit. The agreements with the City of Casper and the Wyoming Baptist Convention specified that all excavations on their property were to be refilled after sampling was completed.

Exploration of the deposit was confined to trenching and diamond drilling of the largest schist lens, approximately 2,500 feet long, 500 feet in maximum width, and having an area of approximately 15.6 acres, and to sampling of a road cut through the second largest lens, lying 300 feet east of the main lens and

7/ See footnote 4, p. 831.

having an area of about 3.7 acres. Figure 4 is a contour map of the area. The locations of all trenches and diamond drill holes and of the road cut sampled are shown on figure 5, which also shows how closely the boundaries of the larger lens, as determined by the magnetometer survey, coincide with those disclosed by trenching.

Work at the deposit began on August 23 with five men, who started staking trench lines and preparing diamond drill sites. As the work progressed, this crew was gradually increased until, on October 5, it reached a maximum of 56 men, who were engaged in trenching, trench sampling, and attending to the cores and sludges from the diamond drills. In the meantime, much work of a general nature had been accomplished. A narrow trail running through the woods on the west end of the larger schist lens was widened into a 12-foot road between 1E and 13E (fig. 5), a distance of 1,450 feet, to serve as a main east-west thoroughfare giving access to the trench sites. Two springs were dug out to develop a water supply for diamond drilling, and, on finding that their combined flow was inadequate, an earth dam was built across Elkhorn Creek to impound water for the same purpose. Diamond-drill sites for holes 1 to 6 were cleaned of their dense timber, and roads and trails were cut to them from the main east-west thoroughfare. A galvanized-iron shed housing a 3- by 5-foot Dutch oven for drying diamond-drill sludges was erected at 7W 1.5N, and a sample house for the dry storage and safe keeping of trench samples was built at 1W 1N. Arrangements were made with the City of Casper for the free use of two stone buildings in the neighboring city park in section 16, one for a carpenter shop, where core boxes, benches, office furniture, tool boxes, and other equipment were made and in which all diamond-drill cores and sludges were weighed and stored, and the other as a magazine for dynamite. On September 13, an unfurnished office in the Consolidated Royalty Building in Casper was hired for 3 months at $25 per month and equipped with furniture.

The diamond drilling was let under contract by the Bureau of Mines to the Diamond Drill Contracting Co. of Spokane, Wash., which installed two drilling rigs on the property early in September and a third on October 23. This company furnished its own drill crews and a drill foreman under whose direction drilling was done on two or three 8-hour shifts daily, as conditions warranted. A caterpillar winch for pulling stumps, an air compressor and necessary equipment, and a bulldozer were hired to facilitate trenching operations. Men were transported between Casper and the deposit in a 1-1/2-ton Ford truck with a platform and stake body. When more than 30 men were employed, it was necessary to make two trips to carry them, one crew leaving Casper at 6:15 a.m. and the second crew at 7:30 a.m. An 8-hour shift was worked, two foremen and the truck driver receiving 75 cents an hour and the rest of the men 62.5 cents per hour.

All trenching was completed on October 30, and trench sampling was finished the next day. On November 1 the crew was reduced to 12 men and on November 8 to 5 men, who were retained to handle diamond-drill cores and sludges. Diamond drilling was completed on December 3, and the backfilling of trenches and diamond-drill sites was finished on December 6, which completed the work on the deposit.

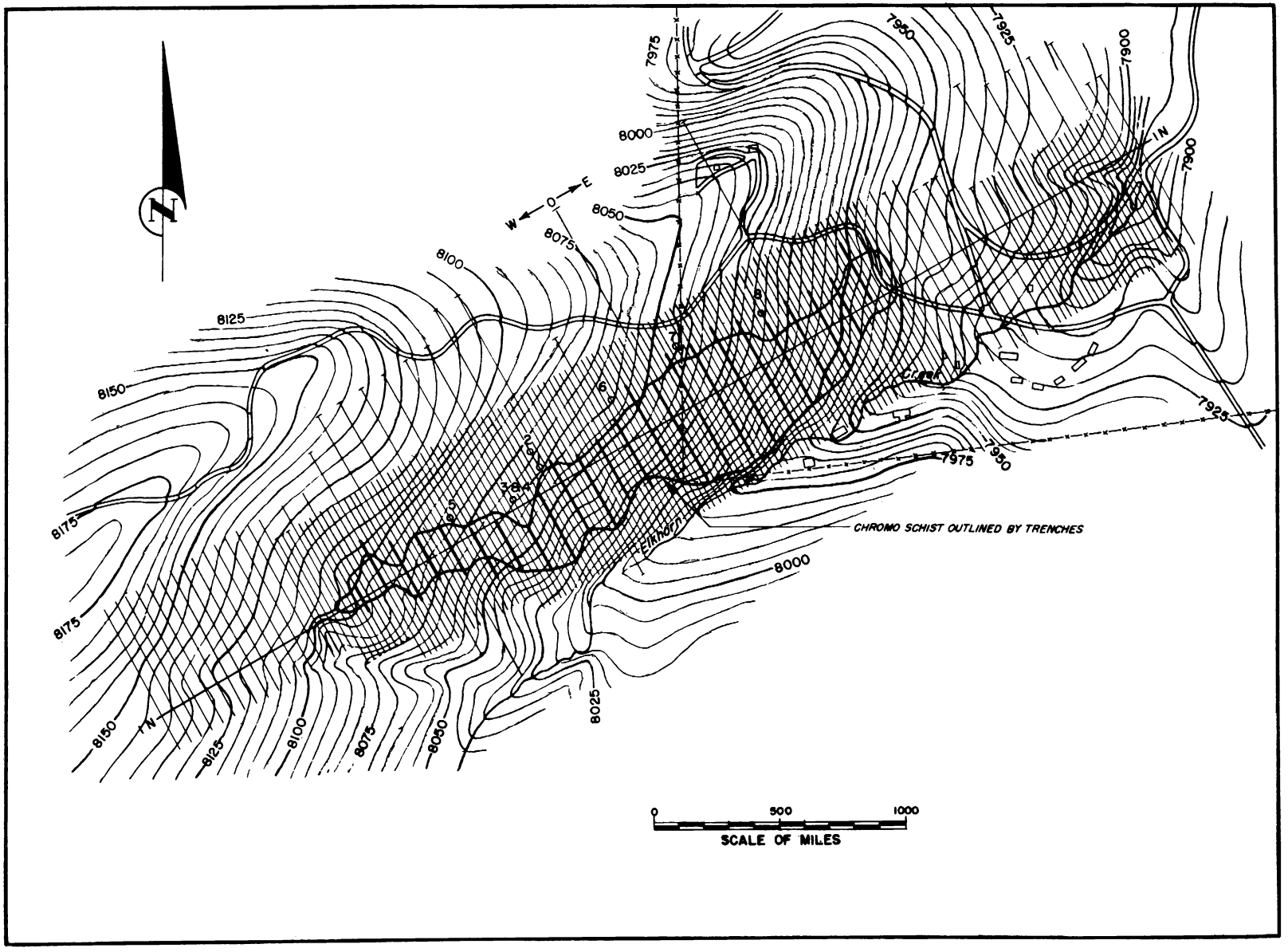


Figure 4. - Contour map showing relation of trenches and diamond drill holes to magnetometer survey.

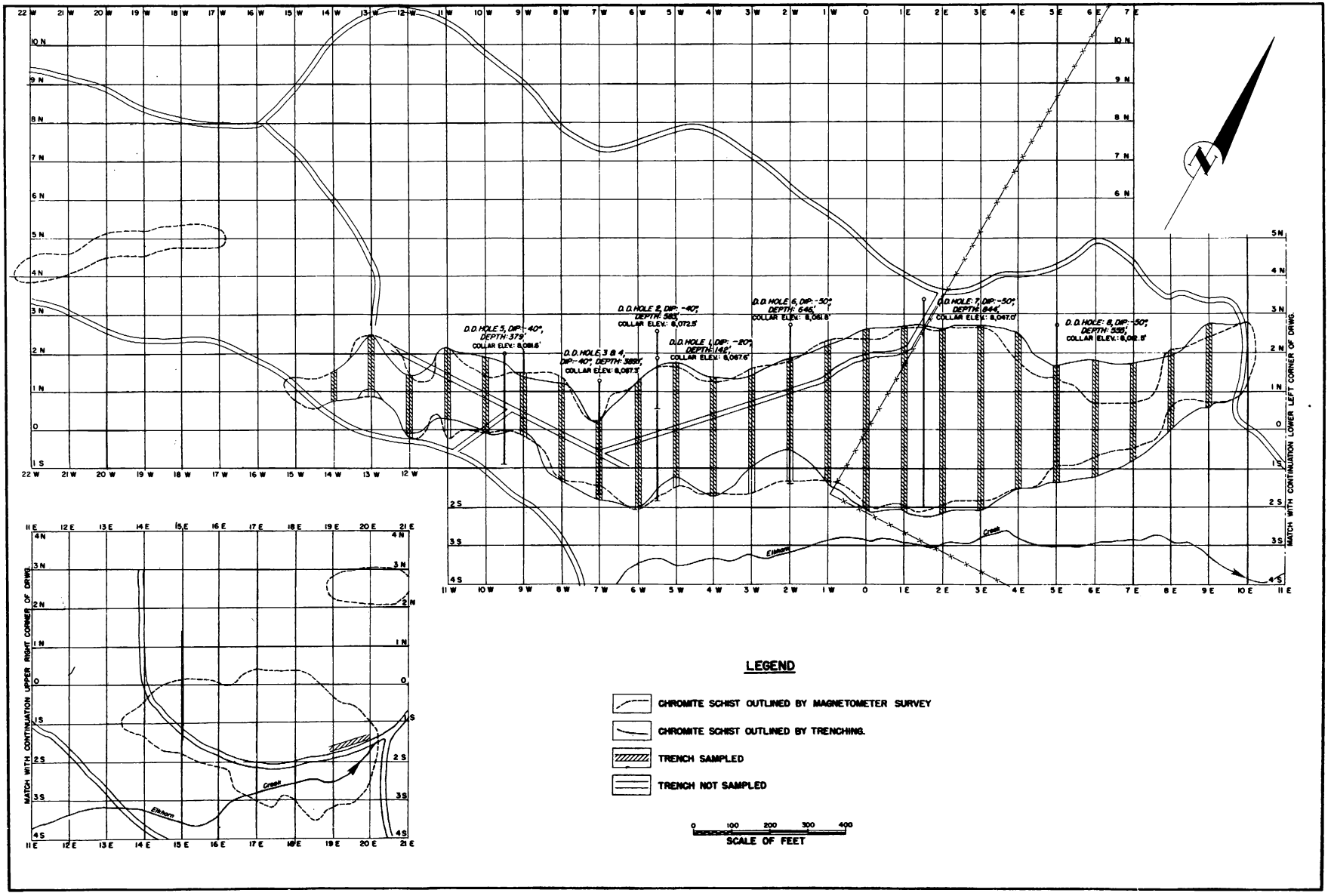


Figure 5. - Plan showing locations of trenches and diamond drill holes.

Eight thousand and seventy-three feet of trenching and 3,623 feet of diamond drilling were done, and 1,644 samples were taken. A total of 1,920 man shifts was worked on this project by day labor with an average crew of 20 men and 96 working days. Total wages were $9,938.20.

Trenching

Twenty-four parallel trench sites having a total length of over 8,000 feet were laid out at right angles to the strike of the larger schist lens; these sites coinciding with the 100-foot intervals of the magnetometer survey and bearing S. 30° E. The positions of these trench sites with reference to the magnetometer grid and the schist lens are shown on figures 4 and 5. From a zero point on the line between sections 16 and 17, the trench sites to the west were numbered consecutively from 1W to 14W and those to the east from 1E to 9E.

As agreements had been made with the City of Casper and the Wyoming Baptist Convention to refill all trenches on their property after sampling was completed, it was necessary to clear the timber from the trench sites for a minimum width of 10 feet to provide room for piling the excavated material where it could be backfilled with a bulldozer. Such clearing also allowed the use of a bulldozer in removing the unconsolidated overburden at a great saving over doing it by hand. The interlocking roots of the closely growing pines formed a matlike network, which made excavation difficult, and, lacking a powerful bulldozer such as a D7 or D8, the cheapest method of removing the timber from the trench sites was to cut it, leaving stumps 3 to 4 feet high, and then to pull the stumps, piling them with the tree trunks along the sides of the trench sites. Several thousand lodgepole pine trunks were later used for building windbreaks on a C.C.C. project in Casper. By pulling the stumps, all bothersome roots were removed. Stump pulling was done with a caterpillar winch hired at $7 per hour of operating time. The work began on September 1 and was completed on September 12. About 3,250 stumps were removed in 54 hours operating time at a total cost of approximately 21 cents each.

The high speed and low cost attained in stump pulling were due to the methodical work of a crew of six men and the winch operator. Each of four men, in rotation, placed a wire-rope sling around a single large stump or laced it about a group of small ones. A fifth man hooked the winch cable to each sling which it was ready, signaled the winch operator to pull, and unhooked the winch cable from the sling after the pull was completed. After each pull, the sixth man unreeled the winch cable the 10 or 15 feet required for a new hook-up. In a few instances, trench lines were extended for short distances by pulling the trees without cutting them, but this method was both more costly and more dangerous than the normal procedure. Removing timber and stumps from the trench sites required 1,269 man-hours of labor at a cost of $793.13.

After the timber and stumps had been removed, the trench sites were cleared of top soil and unconsolidated overburden by a D4 caterpillar bulldozer, the only machine available for hire. Bulldozing began on September 6 and was completed on September 18. A total of 4,339 cubic yards of material

was excavated in 109 hours operating time at a cost of $490.50, or 11.3 cents per cubic yard.

Excavation by pick and shovel began on September 14, and trenches with an average width of 32 inches were dug to bedrock. A portable air compressor and accessory equipment were hired on September 9 to operate a jackhammer that was used to drill the bedrock to a depth of 2 to 3 feet, depending on how badly it was weathered. Usually, holes were put in about 40 inches apart and broken with 1-1/2 sticks of 40 percent dynamite. There was much hardpan in the overburden, and this also was drilled and blasted.

Although four snowfalls and freezing temperature were considerable handicaps, all trenching was completed on October 30. Drilling and blasting were finished on October 25, and the air compressor and accessory equipment were returned to their owners next day. In all, 8,073 feet of trenches having an average depth of 5.24 feet were dug. Longitudinal profiles of each of the 24 trenches are shown on figures 6 to 9. The total volume of material removed was 4,182 cubic yards, of which 3,023 cubic yards were excavated by hand at a total cost of $2.646 per cubic yard, and 1,158 cubic yards were removed by bulldozer at a cost of 11.3 cents per cubic yard, or an average cost of $2.031 per cubic yard.

Trench Sampling

After cleaning the bottom of the trenches with brooms, continuous channels 4 inches wide and 2 inches deep, yielding about 10 pounds of sample per foot, were cut along the bottom of the trenches except where pegmatite, metadiorite, or other barren intrusives occurred. Sample cutting was done with single jacks and moils. The cut material was gathered in powder boxes, from which it was transferred to closely woven burlap sacks holding 50 to 60 pounds each. Melting snow and infiltration of water from surface springs sometimes made it necessary to bail portions of the trenches, and where the samples contained too much water they were dried in tubs over the Dutch oven used for drying and sludge from the diamond drills.

As far as possible the sampling intervals were made to conform with the geologic units in order to determine the distribution of the chromite with respect to the various types of rock. However, in a few instances individual samples embraced portions of formations that showed slight differences in mineralogical composition. The number of such samples was insignificant compared with the total number taken, and the differences in composition between rocks included in the same sample were in general so minor as to be distinguishable only to a trained geologist. In a few instances, narrow streaks of notably different rock were included in the same sample, but these streaks would necessarily have to be mined with the surrounding rock.

In general, the trenches disclosed a great many rock units as well as great variation in the character and amount of alteration and weathering within single units. Usually the sample interval was 5 or 10 feet, and only 12 sample intervals exceeded 10 feet and none more than 13 feet. A galvanized-iron shed was erected at 1W 1N to store samples where they could be kept dry and safe

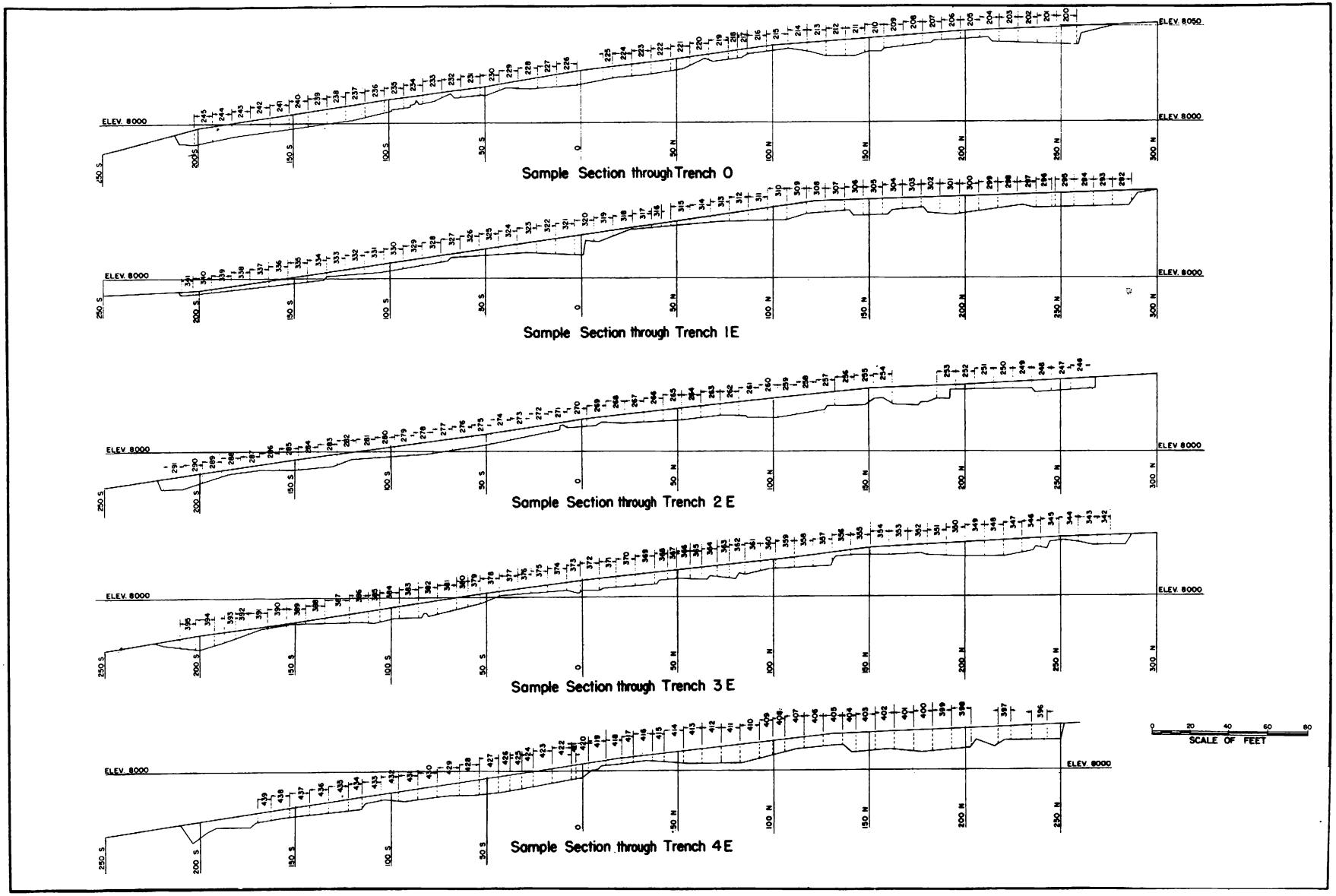


Figure 6. - Sections through trenches 0 and 1E to 4E, showing locations of samples.

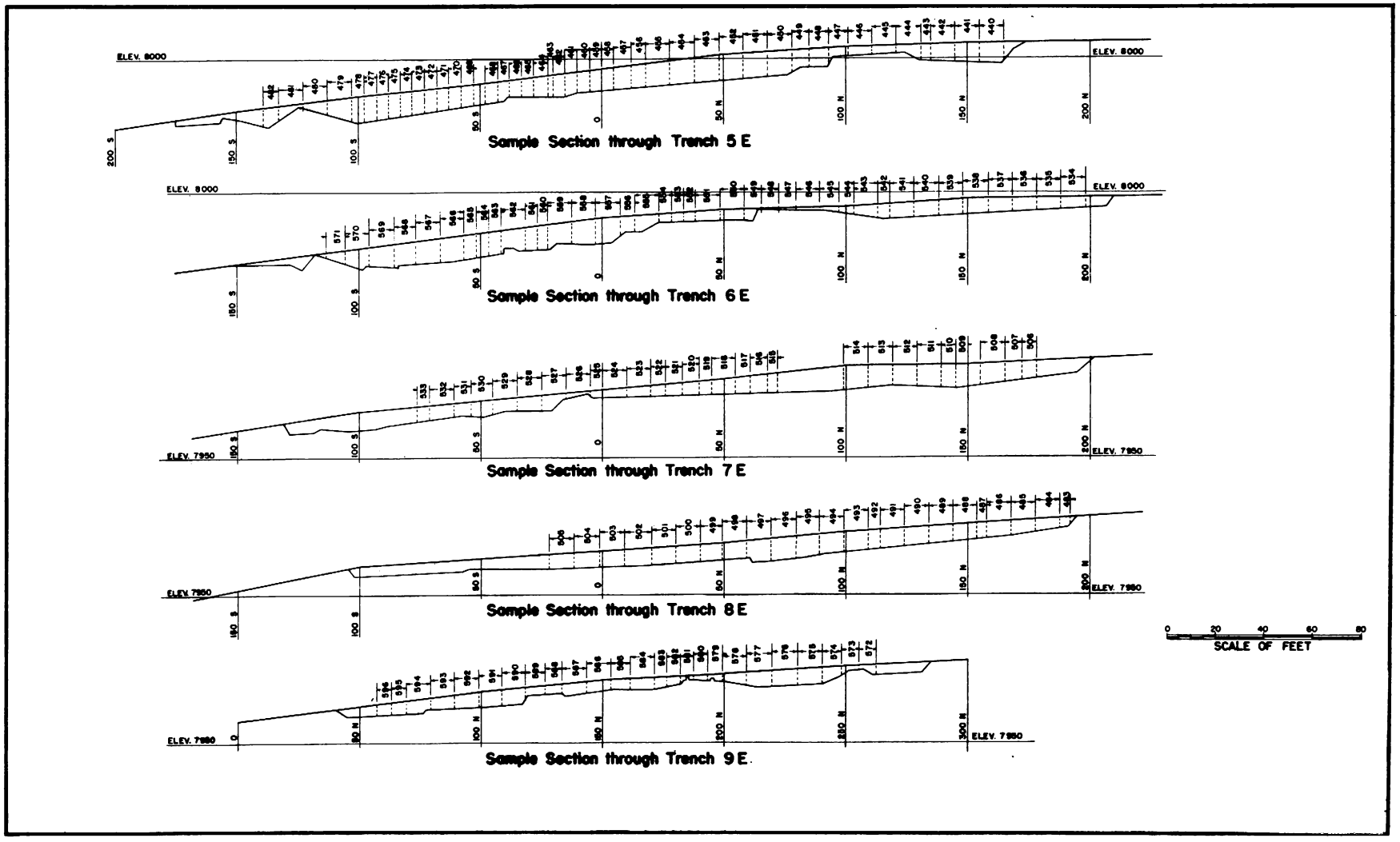


Figure 7. - Sections through trenches 5E to 9E, showing locations of samples.

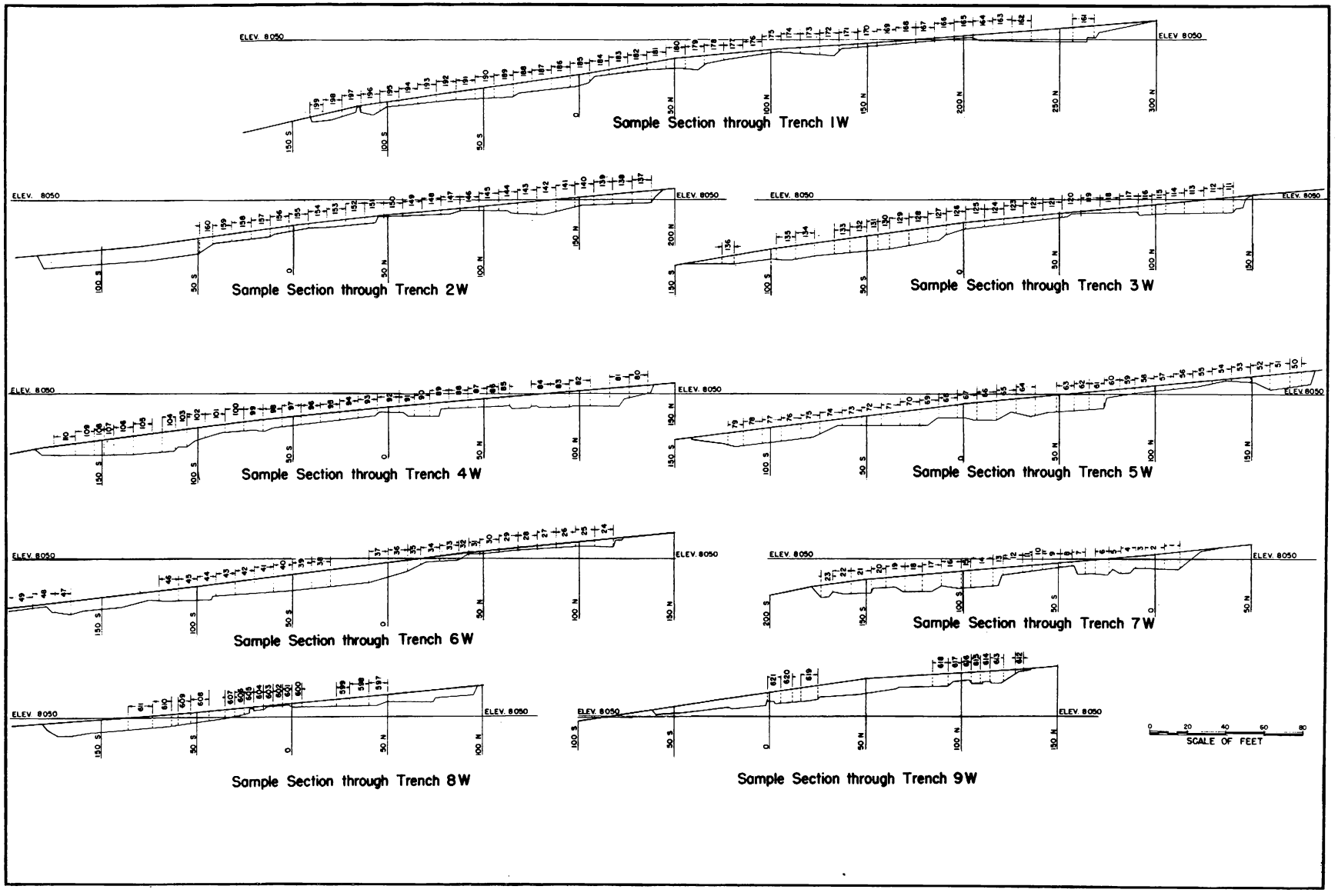


Figure 8. - Sections through trenches 1W to 9W, showing locations of samples.

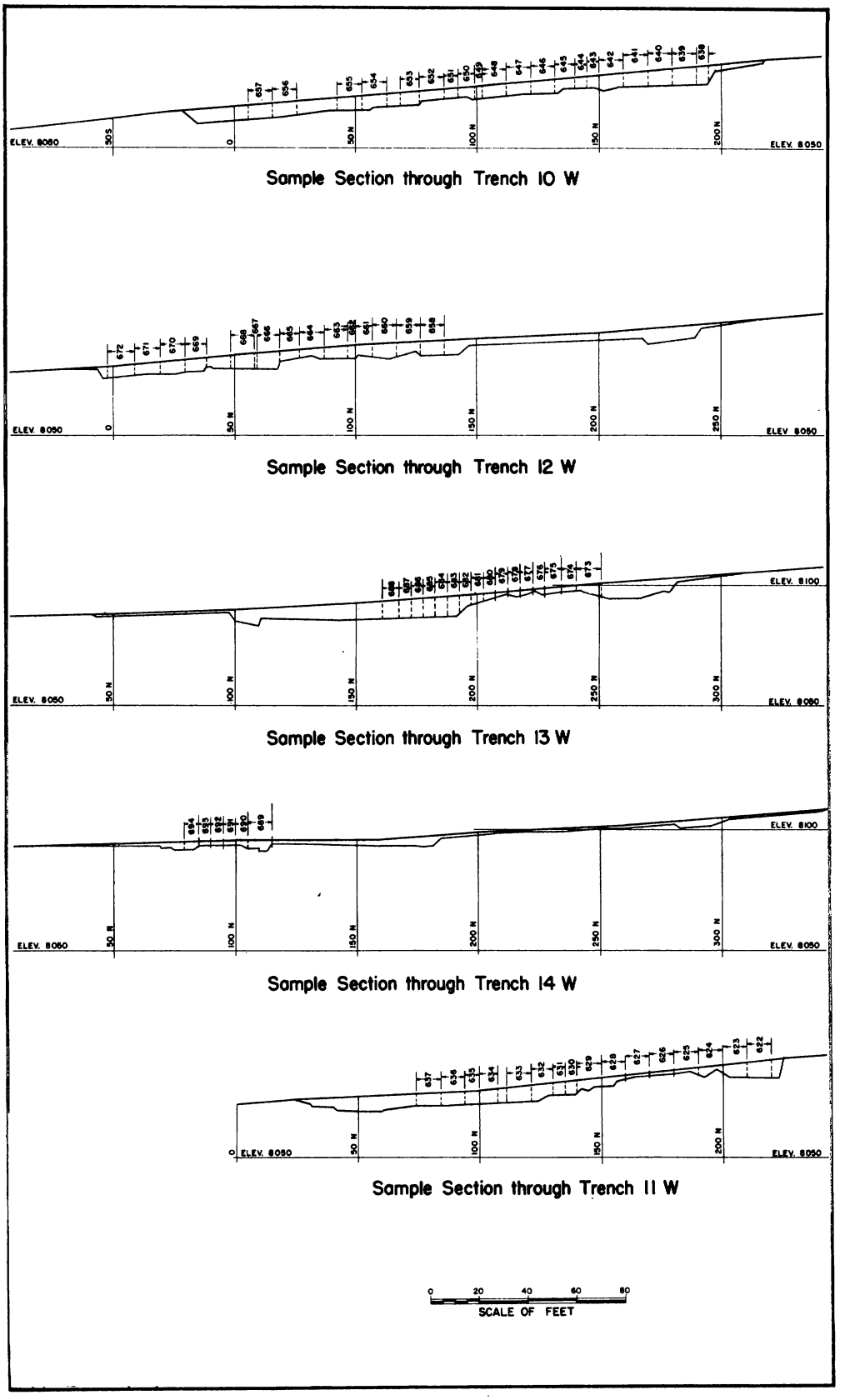
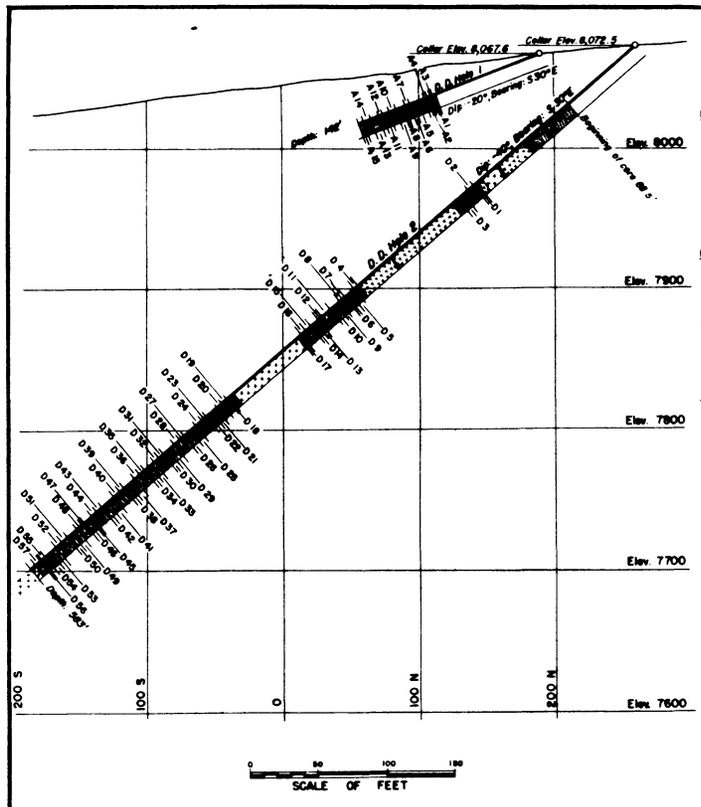
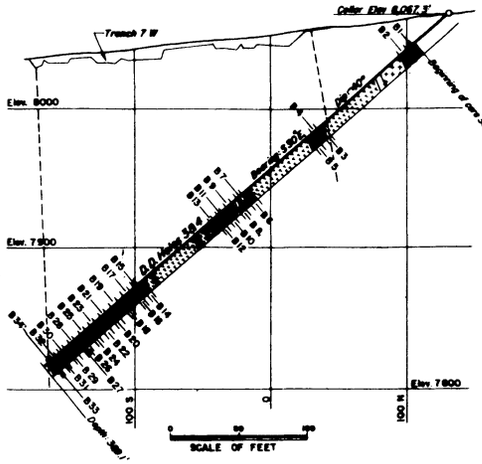


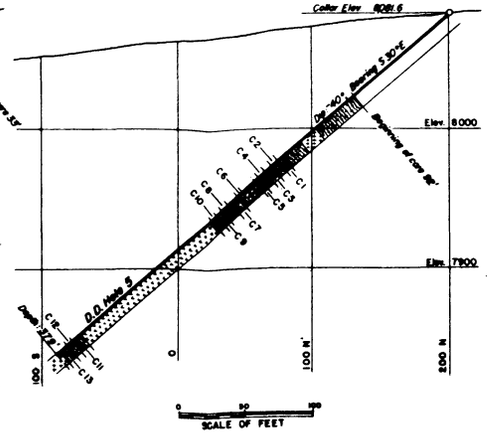
Figure 9. - Sections through trenches 10W to 14W, showing locations of samples.



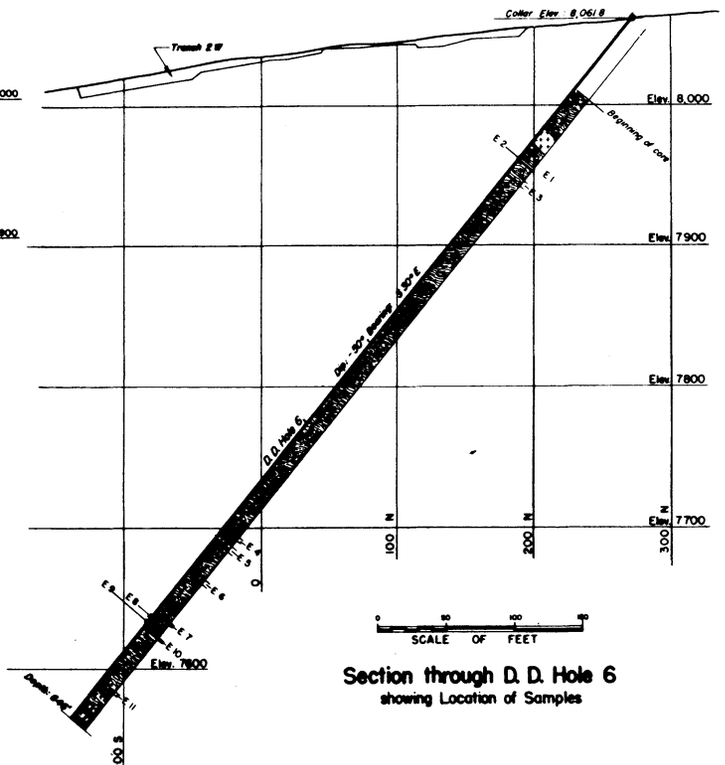
Section through D. D. Hole 1 & 2
showing Location of Sample



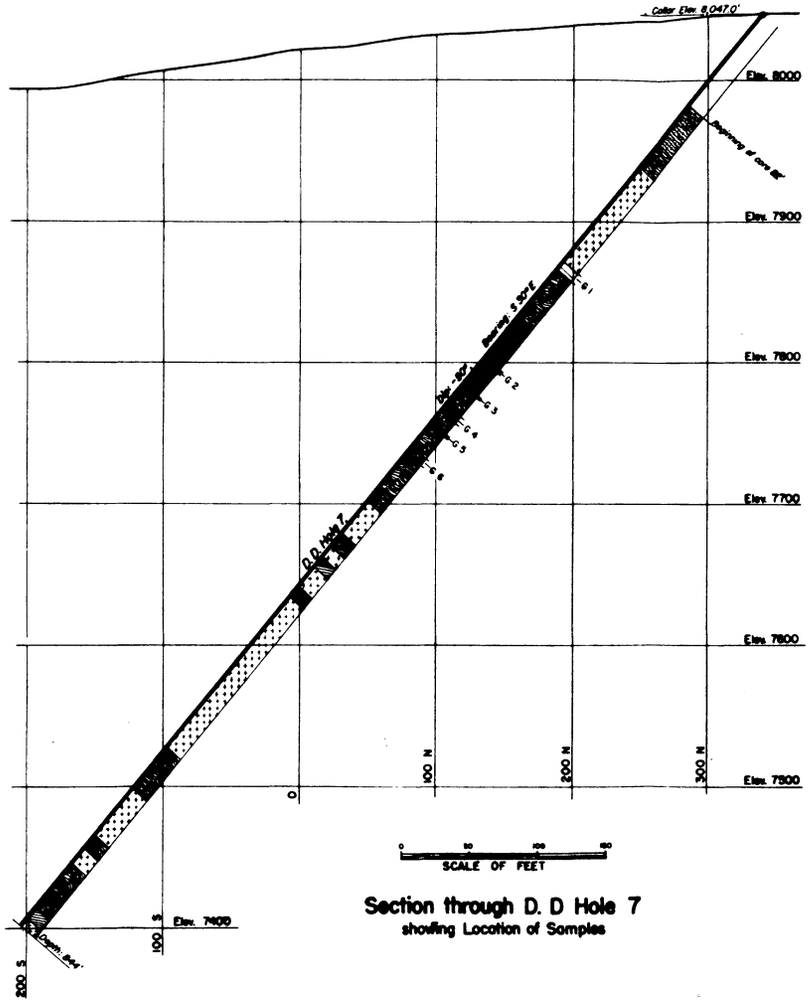
Section through D. D. Hole 3 & 4
showing Location of Samples



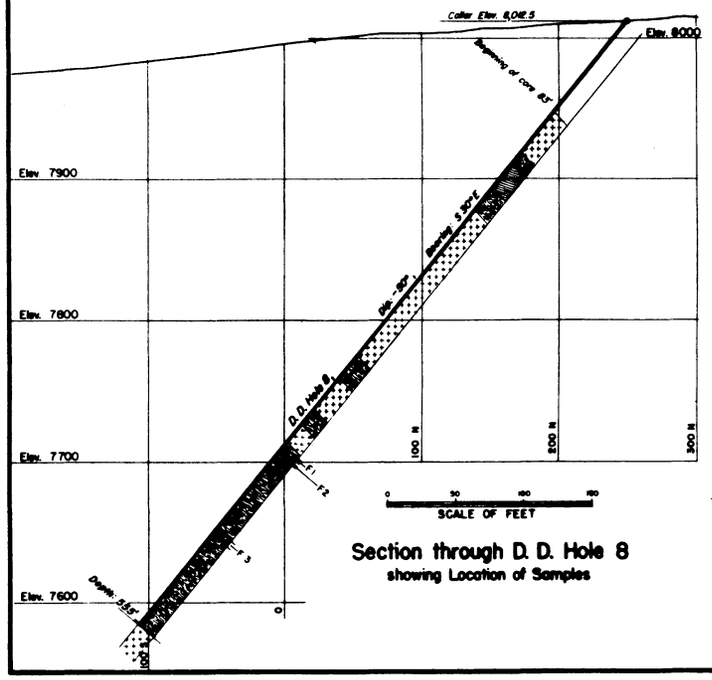
Section through D. D. Hole 5
showing Location of Samples



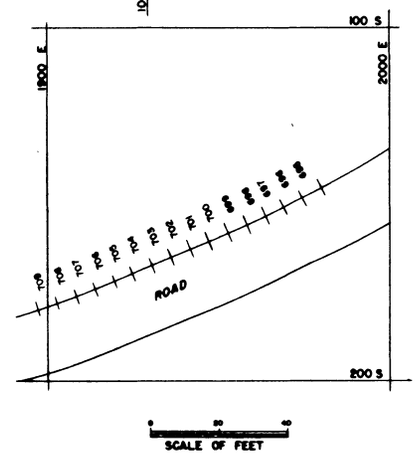
Section through D. D. Hole 6
showing Location of Samples



Section through D. D Hole 7
showing Location of Samples



Section through D. D. Hole 8
showing Location of Samples



Sampling Map of Road Cut

Figure 10. - Sample sections of drill holes and road sample map.

until shipped. Snowstorms interferred with trench sampling on October 9, 10, and 26, but it was completed on October 31. In all, 694 samples with a total weight of approximately 32 tons were cut from 6,222 feet of channel in the trenches and shipped to Reno for analysis. Longitudinal sections of each trench showing the position, interval, and number of each sample are shown in profile on figures 6 to 9 and in the plan on figure 5.

The only sampling done on the second largest schist lens, which lies about 300 feet east of the main lens, was on the north wall of a road cut where the chromite-bearing schist was exposed for a length of 90 feet. Here a continuous channel was cut over the entire distance and divided into 15 individual samples, each representing an interval of 6 feet. The position of this cut and of the 15 individual samples is shown on figure 10.

Diamond Drilling

Data regarding diamond drilling are summarized in table 1.

TABLE 1. - Summary of diamond-drill data

Hole	Location	Elevation at collar, ft.	Dip, degrees	Bearing	Depth on dip, feet	Core size, in.	Started	Completed
1	5.50 W., 1.90 N.	8,067.6	20	S.30°E.	142	7/8	Sept.13	Abandoned Sept. 21
2	5.50 W., 2.60 N.	8,072.5	40	do.	583	do.	Sept.23	Oct. 25
3	7.00 W., 1.30 N.	8,067.3	20	do.	85	do.	Sept.14	Abandoned Sept. 18
4	7.00 W., 1.30 N.	8,067.3	40	do.	389	do.	Sept.19	Oct. 5
5	9.50 W., 2.00 N.	8,081.6	40	do.	379	do.	Oct. 6	Oct. 23
6	2.75 N., 2.00 W.	8,061.8	50	do.	646	do.	Oct. 26	Nov. 13
7	3.40 N., 1.50 E.	8,047.0	50	do.	844	do.	Oct. 25	Dec. 3
8	2.50 N., 5.00 E.	8,012.5	50	do.	555	do.	Oct. 28	Nov. 18

The total footage drilled was 3,623. The positions of the various drill holes are shown on figure 5. Sampling maps and geologic profiles of the individual holes are given on figure 10.

Diamond drilling proved (1) that the subsurface schist is of the same general character as and has a comparable chromite content to that on the surface; (2) that the schist extends, at least in several places, to vertical depths of 400 and 500 feet; and (3) that with depth the intrusions of granite, pegmatite, and metadiorite increase both in frequency and width, bearing out the supposition that the schist lens is a roof pendant and indicating that it may terminate within a few hundred feet beyond the maximum depth reached by drilling.

A total of 1,903.5 feet of core was recovered from 3,623 feet in the eight diamond-drill holes. However, the total distance from the collars of the holes through overburden and unconsolidated material to where cores were first

obtained was 581.5 feet. This distance, subtracted from the total length of the holes, leaves 3,041.5 feet as the total length of possible core, based on which the average core recovery was 62.6 percent. This rather low recovery was due mainly to drilling through bands of vermiculite and soft, friable schists from which little if any core could be obtained. It was noted, however, from examination of both cores and sludges that where any reasonable amount of chromite was present the core was reasonably strong and usually gave good recovery. Hence, the core samples are believed to represent such sections fairly, although where partial cores were obtained they are not, of course, truly representative of the entire section drilled.

In general, all core samples consisted of a longitudinally split half of all the core raised by each pulling of a 5-1/2-foot core barrel. In all, 631 core samples were taken, but only 139 were split for analysis. The position and analyses of these samples are given in appendix B.

Sludge samples were taken over the same intervals as the core samples so that the analyses of core and sludge might be properly combined to give a weightod analysis that would represent the interval drilled.

All sludge from holes 1 to 5 was saved, dried, and weighed, as well as that from the upper parts of holes 6, 7, and 8. However, before completing the latter holes it became evident that the sludge samples as a whole were of little value because of caving of the holes along the streaks of vermiculite and soft schist frequently intercalated in the schist lens. In many instances, the sludge was so diluted with caved material that it was valueless as a sample, and as ample core was being obtained to give a true picture of the chromite content of the richer streaks of schist, it was deemed a waste of money to collect further sludge samples.

In all, 304 sludge samples were collected and weighed, but only a selected few of them were analyzed to determine if, as concluded from panning tests, the sludges in general contained much less chromite than the cores. Five sludge samples containing 0.05 to 10.7 percent Cr_2O_3 were compared with corresponding cores, and every core was found to be considerably the richer. Details of this comparison are shown in table 2.

TABLE 2. - Comparison of analyses from diamond-drill core and sludge samples

	Core		Sludge		Length	Length	Percent	Percent	Weighted
	Sample	Percent	Sample	Percent	drilled,	core,	core by	sludge by	analysis,
Drill	No.	Cr_2O_3	No.	Cr_2O_3	inches	inches	volume	volume	percent Cr_2O_3
2....	D9	6.14	DS1	0.05	36	4	3.95	96.05	0.29
2....	D10	4.51	DS2	1.50	72	64	31.56	68.44	2.45
2....	D12	5.12	DS3	3.10	66	53	28.51	71.49	3.68
6....	E3	12.50	ES1	5.55	60	20	11.84	88.16	6.37
6....	E2	16.00	ES2	10.70	24	10	14.79	85.21	11.48

It is certain that the softer and more friable portions of the schist contain less chromite than the harder parts. In other words, the schist seems to be strengthened by the chromite. Therefore, partial cores should always be richer than their corresponding sludges, as they were in the samples analyzed. Panning tests showed that where no core was obtained, the sludges contained virtually no chromite.

RESULTS OF INVESTIGATION

The locations of trench samples are shown on the sections on figures 6 to 9, and the analyses are given in appendix A. Table 3 gives a list of samples containing over 15 percent Cr_2O_3, and table 4 between 10 and 15 percent Cr_2O_3.

TABLE 3. - Samples containing over 15 percent Cr_2O_3

Sample No.	Trench	Interval, feet	Percent Cr_2O_3
31	6W	6	17.35
32	6W	5	24.05
107	4W	5	16.02
579	9E	6	19.50
580	9E	6	25.50
581	9E	5	26.50
582	9E	8	22.50
631	11W	5	22.90
644	10W	5	16.69
650	10W	7	21.25
667	12W	1	24.90
33	6W	10	13.63
108	4W	5	11.23
257	2E	10	14.09
258	2E	10	14.30

TABLE 4. - Samples containing between 10 and 15 percent Cr_2O_3

Sample No.	Trench	Interval, feet	Percent Cr_2O_3
425	4E	6	14.75
435	4E	10	10.19
520	7E	7	11.10
626	11W	10	12.10
627	11W	10	11.50
676	13W	5	10.40
679	13W	5	10.00
682	13W	5	12.20
686	13W	5	10.00
687	13W	5	10.20

A section showing the location of samples in the road cut are shown on figure 10. The analyses are given in appendix A.

Figure 10 gives the sections through diamond-drill holes and location of samples. Analyses of diamond-drill core samples are given in appendix B, and logs of holes are given in appendix C.

APPENDIX A

Analyses of Trench Samples

Sample No.	Trench	Interval, feet	Percent Cr_2O_3
1	7W	8	0.60
2		10	1.15
3		5	1.47
4		8	.69
5		6	.09
6		7	.23
7		7	1.51
8		6	1.88
9		9.5	3.63
10		5.6	1.06
11		5.1	7.11
12		10	1.61
13		5.3	2.02
14		11.5	.41
15		5	.18
16		10	.87
17		10	.05
18		9	.83
19		10	.64
20		7.7	1.06
21		10.3	.73
22		10	1.01
23		6	.55
24	6W	10	.73
25		10	.46
26		10	.32
27		10	.46
28		10	3.44
29		10	3.58
30		10	4.82
31		6	17.35
32		5	24.05
33		10	13.63
34		10	2.39
35		7	1.10
36		10.3	2.52
37		10	1.10
38		10	.46
39		10	.28
40		10	.14
41		10	.18
42		10	.09
43		10	.28
44		10	.50
45		10	.96
46	6W	10	0.41
47		8	.96
48		12	1.01
49		12	1.15
50	5W	6	1.35
51		10	1.28
52		10	3.07
53		10	.92
54		10	1.19
55		10	.73
56		10	1.01
57		10	.96
58		10	.78
59		8	3.58
60		8	.28
61		8	.83
62		8	.83
63		9	.92
64		10	.33
65		10	1.25
66		10	1.15
67		10	1.12
68		10	.50
69		10	1.29
70		10	1.58
71		10	.92
72		10	.88
73		10	1.14
74		12	1.10
75		10	.18
76		10	.72
77		10	4.48
78		10	.99
79		8	.64
80	4W	10	.33
81		10	.55
82		11	8.03
83		10	8.34
84		10	1.89
85		6	1.05
86		6	1.27
87		10	1.18
88		10	.81
89		10	.55
90		7.9	.31
91	4W	7.9	0.31
92		11.5	.33
93		10	.90
94		10	1.12
95		10	.83
96		10	.77
97		10	.79
98		10	.72
99		10	.42
100		10	.53
101		10	.70
102		10	.88
103		6	1.14
104		7	2.46
105		10	1.62
106		10	1.14
107		5	16.02
108		5	11.23
109		10	3.47
110		11	1.80
111	3W	5	1.49
112		10	.83
113		10	.75
114		10	.79
115		7	2.24
116		7	.24
117		10	1.10
118		10	1.54
119		10	.68
120		10	.81
121		10	.81
122		10	1.54
123		10	.88
124		10	1.01
125		10	1.27
126		10	1.45
127		9.7	.70
128		10	.79
129		10	.83
130		6	.97
131		6	.75
132		8.5	.70
133		8.5	.61
134		10	1.40
135		10	.83
136		5	1.26
137	2W	10	.81
138		10	.74
139		10	2.12
140		10	1.80
141	2W	10	0.24
142		10	.87
143		10	.96
144		10	1.68
145		10	1.19
146		10	1.78
147		10	1.71
148		10	1.01
149		10	1.18
150		10	1.10
151		10	1.01
152		10	.79
153		10	.79
154		10	.88
155		10	.88
156		10	1.45
157		10	2.85
158		10	1.01
159		10	.83
160		7	1.40
161	1W	11	.18
162		10	.61
163		10	.79
164		10	1.01
165		10	.61
166		10	3.69
167		10	1.36
168		10	1.18
169		10	1.45
170		10	1.80
171		10	1.23
172		10	1.29
173		10	.39
174		10	.94
175		10	.57
176		10	.94
177		10	.94
178		10	2.23
179		10	1.02
180		10	.70
181		10	.72
182		10	2.49
183		10	2.53
184		10	8.29
185		10	.53
186		10	.44
187		10	3.91
188		10	1.32
189		10	1.10
190		10	3.07

Sample No.	Trench	Interval, feet	Percent Cr_2O_3
191	1W	10	1.71
192		10	1.58
193		10	1.36
194		10	4.91
195		10	1.53
196		10	1.10
197		10	1.53
198		10	1.75
199		7	1.05
200	0	8	.20
201		10	.88
202		10	1.02
203		10	1.40
204		10	1.40
205		10	1.48
206		10	2.22
207		10	1.97
208		10	1.27
209		10	1.05
210		10	.57
211		10	1.10
212		10	.66
213		10	.86
214		10	1.18
215		10	1.58
216		10	1.10
217		5	.49
218		5	.22
219		10	7.24
220		10	1.23
221		10	.44
222		10	.22
223		10	1.18
224		10	.92
225		5	.97
226		10	1.14
227		10	.97
228		10	5.79
229		10	.61
230		10	.66
231		10	.22
232		10	.83
233		10	1.15
234		10	.91
235		10	1.48
236		10	1.69
237		10	.62
238		10	.68
239		10	.26
240		10	.16

Sample No.	Trench	Interval, feet	Percent Cr_2O_3
241	0	10	1.71
242		10	1.31
243		10	2.49
244		10	2.15
245		10	.44
246	2E	10	.44
247		10	.53
248		10	1.18
249		10	.97
250		10	1.10
251		10	1.18
252		10	.75
253		10	1.14
254		10	9.17
255		10	4.30
256		10	6.19
257		10	14.09
258		10	14.30
259		10	6.80
260		10	5.57
261		10	4.39
262		10	3.60
263		10	3.38
264		10	4.61
265		10	2.37
266		10	2.90
267		10	2.37
268		10	.88
269		10	2.24
270		10	2.50
271		10	6.67
272		10	2.76
273		10	3.99
274		10	1.80
275		10	.97
276		10	1.89
277		10	.83
278		10	.75
279		10	.70
280		10	1.10
281		10	1.32
282		10	1.32
283		10	.66
284		10	.49
285		10	.70
286		10	2.41
287		10	1.32
288		10	.57
289		10	2.96
290		10	2.40

Sample No.	Trench	Interval, feet	Percent Cr_2O_3
291	2E	10	0.82
292	1E	10	.05
293		10	.10
294		10	1.84
295		10	2.60
296		8	.36
297		10	.87
298		10	.66
299		10	1.28
300		10	1.28
301		10	1.68
302		10	.77
303		10	2.60
304		10	4.44
305		10	.31
306		10	.87
307		10	1.38
308		10	1.68
309		10	1.33
310		10	4.19
311		10	2.91
312		10	2.96
313		10	2.61
314		10	4.43
315		10	3.47
316		5	1.53
317		10	2.14
318		10	2.14
319		10	3.01
320		10	1.19
321		10	.56
322		10	1.02
323		10	.05
324		10	.51
325		10	3.32
326		10	1.07
327		10	.87
328		10	.77
329		10	.56
330		10	1.84
331		10	1.17
332		10	.77
333		10	.92
334		10	.66
335		10	.66
336		10	.87
337		10	1.07
338		10	1.46
339		10	1.22
340		10	.56

Sample No.	Trench	Interval, feet	Percent Cr_2O_3
341	1E	6	0.77
342	3E	5	.26
343		10	2.70
344		10	2.04
345		10	1.12
346		10	1.12
347		10	2.65
348		10	1.79
349		10	2.96
350		10	2.50
351		10	.61
352		10	6.89
353		10	8.67
354		10	3.20
355		10	4.90
356		10	5.25
357		10	3.47
358		10	3.62
359		10	8.77
360		8	2.04
361		8.5	2.50
362		8.5	8.47
363		6	3.28
364		8	7.99
365		6.5	3.79
366		7	8.14
367		6	1.02
368		7	2.20
369		10.5	3.28
370		10	2.66
371		9	2.25
372		10.5	2.82
373		7	3.58
374		10	3.23
375		8.5	4.20
376		7	2.82
377		10	1.13
378		10	2.30
379		6.5	1.59
380		6	1.33
381		10	1.33
382		10	1.38
383		10	1.08
384		10	1.89
385		6	3.48
386		10	1.18
387		13	.88
388		10	3.38
389		10	3.58
390		10	.05

Sample No.	Trench	Interval, feet	Percent Cr_2O_3
391	3E	10	1.84
392		7	2.15
393		6	2.00
394		10	.05
395		8	.05
396	4E	8	.05
397		6.5	1.02
398		10	.31
399		10	.51
400		10	1.59
401		10	1.74
402		10	2.56
403		10	1.54
404		7	2.25
405		10	2.20
406		10	.72
407		10	.41
408		6	.56
409		7	.36
410		10	1.74
411		10	2.66
412		10	2.15
413		10	.87
414		10	.20
415		6	.46
416		10	2.10
417		6	1.54
418		8	1.74
419		9	2.10
420		6	3.64
421		2	1.46
422		10	4.04
423		10	7.73
424		6	8.70
425		6	14.75
426		6	2.10
427		10	1.79
428		10	1.23
429		12	1.13
430		10	1.33
431		10	.61
432		9	3.84
433		10	2.36
434		7	3.99
435		10	10.19
436		10	1.64
437		10	.10
438		10	3.94
439		7	2.10
440	5E	10	.56

Sample No.	Trench	Interval, feet	Percent Cr_2O_3
441	5E	10	0.92
442		10	1.84
443		4	2.51
444		10	2.41
445		10	2.84
446		10	2.41
447		8	2.28
448		8	2.33
449		7	2.82
450		10	4.10
451		10	4.07
452		10	2.41
453		10	1.77
454		10	1.79
455		10	1.31
456		6	1.28
457		7	5.53
458		5	.31
459		5	.05
460		5	.05
461		5	.05
462		5	.05
463		2	.87
464		6	9.73
465		5	8.09
466		5	2.00
467		5	.10
468		5	2.92
469		5	3.60
470		5	7.80
471		5	4.40
472		5	.05
473		5	1.20
474		5	1.40
475		5	.30
476		5	.30
477		5	1.80
478		5	1.60
479		10	.80
480		10	1.30
481		10	1.08
482		6	.97
483	8E	4	.05
484		10	.05
485		10	.05
486		10	.05
487		4	4.45
488		10	3.17
489		10	18.43
490		10	3.64

Sample No.	Trench	Interval, feet	Percent Cr_2O_3
491	8E	10	0.78
492		5	.05
493		10	.05
494		10	.10
495		10	.05
496		10	.30
497		10	1.28
498		10	.31
499		10	.13
500		10	.28
501		10	.18
502		10	.74
503		10	.33
504		11	.10
505		10	.23
506	7E	6	.05
507		7	.38
508		10	.35
509		5	.60
510		6	.60
511		10	.05
512		10	.05
513		10	.05
514		10	.06
515		4	5.00
516		7	4.50
517		6	4.20
518		10	6.10
519		5	3.70
520		7	11.10
521		7	3.07
522		6	3.13
523		10	.33
524		10	.18
525		5	.10
526		10	.15
527		10	.18
528		10	.33
529		10	.28
530		9	.26
531		7	.33
532		10	.44
533		5	.40
534	6E	10	.05
535		10	.05
536		10	.05
537		10	.05
538		10	.05
539		10	.20
540		10	.20

Sample No.	Trench	Interval, feet	Percent Cr_2O_3
541	6E	10	0.20
542		5	.05
543		10	.20
544		6	.05
545		8	.10
546		10	.10
547		7	.10
548		7	.05
549		7	.05
550		10	4.80
551		10	5.50
552		5	7.00
553		5	7.00
554		5	4.70
555		10	7.80
556		6	2.10
557		10	.30
558		10	.05
559		10	.30
560		4	.30
561		5	.20
562		10	.40
563		5	1.00
564		5	.20
565		5	.20
566		10	.20
567		10	.05
568		9	.40
569		10	.90
570		10	.50
571		8	.20
572	9E	7	.20
573		7	.20
574		8	1.30
575		10	2.60
576		10	.20
577		10	.05
578		10	7.20
579		6	19.50
580		6	25.50
581		5	26.50
582		6	22.50
583		5	3.80
584		10	.70
585		8	.70
586		10	3.40
587		10	2.70
588		7	2.90
589		8	1.40
590		10	1.50

Sample No.	Trench	Interval, feet	Percent Cr_2O_3
591	9E	10	0.50
592		10	2.70
593		10	.80
594		10	.80
595		6	.80
596		6	3.50
597	8W	10	2.00
598		10	.87
599		7	.20
600		5	4.04
601		5	2.90
602		5	8.70
603		5	2.09
604		5	5.90
605		5	2.30
606		5	2.00
607		5	1.33
608		10	4.04
609		10	1.64
610		10	.31
611		13	.05
612	9W	4	5.40
613		7	.28
614		5	.26
615		5	.20
616		5	.16
617		7	.61
618		8	.05
619		9	8.19
620		6	.20
621		7	3.20
622	11W	10	.31
623		10	.60
624		10	6.70
625		10	8.19
626		10	12.10
627		10	11.50
628		10	3.00
629		10	1.80
630		5	6.45
631		5	22.90
632		9	5.48
633		10	.05
634		7.8	.26
635		6	.10
636		10	.20
637		10	.87
638	10W	5	.61
639		10	2.05
640		10	.61
641		10	.15
642		10	.46
643	10W	5	0.92
644		5	16.69
645		8	.56
646		10	.87
647		10	.31
648		10	.15
649		3	2.16
650		7	21.25
651		6	6.65
652		10	.61
653		8	.24
654		10	2.59
655		10	2.20
656		10	1.79
657		10	4.64
658		10	.05
659		10	1.42
660		10	2.71
661		7	4.91
662		3	1.79
663		10	1.57
664		10	2.09
665		8	3.20
666		9.5	1.50
667		1	24.90
668		9.5	1.00
669		9	3.20
670		10	2.30
671		10.5	4.40
672		11	.90
673		10	4.20
674		6	.80
675		7	5.20
676		5	10.40
677		5	1.40
678		5	3.00
679		5	10.00
680		5	3.10
681		5	3.30
682		5	12.20
683		5	4.90
684		5	1.00
685		5	4.60
686		5	10.00
687		5	10.20
688		7	1.70
689	14W	10	.27
690		5	1.44
691		5	6.40
692		5	1.38
693		5	3.77
694		6	.72

Samples from Road Cut in East Lens

Sample No.	Interval, feet	Percent Cr_2O_3
695	6	10.92
696	6	7.04
697	6	17.23
698	6	8.81
699	6	3.51
700	6	.51
701	6	1.08
702	6	2.05
703	6	1.13
704	6	1.08
705	6	11.98
706	6	.82
707	6	11.62
708	6	3.94
709	6	1.38

APPENDIX B

Analyses of Diamond Drill Core Samples

Sample No.	Depth, feet From	To	Interval, feet	Percent Cr_2O_3
Hole 1				
A1*	75	77	2	2.17
A2	77	79	2	.66
A3	79	81	3	1.10
A4	81	83	2	.63
A5	83	92	9	.92
A6	92	94	2	.76
A7	94	98	4	1.22
A8	98	100	2	.64
A9	100	105	5	1.33
A10	105	110.5	5.5	1.89
A11	110.5	116	5.5	.42
A12	116	119	3	.36
A13	119	125.5	6.5	1.48
A14	125.5	131	5.5	1.17
A15	131	135	4	1.35

*Core from 75.5-76 was granite and was excluded from the sample.

Hole 2

D1	153	155	2	1.84
D2	155	160	5	.61
D3	165	170	5	.72
D4	266	269.3	3.3	.46
D5	269.3	274	4.7	.46
D6	274	279	5	.46
D7	279	281.1	2.1	.26
D8	281.1	283	1.9	.41
D9	283	286	3	6.14
D10	286	292	6	4.51
D11	292	297.5	5.5	6.82
D12	297.5	303	5.5	5.12
D13	303	306	3	3.07
D14	306	311	5	2.76
D15	311	316	5	.56
D16	316	321	5	.72
D17	321	323	2	.05
D18	390.5	392	1.5	.05
D19	392	397	5	.77
D20	397	402	5	.72
D21	403	406	3	.97
D22	406	411	5	.82
D23	411	416	5	.77
D24	416	421	5	1.02
D25	421	426	5	0.97
D26	426	431	5	.97
D27	431	436.5	5.5	2.71
D28	436.5	442	5.5	1.07
D29	442	448	6	.51
D30	448	453	5	.72
D31	453	458	5	.82
D32	458	462	4	.72
D33	462	467	5	.97
D34	467	472	5	.97
D35	472	477	5	1.07
D36	477	482	5	.51
D37	482	487	5	.87
D38	487	492	5	1.74
D39	492	496.3	4.3	1.89
D40	496.3	501.8	5.5	2.05
D41	501.8	507.5	5.7	5.58
D42	507.5	513	5.5	1.43
D43	513	518	5	1.54
D44	518	523	5	1.38
D45	523	525	2	1.64
D46	525	530	5	2.56
D47	530	532	2	2.46
D48	532	538	6	1.69
D49	538	542.2	4.2	1.23
D50	542.2	546.7	4.5	1.33
D51	546.7	551.8	5.1	2.19
D52	551.8	557.3	5.5	1.27
D53	557.3	563	5.7	1.69
D54	563	568.5	5.5	.82
D55	568.5	571.5	3	.87
D56	571.5	573	1.5	3.79
D57	573	578	5	.46

Hole 3

Abandoned at a depth of 85 feet before any regular core was obtained.

Sample No.	Depth, feet From	To	Interval, feet	Percent Cr_2O_3
Hole 4				
B1	36	39	3	0.53
B2	39	46	7	.30
B3	121	126.5	5.5	.30
B4	126.5	131	4.5	.15
B5	131	136	5	.26
B6	193	199	6	.31
B7	199	204	5	2.05
B8	204	209	5	1.40
B9	209	214	5	2.30
B10	214	219	5	2.15
B11	219	223	4	.92
B12	223	228	5	1.13
B13	228	229	1	.05
B14	294	298	4	1.28
B15	298	302	4	1.89
B16	302	306	4	1.02
B17	306	312.4	6.4	.72
B18	313	318	5	.46
B19	318	324	6	.15
B20	324	329.5	5.5	1.13
B21	329.5	334.5	5	1.79
B22	334.5	340	5.5	.10
B23	340	344	4	.82
B24	344	349	5	.87
B25	349	354	5	.77
B26	354	357	3	.82
B27	357	359	2	.92
B28	359	364	5	.82
B29	364	369	5	1.02
B30	369	374	5	1.28
B31	374	377	3	1.28
B32	377	381	4	.92
B33	381	383.25	2.25	1.07
B34	383.25	384.75	1.5	1.85
Hole 5				
C1	159	164	5	0.46
C2	164	170	6	.05
C3	170	176	6	.26
C4	176	182	6	.05
C5	182	186	4	.15
C6	198	203	5	.05
C7	203	209.5	6.5	.05
C8	212	218	6	2.10
C9	218	223	5	.20
C10	223	228	5	.36
C11	356	364	8	.46
C12	364	369	5	1.43
C13	369	376	7	.41
Hole 6				
E1	127	131	4	14.00
E2	131	133	2	16.00
E3	143	148	5	12.50
E4	472	473	1	9.45
E5	479	484.5	5.5	10.70
E6	521.5	523	1.5	11.25
E7	549	550	1	15.40
E8	552	554	2	17.80
E9	557.5	558.5	1	7.00
E10	562.5	563.5	1	8.65
E11	613	614	1	19.95
Hole 7				
G1	233	240	7	1.95
G2	322	325	3	4.85
G3	346	348	2	3.65
G4	367	373	6	1.15
G5	382	384	2	2.45
G6	397.5	404	6.5	1.00
Hole 8				
F1	392.5	395	2.5	5.20
F2	397	398	1	2.40
F3	467	472	5	2.55

APPENDIX C

Diamond Drill Hole Logs

Hole 1
Location: 550 W., 190 N.
Elevation at collar: 8,067.6
Bearing: S. 30° E.
Dip: 20°
Depth: 142 feet (abandoned)

Footage From	Footage To	Interval, feet	Core recovery Inches	Core recovery Percent	Weight, grams Core	Weight, grams Sludge	Description
0	51	51				Sludge was not weighed as it was not representative and the hole was abandoned	Soil and broken rock.
51	55	4	24	50			Broken pegmatite and green actinolite schist.
55	75	20	0	0	None		
75	77	2	24	100	1,300		75-135 normal actinolite schist with chromite in large grains and small knots up to 1/2-in. in diameter. From 76-77, pink pegmatite consisting of quartz and ortheclase.
77	79	2	16	67	700		
79	81	2	23	96	880		
81	83	2	17	71	660		
83	92	9	20	19	710		
92	94	2	11	46	330		
94	98	4	30	5	630		
98	100	2	14	58	480		
100	105	5	22	37	480		
105	110.5	5.5	19	29	410		
110.5	116	5.5	8	12	120		
116	119	4	12	25	210		
119	125.5	6.5	15	19	330		
125.5	131	5.5	36	36	880		
131	135	4	27	56	550		
135	142	7	0	0	None		

Hole 2
Location: 5.50 W., 2.60 N.
Elevation at collar: 8,072.5
Bearing: S. 30° E.
Dip: 40°
Depth: 583 feet

Footage From	Footage To	Interval, feet	Core recovery Inches	Core recovery Percent	Weight, grams Core	Weight, grams Sludge	Description
0	68.5	68.5	0	0	0	0	Overburden and badly weathered quartz-mica schist.
68.5	70.5	2	19	79	?	0	Quartz-mica schist.
70.5	74	3.5	12	29	?	0	do.
74	97	23	0	0	0	0	Unconsolidated.
97	102	5	23	38	425	510	Quartz-mica schist.
102	107	5	36	60	652	1,830	From 106 metadiorite.
107	112	5	18	30	360	1,785	Metadiorite.
112	117	5	18	30	327	(1,060	do.
117	119	2	3	12	059	(	do.
119	122	3	14	39	263	1,113	do.
122	127	5	12	20	260	1,456	One foot dark schist.
127	132	5	0	0	0	1,260	
132	138	6	28	39	480	2,814	To 133 vermiculite granite-pegmatite.
138	143	5	31	52	630	2,840	do.
143	145	2	13	54	185	710	do.
145	147	2	6	25	65	370	do.
147	150	3	29	81	656	280	From 148.5 fine black schist.
150	155	5	34	57	718	655	Fine black schist.
155	160	5	14	23	280	630	From 153 talc-actinolite schist with chromite.
160	165	5	0	0	0	2,749	
165	170	5	36	60	792	19,119	Fine dark green schist.
170	175	5	21	35	405	6,825	Vermiculite to 173.5; quartz 173.5 to 174 thermetadiorite.
175	178	3	26	72	618	2,340	Metadiorite.
178	183	5	57	95	1,553	6,087	do.
183	188	5	31	52	806	6,322	do.
188	193	5	59	98	1,608	8,440	do.
193	198	5	60	100	1,581	8,100	do.
198	203	5	50	83	1,258	8,435	do.
203	208	5	60	100	1,380	15,872	do.
208	213	5	9	15	180	8,910	do.
213	218	5	60	100	1,500	8,941	do.
218	223	5	60	100	1,410	4,250	do.
223	228	5	35	59	760	2,853	do.
228	232	4	20	42	397	1,420	do.
232	238	6	60	83	375	2,960	do.
238	243	5	60	100	1,467	3,900	do.
243	248	5	50	83	1,314	2,081	do.
248	253	5	60	100	1,636	8,459	do.
253	258	5	60	100	1,710	2,210	do.
258	263	5	60	100	1,843	3,475	do.
263	269	6	56	94	1,625	2,990	From 266 gray-green talc-actinolite schist with chromite.
269	274	5	45	75	1,332	1,859	do.
274	279	5	49	82	1,250	1,216	do.
279	281	2	18	75	320	1,319	do.
281	283	2	21	88	414	880	do.
283	286	3	4	11	56	1,503	do.
286	292	6	64	89	1,520	715	do.
292	297.5	5.5	32	49	691	685	do.
297.5	303	5.5	53	81	1,346	210	do.
303	306	3	21	58	516	323	do.
306	311	5	41	69	984	440	do.
311	316	5	38	63	830	640	do.
316	321	5	60	100	1,387	1,240	do.
321	326	5	26	43	462	1,770	Granite-pegmatite
326	331	5	54	90	1,213	645	do.

Footage From	Footage To	Interval, feet	Core recovery Inches	Core recovery Percent	Weight, grams Core	Weight, grams Sludge	Description
331	333.5	2.5	20	66	383	338	Granite-pegmatite.
333.5	339	5.5	60	91	1,278	320	do.
339	342	3	24	66	858	460	do.
342	344	2	14	59	253	67	do.
344	349	5	44	73	975	148	do.
349	354	5	54	90	1,120	278	do.
354	358	4	33	69	630	775	do.
358	363	5	60	100	1,337	865	do.
363	368	5	60	100	1,340	566	do.
368	372	4	36	75	684	435	do.
372	375	3	31	86	639	510	do.
375	380.5	5.5	61	93	1,328	154	do.
380.5	386	5.5	40	61	1,835	375	do.
386	392	6	65	90	1,220	407	From 390.5 gray-green talc-actinolite schist with chromite.
392	397	5	41	69	1,690	716	do.
397	402	5	60	100	1,799	1,143	do.
402	403	1	Lost core		630(	1,200	do.
403	406	3	32	89	1,450(		do.
406	411	5	59	98	1,450	1,575	do.
411	416	5	54	90	1,370	2,991	do.
416	421	5	59	98	1,423	2,000	do.
421	426	5	60	100	1,587	2,871	do.
426	431	5	60	100	1,614	1,783	do.
431	436.5	5.5	38	58	788	1,350	do.
436.5	442	5.5	57	86	1,120	1,351	do.
442	448	6	58	81	1,655	835	do.
448	453	5	37	62	743	781	do.
453	458	5	33	55	659	835	do.
458	462	4	24	50	510	986	do.
462	467	5	49	82	1,028	2,770	do.
467	472	5	45	75	1,035	1,795	do.
472	477	5	48	80	901	995	do.
477	482	5	60	100	1,418	1,050	do.
482	487	5	56	93	1,399	1,231	do.
487	492	5	38	63	867	961	do.
492	496.3	4.3	44	85	1,033	1,412	do.
496.3	501.1	5.4	61	94	1,517	1,737	do.
501.1	507.5	5.8	60	86	1,551	2,246	do.
507.5	513	5.5	49	74	1,438	1,207	do.
513	518	5	60	100	429	1,466	do.
518	523	5	27	45	363	648	do.
523	525	2	24	100	192	541	do.
525	530	5	56	93	1,392	1,279	do.
530	532	2	24	100	685	687	do.
532	538	6	60	86	1,016	1,417	do.
538	542.2	4.2	45	89	940	1,065	do.
542.2	546.6	4.4	52	99	1,462	1,412	do.
546.6	551.8	5.2	59	95	1,532	1,571	do.
551.8	557.3	6.5	58	74	799	1,515	do.
557.3	563	5.7	60	88	697	1,555	Gray-green talc-actinolite schist with chromite.
563	568.5	5.5	39	59	881	992	do.
568.5	571.5	3	36	100	946	435	do.
571.5	573	1.5	11	61	191	647	do.
573	580	7	26	31	551	1,779	From 578 granite pegmatite.
580	583	3	26	72	448	779	do.

Hole 4
Location: 700 W., 130 N.
Elevation at collar: 8,067.3
Bearing: S. 30° E.
Dip: 40°
Depth: 389.1 feet

Footage From	Footage To	Interval, feet	Core recovery Inches	Core recovery Percent	Weight, grams Core	Weight, grams Sludge	Description
0	33	33	0	0	0	0	Soil and unconsolidated rock.
33	35	2	12	50	160	0	Weathered amphibolite.
35	36	1	9.6	80	230	0	Actinolite-talc schist with chromite.
36	39	3	18	50	370	0	do.
39	46	7	18	21.4	350	3,640	do.
46	49	3	33.6	93.3	800	3,233	Granite pegmatite.
49	54	5	18	30	420	2,533	do.
54	59	5	18	30	340	4,088	do.
59	64	5	21.6	35	490	3,012	do.
64	66	2	20.4	85	320(	3,913	Talc-mica schist.
66	69	3	27.6	76.7	380(		Talc-mica schist and vermiculite.
69	70.5	1.5	13.2	73.3	210(	5,390	do.
70.5	75	4.5	23.8	44.1	340(		do.
75	84	9	39.6	36.65	850	7,069	Metadiorite.
84	90	6	6	.834	120	9,790	do.
90	91.5	1.5	18	100	520(	1,573	do.
91.5	92.5	1	9.6	80	220(		do.
92.5	94	1.5	0	0	0	0	do.
94	98.5	4.5	30	55.5	740(	5,590	do.
98.5	101.5	3	30	83.3	710(		do.
101.5	106.5	5	60	100	1,600	2,383	do.
106.5	112	5.5	36	54.5	900	796	do.
112	116	4	25.4	52.9	630	1,386	do.
116	121	5	34.8	58.0	670	1,745	1 in. metadiorite, 4 in. actinolite-talc schist, with chromite.
121	126.5	5.5	18	27.25	370	1,717	Actinolite-talc schist with chromite.
126.5	131	4.5	25.4	47	450	5,400	do.
131	136	5	18.7	31.2	330	5,657	do.
136	141	5	13.2	22.0	250	3,956	Metadiorite.

Footage From	Footage To	Interval, feet	Core recovery Inches	Core recovery Percent	Weight, grams Core	Weight, grams Sludge	Description
141	146	5	42	70	820	8,053	Metadiorite.
146	148	2	20.4	85	390	3,884	do.
148	158	10	0	0	0	5,048	No core recovery.
158	160	2	18	75	310(	4,387	Metadiorite.
160	163	3	28.8	80	580(		
163	168	5	12	20	250	4,167	do.
168	173	5	40.8	68	790	3,917	do.
173	178	5	60	100	1,440	1,635	do.
178	183	5	34.8	58	710	1,928	do.
183	188	5	54	90	1,010	2,890	do.
188	193	5	40.8	68	1,000	3,110	do.
193	199	6	38.4	53.4	870	5,130	Actinolite schist with chromite.
199	204	5	37.2	62	740	3,145	Actinolite schist and chromite.
204	209	5	25.2	42	470	4,340	do.
209	214	5	57.6	96	1,090	3,480	do.
214	219	5	43.2	72	870	3,347	do.
219	223	4	39.6	82.5	910	1,775	do.
223	228	5	37.2	62	760	3,156	do.
228	229	1	4.8	40	20	0	do.
229	234	5	20	34	470	6,430	Metadiorite.
234	237	3	14.4	40	320	978	Talc-mica schist.
237	241	4	15.6	32.5	300	1,350	Metadiorite.
241	246	5	9.6	16	220	6,750	Talc-mica schist.
246	249	3	15.6	43.3	340	4,460	Metadiorite.
249	254	5	42	70	970	5,740	do.
254	256	2	18	75	460(	3,750	do.
256	259	3	20.4	56.6	490(		
259	264	5	13.2	22	280	3,830	do.
264	269	5	30	50	620	3,780	do.
269	274	5	39.6	66	870	3,825	do.
274	279	5	60	100	1,360	5,375	do.
279	282.5	3.5	38.4	91.3	860	5,490	do.
282.5	285.5	3	34.8	96.6	950	535	do.
285.5	288.5	3	24	66.7	630	680	do.
288.5	292	3.5	39.6	94.3	1,160	1,585	do.
292	294	2	21.6	90	690(	5,515	do.
294	298	4	42	87.5	1,130(		Green schist or serpentine and chromite.
298	300	2 (	24	50	615	1,415	do.
300	302	2 (				2,730	do.
302	306	4	46	96	1,700	1,800	do.
306	312.3	6.3	24	31.8	660	3,345	do.
312.3	313	.7			39	2,700	do.
313	318	5	38	63.4	880	4,340	do.
318	324	6	9.5	15.8	185	3,735	do.
324	329.5	5.5	41	62.1	935	1,515	do.
329.5	334.5	5	31.5	52.5	780	2,645	do.
334.5	340	6.5	60.5	91.6	1,487	2,665	Green schist or serpentine and chromite.
340	344	4	41	85.5	962	4,479	do.
344	349	5	60	100	1,480	3,822	do.
349	354	5	60	100	1,350	3,038	do.
354	357	3	25	69.5	528	2,505	do.
357	359	2	24	100	530	2,485	do.
359	364	5	34	56.7	722	1,695	Actinolite-talc schist with chromite.
364	369	5	34	56.7	609	2,580	do.
369	374	5	40	67	608	1,575	do.
374	377	3	36	100	737	1,775	do.
377	381	4	45	93.7	1,041	3,490	do.
381	383.25	2.25	12	44.45	206	973	do.
383.25	384.75	1.5	15	83.3	280(	2,573	9 in. green vermiculite granite.
384.75	386.75	2	16	66.7	340(		
386.75	389.1	2.3	0	0	0	124	do.
Hole 5						Bearing: S. 30° E.	
Location: 9.50 W., 2 N.						Dip: 40°	
Elevation: 8,081.6						Depth: 379 feet	
0	92						Overburden and badly weathered quartz-mica schist.
92	94.2	2.2	18	68	340(	2,396	Quartz-mica schist.
94.2	99.3	5.1	10	16	200(		
99.3	102	2.7	18	55	308	330	do.
102	107	5	30	50	585	2,530	do.
107	112	5	14	23	225	1,232	do.
112	117	5	20	33	311	2,274	do.
117.5	120	2.5	18	60	314	.398	do.
120	125	5	26	43	530	2,210	do.
125	128.5	3.5	26	62	486	554	do.
128.5	133	4.5	17	31	315	2,525	Granite pegmatite.
133	138	5	30	50	720	7,084	do.
138	143	5	28	46	470	4,912	do.
143	148	5	0	0	No core	6,008	Altered quartz-mica schist (?).
148	149	1	12	100	215	No sludge	do.
149	154	5	0	0	No core	5,215	do.
154	159	5	41	68	do.	3,567	Quartz-mica schist.
159	164	5	48	80	1,131	4,837	Gray-green actinolite (?) schist with chromite.
164	170	6	13	18	291	3,015	do.
170	176	6	62	86	1,384	4,229	do.
176	182	6	47	66	990	3,726	do.

Footage From	Footage To	Interval, feet	Core recovery Inches	Core recovery Percent	Weight, grams Core	Weight, grams Sludge	Description
182	188	6	56	78	1,320	2,585	From 186 fine, green schist and granite interbanded.
188	193	5	60	100	1,767	1,067	do.
193	198	5	39	65	991	1,650	do.
198	203	5	42	70	929	1,683	Fine, dark green schist.
203	208.5	5.5	21	32	414	1,654	Gray-green talc actinclite schist to 209.5.
208.5	213	4.5	46	85	1,100	1,443	Granite to 212.
213	218	5	47	78	1,129	3,258	Gray-green talc actinolite schist with chromite.
218	223	5	53	88	973	6,763	do.
223	228	5	21	35	312	7,793	do.
228	233	5	60	100	1,121	6,449	Metadiorite.
233	238	5	46	77	1,025	3,555	do.
238	243	5	49	82	796	1,241	do.
243	248	5	18	30	216	1,593	do.
248	253	5	26	43	409	7,442	do.
253	257	4	15	31	294	7,442	do.
257	262	5	33	55	671	1,301	do.
262	267	5	60	100	1,372	1,535	do.
267	273	6	65	90	1,595	1,566	do.
273	278	5	60	100	1,970	1,180	do.
278	283	5	59	98	1,925	990	do.
283	288.5	5.5	60	91	1,848	855	do.
288.5	294	5.5	65	99	1,965	928	do.
294	299	5	39	65	1,062	620	do.
299	304	5	60	100	1,960	2,107	do.
304	306	2	0	0	No core	1,153	do.
306	311	5	51	85	1,180	2,632	do.
311	318	7	65	77	1,734	3,010	do.
318	323	5	60	100	1,463	2,462	do.
323	328	5	49	82	1,014	1,247	do.
328	333.5	5.5	50	76	1,291	246	do.
333.5	339	5.5	52	68	1,423	265	do.
339	344	5	34	57	868	3,500	do.
344	349	5	60	100	1,438	4,479	do.
349	354	5	60	100	1,550	3,551	do.
354	359	5	38	63	841	2,623	Gray-green actinolite schist with chromite to 356.
359	364	5	30	50	490	462	do.
364	369	5	34	57	661	1,696	do.
369	372	3	13	37	230	515	do.
372	376	4	34	71	537	2,442	do.
376	379	3	25	69	322	2,679	Pegmatite to 377.

Hole 6
Location: 275 N., 2 W.
Elevation at collar: 8,061.8

Bearing: S. 30° E.
Dip: 50°
Depth: 646 feet.

Footage From	Footage To	Interval, feet	Core recovery Inches	Core recovery Percent	Weight, grams Core	Weight, grams Sludge	Description
0	67	67	0	0	0	0	Soil and weathered rock.
67	72	5	28	47	597	0	From 67 to 103 talc-actinolite schist, little chromite.
72	77	5	26	44	620	1,648	do.
77	83	6	29	40	657	1,570	do.
83	88	5	43	72	593	398	do.
88	93	5	32	53	670	451	do.
93	98	5	26	44	543	1,049	do.
98	104	6	25	35	576	1,156	do.
104	109	5	30	50	682	2,813	From 103 to 117, pegmatite and vermiculite.
109	114.5	5.5	11	17	261	3,463	do.
114.5	119.5	5	45	75	1,200	2,222	do.
119.5	125	5.5	33	55	896	1,978	Dark green schist, some chromite, 117 to 121.
125	131	6	34	57	1,017	4,641	From 121 to 148 talc-actinolite schist and chromite. Best chromite apparently from 124 to 124-1/2, 127 to 131, 131 to 133 and 145 to 148.
131	133	2	10	42	467	2,062	do.
133	138	5	8	13	152	3,642	do.
138	143	5	20	33	443	2,882	do.
143	148	5	20	33	1,071	1,973	do.
148	154	6	5	7	53	3,532	From 148 to 164-1/2 soft talc-actinolite schist.
154	159	5	8	13	147	2,966	do.
159	164.5	5.5	18	27	288	2,769	do.
164.5	170	5.5	50	76	1,412	1,943	From 164-1/2 to 185, solid talc-actinolite schist.
170	172.5	2.5	23	77	619	707	do.
172.5	178	5.5	57	87	1,518	2,800	do.
178	182	4	46	96	1,101	981	do.
182	186	4	36	75	944	1,693	do.
186	191	5	47	79	1,147	1,193	Talc-actinolite schist.
191	196	5	28	47	680	760	do.
196	201	5	60	100	1,476	2,300	do.
201	206	5	21	35	470	2,466	do.
206	209	3	12	33	290	1,050	do.
209	213	4	37	77	873	1,131	do.
213	218	5	52	87	1,157	1,365	do.
218	222	4	10	21	234	806	do.

Footage From	Footage To	Interval, feet	Core recovery Inches	Core recovery Percent	Weight, grams Core	Weight, grams Sludge	Description
222	225	3	30	83	615	666	Talc-actinolite schist.
225	227	2	24	100	624	331	do.
227	229.5	2.5	18	60	336	600	do.
229.5	235	5.5	60	91	1,521	1,679	do.
235	240	5	58	97	1,421	236	do.
240	245	5	57	95	1,380	442	do.
245	250	5	30	50	589	419	do.
250	255	5	54	90	1,270	1,679	do.
255	260	5	57	95	1,390	757	do.
260	265	5	37	62	748	738	do.
265	270.5	5.5	61	93	1,397		do.
270.5	273	2.5	30	100	683		do.
273	278	5	52	86	1,184		do.
278	283	5	46	77	999		do.
283	289	6	44	61	943		do.
289	294	5	6	10	129		do.
294	300	6	63	85	1,433		do.
300	306	6	58	80	1,512		do.
306	311.5	5.5	61	93	1,570		do.
311.5	317	5.5	57	87	1,463		do.
317	322	5	56	94	1,427		do.
322	327	5	47	78	1,190		do.
327	332	5	60	100	1,610		do.
332	337	5	60	100	1,368		do.
337	343	6	63	88	1,360		do.
343	348	5	60	100	1,350		do.
348	353.5	5.5	63	96	1,595		do.
353.5	359	5.5	65	99	1,633		do.
359	364	5	60	100	1,617		do.
364	369	5	60	100	1,350		do.
369	375	6	62	86	1,325		do.
375	380	5	53	89	1,172		do.
380	386	6	53	74	1,495		do.
386	392	6	61	85	1,655		do.
392	398	6	64	89	1,370		do.
398	403	5	58	97	1,288		do.
403	408	5	37	62	831		do.
408	413.5	5.5	45	68	1,049		do.
413.5	419	5.5	62	94	1,270		do.
419	423	4	36	75	703		do.
423	428	5	56	93	1,213		do.
428	434	6	62	86	1,536		do.
434	440	6	63	88	1,463		do.
440	446	6	63	88	1,541		do.
446	451	5	60	100	1,475		do.
451	457	6	52	72	1,311		do.
457	462	5	60	100	1,560		do.
462	467.5	5.5	62	94	1,270		do.
467.5	473	5.5	33	50	401		do.
473	479	6	66	92	1,110		Talc-actinolite schist.
479	484.5	5.5	16	24	247		do.
484.5	490	5.5	22	33	476		do.
490	496	6	62	86	1,438		do.
496	502	6	57	79	1,270		do.
502	508	6	60	83	1,311		do.
508	514	6	64	89	1,500		do.
514	520	6	63	87	1,500		do.
520	525	5	60	100	1,566		do.
525	527.5	2.5	30	100	830		do.
527.5	531.5	4	48	100	1,061		do.
531.5	535.5	4	11	23	230		do.
535.5	537	1.5	17	95	583		do.
537	542	5	60	100	1,450		do.
542	547	5	60	100	1,341		do.
547	552	5	60	100	1,620		do.
552	557.5	4.5	62	94	1,715		do.
557.5	563	5.5	20	30	1,586		do.
563	568	5	60	100	1,646		do.
568	573	5	60	100	1,641		do.
573	578.5	5.5	9	14	183		do.
578.5	580.5	2	12	50	188		do.
580.5	585.5	5	60	100	1,575		do.
585.5	590.5	5	60	100	1,618		do.
590.5	596	5.5	25	38	610		do.
596	601	5	56	94	1,227		do.
601	606	5	54	90	1,146		do.
606	612	6	62	86	1,395		do.
612	617.5	5.5	64	97	1,565		do.
617.5	620	2.5	28	93	592		From 617-1/2 to 645 talc-actinolite schist with vermiculite and narrow bands of quartz.
620	623	3	36	100	836		do.
623	629	6	53	74	1,187		do.
629	635	6	63	87	1,411		do.
635	640	5	33	55	747		do.
640	646	6	34	47	705		Granite pegmatite.

Hole 7
Location: 340 N., 150 E.
Elevation at collar: 8,047 feet

Bearing: S. 30° E.
Dip: 50°
Depth: 844 feet.

0	82						Soil and broken weathered rock (quartz-mica schist(?).
82	87	5	36	60	779		Quartz-mica schist, broken but solid.
87	93	6	28	39	505	536	do.
93	100	7	No core				do.
100	105	5	25	42	446	1,832	do.

Footage From	Footage To	Interval, feet	Core recovery Inches	Core recovery Percent	Weight, grams Core	Weight, grams Sludge	Description
105	111	6	5	7	87	1,899	Quartz-mica schist, broken but solid.
111	117	6	48	67	857	2,562	do.
117	122	5	30	50	610	2,049	do.
122	127	5	45	75	873	4,258	From 122 to 142, fine green to black schist.
127	132.5	5.5	39	59	767	2,600	do.
132.5	138.5	6	66	92	550	1,321	do.
138.5	144	5.5	47	71	80	2,355	From 142 to 180, granite pegmatite, variable.
144	148	4	38	79	694	1,452	do.
148	151	3	13	36	192	425	do.
151	156	5	40	67	723	1,264	do.
156	158.5	2.5	17	56	273	723	do.
158.5	164	5.5	41	62	868		do.
164	165	1	No core				
165	170	5	56	77	241		do.
170	175	5	29	49	581		do.
175	180	5	33	55	639		do.
180	182	2	23	97	395		Granite pegmatite, variable.
182	187	5	25	42	570		do.
187	191	4	43	89	938		do.
191	196	5	40	67	842		do.
196	201	5	48	80	1,023		do.
201	206	5	44	73	865		do.
206	208.5	2.5	30	100	691		do.
208.5	213	4.5	19	35	806		do.
213	217	4	15	31	263		do.
217	223	6	11	15	190		do.
223	228	5	50	84	972		do.
228	233	5	No core				
233	234	1	9	75	100		Talc-actinolite schist with chromite (best chromite 322 to 325, 567 to 373, 382 to 384, 397-1/2 to 404).
234	240	6	34	47	707		do.
240	247	7	16	19	340		do.
247	252.5	5.5	No core				
252.5	264	11.5	11	1	150		do.
264	267	3	21	58	242		do.
267	274	7	33	39	555		do.
274	280	6	23	32	391		do.
280	285	5	17	28	354		do.
285	290	5	54	90	1,107		do.
290	295	5	55	92	1,270		do.
295	304	9	14	13	212		do.
304	306.5	2.5	No core				
306.5	312	5.5	40	80	829		Talc-actinolite schist with chromite.
312	316	4	32	67	680		do.
316	321.5	5.5	30.	46	565		do.
321.5	326.5	5	44	74	840		do.
326.5	333	6.5	No core				
333	339	6	7	10	101		do.
339	345	6	31	43	652		do.
345	351	6	66	91	1,410		do.
351	357	6	No core				
357	361	4	17	35	295		do.
361	366	5	41	78	973		do.
366	371	5	59	98	1,175		do.
371	376.5	5.5	60	91	1,446		do.
376.5	381.5	5	15	25	289		do.
381.5	384.5	3	35	97	780		do.
384.5	390	5.5	33	46	718		do.
390	392	2	24	100	595		do.
392	397.5	5.5	40	60	886		do.
397.5	403	5.5	59	89	1,370		do.
403	408	5	60	100	1,494		do.
408	413	5	14	23	263		do.
413	418	5	52	86	1,139		do.
418	423.5	5.5	36	55	688		do.
423.5	427	3.5	33	79	640		do.
427	432.5	5.5	62	94	1,536		do.
432.5	437	4.5	54	100	1,490		do.
437	442	5	52	87	1,462		do.
442	446	4	29	60			do.
446	447	1	29	92			do.
447	448	1	8	67			do.
448	450	2	No core				
450	456	6	12	17			From 450 to 480-1/2, pegmatite.
456	462	6	55	77			do.
462	467.5	5.5	44	67	1,555		do.
467.5	473	5.5	42	64	651		do.
473	479	6	45	63	1,298		
479	484.5	5.5	55	83	280		From 480-1/2 to 489, black basic dike, hard, dense.
484.5	490	5.5	30	46	388		do.
490	492	2	No core				
492	496	3.5	24	57			Pegmatite.
496	500.5	4.5	12	25			do.
500.5	501.5	1	12	100	300		do.
501.5	503	1.5	15	50	171		do.
503	505	2	24	100	497		Black, basic dike, hard, dense.

Footage From	Footage To	Interval, feet	Core recovery Inches	Core recovery Percent	Weight, grams Core	Weight, grams Sludge	Description
505	506	1	7	58	98		Black basic dike, hard, dense.
506	507	1	12	100	340		do.
507	509	2	14	58	274		do.
509	512.5	3.5	27	64	551		do.
512.5	516	3.5	16	38	509		From 510-1/2 to 530, pegmatite.
516	522	6	7	97	102		do.
522	526	4	7	14	95		do.
526	529	3	29	80	486		do.
529	532	3	17	47	267		From 530 to 540, schist and vermiculite, highly altered, silicified in part.
532	536	4	32	67	502		do.
536	540.5	4.5	53	98	1,144		do.
540.5	544	3.5	18	43	305		Granite pegmatite, variable, with inclusions of highly altered schist and vermiculite.
544	550	6	8	11	115		do.
550	555	5	25	42	425		do.
555	557	2	8	30	155		do.
557	558	1	7	58	80		do.
558	563	5	42	70	755		do.
563	569	6	22	31	435		do.
569	575	6	59	82	1,910		do.
575	580	5	32	54	640		do.
580	584	4	16	33	330		do.
584	589	5	60	100	1,150		do.
589	594	5	60	100	1,117		do.
594	597	3	36	100	290		do.
597	603	6	57	79	1,220		do.
603	608	5	40	67	795		do.
608	613	5	58	96	1,145		do.
613	618	5	60	100	1,260		do.
618	623	5	53	89	1,010		do.
623	628	5	57	95	1,170		do.
628	630	2	20	83	450		do.
630	636	6	55	76	1,490		do.
636	642	6	60	83	1,522		do.
642	646	4	43	90	1,032		do.
646	651	5	36	60	872		do.
651	656	5	60	100	1,513		do.
656	661.5	5.5	46	70	1,044		do.
661.5	666	4.5	21	39	357		do.
666	670	4	8	17	135		do.
670	673	3	12	33	237		do.
673	678	5	42	70	1,023		do.
678	682	4	34	71	761		Silicified schist (hornblende schist?).
682	686	4	28	58	654		do.
686	691	5	35	58	852		do.
691	696	5	44	73	1,046		do.
696	701	5	23	38	536		do.
701	706	5	27	45	629		do.
706	710	4	2	4	15		do.
710	711	1	1.5	12	19		do.
711	717	6	19	26	360		do.
717	719	2	15	62	314		Granite pegmatite with altered talc actinolite schist.
719	724.5	5.5	30	45	672		Granite pegmatite with altered talc actinolite schist inclusions and vermiculite.
724.5	730	5.5	66	100	1,426		do.
730	731	1	8	67	130		do.
731	736	5	48	80	1,071		do.
736	741	5	56	93	1,358		do.
741	746	5	56	93	1,429		do.
746	751	5	52	87	1,238		do.
751	755	4	28	58	589		From 751 to 758, pink pegmatite.
755	760	5	45	75	953		do.
760	765	5	30	50	636		From 758 to 772, fine grained talc actinolite schist.
765	771	6	39	54	840		do.
771	775.5	4.5	37	69	493		From 772 to 786, pegmatite.
775.5	781	5.5	23	35	600		do.
781	786	5	31	52	600		do.
786	792	6	63	88	1,570		Green schist in part silicified pegmatite inclusions.
792	796	4	17	35	306		do.
796	802	6	63	88	1,439		do.
802	804	2	No core				
804	811	7	29	35	509		do.
811	816.5	5.5	6	9	72		do.
816.5	822	5.5	34	52	592		do.
822	827	5	21	35	369		do.
827	832	5	20	33	302		From 828 to 837, hard, black, dense rock.
832	835	3	18	50	337		do.
835	838	5	33	50	602		From 837 to 840-1/2, white quartz with much biotite.
838	840.5	2.5	30	100	482		do.
840.5	844	3.5	12	29	92		Granite with muck biotite.

Hole 8
Location: 275 N., 5 E.
Elevation at collar: 8,012.5

Bearing: S. 30° E.
Dip: 50°
Depth: 555 feet

Footage From	Footage To	Interval, feet	Core recovery Inches	Core recovery Percent	Weight, grams Core	Weight, grams Sludge	Description
0	83	83	0	0			Soil and weathered rock.
83	99	16	0	0			Granite pegmatite
99	104.5	5.5	9	13	162	969	do.
104.5	110	5.5	8	12	161	2,381	do.
110	116	6	45	63	876	1,513	do.
116	121	5	52	87	1,078	458	do.
121	126	5	32	53	645	204	Dark green, fine schist.
126	131	5	11	18	210	2,284	do.
131	136	5	25	42	497	1,900	Hard, black rock (basic dike).
136	141	5	8	13	140	1,810	do.
141	146	5	3	5	49	2,765	do.
146	148	2	7	19	130	1,615	do.
148	150	2	5	21	67	821	do.
150	154	4	10	21	208	736	do.
154	158.5	4.5	28	52	527	1,786	Very dark green, fine schist.
158.5	163.5	5	33	55	637		do.
163.5	167	3.5	31	74	567		do.
167	172	5	53	89	1,258		do.
172	175	3	25	70	545		do.
175	180	5	13	22	226		Granite pegmatite.
180	187	7	44	52	728		do.
187	193	6	42	59	792		do.
193	199	6	51	72	934		do.
199	202	3	33	92	664		do.
202	207	5	55	92	1,446		do.
207	213	6	36	50	775		do.
213	217	4	31	65	592		do.
217	221	4	9	19	173		do.
221	226	5	30	50	539		do.
226	231	5	21	35	376		do.
231	233	2	5	21	77		do.
233	237	4	24	50	428		do.
237	243	6	59	82	1,260		do.
243	248	5	36	60	717		do.
248	254	6	32	45	590		do.
254	260	6	29	40	531		do.
260	265.5	5.5	63	96	1,250		do.
265.5	271	5.5	22	28	445		do.
271	276	5	28	47	528		do.
276	281	5	34	57	660		do.
281	285	4	21	44	295		do.
285	287	2	16	67	290		do.
287	292	5	22	37	396		do.
292	295	3	27	75	410		do.
295	299	4	48	100	911		do.
299	304	5	60	100	643		Granite pegmatite.
304	309	5	58	96	1,188		do.
309	314	5	60	100	1,462		From 308 to 329, dark gray schist, highly silicified.
314	318.5	4.5	23	43	434		do.
318.5	323.5	5	21	35	371		do.
323.5	326	2.5	30	100	487		do.
326	331	5	45	75	859		do.
331	336	5	40	66	829		Pegmatite
336	341.5	5.5	18	33	352		do.
341.5	347	5.5	33	50	753		do.
347	352	5	28	47	491		do.
352	358	6	66	92	1,294		do.
358	362	4	33	69	675		Variable, silicified schist.
362	365	3	31	86	528		do.
365	368	3	23	64	435		do.
368	371	3	36	100	730		do.
371	375	4	38	79	778		do.
375	380	5	60	100	1,590		From 372 to 391, metadiorite.
380	385	5	60	100	1,470		do.
385	391	6	40	56	819		do.
391	396.5	5.5	55	85	1,300		Talc-actinolite schist (best chromite apparently from 397 to 398, 466 to 472 ft).
396.5	402	5.5	53	80	1,248		do.
402	407	5	42	70	918		do.
407	411	4	48	100	1,177		do.
411	414	3	8	22	189		do.
414	418	4	22	46	427		do.
418	421	3	12	33	247		do.
421	426	5	60	100	1,290		do.
426	431	5	0	0			do.
431	436	5	27	45	589		do.
436	441	5	0	0			do.
441	443	2	7	29	148		do.
443	446	3	5	14	80		do.
446	447.5	1.5	3	16	36		do.
447.5	451	3.5	42	100	1,012		do.
451	456	5	60	100	1,440		do.
456	460	4	47	98	1,067		do.
460	463	3	26	72	592		do.
463	468.5	5.5	62	94	1,317		do.
468.5	474	5.5	44	67	992		do.
474	478	4	36	75	872		do.

Footage From	Footage To	Interval, feet	Core recovery Inches	Core recovery Percent	Weight, grams Core	Weight, grams Sludge	Description
478	481	3	36	100	908		Talc-actinolite schist.
481	486	5	60	100	1,532		do.
486	489	3	36	100	912		do.
489	495	6	61	85	1,545		do.
495	499	4	43	90	1,030		do.
499	504	5	60	100	1,403		do.
504	509.5	5.5	46	70	1,035		do.
509.5	514	5.5	42	78	983		do.
514	519.5	5.5	38	58	812		do.
519.5	521.5	2	13	54	218		do.
521.5	527.5	6	15	21	287		do.
527.5	533	5.5	57	87	1,211		do.
533	538	5	60	100	1,260		do.
538	544	6	13	18	130		do.
544	549.5	5.5	27	41	485		do.
549.5	553	3.5	18	43	415		do.
553	555	2	22	92	430		White quartz (pegmatite).