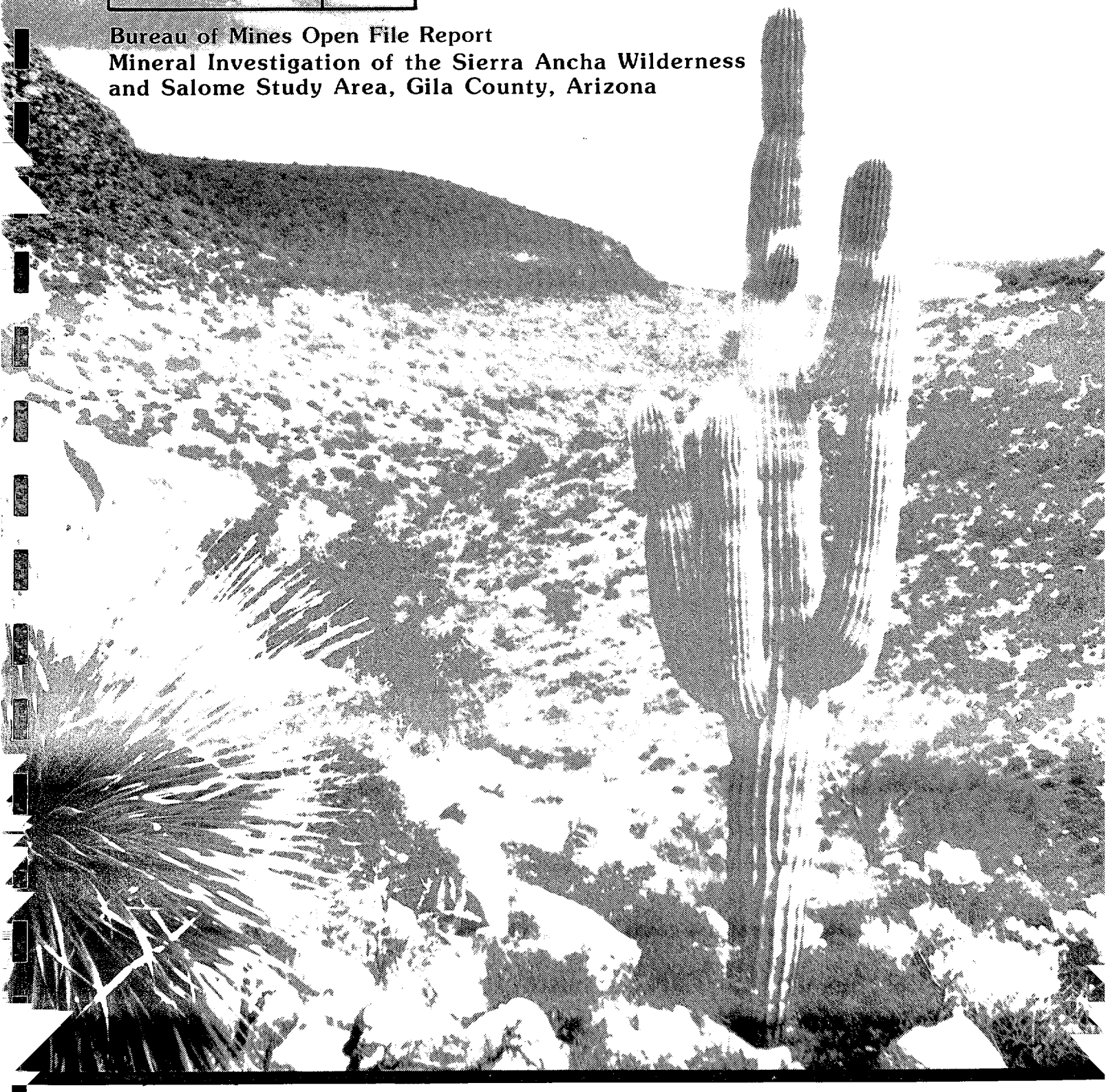
MLA 34-85

Bureau of Mines Open File Report
Mineral Investigation of the Sierra Ancha Wilderness and Salome Study Area, Gila County, Arizona



United States Department of the Interior
Bureau of Mines

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BUREAU OF MINES

MINERAL INVESTIGATION OF THE SIERRA ANCHA WILDERNESS AND SALOME STUDY AREA, GILA COUNTY, ARIZONA

by

Thomas D. Light

MLA 34-85
1985

This open-file report summarizes the results of a Bureau of Mines wilderness study and will be incorporated in a joint report with the Geological Survey. The report is preliminary and has not been edited or reviewed for conformity with the Bureau of Mines editorial standards. Work on this study was conducted by personnel from Intermountain Field Operations Center, Building 20, Denver Federal Center, Denver, CO 80225.

STUDIES RELATED TO WILDERNESS

WILDERNESS AND STUDY AREAS

In accordance with the provisions of the Wilderness Act (Public Law 88-577, September 3, 1964) certain areas within the national forests previously classified as "wilderness," "wild," or "canoe," were incorporated into the National Wilderness Preservation System. The act provides that areas under consideration for wilderness designation should be studied for suitability for incorporation into the Wilderness System. The act stipulates that the Bureau of Mines and the Geological Survey conduct surveys to determine the mineral values, if any, that may be present. The results of such surveys are to be made available to the public and submitted to the President and Congress.

This report presents the results of the mineral survey of the Sierra Ancha Wilderness and Salome Study Area conducted by the U.S. Bureau of Mines. A combined summary report of work done by the U.S. Geological Survey and U.S. Bureau of Mines has been previously published.

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MINERAL RESOURCES OF THE SIERRA ANCHA WILDERNESS AND SALOME STUDY AREA, GILA COUNTY, ARIZONA

by

Thomas D. Light1/

SUMMARY

The Bureau of Mines conducted a survey in 1978 of the mineral resources of the Sierra Ancha Wilderness, 20,850 acres, and Salome Study Area, 18,900 acres, Gila County, Arizona. These areas are in the Tonto National Forest about 30 miles north of Globe, Arizona.

The Sierra Ancha Wilderness contains deposits of asbestos, iron, and uranium. Asbestos deposits are projected to underlie the southern half of Center Mountain and in the Asbestos Point-Zimmerman Point area. Iron deposits with indicated subeconomic resources of 15 million tons averaging 26.5 percent iron are present at Zimmerman Point, and inferred subeconomic resources of 6 million tons averaging greater than 40 percent iron occur at the Pueblo and Lucky Strike Mines. Uranium resources within the wilderness probably exceed several million pounds of uranium. Copper and silver mineralization occurs locally within the wilderness, but deposits were not identified. Fluorspar has been mined from the McFadden fault zone adjacent to the wilderness, and several thousands of tons of fluorspar resources can be projected to occur in the adit within the wilderness. No identified mineral resources were found in the Salome Study Area during this investigation.

1/ Geologist, Intermountain Field Operations Center, Denver Colorado (now with Branch of Exploration Geochemistry, U.S. Geological Survey, Denver, Colorado).

INTRODUCTION

The U.S. Bureau of Mines conducted a mineral survey of the Sierra Ancha Wilderness, and the Salome Study Area, Gila County, Arizona, in 1978. These areas lie in the southern Sierra Ancha Range in the Tonto National Forest, approximately 30 miles north of Globe, Arizona and 75 miles northeast of Phoenix, Arizona (figure 1).

The Sierra Ancha Primitive Area, containing 34,000 acres, was established in 1933. When the area was designated a Wild Area in 1951, the boundaries were revised. The Sierra Ancha Wilderness, established by the Wilderness Act of 1964, encompasses an area of 20,850 acres. In 1973, the U.S. Forest Service in their RARE (Roadless Area Review and Evaluation) study proposed that 1,500 acres on McFadden Horse Mountain be added to the wilderness, and that the Salome Study Area of 18,900 acres be added to the National Wilderness Preservation System. The addition and study area were classified as non-wilderness areas by the U.S. Forest Service in their RARE II study (U.S. Department of Agriculture, 1979, p. 20).

Access to the wilderness is provided by Arizona Highway 288 on the west and the Cherry Creek road on the east. The Cherry Creek road leaves Highway 288 about 2 miles north of the Salt River bridge, then goes south of the wilderness to Cherry Creek, then northward along Cherry Creek to P B Creek. The Cherry Creek road then trends northward to rejoin Highway 288 at Bore Tree Saddle, 11 miles south of Young, Arizona. Several other dirt roads provide access to various portions of the wilderness.

The Salome Study Area lies west of the Sierra Ancha Wilderness along Salome Creek. Several dirt roads provide access to most of the area. Connecting Highway 288 and Tonto Basin, the A-Cross road passes within 1 mile of the area on the south side. Highway 288 crosses Reynolds Creek approximately

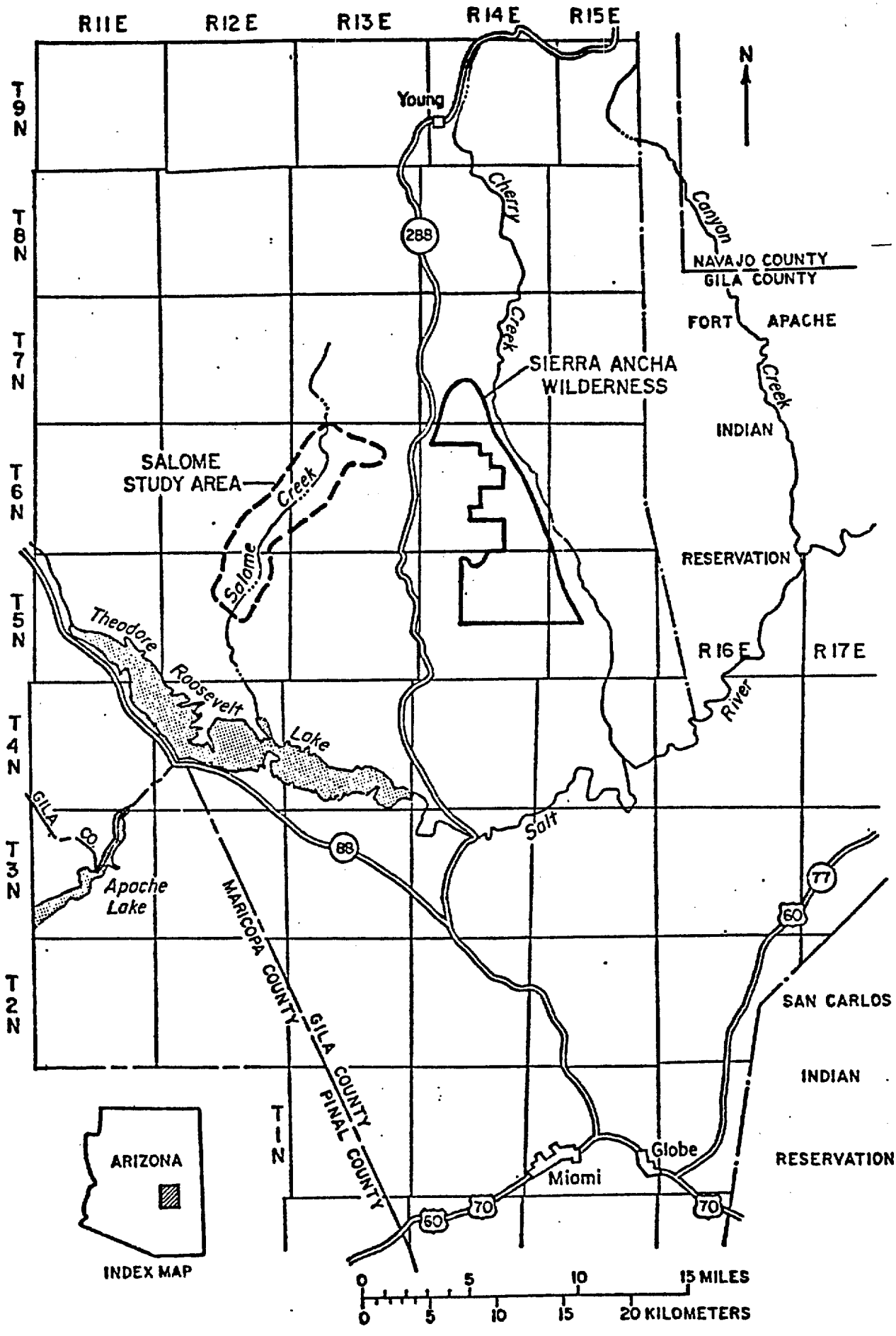


Figure 1. - Location of the Sierra Ancha Wilderness and Salome Study Area, Gila County, Arizona.

1 mile from the eastern boundary. Access to the northern and western portions of the area is provided by a network of Forest Service roads which start at either the A-Cross road or Highway 288.

The Sierra Ancha Wilderness consists of broad, flat-lying mesas with deeply-incised stream valleys, typical of the transition zone between the Colorado Plateau and the Basin and Range physiographic provinces (Hayes, 1969, 35). The major portion of the Sierra Ancha Wilderness lies on the steep western wall of the Cherry Creek Canyon. Elevations range from 3,000 feet on the southeast corner of the wilderness to over 7,600 feet at Aztec Peak. The topography in the wilderness is flat on the mesa tops, such as McFadden Horse Mountain, but very steep to vertical along the slope of Cherry Creek Canyon. Steep slopes, abundant talus, and dense vegetation all inhibit access throughout the area. Water is normally available in springs and seeps in many areas. However, during the summer months, and especially in dry years, water is locally unavailable. Temperatures are normally moderate throughout much of the year, but may exceed 100° F in the lower areas during the summer months. In wet years snow in the higher areas essentially prohibits travel during the winter months.

The Salome Study Area encompasses the stream channels and adjacent slopes of lower Reynolds Creek and middle Salome Creek. Elevations range from 2,600 feet in the south to over 6,300 feet in the north. The relief is fairly gentle along parts of the stream channels, but is normally very steep to vertical on the slopes. Access to parts of the area is severely limited, even to travel by foot, because of the locally precipitous terrain. Slopes are generally covered with talus and debris which also hinders travel. Water is usually available in the streams, except in dry years. Temperatures are

moderate throughout much of the year, but reach over 100° F during the summer months.

Previous studies

Numerous reports have been published on the mineral deposits of the Sierra Ancha Range. Stewart (1955; 1956) described the chrysotile asbestos deposits of Arizona, several of which are within or adjacent to the wilderness. Harrer (1964) described several hematite and magnetite occurrences in and around the wilderness. Granger and Raup studied the geology of the uranium deposits (1969b) and described most of the mine workings in detail (1969a). Several of the workings were also examined jointly by the U.S. Atomic Energy Commission and the U.S. Geological Survey (1970). R. Schwartz examined many of the uranium deposits and has been cited by many authors. His report (Schwartz, 1957) was issued by the U.S. Department of Energy in 1978.

A generalized interpretation of the data contained in this report was published by Light (1981). Duval and Pitkin (1981) and Kulik (1981) presented results of geophysical investigations. Barton and others (1980), Negri and others (1980), and Tripp and others (1980) reported geochemical and mineralogical studies of the area. The mineral resource potential of the Sierra Ancha Wilderness and Salome Study Area was compiled by Otton and others (1981).

Present investigation

Prior to field investigations a detailed review of the published and unpublished literature on the geology and mineral activity in the area was completed. Location notices of mining claims were examined in the Gila County Recorder's Office in Globe for the location of claims in and near the areas studied. The records of the Bureau of Land Management State Office in Phoenix were checked for patented claims and mineral leases, but none were

found to be in the area under investigation. Plate 1 shows the locations of unpatented mining claims that could be accurately located in and near the study areas. Many claim notices had vague location descriptions, and consequently, the locations of these claims could not be plotted.

Field investigations by the U.S. Bureau of Mines personnel focused on known mines, prospect workings and mineralized areas. Surface and underground workings in the Sierra Ancha Wilderness and the Salome Study Area, and many workings in the surrounding area, were mapped and sampled. Known locations of mining claims were examined and sampled, where mineralization or workings were encountered.

The U.S. Bureau of Mines collected 440 samples from locations shown on plate 1. All samples, except those taken for asbestos, were spectrographically analyzed for 40 elements, and specific samples were assayed for gold, silver, copper, lead, zinc, barium, uranium, vanadium, and/or fluoride. The spectrographic analyses are on file at the U.S. Bureau of Mines, Intermountain Field Operations Center, Denver, Colorado, and are available for inspection. Samples that could be plotted accurately from previously published reports are included in this report. Panned-concentrate samples of stream sediments were taken from 22 localities. At most of these locations stream sediment samples were also taken, and both types of samples were fire assayed for gold and silver, and spectrographically analyzed for 40 elements.

All known uranium-bearing areas were examined with either a Geiger counter or a gamma-ray spectrometer. Chip samples were taken at each working and were analyzed for uranium content.

Analyses of 37 asbestos samples were made by crushing and then testing in a Quebec Standard Testing Machine to determine the grade and the amount and character of fiber in the samples.

Acknowledgments

The field work was assisted by J. Coursey, N. Anderson, L. Hamm, S. Brown, and J. Brown, all of the U.S. Bureau of Mines, and by T. Biggs, a part-time student employee. The cooperation and assistance of officials of the Tonto National Forest and Arizona Department of Mineral Resources is gratefully acknowledged. T. Clary and R. Mayberry, Pinal Minerals and Mining Company, contributed information on uranium mineralization through field trips and many discussions. G. Ryberg of B and B Mining Company and A. Tipton and J. Jones of Wyoming Minerals Corporation discussed their company's exploration programs and shared some of their knowledge of the area. The cooperation of local residents is greatly appreciated, especially that of N. Ellison, F. Meadows, B. Wilson, and E. C. Conway, all of whom accompanied the author to their individual claims. T. E. Ellison and A. Haught provided much information on mining history.

GEOLOGIC SETTING

The Sierra Ancha Wilderness and vicinity is underlain by igneous and sedimentary rocks of Precambrian age. The sedimentary rocks are nearly flat lying except near monoclines, which represent the major structural features. Several faults are in the area, the most notable being the east-west trending McFadden fault that cuts the northern part of the wilderness. The geology of the Sierra Ancha Wilderness and vicinity including the proposed addition and the Salome Study Area has been mapped by the U.S. Geological Survey (Berquist and others, 1981); also detailed description of the rock units have been published by the U.S. Geological Survey (Granger and Raup, 1964 and 1969b; and Shride, 1967).

A generalized stratigraphic section of the Precambrian rocks is shown in figure 2. The Ruin Granite is the oldest unit, and is unconformably overlain by the Apache Group rocks. The Apache Group consists, in ascending order, of the Scanlam Conglomerate, Pioneer Formation, Dripping Spring Quartzite, Mescal Limestone, and an unnamed basalt. The Troy Quartzite overlies the Apache Group. Diabase has intruded the Troy Quartzite and older rocks as a large sill with associated dikes; in some place the sill is over 1,000 feet thick. Locally Tertiary gravel deposits and Quaternary alluvial, terrace, and landslide deposits occur.

The Dripping Springs Quartzite is a host rock for uranium deposits and the Mescal Limestone for asbestos and iron deposits. The McFadden fault contains a fluorspar deposit. Minor copper mineralization due to hydrothermal activity, associated with the intrusion of the diabase, is present in the Mescal Limestone and the overlying basalt.

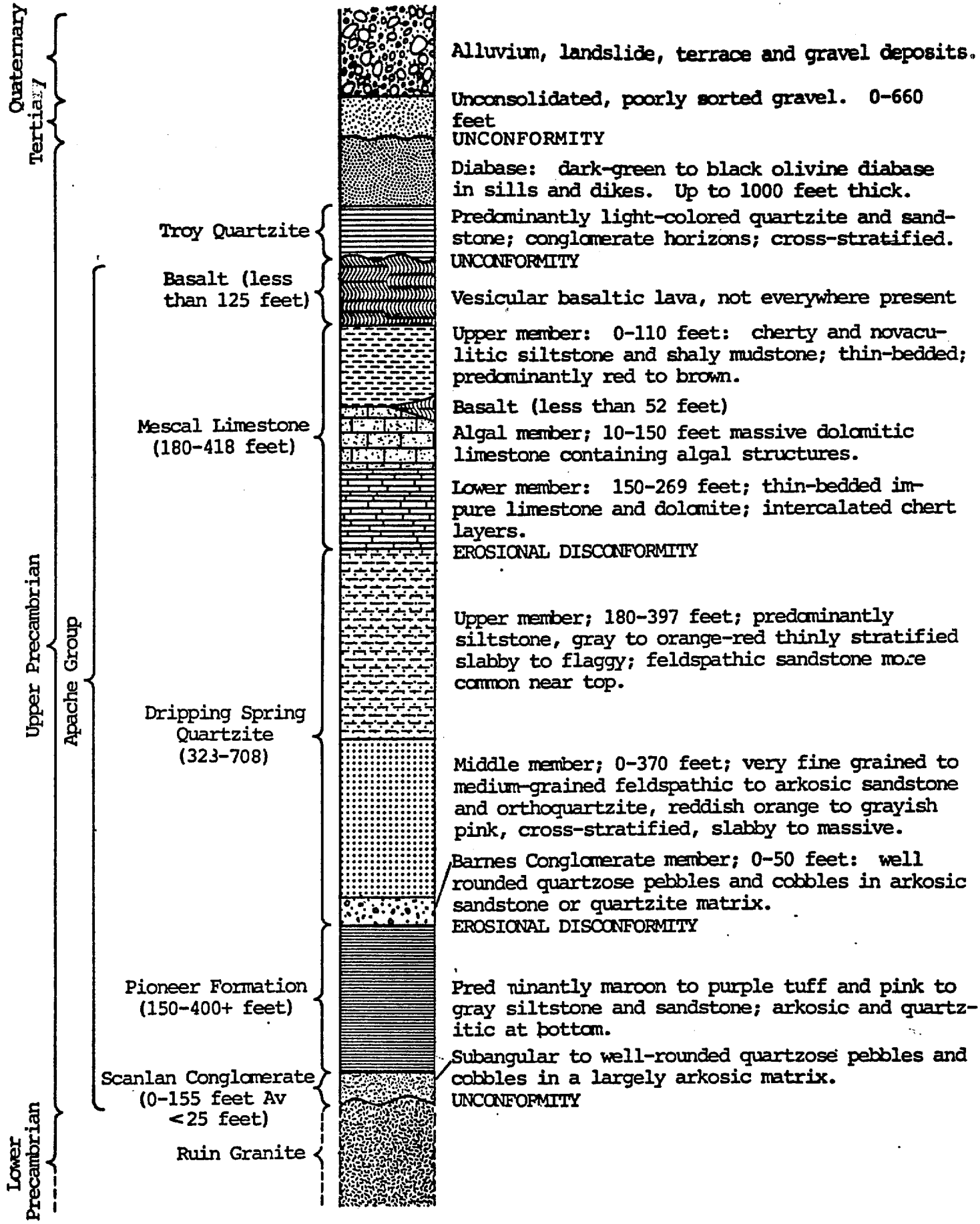


Figure 2. - Generalized stratigraphic section of the Sierra Ancha Wilderness and vicinity, Gila County, Arizona (compiled from Granger and Raup, 1964, p. 6, and from Bergquist, Shride, and Wrucke, 1981).

MINING HISTORY AND PRODUCTION

Mining activity in the Sierra Ancha Mountains has been sporadic over the past 100 years. Approximately 4,000 mining claims have been recorded as being in the Sierra Ancha Wilderness and Salome Study Area. The earliest claims were staked over minor copper showings, but none of these was developed. The majority of the claims was located in and around the wilderness for uranium or asbestos. Production has been reported from some of the claims. Several claims have been staked on iron occurrences but no iron production has been reported. Claims have been located for fluorspar between the wilderness and the Salome Study Area and in 1979 a fluorspar mine was in operation. Mineral occurrences are sparse in the Salome Study Area. Some claims have been located in and adjacent to the study area but no production has been reported. About 3 miles west of the study area, some barite and copper may have been produced from the Journigan and Saguaro Mines but there are no official records of such production.

Most of the asbestos claims in the Sierra Ancha region were originally located between 1913 and 1920 (Wilson, 1928, p. 24). The Pueblo, Lucky Strike, American Ores, and Reynolds Falls Mines have produced some asbestos. Although no production figures are available from the Pueblo or Lucky Strike Mines, the size of the workings indicates that a minimum of several thousand tons of fiber has been mined. The American Ores and the Reynolds Falls asbestos mines both lie about 1 mile outside the wilderness. Approximately 1,700 tons of fiber were produced from the American Ores Mine between 1916 and 1927 (Wilson, 1928, p. 67), and about 250 tons of fiber were produced from 1958-1963 (Rex Town, oral communication, 1979). From 1941 to 1958, the Reynolds Falls Mine produced at least 150 tons of asbestos fiber (U.S. Bureau of Mines production data).

Uranium was first discovered in the Dripping Spring Quartzite along Warm Creek by Carl Larsen in 1950. The discovery site was on the Red Bluff claims in the SE 1/4 sec. 31, T. 5 N., R. 14 E. In 1954 the U.S. Atomic Energy Commission (AEC) announced that it would conduct an airborne survey to define areas of radioactive anomalies in the Sierra Ancha, and that the result of that study would be made available to the public. This announcement started a uranium rush which lasted until 1957 (Granger and Raup, 1969b, p. 63). Uranium development was encouraged when the AEC established an ore-buying depot in Cutter, Arizona, 8 miles east of Globe in 1958. The AEC financed the construction of two roads in the Sierra Ancha region: 1) the upper Cherry Creek road, from the Ellison Ranch north to the Globe-Young highway at Bore Tree Saddle; and 2) the Bull Canyon road, from the Cherry Creek road, west of Cherry Creek, to the head of Bull Canyon. The Defense Minerals Exploration Administration (DMEA) issued loans to several mine operators in the area to aid in development of their properties. After determining that the ore volume and grade being delivered did not justify the cost of the operation, AEC closed the Cutter buying depot in June 1957. The Hope Mine continued producing until 1960, but all the other mines ceased operation when the buying depot was closed (Granger and Raup, 1969b, p. 63).

Table 1 lists the uranium production from mines in and around the Sierra Ancha Wilderness. A total of 21,857.5 tons of ore averaging 0.24 percent U_3O_8 was produced from the 13 mines. In addition, six mines produced 1,154.5 tons of "No-Pay Ore"; this tonnage was called "No-Pay Ore" because the U_3O_8 content was less than 0.10 percent and the AEC would not buy any production below that figure. At the grades listed in Table 1, the 1,154.5 tons of "No-Pay Ore" contained 1,713.6 pounds of U_3O_8. The value of the Pay Ore would be

$1,573,740 based on the price listed by the Nuclear Exchange Corp. for January 1985, at $15.00 per pound U_3O_8.

Table 1. - Uranium production, Sierra Ancha Wilderness and vicinity1/.

Mine	Location	Production "No-Pay Ore" Tons	Production "No-Pay Ore" %U_3O_8	Purchased by AEC Tons	Purchased by AEC %U_3O_8
Big Buck	Sec. 25, T. 6 N., R. 14 E.	--	--	279	0.14
Black Brush	Sec. 10, T. 6 N., R. 14 E.	11	0.07	8	.11
Donna Lee	Sec. 13, T. 5 N., R. 14 E.	--	--	12	.16
Horseshoe	Sec. 10, T. 5 N., R. 14 E.	7.5	.02	6.5	0.17
Red Bluff2/	Sec. 31, T. 6 N., R. 14 E.	213	.09	2,796	.20
Sue	Sec. 19, T. 5 N., R. 14 E.	--	--	450	.21
Workman Creek Group2/					
Hope	Sec. 30, T. 6 N., R. 14 E.	--	--	9,050	.30
Jon	Sec. 29, T. 6 N., R. 14 E.	49	.09	157	.10
Little Joe	Sec. 19, T. 6 N., R. 14 E.	--	--	2,703	.20
Lost Dog	Sec. 30, T. 6 N., R. 14 E.	522	.07	1,040	.17
Lucky Stop	Sec. 30, T. 6 N., R. 14 E.	259	.07	2,588	.16
Suckerite	Sec. 24, T. 6 N., R. 14 E.	--	--	2,603	.23
Workman	Sec. 19, T. 6 N., R. 14 E.	93	.07	165	.13
		1,154.5		21,857.5	

1/ Data from Schwartz, 1957, p. 56.
2/ Outside the area of this report.

Escalation of the sale price of uranium in the early 1970's encouraged a resurgence of uranium exploration in the Dripping Spring Quartzite (However, prices for uranium since then have again dropped.). Several companies took new leases on nearly all of the old mines in the Sierra Ancha. Wyoming Minerals Corp., Globe, leased the Red Bluff Mine and several properties in the Workman Creek Area. In 1979 they were exploring the properties to determine the extent, grade, and accessibility of the uranium mineralization. Wyoming Minerals Corp. and B and B Mining Company, Prescott, Arizona, entered a joint venture agreement to explore in the Deep Creek-Bull Canyon area. Sierra Ancha Minerals and Mining, Ltd., leased some of the properties near Workman Creek, and staked additional claims in the area.

Fluorspar production in the area has been limited to the Mack Mine which lies 1-1.5 miles west of the wilderness and 1 mile northeast of the Salome Study Area on the south flank of McFadden Peak. Approximately 30,000 tons of ore averaging 60-90 percent CaF_2 were mined from 1976, when production began, to 1978. The mine was still active in 1979.

MINES, PROSPECTS, AND MINERALIZED ZONES

Sierra Ancha Wilderness

Asbestos, fluorspar, iron, and uranium occur in various places throughout the Sierra Ancha Wilderness. If the Mescal Limestone had been adequately subjected to karstification and silicification before intrusion of the diabase, then conditions are favorable for the growth of chrysotile asbestos during thermal metamorphism (Shride, oral communication, 1978). The main areas where all these conditions were met are: 1) the east side of Center Mountain; 2) in upper Reynolds Creek; 3) the Asbestos Point-Zimmerman Point area; 4) the southwest slope of McFadden Horse Mountain. The projection of the diabase-Mescal Limestone contact from the Pueblo and Lucky Strike Mines, on the east side of Center Mountain, to the Reynolds Falls Mine, in upper Reynolds Creek, outlines a favorable contact-metasomatic environment that may have developed large quantities of asbestos underlying Center Mountain.

Fluorspar occurs in the McFadden Fault west of the wilderness. Magnetite occurs in the Mescal Limestone where silty beds have been metasomatically replaced by iron-bearing solutions during intrusion of diabase sills and dikes (Harrer, 1964, p.26).

The black facies of the Dripping Spring Quartzite is the host rock for uranium deposits, and the formation underlies nearly all of the wilderness. Uranium deposits are numerous in and around the wilderness where erosion has exposed the black facies. The large area of black facies which underlies the wilderness may contain a considerable number of concealed deposits.

One prospect containing anomalous silver and copper occurs on the ridges flanking Gold Creek (sample nos. 114-116 and 128-131, plate 1).

Asbestos

Asbestos deposits in the Sierra Ancha are normally restricted to the middle member of the Precambrian Mescal Limestone in areas where the limestone has been serpentinized at or near intrusions of diabase. Zones of serpentine are essentially parallel to the bedding in the limestone, mostly where favorable stratigraphic zones, which had previously undergone karstification and silicification (Shride, 1967, p. 35), served as the conduit for the emanating magmatic fluids. The magmatic fluids created a thermochemical reaction in which ionic mobilization of the magnesium from the limestone and the diabase promoted serpentine formation. Within the serpentine, chrysotile asbestos developed as cross-fiber veins, with fibers elongated approximately perpendicular to the vein.

Asbestos veins locally pinch, swell, and roll irregularly within the serpentine. The length of the chrysotile zones (width of the vein) is normally less than 1/2 inch, but may reach lengths of several inches. An individual serpentinized bed may contain numerous visible chrysotile veins, constituting up to 40 percent of the serpentine zone. Locally, short fibers (less than 1/8 inch) are dispersed throughout the serpentine.

The nearly horizontal asbestos deposits were mined by room and pillar, or longwall mining methods with some backfilling. Ore was hand-cobbed and, because of the haulage distance and lack of good roads, only the longest fibers were shipped to the mills. Much of the short-fiber asbestos contained in the massive serpentine went to the dumps.

Asbestos was first discovered in Gila County by Charlie Newton in 1872 (Melhase, 1925, p. 805). However, the asbestos properties in the Sierra Ancha region were not located until 1913, and most of the major properties had been staked by 1920 (Wilson, 1928, p. 24).

The American Ores, Lucky Strike, Pueblo, Reynolds Falls, and Rosa asbestos mines are all on the periphery of the wilderness. Several claims for asbestos have been staked along Workman Creek, but no mineralization was noted in this area. Figure 3 shows the locations of asbestos mines in and around the Sierra Ancha Wilderness.

Asbestos fiber is graded by crude and fiberized standards. The crude standard represents the fiber length measured before crushing. Chrysotile veins appear to be composed of one length fiber, but are normally an aggregate of shorter intertwined fibers. For that reason a separate grade standard is used to define the fiber length after the crude has been crushed and sieved. Table 2 lists the Arizona Standard for determining the fiber classification based on crude lengths and grade of fiber for fiberized samples.

Chrysotile fiber is considered soft if it bends and the fibers part easily; if the fiber is stiff and breaks when bent, it is considered harsh. All grades of fiber between these two extremes occur in the Sierra Ancha deposits, and the quality of fiber within a particular vein may vary considerably over several feet or tens of feet. The harshness of chrysotile fiber is in direct proportion to the amount of calcite surrounding the fibers (Wilson, 1928, p. 11).

Values used in estimating the amount of fiber which may have been mined from individual asbestos workings were determined from: the size of the area excavated; observed thickness of remaining asbestos veins; and an assumed value of 2.3 for the specific gravity of chrysotile. Because the asbestos was hand cobbed, only the fiber lengths of the longest remaining fiber, rather than the average fiber content, were used to estimate production. In reality, the fiber lengths remaining probably represent a cutoff length, and the asbestos which was mined may have been much longer fiber. Therefore,

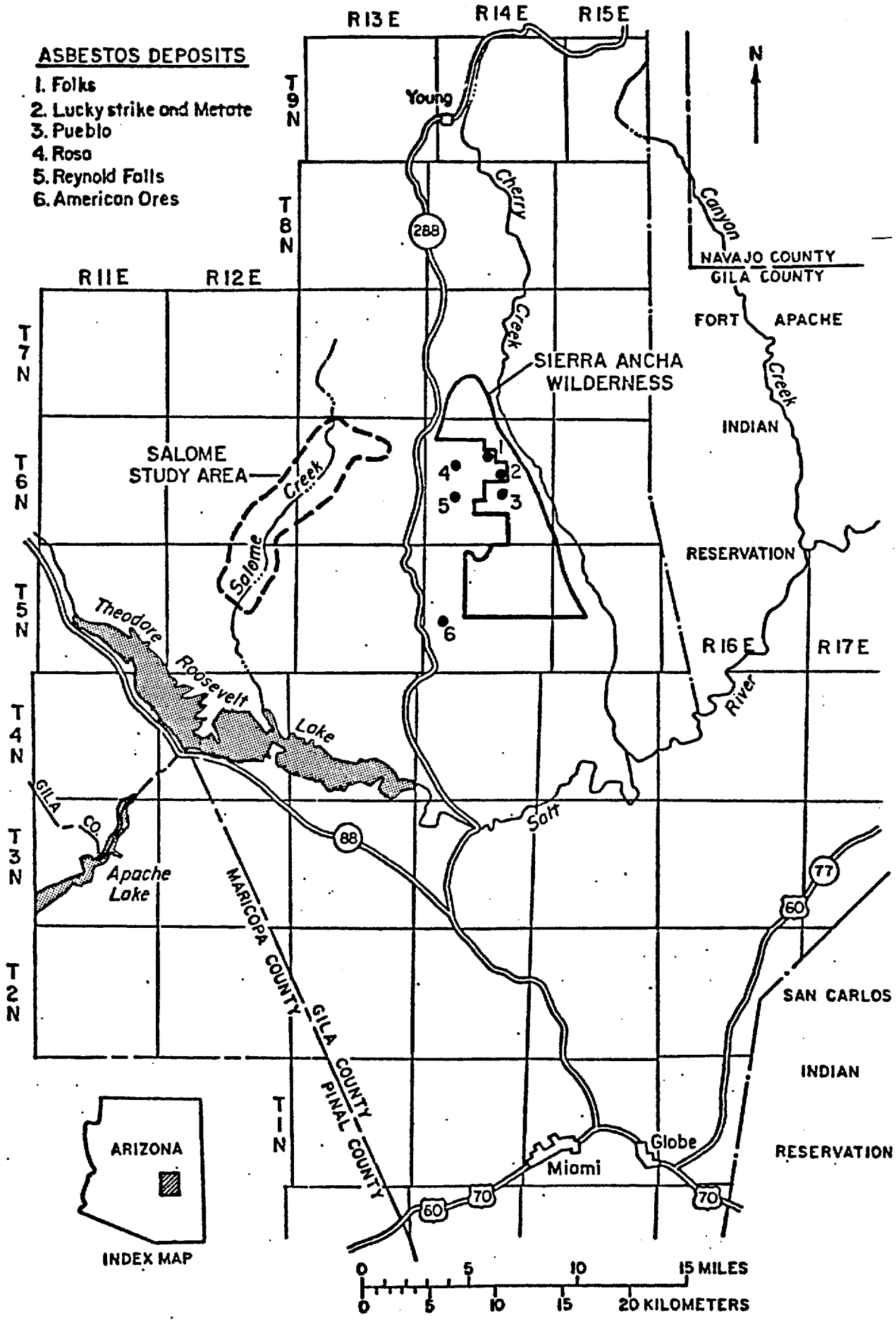


Figure 3. - Location of asbestos deposits of the Sierra Ancha Wilderness, Salome Study Area, and vicinity, Gila County, Arizona.

the estimated production for all mines is, by necessity a minimum, and the actual production was probably much higher in some cases.

Table 2. - Arizona standards for classification of crude and fiberized asbestos fiber (Asbestos Manufacturing Co., written communication, 1978).

Crudes - Arizona Standard

#1 - 3/4 in. +
#2 - 3/8 to 3/4 in.
#3 - 1/8 to 3/8 in.
#4 - less than 1/8 in.

Fiberized Arizona minimum standard grade1/

Grade	2 Mesh	4 Mesh	10 Mesh	Pan
3-Z		8.0	6.0	2.0
4-T		2.0	10.0	4.0
5-K			12.0	4.0
6-D			7.0	9.0
7-M			1.0	15.0
8-S	Less than 75 lb per cu ft not packed			
9-F	Over 75 lb per cu ft not packed			

1/ Sample figures based on 16 ounces per pound.

American Ores Mine

The American Ores asbestos mine area is located between Asbestos Point and Zimmerman Point in west-central sec. 20, T. 5 N., R. 14 E., 3/4 to 1 mile west of the Sierra Ancha Wilderness. The mine is accessible by the Pocket Creek Road which goes from Arizona 288 to the pass between Asbestos Point and Zimmerman Point.

The claims were staked by C. Watkins in 1914. In 1917, C. F. Sloane formed the American Ores and Asbestos Company and leased the property. The Raybestos and United States Asbestos Companies worked the deposit in 1919 and 1920 (Wilson, 1928, p. 67). From 1916 to 1920, the mine produced 1,300 tons of No. 1 crude and 300 tons of No. 2 crude fiber (Melhase, 1925, p. 808). W. G. Shanley, International Asbestos Company, acquired the claims in 1923.

From 1947 to 1955, several leases were issued on the property, but no figures are available for the amount of ore produced (Stewart, 1955, p. 64-65). Approximately 250 tons of long fiber were produced from 1958 to 1963. Most of this production was 2- to 9 inch-long fiber, with a maximum fiber length of 14 inches (Rex Town, oral communication, 1979).

Twenty adits, with lengths ranging from 40 to 900 feet, have been driven into the hillside from a bench which has exposed asbestos for a length of nearly 2,000 feet. Stewart (1955) examined the workings in detail; and because many of the workings have since become inaccessible, his map is included to show the extent of workings (figure 4).

The asbestos at the American Ores Mine occurs in the algal member of the Mescal Limestone, which is underlain by a thick diabase sill exposed throughout the area surrounding Asbestos Peak.

Folks deposit

The Folks asbestos deposit is located approximately 500 feet west of the wilderness in the SW 1/4 sec. 10, T. 6 N., R. 14 E., along what is locally called Gold Creek. The mine is accessible by an old mine road which joins the road leading from the upper Cherry Creek road to the Black Brush and Sorrel Horse uranium workings.

The claims were staked and worked around 1956-1958 by Lee Folks, Young, Arizona. Folks drove an adit approximately 200 feet (Lee Folks, oral communication, 1978). The adit trends S 70° W at the portal but is inaccessible due to flooding (figure 5). Table 3 lists the descriptions of two outcrop samples and one select sample from the dump taken at this deposit. Chrysotile asbestos occurs in thin veins up to 1/2 inch wide in a serpentine zone 4 inches thick at the portal. The fiber is mostly harsh to semi-harsh,

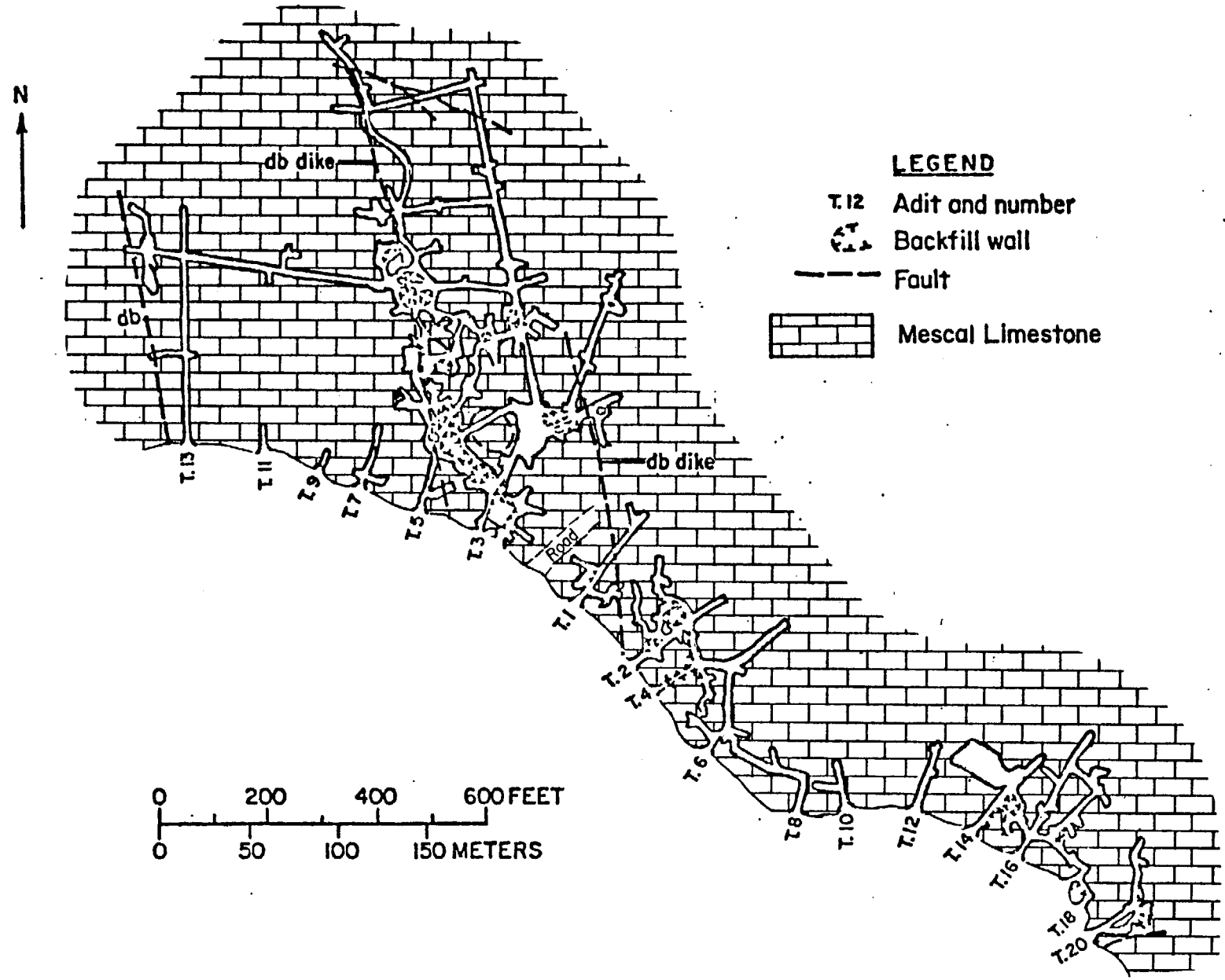


Figure 4. - The American Ores Mines. (After Stewart, 1955, p. 66.)

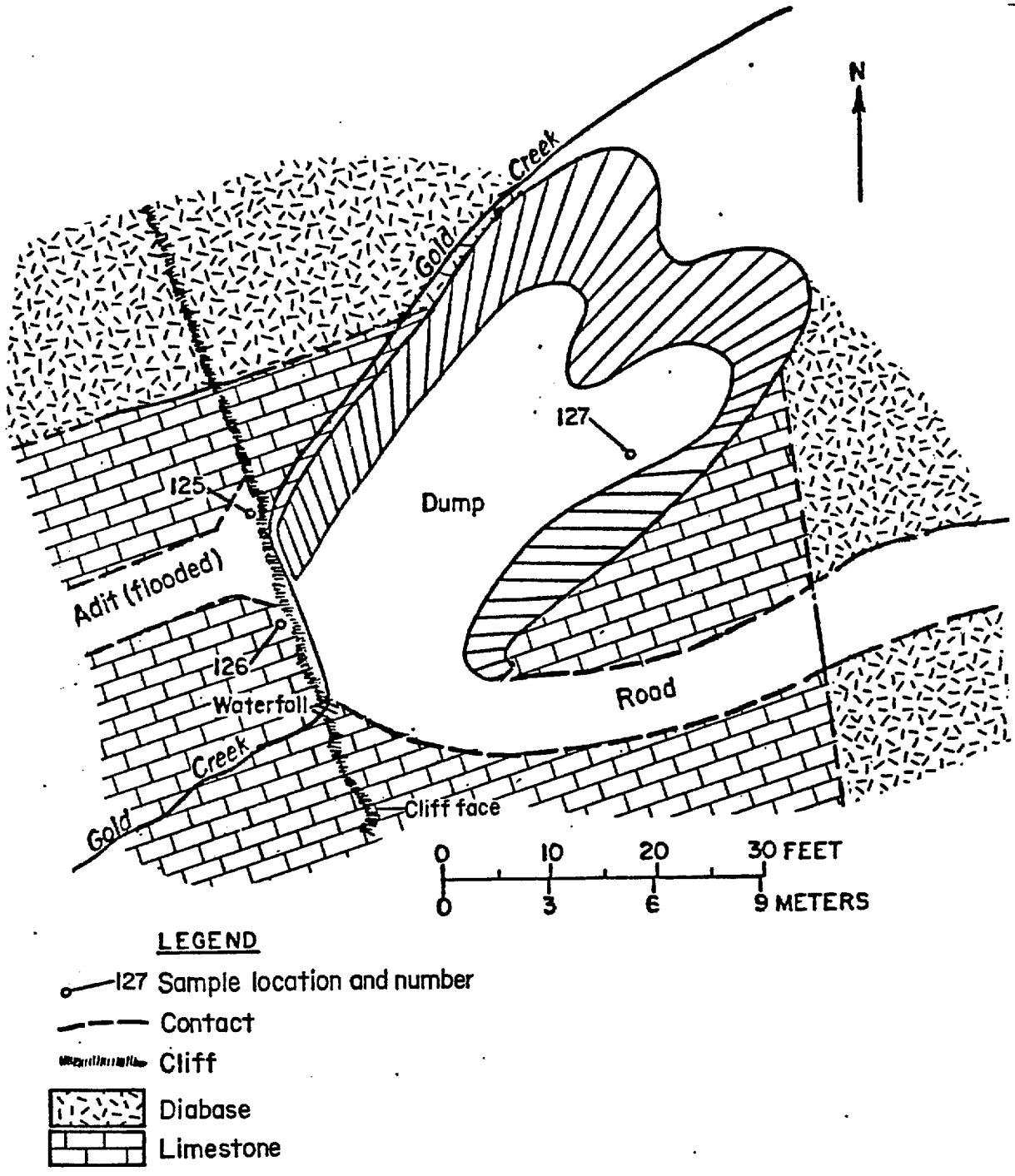


Figure 5. - Sample localities of the Folks asbestos deposit (map by D. Brown, 1978).

and crude grades are estimated to be about 20 percent No. 3, and 80 percent No. 4. No fiber was sold from this deposit.

Table 3. - Descriptions of samples from the Folks deposit.

Sample No.	Type	Length (inches)	Remarks
125	Chip	4	Serpentine zone in right rib at portal containing approximately 70% asbestos. Maximum fiber length 1/2 in; average fiber length 1/8 in.
126	do.	4	Serpentine zone containing approximately 40% asbestos in several discontinuous stringers. Maximum fiber length 1/8 in; average fiber length 1/16 in.
127	Select		Asbestos fiber from serpentine in dump. Maximum fiber length 1/2 in; average fiber length 1/8 in.

Pueblo and Lucky Strike Mines and Metate prospect workings

The Pueblo and Lucky Strike Mines and Metate prospect workings are located in the S 1/2 sec. 15, and NE 1/4 sec. 22, T. 6 N., R. 14 E., where the Mescal Limestone crops out in the cliff face along the eastern side of Center Mountain. The Pueblo Mine lies within the Sierra Ancha Wilderness, and the Lucky Strike Mine and Metate prospect lie 1/4 mile north and 1/2 mile to 3/4 mile west of the wilderness (plate 1). The two mines are separated by a landslide which covers the mineralized horizon for approximately 1/2 mile. The similarities between the mineral paragenesis and distribution at the two mines, and the possibility that mineralization continues beneath the landslide cover, indicates that the Pueblo and Lucky Strike Mines constitute one conterminous deposit. The Metate deposit is a northwesterly continuation of the Lucky Strike mineralization. Therefore, all three occurrences are discussed together in this report.

The Pueblo, Lucky Strike, and Metate workings are accessible from Highway 288 by following the Reynolds Creek road 2 miles to the Cienega Springs turnoff, then about 4-1/2 miles to the mine area. The road is closed by a locked U.S. Forest Service gate approximately 1-1/2 miles from the mines, at the divide between the north fork of Reynolds Creek and an eastwardly flowing tributary of Cherry Creek.

The Pueblo group consists of 14 claims staked in 1923 and 1924 by A. Stoddard and Wm. Andrews. Regal Asbestos Mines, Inc. produced about 3-1/2 tons of crudes No. 1 and No. 2 during the first half of 1928 (Wilson, 1928, p. 82). Roger Kyle acquired the properties in 1937 (U.S. Forest Service, Young, Arizona, file data, 1978).

The Lucky Strike claims were staked in 1917 by J. C. Kennedy and M. B. Kennedy. C. F. Sloane held the properties until they were leased to the Riga Asbestos Co. in 1925. Numerous owners held the claims until W. W. Poindexter mined the property in 1939. In 1942 N. G. Hill leased the Lucky Strike Mine to T. C. Caughlin. Approximately 1 ton of fiber per day was produced at 10 percent crude No. 1, 30 percent crude No. 2, and 60 percent crudes Nos. 3 and 4 (Arizona Department of Mineral Resources, Phoenix, file data). Roger Kyle acquired the Lucky Strike claims in the mid 1940's (Stewart, 1955, p. 79).

In 1941, the Pueblo and Lucky Strike Mines were estimated to have produced approximately 300 tons of crude Nos. 1 and 2 fiber, and were evaluated as capable of producing as much as 1,000 tons of fiber per year for several years. After being acquired by Roger Kyle the mines were worked periodically until his death, but production data are not available. Ownership of the claims remained in the Kyle estate, and the claims were still being maintained in 1979.

The Metate deposit is covered by a group of four Metate claims which extend northward from the Lucky Strike No. 6 claim. The claims were staked in 1943, and a tramway was built to the west, above the claims on Bear Pass. Several short adits driven on the property were mainly for exploration. No ore was produced from these claims (J. Neal, Globe, Arizona, oral communication, 1978).

Pueblo Mine

The Pueblo Mine consists of eight adits ranging from 11 feet to 210 feet in length. Two of the largest adits, which interconnect underground, have been stoped and partly backfilled. All adits were at least partly accessible for sampling and mapping. Asbestos mineralization in the Pueblo Mine area occurs in numerous serpentine zones in the Mescal Limestone. Magnetite is also present in beds between the serpentinized limestone. Discordant diabase intrusions are present in and near the largest adit. The limestone-diabase contact, in the roadcut near the largest adit, dips 40° to the north (figure 6).

Pueblo Adit A. - Pueblo Adit A, the northernmost working of the Pueblo Mine, is located about 200 feet southwest of the intersection of the road from Cienega Spring with the Hinton Creek Trail. This adit was driven 27 feet, N 28° W; the portal is 6 feet above the road level (figure 7). The adit was driven on two seams of asbestos-bearing serpentine, one at the back and another 3 feet below the back. Both of the asbestos veins pinch out 10 to 15 feet from the portal. No fiber-bearing veins were found at the face. Sample 235 was cut from the upper asbestos seam 7 feet from the portal on the right rib (table 4). The cumulative fiber length in this sample is 1-1/2 inches with a maximum fiber length of 3/4 inch. The lower asbestos seam, containing only 1/4 inch of asbestos, was not sampled.

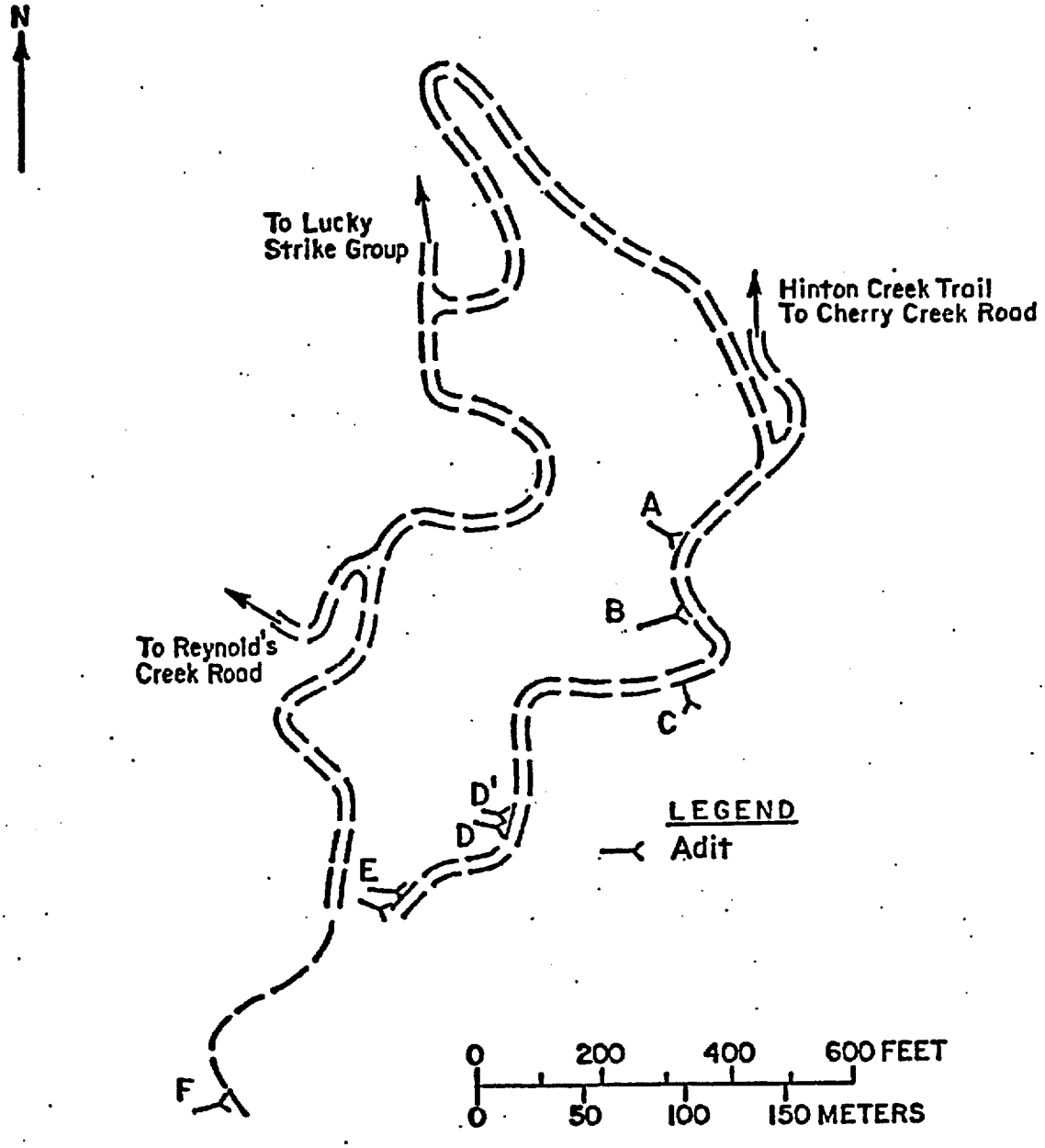


Figure 6. - Locations of workings in the Pueblo Mine area.

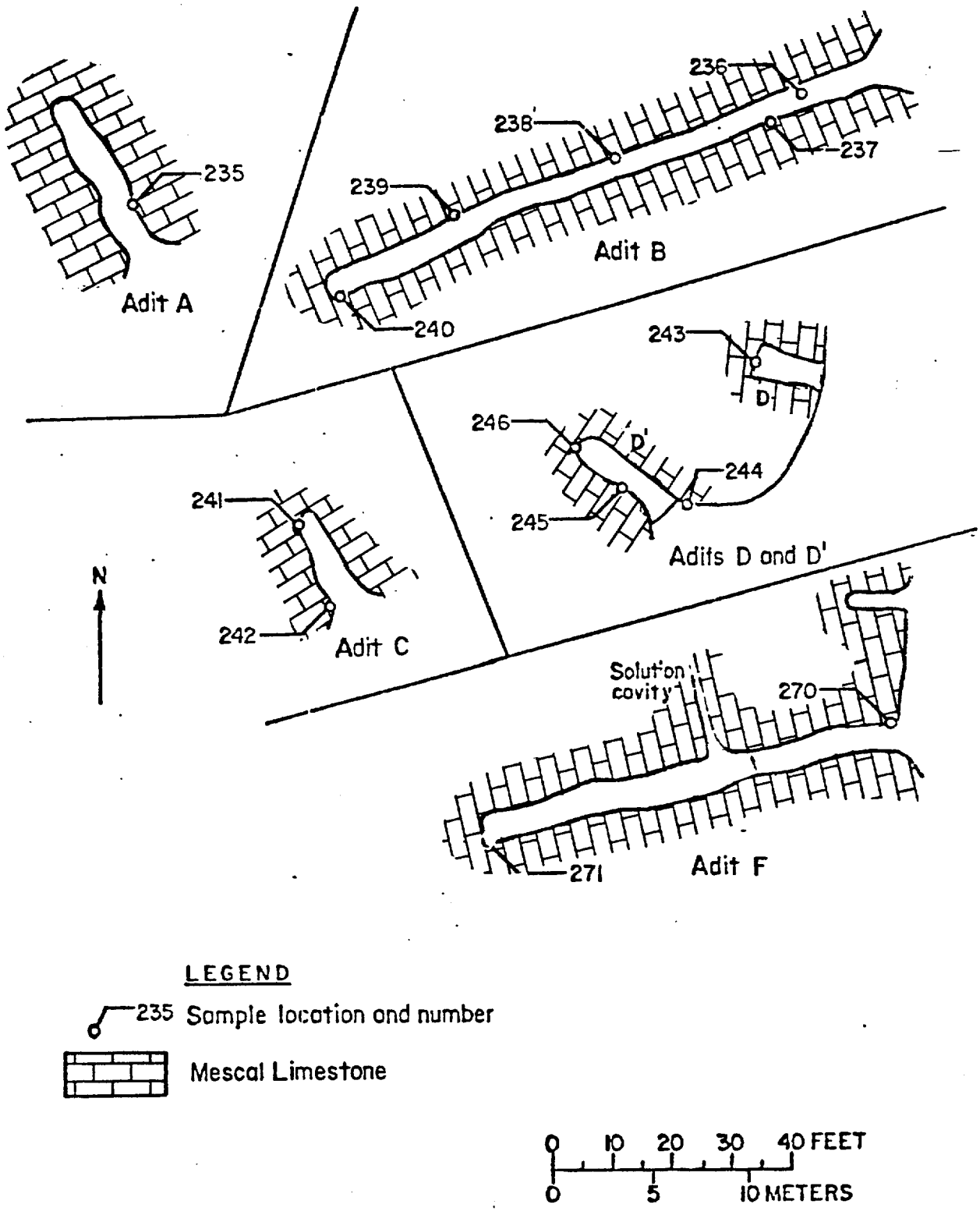


Figure 7. - Pueblo Mine Adits A, B, C, D, D', and F. (Map by J. Coursey,]978.)

Table 4. - Descriptions of samples from Pueblo Adits A, B, C, D, D', and F.

Sample No.	Type	Length	Remarks
235	Chip	3 in	Serpentine band containing approximately 60% asbestos. Maximum fiber length 3/4 in.; average fiber length 1/8 in.
236	do.	6 in	Five asbestos veins in serpentine. Maximum fiber length 1/4 in.; average fiber length 1/8 in.
237	do.	5 ft	Multiple asbestos veins in serpentine band 5 in. thick. Maximum fiber length 1/4 in.; average fiber length 1/8 in.
238	do.	6 ft	Serpentinized limestone containing 15.8% Fe. No visible asbestos.
239	do.	6 ft	Serpentinized limestone containing 12.8% Fe. No visible asbestos.
240	do.	6 ft	Dolomitic limestone with minor serpentinization, and scattered magnetite. Sample contained 7% Fe. No visible asbestos.
241	do.	4 ft	Serpentine zone 17 in. thick containing minor asbestos and magnetite. Maximum fiber length 1/16 in.
242	do.	1 ft	Serpentine zone containing one asbestos vein with fibers 1/4 in. long.
243	do.	3.5 ft	Serpentine band 10 in. thick containing one asbestos vein with 1/4 in. fiber. Two magnetite beds with a total thickness of 2 ft, containing 40.8% Fe.
244	Select		Asbestos vein with maximum fiber length 3/4 in.; average fiber length 1/2 in.
245	Chip	4 ft	Magnetite bed with minor serpentine. No visible asbestos.
246	do.	1 ft	Serpentine band containing approximately 25% asbestos. Maximum fiber length 1/2 in.; average fiber length 1/8 in.

Table 4. - Descriptions of samples from Pueblo Adits A, B, C, D, D', and F--Continued

Sample No.	Type	Length	Remarks
270	do.	1 ft	Serpentine band containing approximately 40% asbestos. Maximum fiber length 3/8 in.; average fiber length 1/8 in.
271	do.	6 ft	Three serpentine bands with a total thickness of 14 in. and containing approximately 20% asbestos. Maximum fiber length 3/8 in.; average fiber length 1/8 in.

Pueblo Adit B. - Pueblo Adit B, approximately 150 feet southwest of Adit A, was driven on the road level for 92 feet, S 78° W. (figure 7). Two zones of asbestos bearing serpentine occurring at the portal, pinch out less than 30 feet inside the adit. Two samples of these seams contain a maximum fiber length of 1/4 inch. The average combined width of the two asbestos zones is 6 inches but the longest fibers exposed are crude grades No. 3 and No. 4 (table 4). The last 70 feet of Adit B reveal only minor magnetite mineralization containing up to 30 percent Fe.

Pueblo Adit C. - Pueblo Adit C, about 150 feet south of Adit B, was driven 15 feet, N 25° W, into the slope a few feet below the road level (figure 6). Two samples were taken in this prospect, one at the face and one at the portal (figure 7). The sample taken at the face contained three asbestos veins with fiber lengths not exceeding 1/16 inch (table 4). One asbestos seam, containing 1/4 inch fiber, was found at the portal location. Disseminated magnetite was present in minor amounts, but was not sampled.

Pueblo Adits D and D'. - Pueblo Adits D and D' are at road level approximately 750 feet south of the trail to the Cherry Creek road (figure 6). Adit D was driven 18 feet, N 48° W, and Adit D' was driven 11 feet N 74° W.

The asbestos seam in Adit D has 1/2 inch of total fiber exposed near the back. A 1/4- to 1/2-inch vein of fiber is present at floor level in Adit D' (table 4).

Magnetite mineralization, disseminated through both workings, is concentrated in two beds. The beds are separated by up to 1/2 foot of serpentine or clay and measure a combined width of 2 to 4 feet.

Pueblo Adit E. - Pueblo Adit E, largest working in the Pueblo group is located at the end of the access road, approximately 1,000 feet southwest of the Hinton Creek Trail (figure 6). The workings consist of two interconnected levels accessible by three adits. Collectively, these three adits are referred to as Adit E (figure 8).

The lower level, about 7 feet above the road, trends generally N 10° W for 210 feet, and served primarily as a haulageway. The asbestos mineralization on the lower level pinches out about 50 feet west of the portal. Limestone interbedded with serpentine containing up to nine separate veinlets of asbestos was noted in the stoped area to the north of the haulageway. A drift, driven east from the stope, contains one visible asbestos seam, with a maximum fiber length of 3/4 inch. Of the four asbestos samples taken on the lower level, the maximum total crude fiber recorded was 2-1/4 inches of all grades. The longest fiber sampled was 1 inch; the average was less than 1/4 inch. Ten tons of asbestos of all grades may have been produced from the lower level. Seven samples taken from the main haulageway contained scattered amounts of magnetite and were assayed for their iron content.

The upper level is served by two portals a few feet to the southwest of the lower adit. One portal is about 15 feet higher than the lower adit; the other, 10 to 15 feet further southwest, is 5 feet higher still. Both adits join at approximately 20 feet from the portals. The confluence of the two adits occurs in the first upper-level stope, leaving a 5-foot bench on the

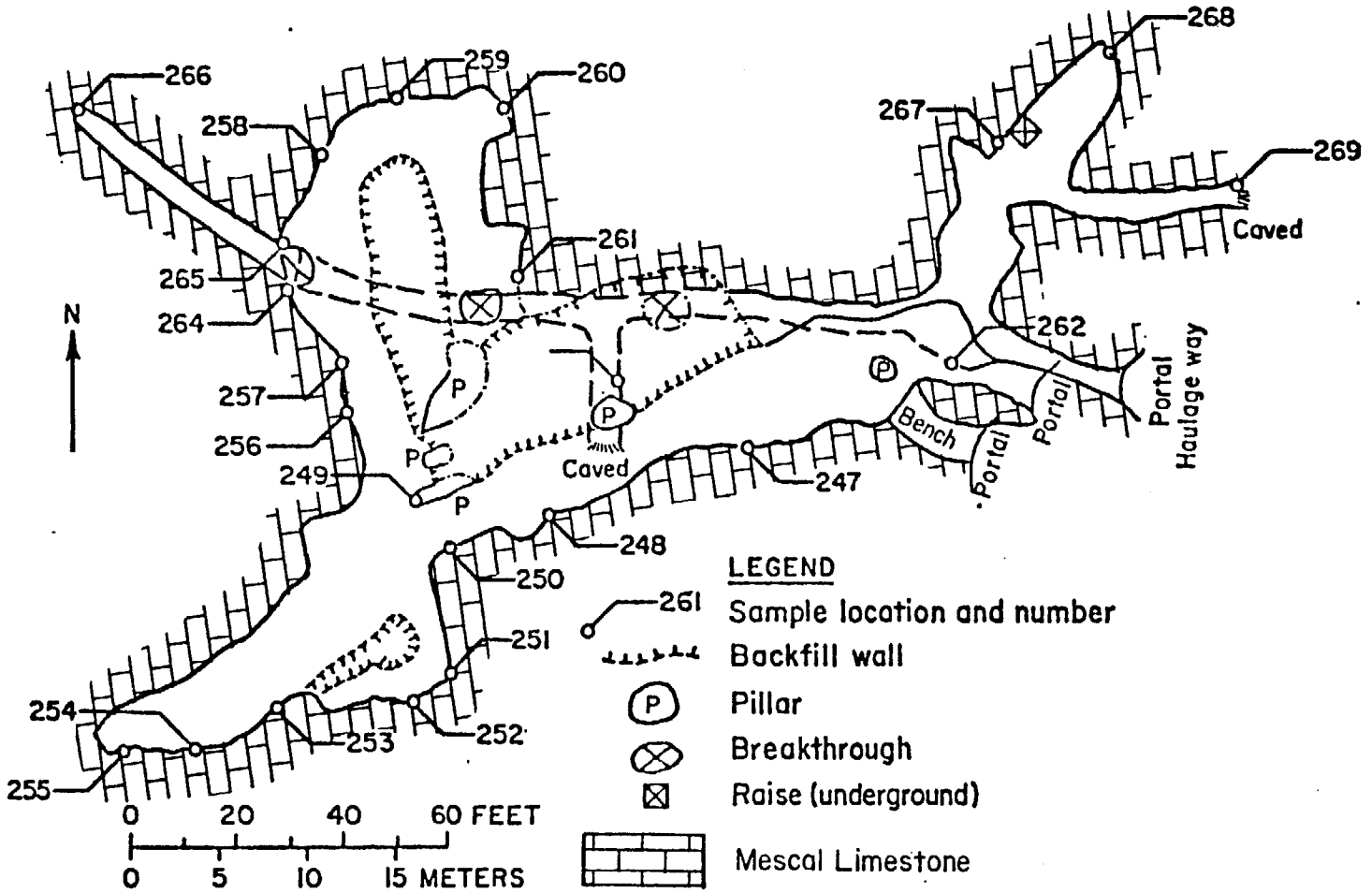


Figure 8. - Sample locations at the Pueblo Adit E. (Map by J. Coursey, 1978.)

southernmost adit. An area of approximately 6,500 square feet has been mined on the upper level. Portions of this area were backfilled and were inaccessible for mapping and sampling. Three breakthroughs to the lower level served as chutes to the haulageway. Sixteen samples taken throughout the open areas on the upper level are summarized in table 5. Some sample locations have three or more distinct asbestos-bearing serpentine zones separated by limestone, while other sites have only one mineralized zone. The asbestos veins found on this level pinch and swell considerably with fiber lengths up to 1-1/2 inches. The total fiber content estimated at the sample locations ranged from 1 inch to 9-1/2 inches. The average composite of fiber lengths sampled was 4 inches with an average fiber length of 1/4 inch. Based on the average fiber lengths remaining in the mine, at least 250 tons of all four fiber grades combined was produced from the upper level of Adit E.

Table 5. - Descriptions of samples from Pueblo Adit E.

Sample No.	Type	Length	Remarks
247	Chip	29 in	Multiple irregular veinlets of asbestos within 21 in. band of serpentine. Maximum fiber length 1/2 in.; average fiber length 1/8 in.
248	do.	2 ft	Serpentine zone containing approximately 40% asbestos. Maximum fiber length 1 in.; average fiber length 3/8 in.
249	do.	15 in	Serpentine zone 5 in. thick containing five asbestos veins. Maximum fiber length 1/2 in.; average fiber length 1/4 in.
250	do.	30 in	Serpentine zone 22 in. thick containing approximately 40% asbestos. Maximum fiber length 1/2 in.; average fiber length 1/8 in.
251	do.	6.5 ft	Three serpentine zones with a total thickness of 25 in. containing approximately 30% asbestos. Maximum fiber length 1/2 in.; average fiber length 1/8 in.

Table 5. - Descriptions of samples from Pueblo Adit E--Continued

Sample No.	Type	Length	Remarks
252	do.	8 in	Serpentine zone containing approximately 60% asbestos. Maximum fiber length 3/4 in.; average fiber length 1/8 in.
253	do.	12 in	Serpentine zone containing approximately 50% asbestos. Maximum fiber length 1-1/2 in.; average fiber length 1/8 in.
254	do.	28 in	Serpentine zone 10 in. thick containing approximately 20% asbestos. Maximum fiber length 3/4 in.; average fiber length 1/8 in.
255	do.	38 in	Two serpentine zones with a total thickness of 5 in. containing approximately 60% asbestos. Maximum fiber length 1/2 in.; average fiber length 3/16 in.
256	do.	4.5 ft	Multiple irregular veins of asbestos within 2-ft zone of serpentine. Maximum fiber length 1/2 in.; average fiber length 1/8 in.
257	do.	5 ft	Five asbestos veins in 2-ft band of serpentine. Maximum fiber length 1/2 in.; average fiber length 3/16 in.
258	Chip	2 ft	Serpentine zone containing approximately 10 to 15% asbestos. Maximum fiber length 1/2 in.; average fiber length 1/16 in.
259	do.	20 in	Serpentinized limestone with minor asbestos. Maximum fiber length 1/4 in.
260	do.	15 in	Serpentine zone containing approximately 50% asbestos in abundant veins. Maximum fiber length 1/2 in.; average fiber length 1/8 in.
261	do.	17 in	Serpentine zone containing abundant asbestos and 17.3% Fe. Maximum fiber length 1 in.; average fiber length 1/8 in.
262	do.	3 ft	Serpentinized limestone containing scattered magnetite and 2 asbestos veins with fiber lengths of 1/8 in.
263	do.	5.5 ft	Serpentinized limestone containing 13.8% Fe. No visible asbestos.
264	do.	6 in	Serpentine with abundant asbestos fiber up to 1/4 in. long.

Table 5. - Descriptions of samples from Pueblo Adit E--Continued

Sample No.	Type	Length	Remarks
265	do.	6 ft	Serpentinized limestone containing 23.3% Fe. No visible asbestos.
266	do.	6.5 ft	Limestone with minor serpentine and 13.0% Fe. No visible asbestos.
267	do.	33 in	Six asbestos veins in 20 in. band of serpentine. Maximum fiber length 3/4 in.; average fiber length 3/8 in.
268	do.	32 in	Eight asbestos veins in 14 in. band of serpentine. Maximum fiber length 1 in.; average fiber length 1/4 in.
269	do.	11 in	Serpentine band 4 in. thick containing one asbestos vein with fiber length of 3/4 in.

Pueblo Adit F. - Pueblo Adit F, southwesternmost working in the Pueblo group, is accessible by a narrow trail which contours around the hillside from Adit E (figure 6). This working is about 400 feet southwest of and approximately 50 feet higher than Adit E. The adit was driven S 80° W, 73 feet into two asbestos-bearing serpentine bands which sandwich irregular serpentine nodules containing additional asbestos (figure 7).

Sample 270, from the upper bed, was taken at the portal and included almost 5 inches of fiber with lengths up to 3/8 inch thick (table 4). At this location, additional fiber is present in nodules of serpentine below the sampled bed. Sample 270, taken at the face, included 4 inches of fiber, with lengths up to 3/8 inch, between the back and the floor. The overall fiber content of the serpentine is estimated to be near 20 percent.

Approximately 20 feet north of Adit F a small 10-foot-long adit, which appears to have been used for storage at one time, contained some asbestos mineralization. A 3-inch serpentine bed containing 2 inches of asbestos

is exposed in this working about 1 foot above the floor. This zone coincides with the lower bed in the larger adit. Nodules of serpentine with a trace of asbestos mineralization occur along the ribs near the back. No samples were taken from this working because of the similarity of the mineralization with that sampled in Adit F.

Lucky Strike Mine

The Lucky Strike Mine consists of 10 adits from 5 feet to 215 feet in length (figure 9). A few adits have been stoped laterally and are partially backfilled. Most of the workings were accessible for mapping and sampling with the exception of two flooded adits and one adit with a caved portal.

Both asbestos and magnetite are present in the area. Many asbestos seams are exposed in the various workings. Magnetite beds are exposed along the road, but few adits contain magnetite. The main diabase sill lies about 25 to 30 feet below the workings, but one and sometimes two thin diabase intrusions were present in several of the adits.

Lucky Strike Adit No. 1. - The Lucky Strike Adit No. 1, the easternmost adit in the Lucky Strike group, lies about 30 feet below the access road. It is the largest working of the Lucky Strike group, and has a mined area of over 5,000 square feet, some of which has subsequently been backfilled. The adit extends nearly due south for 215 feet (figure 10). Stoping has been done to the east and west at 6 feet above the adit, leaving benches on either side of the adit. The height in the stopes averages 5 feet, and the height of the adit averages 7 feet except where it adjoins the stopes. In the stoped area, the height of the adit between the benches is about 12 feet.

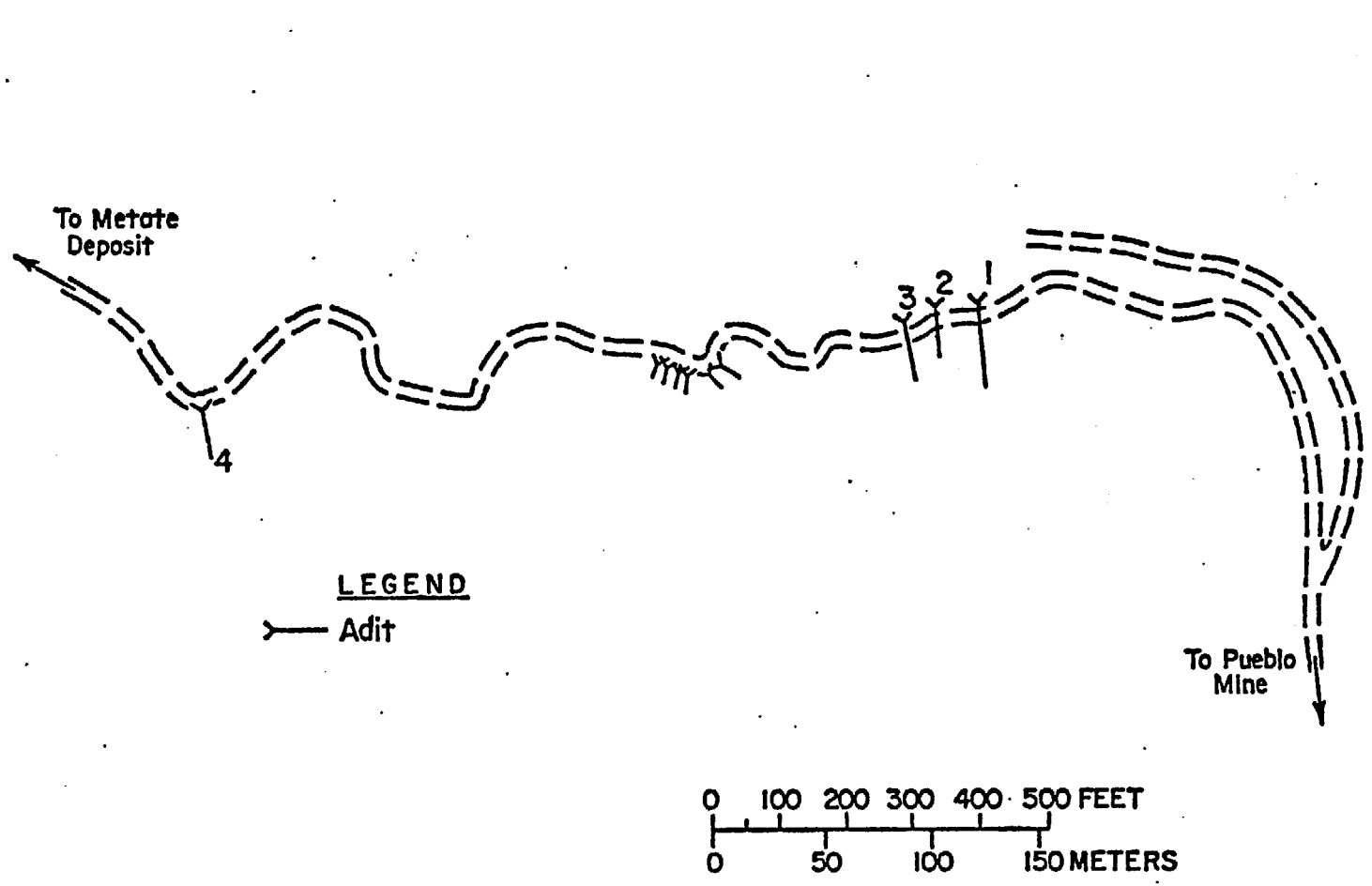


Figure 9. - Locations at workings in the Lucky Strike Mine area.

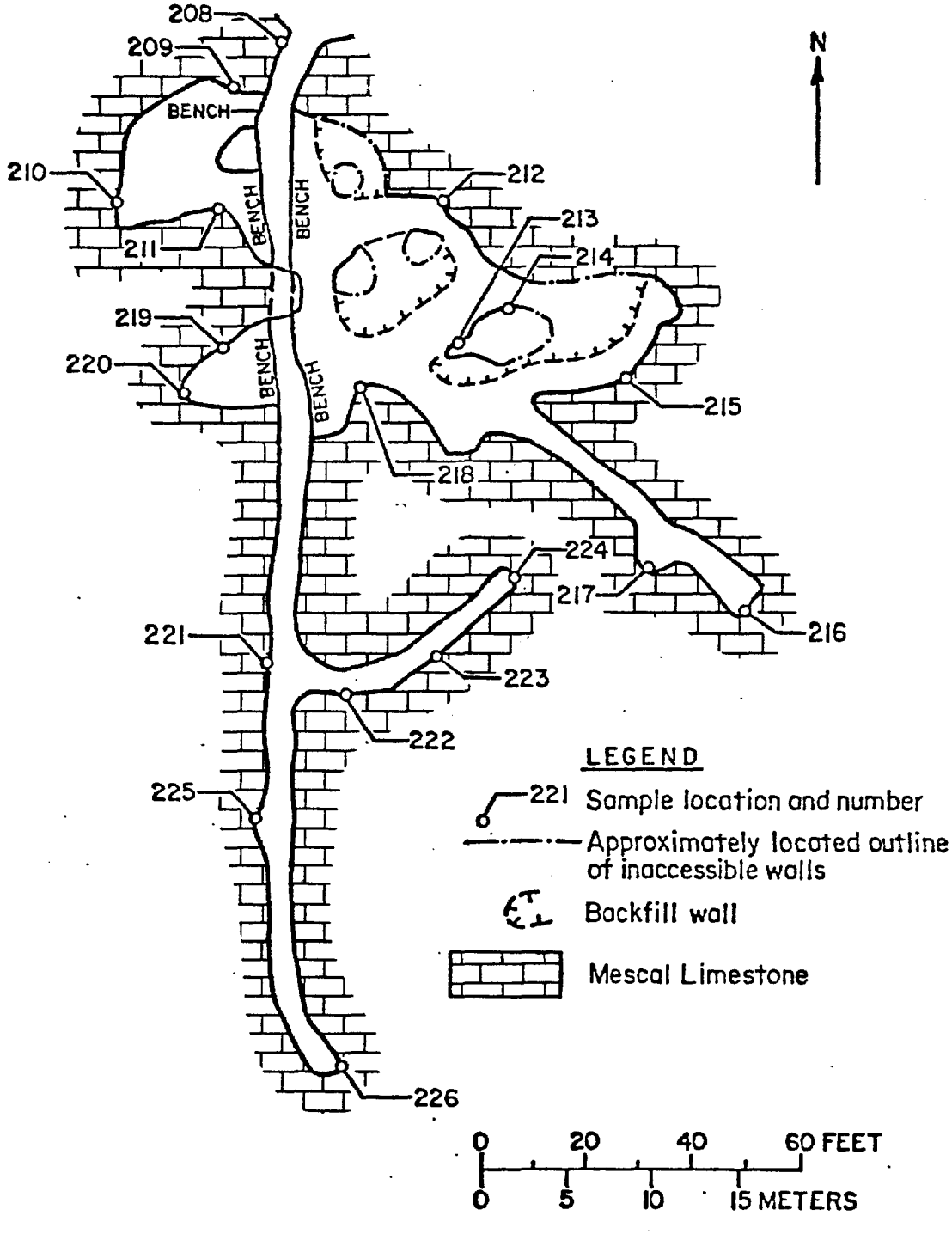


Figure 10. - Sample locations of the Lucky Strike Adit No. 1.

The asbestos mineralization is concentrated in four serpentine beds and scattered serpentine nodules. Nineteen samples were taken throughout the mine (table 6). Thirteen chip samples contained an average total crude fiber content of 2-3/4 inches of all grades. The most common fiber length was between 1/8 inch and 1/4 inch, but fibers up to 1 inch were observed. Based on the fibers remaining in this mine, at least 90 tons of all four fiber grades combined was produced from the Lucky Strike No. 1.

Table 6. - Descriptions of samples from the Lucky Strike Adit No. 1.

Sample No.	Type	Length	Remarks
208	Chip	10 ft	Four serpentine bands totalling 9 in. containing approximately 30% asbestos. Maximum fiber length 3/4 in.; average fiber length 1/8 in.
209	do.	3.5 ft	Well-developed serpentine band 3 in. thick containing approximately 70% asbestos. Maximum fiber length 3/4 in.; average fiber length 1/4 in.
210	do.	37 in	Three thin serpentine bands with a total thickness of 4 in. containing approximately 50% asbestos. Maximum fiber length 9/16 in.; average fiber length 1/4 in.
211	do.	5 in	Serpentine band containing approximately 60% asbestos. Maximum fiber length 1 in.; average fiber length 3/8 in.
212	Chip	34 in	Serpentine band containing approximately 20% asbestos. Maximum fiber length 1/2 in.; average fiber length 1/8 in.
213	do.	4 in	Serpentine band containing approximately 50% asbestos. Maximum fiber length 1/2 in.; average fiber length 1/8 in.
214	do.	45 in	Two serpentine bands with a total thickness of 7 in. containing approximately 30% asbestos Maximum fiber length 1/4 in.; average fiber length 1/8 in.

Table 6. - Descr.ptions of samples from the Lucky Strike Adit No. 1--Continued

Sample No.	Type	Length	Remarks
215	do.	4 ft	Two serpentine bands with a total thickness of 7 in. containing approximately 50% asbestos. Maximum fiber length 1/2 in.; average fiber length 1/4 in.
216	do.	2 in	Serpentine band with well-developed asbestos fiber. Maximum fiber length 1 in.; average fiber length 3/8 in.
217	do.	5.5 ft	Three serpentine bands with a total thickness of 13 in. containing approximately 50% asbestos. Maximum fiber length 1/2 in.; average fiber length 1/4 in.
218	do.	3.5 ft	Three serpentine bands with a total thickness of 9 in. containing approximately 30% asbestos. Maximum fiber length 1/4 in.; average fiber length 1/8 in.
219	do.	6 in	Serpentine band 4 in. thick containing approximately 30% asbestos. Maximum fiber length 1/2 in.; average fiber length 1/8 in.
220	do.	40 in	Two serpentine bands with a total thickness of 13 in. containing approximately 30% asbestos. Maximum fiber length 1/2 in.; average fiber length 1/8 in.
221	do.	4 in	Serpentine band containing approximately 60% asbestos. Maximum fiber length 1/2 in.; average fiber length 1/4 in.
222	Chip	6.5 ft	Three serpentine bands with a total thickness of 8 in. containing approximately 30% asbestos. Maximum fiber length 1/2 in.; average fiber length 1/4 in.
223	do.	4 in	Serpentine band containing approximately 30% asbestos. Maximum fiber length 1/4 in; average fiber length 1/16 in.
224	do.	6.5 ft	Two serpentine bands with a total thickness of 6 in containing approximately 30% asbestos. Maximum fiber length 3/8 in; average fiber length 1/8 in.

Table 6. - Descriptions of samples from the Lucky Strike Adit No. 1.--Continued

Sample No.	Type	Length	Remarks
225	do.	6.5 ft	Three serpentine bands with a total thickness of 18 in containing approximately 30% asbestos. Maximum fiber length 1/4 in; average fiber length 1/16 in.
226	do.	4 ft	Three serpentine bands with a total thickness of 10 in containing approximately 20% asbestos. Maximum fiber length 1/2 in; average fiber length 1/16 in.

Lucky Strike Adit No. 2. - The Lucky Strike Adit No. 2 is about 50 feet west of Adit No. 1, and at approximately the same elevation as that portal. The adit, trending nearly due south, was driven horizontally for 40 feet (figure 11). The height of the adit averages 6 feet except for a short raise of about 15 feet on the east side at the face. Approximately 15 feet south of the portal, a 35-foot crosscut was driven into the east rib. The back of this drift is only 4 feet high near the face. The north rib of this drift has a small caved crosscut which may have been a second portal for this adit.

The wall rock in the Lucky Strike Adit No. 2 is a dense, light to medium-gray, fine crystalline limestone with distinctive bedding averaging 2 to 3 inches thick. Some of the beds have a pale green color due to fine-grained calc-silicate minerals. One major asbestos-bearing serpentine band is in the adit. The serpentine is parallel or subparallel to the bedding, varies in thickness from 1.0 to 3.5 inches, and is virtualy absent at the south face of the main drift. The limestone bordering the serpentine contains abundant brown or reddish-brown chert above and below the dark-green to black serpentine.

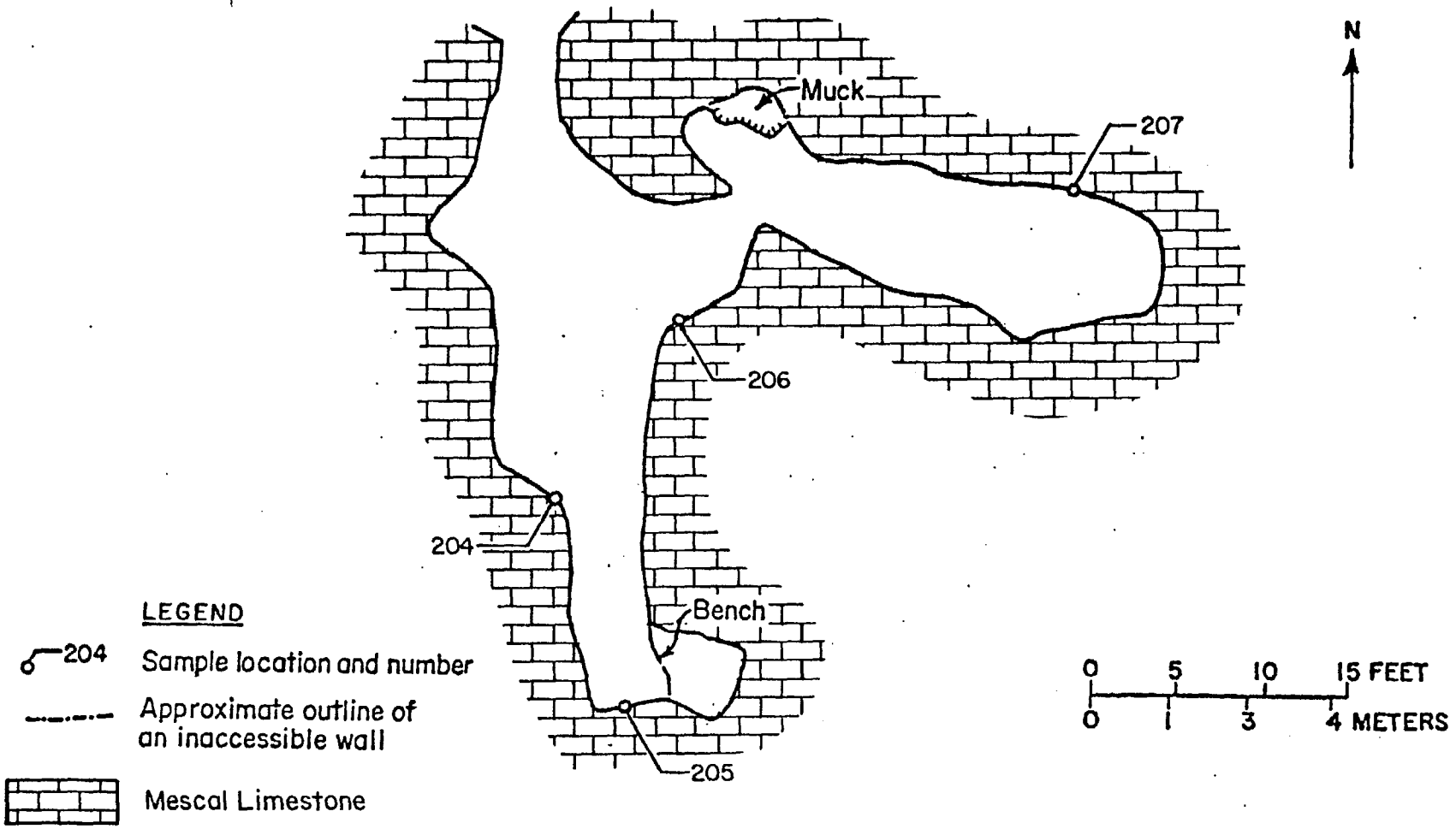


Figure 11. - Sample locations of the Lucky Strike Adit No. 2. (Map by J. Coursey, 1978.)

Four chip samples taken from the adit revealed that the serpentine band had an total fiber content of approximately 40 percent. The average fiber length was 1/8 inch; the maximum fiber length was 1/2 inch (table 7). Although the asbestos is normally confined to one vein, in places the serpentine band contains up to 60-percent asbestos in eight small veinlets. No magnetite was noted in this adit.

Table 7. - Descriptions of samples from the Lucky Strike Adits Nos. 2 and 3.

Sample No.	Type	Length	Remarks
202	Chip	6 ft	Six irregular serpentine bands with a total thickness of 11 in. containing approximately 10% asbestos. Maximum fiber length 1/2 in.; average fiber length 1/8 in.
203	do.	27 in	Four irregular serpentine bands with a total thickness of 8 in. containing approximately 30% asbestos. Maximum fiber length 3/8 in.; average fiber length 1/16 in.
204	do.	4 in	Serpentine band containing approximately 50% asbestos. Maximum fiber length 1/2 in.; average fiber length 1/8 in.
205	do.	5.5 ft	Serpentinized limestone with one asbestos vein containing fibers 1/8 in. long.
206	Chip	2 in	Serpentine band containing approximately 50% asbestos. Maximum fiber length 3/8 in.; average fiber length 1/8 in.
207	do.	3 in	Serpentine band containing approximately 60% asbestos. Maximum fiber length 3/8 in.; average fiber length 1/8 in.

Approximately 550 square feet were excavated in Adit No. 2. If the longest fiber (1/2 inch) left in the ribs is used as an average fiber length for the material excavated, then at least 2 tons of fiber was mined from this adit.

Lucky Strike Adit No. 3. - The Lucky Strike Adit No. 3 lies approximately 75 feet west of the portal of Adit No. 2 (figure 9). The adit was driven S 14° E on a slight decline (5°) for about 70 feet, but was flooded beyond 55 feet (figure 12). At 40 feet from the portal a crosscut was driven S 45° W. The crosscut was flooded, but is estimated to extend 50 feet from the adit.

Asbestos in Adit No. 3 is confined to a 6-inch- to 1-foot-thick serpentinized zone normally containing four to six serpentine bands. Two samples taken from the adit contained an average cumulative fiber content of 3-3/8 inches (table 7). The average fiber length was 1/8 to 1/16 inch; the maximum fiber length of 1/2 inch.

The area excavated from this adit is estimated to be 750 square feet. Based on a fiber length of 1/2 inch, fiber production has been calculated to be at least 2-1/2 tons.

Lucky Strike Adit No. 4. - The Lucky Strike Adit No. 4 is near the end of the access road, approximately 1,300 feet west of Adit No. 1 (figure 9). The workings consist of several drifts partially interconnected by stopes and serviced by three portals (figure 13). A fourth portal, 25 feet to the west, yields access to two flooded drifts which do not appear to be connected to the eastern workings. This adit is also discussed as part of the workings of the Lucky Strike Adit No. 4.

Asbestos is contained in one to three serpentine bands with a total thickness of from 6 to 10 inches. Eleven samples from this working revealed that the serpentine zone contained a total fiber content of from 10 to 40 percent (table 8). Average fiber length was 1/8 to 1/16 inch, and the maximum fiber length was 3/4 inch.

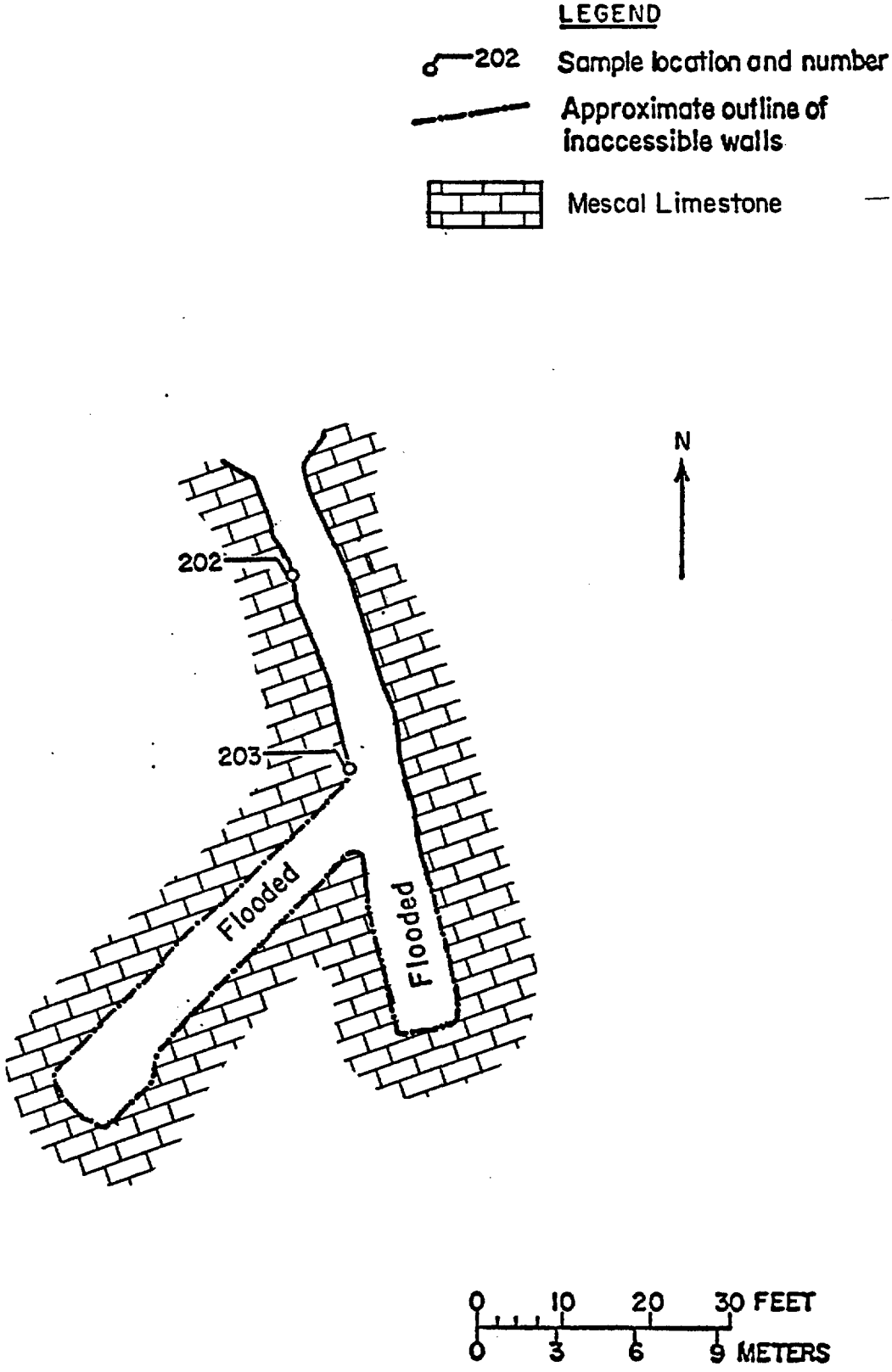


Figure 12. - Sample locations of the Lucky Strike Adit No. 3. (Map by J. Coursey, 1978.)

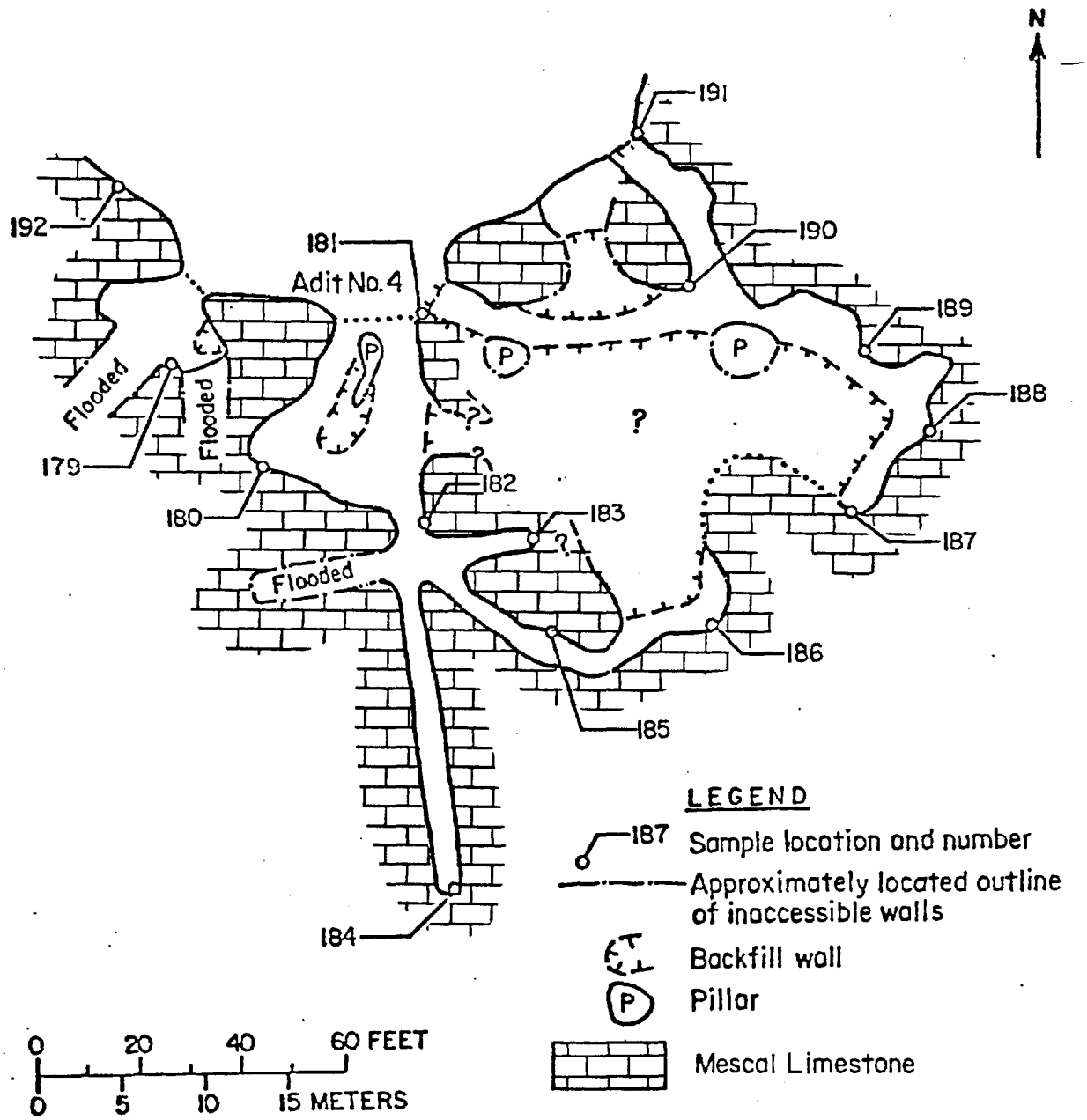


Figure 13. - Sample locations of the Lucky Strike Adit No. 4.

Because of considerable backfilling in the stopes, the total area excavated could only be estimated as approximately 4,500 square feet. Based on an average fiber length of 3/4 inch in two serpentine bands, production from the Lucky Strike Adit No. 4 workings would have been at least 40 tons of fiber.

Sample 191 was taken from the rib at the portal of the easternmost adit. This sample contained 35.5 percent iron in a 4-foot magnetite bed. Sample 192, taken 230 feet west of the westernmost adit, contained 41.0 percent iron in a magnetite bed 4.3 feet thick.

Table 8. - Descriptions of samples from the Lucky Strike Adit No. 4.

Sample No.	Type	Length	Remarks
179	Chip	33 in	Serpentine band 18 in. thick containing approximately 15% asbestos. Maximum fiber length 5/8 in.; average fiber length 3/8 in.
180	do.	3 ft	Serpentine band 17 in. thick containing approximately 40% asbestos. Maximum fiber length 3/4 in.; average fiber length 1/8 in. Sample contained 11.0% Fe.
181	do.	5.5 ft	Two serpentine bands with a total thickness of 18 in. containing approximately 30% asbestos. Maximum fiber length 1/2 in.; average fiber length 1/8 in.
182	do.	4.5 ft	Two serpentine bands with a total thickness of 10 in. containing approximately 60% asbestos. Maximum fiber length 1/4 in.; average fiber length 1/16 in.
183	Chip	38 in	Three serpentine bands with a total thickness of 14 in. containing approximately 10% asbestos. Maximum fiber length 1/4 in.; average fiber length 1/16 in.
184	do.	4 ft	Serpentine band 8 in. thick containing approximately 10% asbestos. Maximum fiber length 1/8 in.; average fiber length 1/16 in.

Table 8. - Descriptions of samples from the Lucky Strike Adit No. 4--Continued

Sample No.	Type	Length	Remarks
185	do.	31 in	Serpentine band 6 in. thick containing approximately 10% asbestos. Maximum fiber length 1/8 in.; average fiber 1/16 in. Sample contained 16.8% Fe.
186	do.	3.5 ft	Serpentine band 14 in. thick containing approximately 20% asbestos. Maximum fiber length 1/2 in.; average fiber length 1/8 in.
187	do.	3 in	Serpentine band containing approximately 50% asbestos. Maximum fiber length 1/2 in.; average fiber length 1/8 in.
188	do.	33 in	Serpentine band 7 in. thick containing approximately 30% fiber. Maximum fiber length 1/2 in.; average fiber length 1/4 in.
189	do.	3.5 ft	Serpentine band 14 in. thick containing approximately 20% asbestos. Maximum fiber length 1/2 in.; average fiber length 1/4 in.
190	do.	5.5 ft	Serpentine band 14 in. thick containing approximately 10% asbestos. Maximum fiber length 1/4 in.; average fiber length 1/16 in.
191	do.	4 ft	Magnatite bed containing 35.5% Fe.
192	do.	4.3 ft	Magnatite bed containing 41.0% Fe.

Other workings in the Lucky Strike group. - Approximately 450 feet to 550 feet to the west of Lucky Strike Adit No. 1, along the access road (figure 9), is a group of seven small adits 5 to 35 feet long (figure 14). Slightly more than 1,000 square feet has been excavated in these workings. Nine samples taken in these adits contained from 1-1/4 inches to 7-1/4 inches total fiber with the average being 3-1/2 inches of fiber (table 9). The maximum fiber length is 7/8 inch; the average length is between 1/8 and 1/4 inch. The asbestos-bearing serpentine occurs in nodules of varied lateral extent.

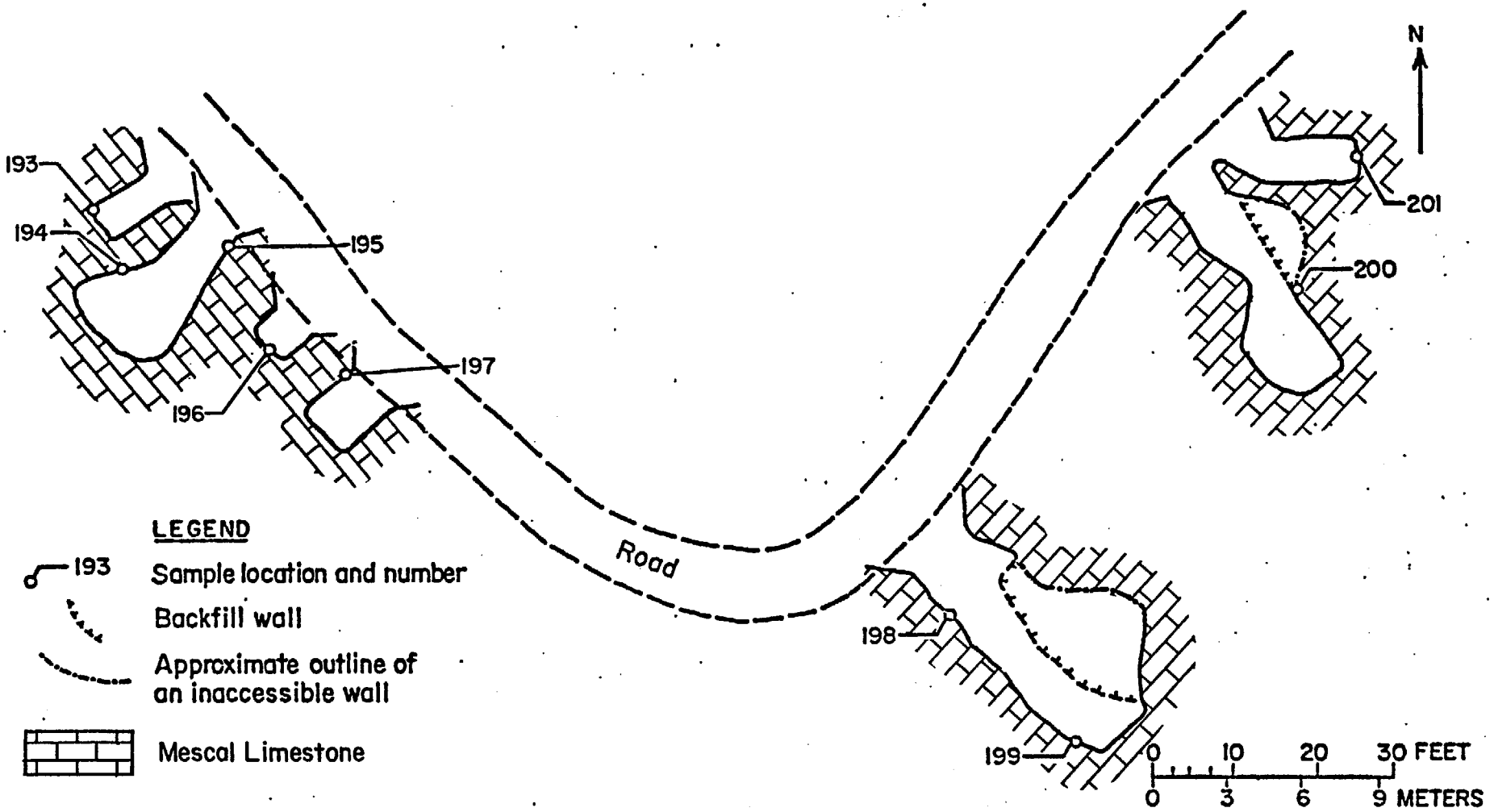


Figure 14. - Sample locations of other prospects at the Lucky Strike Mine. (Map by J. Coursey, 1978.)

Table 9. - Descriptions of samples from prospect adits at the Lucky Strike Mine.

Sample No.	Type	Length	Remarks
193	Chip	5 ft	Serpentized limestone with scattered magnetite and minor short, harsh asbestos fiber.
194	do.	8 in	Serpentine band containing approximately 30% asbestos. Maximum fiber length 5/8 in.; average fiber length 1/4 in. All fiber is very harsh.
195	do.	3.7 ft	Two serpentine bands with a total thickness of 20 in. containing approximately 35% asbestos. Maximum fiber length 3/4 in.; average fiber length 1/4 in.
196	do.	5 ft	Two serpentine bands with a total thickness of 23 in. containing approximately 40% asbestos. Maximum fiber length 1/2 in.; average fiber length 3/16 in.
197	do.	10 in	Serpentine band 7 in. thick containing approximately 70% asbestos. Maximum fiber length 1/4 in.
198	do.	2.5 ft	Serpentine band 13 in. thick containing approximately 20% asbestos. Maximum fiber length 1/4 in.; average fiber length 1/8 in.
199	do.	2.5 ft	Two serpentine bands with a total thickness of 4 in. containing approximately 40% asbestos. Maximum fiber length 1/4 in.; average fiber length 1/8 in.
200	do.	18 in	Serpentine band containing approximately 10% asbestos. Maximum fiber length 7/16 in.; average fiber length 1/8 in.
201	do.	4 ft	Two serpentine bands with a total thickness of 17 in. containing approximately 10% asbestos. Maximum fiber length 1/2 in.; average fiber length 1/8 in.

Metate prospect workings

The Metate prospect workings consist of 10 adits, 300 to 800 feet northwest of the Lucky Strike Adit No. 4, and in the same stratigraphic level as the Lucky Strike workings (plate 1). The adits have been arbitrarily numbered in this report from northwest to southeast. Asbestos occurrence in nodular serpentine in the workings suggests that the Mescal Limestone at this locality did not contain sufficient silica for developing long fibers in continuous veins.

Metate Adit No. 1. - The Metate Adit No. 1 lies at the northwest end of a narrow trail leading from the Lucky Strike Mine. The portal of the Metate Adit No. 1 is 35 feet wide, and the workings extend 27 feet into the hillside (figure 15). Asbestos occurs in discontinuous multiple zones of nodular serpentine. Two samples from this adit contained accumulative asbestos fiber lengths of 1-1/4 and 4-1/3 inches. The average fiber length was 1/8 to 1/16 inch, the maximum fiber length was 1/2 inch (table 10).

Metate Adit No. 2. - The Metate Adit No. 2 is located approximately 40 feet southwest of Adit No. 1 (figure 15). Adit No. 2 trends N 65° W for 20 feet, and exposes asbestos in nodular serpentine. Total accumulated fiber length in two samples from this adit was 2/3 inch and 1-1/2 inches. The average fiber length was 1/16 inch, and the maximum fiber length was 3/8 inch (table 10).

Metate Adit No. 3. - The portal of Metate Adit No. 3 is 20 feet south of Adit No. 2 (figure 15). From the portal the adit trends S 75° W, 40 feet, then turns to S 20° W for 42 feet. Although portions of the ribs have been concealed by backfill, the total area of excavation is estimated to be 900 square feet. Asbestos occurs in one to three serpentine bands. Accumulated total fiber content from four samples ranged from 5/8 inch to 5-1/4 inches,

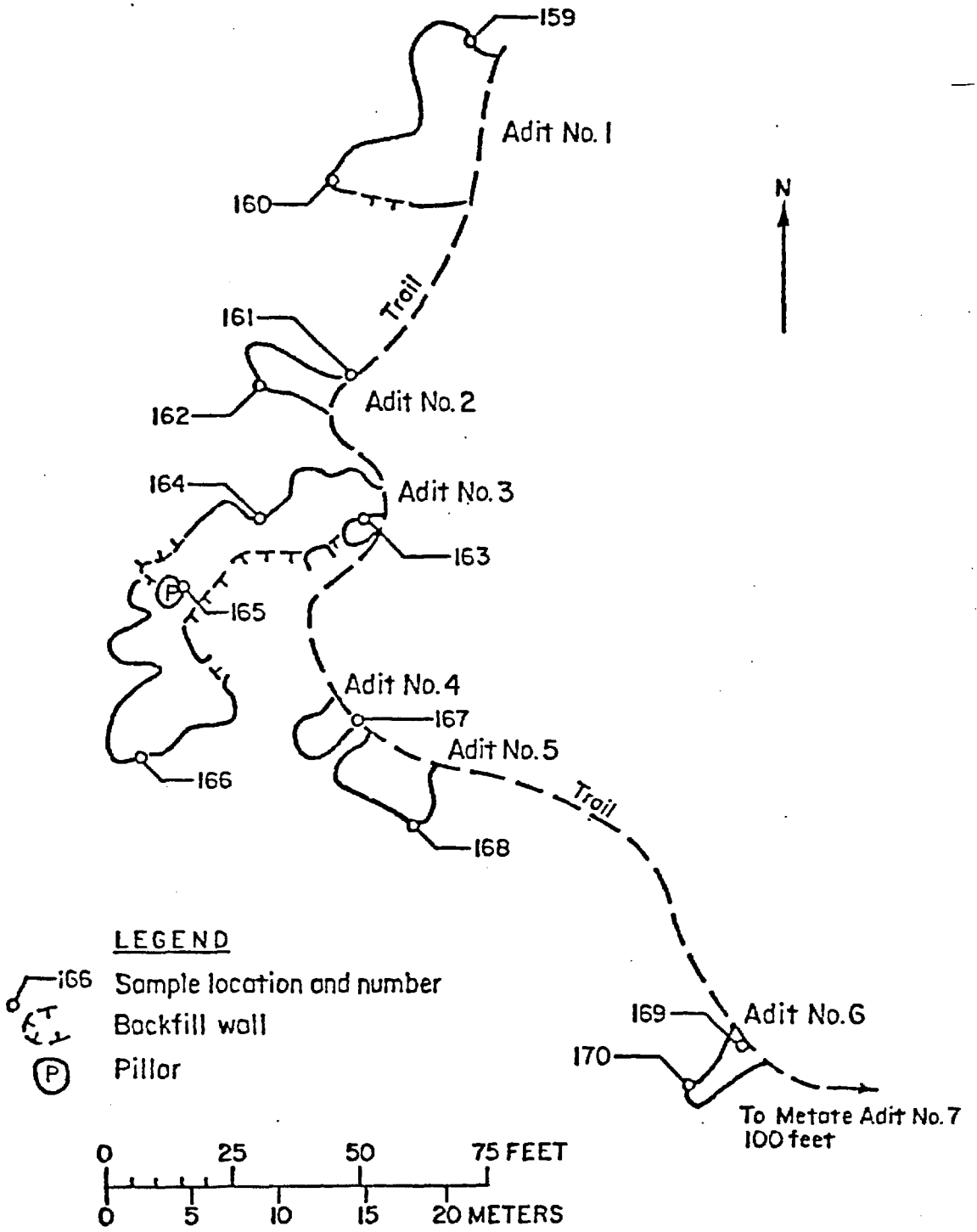


Figure 15. - Sample locations of the Metate Adits Nos. 1 through 6.

Table 10. - Descriptions of samples from the Metate deposit.

Sample No.	Type	Length	Remarks
159	Chip	20 in	Two serpentine bands with a total thickness of 13 in. containing approximately 10% asbestos. Maximum fiber length 1/2 in.; average fiber length 1/16 in.
160	do.	4 ft	Four serpentine bands with a total thickness of 18 in. containing approximately 10% asbestos. Maximum fiber length 1/2 in.; average fiber length 1/8 in.
161	do.	16 in	Serpentine band containing approximately 10% asbestos. Maximum fiber length 1/4 in.; average fiber length 1/16 in.
162	do.	13 in	Serpentine band containing approximately 5% asbestos. Maximum fiber length 3/8 in.; average fiber length 1/16 in.
163	do.	5.5 ft	Three serpentine bands with a total thickness of 26 in. containing approximately 20% asbestos. Maximum fiber length 3/8 in.; average fiber length 1/16 in.
164	do.	15 in	Serpentine band containing approximately 10% asbestos in three irregular veins. Maximum fiber length 1/4 in.; average fiber length 1/16 in.
165	do.	16 in	Serpentine band containing approximately 40% asbestos. Maximum fiber length 5/8 in.; average fiber length 1/4 in.
166	do.	16 in	Serpentine band 7 in. thick containing approximately 10% asbestos. Maximum fiber length 5/8 in.; average fiber length 1/16 in.
167	do.	18 in	Serpentine band 7 in. thick containing approximately 10% asbestos in irregular veins. Maximum fiber length 5/8 in.; average fiber length 1/2 in.

Table 10. - Descriptions of samples from the Metate deposit--Continued

Sample No.	Type	Length	Remarks
168	do.	2 in	Serpentine containing approximately 60% asbestos. Maximum fiber length 3/4 in.; average fiber length 1/4 in.
169	do.	1 ft	Serpentine containing approximately 20% asbestos. Maximum fiber length 3/8 in.; average fiber length 1/16 in.
170	Chip	9 in	Serpentine band containing approximately 30% asbestos. Maximum fiber length 1/2 in.; average fiber length 1/8 in.
171	do.	18 in	Serpentine band containing approximately 10% asbestos. Maximum fiber length 3/8 in.; average fiber length 1/16 in.
172	do.	14 in	Serpentine band containing approximately 10% asbestos. Maximum fiber length 1/4 in.; average fiber length 1/16 in.
173	do.	8 in	Serpentine band containing approximately 30% asbestos. Maximum fiber length 1/2 in.; average fiber length 1/4 in.
174	do.	4 in	Serpentine band containing approximately 40% asbestos. Maximum fiber 3/4 in.; average fiber length 1/8 in.
175	do.	1 ft	Serpentine band containing approximately 15% asbestos. Maximum fiber length 3/8 in.; average fiber length 1/4 in.
176	do.	1 ft	Serpentine band containing approximately 20% asbestos. Maximum fiber length 1/4 in.; average fiber length 1/8 in.
177	do.	17 in	Serpentine band containing approximately 10% asbestos. Maximum fiber length 1/4 in.; average fiber length 1/8 in.
178	do.	26 in	Irregular nodular serpentine containing approximately 5% asbestos. Maximum fiber length 1/4 in.; average fiber length 1/16 in.

averaging 3-1/2 inches. The most common individual fiber length is from 1/4 to 1/16 inch, and the maximum length is 5/8 inch (table 10).

Metate Adit Nos. 4 and 5. - Metate Adit No. 4 is 40 feet south of Adit No. 3 and Adit No. 5 is 5 feet further southeast (figure 15). Both adits trend about S 45° W and are 12 feet long. Adit No. 4 is 6 feet wide and Adit No. 5 is 15 feet wide. Asbestos occurs in an irregular serpentine band up to 7 inches thick in Adit No. 4. The average fiber length is 1/4 inch, and the maximum fiber length is 5/8 inch (table 10). In Adit No. 5, the serpentine is nodular and more irregular than in Adit No. 4. The average fiber length is 1/4 inch and the maximum fiber length is 3/4 inch.

Metate Adit No. 6. - About 80 feet southeast of Adit No. 5, Metate Adit No. 6 was driven S 45° W, 15 feet (figure 15). Asbestos-bearing serpentine nodules are up to 1 foot thick. Cumulative fiber thicknesses from two samples were 1-3/4 and 2-1/8 inches. The most common fiber length is from 1/8 to 1/16 inch, and the maximum fiber length is 1/2 inch (table 10).

Metate Adit Nos. 7 and 8. - Metate Adit No. 7 is approximately 100 feet southeast of Adit No. 6 and 5 feet northwest of Adit No. 8 (figure 16). Adit No. 7 trends S 35° W, 53 feet, and is 6 feet stratigraphically higher than Adit No. 8, which trends S 40° W, 40 feet. The adits are connected by a raise at 15 to 20 feet from the portals. One asbestos-bearing serpentine band occurs just below the back in Adit No. 8 and just above the floor in Adit No. 7. This band is from 4 to 18 inches thick and the total fiber length averages 2 inches. The most common fiber length is from 1/8 to 1/16 inch and the maximum fiber length is 3/4 inch (table 10). Adit No. 7 has a second, more nodular asbestos-bearing serpentine band just below the back. This band contains a total fiber length of up to 1-1/2 inches with maximum individual fiber lengths of 3/4 inch.

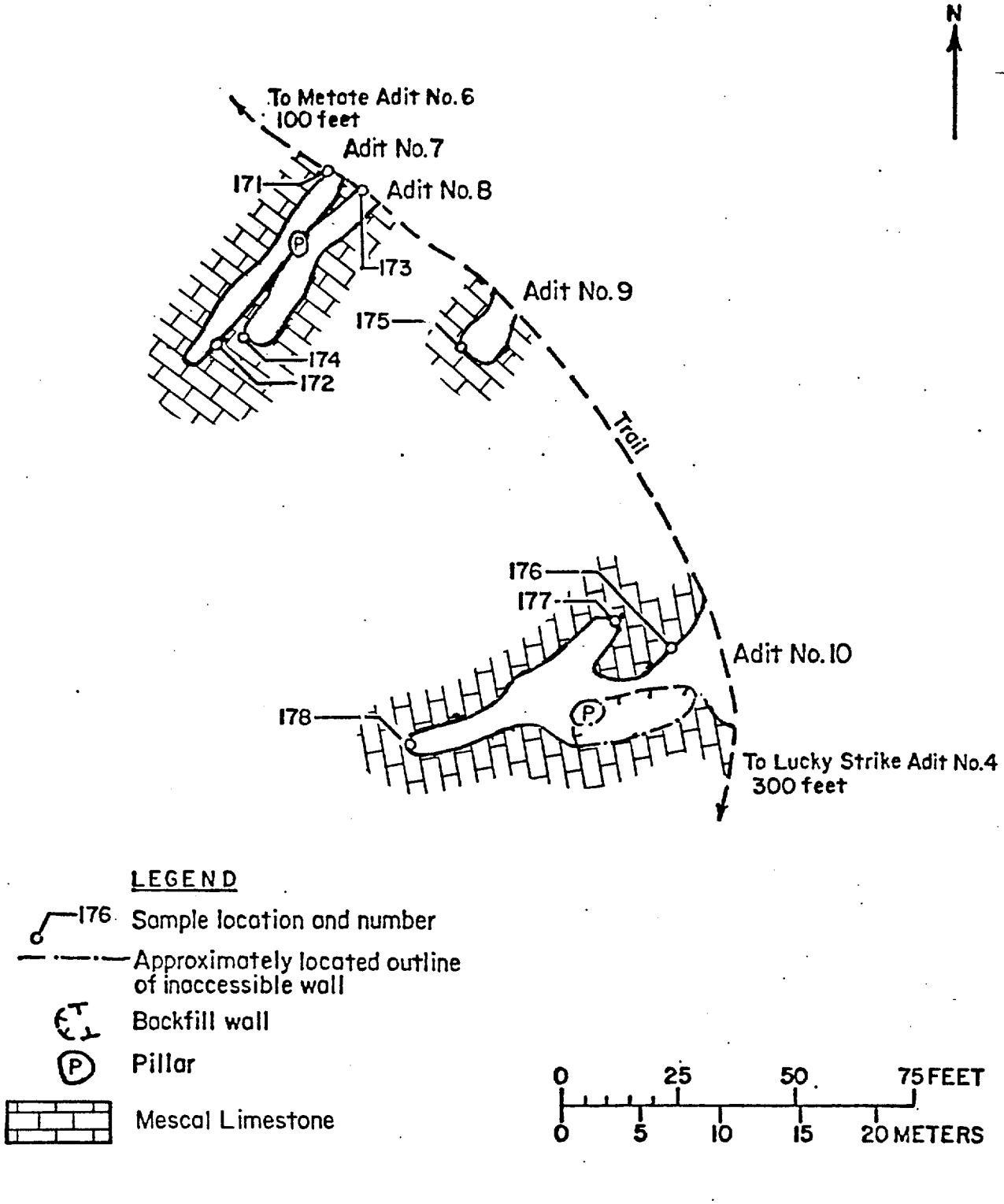


Figure 16. - Sample locations of the Metate Adits No. 7 through 10.

Metate Adit No. 9. - Metate Adit No. 9 is approximately 40 feet southeast of Metate No. 8, and was driven S 30° W, 14 feet (figure 16). Asbestos occurs in an irregular serpentine band about 13 inches wide. At the face the serpentine contains a total fiber length of 2 inches. The average fiber length is 1/4 inch, and the maximum fiber length is 3/8 inch (table 10).

Metate Adit No. 10. - Metate Adit No. 10 is approximately 80 feet southeast of Adit No. 9 and 300 feet northwest of Lucky Strike Adit No. 4. The adit was driven S 75° W, 65 feet, and has been partially stoped and backfilled (figure 16). In a serpentine band up to 1-1/2 feet thick, asbestos occurs in irregular serpentine nodules. Three samples from this adit contained an cumulative fiber content of 2-1/4 inches. The average fiber length is 1/8 inch, and the maximum fiber length is 1/4 inch (table 10).

Reynolds Falls Mine

The Reynolds Falls asbestos mine lies along the south fork of Reynolds Creek in the SW 1/4 sec. 21, T. 6 N., R. 14 E., and lies 1 mile west of the wilderness. The mine is accessible from Arizona Highway 288 by the Reynolds Creek road.

The claims were originally located by B. L. Rogers in 1917. W. Andrews acquired the property and shipped a few tons of fiber in 1924 and 1928. Imperial Asbestos, Ltd., gained control of the property and installed a small mill. J. E. Wells acquired the property in 1931, and mining operations were carried out under leases by R. C. Currier and A. Enders. Apparently most of the production occurred during this time (Stewart, 1955, p. 74). In 1943, the U.S. Bureau of Mines conducted an exploratory program consisting of sampling and of extending the workings with two drifts, each approximately 90 feet long (Stewart and Haury, 1947, p. 25-28). G. Kohl leased the property

and periodically produced fiber from 1949 to 1953 (Stewart, 1955, p. 74). Via Development Co., which acquired the mine and mill in the mid 1950's, reportedly shipped approximately 50 tons of mostly crude No. 2 fiber in 1958. Asbestos shipments were made intermittently from the Reynolds Falls Mine until about 1968. Wyoming Minerals Corp. purchased the property in 1976 (C. Moore, Globe, oral communication, 1979).

The main working at the Reynolds Falls Mine consists of 30,000 to 35,000 square feet of drifts and stopes which have been largely backfilled (figure 17). The workings are inclined along the bedding in the Mescal Limestone, which dips about 4 degrees to the west. This inclination of the mine promotes ponding of water and the adit is normally flooded. Because of the severe flooding, the adit was not accessible at the time of this investigation.

Stewart (1955, p. 76-78) reports three zones of asbestos-bearing serpentine over a stratigraphic interval of 9 to 11 feet. The very irregular upper zone, located just below the back, is 2 to 4 feet thick, and locally contains 2 inches of total fiber with a maximum fiber length of 1/2 inch. The middle zone, 6 to 8 feet above the floor, contains three serpentine bands separated by limestone. The upper band of the middle zone, the most consistent, represents the major producing horizon. Total fiber content of this band is 1 to 4 inches throughout the mine. A 1,400-pound channel sample, 115 feet long, cut from the upper band of the middle zone, contained 12 percent No. 2 fiber, 20 percent No. 3 fiber, and 68 percent No. 4 fiber; the serpentine zone was estimated to contain 46 percent asbestos fiber (Stewart and Haury, 1947, p. 28). The lower zone is in or below the floor, contains only harsh fiber, and was not mined.

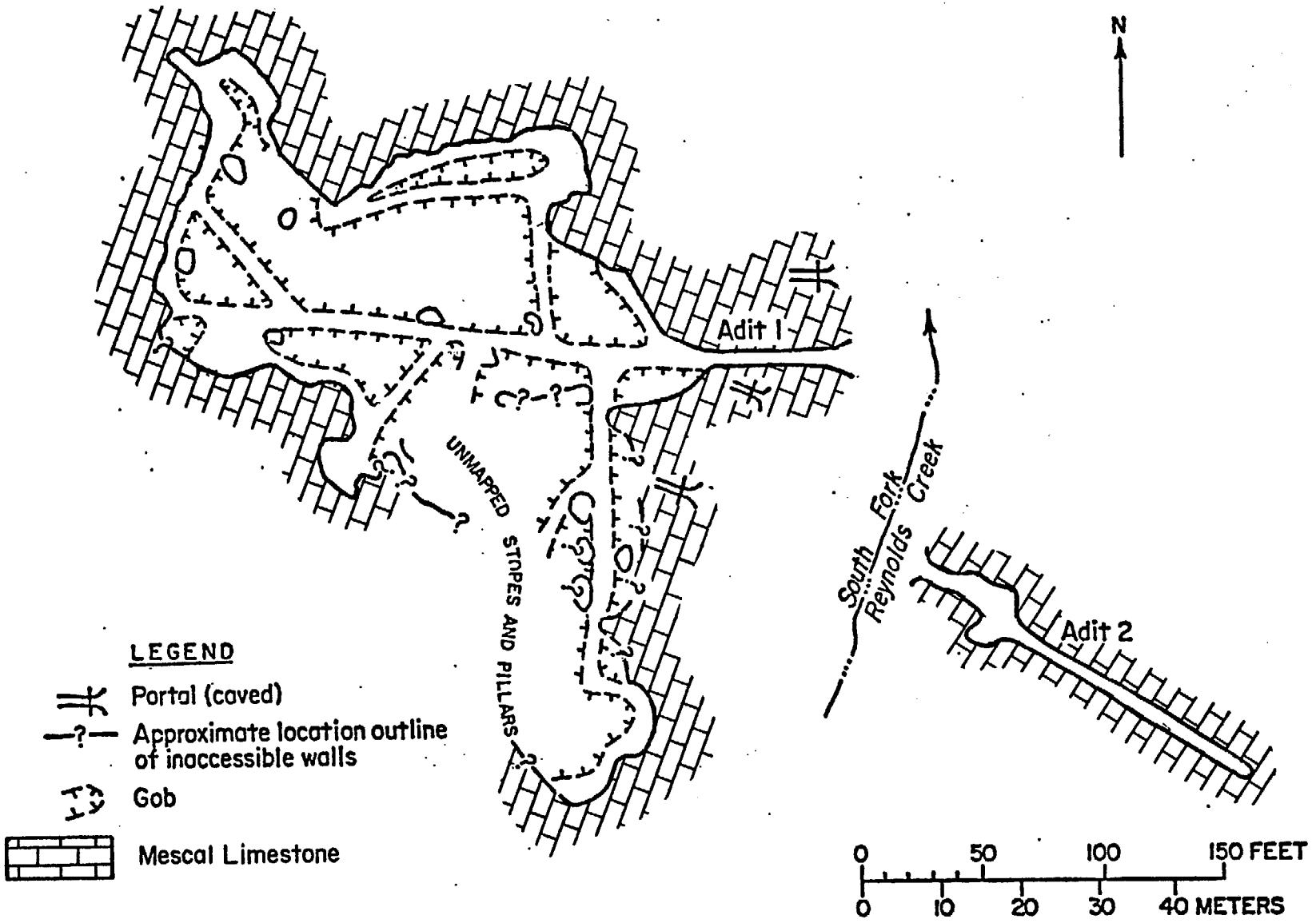


Figure 17. - South workings at the Reynolds Falls Mine. (After Stewart, 1955, p. 77.)

If the average fiber content of the 30,000 to 35,000 square feet excavated was 2 to 4 inches, then production from the Reynolds Falls Mine was probably within the range of 300 to 900 tons of fiber.

On the east side of the South Fork an adit, 160 feet long and trending S 57° E, was driven on the same stratigraphic horizon as the main adit (figure 17). Fiber lengths in the middle zone of serpentine measured 1/2 to 3/4 inch at the portal, and the asbestos gradually becomes less well developed to the southeast (Stewart, 1955, p. 78). If any ore was produced from this adit, tonnages would have been minor.

Approximately 1,000 feet north of the main adit, a third adit was driven 62 feet, S 45° W (figure 18). Although this adit is several feet higher than the main adit, a slight flexure of the limestone allows correlation of this adit to the upper zone of mineralization observed in the main adit. Asbestos in the northern adit is poorly developed, consists of harsh fiber, and does not exceed 2 inches in total length. The average fiber length is 1/8 inch, and the maximum fiber length observed in four samples is 3/8 inch (table 11). No ore was produced from this adit.

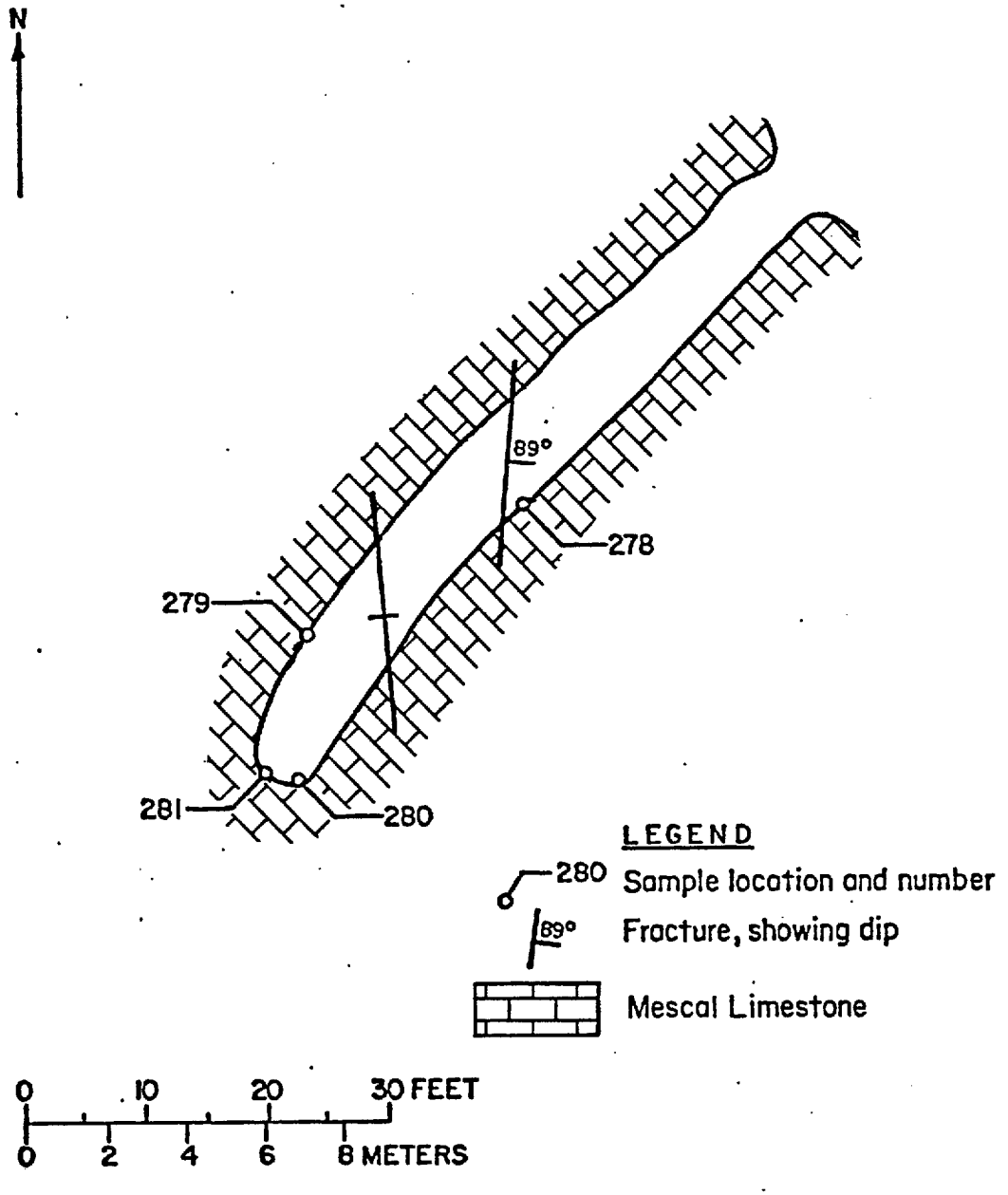


Figure 18. - Sample locations of the north adit of the Reynolds Falls Mine.

Table 11. - Descriptions of samples for the north adit of the Reynolds Falls Mine.

Sample no.	Type	Length (inches)	Remarks
278	Chip	2	Serpentine band containing approximately 50% asbestos. Maximum fiber length 3/8 in.; average fiber length 1/4 in.
279	do.	2	Serpentine band containing approximately 30% asbestos. Maximum fiber length 3/8 in.; average fiber length 1/8 in.
280	do.	9	Serpentine band containing approximately 10% asbestos. Maximum fiber length 1/4 in.; average fiber length 1/16 in.
281	do.	16	Serpentine band containing approximately 10% asbestos. Maximum fiber length 3/8 in.; average fiber length 1/8 in.

Rosa Mine

The Rosa Mine is a group of 12 workings along the western and southern flanks of McFadden Horse Mountain in the SE 1/4 sec. 7, SW 1/4 sec. 8, NW 1/4 sec. 17, and NE 1/4 sec. 18, T. 6 N., R. 14 E. (figure 19; plate 1). Access to the workings is along a road which trends southerly from Highway 288 in sec. 6, T. 6 N., R. 14 E. and joins the road following the north fork of Reynolds Creek at Cienega Spring.

The mining claims in the Rosa Mine area were originally located by Wm. Andrews in the late 1920's. A. Rosales held the claims during the 1930's. From 1938 to 1951 the claims were owned by F. Chisum. E. Sandoval, A. Gonzales, and Y. Ruiz acquired the claims in 1951, and leased them to J. Bustamante Jr., in 1953 (Stewart, 1956, p. 34). G. McGowen and Woodie Nichols relocated many of the claims as the Rosa and American Groups in 1954; they still maintained the claims as of 1979.

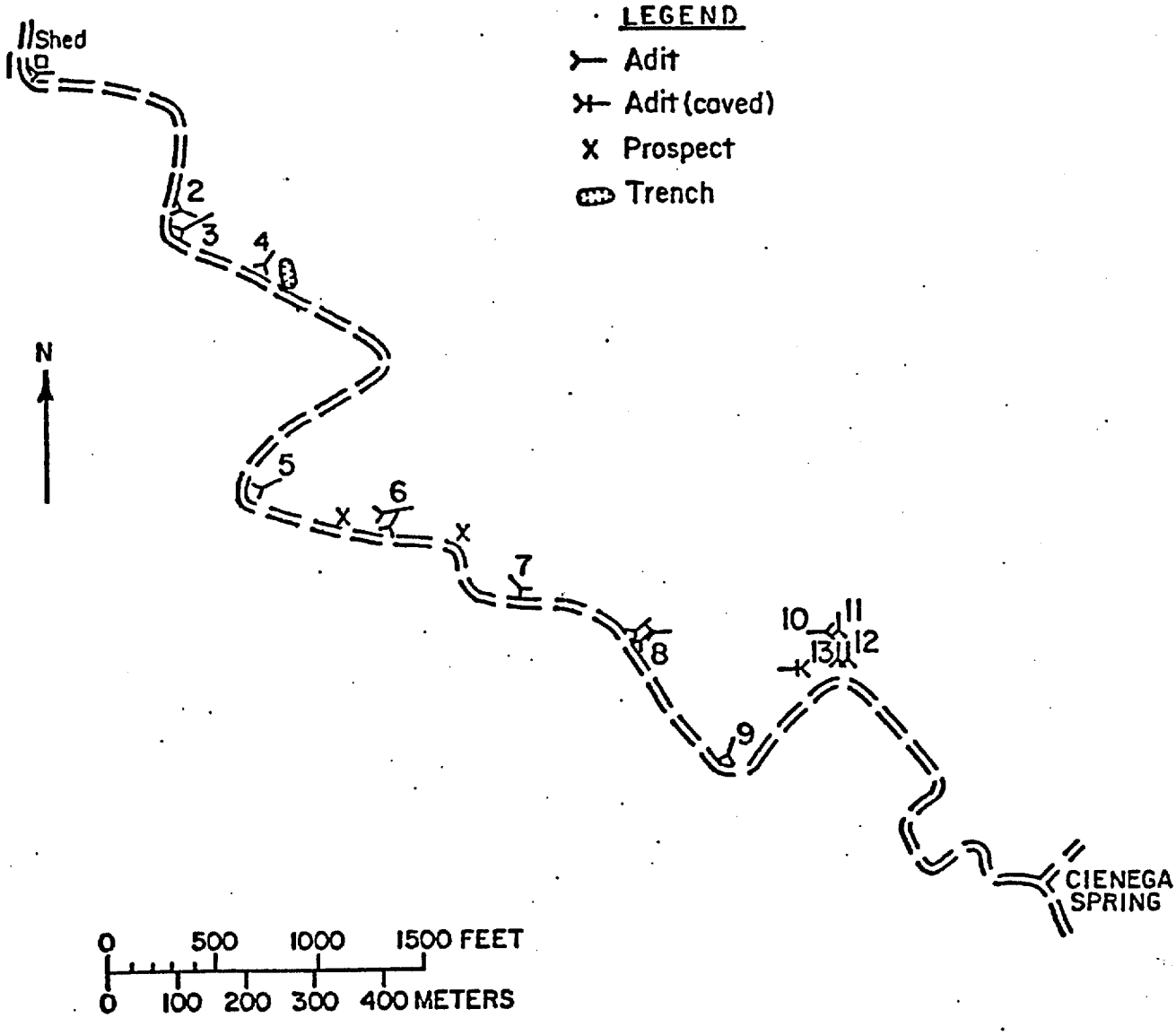


Figure 19. - Locations of workings in the Rosa Mine area.

No production figures are available for the Rosa Mine, but as of 1956 production had been minor (Stewart, 1956), and no production is known since that time.

Diabase does not crop out in the vicinity of the Rosa Mine. The closest diabase lies 1/4 mile to the west. Asbestos mineralization at the Rosa Mine may represent the eastern fringe of mineralization which was originally concentrated to the west, nearer to the diabase intrusion, and has been subsequently eroded.

Rosa Adit No. 1

Rosa Adit No. 1 was driven 16 feet, due east, from the eastern end of an open cut 20 feet long (figure 20). Asbestos occurs in three discontinuous, highly irregular veins, with a total fiber length up to 3-1/2 inches, but usually much less. Sample 134 was taken across an 8 inch serpentine band consisting of approximately 20 percent asbestos. The maximum fiber length was 3/8 inch; the average length was 1/8 inch (table 12).

Rosa Adit No. 2

The Rosa Adit No. 2 lies approximately 1,000 feet southeast of the Adit No. 1. The adit trends S 70° E for 25 feet (figure 20). Two asbestos-bearing serpentine bands, up to 6 inches thick, are exposed in the ribs. The serpentine dips 19° SE, and the lower band, exposed near the back at the portal, goes into the floor at the face. The upper band is exposed 5 feet above the floor at the face. Two samples from Adit No. 2 contained 1-1/2 to 2 inches total fiber length. The most common fiber length is from 1/8 to 1/4 inch, and the maximum fiber length is 3/4 inch (table 12).

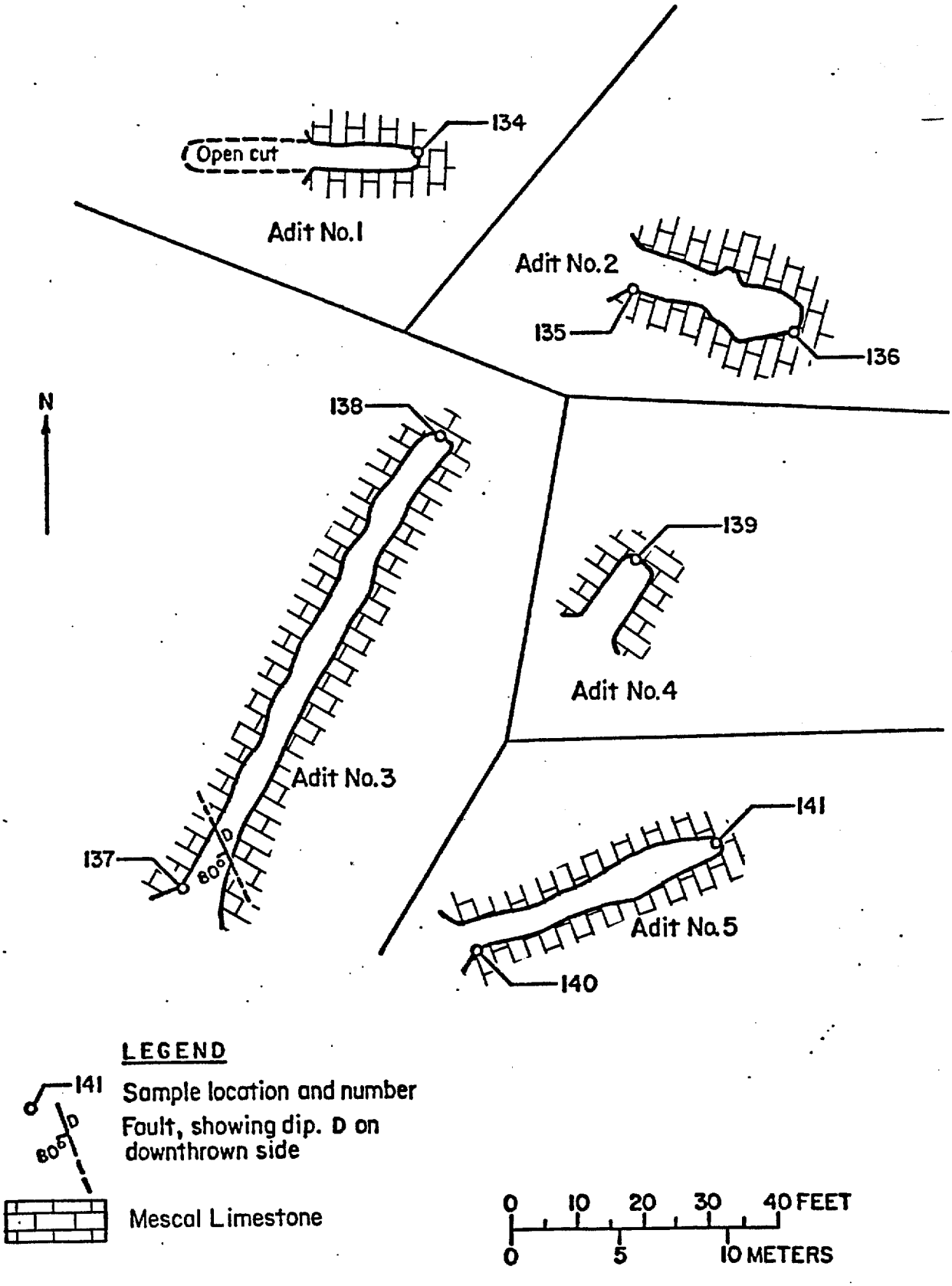


Figure 20. - Sample locations of the Rosa Adits Nos. 1 through 5. (Maps by J. Coursey, 1978.)

Rosa Adit No. 3

The Rosa Adit No. 3, 100 feet southeast of the Adit No. 2, was driven 80 feet, N 63° E (figure 20). The adit is about 15 feet above the road level. One asbestos-bearing serpentine band is present throughout the adit. The serpentine dips about 10° eastward. At 8 feet from the portal the serpentine is displaced 34 inches by a small fault trending N 23° W and dipping 80° SW. The average thickness of the serpentine band is 3 inches, and consists of approximately 40 percent asbestos (table 12). The most common fiber length is 1/4 to 1/8 inch; the maximum length is 3/8 inch. Both the quality and the length of the fiber appear to decrease gradually toward the face.

Table 12. - Descriptions of samples from the Rosa Mine.

Sample No.	Type	Length	Remarks
134	Chip	8 in	Serpentine band containing approximately 20% asbestos. Maximum fiber length 3/8 in.; average fiber length 18 in.
135	do.	4 in	Serpentine band containing approximately 50% asbestos. Maximum fiber length 3/4 in.; average fiber length 1/4 in.
136	do.	6 in	Serpentine band containing approximately 20% asbestos. Maximum fiber length 1/2 in.; average fiber length 1/8 in.
137	do.	3 in	Serpentine band containing approximately 40% asbestos. Maximum fiber length 3/8 in.; average fiber length 1/4 in.
138	do.	2 in	Serpentine band containing approximately 40% average asbestos. Maximum fiber length 1/4 in.; average fiber length 1/8 in.
139	Chip	5.5 ft	Two serpentine bands with a total thickness of 5 in. containing approximately 20% asbestos. Maximum fiber length 1/8 in.; average fiber length <1/16 in.

Table 12. - Descriptions of samples from the Rosa Mine--Continued

Sample No.	Type	Length	Remarks
140	do.	4 in	Serpentine band containing approximately 20% asbestos. Maximum fiber length 1/4 in.; average fiber length 1/16 in.
141	do.	4 in	Serpentine band containing approximately 10% asbestos. Maximum fiber length 1/8 in.; average fiber length <1/16 in.
142	do.	5 in	Serpentine band containing approximately 60% asbestos. Maximum fiber length 3/8 in.; average fiber length 1/16 in.
143	do.	15 in	Two serpentine bands with a total thickness of 8 in. containing approximately 40% asbestos. Maximum fiber length 1/4 in.; average fiber length 1/8 in.
144	do.	17 in	Serpentine band 15 in. thick containing approximately 10% asbestos. Maximum fiber length 1/8 in.; average fiber length 1/16 in.
145	do.	2 ft	Serpentine band 9 in. thick containing approximately 40% asbestos. Maximum fiber length 1/8 in.; average fiber length <1/16 in.
146	do.	11 in	Serpentine band 7 in. thick containing approxiately 40% asbestos. Maximum fiber length 3/8 in.; average fiber length 1/16 in.
147	do.	6 ft	Two serpentine bands with a total thickness of 18 in. containing approximately 15% asbestos. Maximum fiber length 1/8 in.; average fiber length <1/16 in.
148	do.	15 in	Serpentine band containing approximately 15% asbestos. Maximum fiber length 3/8 in.; average fiber length 1/8 in.
149	do.	14 in	Serpentine band containing approximately 10% asbestos. Maximum fiber length 1/2 in.; average fiber length 1/8 in.
150	Chip	10 in	Serpentine band containing approximately 10% asbestos. Maximum fiber length 1/2 in.; average fiber length 1/8 in.
151	do.	6 ft	Thinnly bedded dolomitic limestone, no asbestos visible.

Table 12. - Descriptions of samples from the Rosa Mine--Continued

Sample No.	Type	Length	Remarks
152	do.	10 in	Serpentine band containing 10% asbestos. Maximum fiber length 1/4 in.; average fiber length 1/8 in.
153	do.	2 in	Serpentine band containing approximately 50% asbestos. Maximum fiber length 3/16 in.; average fiber length 1/16 in.
154	do.	2 in	Serpentine band containing approximately 50% asbestos. Maximum fiber length 1/2 in.; average fiber length 1/4 in.
155	do.	6 in	Limestone with siliceous pods; no asbestos visible.
156	do.	4 in	Serpentinized limestone with poorly developed asbestos. Maximum fiber length 1/4 in.; average fiber length 1/16 in.
157	do.	3 ft	Dolomitic limestone with minor serpentine; no asbestos visible.
158	do.	6 in	Serpentinized limestone; no visible asbestos.

Rosa Adit No. 4

Approximately 400 feet southeast of the Adit No. 3, the Rosa Adit No. 4 is 12 feet long and trends N 33° E (figure 20). The adit lies 20 feet above the road level. Two small asbestos-bearing serpentine bands are exposed throughout the working at about 1-1/2 feet below the back and 1 foot above the floor. Both serpentine bands are displaced 6 inches downward to the northeast, by a small vertical fault trending N 55° W. The upper serpentine band is 1 inch thick and contains about 20-percent asbestos with a maximum fiber length of 1/8 inch (table 12). The lower band contains only one asbestos veinlet with the average fiber length less than 1/16 inch.

Rosa Adit No. 5

The Rosa Adit No. 5 is a 41-foot adit driven N 70° E (figure 20). This working lies 1,000 feet south of Adit No. 4, and is 20 feet above the road level. One asbestos-bearing serpentine band is exposed throughout the adit at 1 foot above the floor. Two samples across the 4-inch serpentine band contained 10 to 20 percent asbestos (table 12). The fiber is mostly harsh to semi-harsh and averages less than 1/16 inch in length. The length and quality of the fiber tend to decrease slightly away from the portal.

Rosa Adit No. 6

The Rosa Adit No. 6 workings, 600 feet east of the Adit No. 5, consist of an adit 57 feet long, N 22° E, a central stoped area, and four crosscuts (figure 21). The stoped area is partially backfilled, concealing portions of the rib; however, the area of excavation is estimated to be about 1,200 square feet. Asbestos occurs in two irregular discontinuous veins, one at the back and one near the floor. Five samples from Adit No. 6 contained an average total fiber length of about 2-1/2 inches (table 12). The average fiber length is 1/16 inch, and the maximum fiber length is 3/8 inch. Based on a mined area of 1,200 square feet with an average total fiber content of 2-1/2 inches, approximately 15 tons of fiber could have been produced. Any production from this adit would probably have been mostly crude No. 3 and No. 4 fiber.

Rosa Adit No. 7

Located approximately 700 feet southeast of Adit No. 6, the Rosa Adit No. 7 is about 25 feet above the road level. The adit was driven N 58° W, 22 feet (figure 21). At 5 feet from the portal, a 12 foot crosscut was driven S 30° W. Two asbestos-bearing serpentine bands occur irregularly

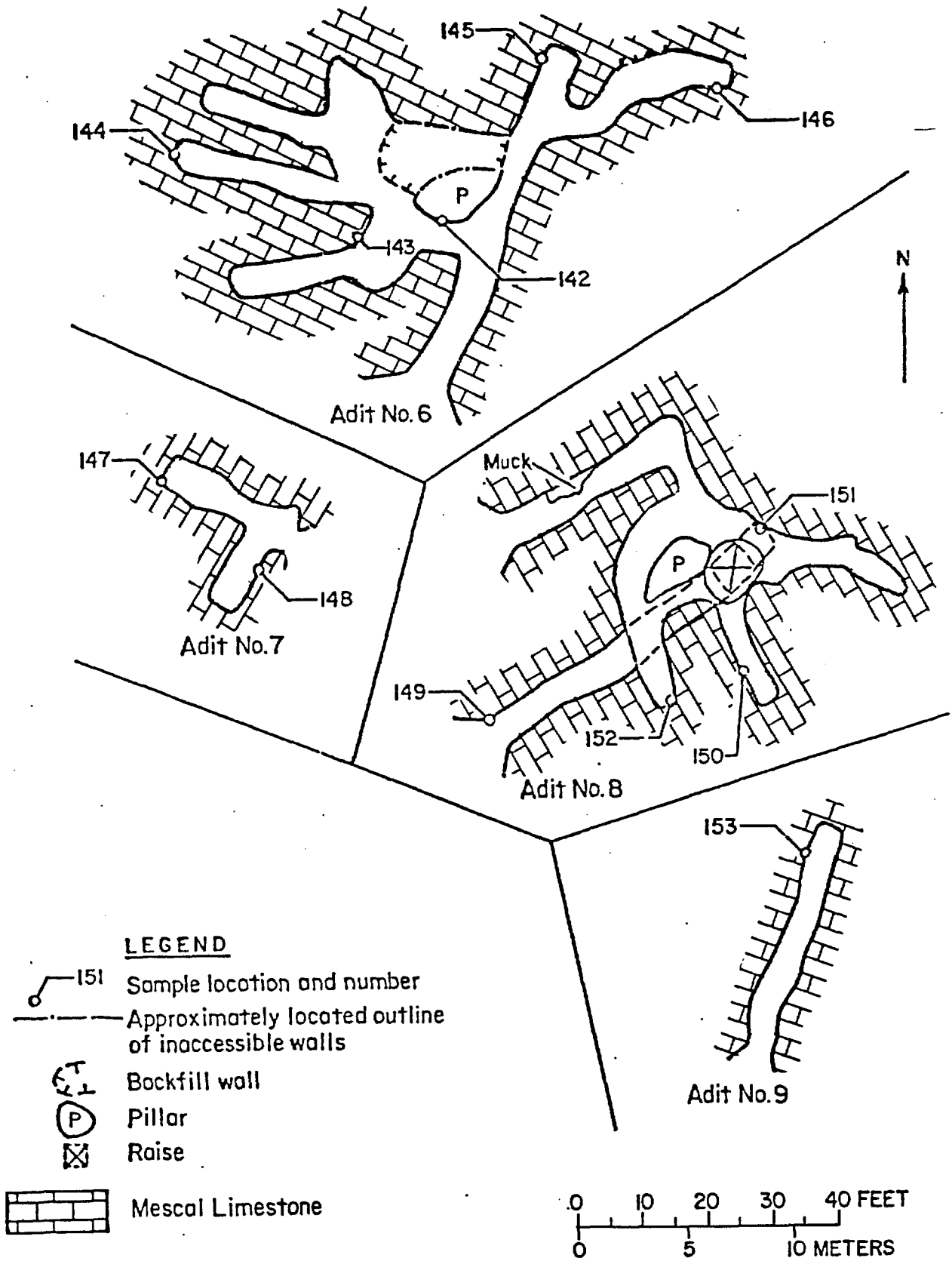


Figure 21. - Sample locations of the Rosa Adits Nos. 6 through 9. (Map by J. Coursey, 1978.)

throughout the adit. The fiber is harsh to semi-harsh, and commonly has a length between 1/8 to 1/16 inch (table 12); the maximum fiber length is 3/8 inch. The fiber tends to become shorter and more brittle inward from the portal.

Rosa Adit No. 8

The Rosa Adit No. 8 workings, 600 feet southeast of Adit No. 7, consist of a lower haulage level and an upper level of interconnected drifts (figure 21). The two levels are connected by a 10-foot-high timbered chute and manway. The lower level trends N 54° E for 51 feet. The adit of the upper level is 30 feet north of, and 15 feet above, the portal to the lower adit. The upper adit is 31 feet long, N 60° E, and is extended to the south and southeast by about 110 feet of drifts and crosscuts.

At the portal, the lower level contains a 14-inch serpentine band with four asbestos veinlets containing fiber lengths up to 1/4 inch, averaging 1/8 inch (table 12). The asbestos gradually pinches out to the northeast, and no fiber is visible at the face.

The upper level workings contain a 10-inch serpentine band with approximately 10 percent asbestos. The average fiber is 1/8 inch; the maximum fiber length is 1/2 inch. The excavated area of the upper level is approximately 700 square feet. If the average cumulative fiber length were 1 inch then production from the Rosa No. 8 would be about 4 tons of fiber.

Rosa Adit No. 9

Rosa Adit No. 9 is about 700 feet southeast of Adit No. 8. The adit was driven 52 feet, N 20° E (figure 21). In front of the portal was a 14-foot opencut. Three discontinuous asbestos veins occur in a 2-inch serpentine band. One sample, taken near the face of the adit, contained

approximately 50 percent asbestos within the serpentine. The maximum fiber length was 3/16 inch and the average fiber length was 1/16 inch (table 12).

Rosa Adit Nos. 10 and 11

Rosa Adit Nos. 10 and 11 are two short adits about 700 feet northeast of Adit No. 9, and 1/4 mile northwest of Cienega Spring. Adit No. 10 was driven N 87° W for 35 feet (figure 22). A serpentine band 2 inches wide consists of approximately 50-percent asbestos with fiber up to 1/2 inch long, averaging 1/4 inch (table 12). Asbestos in this band is harsh to semi-harsh, and pinches out at 28 feet from the portal.

Adit No. 11 was driven N 5° W for 12 feet on a band of serpentinized limestone with minor asbestos. The fiber is extremely discontinuous, very poorly developed, with a maximum length of 1/4 inch and an average length of 1/16 inch.

Rosa Adits Nos. 12 and 13

Rosa Adit Nos. 12 and 13 lie about 25 feet below Adit Nos. 10 and 11. The adits are 5 and 10 feet long, respectively (figure 23). Both adits were cut in serpentinized dolomite which contained clay zones and only very minor asbestos. The asbestos pinches out immediately away from the portal (table 12). Clay zones along bedding planes indicate that the dolomite was not sufficiently metamorphosed to form asbestos veins.

Fluorspar: Mack Mine

Fluorspar in the vicinity of the Sierra Ancha Wilderness occurs along the west trending McFadden Fault. The fault acted as the conduit for ascending hydrothermal fluids containing high quantities of fluorine. Fluorspar occurrences in the southwest United States are normally accompanied by anomalous

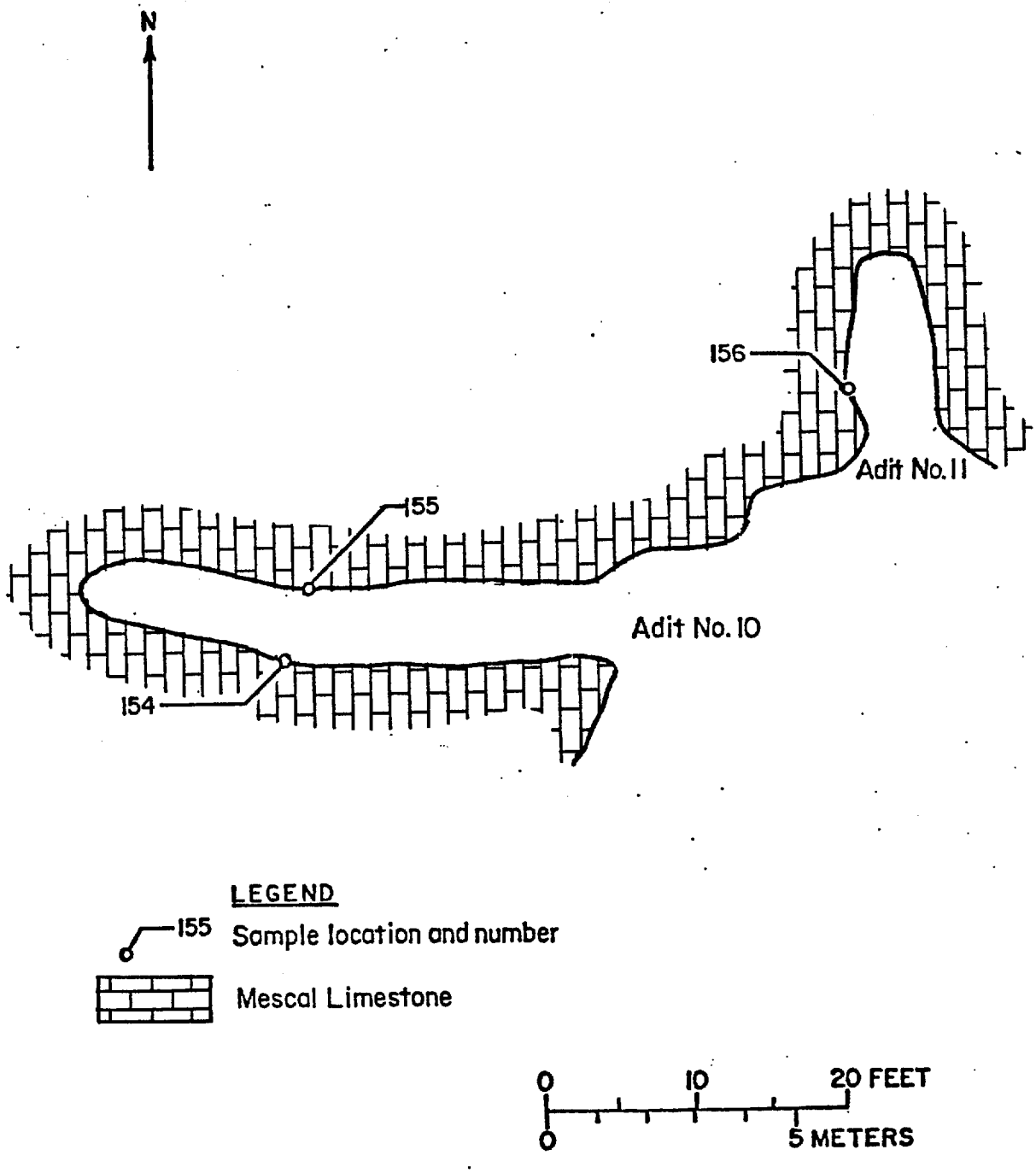


Figure 22. - Sample locations of the Rosa Adits Nos. 10 and 11. (Map by J. Coursey, 1978.)

quantities of barite, zinc, lead, molybdenum, uranium, thorium, niubium, tin, beryllium, or rare-earth minerals (Van Alstine, 1976, p. 985). The association of several of these elements or minerals with the fluorspar in the McFadden fault is supported by assays of geochemical samples; (Barton, Tripp, and Theobald, 1980; Tripp, and others, 1980). Deposition of the fluorspar in the fault zone probably occurred during the middle or late Tertiary (Lamarre and Hodder, 1978, p. 236).

The Mack Mine is approximately 1-1/2 miles west of the Sierra Ancha Wilderness on the south slope of McFadden Peak, in sec. 36, T. 7 N., R. 13 E. and sec. 31, T. 7 N., R. 14 E. The mine is reached by an access road which leaves Arizona Highway 288 in sec. 6, T. 6 N., R. 14 E.

The Mack claims were originally staked by G. McGowan and Woodie Nichols in 1964. The property was leased to Western Fluorspar, Ltd., in 1976. From 1976 through 1978 approximately 30,000 tons of ore containing 60 to 90 percent CaF_2 were mined and shipped approximately 40 miles to a mill in Punkin Center.

Mineralization at the Mack Mine is concentrated along the McFadden fault, an east-west trending structure which extends for more than 4 miles. Ore has been produced at the Mack Mine from three open cuts and an adit. In 1978 production was restricted to the adit which was being driven westward along the vein. Information from the mine operator revealed that drilling along the structure has delineated reserves of over 300,000 tons (Victor Randolph, oral communication, 1979). Fluorspar has not been observed along the fault zone in the wilderness, but exploration for buried fluorspar resources should be conducted along the fault underneath the Troy Quartzite.

Four samples were taken from the western extension of the fluorspar vein in the McFadden fault, in the SW 1/4 sec. 36, T. 7 N., R. 13 E., approximately

one mile west of the Mack Mine. The vein crops out intermittently over a distance of 110 feet in this area, and has a width of up to 5 feet (figure 24). Samples from this portion of the vein contained from 78.5 to 99.1 percent CaF_2 (Table 13). Although the vein is irregular and appears to pinch out to the west, the calcium-fluoride content remains high.

Table 13. - Assay data for samples from the western portion of the McFadden fault.

Sample No.	Type	Length (feet)	CaF_2 percent	Cu percent	Pb percent	Zn percent
42	Chip	4.5	88.4	0.005	0.019	0.005
43	do.	1.8	94.4	.003	.003	.006
44	do.	1.8	99.1	.003	.005	.06
45	do.	3	78.5	.004	.37	.04

Iron

Magnetite and minor amounts of hematite occur locally in the Sierra Ancha Wilderness. Nearly horizontal, silty beds in the Mescal Limestone were pyrometasomatically replaced by iron-bearing solutions during intrusion of adjacent diabase sills and dikes (Granger and Raup, 1964, p. 435). The iron deposits range from massive to disseminated, and are characteristically irregular in shape and discontinuous (Harrer, 1964, p. 18).

The largest known deposits occur at Zimmerman Point, and at the Pueblo and Lucky Strike Mines. Scattered occurrences of iron have been reported west of the wilderness in the slopes of Baker, Carr, and Center Mountains (Harrer, 1964, p. 26, 31). Hematite has been reported as a discontinuous contact metamorphic replacement in the south-central Sierra Ancha Wilderness, between Coon Creek and Deep Creek Canyons in sec. 13, 23, and 24, T. 5 N., R. 14 E. (Harrer, 1964, p. 31-32).

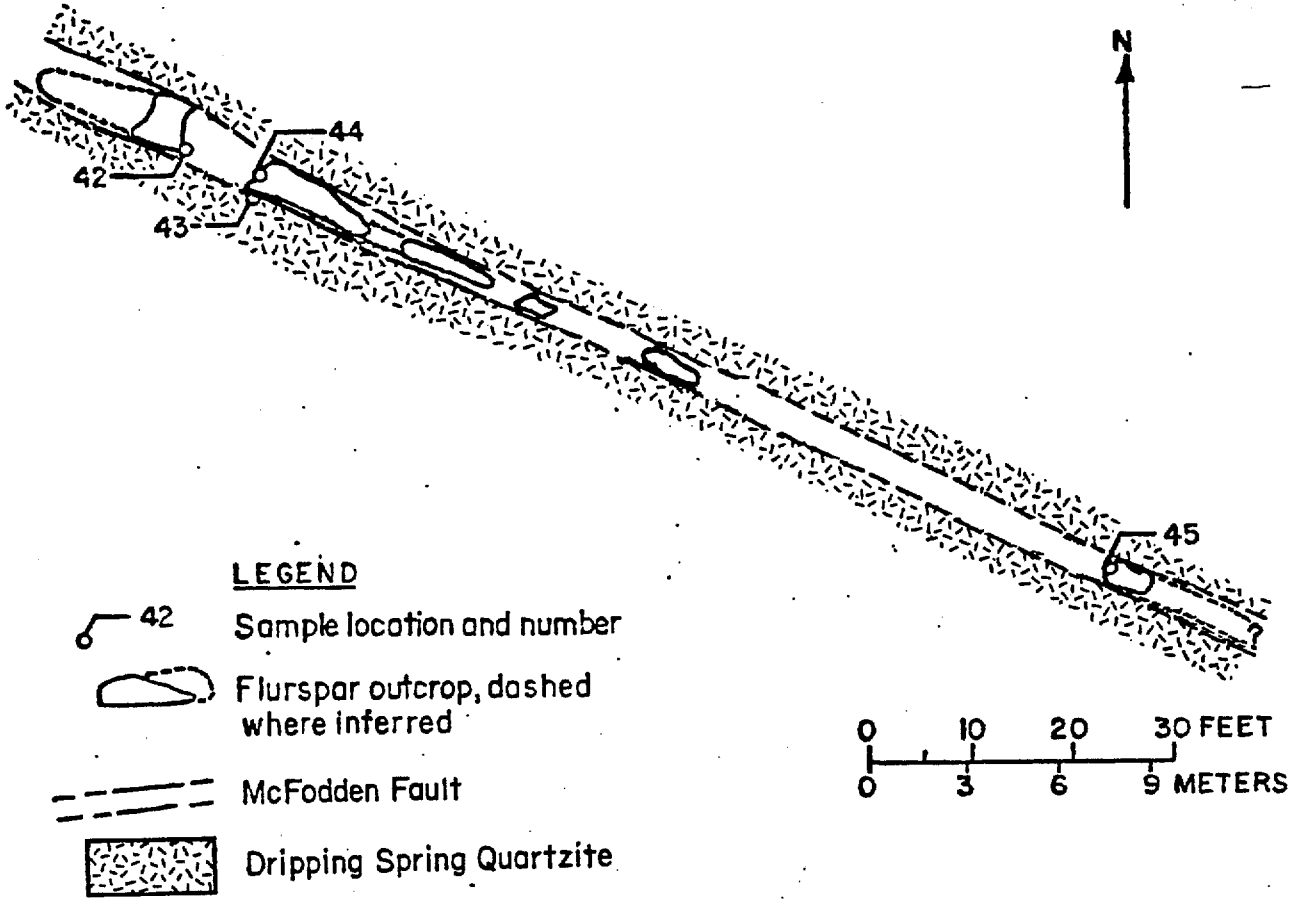


Figure 24. - Sample locations for the western portion of the McFadden fault.

Zimmerman Point deposit

Magnetite occurs as irregular, discontinuous replacement zones in the Mescal Limestone at an elevation of approximately 5,400 feet in the steep eastern and southern flanks of Zimmerman Point, secs. 20, 21, and 29, T. 5 N., R. 14 E. (figure 25). A total of 38 mining claims were located on the deposit. C. H. Jonas, R. L. Peugh, and M. Peugh had 13 claims which they leased with an option to purchase to Cerro de Pasco Corp. in 1957. Cerro staked an additional 25 claims and conducted geological mapping, trenching, dip-needle surveys, drilling and metallurgical testing. The purchase option and lease were dropped by Cerro in 1960.

Cerro's evaluation of the data from their exploration program was that the property contained an iron deposit of 15 million tons with an average grade of 26.5% iron (Cerro de Pasco Corp., written communication, 1979). The tonnage and grade of the deposit was not considered to be economic as of 1980.

Pueblo--Lucky Strike deposit

Magnetite crops out on the steep eastern slope of Center Mountain, above the Pueblo and Lucky Strike asbestos mines. The magnetite beds are similar to those of the Zimmerman Point deposit in that they are locally irregular discontinuous. Iron reserves were reportedly estimated at 6 million tons of rock averaging 40-60% Fe (B. B. Kyle, Globe, Arizona, oral communication, 1978), but no iron ore has been produced from the property. Table 14 lists assay results from previous Bureau of Mines investigations (Harrer, 1964, p. 54).

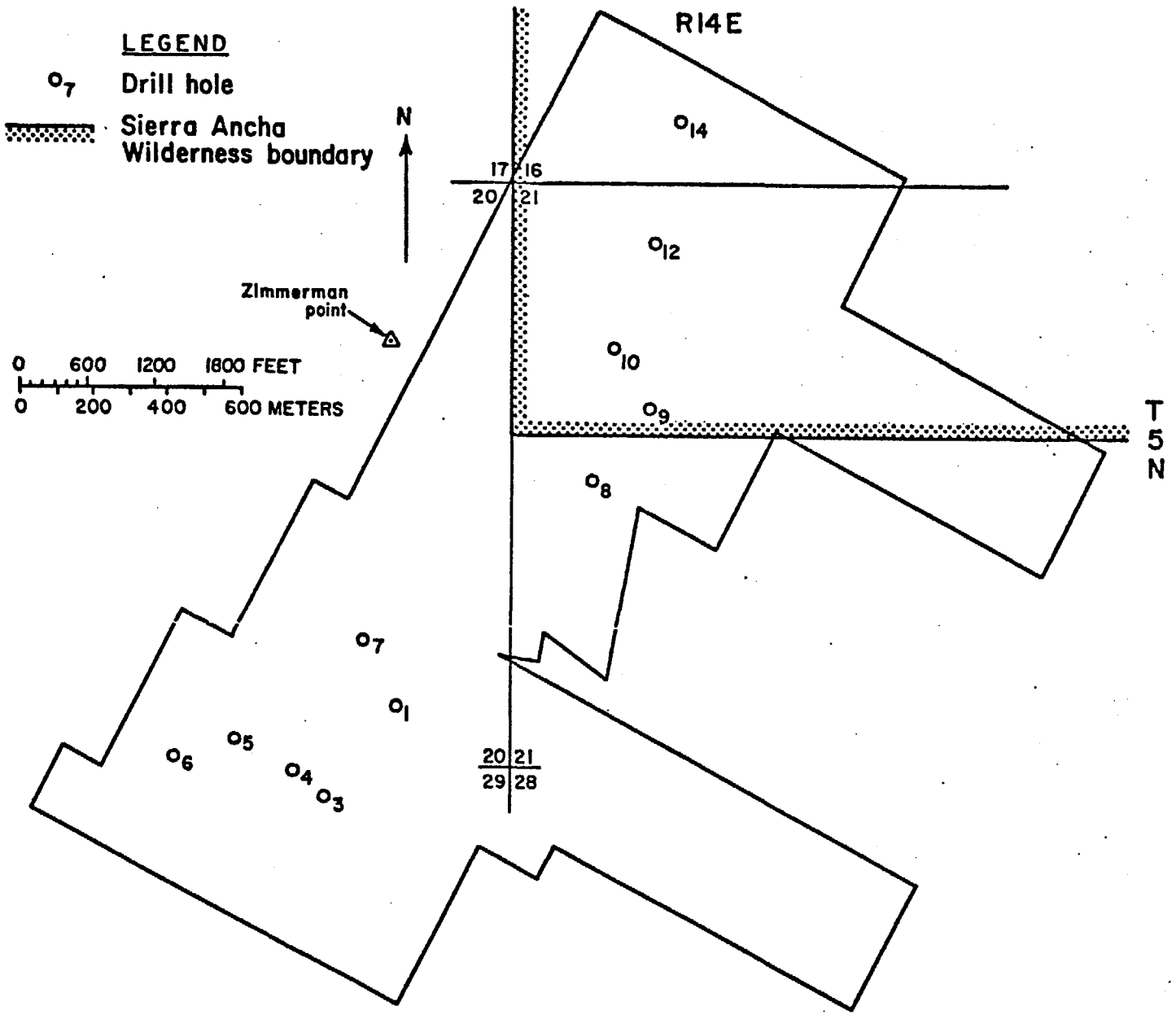


Figure 25. - Zimmerman Point iron deposit (after Harrer, 1964, p. 58).

Table 14. - Analyses of magnetite samples, Pueblo-Lucky Strike Mines area.

Sample	Chemical analyses, percent												Remarks
	Fe	Mn	SiO_2	Al_2O_3	P	S	As	Cu	Ni	Pb	Zn	TiO_2	
1[1/]...	51.0	0.05	14.6	0.3	0.01	0.01	-	-	-	-	-	-	Courtesy Roger Kyle owner, Globe, AZ. Analyzed by C. F. I. Corp., Dec. 5, 1958.
2.....	58.7	.12	5.70	-	.02	.015	0.02	0.01	0.01	0.01	0.04	0.09	Courtesy Roger Kyle Globe, AZ. Analyzed by U.S. Steel Corp.
3.....	55.2	.3	8.2	-	.03	.10	-	-	-	-	-	.03	Bureau of Mines character sample Aug. 17, 1961.

1/ Semiquantitative spectrographic analysis indicated presence of 0.003 percent copper 0.005 percent gallium and titanium (After Harrer, 1964, p. 54).

-, not available

Uranium

Anomalous uranium concentrations occur in the black facies of the upper member of the Precambrian Dripping Spring Quartzite in the Sierra Ancha. The black facies is a fine-grained siltstone to silty sandstone with locally abundant sulfides and carbonaceous material. Uranium is concentrated along a conjugate fracture set trending approximately N 20° E and N 70° W. Locally the mineralized areas extend from the fractures along bedding planes. Uraninite, metatorbernite, bassetite, and uranophane have been reported as the most abundant uranium-bearing minerals (Granger and Raup, 1969b, p. 80).

The uranium deposits are epigenetic enrichments due to migration of uranium into fractures in the Dripping Spring Quartzite. The carbonaceous material in the black facies of the upper member produced a reducing environment allowing concentration and reprecipitation of uranium. The rapid development of secondary hydrous sulfate and hydrous phosphate minerals on exposed surfaces underground indicates that the effect of supergene enrichment due to ground water migration may be significant in some deposits.

The potential for uranium resources in the wilderness has been estimated using the following criteria: (1) presence of the upper member of the Dripping Spring Quartzite; (b) presence of well-developed carbonaceous siltstone; (c) proximity to a major diabase sill or dike; (d) presence of known uranium deposits in the area; (e) presence of contact metamorphic effects and (or) late stage differentiates of diabase; (f) proximity to a monocline; (g) presence of anomalously high levels of uranium or radon in water samples (Otton, and others, 1981).

The black facies of the upper member of the Dripping Spring crops out in the steep canyon walls throughout the area, and underlies most of the wilderness. The projection of known mineralized fractures into the Dripping Spring underlying nearly the entire wilderness suggests a minimum of several millions of pounds of uranium. However, because the deposits are localized and discontinuous, and the depth of burial exceeds 2,000 feet in portions of the wilderness, the vast majority of uranium deposits would be very difficult to locate. The deposits which deserve investigation for economic development are those exposed in the deeply incised valleys which have penetrated the Dripping Spring Quartzite; such deposits could be readily accessible by short underground workings.

Figure 26 shows the uranium deposits in and around the Sierra Ancha Wilderness which were examined during the course of this investigation.

Ancient (Cliff Springs) deposit

The Ancient deposit is located on the south wall of Pueblo Canyon, approximately 1-3/4 miles west of the upper Cherry Creek road at an elevation of about 6,100 feet, in the NW 1/4 sec. 26, T. 6 N., R. 14 E. The mine is accessible via 1-1/2 miles of nonmaintained dirt road, and 1/2 mile of trail.

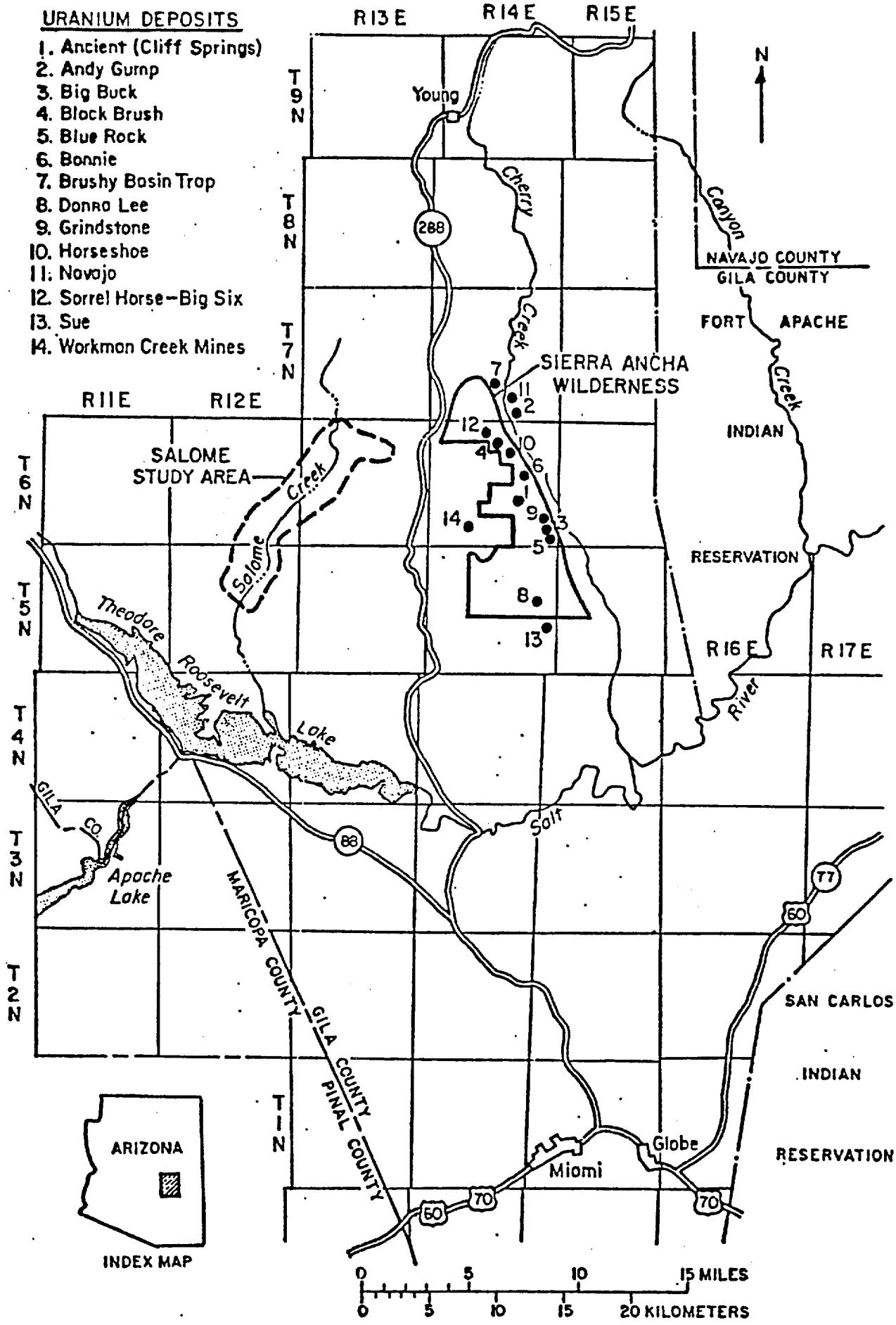


Figure 26. - Location at uranium deposits in and around the Sierra Ancha Wilderness.

The property was originally located as the Ancient claims by William Fitz, in 1955 (T. Ellison, oral communication, 1978). Fitz drove an adit 92 feet at S 20° E., with a crosscut beginning at 32 feet from the portal and extending 33 feet S 70° E. (figure 27). No ore has been produced from the property. The property was restaked as the Cliff Springs claims in 1975 by F. Nelssen and others.

The adit at the Ancient deposit was driven in a well indurated, highly silicious, fissile shale in the Mescal Limestone, and is the only known working in this facies of the Mescal. The shale contains abundant finely disseminated copper and iron sulfides which have been leached and deposited as hydrous compounds on the walls of the adit. These secondary products are impossible to exclude from samples and are a contaminant within the samples. The property was originally staked and worked as an uranium deposit; however, no strong radioactive anomalies were observed. No dominant fracture pattern is evident in the control of the radioactivity.

Seventeen samples taken throughout the adit were assayed for uranium, gold, silver, copper, lead, and zinc (table 15). Sample 295 contained 0.09 percent U_3O_8, 1.4 percent copper, and 1.1 ounces silver per ton. Sample 287 contained 3.2 percent copper and 0.9 ounces silver per ton. These were 7- and 8-inch chip samples, respectively, taken across bedding, and indicate that mineralization in the Ancient adit is concentrated along narrow, discontinuous zones within the bedding of the shale.

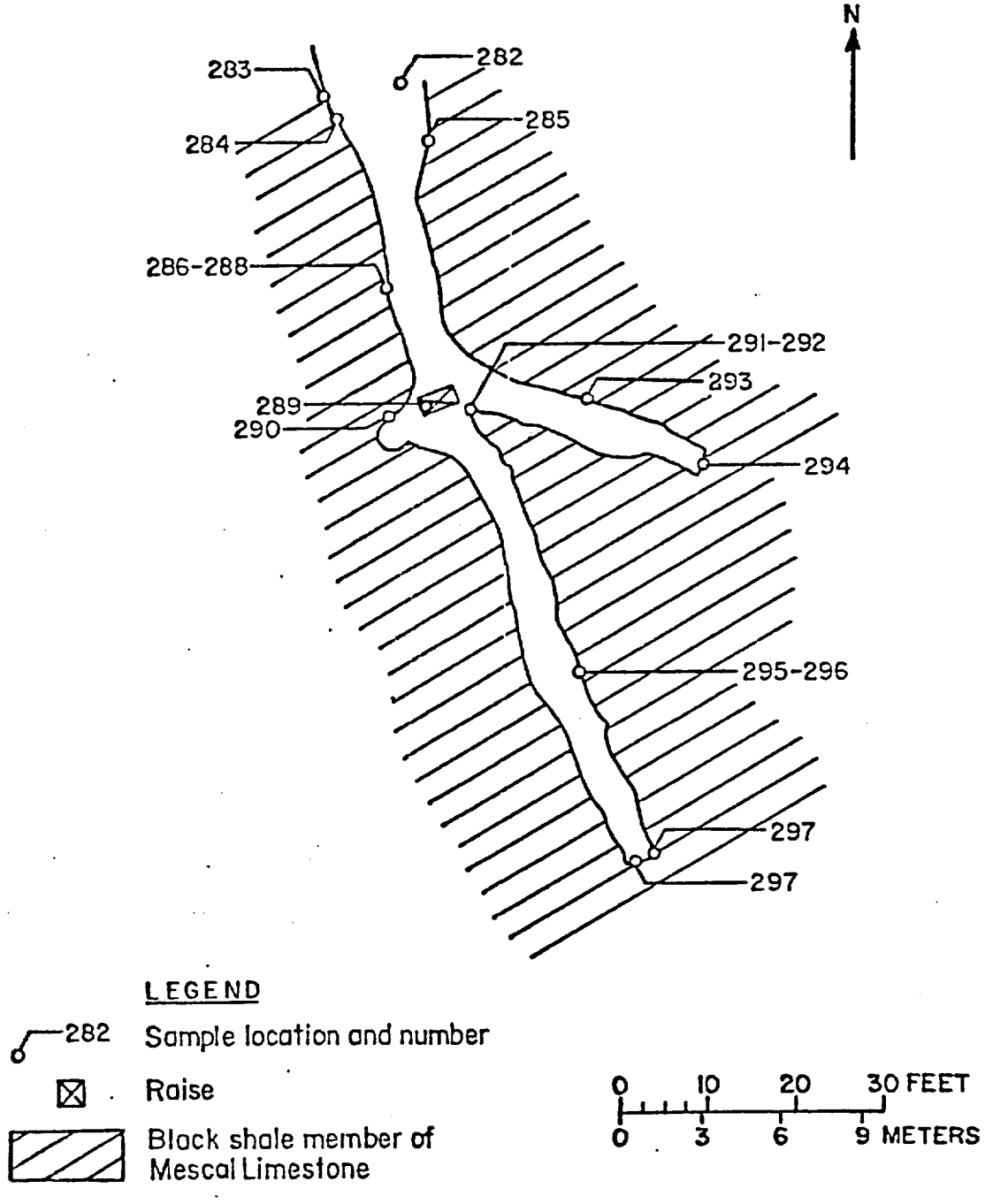


Figure 27. - Sample locations of the Ancient (Cliff Springs) deposit.

Table 15. - Assay data for samples from the Ancient (Cliff Spring) Adit.

Sample No.	Type	Length	U_3O_8 percent	Au oz/T	Ag oz/T	Cu percent	Pb percent	Zn percent
282	Chip	9 ft	0.005	Tr	0.2	0.02	Tr	Tr
283	do.	1 ft	0.004	Tr	--	0.48	Tr	Tr
284	do.	5 ft	0.003	--	--	0.06	Tr	Tr
285	do.	2 ft	0.01	Tr	0.6	0.55	0.05	Tr
286	do.	6 in	0.01	--	0.2	0.49	Tr	Tr
287	do.	8 in	0.01	Tr	0.9	3.2	0.02	Tr
288	do.	4 ft	0.01	--	--	0.82	Tr	Tr
289	do.	18 in	0.002	--	--	0.01	Tr	Tr
290	do.	5 ft	0.01	Tr	0.2	0.01	Tr	Tr
291	do.	1 ft	0.08	--	0.6	0.74	0.19	Tr
292	do.	4 ft	0.02	--	0.2	0.38	0.02	Tr
293	do.	5 ft	0.01	--	0.2	0.05	Tr	Tr
294	do.	3.5 ft	0.01	--	0.2	0.07	0.02	Tr
295	do.	7 in	0.09	Tr	1.1	1.4	0.10	Tr
296	do.	6 ft	0.01	--	0.2	0.38	0.01	Tr
297	do.	2.5 ft	0.002	Tr	0.2	0.01	Tr	Tr
298	do.	2.5 ft	0.002	--	0.2	0.01	Tr	Tr
299	Select		0.02	--	0.3	0.38	0.01	0.02

Tr, Trace
--, not detected

Andy Gump deposit

The Andy Gump deposit is located on the east side of Cherry Creek about 100 feet above the creek, 1/3 mile east of the wilderness in the NE 1/4 sec. 34, T. 7 N., R. 14 E. (unsurveyed). A nonmaintained road from the upper Cherry Creek road to the west bank of Cherry Creek provides access to the deposit.

The Andy Gump claims were located in 1954 by A. Haught and others. Pacific Uranium Company leased the property and drove a 42-foot adit and 15-foot crosscut in 1955 (Granger and Raup, 1969a, p. 6). In 1956, Twentieth Century Fuels, Inc., extended the adit 95 feet. No ore was produced from the property.

The adit was driven a total of 137 feet, N 15° E. along a fracture containing anomalous radioactivity (figure 28). The host rock is the

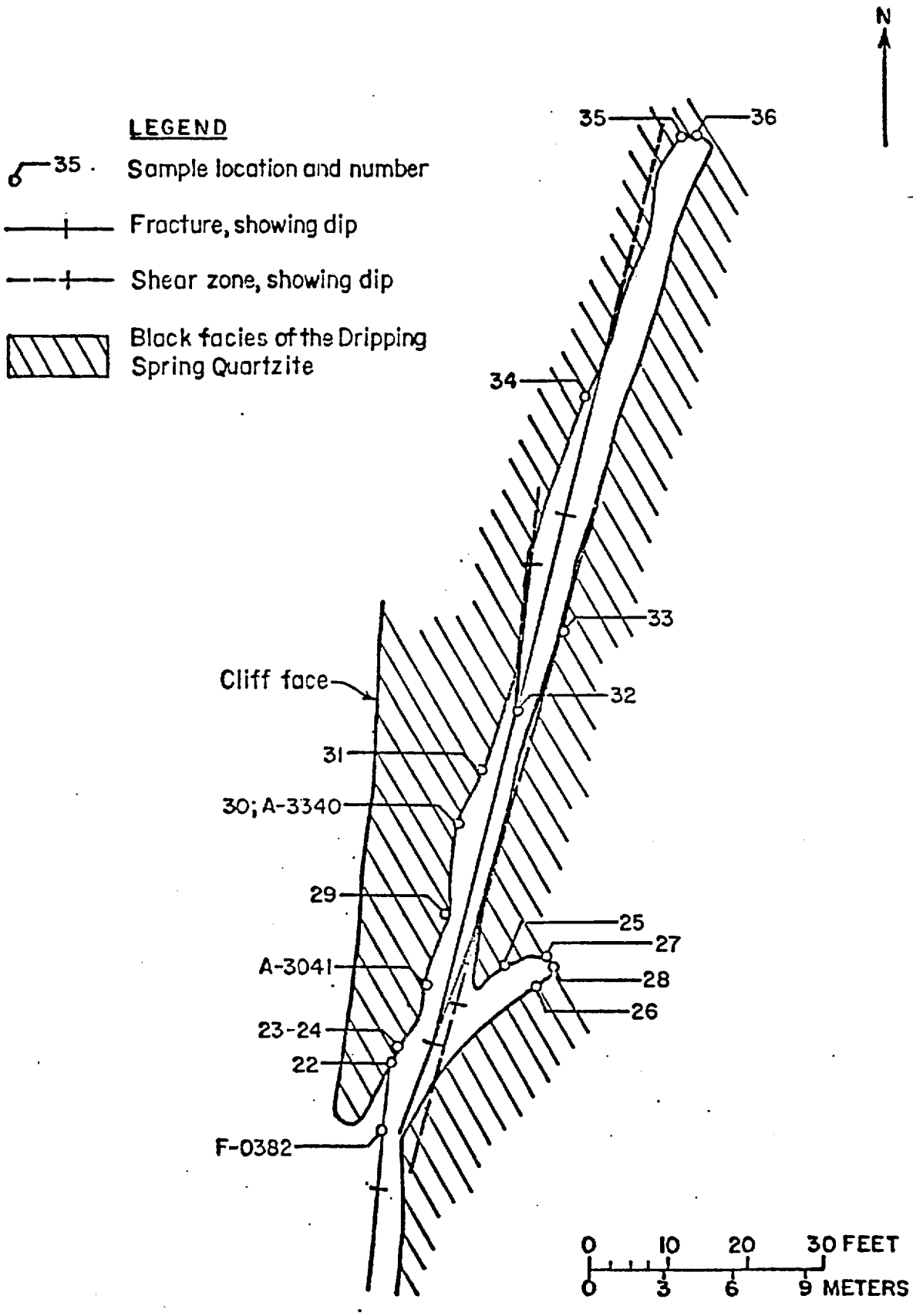


Figure 28. - Sample locations of the Andy Gump deposit.

black facies of the Dripping Spring Quartzite, and is a well-indurated, gray to black, sandy siltstone with abundant limonitic alteration. Minor amounts of pyrite are dissiminated throughout the siltstone. No primary uranium minerals were observed, but metatorbernite and an unidentified powdery white sulfate occur on weathered surfaces.

The highest radioactivity noted in the adit was between 8 and 55 feet from the portal on the left rib of the main drift, and between 5 and 25 feet on the left rib of the crosscut.

Fifteen samples were taken from the Andy Gump adit to define the extent of uranium, copper, lead, and zinc mineralization (table 16). Sample 28 contained 0.07 percent U_3O_8 and 0.69 percent copper, the highest values obtained from the working. Four samples collected by Schwartz (1957) contained from 0.015 to 0.72 percent U_3O_8, and he suggested that the higher value was probably due to secondary mineralization concentrated on fracture surfaces.

Distribution of radiometric anomalies is controlled more by bedding than fractures; however, assay results indicate that the U_3O_8 is less concentrated than would be expected. The incongruity between radiometric anomalies and uranium content suggests that the uranium is not in equilibrium. That is, the uranium has been leached, leaving a residue of radioactive daughter products.

Table 16. - Assay data for samples from the Andy Gump Adit.

Sample No.	Type	Length	U_3O_8 percent	Cu percent	Pb percent	Zn percent
F-0382[1/]	Chip	3 ft	0.17	N.A.	N.A.	N.A.
22	do.	5 ft	.06	0.063	0.009	0.001
23	do.	8 in	.33	.028	.062	.001
24	do.	5 ft	.16	.059	.026	.002
A-3041[1/]	do.	6 ft	.13	N.A.	N.A.	N.A.
25	do.	4.5 ft	.01	.14	.009	.002
26	do.	5 ft	.05	.25	.015	.003
27	do.	5 ft	.02	.96	.005	.004
28	do.	4 ft	.07	.69	.008	.001
29	do.	6 ft	.01	.023	.007	Tr
30	do.	5.5 ft	.08	.046	.02	.001
A-3340[1/]	do.	3 ft	.72	N.A.	N.A.	N.A.
31	do.	1 ft	.10	.06	.02	.001
32	do.	21 in	.007	.064	.057	.01
33	do.	5.5 ft	.005	.36	.003	.001
34	do.	5.5 ft	.005	.005	.004	.005
35	do.	4 ft	.005	.41	.007	.01
36	do.	5 ft	.02	.27	.003	.013
F-0385[1/]	Select		.015[3/]	N.A.	N.A.	N.A.

1/ Schwartz, 1957, p. 18
2/ U.S. Atomic Energy Commission and U.S. Geological Survey, 1970, p. 169
3/ equivalent U_3O_8
N.A., not available
Tr, trace

Big Buck Mine

The Big Buck Mine is located between Cold Spring Canyon and Devil's Chasm in the SE 1/4 sec. 25, T. 6 N., R. 14 E. The mine is accessible by foot or horseback on an old road extending from the upper Cherry Creek road on the north side of Cold Spring Canyon, and leads to the Grindstone deposit, Big Buck Mine, and Blue Rock deposit. A trail leading from the Cherry Creek road, north of Devil's Chasm, to the mine provides a much shorter, but steeper route of access.

The Big Buck claims were located in 1954 by T. Ellison, and others. Development work, done by Metbel Mining and Exploration Co., consists of a 45-foot open cut and an adit driven 109 feet, S 21° W (figure 29). In 1956

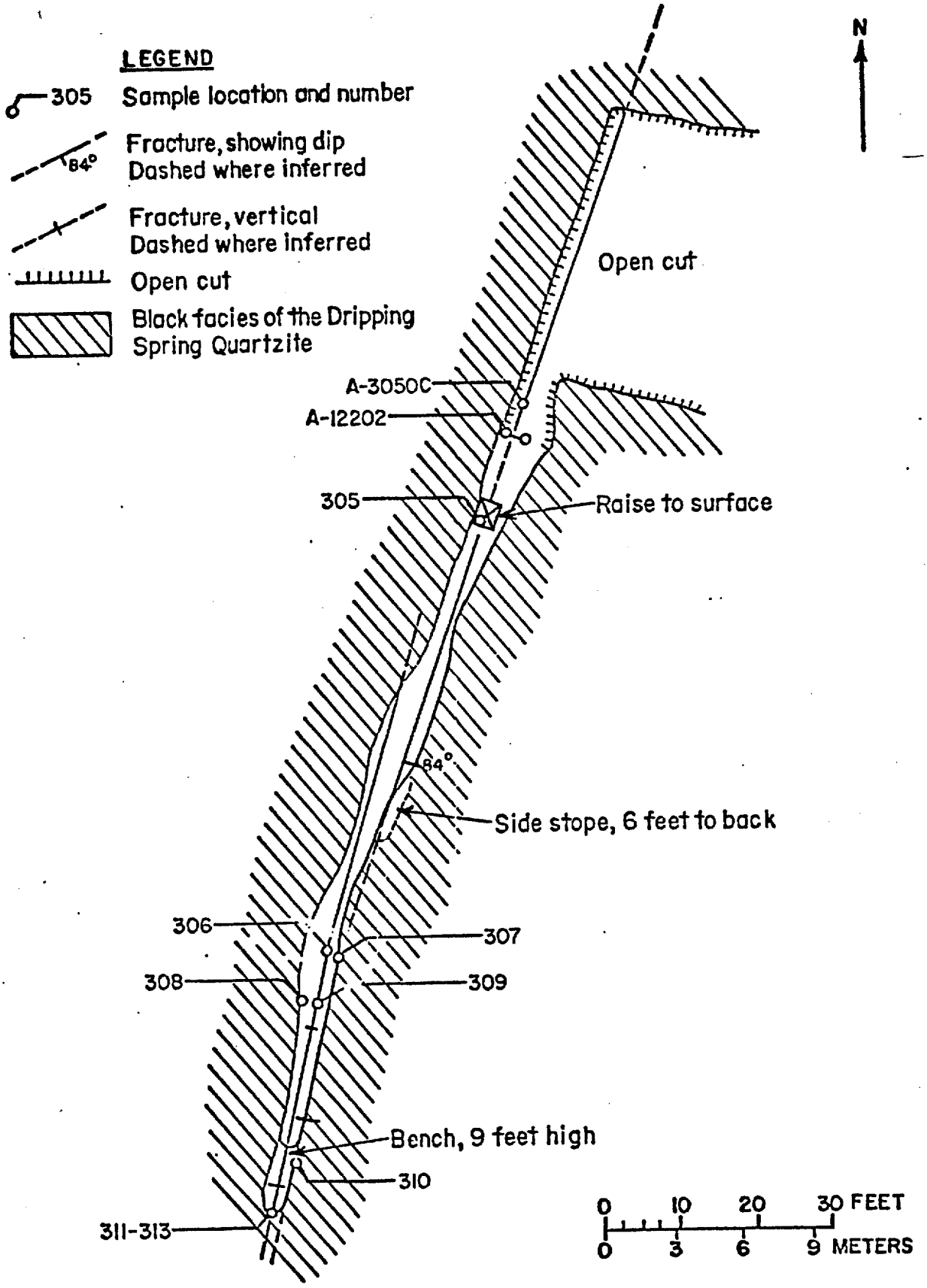


Figure 29. - Sample locations of the Big Buck Mine.

and 1957, 279 tons of ore averaging 0.14 percent U_3O_8 were shipped to the Cutter buying station (Schwartz, 1957, p. 56).

Uranium in the Big Buck Mine is concentrated in two limonite-filled, en echelon fractures that strike about N 17° E, and dip 84° SE to vertical. The first fracture is continuous throughout the open cut and the adit, with the exception of 20 feet, where it is not exposed in the left rib. The second fracture is exposed at 37 feet from the portal, and continues in the center of the back to the face. At 10-13 feet from the portal a raise on the fracture extends to the surface. The host rock is flaggy, sandy siltstone with minor sandstone lenses in the black facies of the Dripping Spring Quartzite.

Limonite is abundant on all fracture surfaces and many bedding planes. Visible uranium mineralization is scarce, but saleeite and bassetite was determined by X-ray diffraction (Granger and Raup, 1969a, p. 9). Fine-grained pyrite is disseminated throughout the siltstone.

Nine samples from the Big Buck Mine contained from 0.02 to 0.21 percent U_3O_8 (table 17). The highest uranium values come from 5- to 6- inch-long chip samples taken across the fractures. Sample 312, taken along a limonite-filled fracture parallel to the bedding, contained 0.11 percent U_3O_8. These results indicate the role of the fractures in concentrating the uranium mineralization. Two samples taken across the fracture at or near the portal by Schwartz (1957, p. 20) contained 0.28 and 0.29 percent U_3O_8. Sample 306 contained 0.2 percent Cu, however neither copper staining nor metatorbernite was observed.

Uranium mineralization is continuous along the strike of the fractures, but the grade is highly variable. Exploratory drilling has indicated the mineralization in the fracture to be at least 33 feet in vertical extent (Schwartz, 1957, p. 19).

Table 17. - Assay data for samples from the Big Buck Mine.

Sample No.	Type	Length	U_3O_8 percent	Au oz/T	Ag oz/T	Cu percent	Pb percent	An percent
A-3050C[1/]	Chip	14 in	0.28	N.A.	N.A.	N.A.	N.A.	N.A.
A-12202[1/]	do.	4 ft	.29	N.A.	N.A.	N.A.	N.A.	N.A.
305	do.	6 in	.14	--	0.1	0.011	0.16	0.05
306	do.	5 in	.21	--	.1	.21	.075	.019
307	do.	21 in	.06	0.01	--	.038	.016	.003
308	do.	18 in	.04	--	--	.019	.019	.004
309	do.	6 in	.14	--	--	.055	.048	.013
310	do.	8 in	.08	--	--	.09	.02	.004
311	do.	28 in	.02	.01	--	.011	.005	.006
312	do.	2 ft	.11	--	.1	.012	.024	.003
313	do.	10 in	.03	--	--	.012	.019	.005

1/ Schwartz, 1957, p. 20
N.A., not available
--, not detected

Betsy Ross and Mary Louise claims

The Betsy Ross claims consist of a group of 71 claims located along the upper Cherry Creek (AEC) road, from Devil's Chasm on the south to Gold Creek (local usage) on the north. The claims cover portions of secs. 10, 11, 13, 14, 15, 24, and 25, T. 6 N., R. 14 E., and portions of secs. 30, and 31, T. 6 N., R. 15 E. The Mary Louise claims are contiguous to the north with the Betsy Ross claims, and extend from Gold Creek on the south to the Ellison-Flying H drift fence on the north. These claims cover portions of secs. 33 and 34, T. 7 N., T. 14 E., and portions of secs. 2, 3, 4, 10, and 11, T. 6 N., R. 14 E.

The Betsy Ross and Mary Louise claims were located by A. Haught, and others, in 1976. No evidence of any exploration activity was present, other than validation work. No ore has been produced from the claims.

Sample 233 is a select sample taken from a dozer cut in the SW 1/4 sec. 14, T. 6 N., R. 14 E. (plate 1). No anomalous radioactivity was observed, and assay results indicated that the sample contained 0.002 percent U_3O_8. Sample

234 is a 1-foot chip across a vertical fracture trending N 11° E, in a prospect cut in the north side of Hinton Creek, in the SE 1/4 sec. 14, T. 6 N., R. 14 E. Anomalous radioactivity, up to 550 cpm, was noted in the fracture, but assay results showed no detectible U_3O_8 in the sample. The outcrop at this locality is in Lower Dripping Spring Quartzite. The anomalous radioactivity probably represents uranium daughter products leached from overlying rocks and concentrated by migrating groundwaters.

Black Brush Mine

The Black Brush Mine is located in the steep east-facing slope of McFadden Horse Mountain in the SE 1/4 sec. 4 and the NE 1/4 sec. 9, T. 6 N., R. 14 E. An old jeep trail leads from the upper Cherry Creek road, north of Cold Water Canyon, to the mine.

The Black Brush claims were staked by Travis E. Ellison, and others, in 1954. Western Mining and Exploration Co. did exploratory work consisting of benching, drifting, and percussion drilling. Three adits were driven along fractures with anomalous radioactivity. Two shipments were made to the Cutter buying station from Adit No. 1. In 1955 7.94 tons of ore averaging 0.11 percent U_3O_8 were shipped; the second shipment, in 1956, consisted of 11.23 tons of "no pay" ore averaging 0.07 percent U_3O_8 (Granger and Raup, 1969a, p. 15). In 1979 the mine was under lease to Wyoming Minerals Corporation, Globe.

The host rock in the Black Brush Mine area is the black facies of the Dripping Spring Quartzite. The siltstone is dark gray to black and well indurated with minor sandy lenses. Limonite stain is abundant along fracture surfaces and bedding planes. Minor pyrite and galena are disseminated

throughout the host rock, and metatorbernite is visible in the fractures. Sharp (1956, p. 11) reported uraninite as the main uranium-bearing mineral.

The workings at the Black Brush Mine consists of 3 adits. Adit No. 1 is 56 feet long and bears N 18° E (figure 30). At 25 feet from the portal, a crosscut bearing N 45° W was driven 140 feet. The zones of highest radioactivity were in the northeasterly trending fractures, and in a stratigraphic interval, 1 to 2 feet thick, 4 feet above the floor, near the intersection of the adit and the crosscut.

Twelve samples taken from the zones of radioactivity in Adit No. 1 assayed from 0.007 to 1.5 percent U_3O_8 (table 18). Samples 95, 97, and 99 were all taken on the northeast-trending fracture where the side-stope was cut.

Adit No. 2, approximately 600 ft N 30° E of Adit No. 1, was driven 100 feet, N 80° W, along a vertical fracture (figure 31). Geiger counter readings on the fracture reached a maximum of 1.2 mr/hr at the portal. Assay values of five samples taken from the adit showed a maximum of 0.03 percent U_3O_8.

Adit No. 3 is 75 feet southwest of Adit no. 1 (figure 30). Adit No. 3 was driven 10 feet along a fracture trending N 50° W. One sample cut across the back of this adit assayed 0.02 percent U_3O_8.

Some of the samples from Adit No. 1 contained the highest uranium concentrations encountered in the wilderness. The extent of supergene uranium enrichment is not known, and additional data would be needed to determine the grade and extent of mineralization along the fractures. Based on the uranium content of mineralized rocks in the available workings, the Black Brush property represents the most favorable target in the wilderness for finding additional uranium ore.

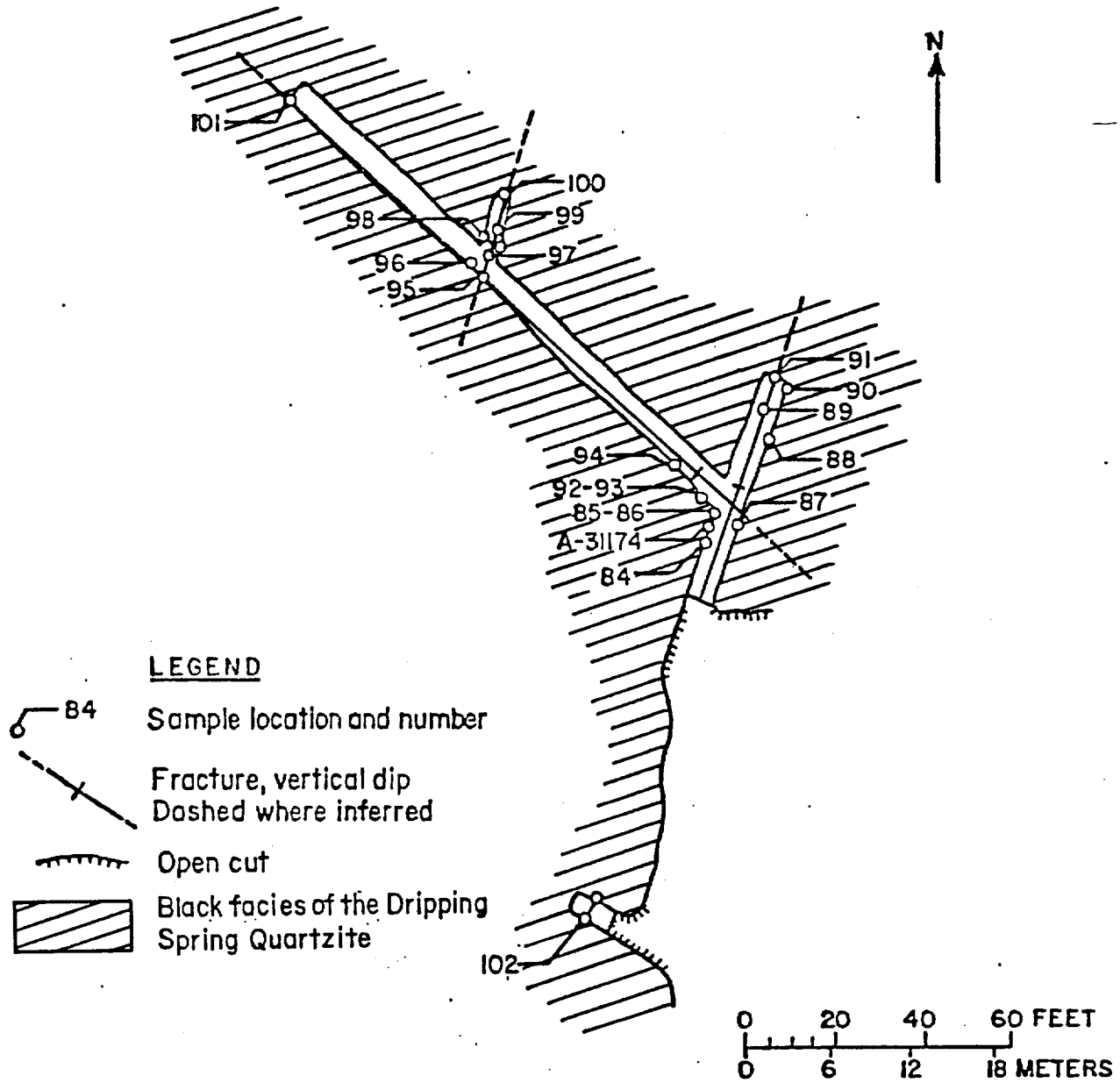


Figure 30. - Sample locations of the Black Brush Adits Nos. 1 and 3.

Table 18. - Assay data for samples from the Black Brush Mine.

Sample No.	Type	Length (feet)	U_3O_8 percent	Cu percent	Pb percent	Zn percent
Adit No. 1						
84	Chip	6.5	0.02	0.012	0.004	0.002
A-3117A[1/]	do.	3	.25	N.A.	N.A.	N.A.
85	do.	7	.07	.016	.01	.001
86	do.	1	.19	.044	.033	.001
87	do.	1	.24	.024	.036	.001
88	do.	1	.31	.04	.04	.001
89	do.	2	.007	.006	.001	.001
90	do.	1	.08	.021	.018	.005
91	do.	1.5	.007	.016	.001	.001
92	do.	6.5	.01	.015	.004	.006
93	do.	0.5	.48	.026	.064	.001
94	do.	7	.02	.012	.004	.005
95	do.	1	1.5	.088	.15	.001
96	do.	4	.30	.053	.034	.003
97	do.	0.7	1.38	.042	.14	.002
98	do.	3	.16	.014	.022	.015
99	do.	1	1.0	.066	.14	.002
100	do.	2	.09	.009	.028	.006
101	do.	0.8	.06	.031	.011	.001
Adit No. 3						
102	do.	3.5	.02	.015	.002	.003
Adit No. 2						
103	do.	0.7	.02	.015	.015	.006
104	do.	1.5	.02	.029	.005	.001
105	do.	0.3	.03	.007	.008	.007
106	do.	1	.02	.024	.008	.002
107	do.	2.5	.01	.018	.004	.004

1/ Schwartz, 1957, p. 21
N.A., not available

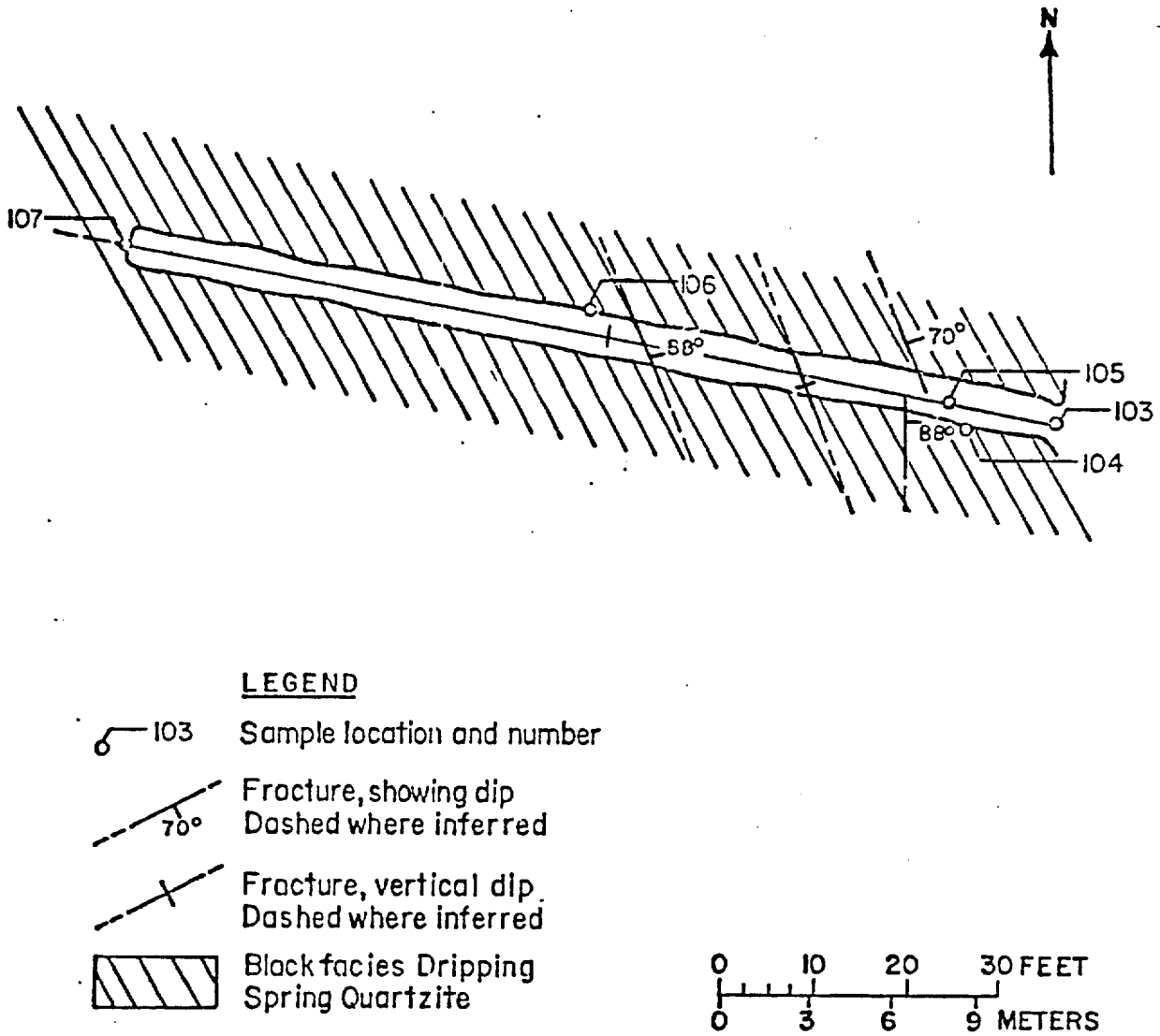


Figure 31. - Sample locations of the Black Brush Adit No. 2.

Blue Rock deposit

The Blue Rock deposit is located between Cold Spring Canyon and Devil's Chasm, about 2,000 feet southeast of the Big Buck Mine in the NE 1/4 sec. 36, T. 6 N., R. 14 E. (plate 1). Access to the deposit is by either the road or the trail to the Big Buck Mine.

The claims in this area were staked by F. Meadows, and others in 1955. Exploration and assessment work have been limited to a group of seven shallow pits (figure 32) dug on fractures with anomalous radioactivity. No ore has been produced from these claims.

The host rock is a dark gray to black, flaggy siltstone of the black facies of the Dripping Spring Quartzite. Anomalous radioactivity is limited to limonite-filled fractures trending N 10-15° E. and dipping from S 82° E. to vertical. The fractures are irregular and discontinuous indicating a possible en echelon arrangement across the area of the pits. Metatorbernite is abundant in some of the fractures and adjacent bedding planes. Selected samples containing up to 0.35 percent U_3O_8 have been analyzed from this area (F. Meadows, oral communication, 1978).

Six samples from the prospect pits of the Blue Rock deposit had uranium contents ranging from 0.02 to 0.09 percent U_3O_8 (table 19). Minor amounts of copper staining were noted in all the samples. Samples 315 and 317 each contained 0.1 percent bismuth, and sample 315 contained 0.13 percent vanadium.

Table 19. - Assay data for samples from the Blue Rock deposit.

Sample No.	Type	Length (feet)	U_3O_8 (percent)
314	Chip	1 ft	0.07
315	do.	1 ft	.05
316	do.	1.6 ft	.02
317	do.	0.2 ft	.09
318	Select		.08
319	Chip	0.5 ft	.03

Although the fractures are discontinuous and the area of exposed mineralization is limited, the Blue Rock deposit might support a heap leaching operation, if sufficient tonnage of mineralized rock can be delineated at the grade observed.

Bonnie deposit

The Bonnie deposit is in a small northeast-flowing tributary (locally known as Lonnie's Canyon) of Cherry Creek in the NW 1/4 sec. 14, T. 6 N., R. 14 E. (plate 1). The deposit is reached by a nonmaintained trail from the Cherry Creek road.

The claims were originally located in 1954 by A. Haught, Young, Arizona, and were worked in late 1955 and early 1956 by L. Dillahande and B. Townsend (A. Haught, oral communication, 1978). A 41-foot adit was driven S 10° E in the black facies of the Dripping Spring Quartzite (figure 33). The portal is in the middle of a cliff face about 40 feet high, and is obscured by a small waterfall, when the intermittent creek is flowing. No ore has been produced from the property.

Six samples from the Bonnie Adit contained some uranium, but no anomalous concentrations of copper, lead, or zinc (table 20). Sample 229 and 230 assayed 0.16 and 0.15 percent U_3O_8, respectively. These two samples were cut from a small east-west trending fracture that dips 85° to the south. None of the other samples contained anomalous uranium concentrations.

Table 20. - Assay data for samples from the Bonnie deposit.

Sample No.	Type	Length (feet)	U_3O_8 percent	Cu percent	Pb percent	Zn percent
227	Chip	4	0.002	0.008	0.003	0.005
228	do.	5.6	.002	.01	.002	.001
229	do.	0.3	.16	.018	.032	.002
230	do.	3	.15	.018	.027	.006
231	do.	4	.002	.011	.002	.001
232	do.	5.6	.003	.012	.002	.001

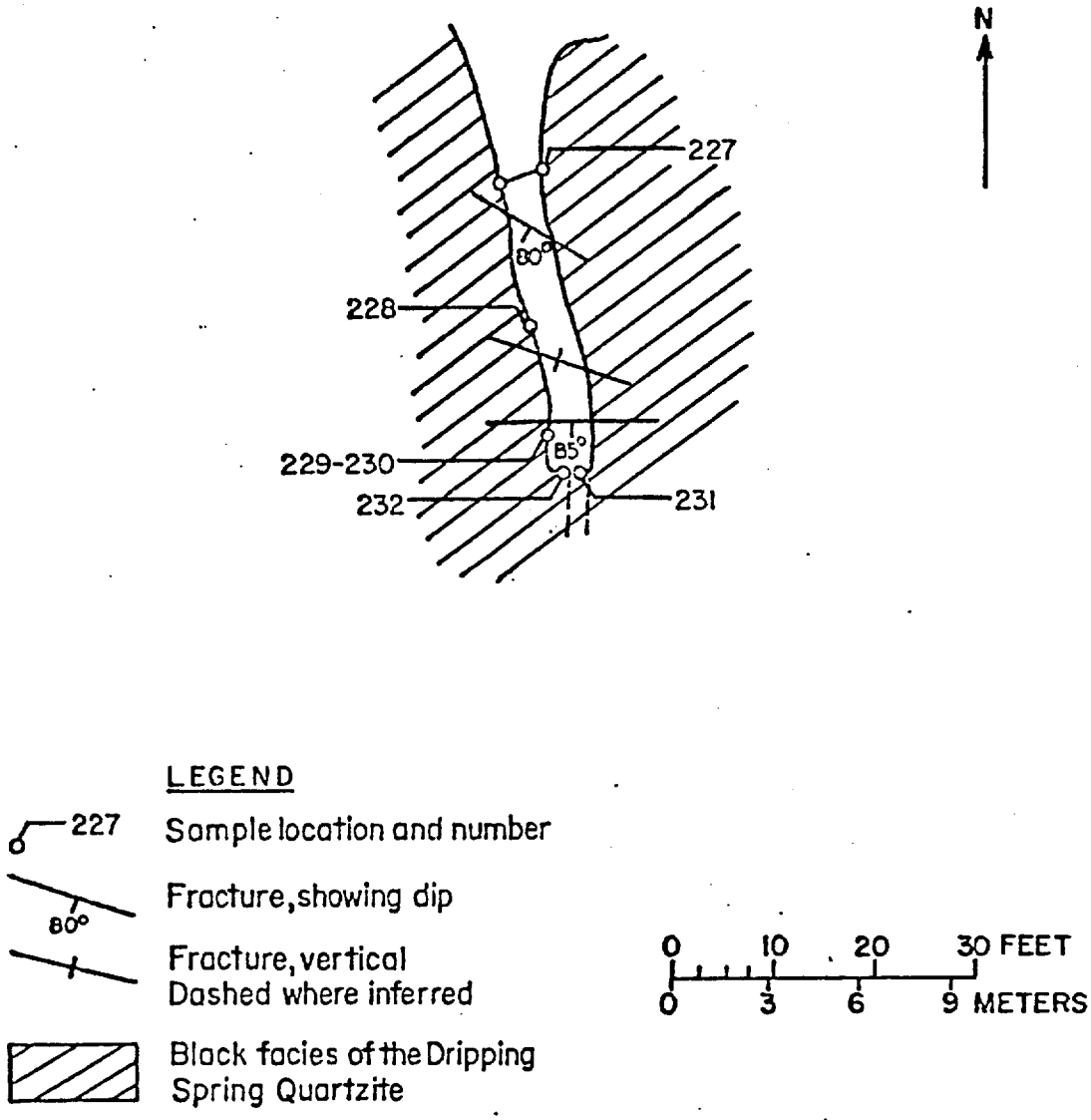


Figure 33. - Sample locations of the Bonnie deposit.

Brushy Basin Trap deposit

The Brushy Basin Trap deposit is located along P B Creek, approximately 800 feet northwest of the confluence with Cherry Creek, in the NW 1/4 sec. 27, T. 7 N., R. 14 E. (unsurveyed), about 1/2 mile east of the wilderness boundary (plate 1). The workings are accessible via a four-wheel-drive road which takes off from the upper Cherry Creek road about 1/2 mile south of the P B Ranch.

The property was originally claimed by A. Haught, and others. Two adits were driven and a prospect pit excavated by W. T. Graham in 1955 and 1956, but no ore was produced (Granger and Raup, 1969b, p. 22; U.S. Atomic Energy Commission and U.S. Geological Survey, 1970, p. 173). The claims were leased to Wyoming Minerals Corp. in 1976.

Adit No. 1 of the Brushy Basin Trap deposit lies on the north side of P B Creek. The adit trends generally N 10° E for 135 feet, with a 63-foot crosscut beginning 65 feet from the portal and trending N 22° W (figure 34). Seven samples from this adit contained from 0.003 to 0.09 percent U_3O_8, and from 0.03 to 0.08 percent copper (table 21). Grange and Raup (1969a, p. 24) reported a sample containing 0.17 percent equivalent U_3O_8 taken from the beginning of the crosscut. However, our sample 9, taken from the most radioactive spot at this same location, contained 0.007 percent U_3O_8.

Approximately 30 feet west of the main adit is a small prospect, cut 5 feet into the slope along a narrow fracture trending N 25° E (figure 34). Sample 12, from the face of the prospect, contained 0.01 percent U_3O_8 and 0.009 percent copper (table 21).

Table 21. - Assay data for samples from the Brushy Basin Trap deposit.

Sample No.	Type	Length (feet)	U_3O_8 percent	Cu percent	Pb percent	Zn percent
Adit #1						
1	Chip	6	0.01	0.054	0.007	0.001
2	do.	0.3	.01	.015	.013	.002
3	do.	6.5	.004	.025	.002	.002
4	do.	0.5	.09	.012	.006	.001
5	do.	7	.01	.029	.008	.001
6	do.	0.3	.01	.11	.002	.001
7	do.	6	.005	.034	.003	.001
8	do.	6.5	.005	.038	.008	.002
9	do.	0.5	.007	.036	.003	.002
A-3114A[1/]	do.	3	.17[2/]	N.A.	N.A.	N.A.
10	do.	4.5	.005	.043	.006	.001
11	do.	5.5	.003	.082	.006	.002
Prospect Cut						
12	do.	3.5	.01	.02	.007	.001
Adit # 2						
13	Chip	6.5	.01	.016	.004	.001
14	do.	6	.005	.021	.005	.002
15	do.	4	.005	.016	.004	.003
16	do.	0.2	.005	.016	.004	.002
17	do.	5	.006	.015	.004	.001

1/ Granger and Raup, 1969a, p. 24, U.S. Atomic Energy Commission and U.S. Geological Survey, 1970, p. 173

2/ Equivalent U_3O_8

Adit No. 2 of the Brushy Basin Trap deposit lies on the south side of P B Creek across from Adit No. 1, and trends S 22° W, 52 feet (figure 35). Three samples from this second adit contained from 0.005 to 0.01 percent U_3O_8, and from 0.004 to 0.02 percent copper (table 21).

The highest Geiger counter readings were in Adit No. 1, at 3 feet and at 65 feet from the portal. The maximum radiometric reading was 0.35 mr/hr, at the location of sample 4. This sample contained 0.09 percent U_3O_8, the highest uranium concentration observed in the Brushy Basin Trap deposit.

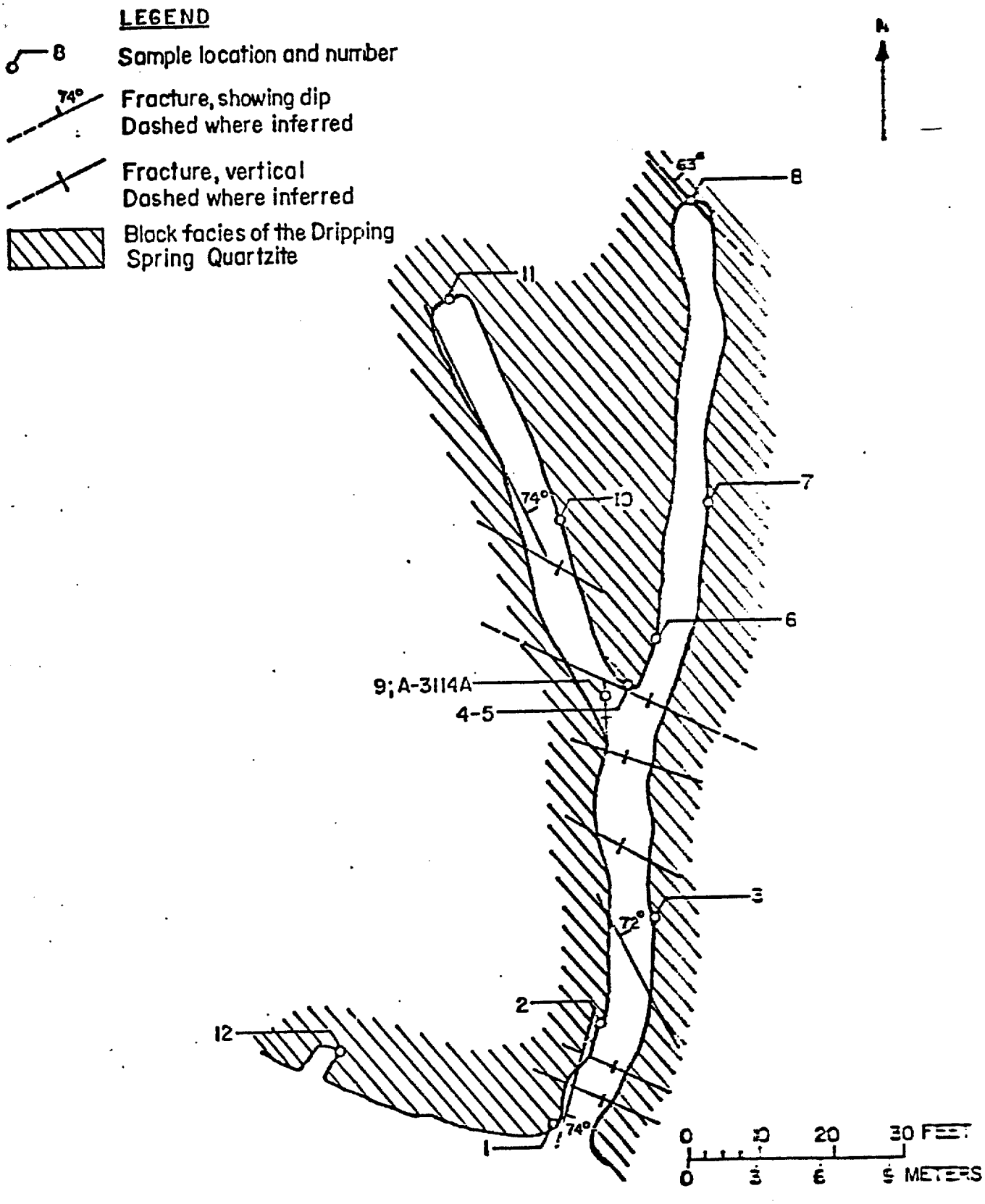


Figure 34. - Sample locations of the Brushy Basin Trap Adit No. 1 and prospect cut.

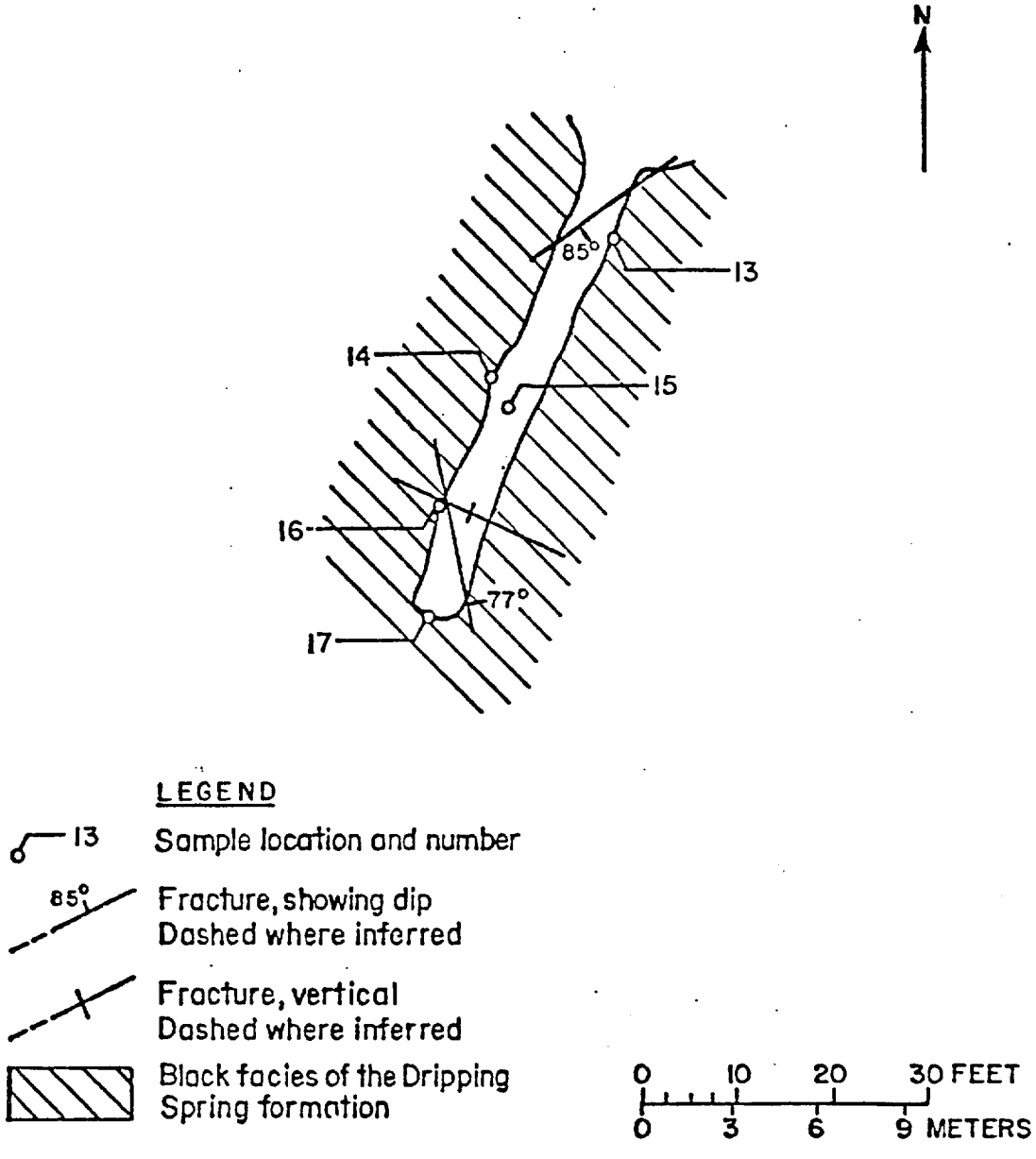


Figure 35. - Sample locations of the Brushy Basin Trap Adit No. 2.

The workings of the Brushy Basin Trap Mine were not cut along well-defined fracture zones, as is the case with other mines and prospects in the Sierra Ancha area. The low uranium content of most of the samples indicates that the mobilization and concentration of uranium has been minor. The area of the Brushy Basin Trap deposit was considered to have moderate potential for uranium resources (Otton and others, 1981).

Donna Lee Mine

The Donna Lee Mine is located in the western wall of Deep Creek, about 1 mile north of the confluence with Bull Canyon, at an elevation of about 4,700 feet in the SE 1/4 sec. 13, T. 5 N., R. 14 E. (plate 1). The mine is accessible by an old four-wheel-drive road which extends approximately 2 miles from the head of the Bull Canyon road.

The Donna Lee claims were located in 1954 by the Miami Copper Company. In 1959, 12 tons of ore averaging 0.16 percent U_3O_8 were shipped from the mine (Schwartz, 1957, p. 56). In 1978 the property was being explored by a joint venture between Wyoming Minerals Corp. and B and B Mining Company.

Development work on the property consists of two adits approximately 1700 feet apart. The north adit extends S 22° W for 90 feet, with a crosscut 52 feet long, S 78° E (figure 36). The south adit trends S 10° W for 85 feet (figure 37). Both adits were driven in the black facies of the Dripping Spring Quartzite, and are approximately 40 feet apart stratigraphically (G. Ryberg, B and B Mining Company, oral communication, 1978).

Anomalous radiometric values in the two adits follow the trend of well-defined fractures, with mineralization extending locally outward along bedding planes. Five samples from the north adit had uranium concentrations from

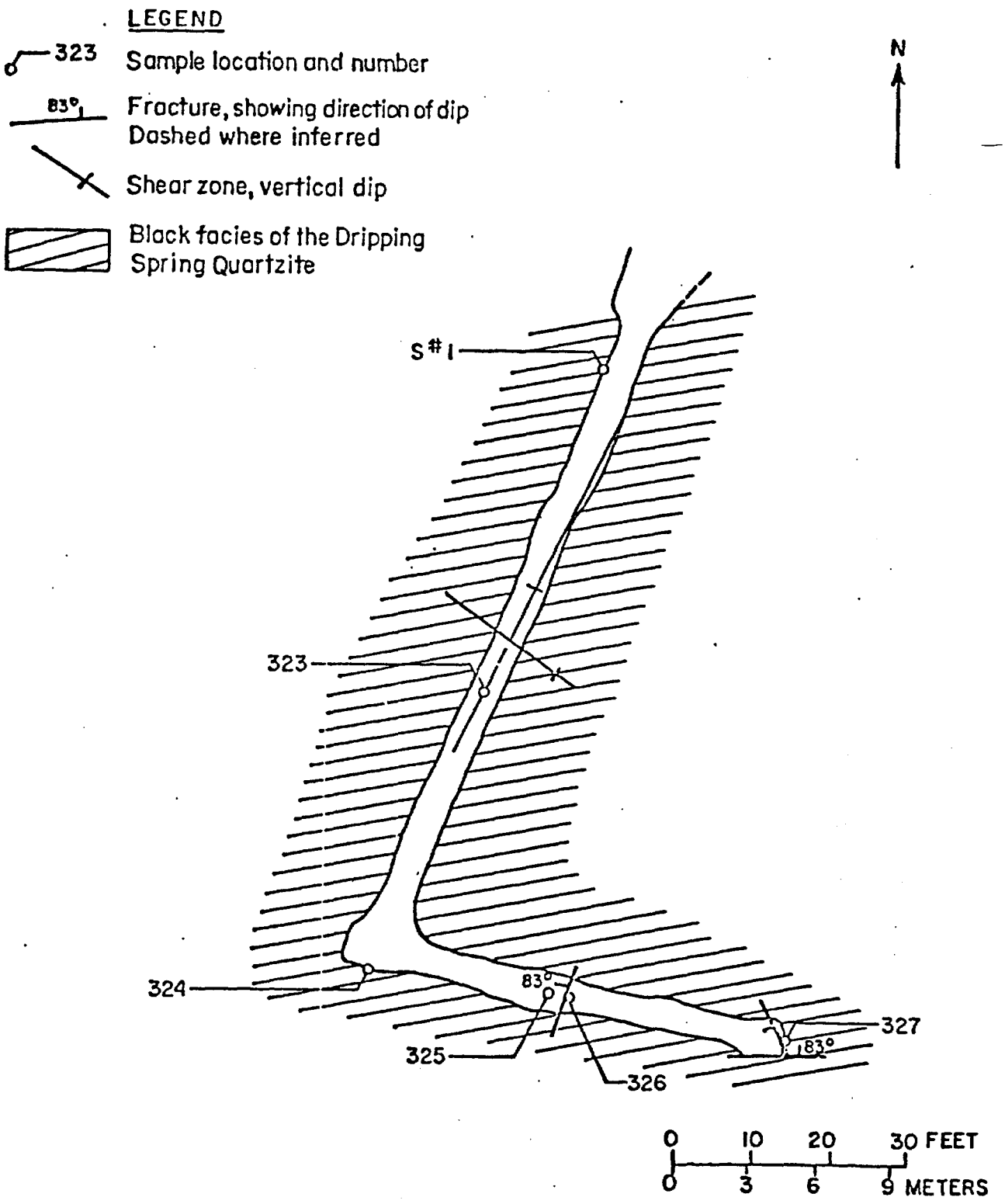


Figure 36. - Sample locations of the Donna Lee North Adit.

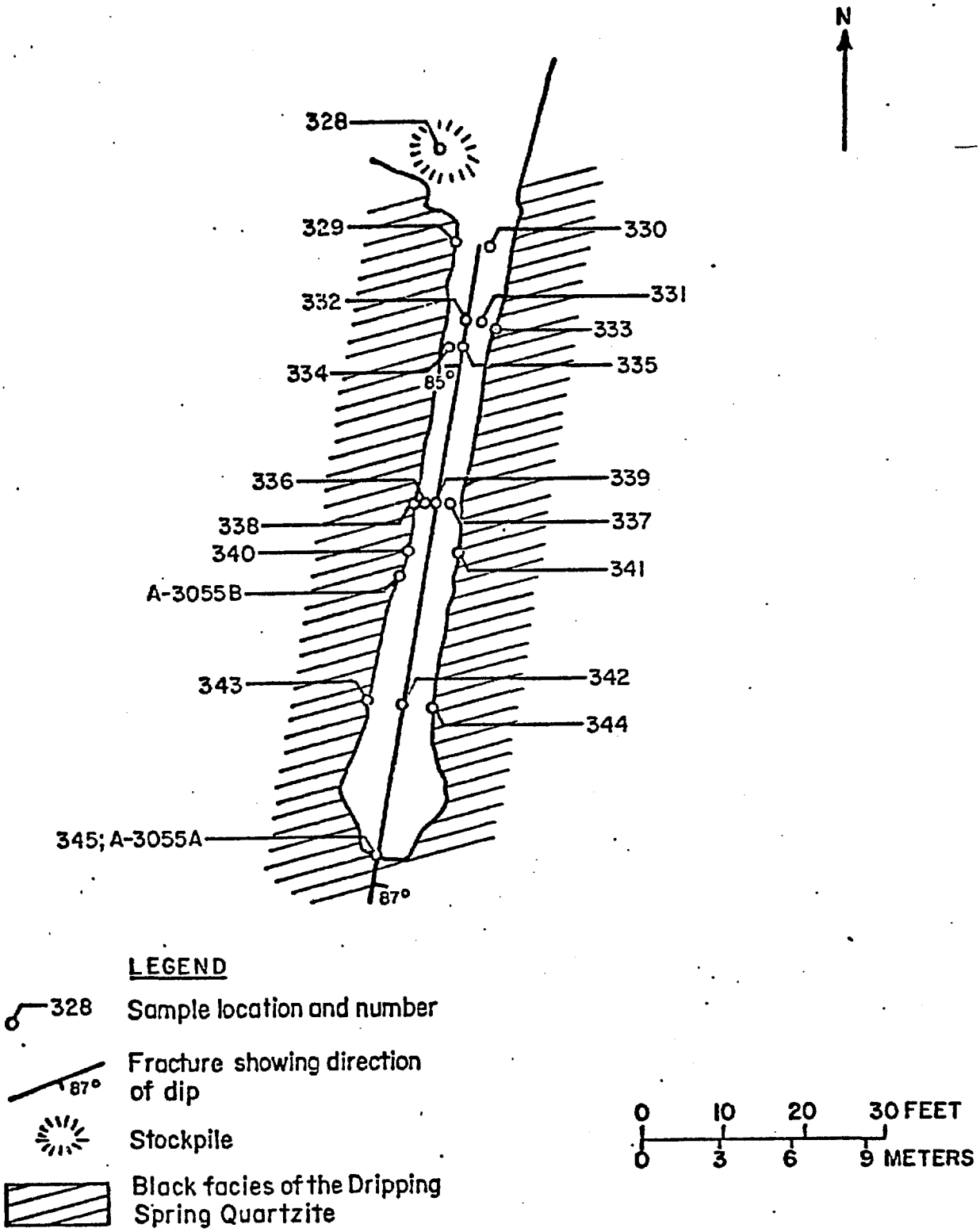


Figure 37. - Sample locations of the Donna Lee South Adit.

0.02 to 0.68 percent U_3O_8 (table 22). Sample 326 had the highest uranium content (0.68 percent U_3O_8) and also contained 0.58 percent copper. A sample taken by Schwartz (1957, p. 26) from the same adit contained 0.21 percent U_3O_8.

Table 22. - Assay data for samples from the Donna Lee adits.

Sample No.	Type	Length (feet)	U_3O_8 percent	Cu percent	Pb percent	Zn percent
North Adit						
S-1[1/]	Chip	1	0.21	N.A.	N.A.	N.A.
323	do.	1	.05	0.33	0.015	Tr
324	do.	2	.05	.047	.003	0.002
325	do.	2.5	.06	.18	.098	.011
326	do.	1	.68	.58	.078	.004
327	do.	5	.02	.008	.003	Tr
South Adit						
328	Dump	3 grid	0.15	0.054	0.026	0.001
329	Chip	6.5	.04	.01	.009	Tr
330	do.	5	.12	.036	.017	.001
331	do.	4	.12	.043	.016	.001
332	do.	6	.05	.012	.009	.002
333	do.	6	.03	.009	.005	.002
334	do.	1	.07	.071	.033	.003
335	do.	0.5	.29	.46	.020	.002
336	do.	1.5	.23	.46	.012	.001
337	do.	1.5	.17	.15	.009	.001
338	do.	1	.75	.58	.034	.005
339	do.	0.3	.39	.57	.026	.004
340	do.	5.5	.28	.15	.01	.009
341	do.	5.5	.16	.010	.006	.002
A-3055B[1/]	do.	4	.26	N.A.	N.A.	N.A.
342	do.	4	.22	.35	.017	.001
343	do.	6	.04	.015	.008	.002
344	do.	5.5	.12	.03	.01	.001
A-3055A[1/]	do.	4	.31	N.A.	N.A.	N.A.
345	do.	3.5	.05	.085	.011	.001
346	Select		.11	.57	.005	.003
347	do.		.84	.72	.047	.01

1/ Schwartz, 1957, p. 25-26
N.A., not available

Twenty samples from the south adit contained from 0.03 to 0.84 percent U_3O_8. Two samples taken by Schwartz (1957, p. 25) contained 0.26 and 0.31 percent U_3O_8. Sample 347 contained 0.84 percent U_3O_8 and 0.72 percent copper; sample 346 contained 0.11 percent U_3O_8 and 0.57 percent copper. These two samples were of the secondary coating which covers the ribs, and are not representative of mineralized Dripping Spring Quartzite. However, the high values of U_3O_8 and copper in samples 346 and 347 are indicative of the contamination which may be present if the walls are not cleaned before sampling.

Grindstone deposit

The Grindstone deposit is located on the north wall of Cold Spring Canyon in the NW 1/4 sec. 25, T. 6 N., R. 14 E., approximately 1/2 mile north of the Big Buck Mine (plate 1). The deposit is accessible by foot along an old road which leads from the north Cherry Creek road, north of Cold Spring Canyon, to the Big Buck Mine.

The Grindstone deposit was originally staked in 1954 by T. E. Ellison and J. Cornett. Western Mining and Exploration, Phoenix, leased the property and explored three mineralized fractures. No ore has been produced from this deposit. In 1976 the claims were leased to Wyoming Minerals Corp.

Exploration work, consisting of two prospect pits and one open cut (figure 38), was centered on fractures trending roughly N 70° W and N 20° E. The highest radiometric reading in the workings was at the intersection of two fractures in the open cut.

Five samples from the prospect workings contained from 0.006 to 0.11 percent U_3O_8 (table 23). A sample taken from the eastern pit by Schwartz contained 0.26 percent U_3O_8 (U.S. Atomic Energy Commission and U.S. Geological Survey, 1970, p. 121).

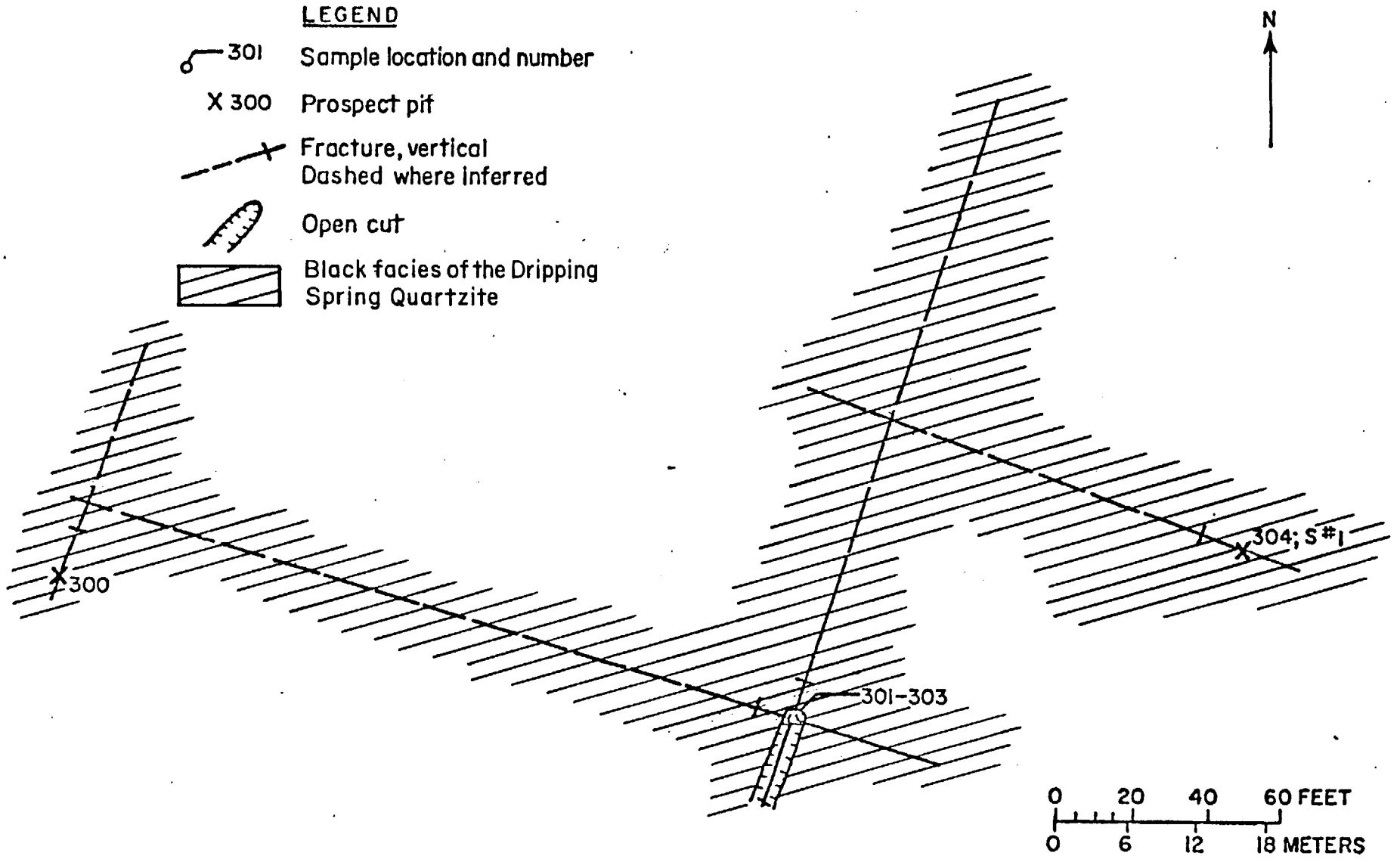


Figure 38. - Sample locations of the Grindstone deposit.

The tendency for uranium mineralization to be concentrated along fractures suggests that the potential for uranium concentration at the Grindstone deposit would be at the projected intersection of the fracture trends, northeasterly from the western and center pits.

Table 23. - Assay data for samples from the Grindstone deposit.

Sample No.	Type	Length (feet)	U_3O_8 percent	Cu percent	Pb percent	Zn percent
300	Chip	2	0.006	0.011	0.01	0.002
301	do.	2	.04	.023	.011	.002
302	do.	1	.11	.03	.014	.004
303	do.	2	.04	.053	.008	.006
304	do.	2	.08	.034	.009	.001
A-3259[1/]	do.	N.A.	.26[2/]	N.A.	N.A.	N.A.

1/ U.S. Atomic Energy Commission and U.S. Geological Survey, 1970, p. 121
2/ equivalent U_3O_8
N.A., not available

Horseshoe Mine

The Horseshoe Mine is located on the north side of Gold Creek in the NE 1/4 sec. 10, T. 6 N., R. 14 E., approximately 1-1/2 miles west of Cherry Creek (plate 1). The mine is accessible by foot along an old road which lies along the north side of Gold Creek and extends from the upper Cherry Creek road to the mine.

The Horseshoe claims were originally staked in 1954 by Alfred Haught and others, Young, Arizona. The claims were worked by Longhorn Exploration Co., Odessa, Texas, in 1956. In 1976 the claims were relocated by Alfred Haught and others, as part of the Mary Louise block of claims.

An adit, 130 feet long and bearing N 5° E, was driven along the axis of a small drag fold formed in the footwall of a westerly dipping reverse fault with minor displacement (figure 39). In the last quarter of 1956, two shipments were made. One shipment consisted of 6.5 tons of ore averaging 0.17

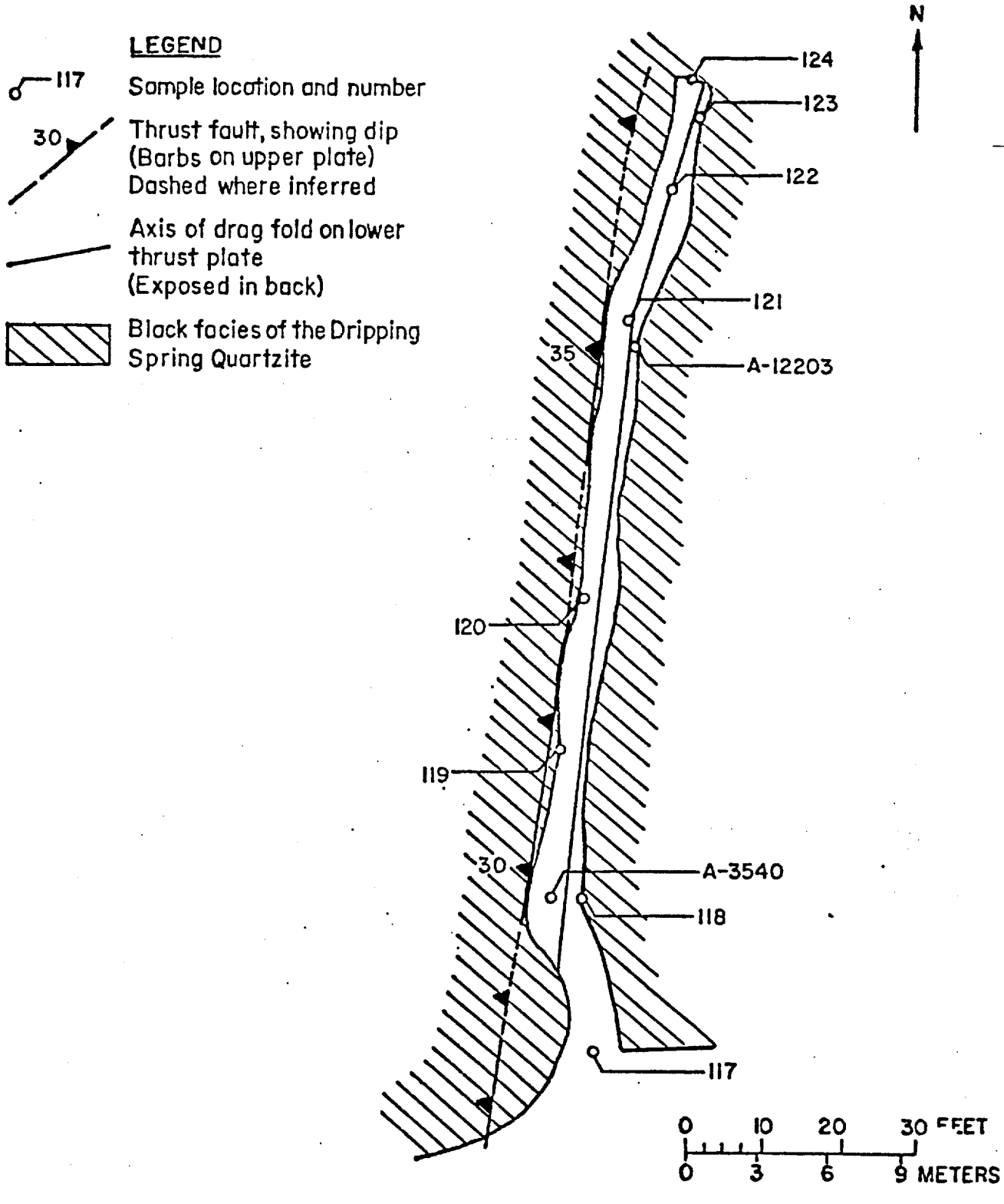


Figure 39. - Sample locations of the Horseshoe Mine.

percent U_3O_8 mined from a stope near the portal. The other shipment consisted of 7.5 tons of rock averaging 0.02 percent U_3O_8 obtained from driving the adit (Schwartz, 1957).

The host rock at the Horshshoe Mine is the black facies of the Dripping Spring Quartzite. The formation is thinly laminated, well indurated, gray to black, sandy siltstone with abundant limonite stain. Small veinlets, normally 1/16 inch or less in width, are common throughout the mine, and are filled with quartz, calcite, pyrite, chalcopyrite, sphalerite, and galena. Accumulations of goslarite (Granger and Raup, 1969a, p. 56) and greenish to bluish hydrous copper sulfates have formed secondary coatings on the mine back and ribs, especially along the drag fold and in fractures.

Eight samples from the Horseshoe Mine contained from 0.01 to 0.42 percent U_3O_8 (table 24). Samples 120 through 123, which had the highest uranium content, were from the drag fold at places having the highest radiometric readings. Several samples had anomalous lead and zinc concentrations, representing the presence of finely disseminated galena and sphalerite.

Table 24. - Assay data for samples from the Horseshoe Mine.

Sample No.	Type	Length (feet)	U_3O_8 percent	Cu percent	Pb percent	Zn percent
117	Chip	1.5	0.02	0.029	0.067	0.099
118	do.	1.8	.03	.031	.014	.13
A-3540[1/]	do.	7	.13	N.A.	N.A.	N.A.
119	do.	0.4	.02	.003	.002	.20
120	do.	1	.09	.005	.018	1.4
A-12203[1/]	do.	2	.10	N.A.	N.A.	N.A.
121	do.	1	.42	.01	.096	.31
122	do.	1	.10	.018	.017	.10
123	do.	1	.30	.012	.049	.025
124	do.	1	.01	.01	.004	.06

1/ Schwartz, 1957, p. 34
N.A., not available

The higher U_3O_8 values occurring along the drag fold indicate that the fold was instrumental in controlling uranium concentration. The northward extent of the fold is not known, but additional uranium concentrations may exist beyond the present extent of the mine.

Navajo deposit

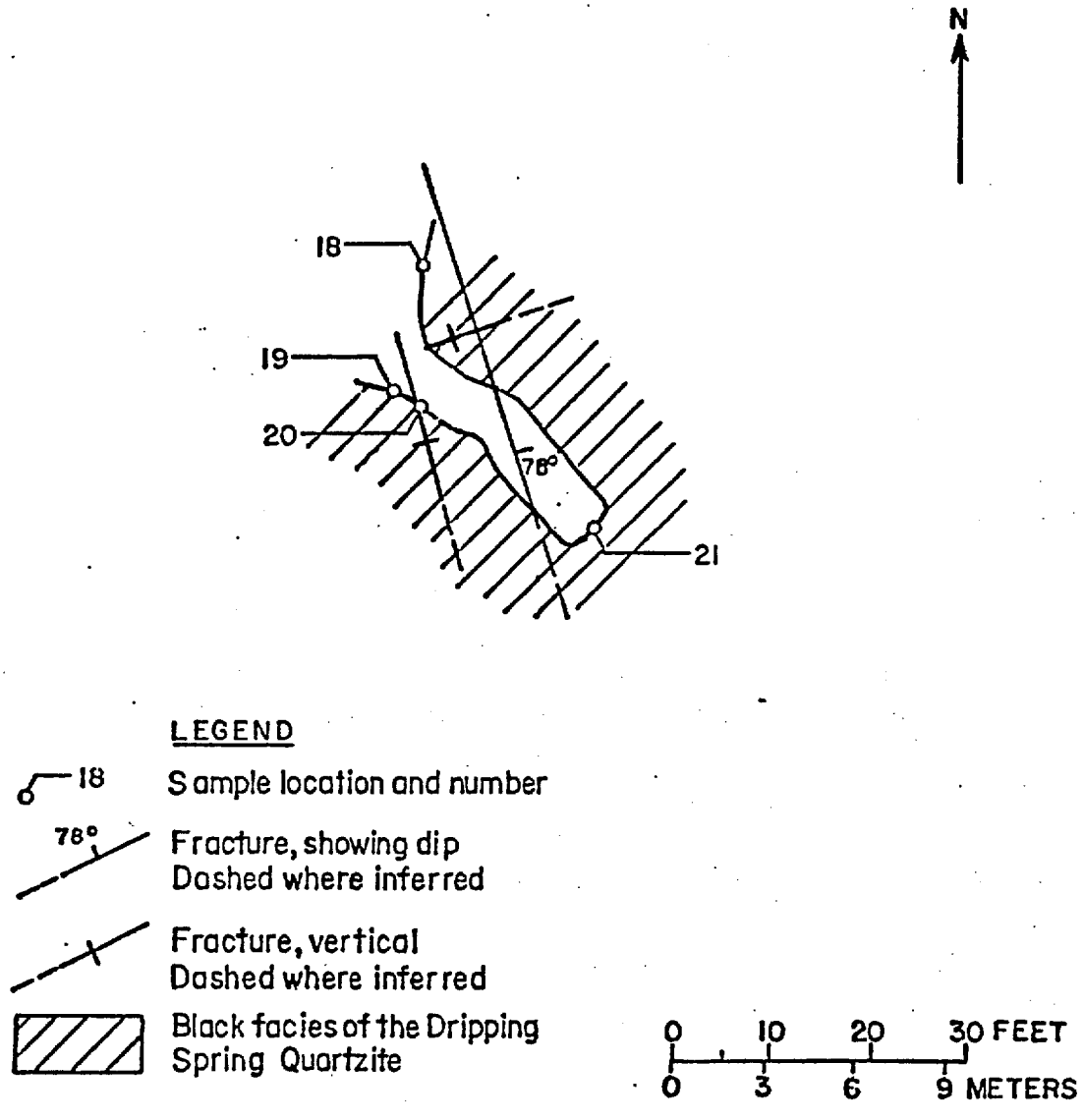
The Navajo deposit is located on the east side of Cherry Creek at an elevation of about 4,050 feet. The deposit lies approximately 600 feet south of the confluence of Cherry Creek and P B Creek in the north-center sec. 27, T. 7 N., R. 14 E. (unsurveyed) (plate 1). Access to the property is by way of the road to the Brushy Basin Trap deposit.

The property was originally located in 1954 by Alfred Haught and others. W. T. Graham leased the property in 1955 and drove a short adit, but no ore was produced (Granger and Raup, 1969a, p. 92). The claims were restaked by Wyoming Minerals Corp. in 1976, and in 1979 were being evaluated for uranium.

An adit, 26 feet long and trending S 50° E, was completed in 1955 (figure 40). The adit was not driven along a fracture. The maximum radioactive reading in the adit was 0.35 mr/hr, near the portal at the location of sample 19.

Four samples from the Navajo Adit contained from 0.006 to 0.06 percent U_3O_8. The presence of copper in samples is due to minor occurrences of metatorbernite.

The low radiometric values, lack of a well-developed fracture in the adit, and low uranium content of samples indicate that uranium mineralization is minor on the Navajo claims.



Sample No.	Type	Length (feet)	U_3O_8 (percent)
18	Chip	0.9	0.01
19	do.	6.5	.006
20	do.	0.8	.01
21	do.	5.5	.06

Figure 40. - Sample locations and assay data for the Navajo Adit.

Sorrel Horse (Big Six) deposit

The Sorrel Horse deposit comprises five adits located at an elevation of 5500 feet on the steep eastern face of McFadden Horse Mountain, in the W 1/2 sec. 4, T. 6 N., R. 14 E. (Plate 1). The north adit, No. 1, is accessible from an old road which branches off the upper Cherry Creek road, about 1/2 mile north of Cold Water Canyon. The southernmost adits, Nos. 4 and 5 are reached by a fork from the road leading to the Black Brush Mine.

The Sorrel Horse claims were staked in 1954 by Alfred Haught, and others. From 1955 to 1957, the northern claims were leased to Big Six Explorations, Inc. The northernmost two adits were driven by Big Six Explorations and have been previously referred to as the Big Six deposit (Granger and Raup, 1969a, p. 10). No ore has been produced from these workings. The property was leased to Wyoming Minerals Corp. in 1976 (A. Haught, oral communication, 1978).

Exploration of the Sorrel Horse deposit consists of five adits, here arbitrarily numbered one to five from north to south. Adit No. 1 was driven 250 feet S 25° W (figure 41), and was worked by Big Six Explorations under a contract with the Defense Minerals Exploration Administration (Granger and Raup, 1969a, p. 10). Eight samples from the adit contained from 0.002 to 0.13 percent U_3O_8 (table 25). Sample 56, cut from the most radioactive place in the adit, contained the highest concentration of uranium (0.13 percent U_3O_8). All other samples contained only minor U_3O_8.

Adit No. 2, about 500 feet southeast of Adit No. 1, was driven due North for 40 feet (figure 42). The adit does not follow a well-defined fracture system. The highest radioactivity occurs in a 1-foot-thick zone just above the floor in the right rib at 10 feet from the portal. Sample 58 from this zone contained 0.12 percent U_3O_8 (table 25). Four other samples from this adit did not contain over 0.004 percent U_3O_8.

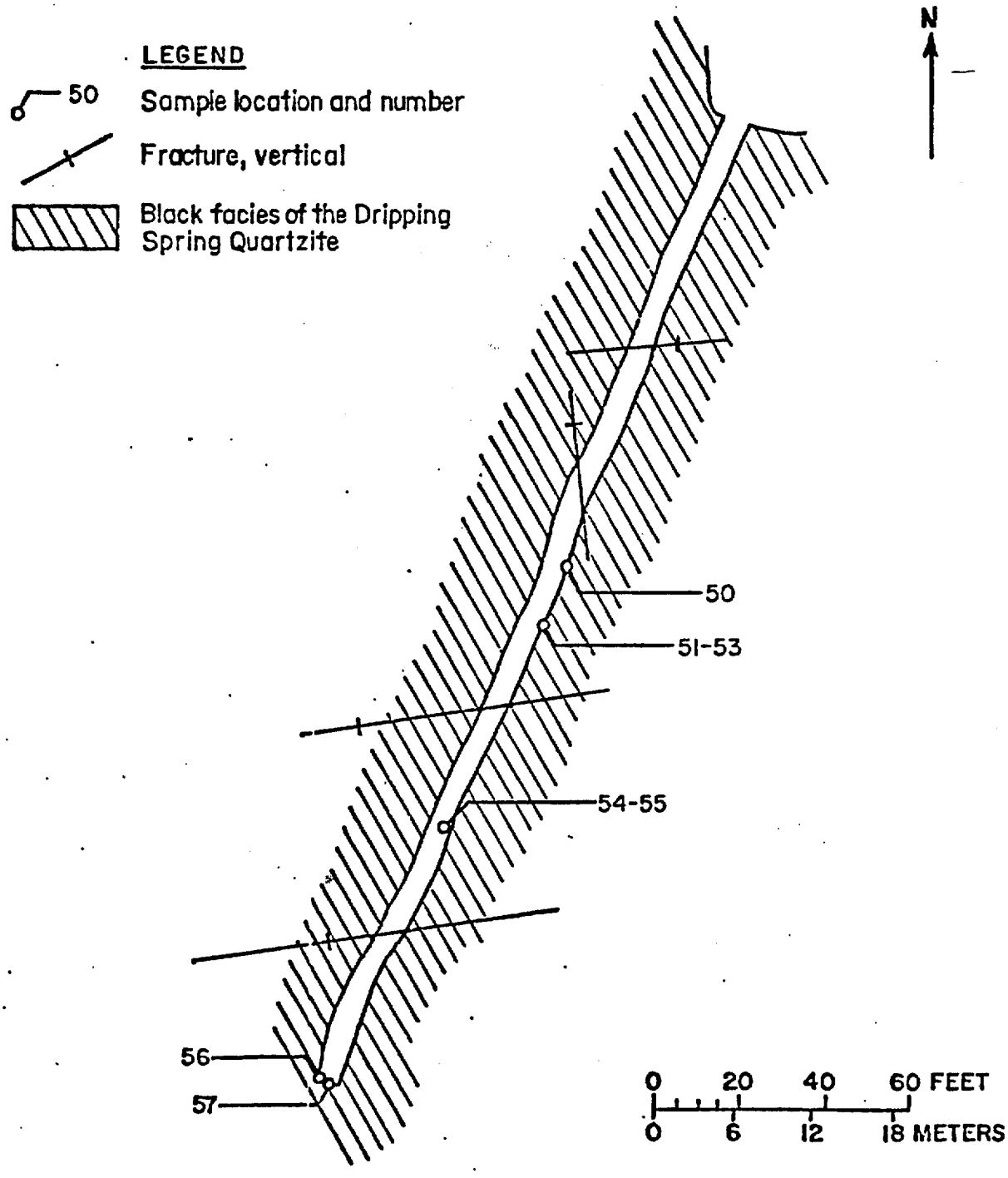


Figure 41. - Sample locations of the Sorrel Horse Adit No. 1.

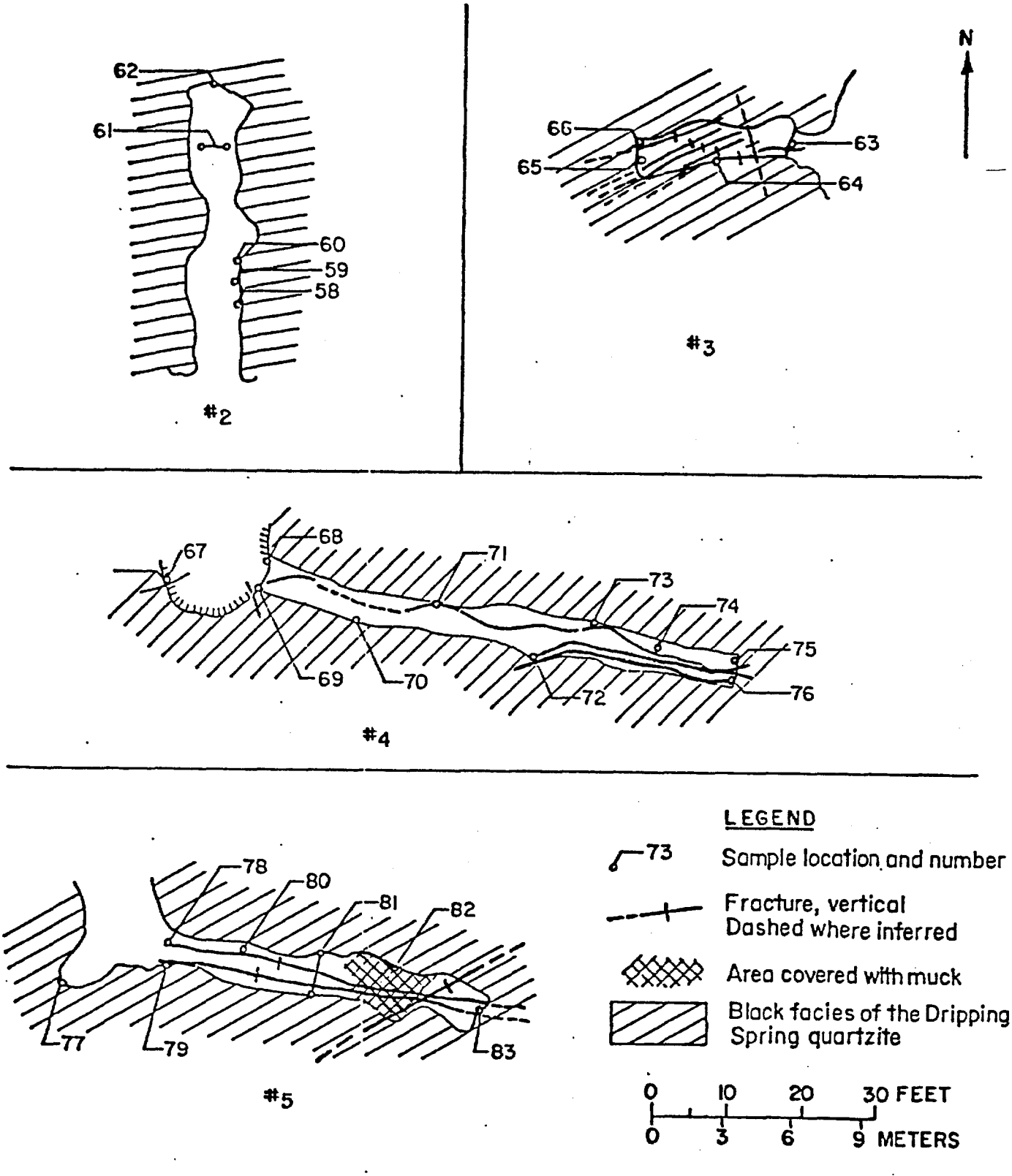


Figure 42. - Sample locations of the Sorrel Horse Adits Nos. 2, 3, 4, and 5.

Table 25. - Assay data for samples from the Sorrel Horse Adits.

Sample No.	Type	Length (feet)	U_3O_8 percent	Cu percent	Pb percent	Zn percent
Adit #1						
50	Chip	0.5	0.003	0.017	Tr	0.003
51	do.	2	.04	.02	0.006	.001
52	do.	2	.003	.006	Tr	.002
53	do.	2	.002	.013	Tr	.001
54	do.	5	.004	.007	Tr	.012
55	Select		.016	N.A.	N.A.	N.A.
56	Chip	0.5	.13	.012	.022	.011
57	do.	2	.005	.023	Tr	.004
Adit #2						
58	Chip	1	0.12	0.014	0.019	0.036
59	do.	1	.002	.01	Tr	.009
60	do.	1	.002	.01	Tr	.012
61	do.	3.5	.004	.004	Tr	.001
62	do.	5	.003	.009	Tr	.006
Adit #3						
63	Chip	5	0.002	0.006	0.007	Tr
64	do.	0.6	.004	.002	.003	Tr
65	do.	3	.002	.007	.002	Tr
66	do.	0.3	.01	.011	.003	Tr
Adit #4						
67	Chip	0.3	0.002	0.017	0.007	0.002
68	do.	4	.009	.01	.003	.004
69	do.	0.3	.03	.008	.013	.004
70	do.	4.5	.003	.-13	.002	.001
71	do.	5	.007	.012	.003	.005
72	do.	0.3	.003	.006	.004	.004
73	do.	3.5	.003	.007	.003	.005
74	do.	3	.003	.007	.01	.002
75	do.	3.5	.003	.056	.004	.004
76	do.	0.3	.004	.006	.002	.005
Adit #5						
77	Chip	2.5	0.003	0.005	0.002	0.011
78	do.	0.5	.007	.022	.005	.006
79	do.	0.2	.002	.023	.003	Tr
80	do.	0.3	.20	.013	.014	.051
81	do.	5	.02	.004	.003	.002
82	do.	0.5	.06	.016	.01	.045
83	do.	1	.09	.006	.007	.003

N.A., not available
Tr, trace

Adit No. 3, driven 21 feet at S 86° W (figure 42), lies about 1,500 feet south of Adit No. 2. This adit explores a group of parallel hairline fractures which locally have associated radiometric values slightly above background. The highest radiometric value occurred at the lower right corner of the face. Sample 66 from this zone in the face contained 0.01 percent U_3O_8, the highest uranium concentration in the four samples from this adit (table 25).

Adit No. 4, about 500 feet south of Adit No. 3, was driven S 78° E for 66 feet along an irregular fracture trend containing locally anomalous radioactivity (figure 42). Ten samples from Adit No. 4 contained from 0.002 to 0.03 percent U_3O_8 (table 25).

Adit No. 5, about 500 feet northeast of Adit No. 4, was driven S 78° E for 45 feet along a set of parallel fractures (figure 42). Seven samples contained uranium concentrations from 0.002 to 0.20 percent U_3O_8 (table 25). Sample 80 contained the highest uranium concentration. It was taken across the widest part of the fracture at 10 feet inside the adit.

The uranium concentrations at the Sorrel Horse deposit are low, highly irregular, and discontinuous. The presence of minable uranium concentrations in this area is unlikely.

Sue Mine

The Sue Mine is located on the south side of Bull Canyon, in the SW 1/4 sec. 19, T. 5 N., R. 15 E. (unsurveyed), approximately 1/2 mile south of the wilderness (plate 1). The mine is accessible by about 1/2 mile of old road which starts near the top of the Bull Canyon road.

The Sue claims were staked in 1954 by K. C. Heron for Arizona Globe Uranium, Inc. Total workings on the property amount to about 1,700 feet

of drifts and crosscuts that connect two adits that bear S. 20° W. (figure 43). A third adit, started to the west of the main workings, extends 30 feet. Approximately 750 feet of the workings were financed by a Defense Minerals Exploration Administration grant (Granger and Raup, 1969a, p. 129). Ore produced from the Sue Mine totaled 450 tons averaging 0.21 percent U_3O_8 (Schwartz, 1957, p. 56). In 1978 the claims were held by a joint venture agreement between Wyoming Minerals Corp. and B and B Mining Co.

Nineteen samples from the Sue Mine contained from 0.006 to 0.69 percent U_3O_8 (table 26). Most of the samples were mine width, which probably resulted in dilution of localized higher-grade concentrations located along fracture surfaces. Sixty-five samples taken by the U.S. Atomic Energy Commission contained from 0.01 to 3.47 percent U_3O_8 (Granger and Raup, 1969a, p. 135-136).

Table 26. - Assay data for samples from the Sue Mine.

Sample No.	Type	Length (feet)	U_3O_8 percent	Cu percent	Pb percent	Zn percent
349	Chip	5.5	0.005	0.017	0.002	Tr
350	do.	6.5	.005	.013	.002	Tr
351	do.	4	.01	.01	.002	Tr
352	do.	6	.03	.008	.004	0.001
353	do.	7	.04	.009	.005	Tr
354	do.	5.5	.03	.03	.005	Tr
355	do.	5	.02	.004	.005	Tr
356	do.	1.5	.69	.01	.03	.005
357	do.	6.5	.10	.018	.032	.001
358	do.	5.5	.01	.015	.006	Tr
359	do.	1	.23	.011	.007	.033
360	do.	5.5	.02	.012	.005	.001
361	do.	3	.04	.011	.004	Tr
362	do.	3.5	.009	.008	.004	Tr
363	do.	5.5	.05	.008	.007	.001
364	do.	6	.02	.003	.006	.002
365	do.	5.5	.02	.008	.014	.001
366	do.	5.5	.04	.032	.085	.001
367	do.	2.5	.02	.018	.045	.007

Tr, trace

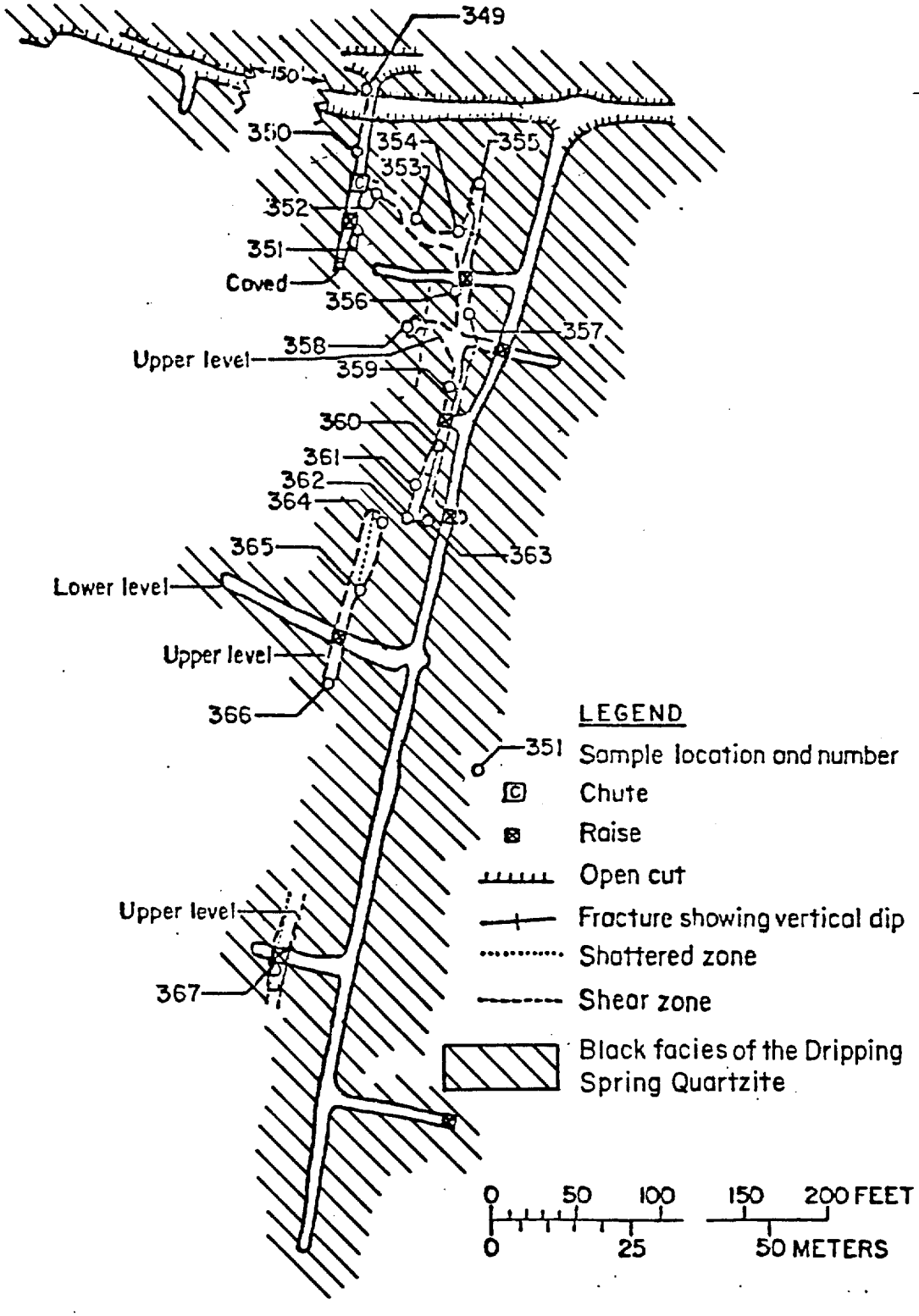


Figure 43. - Sample locations of the Sue Mine.

Nearly all the ore was mined from the upper level, west of the main adit (Schwartz, 1957, p. 51). Additional resources may exist along en echelon fractures extending beyond the mined area, but the quantity cannot be determined without additional data.

Workman Creek Mines

Several mines along Workman Creek yielded uranium between 1954 and 1960. These mines are 2 to 3 miles outside the Sierra Ancha Wilderness; however, the similarity of uranium concentrations at these mines and in the wilderness, the relatively large volume of ore produced, are pertinent for defining the mineral potential of the Sierra Ancha Wilderness. Therefore, a brief discussion of these mines is included. Only a cursory visit was made to the Workman Creek area and most of the following information is based on published reports (Schwartz, 1957; Granger and Raup, 1969b).

The mines in the Workman Creek area are the Hope, Jon, Little Joe, Lost Dog, Lucky Stop, Suckerite, and Workman. All the mining claims on which these mines are situated were under lease in 1978 to either Wyoming Minerals Corp. or Sierra Ancha Minerals and Mining Co., Ltd.

The Hope Mine is located in the NE 1/4 sec. 30, T. 6 N., R. 14 E., and is easily accessible from the Workman Creek road. The claims were staked in 1954 by Charlie Nichols and others. A reported 9,050 tons of ore averaging 0.30 percent U_3O_8 (table 1) was produced from four adits on the property. Most of the ore produced was mined by Arizona Continental Uranium, Inc. One short adit and several prospect pits cut on the Hope claims did not contain any ore.

The Jon Mine is located in the SW 1/4 sec. 29, T. 6 N., R. 14 E. on the northeast side of Workman Creek. The property was staked in 1954 by L. Snow

and others. A 180-foot adit and 140-foot open cut were developed by Regent Uranium and Oil Co. (Granger and Raup, 1969a, p. 60-61). Schwartz (1957, p. 33) reported that 157 tons of ore averaging 0.10 percent U_3O_8 and 49 tons of "no-pay ore" assaying 0.09 percent U_3O_8 had been shipped and that 450 tons averaging about 0.10 percent U_3O_8 had been stockpiled at the property.

The Little Joe Mine is located in sec. 19, T. 6 N., R. 14 E. The claims were located in 1954 by M. Sharp, and others, Globe. Several open cuts and five adits, with a total length of 450 feet, and several prospect pits have been cut on the property. Ore shipped from the Little Joe Mine totaled 2,703 tons averaging 0.20 percent U_3O_8 (Schwartz, 1957, p. 56).

The Lost Dog Mine is in sec. 30, T. 6 N., R. 14 E., on the south side of Workman Creek. The claims were located in 1954 by D. Wilbanks and others. Workings on the property consist of five adits, an open cut, and several prospect pits. Ore shipped from the Lost Dog Mine totaled 1,562 tons averaging 0.13 percent U_3O_8 (Schwartz, 1957, p. 56).

The Lucky Stop Mine is in the NW 1/2, sec. 30, T. 6 N., R. 14 E., on the south side of Workman Creek. The claims were located by J. Brunson and others. Five adits and several open cuts and prospect pits were made by the Lucky Stop Mining Company. Ore shipped from the Lucky Stop mine totaled 2,847 tons averaging 0.16 percent U_3O_8, (Schwartz, 1957, p. 56).

The Suckerite Mine is in sec. 24, T. 6 N., R. 13 E. (unsurveyed), approximately 1/4 mile west of the Globe-Young highway. The claims were located in 1954 by D. Gerovich and others. Tulsa Minerals, Inc., drove two adits totaling 450 feet along a mineralized vein (Granger and Raup, 1969a, p. 126). Production from the Suckerite Mine was 2,603 tons of ore averaging 0.23 percent U_3O_8, (Schwartz, 1957, p. 56).

The Workman Mine is in the S 1/2 sec. 19, T. 6 N., R. 14 E. The claims were located in 1954 by C. Nichols and others. Arizona Continental Uranium, Inc. drove three adits, totaling 360 feet, and dug several pits. Production from the adits totaled 258 tons of ore averaging 0.11 percent U_3O_8, (Schwartz, 1957, p. 56).

Other Resources

Additional resources investigated in the Sierra Ancha Wilderness include copper and silver, sand and gravel, and industrial rock.

Gold Creek deposit

Two prospect pits are located on the Cherry Creek monocline along the ridge slopes north and south of Gold Creek in the E 1/2 sec. 10, T. 6 N., R. 14 E. (plate 1). The Cherry Creek monocline in this area trends about N 15° W. The prospects were dug in highly weathered, possibly sheared, Dripping Spring Quartzite.

Three samples from the north pit, and four samples from the south pit contained anomalous concentrations of silver and copper (table 27). A 1-foot chip, sample 116 contained 12.9 ounces silver per ton and 0.39 percent copper. Although talus cover prevented tracing the mineralization beyond the pits, assays from selected samples indicate that the mineralization is probably as irregular and discontinuous occurrences.

Table 27. - Assay data for samples from the Gold Creek Deposit.

Sample No.	Type	Length (feet)	Au oz/t	Ag oz/t	Cu percent	Pb percent	Zn percent
North pit							
114	Select		--	6.4	1.6	.061	.013
115	do.		Tr	0.5	.015	.013	.005
116	Chip	1	--	12.9	0.39	0.08	0.004
South pit							
128	Select		--	.4	2.5	.019	.032
129	Chip	1	--	0.1	0.33	0.005	0.013
130	do.	2	--	--	.087	.004	.025
131	Grab	Dump, 5 grid	--	.2	0.14	.023	.025

Tr, trace
--, not detected

Sand and Gravel

The Sierra Ancha Wilderness contains large quantities of sand and gravel, stone suitable for crushed rock, and limestone for making lime and possible cement. Similar deposits are also readily available outside the wilderness.

Salome Study Area

Mineral deposits are sparse in the Salome Study Area. Uranium, at the Fairview deposit, and copper, at the Salome deposit, are the only known occurrences within the study area. Additional occurrences of fluorspar, uranium, copper, and barite have been found peripheral to the Salome Study Area.

Because of the lack of known mineralization, stream-sediment samples and stream-panned-concentrate samples were taken at several localities. Spectrographic analyses of these samples for 40 elements did not reveal any anomalous concentrations that might indicate surface or nearsurface mineral deposits. Results of assays of stream-sediment samples and stream panned-concentrate samples, not listed here, are available from the U.S. Bureau of

Mines, Intermountain Field Operations Center, Building 20, Denver Federal Center, Denver, Colorado 80225.

Fluorspar: Oak Springs deposit

The Oak Springs deposit is located about 3-1/2 miles west of the Salome Study Area on the west side of Greenback Creek in the west-center of sec. 30, T. 6 N., R. 12 E., at an elevation of approximately 3,600 feet. Access to the property is by a dirt road from the Conway Ranch in Greenback Valley.

The Oak Springs deposit was originally explored for vanadium by two shafts, approximately 15 and 50 feet deep (E. C. Conway, Punkin Center, Arizona, oral communication, 1978). Both of the shafts have been covered by subsequent surface exploration. The Oak Springs claims were staked by Eddie and Bill Conway in 1969. No ore has been produced from the deposit, but exploration continued in 1979.

Fluorspar occurs at the Oak Spring deposit in a northwest trending vertical vein in a fault zone in diabase, near the intrusive diabase-granite contact (figure 44). Isolated small pockets of fluorspar also occur along a secondary vein trend, approximately 40 feet southwest of the main trend.

Exploration of the prospect has been by surface cuts to expose the main portion of the vein. To the southeast, the vein is terminated by erosion along Greenback Creek; to the northwest, the vein continues into the hillside and is not traceable on the surface. Neither the vertical extent nor the continuation of the vein to the northwest could be determined from the surface.

Assay results of samples taken from the fluorspar veins at the Oak Springs deposit ranged from 38.4 to 77.7 percent CaF_2 (table 28). Scattered crystals of vanadinite up to 1/4 inches long were observed at the eastern shaft; assay results revealed 0.01 percent vanadium in two of the samples.

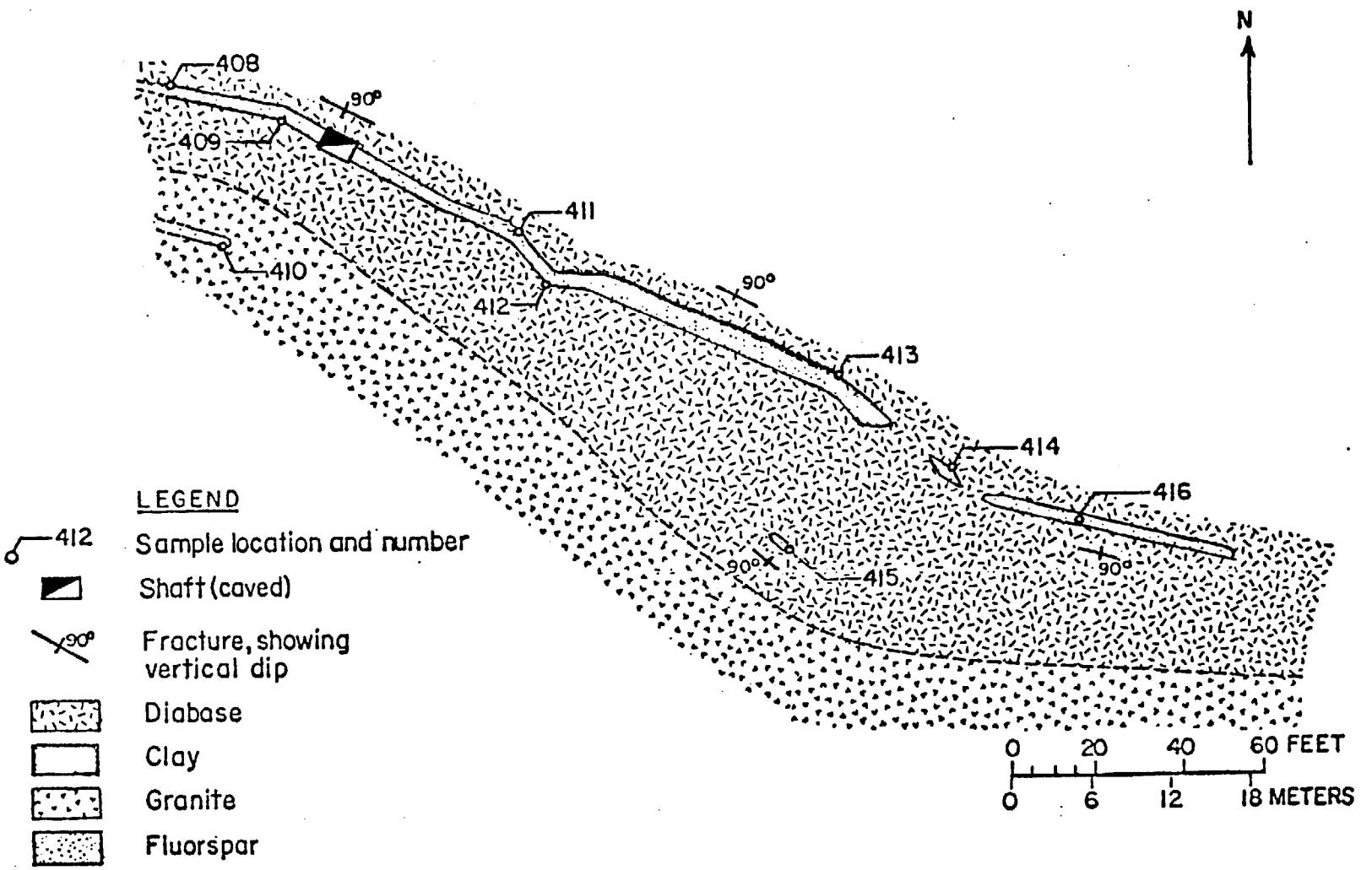


Figure 44. - Sample locations of the Oak Springs deposit.

Table 28. - Assay results for samples from the Oak Springs deposit.

Sample No.	Type	Length (inches)	CaF_2 percent	V percent
408	Chip	12	55.7	0.01
409	do.	30	51.4	.01
410	do.	14	77.7	--
411	do.	52	68.9	--
412	do.	42	72.8	--
413	do.	62	66.0	--
414	do.	18	75.0	--
415	do.	15	66.2	--
416	do.	24	38.4	--

--, not detected

The closest fluorspar mill is at Punkin Center, approximately 16 road miles from the deposit. If the extent of the vein could be demonstrated by drilling, the Oak Springs deposit might be capable of supporting a small-scale mining operation.

Uranium

Anomalous uranium occurrences in and around the Salome Study Area are limited to three occurrences in the upper Dripping Spring Quartzite. The black facies of the Dripping Spring Quartzite does not occur in the study area, and the uranium deposits are less well-developed than deposits in the Sierra Ancha Wilderness. The potential for uranium resources in the Salome Study Area was considered to be very low (Otton and others, 1981).

Easy deposit

The Easy deposit lies approximtely 1 mile southwest of McFadden Peak in the SE 1/4 sec. 35, T. 7 N., R. 13 E. (unsurveyed), at an elevation of about 6,100 feet (plate 1). Access to the deposit is a dirt road which joins the road to McFadden Peak Lookout.

The Easy claims were originally located by A. Williams and J. Carter in 1955. The Blue Bonnet Uranium Corp. leased the property and drilled several

exploration holes (Granger and Raup, 1969a, p. 30). The results of this exploration are not known, but no ore has been produced from the property.

Three chip samples from two small prospect pits contained up to 0.004 percent U_3O_8 (table 29). A select sample from the southern pit contained 0.02 percent U_3O_8. R. Schwartz reported chip samples containing 0.02 and 0.08 percent U_3O_8, and a select sample containing 0.42 percent U_3O_8, (Granger and Raup, 1969a, p. 32).

Table 29. - Uranium content of samples from the Easy deposit.

Sample No.	Type	Length (inches)	U_3O_8 percent
38	Chip	15	0.002
39	do.	33	--
40	do.	11	.004
41	Select		.02

--, not detected

The small size of the deposit, low grade and discontinuous nature of the mineralization indicate that it is unlikely that the Easy deposit contains significant uranium resources.

Fairview deposit

The Fairview deposit is located at an elevation of approximately 5,600 feet, on a bench which extends south from Greenback Peak. Two small pits and a dozer cut have been dug in the SE 1/4 sec. 12, T. 6 N., R. 12 E., (unsurveyed) (plate 1). The claims are accessible by the Malicious Gap road from the Globe-Young highway, or from Punkin Center by way of the road to Dupont Cabin.

The Fairview claims were staked in 1954 by E. C. Conway, and others, Greenback Ranch, and were restaked as the Skyline claims in 1965. The property was leased to the Boxwell and Frates Corporation which drilled over

100 holes, totaling about 8,000 feet, before the lease was dropped (Granger and Raup, 1969a, p. 33). Interpretation of drill hole data by Schwartz, defined three tabular-shaped zones of mineralization ranging from 80 to 160 feet in length, from 20 to 30 feet in width, and up to 1-1/2 feet in thickness (Granger and Raup, 1969a, p. 34). No ore has been produced from the property.

Three samples from the areas of highest radioactivity in the pits contained from 0.008 percent to 0.42 percent U_3O_8 (table 30). Metatorbernite, sphalerite, and galena are present in minor amount.

Because of the limited extent of known mineralization, the Fairview deposit was considered to have low potential for economic development in the near future (Otton and others, 1981). However, the uranium content of samples may be sufficient to encourage exploration. To the south, erosion has removed the favorable horizon, but tabular bodies, similar to those of the Fairview deposit, may extend northward, toward Blevins Canyon.

Table 30. - Uranium content of samples from the Fairview deposit.

Sample No.	Type	Length	U_3O_8 percent
377	Chip	6 in	0.008
378	do.	6 in	.008
379	Select		.42
A-3039[1/]	do.		.56
A- 3039A[1/]	Chip	1 ft	.18

1/ Schwartz, 1957, p. 27

Quartzite property

The Quartzite property is 1/2 mile northeast of Greenback Peak in the SE 1/4 sec. 1, T. 6 N., R. 12 E., at an elevation of approximately 5,800 feet. The deposit is accessible by a pack trail along the south rim of DuPont Canyon.

The Quartzite property consists of 6 claims originally located in 1955 by G. Hill and T. Russel. The amount of exploration work done is unknown, and no ore is known to have been produced from the property.

One small prospect pit was found along the south rim of DuPont Canyon (plate 1). The rock exposed at the canyon rim consists of a well indurated, white to red, flaggy quartzite. The black facies of the Dripping Spring Quartzite was not observed in this area, and radiometric readings did not exceed 0.04 mr/hr. A 12-inch chip sample (376) across the bedding in the prospect pit contained 0.01 percent U_3O_8.

Other Resources

Additional resources in and around the Salome Study Area include copper, barite, and sand and gravel. The occurrences of copper and barite are restricted to veins along en echelon faults along the south and to the west of the study area. The resource potential for these commodities was considered to be low within the Salome Study Area (Otton and others, 1981).

Journigan Mine

The Journigan Mine is located approximately 2 miles west of the Salome Study Area in the SW 1/4 sec. 6 and NW 1/4 sec. 7, T. 5 N., R. 12 E. (unsurveyed), at an elevation of 3,400 to 3,600 feet. The mine is accessible from the A-Cross road by a four-wheel-drive road.

No information is available as to the claimants at the Journigan Mine, when the mine was worked, or what minerals, if any, were produced. The size of the workings indicates that some production could have been possible. The workings appear on the 1964 U.S. Geological Survey Greenback Creek quadrangle topographic map.

The country rock at the Journigan Mine is highly altered diabase. Abundant silica and calcite have been injected along fault zones at the northern adit and the shaft. Slickensides and en echelon veining in and around the workings indicate shear along the fault zones. The presence of fluorspar suggests that the mineralization along the shear zones is of Tertiary age. Much of the silica in the veins formed as euhedral quartz crystals in vugs, representing a later stage of intrusion in a tensional, near-surface environment.

Workings at the Journigan Mine consist of two adits, an open cut, and a shaft (figure 45). Both the adits are caved; their lengths are unknown. However, the associated dumps indicate that the adits are probably not more than a few tens of feet. An open cut, 60 feet long, at the northern adit trends S 80° E and probably parallels the trend of that adit. The southern adit is about 170 feet, S 15° W, from the northern adit, and trends approximately N 40° E at the portal. The shaft, 1,600 feet S 77° W from the southern adit, was developed along a vertical shear zone trending N 76° W. The shaft was flooded beyond a depth of 8 feet, and it was not possible to determine the total depth.

Assays of samples from the Journigan Mine (table 31) show concentrations of gold, silver, and lead in various samples. Disseminated crystals of galena were abundant in most of the samples. Minor occurrences of fluorspar, associated with quartz and calcite, were also present.

Table 31. - Assay data for samples from the Journigan Mine.

Sample No.	Type	Length	Au oz/T	Ag oz/T	Cu percent	Pb percent	Zn percent
425	Chip	5 ft	--	--	0.003	0.05	0.05
426	Select		--	0.5	.002	3.7	.008
427	Grab	Dump, 6 ft grid	--	0.1	.005	.66	.004
428	do.	Dump, 4 ft grid	--	--	.004	.52	.01
429	do.	Dump, 6 ft grid	0.01	--	.006	.24	.019
430	Select		--	--	.006	.32	.002
431	Chip	10 in	--	--	.011	.17	.002
432	Select		0.03	--	.006	.034	.002

--, not detected

Mack No. 8 claim

The Mack No. 8 claim is located just west of Circle Ranch, approximately 1,000 feet east of the Salome Study Area, in the SW 1/4 sec. 1, T. 6 N., R. 13 E., (unsurveyed). Access to the property is by a road which branches off from the road to the Mack Mine (plate 1).

The Mack No. 8 claim was located in 1954 by W. Nichols and G. McGowan. An inclined shaft was sunk along the contact between diabase and Dripping Spring Quartzite where malachite and azurite staining are locally abundant. The flooded shaft was reported to be about 25 feet deep and still encountering locally very high-grade but discontinuous copper mineralization (W. Nichols, oral communication, 1978).

Four samples from near the top of the shaft contained from 0.91 to 4.0 percent copper (table 32). Silver content of the samples ranged from 0.15 to 0.30 ounces per ton.

Table 32. - Assay data for samples from the Mack No. 8 claim.

Sample No.	Type	Length (feet)	Au oz/T	Ag oz/T	Cu percent	Pb percent	Zn percent
46	Chip	1.3	0.001	0.26	2.23	0.004	0.067
47	Select		.01	.20	1.25	.009	.088
48	Chip	1.1	.001	.30	4.0	.027	.39
49	do.	2	.01	.15	0.91	.017	.27

Saguaro Mine

The Saguaro Mine is in the SW 1/4 sec. 31, T. 5 N., R. 12 E. (unsurveyed), about 2-1/2 miles west of the Salome Study Area and 1 mile north of the Journigan Mine (plate 1). The deposit is accessible from the A-Cross road by a four-wheel-drive road.

No information is available as to when the Saguaro Mine was worked, who owned the property, or if there was any production. The 1964 U.S. Geological Survey Greenback Peak quadrangle topographic map shows a shaft at the Saguaro Mine, but the shaft was not evident on the surface in 1978 and may have been covered by subsequent operations.

Workings observed at the Saguaro Mine include an adit driven into diabase for 7 feet along a 2-foot-wide zone containing multiple quartz stringers up to 2 inches thick. The distribution of barite and copper associated with the quartz stringers appear to be highly inconsistent. The general trend of the zone is N 80° W, dipping 75° N. Several open cuts have been bulldozed to define the extent of the vein zone and any areas of higher grade mineralization which might occur near the surface. One open cut exposed several silicious stringers in highly weathered diabase. Four samples across this cut did not reveal significant mineralization.

Sample 422 was taken across the vein zone at the portal of the adit. Sample 423 was taken across the vein zone and adjacent diabase above the adit. Neither of these samples, nor the four taken across the open cut, about 300 feet to the east (samples 417-420), contained any anomalous element concentrations (table 33). Sample 424, scattered barite on the surface near the adit, may represent the remains of an old dump accumulated during excavation of the shaft. This sample contained 51.1 percent Ba. Sample 421 was selected from scattered turquoise of poor quality in the weathered, sandy

soil just west of the open cut, and contained 2.3 percent Cu. The presence of sufficient mineralization to support economic development of the Saguaro Mine is unlikely because of the irregular and discontinuous nature of anomalous metal concentrations.

Table 33. - Assay data for samples from the Saguaro Mine.

Sample No.	Type	Length	Au 0z/T	Ag oz/T	Cu percent	Pb percent	Zn percent	Ba percent
417	Chip	3 ft 8 in	Tr	--	0.021	0.034	0.004	0.06
418	do.	8.5 ft	--	Tr	.004	.009	.009	.10
419	do.	4.5 ft	Tr	--	.005	.012	.019	.004
420	do.	14.5 ft	Tr	Tr	.006	.015	.012	.003
421	Select		0.01	--	2.3	.061	.004	.03
422	Chip	18 in	Tr	--	.044	.092	.005	.17
423	do.	62 in	Tr	--	.024	.053	.012	.05
424	Select		Tr	--	.055	.001	--	51.1

Tr, Trace
--, not detected

Salome deposit

The Salome deposit is located along the southern boundary of the Salome Study Area, west of Salome Creek, in the S 1/2 of sec. 16, T. 5 N., R. 12 E., at an elevation of 2,800 to 3,200 feet. Access to the area is by way of a four-wheel-drive road from the A-Cross road.

The Salome claims were located in 1966 by E. Armer, and others. The claims were restaked in 1970 as the Baker claims by F. Conway. Two prospect pits, approximately 1,000 feet apart, have been excavated (plate 1), but no ore has been produced from the property. The pits were dug along a northwest-trending vertical vein, up to 2 feet thick, in Ruin granite near Salome Creek, and diabase to the west. Massive anhedral quartz and feldspar compose the bulk of the vein, but azurite and malachite staining are locally abundant. Assays of seven samples from the Salome deposit (table 34) reveal anomalous concentrations of copper in four samples. The highest copper concentration,

.3 percent, was from a select sample taken from a small stockpile (approximately 2 tons) at the southeastern pit. Gold (0.03 oz/T) and silver (0.1 oz/T) were present in two samples.

The apparent inconsistency of mineralization along the vein at the Salome claims indicates that the property has no likelihood for future development.

Table 34. - Assay data for samples from the Salome deposit.

Sample No.	Type	Length (feet)	Au oz/T	Ag oz/T	Cu percent	Pb percent
433	Chip	3	Tr	0.1	0.17	--
434	Grab	Dump, 5 ft grid	--	--	.19	--
435	Chip	2	N.A.	N.A.	.89	0.04
436	do.	2	N.A.	N.A.	.04	.04
437	Select		--	--	1.3	.08
438	do.		--	--		
439	do.		--	--	N.A.	N.A.

N.A., not analyzed
--, not detected

Sand and Gravel

The Salome Study Area contains large quantities of sand and gravel. However, similar deposits outside the study area are more readily available so as to preclude development in the study area.

CONCLUSIONS

The Sierra Ancha Wilderness contains deposits of asbestos, iron, uranium, copper and silver and possibly, fluorspar. Asbestos deposits occur in the Mescal Limestone where favorable stratigraphic horizons were metamorphosed during the intrusion of diabase. The major deposits are at the American Ores, Pueblo, Lucky Strike, and Reynolds Falls Mines. These mines produced several thousand tons of asbestos fiber. The area underlying the southern half of Center Mountain, and including the Pueblo, Lucky Strike, and Reynolds Falls Mines, is geologically favorable for asbestos deposits and has high likelihood for developing additional asbestos resources. The area around Asbestos Point and Zimmerman Point, noted for the American Ores Mine, is also geologically favorable, and may contain additional asbestos resources.

Iron deposits formed in the Mescal Limestone by metasomatic replacement associated with diabasic intrusions. The deposit near Zimmerman Point was evaluated by Cerro de Pasco Corp to contain 15 million tons averaging 26.5 percent iron. The Lucky Strike and Pueblo asbestos mines have associated iron occurrences that may contain at least 6 million tons averaging greater than 40 percent iron. Individually, these iron deposits have insufficient tonnage and grade to represent minable deposits as of 1979, but may be available for future exploitation.

Uranium deposits occur in the carbonaceous black facies of Precambrian Dripping Spring Quartzite. During the 1950's several uranium deposits were developed in and near the wilderness. The most notable of these deposits in the wilderness are at the Big Buck, Black Brush, Donna Lee, Horseshoe, and Sue Mines. All of these deposits and several others were found where the black facies has been exposed by erosion in steep canyon walls. Because

the black facies underlies most of the wilderness, many additional deposits can be expected where the black facies is buried beneath younger formations. Uranium resources within the wilderness probably amount to several million pounds of U_3O_8 concentrated in fractures and in associated stratabound zones.

Copper and silver mineralization occurs at the Gold Creek and Ancient deposits. Mineralization at these locations is irregular and discontinuous.

Fluorspar occurs along the McFadden fault west of the wilderness and may also occur along the fault within the wilderness beneath the Troy Quartzite.

Because the Mescal Limestone does not occur in the Salome Study Area, the study area has no potential for either asbestos or iron. The black facies of the Dripping Spring Quartzite laps out east and north of the study area, and the Fairview deposits is the only known uranium occurrence within the study area. Due to the lithologic change in the black facies, the Dripping Spring is not conducive to uranium concentration, and the uranium resource potential for the Fairview deposit is low. Copper occurs in a mineralized fault along the south end of the Salome Study Area at the Salome deposit. The mineralization is locally high-grade, but discontinuous. The Salome deposit is not considered extensive enough for future development.

The evaluation of identified mineral resources for the Sierra Ancha Wilderness and Salome Study Area indicates the following: (1) the Sierra Ancha Wilderness has identified resources of asbestos and uranium; (2) the wilderness has identified subeconomic resources of iron; (3) the wilderness has copper and silver mineralization locally, but no identified resources; and, (4) the Salome Study Area has no identified mineral resources.

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Department of the Interior
Bureau of Mines

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Plate 1

Salome Study Area

OUTLINE OF AREA EXAMINED BY THE U.S. BUREAU OF MINES

Sierra Ancha Wilderness Area

INSET "A"

0 500 1000 2000 FEET
0 250 500 METERS
CONTOUR INTERVAL 200 FEET

INDEX MAP

SCALE 1:48,000
0 1 2 3 MILES

Map of Mines, Prospects, Mining Claims, and Sample Localities of the Sierra Ancha Wilderness and Salome Study Area, Gila County, Arizona

By

Thomas D. Light, U.S. Bureau of Mines

1985

Base from USGS 7.5' topo series: PICTURE MOUNTAIN, COPPER MTN., GREENBACK, ARMER MOUNTAIN, THEODORE ROOSEVELT DAM, WINDY HILL, 1964, 40 ft., and from USGS 15' topo series: MC FADDEN PEAK AND ROCKY STRAW MTN., 1949, 40 ft., ARIZONA. Compiled by Menlo Park Base Map Section. (12-77)(38-23)
MRUCKE, C.