vent facies rocks display high susceptibilities similar to those of the early intrusives. Of the three samples measured (table 10), the high was 6.7×10^{-3} emu/cm^3 and the mean was 4.7×10^{-3} emu/cm^3, indicating that these rocks, given sufficient thickness relative to their distance from the detector, could cause significant anomalies. The 10 samples of volcaniclastic facies early intermediate rocks measured had a broad range in susceptibility but averaged about 0.8×10^{-3} emu/cm^3. These rocks would be expected to produce only low-amplitude anomalies.

The flows of intermediate composition in the Henson and Burns Formations and the welded ash-flow tuffs in the Ute Ridge Tuff showed moderate to high susceptibilities, confirming the observation that these volcanic flows can produce significant anomalies where they are sufficiently thick on topographic highs. Measurements of Sapinero Mesa Tuff indicated that this unit was low in susceptibility.

TABLE 10.—*Magnetic measurements of volcanic flows, breccias, and welded tuffs, Uncompahgre Primitive Area and surrounding areas*

Rock type	Number of samples	[1]$K\times10^{-3}$	
		Range	Mean
Henson and Burns Formations	5	0.1–1.5	1.3
Sapinero Mesa (and Eureka Member) Tuff	3	.0– .7	.2
Ute Ridge Tuff	1	4.1	.....
Early intermediate-composition rocks:			
Volcaniclastic facies	10	.1–2.7	.8
Near-vent facies	3	2.5–6.7	4.7

[1] K=apparent volume magnetic susceptibility in emu/cm^3 measured with an induction-type apparatus.

WESTERN UNCOMPAHGRE PRIMITIVE AREA AND WESTERN CONTIGUOUS STUDY AREA

The aeromagnetic expression of the western contiguous area is dominated by a magnetic high with an amplitude of 800 gammas above the regional level in the vicinity of the intrusive stock underlying Mount Sneffels (anomaly A, fig. 3), and a similar high of 600 gammas above the regional level near the stock on the north side of Iron Mountain and Campbell Peak (anomaly B, fig. 3). Gabbro from Mount Sneffels measured for magnetic properties showed the rock to be highly magnetic (10.0×10^{-3} emu/cm^3), which fact would cause high-amplitude anomalies. The broad gradient on the south side of anomalies A and B and the amplitude of the anomalies indicates that both stocks extend to considerable depths and suggests that they may be connected. The arcuate pattern of the anomaly probably reflects the shape of the intrusive body at depth, indicating emplacement along an arcuate fracture zone, but gradients are locally steepened by the influence of intrusive dikes occurring in swarms near the topographic highs and by thick near-vent flows. The laccolith at Whipple Mountain, owing to its limited thickness in relation to its distance from the detector, causes only a 60-gamma deflection of the gradient contours. North of the highs associated with the stocks at Mount Sneffels and Campbell Peak (anomalies A and B) are induced dipolar lows (anomalies C and D).

A magnetic high marked by a peak value of 1,024 gammas occurs north of the western contiguous area. The high is associated with an Upper Cretaceous intrusive sill of intermediate composition that crops out in the northwestern part of the western contiguous area northwest of Ouray and in the area of the Dallas Divide, not identified on the map but 2½ miles (4 km) north of the contiguous area. The continuity of the magnetic anomaly suggests that this sill underlies the entire area north of the western contiguous area. The linear gradient along the south side of the anomaly suggests that the sill's emplacement may have been partially controlled by an east-trending fault.

CENTRAL UNCOMPAHGRE PRIMITIVE AREA AND CENTRAL CONTIGUOUS STUDY AREA

The aeromagnetic map to the south and southwest of Ouray is characterized by a broad bifurcated low of about 100 gammas below the regional level (anomalies E and F, fig. 3). The low appears to be caused by a composite effect of topography and a thin section of volcanic rocks, as one limb follows the Uncompahgre River and Red Mountain Creek to the vicinity of Ironton. (See Burbank and Luedke, 1964, for detailed geology and topography.) The other limb follows a deep canyon southwest, crosses the topographic divide, and extends to the vicinity of Telluride over the canyon of the San Miguel River (anomaly F, fig. 3). South of Ouray Precambrian quartzites are exposed along the Uncompahgre River in the upthrown block of a fault shown as the Ouray fault by Luedke and Burbank (1962, sec. *B–B′*). North of the fault sedimentary rocks are exposed at the surface underlain by Precambrian quartzite known, from exposures in mine workings (Luedke and Burbank, 1962), to have a thickness of at least 3,300 feet (1 km). In the vicinity of Telluride, volcanic rocks are also absent, as the San Miguel River is deeply eroded into lower Tertiary and pre-Tertiary sedimentary rocks.

Several lines of evidence, however, suggest that the bifurcated low is not entirely due to topography and an absence of volcanic rocks. The Ouray fault is marked by a magnetic gradient with a low to the south, yet the thickest quartzite and sedimentary rocks lie north of the fault. The low is closed on the west at Telluride and its deepest part is east of Telluride, yet the area of greatest topographic relief and sedimentary section is west of Telluride. The low crosses volcanic rocks on the topographic divide that are known to be moderately magnetic in other areas, yet in this area they are apparently nonmagnetic. This fact, coupled with the fact that the low overlies rocks that are moderately to intensely altered and mineralized and crosses the generally northwest-trending veins in the area through their most productive segments, suggests that the low marks an area of intense hydrothermal alteration where the original magnetite content of the volcanic rocks has been destroyed by leaching. This suggestion is supported by low measured susceptibilities of altered early intermediate-composition volcaniclastic rocks from the main mine area.

EASTERN UNCOMPAHGRE PRIMITIVE AREA AND EASTERN CONTIGUOUS STUDY AREA

The eastern part of the Uncompahgre Primitive Area and the eastern contiguous study area are characterized by a broad magnetic high that increases in steplike plateaus to maxima that extend from the divide southwest of Wetterhorn Peak northeastward and eastward to Crystal Peak (anomalies G, H, I, J, fig. 3). North of this peak-studded magnetic plateau, the magnetic pattern is characterized by a broad east-west low and local north-south lows over the West (anomaly K), Middle (L), and East Forks Cimarron River (M), Little Cimarron River (N), and Fall (O), Blue (P), and Elk Creeks (Q). The magnetic plateau is closely coincident with an area of high topography chiefly underlain by thick, early intermediate-composition flows (near-vent facies), Ute Ridge Tuff, and volcanics of Uncompahgre Peak. The high crosses diverse geologic units and is of sufficient magnitude to suggest a cause that is not evident in surface geology. The steepness of the east-west gradient separating the high from the low to the north suggests that much of the high is caused by a mass whose top lies at or above 9,000 feet (2,700 m) altitude or only a shallow distance beneath the surface.

All the early intermediate-composition intrusives exposed within the Uncompahgre Primitive Area and eastern contiguous area lie within the high or along its northern gradient, although the individual mapped intrusives do not produce characteristic highs similar to the intrusives at Mount Sneffels (anomaly A), Sultan Mountain, and elsewhere. Four possibilities may account for this fact: (1) The stocks in the eastern area are all somewhat altered and have had much of the original magnetite destroyed, (2) the thick lava flows capping the peaks and divides do not differ significantly in susceptibility from their related stocks, (3) topographic relief placed the relatively magnetic flow rocks near the magnetometer, causing localized high intensity anomalies, which may mask anomalies resulting from susceptibility contrast and greater thickness, and (4) the entire area may be underlain by Tertiary intrusives, and the exposed intrusives are not representative of their volume at depth.

The positive anomaly over Sheep Mountain (anomaly R, fig. 3) in the northwest part of the eastern contiguous area points up the high susceptibility of many of the near-vent facies flows. This anomaly stands out sharply within the general magnetic low in the northern half of the contiguous area. Sheep Mountain is capped by a single lava flow about

1,000 feet (300 m) thick. An analysis of the anomaly, assuming a contrast of 460+ gammas with the regional level, shows that this flow would need a susceptibility contrast of more than 13×10^{-3} emu/cm^3 to match the observed values, thus requiring that the flow have a higher susceptibility than any of the sampled intrusives. Depth analysis shows that the anomaly originates at or near ground level. No exposures of intrusive rocks are known to exist in the area. The highs and lows along the northern profiles line up closely with topography, suggesting that the lava flow capping the ridge is the source of the Sheep Mountain anomaly. The series of lows located over the stream valleys is , therefore, caused by topography and edge effects of the more magnetic body capping the ridge. A similar positive anomaly caused by near-vent facies early intermediate flows capping a ridge is located northeast of Sheep Mountain and is marked by a peak of 894 gammas on the aeromagnetic map.

The overall magnetic buildup in the eastern part of the Uncompahgre Primitive Area and eastern contiguous area, and the broad low that is developed to the north, however, must originate partly from a deeper source. The localized anomalies with steep gradients undoubtedly reflect shallow sources—probably the near-source lava flows and volcaniclastic sediments exposed at the surface—but these are superimposed on a more general widespread moderate-amplitude anomaly. This deeper source may be a relatively mafic facies of the parent batholith that underlies the San Juan Mountains (Plouff and Pakiser, 1972) from which the Matterhorn, Cimarron, and Larson volcanoes originated. The broad regional magnetic low that lies in the northern half of the central and eastern contiguous areas may be the dipole effect of this deeper source.

The localized anomaly of 1,800+ gammas over Wetterhorn Peak (anomaly H, fig. 3), which is capped by the Ute Ridge Tuff, is probably entirely related to topographic elevation of a relatively magnetic flow, as is anomaly G to the south. The magnetic high marked by a maximum value of 1,728 gammas northeast of Uncompahgre Peak (anomaly I, fig. 3) similarly occurs over one of the largest knots of high topography in excess of 13,000 feet (4,000 m) in the western San Juan Mountains; the peaks are capped by thick, near-vent facies early intermediate-composition flows and are intruded by early intermediate-composition intrusives. The isolated magnetic high marked by 1,299 gammas (anomaly J, fig. 3) occurs over a thick section of intermediate-composition flows and breccias capping Crystal Peak.

The northeast-trending segment of caldera fill that overlies the structural margin of the Uncompahgre caldera north of Henson Creek does not exhibit a recognizable aeromagentic pattern, nor do the rhyolite intrusives that are emplaced along it. Samples of two of these intrusives measured for magnetic properties averaged a low susceptibility of 0.0006 emu/cm^3. This value is not significantly different from that of many of the measured samples of tuffaceous rocks that fill the Uncompahgre caldera and into which these rhyolites were intruded.

Four closed aeromagnetic lows occur in or near the eastern part of the Uncompahgre Primitive Area; these may be related to areas of alteration and thus have economic significance as exploration targets. One low occurs east of Matterhorn Peak (anomaly S, fig. 3) in the headwaters of the East Fork Cimarron River in an area of altered rocks containing anomalous concentrations of metals associated in part with the Matterhorn volcano and in part with the altered area at Iron Beds. Another closed low occurs across the topographic divide in the drainage of Henson Creek (anomaly T, fig. 3) and is a part of the Capitol City mining area. This anomaly lies near the structural margin of the Uncompahgre caldera in an area that shows high copper and zinc values.

A third very small closed low (anomaly U, fig. 3) occurs between El Paso and Pole Creeks adjacent to the Capitol City mining area. This area is cut by the metalliferous veins whose anomalous metal content was indicated by both the CxCu and CxHM chemical tests described earlier in the geologic section of this report. An untested, closed low (anomaly V, fig. 3) occurs in the headwaters of Slaughterhouse Gulch above Lake City. This area was not sampled for metal values, but it occupies a position similar to that of the Capitol City mining area relative to the structural margin and associated intrusives of the Uncompahgre caldera.

ECONOMIC APPRAISAL

By C. L. Bieniewski and H. C. Meeves, U.S. Bureau of Mines

MINING CLAIMS

Land-status records of the U.S. Bureau of Land Management were examined to determine existing patented mining claims, and the records of Hinsdale, Gunnison, Ouray, and San Miguel Counties were examined to determine the unpatented mining claims in and near the three contiguous areas. These examinations revealed 525 patented claims and approximately 4,300 unpatented claims in the area investigated. Of these, 93 patented and approximately 3,000 unpatented claims are within the contiguous areas. The locations of the patented claims, shown on plate 3, are taken from master title plats of the U.S. Bureau of Land Management; the locations of the unpatented claims are based on claim descriptions of the recorded location notices and on maps from individuals or companies. The configurations and locations of the unpatented mining claims are only approximations, for many of these claims were not clearly described. In addition, many unpatented areas have been restaked at different times, and claims shown on plate 3 represent only part of the total number of unpatented claims that have been recorded.

SAMPLING

All mineralized areas in the contiguous study areas were examined and sampled duirng this investigation. If numerous workings were dug in a closely spaced area, commonly, only selected ones were sampled. All sample localities are shown on plate 3.

Most of the underground workings at the old mines and prospects were inaccessible because of caving or flooding. At such places, dumps and surface exposures of veins, fractures, dikes, or similar structures were sampled. If the workings were accessible, samples were taken underground on structures and at the face of the adit or drift. In a few places, samples were taken of stream sediments and of sand and gravel deposits.

Chip samples weighing 1-3 pounds (0.45-1.4 kg (kilograms)) were taken at accessible underground workings and rock outcrops. On dumps, grab samples of 1-5 pounds (0.45-2.3 kg) were taken on a grid system. In a few instances, material considered to represent the dump was selected. Samples from streams were either grab samples of sediments or panned concentrates.

All but two samples were fire assayed for gold and silver and were analyzed spectrographically for 40 elements. Some were further analyzed by other methods for specific elements. The results of all analyses are shown in table 11. One sample of limestone and two samples of coal were analyzed to determine their economic value; the results of these analyses are shown in tables 12 and 13, respectively.

TABLE 12.—*Chemical analysis, in percent, of limestone (sample 390) from Pony Express Limestone Member, Wanakah Formation*

Calcium carbonate ($CaCO_3$)	[1]92.19
Silica (SiO_2)	3.44
Iron oxide (Fe_2O_3)	.57
Alumina (Al_2O_3)	1.28
Lime (CaO)	51.35
Magnesia (MgO)	.73
Titanium oxide (TiO_2)	.05
Volatile matter	40.84
Moisture	.13
Total	98.39

[1] The percentage of calcium carbonate ($CaCO_3$) is calculated by adding the lime (CaO) and the volatile matter, which may be considered as carbon dioxide (CO_2).

HISTORY AND MINERAL PRODUCTION

The history of the mining activity and mineral production in an adjacent to the Uncompahgre Primitive Area up to 1966 was discussed by Fischer, Luedke, Sheridan, and Raabe (1968). The history of the Lake City area was discussed in detail by Irving and Bancroft (1911). Since 1966,

TABLE 13.—*Analyses of coal, in percent, from west of San Miguel*

Sample No	359	360
Proximate analysis:		
Moisture	1.5	1.0
Volatile matter	8.8	10.2
Fixed carbon	37.3	32.6
Ash	52.4	56.2
Total	100.0	100.0
Ultimate analysis:		
Hydrogen	2.1	2.2
Carbon	40.4	35.5
Nitrogen	.7	.6
Oxygen	3.9	5.1
Sulfur	.5	.4
Ash	52.4	56.2
Total	100.0	100.0
British thermal units	6,570	5,470

activity in the contiguous study areas discussed here has consisted mainly of claim location, assessment work, and exploration.

According to U.S. Bureau of Mines records, the only recorded mineral production during 1966–71 from within the contiguous areas was for stone produced in Gunnison County in 1969 and 1970 from two quarries on the east side of the Middle Fork Cimarron River. The northern quarry is 1½ miles (2.4 km) south of the junction of the East and Middle Forks; the other quarry is 1 mile (1.6 km) farther south. The stone was used for riprap in construction of the Silver Jack Dam on the Cimarron River (not shown on plates).

Gold, silver, copper, lead, zinc, limestone, and sand and gravel were produced during 1966–71 from mines near the contiguous areas. The precious- and base-metal production was from the Ute-Ulay (1966–68) and Capitol City (1968) mines in Hinsdale County; the Senorita (1966); Bachelor-Syracuse (1968–70), and Portland (1968) mines in Ouray County; and the Courthouse (1966) mine in San Miguel County. Limestone was quarried at the mouth of Deep Creek in San Miguel County from 1969 through 1971, and it was used at the Union Carbide Corp. uranium mill at Uravan, Colo., to neutralize plant effluent. Sand and gravel, obtained near the junction of the East Fork and West Fork Cimmarron River in 1969, was used in constructing the Silver Jack Dam (not shown on plates).

Exxon Corp. (1971–72) and Greater West Mining Co. (1969) have explored for uranium in the eastern contiguous area and adjacent parts of the original primitive area, and Dixilyn Corp. (1971) explored for molybdenum in the headwaters of the East Fork Cimarron River adjacent to the eastern contiguous area. Other exploration work was done by Eric

Benson (1960) for manganese in the eastern contiguous area, by Hughes Mining Co. (1966–69) for silver, lead, and zinc at the Ute-Ulay mine near the eastern contiguous area, and by Baumgartner Oil Co. (1971–72) for copper in the central contiguous area and adjacent parts of the Uncompahgre Primitive Area. In addition, assessment work on unpatented mining claims was done by other companies and individuals.

LEASING ACT MINERALS

All oil and gas leases that had been issued for land in or within 5 miles (8 km) of the contiguous study areas were cancelled or terminated before 1972; no holes had been drilled. Twelve holes were drilled on private land in T. 45 N., R. 8 W., New Mexico Principal Meridian. The nearest hole to the study area is a dry hole that lies about 1 mile (1.6 km) west of the boundary of the central contiguous area in the SE¼SW¼ sec. 35; the hole was spudded in the Cutler Formation and abandoned in the Hermosa Formation. Two holes in SE¼SW¼ sec. 11 and in NE¼NE¼ sec. 15 yielded a small amount of natural gas from the Dakota Sandstone. The location of 8 of the 12 holes is shown on plate *3A*; the other 4 holes are located in SW¼SW¼ sec. 7, SE¼SW¼ sec. 16, NW¼NE¼ sec. 18, and SW¼SE¼ sec. 30.

Coal-entry patents have been granted, and coal leases and coal permits have been issued for parcels of land in T. 46 N., Rs. 6 and 7 W., several miles northwest of the eastern contiguous area; none is within the contiguous areas. Many of the leases and permits have been cancelled or terminated, but Kemmerer Coal Co. controls some of the active leases and permits and has acquired leases for some private lands. Since 1964, the company has done considerable exploration work for coal on these properties, and in 1972 it was considering development of its coal west of Cimarron Ridge. The coal occurs in the Fruitland Formation in the southern part of the Tongue Mesa coal field. Landis (1959) estimated the reserve of this field at 2,355 million tons of subbituminous coal.

The northeasterly trending Ridgway fault that passes about 5 miles (8 km) northwest of the eastern contiguous area limits the Tongue Mesa coal field on the south. To the southeast, however, some of the Fruitland Formation may be covered by landslides, glacial deposits, and Tertiary volcanic rocks near the northern boundary of the study area in the vicinity of Cimarron Ridge.

MINES, PROSPECTS, AND MINERALIZED AREAS

Most of the study area is covered by Tertiary volcanic rocks, and intrusive bodies of Tertiary age are exposed throughout the area. Paleozoic and Mesozoic sedimentary rocks and the Telluride Conglomerate of Tertiary age are exposed in the central contiguous area. Mesozoic sedimentary rocks and the Telluride Conglomerate crop out in the western contiguous area, but no sedimentary rocks are exposed in the eastern contiguous area. Many of the formations have been fractured and structurally deformed.

WESTERN CONTIGUOUS AREA

The western contiguous area is north and west of the western part of the Uncompahgre Primitive Area. The 45 square miles (115 km^2) that compose the area are almost equally divided between Ouray and San Miguel Counties.

The western contiguous study area borders one of the most highly mineralized areas in Colorado, and numerous claims have been staked in and near it. The claims are most numerous near the southeastern part of the contiguous area where the large productive veins east of Telluride extend toward and in part into the area (pl. 3*B*). Some of the veins probably contain potential resources at depth. Another group of claims is concentrated near Whipple Mountain in the western part of the contiguous area where many small veins are associated with a laccolithic intrusive center. The economic potential of this area, however, seems low. A third group of claims lies mostly outside the contiguous area between the Uncompahgre River and the northeastern part of the contiguous area where many veins are associated with sills and laccoliths on the west flank of a mineralized intrusive center located just north of the town of Ouray. Some of the mineralized rock from this area may have economic potential. Many other claims are scattered throughout the western contiguous area; mineralized rock was evident on some of these, but many claims appear devoid of significant mineral deposits.

PLUMMER GULCH

The Millersburg property is a about one-half mile (0.8 km) southeast of Plummer Gulch, near the eastern end of the western contiguous area (pl. 3*B*). Three adits were driven west along a 4-foot (1.2-m) fault zone that is possibly the western extension of the Black Girl vein. The lowest adit, driven in the Morrison Formation, is inaccessible. The middle adit (fig. 4) is near the Morrison-Dakota contact; it is approximately 75 feet (23 m) higher on the steep slope and is 170 feet (52 m) long. The highest adit, approximately 150 feet (46 m) above the middle adit, was driven 65 feet (20 m) into the Dakota Sandstone. Other nearby workings are an adit, now caved, that was driven into the Dakota Sandstone and a small prospect pit exposing narrow quartz-clacite stringers in the Dakota Sandstone about one-half mile (0.8 km) west of the caved adit.

The workings on Plummer Gulch (fig. 5), about 1 mile (1.6 km) west of the Uncompahgre River (pl. 3*B*), consist of two connecting adits, one of which is caved. The main adit was driven northwest 300 feet (90 m) along the Morrison-Dakota contact.

Of the samples collected in the Plummer Gulch area, only those from the Millersburg property were significantly mineralized. A 1-foot (0.35-m) vein in a 2.5-foot (0.76-m) fault zone at the intersection of narrow cross veins is exposed in the back of the Millersburg middle adit. Chip samples 260 and 261 (table 11) taken across the vein assayed 45.1 and 38.0 ounces of

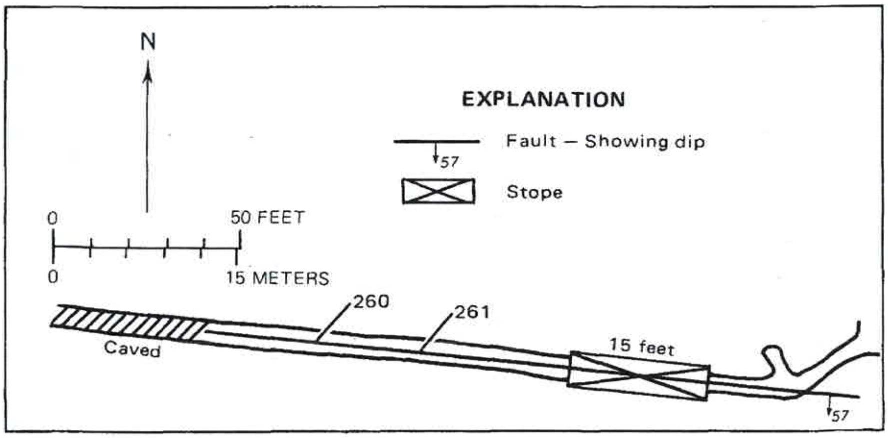

FIGURE 4.—Map of the Millersburg middle adit showing sample localities 260 and 261.

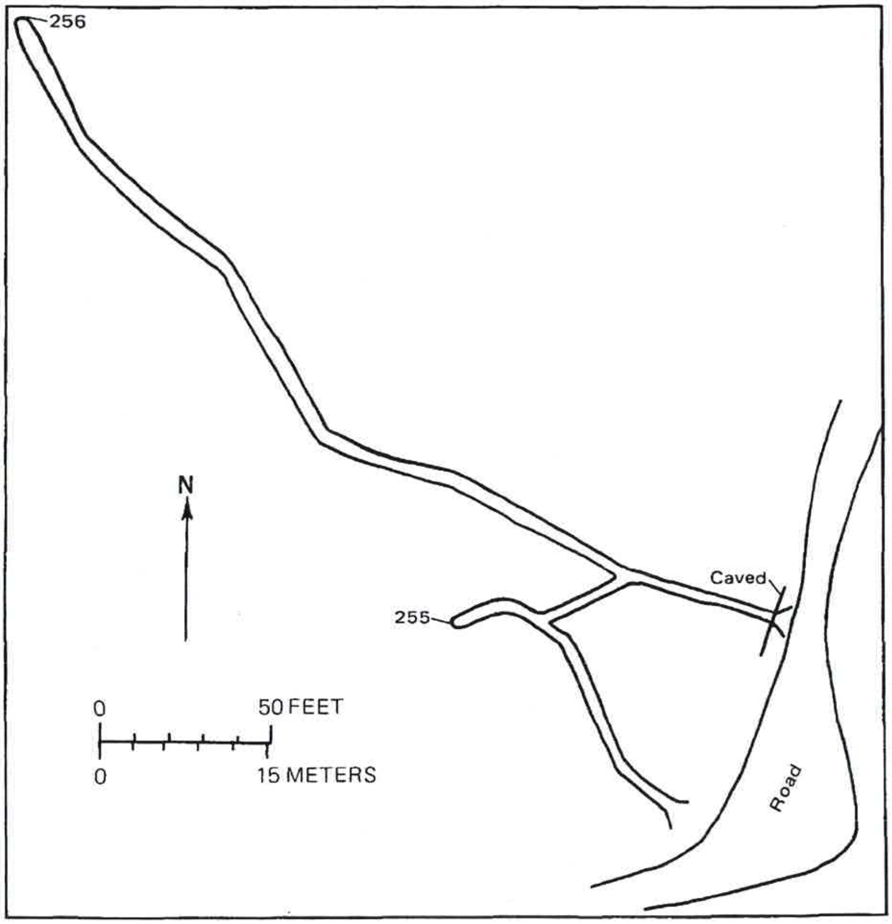

FIGURE 5.—Map of the Plummer Gulch adit showing sample localities 255 and 256.

silver per ton, 3.25 and 2.74 percent copper, and small amounts of lead, zinc, arsenic, and antimony.

Grab samples 262 and 263 taken from the dump at the lowest Millersburg adit contained, respectively 4.8 and 1.6 ounces of silver per ton, and small amounts of copper, lead, gold, and antimony.

MOONSHINE PARK

On the west edge of Moonshine Park in the eastern part of the western contiguous area, a shaft was sunk on a contact between quartzite and diorite porphyry; the shaft is now inaccessible. Sample 264 (table 11) from the dump assayed 0.1 ounce of silver per ton.

About one-half mile (0.8 km) south of Moonshine Park, on the crest of a north-trending ridge, a small prospect pit exposes narrow calcite-quartz stringers in porphyritic andesite. Analyses of sample 265 from the dump of the pit showed no metals of interest.

FORCEMAN CREEK

Just south of Forceman Creek and east of the western contiguous area, a number of workings were driven west in the Wanakah and Morrison Formations. Workings range from prospect pits to inaccessible adits and include the Little Gem mine, which has a 5,000-ton (4,500-t) dump. Generally the openings appeared to have been driven either along or in search of the productive Newsboy–Black Girl–Senorita vein systems that have been mined on the east side of the Uncompahgre River.

The only significant metal values are those of samples 267–270 and 274–275 (table 11) which assayed from a trace to 4.3 ounces of silver per ton and from 0.06 to 1.44 percent copper; samples 269 and 270 contained some antimony.

CORBETT CREEK

Along Corbett Creek and its two tributaries, Pryor and Omaha Creeks, adjacent to the eastern part of the western contiguous area (pl. *3B*), prospect pits, shafts, and adits were dug in the Morrison Formation and along the Morrison-Dakota and the Dakota-Mancos contacts. Most workings follow northwest-trending barite veins that dip steeply to the southwest; the veins contain galena, sphalerite, chalcopyrite, proustite, and tetrahedrite. Samples 276–289 were taken at these workings, and samples 295 and 296 were taken from outcropping veins in Corbett Creek above its junction with Pryor Creek. Except for samples 279, 288, and 289, the analyses indicated little metal of significance (table 11). Sample 279, a grab sample from a 2,000-ton (1,800-t) dump at the caved Chinaman adit, assayed a trace of gold, 1.9 ounces of silver per ton, 1.11 percent lead, and 0.23 percent zinc. Sample 288, from a 500-pound (226-kg) stockpile at the caved Teller adit, assayed a trace of gold, 3.1 ounces of silver per ton, 8.57

percent lead, and 4.86 percent zinc. Sample 289, from a 300-pound (130-kg) stockpile at the caved Sequin adit, assayed a trace of gold, 1.3 ounces of silver per ton, 2.55 percent lead, and 1.15 percent zinc.

About one-fourth mile (0.4 km) east of upper Forceman Creek, five adits, within a horizontal distance of 210 feet (64 m), were driven west in the upper part of the Morrison Formation. The adits are largely caved except for one which is accessible for about 50 feet (15 m) from the portal. The adits are on the projection of the Little Gem–Pony Express veins system which appears to horsetail in this area. Manganese-stained barite, galena, sphalerite, tetrahedrite, and argentite were identified in material from the dumps.

Sample 290, from an 800-pound (363-kg) stockpile, and sample 292, from a 1,000-pound (454-kg) stockpile, assayed, respectively, 20.8 and 9.8 ounces of silver per ton, 2.00 and 1.75 percent lead, and 4.29 and 4.62 percent zinc; sample 292 contains 0.2 ounce of gold per ton. Samples 291, 293, and 294 were taken at the accessible adit; sample 291, taken from a muck pile in a stope, assayed 1.6 ounces of silver per ton, 0.99 percent lead, 1.08 percent zinc, and 0.03 percent antimony, but analyses of other samples showed only small amounts of silver, lead, and zinc.

CORNET CREEK-PACK BASIN-MILL CREEK BASIN

Several old mines and numerous prospect workings were dug in the Cornet Creek-Pack Basin-Mill Creek basin area in the southeastern part of the western contiguous area (pl. 3*B*). The Liberty Bell mine, at the head of Cornet Creek, produced 2.3 million tons of ore valued at $16 million during 1898–1921; less than 3,000 tons was shipped during 1922–35. Except for a small amount of copper and lead, only gold and silver were recovered. No ore production has been reported since 1935.

Figure 6 shows the underground workings of the largest mines (Liberty Bell, Smuggler-Union, Humboldt, and Mountain Top) and their relation to the western contiguous area. Since 1901, these mines have yielded ore valued at $79.2 million, with most of the value coming from gold and silver. In addition, copper, lead, and zinc were recovered from the Smuggler-Union ores, copper and lead from the Mountain Top ores, and lead from the Humboldt ores. The most recent activity in the district was in 1967–71, when exploration for silver, partly financed by the Office of Mineral Exploration (OME), was done at the Mountain Top mine. No ore was found but the work disclosed some precious- and base-metal mineralization.

The only accessible underground workings in the area are three prospect adits, shown in figures 7, 8, and 9. Sample groups 329–335 and 341–346 were taken at these workings. Analyses of samples 329–335 show small amounts of gold, silver, copper, and lead (table 11). Samples 317–328, 336–340, and 347–358 also were taken in the area, but the only

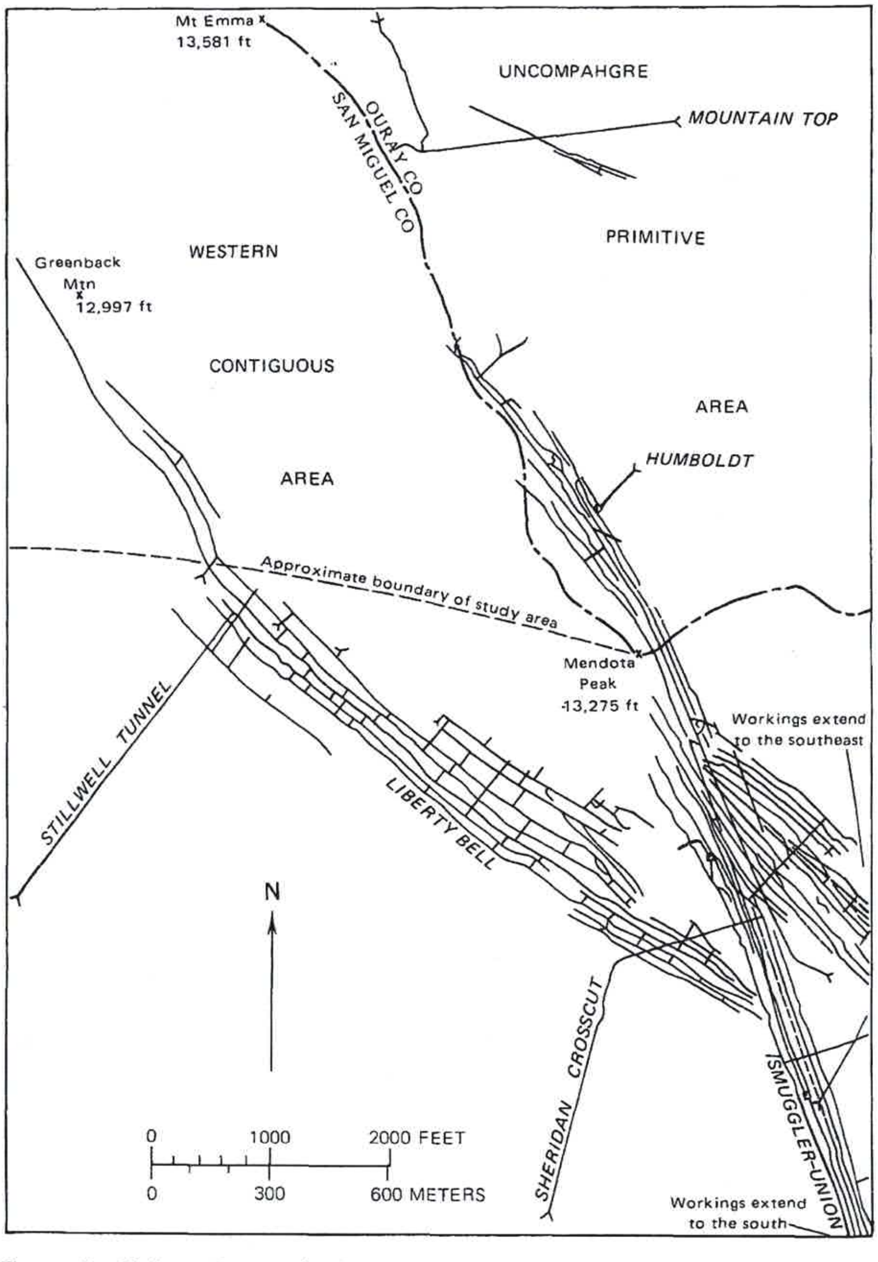

FIGURE 6.—Main underground mine workings in and near the southeast part of the western contiguous area. Modified from King and Allsman (1950, fig. 4a).

significant results came from sample 353, a grab sample from the dump of a caved adit at the head of Cornet Creek, which contained 0.02 ounce of gold and 1.2 ounces of silver per ton.

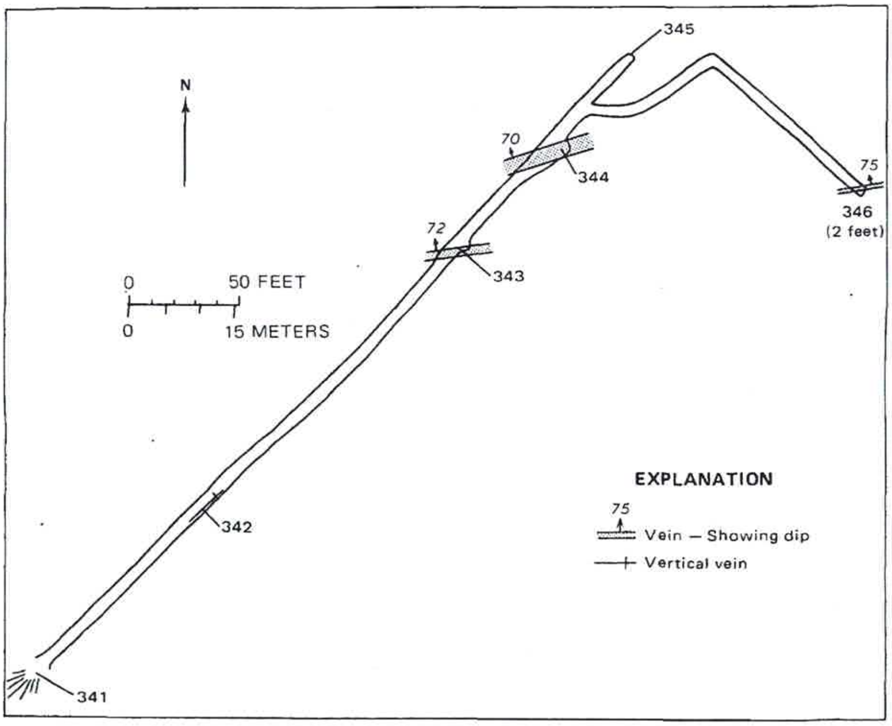

Figure 7.—Map of adit at head of Cornet Creek showing sample localities 341–346.

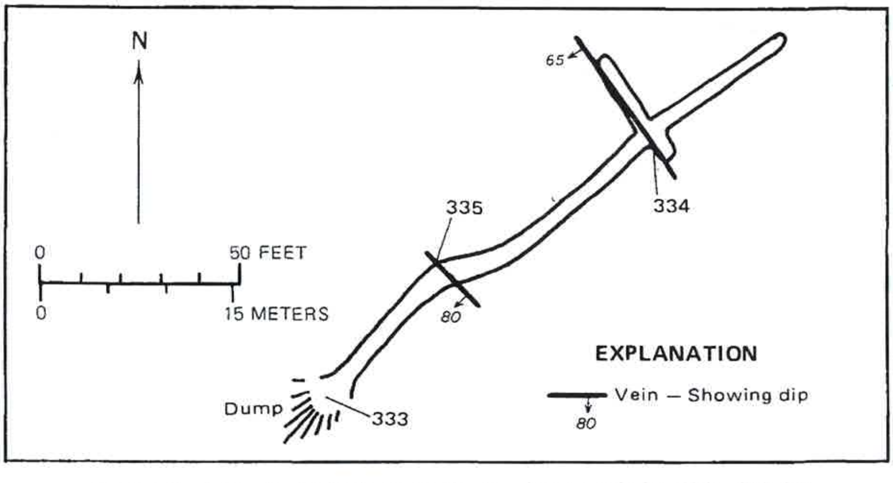

Figure 8.—Map of adit in Pack Basin showing sample localities 333–335.

SAN MIGUEL RIVER

Mesozoic sedimentary rocks, capped by the Telluride Conglomerate and by Tertiary volcanic rocks, are exposed in a strip of land about 2 miles (3.2 km) wide between the San Miguel River and southern boundary of the

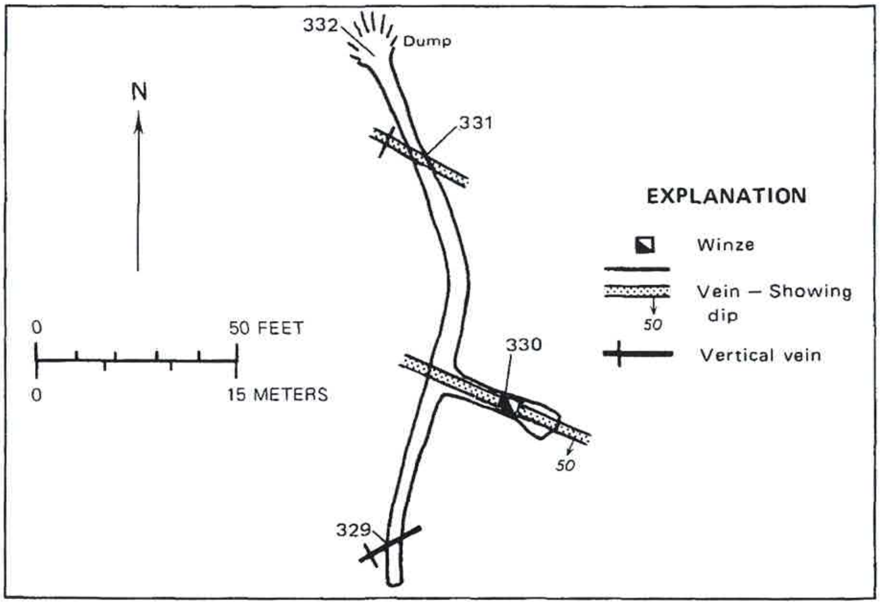

FIGURE 9.—Map of adit in Mill Creek basin showing sample localities 329-332.

western contiguous area (pl. 3*B*). Some ore has been produced from the area, but the only production recorded by the U.S. Bureau of Mines is for limestone that was mined in the late 1960's and early 1970's from a quarry at the mouth of Deep Creek. Gray-black limestone from the Pony Express Member of the Wanakah Formation was used to neutralize plant effluent at the Union Carbide Corp. uranium mill at Uravan, Colo. A chemical analysis of sample 390 from this location is shown in table 12.

About one-fourth mile (0.4 km) north of the limestone quarry, underground workings were driven to explore a 6-foot (2-m) vein that crops out along the cliffs. According to the Colorado Bureau of Mines, lead-silver ore was produced in 1969 from these workings; Sharon Spencer, one of the operators, stated that the ore was mined from a vein in the Pony Express Member at the bottom of a 115-foot (40-m) shaft.

A small coal mine about 1¼ miles (2 km) west of San Miguel near the top of the cliff on the north side of Colorado Highway 145 develops a coal seam in Dakota Sandstone. According to Frank Wilson of Telluride, the mine was operated in the 1880's and again about 1932; the coal was used for heating homes in the Telluride area. Sample 359 was taken across a 1.25-foot (0.4-m) coal seam exposed about 6 feet (2 m) from the portal of the western adit. About one-half mile (0.8 km) west of the coal mine, a dump on the north side of Deep Creek Mesa road marks a nearly obliterated mine opening at the base of the Dakota Sandstone. Sample 360 consisted of a few selected pieces of coal from the dump. Analyses of samples 359 and 360 (table 13) indicated that the coal is poor quality. It should be noted that these samples are weathered and probably are not as good quality as the unweathered coal. Along Summit Creek some prospect pits were dug in the Dakota Sandstone in search of coal; dumps at the prospects indicate that little or no coal was found.

An old quarry on the north side of Colorado Highway 145 about 1 mile (1.6 km) west of San Miguel supplied stone used in constructing some of the old buildings in Telluride. Estimated from the size of the excavation, less than 100 tons (91 t) of sandstone from the Morrison Formation was removed.

HAYDEN PEAK

Several unpatented mining claims have been located between Hayden Peak and North Pole Peak on an altered zone and on some dikes. No prospect workings were found, but stakes of the Vampire group of claims were found. Samples 381–384, taken from dikes and the alteration zone, assayed only a trace of gold and 0.1–0.2 ounce of silver per ton (table 11).

On the northeast side of Hayden Peak, three adits were dug at the base of a cliff where an east-trending shear zone is exposed. The upper and middle adits, about 100 feet (30 m) apart, were driven southwest for nearly 150 feet (46 m); both begin and end in talus. Sample 380 from the dump at the middle adit assayed a trace of gold and 0.1 ounce of silver per ton; no sample was taken at the upper adit because the dump rock was identical to that of the middle adit. The 300-foot (90-m) lower adit, 550 feet (160 m) east of the middle adit, penetrated talus for 40 feet (12 m); thereafter, it was driven in solid rock. Sample 379 of a 10-inch (0.3-m) vein that was cut about 230 feet (70 m) from the portal, and sample 378, taken across the face of the adit, contain some amounts of gold and silver. Sample 377 of the 500-ton (450-t) dump contains a little silver.

WHIPPLE MOUNTAIN

The south slope of Whipple Mountain, between Summit and Willow Creeks in the western part of the western contiguous area, is covered with talus consisting mostly of granodiorite. The exposed side of the rock fragments are black-brown and are covered with green lichen. The demand for this lichen-covered "moss rock" for use as decorative stone in home construction has been increasing; thus, this talus slope represents a significant resource. Moss Rock Nos. 1–6 placer claims located in June 1972 cover part of the talus slope, and some moss rock has been removed recently from along the Last Dollar road, about one-fourth mile (0.4 km) southeast of the spring on Willow Creek. The claims are partly in the western contiguous area.

LAST DOLLAR MOUNTAIN

Several workings, ranging from small prospect pits to inaccessible adits, are on the north and south slopes of Last Dollar Mountain in the western part of the western contiguous area. Most of the workings are along contacts between the Mancos Shale and andesite porphyry sills. Altered rock occurs in steep, southeast-trending fracture zones. Analyses of samples 385–389, collected from Last Dollar Mountain, did not show metal concentrations of interest except for sample 389, which contained 0.15 ounce of gold per ton (5 ppm) (table 11).

COAL CREEK

Coal Creek flows north from Whitehouse Mountain into the Uncompahgre River. Near the head of the east fork of Coal Creek, about one-half mile (0.4 km) north of the Uncompahgre Primitive Area, a basalt dike trends N. 53° E. in the San Juan Formation. The dike is about 6 feet (1.8 m) wide and is nearly vertical. A 2-foot-wide (0.6-m-wide) hematite-stained breccia follows the northwest side of the dike, and quartz-calcite veinlets are interspersed through the dike. Sample 298, a chip sample across the dike, contains no significant values (table 11).

Near the head of the west fork of Coal Creek, another basalt dike, about 10 feet (3.0 m) thick, strikes N. 60° E. in the San Juan Formation. An 8-foot (2.4-m) granodiorite porphyry dike striking N. 42° E. cuts across the basalt dike. Sample 300 was taken across 2 feet (0.6 m) of brecciated material at the junction of the two dikes. Sample 299 was taken across 1 foot (0.3 m) of the middle part of the granodiorite dike approximately 10 feet (3 m) northeast of the junction. Analyses of the two samples showed no mineral values of interest.

BEAVER CREEK

An extremely altered dike crops out in the San Juan Formation near the head of Beaver Creek, about 1¼ miles (2 km) south of the western contiguous area boundary; the dike strikes S. 15° E. and is nearly vertical. Limonite-stained, minute fractures paralleling the dike are exposed in a small prospect pit. About 750 feet (230 m) upstream, a 12-foot (3.7 -m) dike of altered hornblende-diorite porphyry strikes S. 50° E. and dips 78° NE. Quartz-calcite stringers are dispersed throughout the middle 3 feet (1 m) of the dike. Chip samples 301 and 302 from the pit and dike contained no significant values.

WILSON CREEK

Wilson Creek drains the northeast side of Mount Sneffels. The Cowboy adit, at the foot of a cliff about 600 feet (180 m) north of the junction of the east and west forks of Wilson Creek (figs. 10, 11; pl. 3B), was driven 287 feet (88 m) southeast along a 4-foot (1.2-m) fracture zone filled with quartz stringers. At the face of the adit the fracture zone strikes S. 77° E. and dips 73°SW. At 28 feet (8.5 m) from the portal, a crosscut was driven southwest and some stoping was done. Sample 304, a chip sample across the fracture zone in the face of the adit, and sample 305, a grab sample from a muck pile, showed no mineral values of interest.

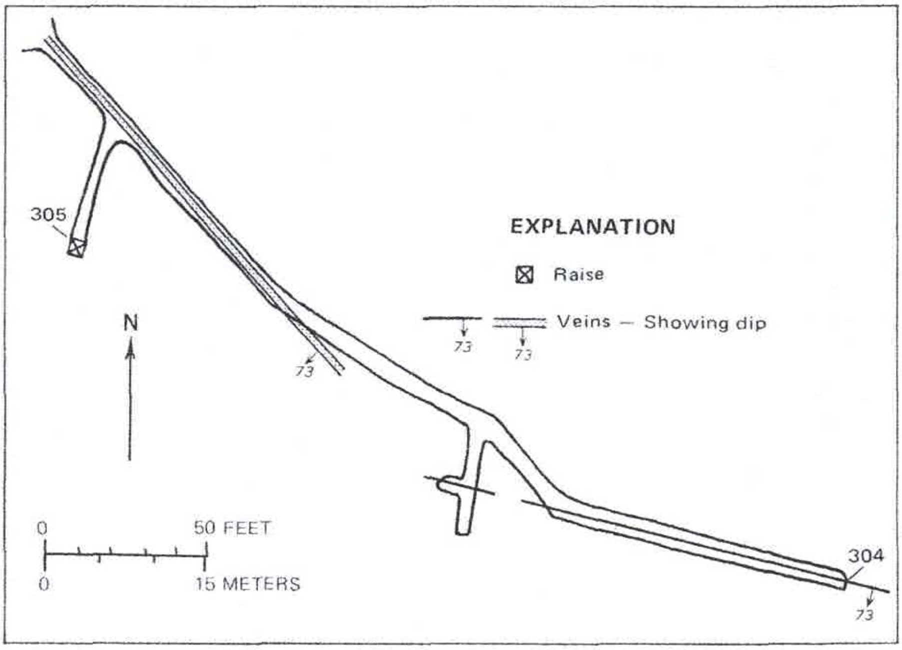

FIGURE 10.—Map of the Cowboy adit showing sample localities 304 and 305.

FIGURE 11.—Aerial view of Blaine Basin, looking southwest. (1) Cowboy adit, (2) Blaine mine, (3) locality for sample 311.

Near the head of the east fork of Wilson Creek, a caved adit appears to have been driven south. Analytical results of sample 303, a grab from the dump, showed no anomalous metal.

The west fork of Wilson Creek drains Blaine Basin (fig. 11) where several openings were examined. The Blaine mine, the largest working, is actually one-half mile (0.8 km) northwest of the location shown on U.S. Geological Survey Mount Sneffels quadrangle topographic map. The adit of the Blaine mine (fig. 12) was driven southwest 1,264 feet (380 m) to intersect three steeply dipping north-south veins. Samples 306–309, taken in the adit, assayed small amounts of gold, silver, lead, and zinc.

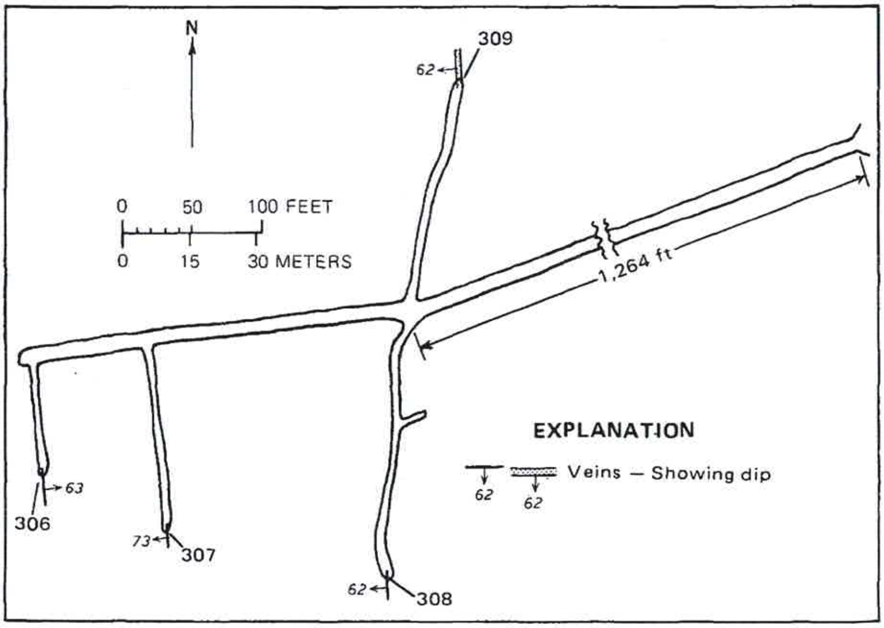

FIGURE 12.—Map of the Blaine mine showing sample localities 306–309.

About 300 feet (90 m) southwest of the Blaine portal, a fracture zone in granodiorite porphyry is exposed in a discovery pit; sample 310, taken across the zone, showed no mineral values of interest.

Several other prospect pits were dug in granodiorite porphyry about one-half mile (0.8 km) southwest of the Blaine portal, on the divide between west fork of Wilson Creek and East Fork Dallas Creek. Sample 312 was taken across a 2.5-foot (0.8-m) vein in the face of a 27-foot-long (8-m-long) adit; the sample assayed a trace of gold, 1.2 ounces of silver per ton, 0.48 percent lead, and 1.98 percent zinc. Sample 313, taken from a 1,200-ton (1,100-t) dump at the caved Mountain Monarch adit, assayed a trace of gold, 14.4 ounces of silver per ton, 0.04 percent copper, 0.77 percent lead, 0.80 percent zinc, and 0.04 percent antimony. Another caved adit, apparently driven S. 63° W., is about 225 feet (70 m) southeast of the Mountain Monarch adit. The analysis of sample 311 (fig. 11) from the dump showed small amounts of silver, copper, lead, and zinc.

BLUE LAKES

Three prospect workings in granodiorite porphyry were examined in the Blue Lakes area west of Mount Sneffels. The first, a short adit 300 feet (90 m) below the lower Blue Lake, exposes a limonite-stained, quartz-filled fracture zone 4 feet (1.2 m) wide. Chip sample 314 taken at the face contains no significant values. The second excavation, about 50 feet (46 m) east of the lower Blue Lake, is a 42-foot (13-m) adit driven S. 78° E. on a 3-foot (1-m) limonite-stained, quartz-filled fracture zone. Sample 315 taken across the face showed no mineral values of interest.

The third prospect, about 150 feet (45 m) northwest of the outlet of the upper Blue Lake, consists of a 15-foot (4.5 m) adit driven along a 1-foot (0.3-m) fracture zone, a 12-foot (3.7-m) shaft, and a 45-foot (14-m) drift that was driven S. 5° E. from the bottom of the shaft. Chip sample 316 was taken across a 4-foot (1.2-m) width of manganese-stained, quartz-filled fracture zone exposed in the face of the drift. The sample yielded a trace of gold, 0.1 ounce of silver per ton, 0.24 percent lead, and 0.48 percent zinc (table 11).

CENTRAL CONTIGUOUS AREA

The central contiguous area is immediately north of the eastern part of the Uncompahgre Primitive Area. The area consists of about 25 square miles (64 km^2) in Ouray County between the Uncompahgre River and Cow Creek.

The southwest side of the central contiguous area borders a highly mineralized area associated with a major intrusive center located just north of Ouray. Many productive veins and replacement bodies containing precious and base metals have been developed in the drainage basins of Dexter and Cutler Creeks, and numerous claims have been staked on the nearby slopes to the north, within the adjacent contiguous study area (pl. 3*A*). An excellent possibility exists that mineralized rock similar to that mined along Dexter Creek extends northeast beneath younger volcanic cover into the central contiguous area.

Other mineralized material in sedimentary rocks beneath the younger volcanic cover is exposed along Cow Creek on the east and northeast sides of the central contiguous area. The buried sedimentary rocks between the mineralized area on Cow Creek and the mineralized intrusive center near Ouray, thus, may contain significant hidden mineral resources.

A younger intrusive center cuts the volcanic rocks on Bighorn Ridge, west of upper Cow Creek and largely within the Uncompahgre Primitive Area. Samples from this center indicate that some potential exists for low-grade disseminated copper mineralization.

COW CREEK

Cow Creek is the eastern border of the central contiguous area. Numerous claims have been located along Cow Creek. In the Courthouse Creek area, three caved adits, one reportedly 1,100 feet (335 m) long, appear to have been driven northeast in Dakota Sandstone. Analyses of samples 157–159 from the dumps revealed no mineral values of interest (table 11).

At the mouth of Winchester Gulch, about one-fourth mile (0.4 km) north of the New York mine area, numerous prospect pits and adits were examined. Most of the openings are on east-trending calcite-barite veins along fractures and fault zones in the Wanakah Formation. The largest working in the area is the Silver Queen adit, which is now caved. Sample 167, from a 600-ton (540-t) dump, assayed 0.3 ounce of silver per ton, 0.02 percent copper, and 0.31 percent lead.Approximately 450 feet (137 m) east of the Silver Queen dump and 75 feet (23 m) higher, near the contact between the Wanakah and Morrison Formations, the Hidden Silver adit (fig. 13) was driven southeast for over 200 feet (60 m) on the Silver Queen vein. Samples 160–166 contain as much as 4.4 ounces of silver per ton, 0.01 percent copper, 0.32 percent lead, and 0.16 percent zinc which is present in a sample of a 15-ton (13.5-t) dump.

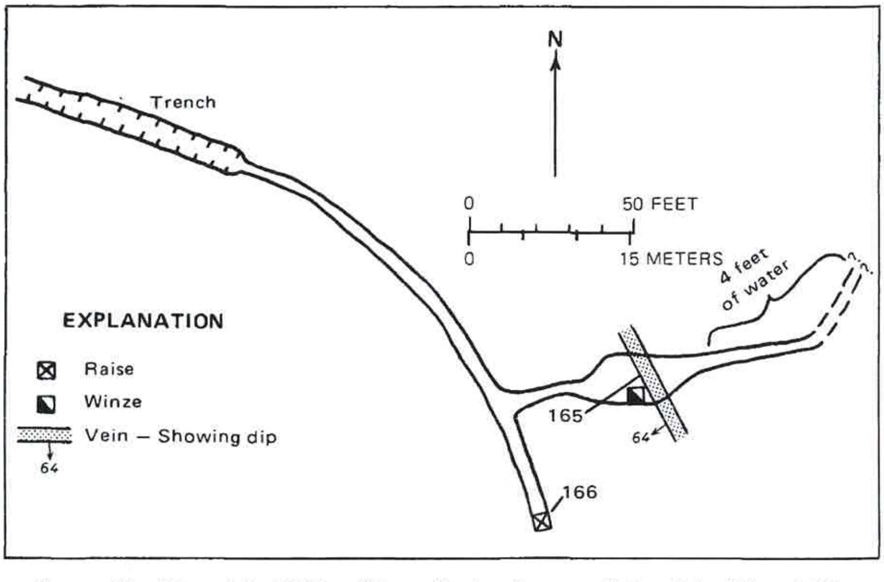

FIGURE 13.—Map of the Hidden Silver adit showing sample localities 165 and 166.

The New York adit (fig. 14) was driven 450 feet (137 m) east in a manganese-stained fault zone about on the contact between the Cutler and Dolores Formations. Analyses of samples 168 and 169 revealed no metals of value. About one-fourth mile (0.4 km) south of the New York adit and 600 feet (180 m) west of Cow Creek, two adits were driven south

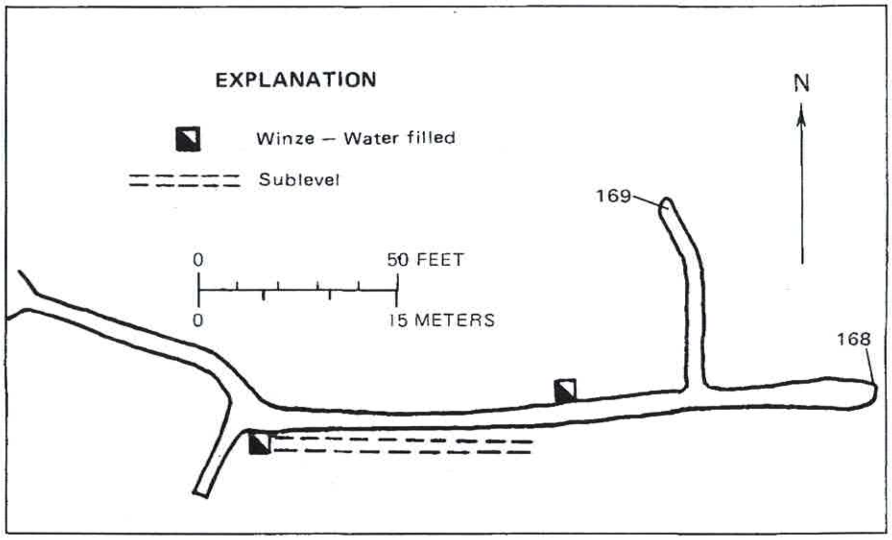

FIGURE 14.—Map of the New York adit showing sample localities 168 and 169.

along kaolinized fault zones in rhyolite. The lower of the two adits is 127 feet (38 m) long, and the higher is 167 feet (50 m) long. Samples 170 and 171 contained no mineral values of interest.

Two prospects—a short adit and a small pit—high up on the west side of Cow Creek and southwest of the New York mine were examined; spectrographic analyses of samples 173 and 174 indicated no values of interest.

The partially caved and water-filled Williams adit, near the head of Winchester Gulch, was reportedly driven 300 feet (90 m) southwest and several crosscuts were turned from the main drift. Samples 175–177 yielded no anomalous values.

On the north end of Bighorn Ridge (fig. 15), along the northern boundary of the original Uncompahgre Primitive Area, a quartz-latite porphyry intrusive center with associated andesitic and rhyolitic dikes (Foss, 1964) cuts the San Juan Formation. A small quartz monzonite plug within the center is strongly pyritized and kaolinized and the contacts are obscured by the alteration. Chip samples 178–183 were taken of the altered material; sample 182 contains 200 ppm copper, and most assayed a trace of gold and from a trace to 0.2 ounce of silver per ton. Baumgartner Oil Co., Denver, Colo., staked a group of claims in the area and conducted geological mapping and geochemical sampling in 1971–72.

DEXTER CREEK

Dexter Creek is along the south boundary of the central contiguous area. Although only a very small segment of Dexter Creek is within the study area (pl. 3*A*), workings on the north side of the creek project toward

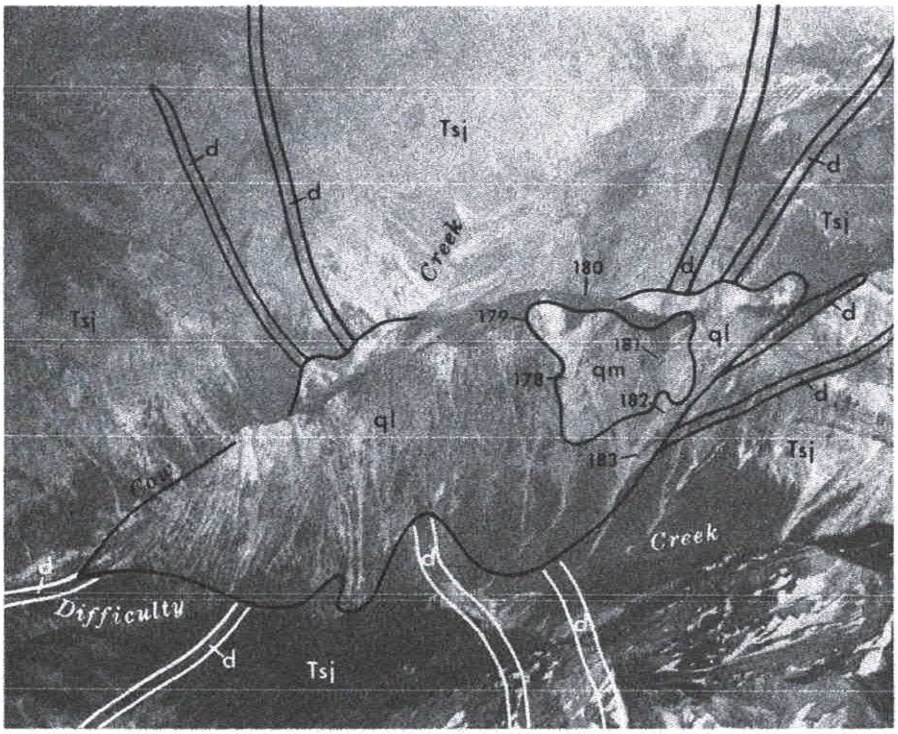

FIGURE 15.—Aerial view of the northern end of Bighorn Ridge, looking east, showing sample localities 178–183. Tsj, San Juan Formation; ql, quartz latite porphyry; d, andesitic and rhyolitic dikes; qm, quartz monzonite plug.

the contiguous area and some may extend into it. The Bachelor group of workings (fig. 16)—consisting of the Old Maid and El Mahdi (Almadi) shafts, the Bachelor and Khedive adits, and the Calliope group of openings—accounted for the recorded production from the Dexter Creek area.

Five prospects were examined in the upper reaches of Dexter Creek, and samples 184–188 were taken. Assay results show negligible amounts of metal. Numerous mine workings and prospects exist in the area from the Old Maid shaft (site of sample 189) west to a small prospect adit (site of sample 208). These include prospect pits, shafts as much as 300 feet (90 m) deep, and adits as long as 1,400 feet (430 m) dug mostly along north- to east-trending fractures in the Morrison Formation or the Dakota Sandstone that are filled with quartz, calcite, and barite. Most of the workings along or near the creek level are shafts sunk to develop ore bodies in the Pony Express Member of the Wanakah Formation. According to Burbank (1940), the ore bodies generally consist of manganese-stained barite with galena, sphalerite, chalcopyrite, tetrahedrite, proustite, and local argentite that form local shoots, or "rolls," along the veins.

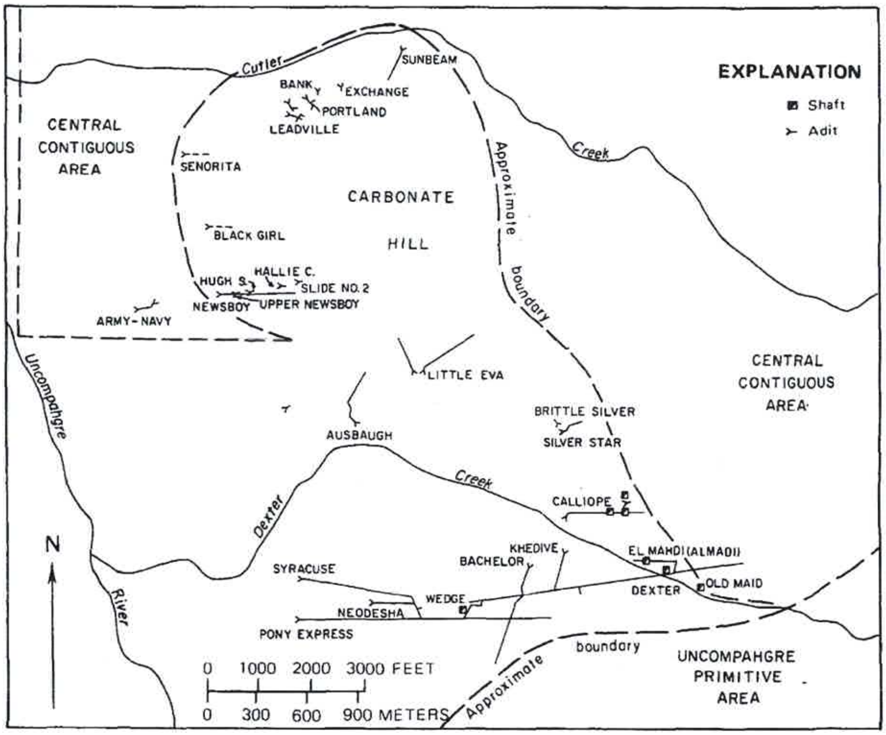

FIGURE 16.—Major underground mine workings of the Carbonate Hill area.

Samples 189–208, collected in the Dexter Creek area, all contained significant amounts of precious and base metals (table 11). The sample localities are as follows:

Sample No.	*Locality*
189	Old Maid dump.
190	The 600-ton (540-t) El Mahdi (Almadi) dump.
191	The 250-ton (230-t) dump at the upper Calliope caved adit.
194	An 800-ton (730-t) dump at an unnamed caved adit.
196	The 250-ton (230-t) Brittle Silver dump.
200	The 1,500-ton (1,360-t) dump at the eastern Little Eva adit.
205	Across the face of the Ausbaugh adit.

CARBONATE HILL

Carbonate Hill is between Dexter and Cutler Creeks. The major underground workings in and near Carbonate Hill are shown in figure 16. Sedimentary rocks exposed on the hill range from the Cutler Formation, at the base of the hill, to the Mancos Shale. These rocks are overlain by the volcanic San Juan Formation. Many adits were driven east into the west side of the hill. The main workings are the Newsboy, Army-Navy, Black Girl, and Senorita mines (fig. 17). Because access to the Black Girl and Senorita

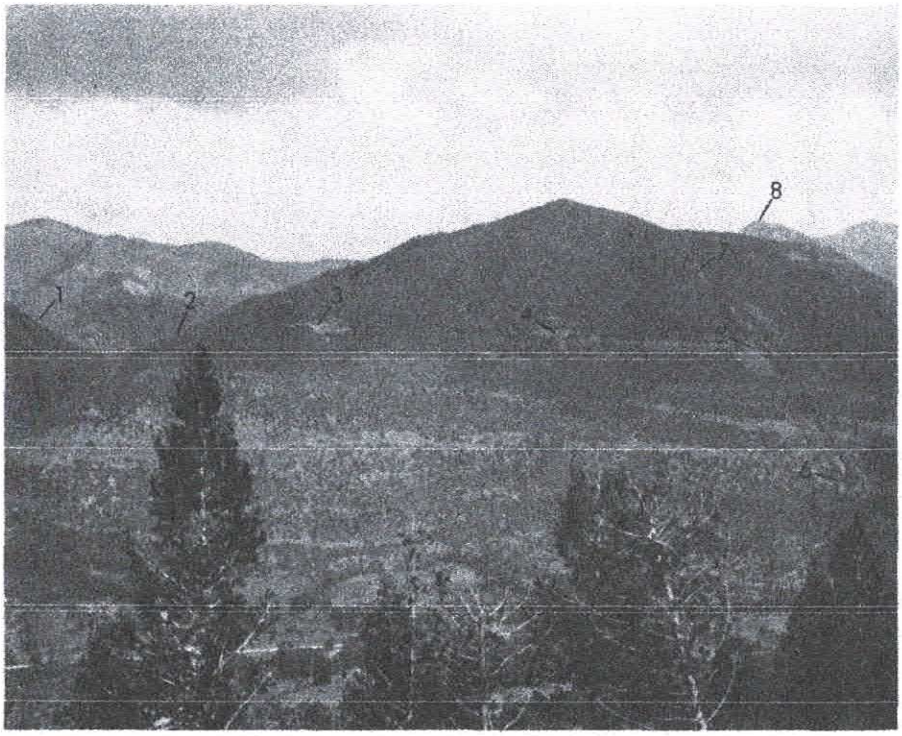

FIGURE 17.—View looking east toward Carbonate Hill from Little Gem mine area. (1) Storms Gulch, (2) Cutler Creek, (3) Senorita portal, (4) Black Girl portal, (5) lower Newsboy portal, (6) Army-Navy portal, (7) Slide No. 2 portal, (8) Dexter Peak.

mines was denied by the operators, only the Newsboy and Army-Navy mines were examined.

The Newsboy group of workings—consisting of the Newsboy mine and the upper Newsboy, Hugh S., Hallie C., and Slide No. 2 adits—is controlled by Depco, Inc., and Husky Oil Co., Denver, Colo. The Newsboy mine consists of two adits about 40 feet (12 m) apart. The north adit is 325 feet (100 m) long; the south adit is accessible for only 350 feet (107 m), but it is reported to be 2,200 feet (670 m) long. Sample 213 (table 11), of the 600-pound (270-kg) stockpile by the south adit, and sample 214, taken across the 2.5-foot (0.76-m) vein at the face of the north adit, assayed significant amounts of silver and minor amounts of base metals. Official recorded production from the Newsboy mine is 1,985 tons of ore valued at $71,595; however, company records show that considerably more ore was mined.

The Army-Navy adit (fig. 18) was driven along the Newsboy vein about 600 feet (180 m) below the Newsboy mine near the contact between the Entrada and Wanakah Formations. The vein is only about 1–1.5 feet (0.3–0.45 m) wide at this mine. Sample 215, taken across a 1.5-foot (0.45-m) vein at the face at the adit, assayed 0.3 ounce of silver per ton. The north

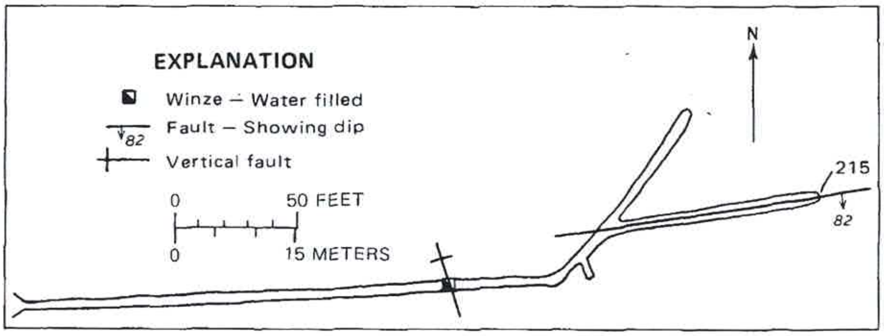

FIGURE 18.—Map of the Army-Navy adit showing sample locality 215.

crosscut from the Army-Navy was probably driven to intersect a cross vein from the Black Girl mine, but no vein was seen in the crosscut. Recorded production of the Army-Navy property is 5 tons of ore valued at $1,091.

Samples 209–212 were grab samples taken from 500- to 3,000-pound (230- to 1,360-kg) stockpiles on the dumps at the caved adits of the Newsboy group of workings. Assay results are (table 11): trace to 0.2 ounce of gold per ton, 6.2 to 29.5 ounces of silver per ton, 0.45 to 8.28 percent lead, 0.13 to 6.36 percent zinc, and 0.02 to 0.08 percent antimony.

CUTLER CREEK

Numerous workings have been developed along Cutler Creek where the Wanakah Formation crops out. Openings on the south side of Cutler Creek were driven south to intersect the east-trending Senorita vein. An ore shoot along the vein in the Wanakah Formation is exposed in one of the Leadville adits and in the Bank, Portland, Exchange, and Sunbeam adits (fig. 16); the Sunbeam workings are shown in figure 19. On the north side of Cutler Creek, adits (fig. 20) as much as 200 feet (60 m) long were driven north on mineralized fractures in the Wanakah Formation. Most of the mineralized rock is in the black, limy shale of the Pony Express Member of the formation. Some adits were driven in the Morrison Formation and in the Dakota Sandstone. The only recorded production from the area is 312 tons (283 t) of ore valued at $6,874; this production was from the Portland mine, which is on the south side of Cutler Creek.

In the Cutler Creek area, samples 216–238, 240–243, 245 and 246 were taken from accessible adits and samples 239 and 244 are grab samples from dumps. Highest values were contained in samples 220 and 221 (table 11) from the Portland adit (fig. 21). Chip sample 220 across 2 feet (0.6 m) of black, siliceous limestone that strikes S. 65° W. and dips 18° SE. assayed 0.27 ounce of gold and 22.7 ounces of silver per ton, 0.30 percent copper, 1.32 percent lead, 0.44 percent zinc, 0.03 percent arsenic, and 0.21 percent antimony. Chip sample 221 from a 2-foot (0.6-m) vein that strikes S. 5° E.

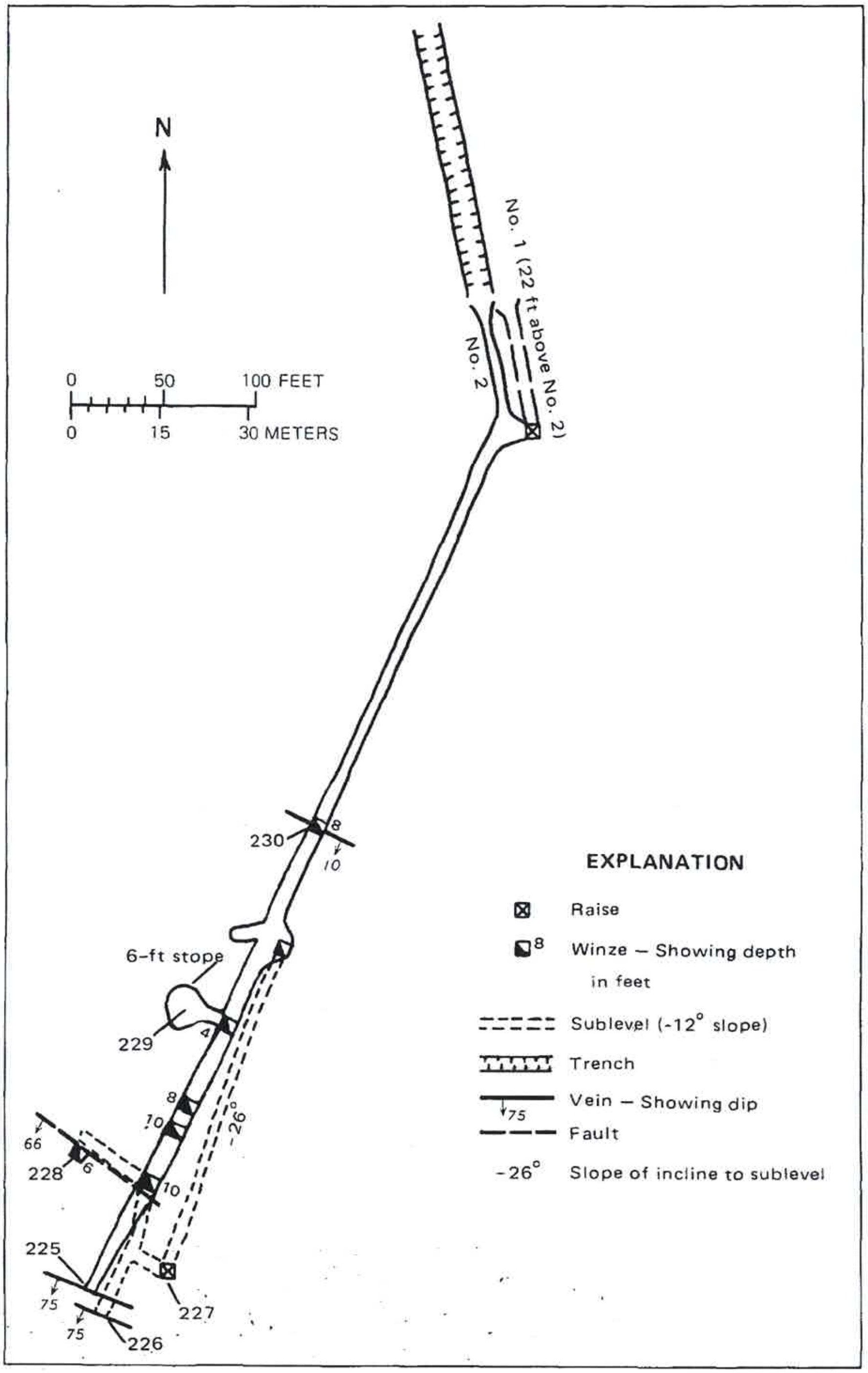

FIGURE 19.—Map of the Sunbeam workings showing sample localities 225–230.

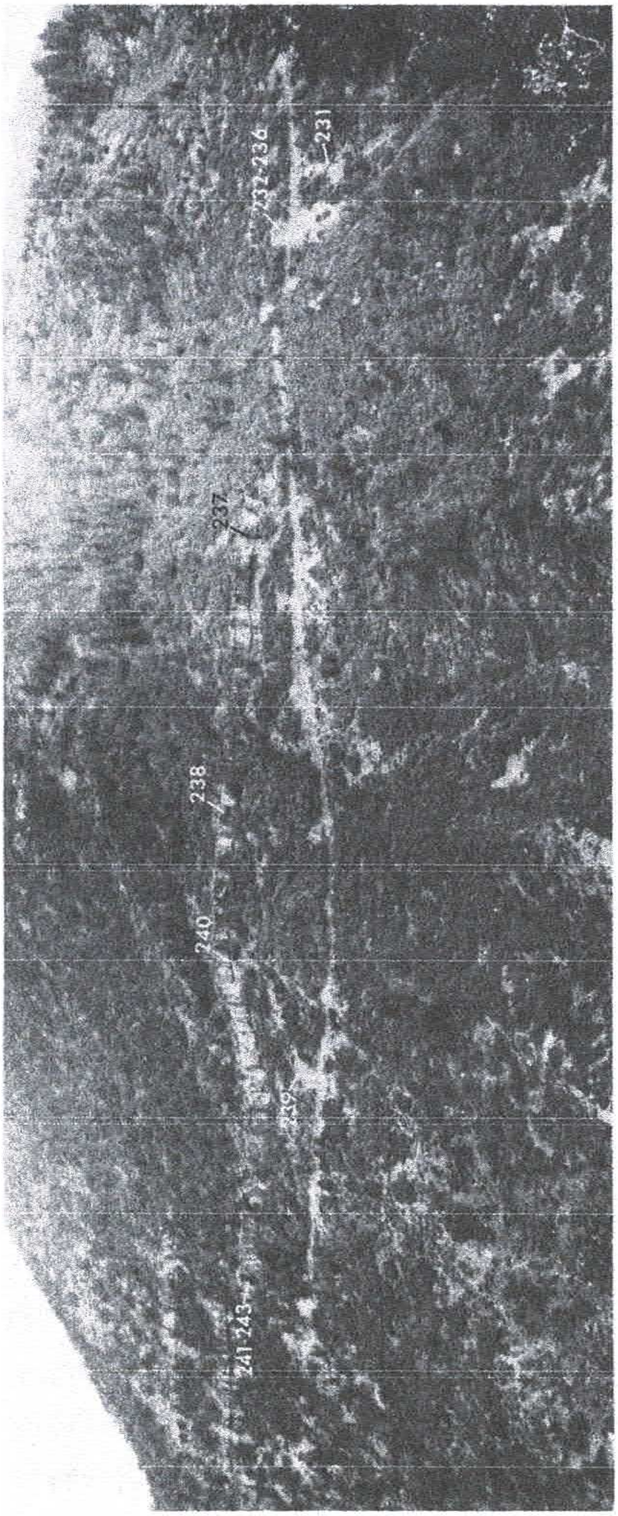

FIGURE 20.—Prospects in Wanakah Formation on north side of Cutler Creek showing sample localities 231–243.

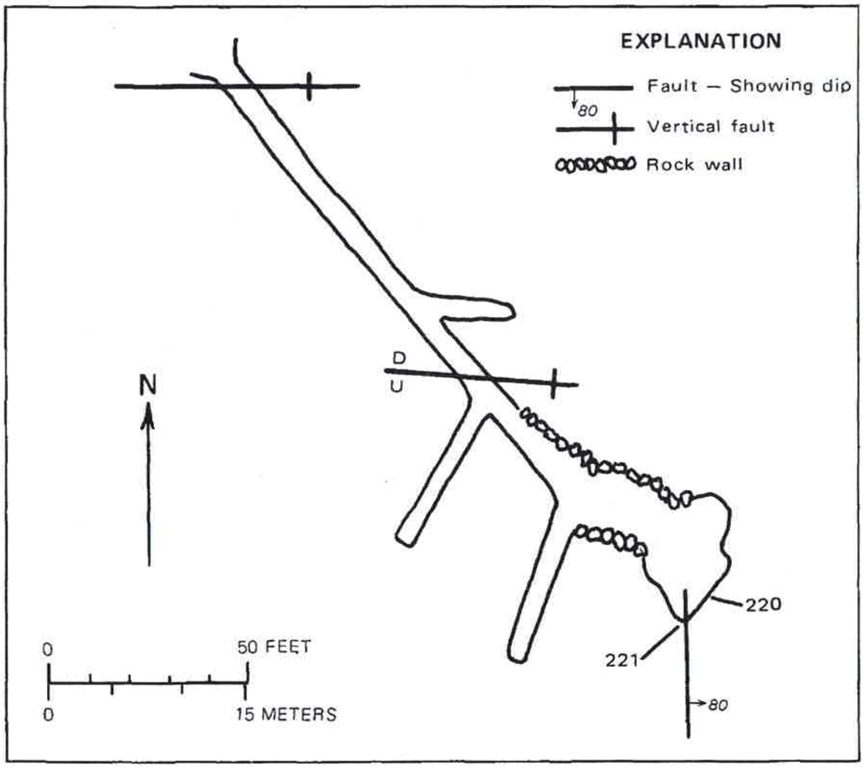

FIGURE 21.—Map of the Portland adit showing sample localities 220-221.

and dips 80° E., assayed 0.12 ounce of gold and 10.8 ounces of silver per ton, 0.16 percent copper, 1.23 percent lead, 0.19 percent zinc, 0.04 percent arsenic, and 0.14 percent antimony. The other samples contain lesser amounts of these metals; samples 226 and 229 assayed 0.015 percent molybdenum.

CROOKED TREE GULCH

In Crooked Tree Gulch, two caved adits appear to have been driven north on fracture zones in the Dakota Sandstone. North of the gulch, two prospects adits were driven east on an andesite porphyry dike in the Cutler Formation. On the southwest slopes of Baldy Peak, a 35-foot (10.7-m) shaft was sunk on the intersection of two mineralized veins in the San Juan Formation. A small prospect pit is on a small, north-trending, kaolinized zone in the San Juan Formation. Samples 250-254, taken from dumps at these workings, assayed no values of interest.

EASTERN CONTIGUOUS AREA

The eastern contiguous area is east of the eastern part of the Uncompahgre Primitive Area and consists of more than 100 square miles (255 km^2) between the Middle Fork Cimarron River and the Lake Fork Gunnison River. Approximately two-thirds of the area is in Hinsdale County and the remaining part is in Gunnison County (pl. 3*A*). Numerous veins containing precious and base metals cut volcanic rocks on the lower slopes above Henson Creek, just south of the eastern contiguous area. Some potential exists for similar deposits in the immediately adjacent area to the north, within the southernmost part of the area studied.

Rhyolite intrusive bodies in the southern part of the eastern contiguous area are anomalously radioactive, and have been widely prospected for uranium. Surface samples of these bodies are generally low in grade, and large masses of rock containing appreciably more uranium would have to be found at depth before significant economic potential would be indicated.

Altered monzonitic intrusive centers were examined north of Matterhorn Peak and between the Silver Jack mine and Porphyry Basin. Anomalous metal contents, particularly of molybdenum, were detected at both of these centers, and some potential exists for low-grade disseminated molybdenum or copper deposits at depth.

HENSON CREEK

Old mines and prospects are in the area between Henson Creek and the southern boundary of the eastern contiguous area. The early history and geology of these mines and prospects were described by Irving and Bancroft (1911). The principal mines are the Ute-Ulay, Hidden Treasure, Pelican, and Yellow Medicine (fig. 22); these have supplied most of the gold, silver, copper, lead, and zinc mined in Hinsdale County. Galena, sphalerite, chalcopyrite, pyrite, and barite were identified in the dump rock of the mines. According to Irving and Bancroft (1911), the Ute-Ulay mine was among the largest sources of silver and lead in Colorado in the early days, when it was reported to have yielded $10–$12 million worth of metals. The U.S. Bureau of Mines records show that the mine was worked intermittently from 1911 to 1969, producing about $600,000 worth of gold, silver, copper, lead, and zinc.

The relationship of the underground workings of the Ute-Ulay, Hidden Treasure, and Pelican mines to the south boundary of the eastern contiguous area is shown in figure 22. Some of the northernmost workings of the Hidden Treasure and Pelican mines extend into the eastern contiguous area.

Old prospects pits, adits, and shafts are on the east side of Neoga Mountain 1 mile (1.6 km) west of Lake City (pl. 3*A*). The largest of these sampled is the Neoga shaft, which is about 40 feet (12 m) deep. Short drifts were driven north and south from the bottom of the shaft on a 3-foot (1-m) vein, which includes a veinlet of barite as much as 0.5 foot (0.2 m) wide. The vein strikes N. 30° E. and is nearly vertical. Sample 33, taken from this vein in the face of the north drift, assayed a trace of gold, 5.9 ounces of

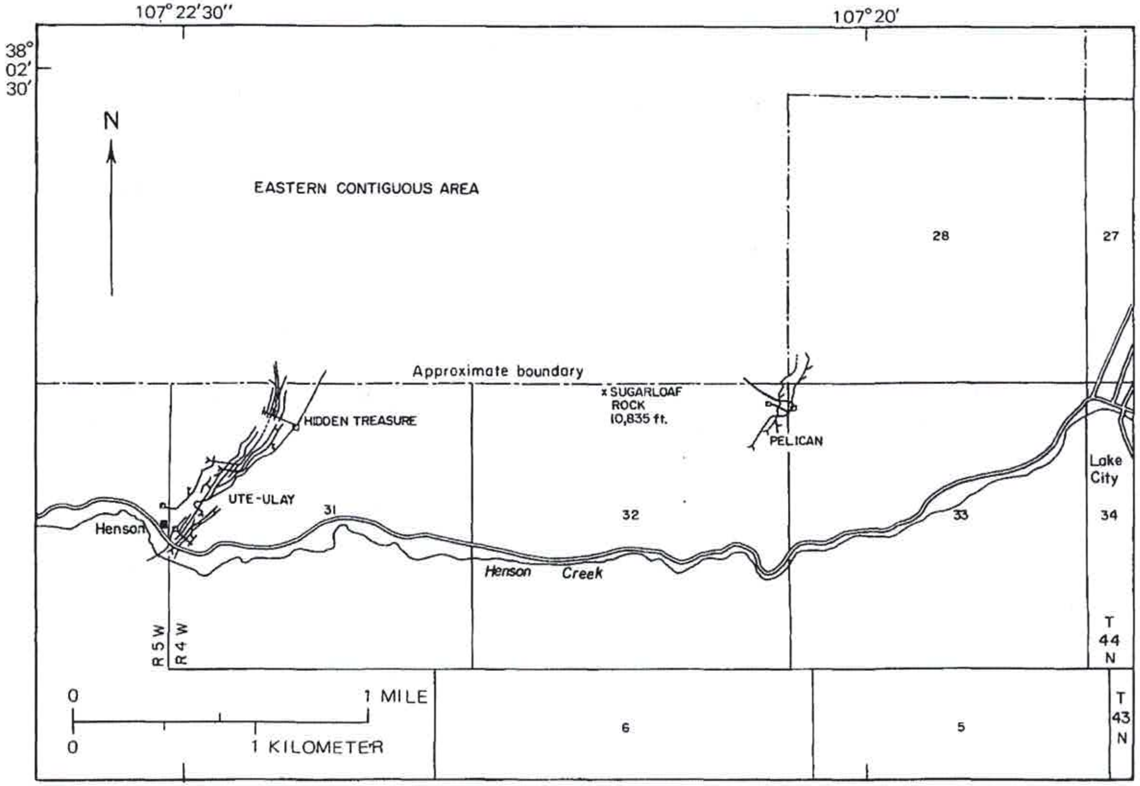

FIGURE 22.—Underground mine workings of the Ute-Ulay, Hidden Treasure, and Pelican mines in and near the southern part of the eastern contiguous area.

silver per ton, and small amounts of copper and lead (table 11). The vein is also exposed in a small pit 50 feet (15 m) southeast of the shaft. Sample 34 was taken across the barite veinlet, which is 0.25 foot (0.1 m) wide at this place, and sample 35 was taken across the rest of the vein, which is 2.5 feet (0.7 m) wide. The barite veinlet assayed a trace of gold and 8.8 ounces of silver per ton, whereas the whole vein assayed 6.7 ounces of silver per ton. Both samples contain only small amounts of copper and lead. Sample 36, taken across a 1.5-foot-wide (0.46-m-wide) gouge zone adjacent to the east side of the vein, assayed only 0.3 ounce of silver per ton and a very small amount of lead. A small pit and a trench about 150 feet (46 m) south of Neoga shaft were examined; sample 37, consisting of specimens from a 50-pound (23-kg) stockpile by the trench, assayed a trace of gold, 62.1 ounces of silver per ton, 0.62 percent copper, 0.51 percent lead, and 0.68 percent antimony.

The Pelican mine is near the southeastern corner of the eastern contiguous area in sec. 32, T. 44 N., R. 4 W.; most of the workings are just outside the study area boundary (pl. 3*A*). Samples 47–50 (table 11), taken in the upper adit, assayed from a trace to 0.07 ounce of gold per ton, 2.7 to 14.3 ounces of silver per ton, 0.07–0.94 percent lead, and 0.12–1.70 percent zinc. Gold and silver values from sample 51 from the dump (700 tons, or 635 t) at the upper adit and sample 46 from the dump (400 tons, or 360 t) by the shaft above the upper adit fall within the above ranges.

Joker Gulch, east of the Pelican mine and 1 mile (1.6 km) north of Henson Creek, is the site of numerous old prospect workings. The two largest workings are the Joker adit and shaft. Sample 44 (table 11) of the dump (200 tons, or 180 t) by the Joker adit assayed a trace of gold and 0.5 ounce of silver per ton; sample 45 of the dump (250 tons, or 230 t) by the Joker shaft assayed a trace of gold and 1.0 ounce of silver per ton. Sample 43 of a dump (30 tons, or 27 t) by a caved adit north of the Joker shaft assayed 2.4 ounce of silver per ton. Sample 42, specimens from a 1-ton (0.9-t) stockpile by a small trench north of the Joker adit, assayed 0.01 ounce of gold and 7.4 ounces of silver per ton.

The Ute-Ulay mine is about 3 miles (4.8 km) west of Lake City and is about one-half mile (0.8 km) south of the study area boundary. It was possible to examine only the No. 5 level of the workings. Sample 52 (table 11), taken across the 3.75-foot (1.1-m) vein in the face at the end of the 4,000-foot (1,220-m) drift, assayed a trace of gold and 2.3 ounces of silver per ton. Sample 53, a grab sample from a muck pile on the floor near the face, assayed 5.4 ounces of silver per ton. Both samples contain some copper, lead, and zinc.

The Hidden Treasure mine lies northeast of the Ute-Ulay workings. The workings, which are inaccessible, are mostly south of the eastern contiguous area, but some extend into it.

The workings of the Vermont mine on El Paso Creek, which are also inaccessible, are 1 mile south of the study area boundary. Sample 101, a grab from altered and mineralized rock in the dump (4,000 tons, or 3,600 t), assayed 0.02 ounce of gold and 9.8 ounces of silver per ton, 0.41 percent copper, 4.15 percent lead, and 2.22 percent zinc. Chip sample 102 across a 7-foot (2.1-m) vein cropping out along the south side of the dump assayed a trace of gold and 1.4 ounces of silver per ton, 0.99 percent lead, and small amounts of copper and zinc.

North of Capitol City, sample 103 was taken at the Czarina shaft, samples 104–108 at the Czar mine, and sample 109 in an adit near the Yellow Medicine mine. The workings lie approximately 1 mile (1.6 km) south of the study area boundary. Sample 106, taken across a 2-foot (0.6-m) vein in a stope 35 feet (11 m) from the portal of the upper adit of the Czar mine, assayed 0.05 ounce of gold and 11.6 ounces of silver per ton, 1.74 percent copper, 19 percent lead, and 4.56 percent zinc. The other samples assayed from a trace to 0.02 ounce of gold per ton, 1.4 to 5.9 ounces of silver per ton, 0.13 to 1.01 percent copper, 1.48 to 5.32 percent lead, and 0.32 to 3.74 percent zinc. In the summer of 1972, Joe Gomez of Crested Butte, Colo., was doing development work at the Yellow Medicine mine (site of sample 109) and was constructing a 25-ton-per-day mill nearby.

UNCOMPAHGRE PEAK-NELLIE CREEK-LARSON CREEK

The Uncompahgre Peak–Nellie Creek–Larson Creek area is in the southern part of the eastern contiguous area (pl. 3*A*). Rhyolite intrusives exposed between Uncompahgre Peak and Larson Creek have been of interest to uranium prospectors since the late 1950's. Numerous claims have been staked in this area, but very few prospect workings were found during our investigation. The only known uranium production is a small quantity (less than 100 tons, or 90 t) of ore mined about 1960 from the Beth claims (site of sample 117) located on the south slope of Uncompahgre Peak.

In 1969, Greater West Mining Co. drilled four diamond-drill holes on claims at the head of the east branch of Nellie Creek. Drilling results are not known; after the exploration, the company abandoned the project. In 1971 and 1972, Exxon Corp. conducted an exploration program consisting of geologic mapping, geochemical sampling, and diamond drilling near Nellie Creek and Matterhorn Peak.

Most samples collected in the Nellie Creek area were only weakly radioactive and did not register more than three times background count when checked with a Geiger counter. Radiometric analysis of certain selected samples gave the following results:

Sample	U_3O_8 (percent)	Sample	U_3O_8 (percent)
59	0.01	83	0.01
61	.10	110	.01
77	.01	115	.10
79	.01	117	.07
80	.01	136	.01

Only samples 61, 115, and 117 contained significant quantities of uranium. Sample 61 was a 1-foot (0.3-m) chip of rhyolite in the wall of one of the trenches at the head of the east fork of Nellie Creek; this sample was from near the site of one of four holes drilled by the Greater West Mining Co. Sample 117 was a grab sample of rhyolite fragments at the portal of the caved adit on the Beth claims which are on the border of the primitive area. Sample 115 was taken near the discovery pit of the Ace claim in the primitive area; the sample consisted of a single selected specimen (a cube slightly more than an inch (3 cm) on a side) of rhyolite with visible uranophane. Sample 114, taken at the same spot, was a selected specimen of rhyolite without any visible uranophane; it registered only about twice background on the Geiger counter.

On the El Chaddai Ithiel group of claims, about 1 mile (1.6 km) north of the Larson Lakes, six trenches 50–100 feet (15–30 m) long and 2–6 feet (0.6–1.8 m) deep were dug with a bulldozer. The work was done in 1959 or 1960 by Eric Benson, one of the locators. The trenches are in rhyolite containing some stringers of iron and manganese oxides. Sample 68, taken horizontally across 10 feet (3 m) of a wall at one of the trenches, contained 31.9 percent manganese and 0.06 percent molybdenum; the spectrographic analysis showed only small amounts of copper, cobalt, nickel, tin, and vanadium (table 11). A 60-foot-wide (18-m-wide) zone of vitrophyre is exposed on the trail about 600 feet (180 m) northwest of the trenches. Sample 67 of this material contained no mineral values of interest.

The Treasure Hill Spar claim, about 1 mile (1.6 km) north of Henson Creek and one-fourth mile (0.4 km) east of Nellie Creek, was patented in 1883. In the center of the claim, a trench (designated as an opencut on the mineral survey plot) 160 feet (50 m) long, 8 feet (2.4 m) wide, and 1–2 feet (0.3–0.6 m) deep exposes four 1.5- to 6-foot (0.46- to 1.8-m) calcite veins. Assay results of samples 90–96, taken from the veins and float in the floor of the trench, indicated no mineral values of interest. Grab sample 99 was taken from a small pile of calcite that is near the remains of two log cabins on Nellie Creek; the material probably came from the trench on the patented claim. The sample contains only a trace of gold.

Two other prospect pits near the Treasure Hill Spar claim were sampled. Grab sample 97 of a dump at the pit south of the claim contained no mineral values of interest. At the pit west of the claim, sample 98 was taken across a 1.8-foot (0.55-m) vein exposed in the pit; assays indicate 0.9 ounce of silver per ton, 0.2 percent copper, 0.04 percent lead, and 0.07 percent antimony.

MATTERHORN PEAK

An altered monzonite intrusive on the north side of Matterhorn Peak, at the head of the East Fork Cimarron River (pl. 3*A*), is surrounded by a halo of altered andesite. About 240 unpatented claims, consisting of the Cimarron Chief group (50 claims) and the Dix group (190 claims), have been located in the area. These claims have been explored for molybdenum; the latest work, in 1971, consisted of trenching and geochemical sampling by Dixilyn Corp. which had located the Dix claims and had leased the Cimarron Chief claims.

Samples 121–124, taken from bulldozed trenches in the alteration zone, showed only small amounts of molybdenum. The largest amount, 60 ppm molybdenum, was reported for sample 121; the other samples show less than 20 ppm molybdenum (table 11). These traces of molybdenum possibly indicate that higher grade material may be at depth.

SILVER JACK MINE AREA

The Silver Jack mine area is on the East Fork Cimarron River, about 3 miles (4.8 km) north of Uncompahgre Peak. Six patented lode claims, one patented placer claim, and several unpatented claims are in the area. The Silver Jack mine is on Silver Creek, about one-fourth mile (0.4 km) from its mouth. Two adits, one on each side of the creek, probably were driven to investigate the nearby outcropping dikes; both adits are caved. Samples 136 and 141–143 (table 11) were taken from the dumps; assay results indicated no mineral values of interest. Sample 138, from a dump at a small pit on the north bank of Silver Creek below the two adits, assayed 0.09 ounce of gold and 0.2 ounce of silver per ton.

Samples 131 and 132, panned concentrates of sand and gravel, and samples 133 and 134, chip samples of dikes, were taken along the East Fork Cimarron River; analyses of samples showed no mineral concentrations of significance.

Samples 144–147 were chip samples taken across dikes exposed on the west side of the East Fork Cimarron River. The spectrographic analyses of these samples showed small amounts of copper (40–100 ppm), lead (100 and 400 ppm), and molybdenum (30 ppm); both samples 144 and 147 assayed 0.1 ounce of silver per ton.

Sample 149 was a panned concentrate of sand and gravel from the East Fork Cimarron River on the Pay Day patented placer claim. The analyses of this sample showed no mineral concentration of significant value.

PORPHYRY BASIN

Porphyry Basin lies west of the Silver Jack mine area and is between the East and Middle Forks Cimarron River. At the time of the field investigation, one of the claim owners was doing assessment work. At the junction of the two forks that drain the basin, a 35-foot (11-m) adit was being driven due east in the hope of intersecting a gold vein reported to have been mined in the north-trending streambed about 1910. Samples 153 and 154, taken at the face of the adit, contained no mineral values of interest. Sample 155, taken from a 0.5-foot (0.2-m) gouge zone in the streambed about 300 feet (90 m) east of the adit, assayed a trace of gold. Sample 150 from across a 0.5-foot (0.2-m) vein near a caved adit on the south bank farther upstream and sample 151 from a similar vein on the north bank each assayed a trace of gold. Sample 152, a grab sample from a dump near a caved shaft on the south bank of the northern streambed, assayed a trace of gold and 0.1 ounce of silver per ton. The analysis of sample 156, a sediment sample taken from the Porphyry Basin stream about one-quarter of a mile (0.4 km) above the Middle Fork Cimarron River, indicated traces of gold and silver.

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TABLES 5-8, 11

TABLE 5.—*Analyses of stream-sediment*

[See plate 2*A* for sample localities. ppm, parts per million; N, not detected; L, detected but below lower limit looked for in spectrographic analyses, and either not found or found in amounts normal for the type Co (5), Cr (10), La (20), Ni (5), Sb (100), Sc (5), Sn (10), Sr (100), V (10), W (50), Y (10), and Zr (10)]

Sample	Semiquantitative spectrographic analyses (ppm)						
	Mn (10)	Ag (.5)	Ba (20)	Be (1)	Cu (5)	Mo (5)	Nb (10)
			Matterhorn Creek				
S48	700	N	700	L	15	N	L
S49	1,000	N	700	L	20	15	L
S50	700	N	1,500	L	30	20	L
S51	700	N	700	L	20	10	L
S52	700	N	500	L	20	5	N
S53	1,000	N	500	2	50	N	N
S54	1,000	N	700	L	20	5	L
S55	1,000	N	700	L	15	N	N
S56	1,000	N	700	L	20	N	L
S57	1,000	N	1,000	1	15	N	N
S58	700	N	700	1	20	5	N
S59	700	N	500	1	15	N	L
S60	1,000	N	700	1	20	N	N
S61	1,000	N	1,500	L	20	N	N
S62	2,000	N	700	7	30	N	L
S63	1,000	N	500	3	20	N	N
S64	1,000	N	500	5	20	N	N
S65	1,000	N	500	1	20	N	N
			El Paso Creek				
J51	1,000	N	1,000	N	10	N	N
J52	1,000	N	700	N	15	L	N
J53	1,000	N	1,000	L	10	N	N
J54	1,000	N	700	L	15	N	N
J55	1,500	N	1,000	1	15	N	N
J56	1,500	N	700	L	15	N	N
J57	700	N	700	1	20	N	N
J59	700	N	500	1	7	N	N
J60	2,000	N	1,500	1.5	5	L	20
J61	2,000	N	1,000	1.5	10	N	N
J62	2,000	N	700	1.5	15	N	N
J63	1,500	N	1,000	1	10	N	N
J85	1,000	N	700	1	10	N	N
J86	1,500	N	1,000	1	10	N	N
J87	1,500	N	700	1	10	N	N
J88	1,500	N	700	L	15	N	N
J89	1,000	N	500	L	20	N	N
J90	1,000	N	700	L	15	N	N
J91	1,000	N	700	L	15	N	N
J92	1,000	N	700	L	20	N	N
J93	1,000	N	700	L	15	N	N
J94	1,000	N	700	1	15	N	N
J95	1,000	N	700	1	15	N	N
J96	1,000	N	700	1	30	N	N
S37	1,000	N	700	1	15	N	N
S38	1,000	N	700	L	15	N	N
S39	700	N	700	L	20	N	N
S40	1,000	N	700	1	7	N	N
S41	1,000	N	700	L	10	N	N
S42	1,000	N	700	L	15	N	N
S43	1,000	N	700	1	20	N	N
S44	1,000	N	700	1	10	N	N
S45	1,000	N	700	1	7	N	N
S46	700	N	500	1	15	N	N

samples from the eastern contiguous area

of measurement. Number in parentheses below element symbol is the usual lower limit of determination. Also of material sampled, were Fe (0.05), Mg (0.02), Ca (0.05), Ti (0.002), As (200), Au (10), B (10), Bi (10), Cd (20),

Sample	Semiquantitative spectrographic analyses--Continued (ppm)			Chemical analyses (ppm)			
	Pb (10)	Sr (100)	Zn (200)	Au (.05)	CxCu (1)	CxHM (1)	Sb (.5)
			Matterhorn Creek--Continued				
S48	50	500	N	N	3	3	2
S49	70	300	N	N	4	4	2
S50	70	300	N	N	4	1	3
S51	70	300	N	N	2	L	2
S52	20	150	N	N	4	N	1
S53	30	200	N	N	4	N	1
S54	20	300	N	N	6	L	2
S55	20	500	N	N	3	1	.5
S56	30	500	N	N	4	2	1
S57	30	500	L	N	4	2	2
S58	30	300	N	N	3	N	2
S59	20	300	N	N	3	N	2
S60	30	300	200	N	8	7	2
S61	30	300	200	N	8	5	1
S62	20	500	500	N	10	40	3
S63	20	500	300	N	8	17	4
S64	20	300	300	N	8	20	3
S65	20	300	N	N	8	5	2
			El Paso Creek--Continued				
J51	50	700	N	N	4	N	1
J52	70	500	N	N	4	1	1
J53	70	500	N	N	6	3	.5
J54	50	500	N	N	8	4	1
J55	50	500	N	N	6	L	1
J56	70	500	N	N	3	2	.5
J57	30	500	N	N	3	N	1
J59	30	200	N	N	4	4	1
J60	70	500	N	N	2	N	2
J61	50	300	N	N	1	1	.5
J62	50	300	N	N	2	2	1
J63	50	500	N	N	L	N	.5
J85	50	300	N	N	1	L	1
J86	50	300	N	N	N	N	.5
J87	50	500	N	N	2	14	1
J88	50	500	N	N	1	N	.5
J89	30	500	N	N	1	N	1
J90	50	500	N	N	1	N	1
J91	50	500	N	N	L	L	1
J92	50	500	N	N	4	L	1
J93	50	500	N	N	4	4	1
J94	50	300	N	N	3	3	1
J95	30	300	N	N	2	5	1
J96	100	300	N	N	8	11	2
S37	30	300	N	N	4	2	3
S38	50	300	N	N	2	4	3
S39	30	300	N	N	4	1	1
S40	50	300	N	N	2	5	1
S41	50	300	N	N	2	2	1
S42	30	500	N	N	1	N	.5
S43	50	300	N	N	3	2	1
S44	50	300	N	N	2	4	1
S45	20	300	N	N	3	2	1
S46	100	300	N	N	8	14	2

TABLE 5.—*Analyses of stream-sediment samples*

Sample	Semiquantitative spectrographic analyses (ppm)						
	Mn (10)	Ag (.5)	Ba (20)	Be (1)	Cu (5)	Mo (5)	Nb (10)
East Fork Cimarron River							
S4	1,000	N	500	N	30	N	N
S5	1,000	N	700	N	20	N	N
S6	1,000	N	700	L	20	N	N
S7	700	N	500	L	20	N	N
S8	700	N	700	L	20	N	L
S9	1,000	N	1,000	L	15	N	N
10	1,000	N	1,000	N	20	N	N
S11	1,000	N	1,000	L	30	N	N
S12	1,500	N	1,000	L	20	N	N
S13	1,500	N	1,000	1	20	N	N
S14	1,000	N	1,000	L	20	N	N
S15	1,000	N	700	L	20	N	N
S16	1,000	N	1,000	L	20	N	N
S17	1,000	N	1,000	L	15	N	N
S18	1,000	N	1,000	L	20	N	N
S19	1,000	N	1,000	L	20	N	N
S20	1,000	N	1,000	L	30	N	N
S21	1,000	N	1,000	L	30	N	N
S22	1,000	N	1,000	L	20	N	N
S23	1,000	N	1,000	L	15	N	N
S24	1,000	N	700	L	20	N	N
S25	1,000	N	1,000	N	15	N	N
S26	1,000	N	1,000	N	50	N	N
S27	1,000	N	700	N	30	N	N
S28	1,500	N	1,500	N	20	N	N
S29	1,000	N	1,000	N	20	N	N
S30	700	N	1,000	N	10	N	N
S31	1,000	N	1,000	N	20	N	N
S32	700	N	700	N	10	N	N
S33	1,000	N	1,500	N	15	N	N
S34	1,500	N	700	N	20	N	N
S35	1,000	N	700	N	15	N	N
G146	1,000	N	1,000	L	10	N	N
G147	1,000	N	1,000	L	20	N	N
G148	1,000	N	700	N	15	N	N
G149	1,000	N	1,000	1	15	N	N
G150	1,000	N	1,000	L	20	N	N
G151	1,500	N	1,000	L	15	N	N
G152	1,500	N	1,000	L	20	N	N
G153	1,000	N	1,000	1	15	N	N
G154	1,000	N	1,000	L	15	N	N
G155	1,000	N	1,000	L	20	N	N
G156	1,000	N	700	L	15	N	N
G157	700	N	700	L	10	N	N
G158	1,000	N	1,000	N	10	N	N
G159	1,000	N	1,000	L	15	N	N
G160	1,000	N	700	L	20	N	N
G161	1,000	N	700	L	15	N	N
G162	1,000	N	700	L	15	N	N
G163	1,000	N	700	L	10	N	N
G164	1,000	N	500	N	15	N	N
G165	1,000	N	700	L	15	N	N
G166	1,000	N	1,000	L	15	N	N
G167	1,000	N	700	L	7	N	N
G168	1,000	N	700	L	15	N	N
G169	1,000	N	700	N	15	N	N
G170	1,000	N	700	L	15	N	N
G171	1,000	N	1,000	L	15	N	N
G172	1,000	N	700	L	15	N	N
G173	1,500	N	700	N	15	N	N
G174	1,500	N	700	N	20	N	N

from the eastern contiguous area—Continued

Sample	Semiquantitative spectrographic analyses--Continued (ppm)			Chemical analyses (ppm)			
	Pb (10)	Sr (100)	Zn (200)	Au (.05)	CxCu (1)	CxHM (1)	Sb (.5)
			East Fork Cimarron River--Continued				
S4	20	300	200	N	10	2	0.5
S5	20	500	N	N	6	N	.5
S6	20	500	N	N	2	1	.5
S7	20	300	L	N	6	2	1
S8	20	300	N	N	8	2	.5
S9	30	300	N	N	8	2	.5
S10	20	500	200	N	3	N	.5
S11	50	300	N	N	10	2	.5
S12	30	700	N	N	6	1	L
S13	30	500	N	N	15	2	1
S14	30	500	N	N	10	3	1
S15	20	300	N	N	10	1	1
S16	30	500	200	N	8	2	1
S17	20	700	N	N	4	2	.5
S18	15	500	N	N	8	2	2
S19	10	500	L	N	8	2	.5
S20	20	500	L	N	6	1	.5
S21	20	500	N	N	3	L	2
S22	20	500	N	N	10	2	.5
S23	20	700	L	N	4	1	.5
S24	20	300	200	N	10	2	.5
S25	15	500	N	N	6	1	1
S26	15	500	N	N	6	1	1
S27	20	300	N	N	6	1	.5
S28	20	1,000	N	N	2	N	.5
S29	20	500	N	N	8	2	1
S30	10	500	N	N	6	1	.5
S31	20	500	200	N	8	3	.5
S32	15	500	N	N	8	L	L
S33	20	500	200	N	6	2	.5
S34	20	500	300	N	4	N	L
S35	15	700	N	N	1	N	.5
G146	15	700	N	N	6	N	1
G147	20	700	L	N	8	4	.5
G148	15	700	N	N	2	N	.5
G149	15	700	N	N	4	N	L
G150	20	700	200	N	10	7	.5
G151	15	1,000	200	N	2	N	L
G152	15	700	200	N	10	2	.5
G153	20	700	N	N	1	N	.5
G154	15	700	N	N	L	N	.5
G155	15	500	200	N	10	7	.5
G156	15	500	L	N	8	5	.5
G157	15	700	N	N	4	1	.5
G158	20	700	L	N	L	N	L
G159	15	700	N	N	8	2	.5
G160	15	500	N	N	8	3	L
G161	20	700	L	N	2	L	.5
G162	20	500	L	N	6	1	.5
G163	20	700	N	N	8	2	.5
G164	15	500	L	N	3	N	1
G165	15	700	N	N	6	N	.5
G166	15	700	L	N	6	3	.5
G167	15	700	N	N	L	N	.5
G168	15	700	N	N	8	L	L
G169	15	700	N	N	3	2	.5
G170	15	700	N	N	1	N	1
G171	15	700	N	N	1	N	.5
G172	15	700	N	N	8	5	.5
G173	15	700	N	N	2	L	.5
G174	15	500	300	N	6	3	1

TABLE 6.—*Analyses of rock samples from*

[See plate 2A for sample localities. ppm, parts per million, N, not detected, L, detected but below lower looked for in spectrographic analyses, and either not found or found in amounts normal for the type La (20), Ni (5), Sb (100), Sc (5), Sn (10), V (10), W (50), Y (10), and Zr (10)]

Sample	Semiquantitative spectrographic analyses (ppm)											
	Mn (10)	Ag (.5)	Ba (20)	Bi (10)	Cd (20)	Co (5)	Cu (5)	Mo (5)	Nb (20)	Pb (10)	Sr (100)	Zn (200)
					Cimarron altered area							
S85A	300	N	100	N	N	7	L	N	20	70	150	N
S85B	1,000	N	1,000	N	N	L	7	N	N	15	500	N
S85C	1,000	N	1,000	N	N	15	50	N	N	50	500	N
S85D	1,000	N	1,000	N	N	15	70	N	N	20	1,000	N
S85E	200	N	1,000	N	N	L	10	N	L	30	300	N
S85F	700	.5	1,000	N	N	L	20	N	L	150	500	N
S85G	700	N	1,000	N	N	L	20	N	L	100	500	N
S85H	700	.7	700	N	N	N	7	10	L	100	300	N
S85I	1,000	N	1,000	N	N	5	15	5	L	100	500	N
S85J	1,000	N	700	N	N	10	50	7	L	70	500	N
S86A	1,000	N	1,500	N	N	10	20	N	N	20	1,000	N
S86B	1,500	N	700	N	N	15	5	N	N	20	700	N
S86C	1,500	N	1,000	N	N	15	5	N	N	70	1,500	N
S86D	1,000	N	1,500	N	N	10	7	N	N	15	1,000	N
S86E	150	1	300	N	N	10	5	15	L	70	N	N
S86F	1,000	L	2,000	N	N	20	70	10	L	100	300	N
S86G	1,000	N	700	N	N	10	L	N	L	20	500	N
S86H	2,000	7	300	N	N	20	20	15	N	1,000	500	700
S86I	1,000	N	1,000	N	N	5	20	7	L	70	300	N
S170A	1,500	N	1,500	N	N	20	15	N	L	20	1,000	N
S170B	1,000	N	1,000	N	N	10	15	N	L	50	500	N
S171	100	L	1,000	N	N	N	10	N	L	20	300	N
S172	70	N	1,500	N	N	5	15	N	L	15	300	N
S173	70	N	2,000	N	N	L	15	7	L	20	300	N
S174	300	N	700	N	N	N	15	N	N	20	300	N
S175	70	N	2,000	N	N	N	10	5	L	15	500	N
					Matterhorn altered area							
S89A	500	N	1,000	N	N	N	15	N	N	20	200	N
S89B	150	N	300	L	N	N	L	5	N	50	500	N
S89C	200	N	1,000	N	N	N	5	5	N	30	500	N
S89E	1,000	.7	300	N	N	5	10	15	N	70	300	L
S89F	700	.5	200	N	N	10	20	15	N	70	N	N
S90B	1,000	N	1,000	N	N	15	20	N	N	30	700	N
S91	20	N	700	15	N	5	10	7	L	1,500	2,000	N
S93A	30	N	700	10	N	N	L	7	20	70	1,000	N
S93B	1,000	N	700	N	N	7	20	N	N	20	300	N
S93C	700	N	700	N	N	15	30	N	N	20	500	N
S93D	1,000	N	700	N	N	10	50	5	N	50	500	N
S93E	1,000	N	1,000	N	N	10	20	N	L	70	700	N
S93F	700	N	1,000	N	N	7	20	N	N	70	700	N
S94	200	N	1,500	N	N	L	10	15	N	70	200	L
S95	1,000	N	700	N	N	30	15	N	N	L	100	N
S96	700	N	700	N	N	7	50	5	N	10	500	N
S97	30	N	500	10	N	10	10	5	N	200	1,500	N
S163	200	N	200	N	N	7	15	N	L	20	300	N
S165	1,000	N	150	N	N	20	20	15	L	20	100	N
S166A	30	1	700	N	N	N	20	10	L	500	700	N
S166B	50	L	700	N	N	N	L	N	L	50	1,000	N

altered areas, eastern contiguous area.

limit of measurement. Number in parentheses below element symbol is the usual lower limit of determination. Also of material sampled, were Fe (.05), Mg (0.02), Ca (0.05), Ti (0.002), As (200), Au (10), Be (1), Cr (10),

	Chemical analyses (ppm)								
Sample	Au (.05)	Hg (.02)	Cu (5)	Pb (5)	Zn (5)	As (10)	Sb (.5)	Te (.5)	Sample description
Cimarron altered area--Continued									
S85A	N	1.2	5	40	45	160	1	2	Altered monzonite dike; pyrite.
S85B	N	.35	10	15	80	N	1	L	Altered andesite breccia; pyrite.
S85C	N	N	45	10	80	10	.5	N	Altered andesite breccia.
S85D	N	N	55	5	80	10	1	N	Propylitized andesite breccia.
S85E	N	.65	20	20	20	700	1	.5	Altered monzonite; pyrite.
S85F	N	L	30	60	45	N	3	1	Fines from altered monzonite talus.
S85G	N	.04	30	60	45	20	2	2	Do.
S85H	N	N	10	65	35	10	2	1	Do.
S85I	N	.04	30	35	65	10	1	1	Do.
S85J	N	.04	50	30	70	60	1	1	Do.
S86A	N	.60	35	5	65	10	.5	L	Altered monzonite dike; pyrite.
S86B	N	.90	10	15	160	N	.5	L	Altered andesite breccia; pyrite.
S86C	N	.14	5	25	190	160	1	N	Monzonite dike; pyrite.
S86D	N	.40	5	10	65	160	1	L	Altered monzonite dike; pyrite.
S86E	N	.70	10	75	90	10	1	1	Altered monzonite dike; limonite.
S86F	N	.12	35	75	95	L	1	3	Altered andesite breccia.
S86G	N	N	5	10	80	N	2	N	Monzonite dike.
S86H	N	N	25	600	750	60	3	3	Altered andesite breccia; limonite.
S86I	N	.90	25	35	90	1,600	1	L	Altered monzonite dike; pyrite.
S170A	N	.20	25	20	90	L	L	L	Altered contact; monzonite intrusive.
S170B	N	N	25	35	65	20	.5	L	Do.
S171	N	N	15	5	30	N	L	1	Altered monzonite; pyrite.
S172	N	.95	15	5	15	N	L	2	Do.
S173	N	.95	10	10	N	N	L	.5	Do.
S174	N	.04	15	10	30	10	.5	.5	Soft argillized monzonite.
S175	N	.92	5	L	N	N	L	L	Altered monzonite; pyrite.
Matterhorn altered area--Continued									
S89A	N	0.10	25	20	50	40	1	2	Altered contact, monzonite stock.
S89B	N	.10	5	25	5	60	1	2	Do.
S89C	N	.12	5	20	5	N	.5	1.1	Do.
S89E	N	.12	20	60	150	80	1	2	Argillized monzonite.
S89F	N	.80	40	60	120	L	.5	.5	Altered monzonite; pyrite.
S90B	N	N	30	10	40	N	1	N	Propylitized monzonite.
S91	N	2	5	270	N	L	1	.5	Silicified and pyritized monzonite.
S93A	N	.16	5	50	N	20	.5	1	Altered fines from monzonite talus.
S93B	N	.12	30	25	55	40	.5	1	Do.
S93C	N	.18	40	25	70	60	.5	1	Do.
S93D	N	.12	35	30	45	N	1	.5	Do.
S93E	N	.14	35	55	60	20	1	.5	Do.
S93F	N	.20	30	30	45	20	2	1	Do.
S94	N	.12	10	75	15	120	2	2	Altered andesite breccia.
S95	N	1	20	5	50	20	1	L	Propylitized monzonite; pyrite.
S96	N	.40	75	10	75	1,200	.5	N	Silicified monzonite; pyrite.
S97	N	.90	30	300	L	600	2	1	Do.
S163	N	L	55	20	45	10	L	L	Altered andesite.
S165	N	L	35	25	90	40	.5	N	Do.
S166A	.10	.10	30	900	20	80	4	2	Do.
S166B	N	.2	5	40	N	20	.5	1	Do.

TABLE 6.—*Analyses of rock samples from altered*

	Semiquantitative spectrographic analyses (ppm)											
Sample	Mn (10)	Ag (.5)	Ba (20)	Bi (10)	Cd (20)	Co (5)	Cu (5)	Mo (5)	Nb (20)	Pb (10)	Sr (100)	Zn (200)
						Iron Beds altered area						
G328A	700	N	700	N	N	5	7	N	L	15	300	N
G328B	70	L	700	10	N	10	15	15	L	150	700	N
G328C	100	N	1,000	N	N	N	5	L	L	50	100	N
G328D	50	N	500	N	N	N	5	L	L	30	100	N
G328E	50	N	1,000	N	N	N	5	N	20	15	200	N
G328F	1,000	N	1,000	N	N	7	20	N	L	20	700	N
G328G	100	N	700	N	N	N	7	5	20	50	1,000	N
G328H	20	N	150	10	N	N	10	N	L	20	1,500	N
G328I	30	N	700	N	N	N	L	N	L	30	700	N
G328J	1,000	N	1,000	N	N	15	50	N	N	50	1,000	N
G328K	1,000	N	2,000	N	N	N	20	N	L	30	500	N
G328L	30	N	700	20	N	N	5	N	L	30	2,000	N
G328M	50	.5	300	N	N	N	5	10	L	70	3,000	N
G328N	1,000	N	700	N	N	15	20	N	N	30	700	N
G328O	20	N	500	L	N	N	L	N	L	30	500	N
G328P	70	N	700	N	N	N	N	N	L	20	500	N
G328Q	1,000	N	700	N	N	15	20	N	N	15	1,000	N
G328R	50	N	700	N	N	N	L	L	L	15	100	N
G328S	300	N	500	N	N	5	5	N	N	15	150	N
S164A	150	N	1,000	N	N	N	L	N	L	50	200	N
S167	50	N	700	N	N	N	L	5	L	10	200	N
S168	20	N	700	N	N	7	15	7	L	100	1,000	N
S169	50	N	1,500	N	N	N	15	5	20	50	1,000	N

areas, eastern contiguous area —Continued

	Chemical analyses (ppm)								
Sample	Au (.05)	Hg (.02)	Cu (5)	Pb (5)	Zn (5)	As (10)	Sb (.5)	Te (.5)	Sample description
				Iron Beds altered area--Continued					
G328A	N	N	10	5	25	N	L	N	Slightly altered Fish Canyon Tuff.
G328B	N	.70	10	10	N	10	2	.5	Highly altered sediments.
G328C	N	N	10	25	35	10	.5	N	Highly altered Crystal Lake Tuff.
G328D	N	.02	L	15	L	10	L	N	Slightly altered Carpenter Ridge Tuff.
G328E	N	.24	L	5	N	L	L	.5	Highly altered lava flow.
G328F	N	.02	25	15	40	N	L	N	Unaltered lava flow.
G328G	N	.08	5	25	L	10	2	4	Altered fines in pit on lava flow.
G328H	N	.04	L	L	N	10	L	.5	Highly altered lava flow.
G328I	N	.02	L	10	N	20	1	2	Altered fines in pit on lava flow.
G328J	N	.60	40	20	75	10	L	L	Unaltered lava flow.
G328K	N	.20	30	15	20	10	L	2	Altered lava flow.
G328L	N	.06	L	10	N	10	1	L	Altered tuff.
G328M	N	.70	5	15	N	20	5	3	Narrow altered zone in lava flow.
G328N	N	L	40	5	35	N	L	N	Unaltered lava flow.
G328O	N	.08	L	30	N	L	L	L	Highly altered Carpenter Ridge Tuff.
G328P	N	.16	5	10	N	120	.5	1	Altered Carpenter Ridge Tuff.
G328Q	N	N	40	5	30	L	L	N	Altered vitrophyre Crystal Lake Tuff.
G328R	N	.10	5	10	5	10	L	N	Highly altered Fish Canyon Tuff.
G328S	N	.20	5	5	L	10	L	N	Unaltered sediments.
S164A	N	N	5	15	5	20	L	L	Highly altered Crystal Lake Tuff.
S167	N	.68	L	10	N	L	L	N	Highly altered lava flow.
S168	N	1	10	20	N	20	1	L	Highly altered monzonite dike; pyrite.
S169	N	.90	5	5	25	N	L	L	Altered Fish Canyon Tuff; pyrite.

TABLE 7.—*Analyses of rhyolite intrusive rocks*

[See plate 2*A* for sample localities. ppm, parts per million, N, not detected, L, detected but below lower of determination. Also looked for in spectrographic analyses, and either not found or found in amounts B (10), Bi (10), Cd (20), Co (5), Cr (10), La (20), Ni (5), Sb (100), Sc (5), W (50), Zn (200), and Zr (10)]

Sample	Semiquantitative spectrographic analyses (ppm)											
	Mn (10)	Ag (.5)	Ba (20)	Be (1)	Cu (5)	Mo (5)	Nb (20)	Pb (10)	Sn (10)	Sr (100)	V (10)	Y (10)
PLUG ALONG EAST FORK OF NELLIE CREEK												
Intrusive rock												
S47D	1,000	N	70	15	N	N	50	30	N	N	N	N
S47F	1,000	N	200	20	L	15	30	50	N	L	N	L
S98A	700	N	200	7	L	N	30	30	N	100	N	15
S98B	700	N	100	7	L	N	20	30	N	N	N	L
S98C	700	N	100	10	L	N	30	30	N	L	N	10
S103	1,000	N	150	7	L	N	30	70	N	L	N	15
S104	1,500	N	150	10	10	N	20	50	N	N	N	N
S105	1,500	N	150	10	5	N	30	50	N	L	N	15
S106A	700	N	150	10	L	5	30	50	N	N	N	10
S106B	700	N	150	7	5	7	30	50	N	100	10	10
S110A	1,500	N	500	20	5	15	70	50	N	300	N	10
S110B	700	N	100	10	5	5	30	30	N	N	N	L
S112A	700	N	150	15	L	N	50	50	N	L	N	L
S113	700	N	100	7	L	7	30	50	N	N	N	L
L47	---	N	520	19	2	8	80	40	N	160	<10	<20
Wallrock												
S47A	>5,000	N	700	1.5	20	N	N	20	N	700	70	150
S47B	>5,000	N	1,000	1.5	50	N	N	20	N	500	100	100
S47C	>5,000	N	700	3	20	N	N	30	N	500	70	70
S47E	200	N	1,000	2	L	N	N	70	N	300	15	20
S106C	1,500	N	700	2	15	N	20	50	N	150	70	20
S107	500	N	700	L	5	L	L	30	N	100	20	20
S108	500	N	1,500	L	10	N	L	70	N	200	20	20
S111	2,000	N	1,000	3	20	N	L	30	N	1,000	150	30
S112B	1,500	N	1,000	L	20	N	N	30	N	700	300	20
S114A	200	N	500	L	L	N	L	20	N	100	20	20
S114B	300	N	700	1	L	N	L	20	N	100	15	30
S114C	1,000	N	300	3	L	N	L	30	N	200	15	30
S114D	1,000	N	700	1.5	L	N	L	30	N	200	20	15

and associated wallrocks, eastern contiguous area

limit of measurement, ..., not analyzed. Number in parentheses below element symbol is the usual lower limit normal for the type of material sampled, were, Fe (0.05), Mg (0.02), Ca (0.05), Ti (0.002), As (200), Au (10),

	Chemical analyses (ppm)								Instrumental radioactivity reading[1]	
Sample	Au (.05)	Hg (.02)	Cu (5)	Pb (5)	Zn (5)	As (5)	Sb (.5)	F (50)		Sample description
PLUG ALONG EAST FORK OF NELLIE CREEK--Continued										
Intrusive rock--Continued										
S47D	N	N	N	10	5	N	L	800	---	Devitrified rhyolite. Topaz.
S47F	N	.02	L	5	5	N	.5	700	---	Marginal vitrophyre.
S98A	N	---	---	---	---	---	---	270	0.15-0.575	Devitrified rhyolite.
S98B	N	---	---	----	---	---	---	700	.15- .600	Do.
S98C	N	---	---	----	----	---	---	900	.15- .575	Do.
S103	N	---	---	---	---	---	---	375	.15- .570	Do.
S104	N	---	---	---	---	---	---	N	.15- .575	Do.
S105	N	---	---	---	---	---	---	L	.15- .450	Porous devitrified rhyolite.
S106A	N	---	---	---	---	---	---	N	.15- .430	Do.
S106B	---	---	---	---	---	---	---	L	.15- .540	Marginal vitrophyre.
S110A	N	---	---	---	---	---	---	80	.15- .660	Do
S110B	---	---	---	---	---	---	---	N	.15- .585	Devitrified rhyolite.
S112A	N	---	---	---	---	---	---	300	.15- .600	Do.
S113	N	---	---	---	---	---	---	N	.15- .600	Do.
L47	---	---	---	---	---	---	---	---	---	Marginal vitrophyre.
Wallrock--Continued										
S47A	0.05	0.02	35	10	40	N	0.5	80	---	Carbonate concretion.
S47B	.1	.02	60	95	45	L	L	90	---	Do.
S47C	.05	L	30	30	75	L	L	90	---	Do.
S47E	N	N	L	10	L	N	.5	150	---	Crystal Lake Tuff. Topaz.
S106C	---	---	---	---	---	---	---	170	---	Soil near contact.
S107	N	---	---	---	---	---	---	N	0.15-0.375	Crystal Lake Tuff.
S108	N	---	---	---	---	---	---	L	.15- .340	Do.
S111	N	---	---	---	---	---	---	100	.15- .425	Bentonitic sediments.
S112B	N	---	---	---	---	---	---	80	.15- .380	Red sediments.
S114A	N	.04	L	L	5	10	2	---	---	Fault zone.
S114B	N	N	L	5	5	N	2	---	---	Do.
S114C	N	L	L	15	5	L	.5	---	---	Do.
S114D	N	N	5	10	5	20	1	---	---	Do.

See footnote at the end of the table.

TABLE 7.—*Analyses of rhyolite intrusive rocks and*

Sample	Semiquantitative spectrographic analyses (ppm)										
	Mn (10)	Ag (.5)	Ba (20)	Be (1)	Cu (5)	Mo (5)	Nb (20)	Pb (10)	Sn (10)	Sr (100)	V (10)	Y (10)
SILL BETWEEN EAST AND WEST FORKS OF NELLIE CREEK												
Intrusive rock												
S117	1,000	L	200	15	L	7	30	50	N	150	10	10
S118	---	---	---	---	---	---	---	---	---	---	---	---
S119	1,000	N	200	10	10	N	20	50	N	150	10	15
S120	1,000	N	500	7	L	N	L	50	N	500	15	15
S121	700	L	200	15	L	N	50	50	N	500	10	10
S122	1,000	N	200	10	5	N	30	50	N	100	10	10
S123	---	---	---	---	---	---	---	---	---	---	---	---
S124	---	---	---	---	---	---	---	---	---	---	---	---
S125	700	N	300	7	7	N	30	30	N	100	20	10
S126	---	---	---	---	---	---	---	---	---	---	---	---
S127	---	---	---	---	---	---	---	---	---	---	---	---
S128	1,000	N	500	7	5	N	30	30	N	200	15	15
S129	---	---	---	---	---	---	---	---	---	---	---	---
S130	700	N	200	10	L	7	30	30	N	N	15	15
S131	---	---	---	---	---	---	---	---	---	---	---	---
S132	---	---	---	---	---	---	---	---	---	---	---	---
S133B	700	N	300	7	5	N	50	30	L	150	20	20
S133C	1,000	N	300	7	5	N	50	30	N	200	20	20
S134	---	---	---	---	---	---	---	---	---	---	---	---
S135A	1,000	N	150	10	L	L	50	50	10	100	L	10
S135B	1,000	N	100	15	L	N	30	50	L	L	L	10
S136	---	---	---	---	---	---	---	---	---	---	---	---
S137	700	N	500	10	7	N	20	50	L	500	20	15
S138	---	---	---	---	---	---	---	---	---	---	---	---
S138	---	---	---	---	---	---	---	---	---	---	---	---
Wallrock												
S133A	1,000	N	1,000	N	20	N	N	30	N	1,000	200	30
S133	---	---	---	---	---	---	---	---	---	---	---	---
S133	---	---	---	---	---	---	---	---	---	---	---	---
S133	---	---	---	---	---	---	---	---	---	---	---	---
S134	---	---	---	---	---	---	---	---	---	---	---	---
S137	---	---	---	---	---	---	---	---	---	---	---	---
S137	---	---	---	---	---	---	---	---	---	---	---	---
S138	---	---	---	---	---	---	---	---	---	---	---	---
SILL WEST OF WEST FORK OF NELLIE CREEK												
S139	700	N	300	7	N	N	20	30	L	100	L	10
S140	---	---	---	---	---	---	---	---	---	---	---	---
S141	700	N	300	7	N	N	20	50	L	200	10	10
S142	1,000	N	300	7	N	N	20	30	L	150	10	20
S143	700	N	300	10	N	N	30	30	L	150	15	20
S145	---	---	---	---	---	---	---	---	---	---	---	---
S146	---	---	---	---	---	---	---	---	---	---	---	---
S146	---	---	---	---	---	---	---	---	---	---	---	---
S147	700	N	150	10	N	N	50	50	L	100	L	15
S148	---	---	---	---	---	---	---	---	---	---	---	---
S148	---	---	---	---	---	---	---	---	---	---	---	---
S149	1,000	N	300	10	N	N	30	50	N	150	L	15

associated wallrocks, eastern contiguous area—Continued

Sample	Chemical analyses (ppm) F (50)	Instrumental radioactivity reading[1/]	Sample description
SILL BETWEEN EAST AND WEST FORKS OF NELLIE CREEK--Continued			
Intrusive rock--Continued			
S117	700	0.15-0.475	Devitrified rhyolite.
S118	---	.15- .600	Do.
S119	700	.15- .600	Do.
S120	500	.15- .400	Do.
S121	300	.15- .500	Do.
S122	<50	.15- .525	Do.
S123	---	.15- .540	Do.
S124	---	.15- .475	Do.
S125	<50	.15- .475	Do.
S126	---	.15- .475	Porous devitrified rhyolite.
S127	---	.15- .525	Devitrified rhyolite.
S128	<50	.15- .450	Do.
S129	---	.15- .480	Do.
S130	200	.15- .475	Do.
S131	---	.15- .440	Do.
S132	---	.15- .360	Porous devitrified rhyolite.
S133B	<50	.15- .325	Do.
S133C	<50	.15- .425	Devitrified rhyolite.
S134	---	.15- .400	Porous devitrified rhyolite.
S135A	<50	.15- .400	Do.
S135B	<50	.15- .500	Devitrified rhyolite.
S136	---	.15- .350	Do.
S137	<50	.15- .425	Do.
S138	---	.15- .500	Do.
S138	---	1.5 - .600	Sheared rhyolite with uranophane.
Wallrock--Continued			
S133A	<50	0.15-0.175	Green sediments at contact.
S133	---	.15- .300	Devitrified Crystal Lake Tuff.
S133	---	.15- .275	Crystal Lake Tuff vitrophyre.
S133	---	.15- .125	Red sediments near contact.
S134	---	.15- .175	Fish Canyon Tuff.
S137	---	.15- .175	Do.
S137	---	.15- .160	Sediments.
S138	---	.15- .175	Do.
SILL WEST OF WEST FORK OF NELLIE CREEK--Continued			
S139	N	0.15-0.525	Porous devitrified rhyolite.
S140	---	.15- .225	Andesite wallrock.
S141	N	.15- .450	Devitrified rhyolite.
S142	N	.15- .350	Porous devitrified rhyolite.
S143	N	.15- .375	Do.
S145	---	.15- .150	Andesite wallrock.
S146	---	.15- .150	Sediments, wallrock
S146	---	.15- .150	Andesite wallrock.
S147	N	.15- .375	Porous devitrified rhyolite.
S148	---	.15- .375	Devitrified rhyolite.
S148	---	.15- .150	Variegated sediments, wallrock.
S149	---	.15- .375	Porous devitrified rhyolite.

See footnote at the end of the table.

TABLE 7.—*Analyses of rhyolite intrusive rocks and*

Sample	Semiquantitative spectrographic analyses (ppm)											
	Mn (10)	Ag (.5)	Ba (20)	Be (1)	Cu (5)	Mo (5)	Nb (20)	Pb (10)	Sn (10)	Sr (100)	V (10)	Y (10)
SILL ON BROKEN HILL												
G324A	---	---	---	---	---	---	---	---	---	---	---	---
G324B	---	---	---	---	---	---	---	---	---	---	---	---
G324C	---	---	---	---	---	---	---	---	---	----	---	---
G324D	1,000	N	50	10	L	N	30	50	N	N	L	10
G324E	1,500	N	50	10	L	5	20	70	L	N	L	10
G324F	1,000	N	30	20	L	N	50	50	L	N	L	N
G324G	1,000	N	30	10	L	N	30	50	N	N	L	N
G324H	1,000	N	70	30	L	L	50	30	N	300	L	L
G324I	1,000	N	50	20	5	N	30	50	L	N	N	L
G324J	700	N	50	15	10	5	50	50	L	N	L	L
G324K	1,000	N	70	15	L	N	30	50	N	N	L	L
G324L	700	N	50	15	L	N	50	50	N	N	N	L
G324M	1,000	N	30	20	L	N	50	50	L	N	N	L
G324N	1,000	N	70	20	20	N	50	50	N	N	N	N
G324O	700	N	50	20	5	N	50	50	N	N	N	L
INTRUSIVES IN UPPER EL PASO CREEK												
G325A	1,000	N	50	15	N	L	50	50	N	N	N	L
G325B	1,000	N	30	15	N	10	50	70	N	N	N	L
G325C	100	N	70	20	N	15	50	50	20	500	N	10
G325D	1,000	N	50	15	N	L	50	50	N	N	N	L
G326A	1,000	N	50	15	N	10	30	70	N	N	N	L
G326B	1,000	N	50	15	N	10	50	70	L	200	N	L
G326C	1,500	N	30	15	L	15	50	50	L	N	N	10
G326D	1,000	N	50	20	N	N	50	70	L	500	N	L
G327A	1,000	N	30	10	N	5	50	70	L	N	N	L
G327B	1,500	N	200	15	N	10	30	70	L	N	N	L
G327C	1,000	N	30	15	N	L	50	70	L	N	L	10
LARSON CREEK PLUG												
S150	---	---	---	---	---	---	---	---	---	---	---	---
S151	1,000	N	300	7	N	N	30	50	L	150	10	15
S152	---	---	---	---	---	---	---	---	---	---	---	---
S153	500	N	300	7	N	N	30	50	N	150	10	20
S154	1,000	N	300	7	N	N	30	50	L	150	15	30
S155	700	N	500	7	N	N	30	50	L	150	15	15
S156	700	N	300	7	N	N	20	30	L	100	10	20
S157	700	N	300	7	N	N	20	30	N	100	15	20
S158	700	N	300	7	N	N	30	30	N	100	15	20
S159	700	N	300	7	N	N	20	30	N	100	10	10
S160	700	N	300	7	N	N	20	30	L	150	15	15
S161	700	N	300	7	N	N	20	50	L	100	10	L
S162	500	N	150	7	N	N	20	50	L	L	L	15

associated wallrocks, eastern area contiguous—Continued

Sample	Chemical analyses (ppm) F (50)	Instrumental radioactivity reading[1]	Sample description
SILL ON BROKEN HILL--Continued			
G324A	90	1-58	Devitrified rhyolite.
G324B	200	1-84	Do.
G324C	70	1-58	Porous devitrified rhyolite.
G324D	90	1-60	Devitrified rhyolite.
G324E	N	1-45	Porous devitrified rhyolite.
G324F	N	1-50	Devitrified rhyolite.
G324G	L	1-54	Do.
G324H	N	1-48	Do.
G324I	900	1-54	Do.
G324J	L	1-65	Marginal vitrophyre.
G324K	1,300	1-70	Do.
G324L	1,100	1-64	Devitrified rhyolite.
G324M	700	1-60	Do.
G324N	N	1-62	Do.
G324O	1,000	1-62	Do.
INTRUSIVES IN UPPER EL PASO CREEK--Continued			
G325A	100	1-56	Soft devitrified rhyolite.
G325B	60	1-50	Devitrified rhyolite.
G325C	80	5-80	Devitrified rhyolite. Secondary uranium minerals.
G325D	N	1-58	Devitrified rhyolite.
G326A	N	1-54	Do.
G326B	N	1-50	Do.
G326C	70	1-52	Do.
G326D	N	1-42	Do.
G327A	80	1-58	Do.
G327B	170	1-48	Do.
G327C	N	1-56	Do.
LARSON CREEK PLUG--Continued			
S150	---	0.15- 0.225	Quartz latite wallrock.
S151	N	.15- .325	Porous devitrified rhyolite.
S152	---	.15- .325	Do.
S153	N	.15- .325	Do.
S154	N	.15- .375	Do.
S155	N	.15- .500	Devitrified rhyolite.
S156	N	.15- .375	Porous devitrified rhyolite.
S157	N	.15- .425	Devitrified rhyolite.
S158	N	.15- .425	Do.
S159	N	.15- .500	Do.
S160	170	.15- .475	Do.
S161	N	.15- .450	Do.
S162	N	.15- .475	Do.

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[1] Readings are uncalibrated field measurements. Those on the plug along the East Fork of Nellie Creek, sill between the East and West Forks of Nellie Creek, sill west of the West Fork of Nellie Creek, and Larson Creek plug were made with Precision Model 1118 Deluxe Scintillator, and those on the sill on Broken Hill and the intrusives in upper El Paso Creek were made with Mount Sopris Model SC 131 Scintillator.

TABLE 8.—*Uranium, thorium, fluorine, and radioactivity in rhyolite intrusives and associated rocks*

[ppm, parts per million, ..., not analyzed]

Sample	eU[1] (ppm)	U[2] (ppm)	Th[2] (ppm)	Th/U	F (ppm)	Instrumental radioactivity reading[3]	Sample description
EAST NELLIE CREEK PLUG Intrusive rock							
S103	60	22.1	55.2	2.6	375	0.15-0.570	Devitrified rhyolite.
S105	60	23.2	47.0	2.0	<50	.15- .575	Do.
S110A	60	42.2	57.5	1.4	80	.15- .660	Marginal vitrophyre.
S112A	50	24.9	50.5	2.0	300	.15- .600	Devitrified rhyolite.
Wallrock							
S107	40	7.7	17.6	2.3	<50	0.15-0.375	Crystal Lake Tuff.
S108	50	25.6	54.6	2.1	<50	.15- .340	Do.
S111	30	8.1	14.4	1.8	100	.15- .425	Bentonitic sediments.
SILL BETWEEN EAST AND WEST NELLIE CREEKS Intrusive rock							
S117	40	8.2	56.6	6.9	700	0.15-0.475	Devitrified rhyolite.
S119	60	29.3	50.9	1.7	700	.15- .600	Do.
S121	40	17.4	53.6	3.1	300	.15- .500	Do.
S122	60	32.4	47.6	1.5	<50	.15- .525	Do.
S125	50	21.4	38.6	1.9	<50	.15- .475	Do.
S128	60	23.5	52.2	2.2	<50	.15- .450	Do.
S130	50	15.9	58.5	3.7	200	.15- .475	Do.
S133B	40	12.9	43.6	3.4	<50	.15- .325	Do.
S133C	50	16.3	42.8	2.6	<50	.15- .425	Do.
S135A	40	15.4	60.9	4.0	<50	.15- .400	Do.
S135B	50	22.8	23.5	1.0	<50	.15- .500	Do.
S137	50	16.7	46.6	2.8	<50	.15- .425	Do.
SILL WEST OF WEST NELLIE CREEK Intrusive rock							
S139	60	26.8	45.4	1.7	<50	0.15-0.525	Porous devitrified rhyolite.
S141	50	16.4	39.7	2.4	<50	.15- .450	Devitrified rhyolite.
S142	50	13.5	46.3	3.4	<50	.15- .350	Porous devitrified rhyolite.
S143	50	24.4	43.2	1.8	<50	.15- .375	Do.
S147	50	14.8	49.5	3.4	<50	.15- .375	Do.
S149	60	22.4	50.2	2.3	<50	.15- .375	Do.
LARSON CREEK PLUG Intrusive rock							
S151	50	19.2	45.0	2.3	<50	0.15-0.325	Porous devitrified rhyolite.
S153	50	10.0	48.4	4.8	<50	.15- .325	Do.
S156	40	10.9	46.7	4.3	<50	.15- .375	Do.
S158	40	12.1	47.0	3.9	<50	.15- .425	Devitrified rhyolite.
S159	40	13.9	45.3	3.3	<50	.15- .500	Do.
S161	40	12.2	40.2	3.3	<50	.15- .450	Do.

See footnotes at the end of the table.

TABLE 8.—*Uranium, thorium, fluorine, and radioactivity in rhyolite intrusives and associated rocks*—Continued

Sample	eU[1] (ppm)	U[2] (ppm)	Th[2] (ppm)	Th/U	F (ppm)	Instrumental radioactivity reading[3]	Sample description
INTRUSIVES IN UPPER EL PASO CREEK							
Intrusive rock							
G325A	70	36.2	46.7	1.3	100	1-56	Soft devitrified rhyolite.
G325B	60	26.2	49.7	1.9	60	1-50	Devitrified rhyolite.
G325C	580	539.4	10.9	.02	80	5-80	Devitrified rhyolite. Secondary uranium minerals.
G325D	60	35.7	49.3	1.4	<50	1-58	Devitrified rhyolite.
G326A	60	36.9	47.1	1.3	<50	1-54	Do.
G326C	60	28.7	53.2	1.9	70	1-52	Do.
G327A	60	32.7	58.1	1.9	80	1-58	Do.
G327C	50	26.8	54.9	2.1	<50	1-56	Do.
L47	70	40.0	63.5	1.6	---	---	Marginal vitrophyre, East Nellie Creek plug.
L47	---	[4]37.5	[4]55.1	1.5	---	---	Do.

[1] Beta-gamma scaler method, E. J. Fennelly, analyst.

[2] Delayed neutron method, H. T. Millard, analyst.

[3] Readings are uncalibrated field measurements. Those on samples S103-161 were made with Precision Model 111B Deluxe Scintillator, and those on samples G325A-G327C were made with Mount Sopris Model SC 131 Scintillator.

[4] Gamma-ray spectrometry, C. M. Bunker, analyst.

TABLE 11.—*Analyses of samples from study areas*

[Semiquantitative spectrographic analyses, fire assays, radiometric analyses for U_3O_8, X-ray fluorescence for As,
at the Reno Metallurgy Research Center, U.S. Bureau of Mines. Detection limits are in parentheses under
trace amount under Au and Ag; M, major quantity (greater than 7 percent); T. R. S., designates location
location approximate; †, additional data given by sample number in footnote at end of table; na, not
The following elements were looked for and not found or were found in amounts normal for rocks of
Bi, Cd, Co, Ga, Hf, In, La, Li, Nb, P, Pt, Re, Sc, Sn, Ta, Te, Tl, W, and Y; Na and Si were major

Sample	Location T. R. S.	Semiquantitative spectrographic analyses											
		percent						ppm					
		Al (.003)	Ca (.02)	Fe (.004)	Mg (.004)	Mn (.003)	Ti (.001)	B (100)	Ba (1,000)	Cr (30)	Cu (20)	Mo (20)	Ni (20)
1†	46- 5-25*	>5.0	1.0	M	3.0	0.4	2.0	-	-	300	60	-	-
2	46- 5-25*	4	4	2.0	.8	.05	.2	-	-	-	30	-	-
3	45- 4- 6*	M	1	4	.8	.1	.4	100	2,000	60	20	<20	-
4	45- 4- 4*	M	M	7	3	.2	.4	-	1,000	100	60	-	40
5	45- 4- 4*	M	M	6	.8	.2	.4	<100	1,000	100	60	-	40
6†	45- 4-16*	M	1	7	.8	.2	.2	-	1,000	60	80	<20	-
7	44- 4- 2	3	.02	1	.006	.01	.02	-	4,000	30	20	-	-
8	44- 4- 2	M	.06	2	.02	.01	.05	-	<1,000	100	40	-	-
9	44- 4-11	4	.06	2	.2	.03	.1	-	<1,000	70	30	-	-
10	44- 4-11	3	.06	2	.2	.03	.1	-	-	70	30	-	-
11	44- 4-11	4	.5	2	.8	.1	.2	-	-	70	40	-	-
12	44- 4-11	4	.06	2	.2	.05	.2	-	-	-	30	-	-
13	44- 4-11	>5	M	3	.4	.1	.1	-	<1,000	100	300	-	-
14	44- 4-11	.04	M	2	.2	.2	.002	-	-	-	-	-	-
15	44- 4-11	2	4	4	.2	.4	.05	-	-	-	<20	-	-
16	44- 4-10	M	.06	3	.2	.01	.2	-	1,000	100	20	<20	-
17	44- 4-15	>5	4	5	.8	.3	.2	-	-	100	80	-	-
18	44- 4-15	M	.03	2	.4	.01	.2	<100	40,000	100	40	20	-
19	44- 4-15	M	.3	4	.6	.02	.2	<100	3,000	100	20	30	-
20	44- 4-15	M	.3	3	.4	.01	.2	<100	-	100	20	<20	-
21	44- 4-15	4	.03	3	.2	.03	.1	-	-	200	60	100	20
22	44- 4-15	>5	2	3	.8	2	.4	-	4,000	100	60	-	-
23	44- 4-15	4	.06	3	.2	.05	.1	-	-	300	80	20	40
24	44- 4-28	5	.06	3	.2	.02	.1	-	30,000	100	400	-	-
25	44- 4-28	5	.06	2	.2	.02	.1	-	30,000	100	300	-	-
26	44- 4-28	M	.3	1	.4	3	.2	300	2,000	60	200	<20	-
27	44- 4-28	M	.06	.5	.4	.8	.1	300	1,000	60	40	<20	-
28	44- 4-28	2	.1	2	.2	.1	.1	200	1,000	60	200	<20	-
29	44- 4-28	M	.06	4	.8	.2	.2	300	<1,000	100	40	-	-
30	44- 4-28	M	.03	4	.2	.2	.1	200	4,000	300	300	<20	-
31†	44- 4-28	3	.06	4	.05	.05	.05	-	M	300	300	-	-
32†	44- 4-28	5	.03	2	.2	.05	.2	200	<1,000	50	50	-	-
33†	44- 4-28	3	.03	3	.05	.1	.05	100	20,000	300	300	-	-
34†	44- 4-28	4	.06	2	.02	.01	.05	-	M	60	400	20	-
35†	44- 4-28	M	.06	3	.02	.02	.05	-	20,000	60	400	20	-
36	44- 4-28	M	.1	3	.1	.05	.2	300	-	60	80	-	-
37†	44- 4-28	3	.03	2	.06	.02	.05	-	40,000	100	10,000	-	-
38	44- 4-28	M	.1	5	.2	1.6	.2	100	5,000	60	80	30	-
39	44- 4-28	M	.03	3	.1	.05	.1	-	1,000	60	40	70	-
40	44- 4-28	5	.03	3	.4	.02	.2	200	<1,000	50	40	-	-
41	44- 4-28	>5	.06	.8	.2	.05	.2	-	-	200	40	<20	-
42†	44- 4-28	2	.02	5	.01	.05	.03	100	40,000	500	600	100	40
43	44- 4-28	3	.03	.8	.02	.05	.03	-	4,000	300	80	<20	20
44	44- 4-28	5	.03	4	.4	.05	.1	200	20,000	60	80	30	-
45	44- 4-28	5	.03	4	.2	.1	.1	200	5,000	100	160	30	-
46	44- 4-32	M	.03	2	.4	.2	.2	200	1,000	100	80	30	-
47	44- 4-32	M	.2	3	.2	.05	.05	-	<1,000	100	80	20	-
48	44- 4-32	3	.3	3	.2	.05	.05	-	20,000	100	160	30	-
49†	44- 4-32	.2	.06	4	.02	.05	.002	-	M	100	600	70	-
50†	44- 4-32	2	.02	1	.2	.02	.02	<100	1,000	60	600	70	-
51†	44- 4-32	M	.03	2	.4	.1	.2	300	20,000	100	300	70	-
52†	44- 4-32	5	.1	3	.2	M	.05	-	-	30	1,000	20	-
53†	44- 4-32	3	.1	4	.1	M	.05	-	-	30	3,000	-	-
54	44- 4-30*	M	1	4	.4	.05	.2	-	2,000	100	40	-	-
55	44- 4-30*	5	.3	2	.4	.05	.1	-	3,000	60	40	-	-
56	44- 4-30*	5	.1	5	.4	.2	.1	100	1,000	100	40	-	-
57	44- 4-19*	M	>4	7	1.5	.3	.4	100	2,000	60	40	-	-
58	44- 4-19*	5	2	6	1	.2	.4	100	-	60	40	-	-
59†	44- 5-13*	5	4	7	3	.2	.2	-	-	30	30	-	-
60	44- 5-13*	M	>4	7	1.5	.2	.8	100	1,000	60	40	-	-

contiguous to the Uncompahgre Primitive Area

Sb, and W, activation analyses for Ba, and atomic absorption (AA) for all other elements were performed elements listed. –, looked for but not detected; <, less than amount shown; >, greater than amount shown; T, of sample by township north (T) and range west (R) of New Mexico Principal Meridian, and section (S); •, analyzed.

the type sampled and were judged not to be significant except as noted in the footnotes at end of table: Be, constituents in almost all samples]

	Semiquantitative spectrographic analyses--Continued				Fire assay		Atomic absorption analyses			
	ppm				oz/ton		percent			Sample data
Sample	Pb (100)	Sr (1,000)	Zn (1,000)	Zr (70)	Au	Ag	Cu	Pb	Zn	
1†	<100	-	-	300	-	-	na	na	na	Stream-panned concentrate
2	-	-	-	<70	T	T	na	na	na	Stream-sediment
3	200	-	-	300	-	.1	na	na	na	Do.
4	200	1,000	-	<70	-	.1	na	na	na	Outcrop-chip-specimen
5	200	<1,000	-	<70	T	T	na	na	na	Outcrop(talus)-specimen
6†	400	-	-	300	-	.1	na	na	na	Outcrop-chip-6 ft.
7	400	-	-	<70	T	.3	na	na	na	Adit-dump(20 tons)-grab
8	300	-	-	<70	T	.3	na	na	na	Adit-face-chip-3.5 ft.
9	100	-	-	70	T	.1	na	na	na	Outcrop-vein-chip-1.25 ft.
10	100	-	-	<70	T	T	na	na	na	Outcrop-vein-chip-1.75 ft.
11	<100	-	-	70	T	-	na	na	na	Adit-dump(200 tons)-grab
12	-	-	-	<70	T	T	na	na	na	Adit-portal-chip-5 ft.
13	100	1,000	-	70	T	.1	na	na	na	Adit-dump(1,000 tons)-grab
14	-	4,000	-	-	T	T	na	na	na	Do.
15	-	<1,000	-	-	-	-	na	na	na	Adit-portal-stream-sediment
16	-	-	-	<70	T	-	na	na	na	Pit-dump(15 tons)-grab
17	-	-	-	70	T	.2	na	na	na	Adit-dump(800 tons)-grab
18	5,000	-	-	<70	T	-	na	0.10	0.03	Adit-portal-chip-0.5 ft.
19	700	-	-	<70	T	-	na	na	na	Adit-stockpile(100 lb.)-grab
20	100	-	-	<70	T	.1	na	na	na	Adit-portal-vein-chip-7 ft.
21	700	-	-	70	T	.2	na	na	na	Pit-dump(20 tons)-grab
22	<100	1,000	-	70	-	-	na	na	na	Outcrop(talus)-specimen
23	700	-	-	70	-	T	na	na	na	Pit-vein-chip-2 ft.
24	6,000	-	-	70	-	2.2	0.2	.05	na	Pit-vein-chip-1 ft.
25	1,500	-	-	70	-	1.6	.1	.02	na	Pit-dump(15 tons)-grab
26	10,000	-	-	<70	T	.01	na	.21	na	Adit-vein-chip-2 ft.
27	400	-	-	<70	T	-	na	na	na	Adit-vein-chip-5 ft.
28	2,000	-	-	<70	T	.04	na	.09	na	Adit-dump(150 tons)-grab
29	400	-	-	100	T	.2	na	na	na	Pit-face-chip-6.5 ft.
30	1,500	-	1,000	100	T	.8	.02	.06	.06	Shaft-dump(75 tons)-grab
31†	3,500	2,000	1,000	100	.02	2.4	.03	.15	.03	Shaft-stockpile(100 lb.)-grab
32†	600	-	-	100	T	.2	na	na	na	Adit-portal-vein-chip-1 ft.
33†	1,500	-	-	100	T	5.9	.02	.07	na	Shaft-drift-face-vein-chip-3 ft.
34†	6,000	4,000	-	<70	T	8.8	.02	.21	na	Pit-face-veinlet-chip-0.25 ft.
35†	6,000	-	-	<70	-	6.7	.02	.20	na	Pit-face-vein-chip-2.5 ft.
36	1,500	-	-	<70	T	.3	na	.05	na	Pit-face-fault zone-chip-1.5 ft.
37†	6,000	<1,000	-	100	T	62.1	.62	.51	na	Trench-stockpile(50 lb.)-grab.
38	700	-	-	300	-	.2	na	na	na	Pit-dump(5 tons)-grab
39	600	-	-	300	T	.2	na	na	na	Pit-dike-chip-2.5 ft.
40	200	-	-	100	T	.1	na	na	na	Pit-vein-chip-1 ft.
41	100	-	-	100	T	.1	na	na	na	Pit-floor-specimen
42†	1,000	-	-	70	.01	7.4	.05	.27	na	Pit-stockpile(1 ton)-grab
43	2,000	-	-	70	-	2.4	na	.17	na	Adit-dump(30 tons)-grab
44	1,500	-	-	70	T	.5	na	.07	na	Adit-dump(200 tons)-grab
45	6,000	-	-	70	T	1.0	.01	.12	na	Shaft-dump(250 tons)-grab
46	3,000	-	2,000	<70	.01	3.0	na	.10	.10	Shaft-dump(400 tons)-grab
47	3,000	-	7,000	<70	T	2.7	na	.07	.12	Adit-wall-vein-chip-1 ft.
48	8,000	-	3,000	<70	.01	2.7	na	.32	.26	Adit-face-chip-5 ft.
49†	20,000	1,000	30,000	<70	.07	13.6	.07	.94	1.70	Adit-face-vein-chip-1.5 ft.
50†	10,000	-	10,000	<70	.07	14.3	.07	.33	1.57	Adit-raise-wall-specimen
51†	20,000	-	3,000	<70	T	5.6	na	.23	.20	Adit-dump(700 tons)-grab
52†	10,000	-	-	<70	T	2.3	.14	.53	na	Adit-face-vein-chip-3.75 ft.
53†	20,000	-	5,000	<70	-	5.4	.24	.95	.52	Adit-face-muck-grab
54	200	-	-	100	-	-	na	na	na	Outcrop-dike-chip-80 ft.
55	100	-	-	100	-	-	na	na	na	Outcrop-dike-chip-specimen
56	200	<1,000	-	600	-	-	na	na	na	Pit-floor-grab-5 ft.
57	200	<1,000	-	600	-	-	na	na	na	Outcrop(talus)-specimen
58	200	<1,000	-	600	-	.2	na	na	na	Stream-sediment
59†	100	<1,000	-	100	-	-	na	na	na	Outcrop(talus)-specimen
60	200	<1,000	-	100	-	T	na	na	na	Outcrop(talus)-grab-30 ft.

TABLE 11.—*Analyses of samples from study areas*

		Semiquantitative spectrographic analyses											
		percent						ppm					
Sample	Location T. R. S.	Al (.003)	Ca (.02)	Fe (.004)	Mg (.004)	Mn (.003)	Ti (.001)	B (100)	Ba (1,000)	Cr (30)	Cu (20)	Mo (20)	Ni (20)
61†	44- 5-13*	5.0	0.2	1.0	0.2	0.05	0.05	-	-	60	40	-	-
62†	44- 5-13*	M	>4	>7	3	.2	.4	100	1,000	60	40	-	-
63	44- 4-18*	M	>4	7	1.5	.4	.4	100	2,000	60	40	-	-
64	44- 4-18*	5	.5	4	.8	.1	.2	-	-	30	30	-	-
65	44- 4-18*	M	.4	7	1.5	.2	.2	-	1,000	30	30	-	-
66	44- 4- 7*	M	.5	7	1.5	.2	.2	-	1,000	-	20	-	-
67	44- 4- 5*	M	.5	2	.4	.4	.2	100	2,000	60	20	-	-
68†	44- 4- 5*	3	.3	.9	.4	M	.02	-	20,000	-	160	300	70
69	44- 4- 5*	M	2	5	.8	.2	.2	-	1,000	200	80	-	-
70	44- 5- 2*	M	.3	2	.2	.1	.1	<100	1,000	60	80	-	-
71‡	44- 5- 2*	5	.5	2	1.5	.05	.05	<100	-	300	20	-	-
72‡	44- 5- 2*	M	.3	7	.4	.4	.1	<100	<1,000	100	100	-	-
73	44- 5- 2*	5	.2	3	.2	.1	.05	<100	<1,000	60	80	-	-
74	44- 5- 9*	M	.3	3	.4	.1	.1	<100	5,000	100	20	-	-
75‡	44- 5- 9*	M	.3	2	.2	M	.1	<100	2,000	60	40	100	-
76†	44- 5-15*	M	M	7	.8	.2	.2	<100	2,000	100	20	-	-
77†	44- 5-15*	M	.2	4	.3	.2	.2	-	-	30	20	-	-
78†	44- 5-15*	>5	4	4	.4	.1	.2	-	-	70	60	-	-
79†	44- 5-15*	M	.3	2	.8	.1	.2	-	<1,000	100	60	-	-
80‡	44- 5-15*	M	.2	1	.4	.05	.2	-	<1,000	60	40	-	-
81	44- 5-15*	>5	.5	3	.4	.1	.2	-	1,000	70	40	-	-
82	44- 5-15*	>5	.5	3	.4	.1	.2	-	1,000	70	30	-	-
83‡	44- 5-22*	5	.2	1	.4	.05	.05	-	-	60	20	-	-
84‡	44- 5-22*	M	.3	2	.2	.1	.1	-	-	60	40	-	-
85	44- 5-22*	5	4	6	3	.1	.1	-	-	60	160	-	-
86†	44- 5-22*	M	.3	2	.4	.1	.2	-	1,000	60	40	-	-
87	44- 5-22*	.3	.06	4	.2	.05	.02	-	-	200	80	-	-
88	44- 5-27*	M	2	6	.4	.2	.4	-	-	30	40	-	-
89	44- 5-27*	2	.2	6	.4	.1	.1	-	-	60	40	-	-
90	44- 5-25*	4	.5	.4	.1	.1	.1	-	-	-	20	-	-
91	44- 5-25*	.3	M	.2	.1	.4	.01	-	-	-	<20	-	-
92	44- 5-25*	2	M	.4	.1	.2	.1	-	-	-	<20	-	-
93	44- 5-25*	.2	M	.2	.1	.4	.003	-	-	-	<20	-	-
94	44- 5-25*	5	>4	.6	.2	.2	.01	-	-	30	30	-	-
95	44- 5-25*	2	M	1	.1	.2	.05	-	-	-	30	-	-
96	44- 5-25*	1	1	1	.1	.2	.02	-	-	60	40	-	-
97	44- 5-25*	M	.5	4	.8	.2	.2	-	1,000	200	80	-	-
98†	44- 5-26*	M	.3	4	.8	.2	.2	100	1,000	200	3,000	-	-
99	44- 5-26*	.2	M	.3	.2	.2	.003	-	-	-	30	<20	-
100	44- 5-34*	3	.06	3	.1	.05	.1	-	-	60	20	<20	-
101‡	44- 5-33*	1	-	3	.05	.02	.02	100	-	30	3,000	30	-
102	44- 5-33*	3	.03	3	.1	.2	.05	200	-	60	600	20	-
103†	44- 6-36*	M	.03	6	.4	.05	.05	100	1,000	100	10,000	30	-
104‡	44- 6-36*	5	.03	4	.1	.05	.05	100	-	100	5,000	30	-
105	44- 6-36*	M	.2	3	.4	.05	.05	100	<1,000	100	10,000	70	-
106‡	44- 6-36*	1	-	3	.1	.05	.01	-	-	100	30,000	200	-
107	44- 6-36*	M	.06	3	.4	.1	.1	100	<1,000	100	5,000	40	-
108	44- 6-36*	M	.03	2	.4	.05	.1	<100	-	100	5,000	30	-
109	44- 6-36*	2	.06	5	.2	.05	.1	-	-	60	600	20	-
110‡	44- 6-25*	4	.06	2	.2	.05	.05	-	-	60	40	-	-
111	44- 6-26*	M	.1	3	.4	.1	.2	200	1,000	60	40	<20	-
112	44- 6-26*	M	.1	3	.4	.03	.2	200	1,000	60	20	<20	-
113	44- 6-26*	M	.06	3	.4	.2	.2	-	2,000	60	40	-	-
114	44- 6-27*	>5	.3	2	.2	.1	.05	-	-	70	30	-	-
115†	44- 6-27*	>5	.3	2	.2	.1	.05	-	-	70	30	-	-
116	44- 5-20*	M	.2	1	.1	.05	.2	-	-	60	20	20	-
117†	44- 5-20*	4	.1	.6	.02	.02	.2	-	-	-	20	-	-
118	44- 5-17*	M	4	7	1.5	.2	.4	<100	2,000	300	80	-	-
119	44- 5-17*	M	4	6	1.5	.2	.4	<100	<1,000	100	40	-	-
120‡	44- 5-17*	M	M	>7	1.5	.2	1	<100	<1,000	300	80	-	-

contiguous to the Uncompahgre Primitive Area—Continued

	Semiquantitative spectrographic analyses--Continued				Fire assay		Atomic absorption analyses			Sample data
	ppm				oz/ton		percent			
Sample	Pb (100)	Sr (1,000)	Zn (1,000)	Zr (70)	Au	Ag	Cu	Pb	Zn	
61†	600	-	-	<70	T	0.2	na	na	na	Trench-wall-chip-1 ft.
62†	1,000	<1,000	-	300	-	.2	na	0.02	na	Pit-floor-specimen
63	200	<1,000	-	600	-	-	na	na	na	Outcrop-chip-specimen
64	-	<1,000	-	100	-	-	na	na	na	Trench-floor-chip-4 ft.
65	100	<1,000	-	100	-	-	na	na	na	Trench-wall-chip-2 ft.
66	100	<1,000	-	300	-	-	na	na	na	Outcrop-chip-3 ft.
67	200	-	-	<70	-	-	na	na	na	Outcrop-chip-specimen
68†	-	1,000	-	300	-	-	0.03	na	na	Trench-wall-chip-10 ft.
69	100	-	-	-	-	-	na	na	na	Trench-floor-grab-10 ft.
70	200	-	-	<70	-	.2	na	na	na	Outcrop-dike-chip-specimen
71†	200	-	-	<70	T	-	na	na	na	Outcrop(talus)-specimen
72†	3,000	-	-	<70	T	.1	na	.04	na	Do.
73	200	-	-	<70	T	.1	na	na	na	Do.
74	100	-	-	<70	T	.1	na	na	na	Do.
75†	100	-	-	<70	-	.1	na	na	na	Pit-vein-chip-1 ft.
76†	100	<1,000	-	<70	-	.1	na	na	na	Outcrop-chip-specimen
77†	700	-	-	<70	T	.1	na	na	na	Outcrop-chip-100 ft.
78†	100	-	-	<70	T	.1	na	na	na	Outcrop-chip-6 ft.
79†	700	-	-	<70	T	T	na	na	na	Outcrop-chip-1 ft.
80†	200	-	-	<70	T	.1	na	na	na	Outcrop-chip-10 ft.
81	100	-	-	100	T	.1	na	na	na	Trench-floor--grab-50 ft.
82	100	-	-	100	T	T	na	na	na	Trench-floor-grab-100 ft.
83†	200	-	-	<70	T	.3	na	na	na	Outcrop(talus)-specimen
84†	200	-	-	70	-	-	na	na	na	Do.
85	100	-	-	70	-	-	.01	na	na	Do.
86†	200	-	-	100	-	-	na	na	na	Do.
87	-	-	-	-	-	-	na	na	na	Do.
88	400	-	-	<70	T	.1	na	na	na	Outcrop-dike-chip-specimen
89	200	-	-	<70	T	.2	na	na	na	Outcrop-dike-chip-1 ft.
90	-	-	-	<70	-	-	na	na	na	Pit-vein-chip-1.5 ft.
91	100	-	-	<70	T	-	na	na	na	Pit-vein-chip-0.5 ft.
92	<100	-	-	<70	T	-	na	na	na	Pit-vein-chip-3 ft.
93	100	-	-	<70	T	-	na	na	na	Pit-floor-specimen
94	<100	-	-	<70	T	-	na	na	na	Pit-vein-chip-6 ft.
95	-	-	-	<70	T	.01	na	na	na	Pit-floor-specimen
96	-	-	-	<70	T	.01	na	na	na	Do.
97	100	-	-	70	-	-	na	na	na	Pit-dump(3 tons)-grab
98†	1,500	-	-	70	-	.9	.20	.04	na	Pit-vein-chip-1.85 ft.
99	100	-	-	<70	T	-	na	na	na	Pit-stockpile(10 tons)-grab
100	400	-	-	<70	T	.1	na	na	na	Stream-grab-specimen
101†	80,000	-	10,000	<70	.02	9.8	.41	4.15	2.22	Adit-dump(4,000 tons)-grab
102	30,000	-	1,000	<70	T	1.4	.05	.99	.19	Adit-portal-vein-chip-7 ft.
103†	50,000	-	5,000	<70	.02	5.9	.42	1.48	.32	Shaft-dump(1,000 tons)-grab
104†	100,000	-	40,000	<70	.01	2.5	1.01	3.20	3.74	Adit-back vein-chip-1.25 ft.
105	60,000	-	30,000	<70	.01	2.5	.49	5.32	3.22	Adit-dump(400 tons)-grab
106†	M	-	80,000	<70	.05	11.6	1.74	19.0	4.56	Adit-stope-vein-chip-2 ft.
107	60,000	-	20,000	<70	T	1.4	.32	2.16	2.00	Adit-dump(800 tons)-grab
108	60,000	-	20,000	<70	.01	1.6	.35	3.02	1.60	Shaft-dump(500 tons)-grab
109	20,000	-	3,000	<70	T	1.6	.13	1.85	.32	Adit-face-vein-chip-3 ft.
110†	200	-	-	<60	-	.2	na	na	na	Trench-wall-chip-100 ft.
111	500	-	-	300	T	.2	na	na	na	Trench-wall-chip-50 ft.
112	600	-	-	100	T	.2	na	na	na	Trench-wall-chip-6 ft.
113	200	-	-	100	T	T	na	na	na	Outcrop-dike-chip-9 ft.
114	100	-	-	70	T	.1	na	na	na	Pit-floor-specimen
115†	100	-	-	70	T	.1	na	na	na	Do.
116	100	-	-	<70	-	T	na	na	na	Trench-floor-specimen
117†	1,500	-	-	<70	T	.1	na	.01	na	Adit-portal-floor-specimen
118	100	-	-	<70	-	.2	na	na	na	Outcrop(talus)-specimen
119	100	-	-	<70	T	.2	na	na	na	Do.
120†	100	-	-	<70	-	-	na	na	na	Do.

TABLE 11.—*Analyses of samples from study areas*

		Semiquantitative spectrographic analyses											
		percent						ppm					
Sample	Location T. R. S.	Al (.003)	Ca (.02)	Fe (.004)	Mg (.004)	Mn (.003)	Ti (.001)	B (100)	Ba (1,000)	Cr (30)	Cu (20)	Mo (20)	Ni (20)
121	44- 6-15*	>5.0	0.06	1.0	0.05	0.006	0.2	-	-	100	40	60	-
122	44- 6-15*	>5	.1	5	2	.05	.2	-	-	100	40	<20	-
123	44- 6-15*	>5	.06	4	.8	.03	.4	<100	-	100	100	<20	-
124	44- 6-15*	>5	.07	5	.8	.03	.4	<100	-	100	100	<20	-
125	44- 6-10*	>5	.03	5	2	.05	.2	-	-	100	40	<20	-
126	44- 6-10*	>5	.1	4	.8	.05	.4	-	-	100	60	<20	-
127	44- 6-10*	>5	.03	3	.2	.03	.4	-	-	100	40	<20	-
128	44- 6-10*	>5	4	4	.8	1	.2	-	-	300	600	-	-
129†	44- 6-10*	4	.03	1	<.004	.01	.1	100	-	100	40	-	-
130†	44- 6-10*	1	.03	4	<.004	.03	.2	-	4,000	500	80	<20	-
131†	44- 6- 1*	2	.5	M	.4	.4	6	-	-	300	80	-	-
132†	44- 6- 1*	3	.5	M	.4	.4	3	-	-	300	60	-	-
133	44- 6- 1*	M	.3	5	1.5	.05	.2	-	<1,000	100	40	-	-
134	44- 6- 1*	M	.3	4	1.5	.05	.2	-	<1,000	60	80	-	-
135	44- 6- 1*	5	.3	4	.8	.1	.4	-	-	100	40	-	-
136†	44- 6- 1*	>5	2	4	.8	.2	.4	-	-	100	60	<20	-
137	44- 6- 1*	>5	1	5	2	.2	.4	-	-	100	60	<20	-
138	45- 6-36*	5	.1	2	.8	.02	.2	-	-	60	40	30	-
139	45- 6-36*	2	.3	.4	.1	.4	.1	-	-	100	40	<20	-
140	45- 6-36*	>5	.3	2	.2	.4	.2	-	-	100	60	<20	-
141	45- 6-36*	>5	.5	4	3	.2	.4	-	-	100	60	<20	-
142	45- 6-36*	>5	.5	4	3	.2	.4	-	-	100	60	<20	-
143	45- 6-36*	>5	2	4	.8	.1	.4	-	-	100	40	-	-
144	45- 6-36*	5	.06	4	.8	.05	.2	-	-	100	40	30	-
145	45- 6-36*	M	.1	4	1.5	.2	.2	-	1,00C	200	40	30	-
146	45- 6-35*	M	.3	4	1.5	.05	.2	-	1,000	200	100	30	-
147	45- 6-35*	M	.2	3	.8	.02	.2	-	1,000	100	80	30	-
148	45- 6-26*	5	.5	6	.8	.02	.2	-	-	100	80	30	-
149†	45- 6-26*	2	.1	M	.4	.2	.8	-	-	300	60	-	-
150	45- 6-34*	3	-	.2	.006	.006	.1	-	-	-	20	20	-
151	45- 6-34*	>5	.1	4	.6	.4	.2	<100	2,000	-	40	-	-
152	45- 6-34*	>5	1	4	2	.2	.2	-	-	100	40	-	-
153	45- 6-34*	5	>4	4	.8	.2	.2	-	2,000	-	40	-	-
154	45- 6-34*	5	4	4	.8	.2	.2	-	-	-	60	-	-
155	45- 6-34*	5	.25	4	.6	.05	.2	<100	-	-	40	-	-
156†	45- 6-34*	M	1	5	1.5	.1	.4	100	1,000	60	40	<20	-
157	45- 7-22*	4	.5	2	.4	.05	.1	-	-	100	20	-	-
158	45- 7-21	3	.5	.9	.2	.03	.05	-	-	<30	10	-	-
159	45- 7-21	4	.5	2	.4	.05	.1	-	-	100	200	-	-
160†	44- 7- 3*	1	M	-	2	2	.09	-	M	500	300	-	40
161	44- 7- 3*	.2	M	2	.1	.05	.006	-	-	100	20	-	20
162	44- 7- 3*	.7	1	1	.8	-	.02	-	4,000	300	40	30	40
163	44- 7- 3*	3	M	.5	.8	2	.1	-	-	60	20	-	20
164	44- 7- 3*	3	M	1	.1	.03	.1	-	-	60	<20	-	-
165†	44- 7- 3*	>5	.3	-	.2	.4	.4	-	20,000	50	300	-	40
166†	44- 7- 3*	M	M	-	3	.4	.4	-	-	30	200	-	-
167	44- 7- 3*	5	M	-	3	3	.2	-	-	500	300	-	40
168†	44- 7- 3*	.1	.3	-	.2	2	.01	-	-	300	300	-	40
169	44- 7- 3*	>5	.4	-	3	2	.2	-	-	300	100	-	40
170	44- 7- 2*	5	M	-	2	.2	.2	-	-	100	100	-	-
171	44- 7- 2*	>5	.5	-	.2	.4	.2	-	-	200	100	-	-
172	44- 7- 2*	>5	.4	-	2	.4	.3	-	-	200	200	-	-
173	44- 7-10*	5	.06	2	.1	.05	.05	-	<1,000	70	30	-	-
174	44- 7-10*	4	-	2	.02	.03	.05	-	4,000	100	40	-	-
175	44- 7-15*	2	.03	1	.07	.02	.2	-	-	60	30	-	-
176	44- 7-15*	M	.06	1	.1	.02	.2	-	-	30	20	-	-
177	44- 7-15*	3	-	.5	.01	.02	.2	-	<1,000	60	40	-	-
178	44- 7-14*	>5	.5	3	.8	.05	.1	-	-	200	40	-	-
179	44- 7-13*	5	.1	2	.1	.02	.05	-	-	30	40	-	-
180	44- 7-24*	M	.1	2	.2	.05	.1	-	4,000	30	40	-	-

contiguous to the Uncompahgre Primitive Area—Continued

	Semiquantitative spectrographic analyses--Continued				Fire assay		Atomic absorption analyses			Sample data
	ppm				oz/ton		percent			
Sample	Pb (100)	Sr (1,000)	Zn (1,000)	Zr (70)	Au	Ag	Cu	Pb	Zn	
121	500	-	-	100	-	-	na	na	na	Trench-wall-chip-16 ft.
122	400	-	-	200	-	-	na	na	na	Trench-floor-grab-100 ft.
123	400	<1,000	-	100	-	0.1	na	na	na	Trench-wall-chip-24 ft.
124	100	-	-	100	T	-	na	na	na	Trench-floor-specimen
125	100	-	-	100	T	T	na	na	na	Outcrop-chip-16 ft.
126	100	-	-	100	-	.1	na	na	na	Shaft-vein-chip-4 ft.
127	700	1,000	-	300	T	.1	na	na	na	Pit-wall-chip-6 ft.
128	400	<1,000	-	100	T	-	0.05	na	na	Outcrop(talus)-specimen
129†	700	<1,000	-	70	0.02	1.2	na	na	na	Pit-wall-chip-3 ft.
130†	700	1,000	-	70	.04	9.6	na	na	na	Pit-vein-chip-2 in.
131†	200	-	-	300	-	-	na	na	na	Stream-panned concentrate
132†	200	-	-	1,000	-	-	na	na	na	Do.
133	100	-	-	100	T	T	na	na	na	Outcrop-dike-chip-2 ft.
134	100	-	-	100	T	.1	na	na	na	Do.
135	400	-	-	100	-	.2	na	na	na	Pit-face-chip-7 ft.
136†	100	-	-	100	-	-	na	na	na	Adit-dump(700 tons)-grab
137	400	-	-	100	T	-	na	na	na	Adit-vein-chip-6 ft.
138	400	-	-	70	.09	.2	na	na	na	Pit-dump(25 tons)-grab
139	100	-	-	70	T	-	na	na	na	Outcrop-chip-10 ft.
140	100	-	-	100	-	T	na	na	na	Outcrop-dike-chip-9 ft.
141	400	-	-	100	-	-	na	na	na	Adit-dump(1,000 tons)-grab
142	400	-	-	100	-	-	na	na	na	Adit-dump(1,000 tons)-grab-specimen
143	-	-	-	100	-	.1	na	na	na	Adit-dump(600 tons)-grab
144	100	-	-	70	T	.1	na	na	na	Pit-dike-chip-4 ft.
145	100	-	-	100	-	-	na	na	na	Outcrop-dike-chip-7 ft.
146	400	-	-	100	-	-	na	na	na	Outcrop-dike-chip-0.5 ft.
147	400	-	-	100	-	.1	na	na	na	Outcrop-dike-chip-1.25 ft.
148	100	-	-	70	T	.1	na	na	na	Adit-dump(25 tons)-grab
149†	90	-	-	1,000	-	T	na	na	na	Stream-panned concentrate
150	400	<1,000	-	70	T	-	na	na	na	Outcrop-vein-chip-0.5 ft.
151	100	-	-	200	T	-	na	na	na	Do.
152	-	-	-	100	T	.1	na	na	na	Shaft-dump(25 tons)-grab
153	100	-	-	100	-	-	na	na	na	Adit-face-veinlet-chip-0.5 in.
154	100	-	-	100	-	T	na	na	na	Adit-face-vein-chip-1.25 ft.
155	100	-	-	200	T	-	na	na	na	Outcrop-gouge-chip-0.5 ft.
156†	200	-	-	300	T	T	na	na	na	Stream-sediment
157	-	-	-	70	-	.1	na	na	na	Adit-dump(60 tons)-grab
158	-	-	-	-	-	-	na	na	na	Adit-dump(50 tons)-grab
159	-	-	-	70	-	-	na	na	na	Adit-dump(500 tons)-grab
160†	2,000	-	-	-	-	.4	na	0.03	na	Pit-vein-chip-3 ft.
161	400	-	1,000	70	-	4.4	na	na	0.12	Pit-dump(15 tons)-grab
162	6,000	-	2,000	-	-	.5	na	.32	.16	Adit-stockpile(100 lb.)-grab
163	500	-	-	70	-	-	na	na	na	Adit-dump(80 tons)-grab
164	-	-	-	70	-	-	na	na	na	Shaft-dump(30 tons)-grab
165†	3,000	-	-	200	-	-	.01	.07	na	Adit-vein-chip-5 ft.
166†	-	-	-	300	-	-	na	na	na	Adit-stope-muck-grab
167	6,000	-	-	<70	-	.3	.02	.31	na	Adit-dump(600 tons)-grab
168†	3,000	-	-	-	-	-	.04	.06	na	Adit-face-vein-chip-1 ft.
169	-	-	-	300	-	-	na	na	na	Adit-face-chip-4 ft.
170	-	-	-	-	-	-	na	na	na	Adit-face-chip-3 ft.
171	-	-	-	-	-	-	na	na	na	Adit-face-muck-grab
172	-	-	-	200	-	-	na	na	na	Pit-vein-chip-1 ft.
173	<100	-	-	70	T	-	na	na	na	Adit-face-chip-4 ft.
174	<100	-	-	<70	T	-	na	na	na	Pit-vein-chip-2 ft.
175	500	-	-	<70	-	-	na	na	na	Adit-dump(100 tons)-grab
176	400	<1,000	-	<70	-	T	na	na	na	Adit-portal-vein-chip-2 ft.
177	400	<1,000	-	<70	T	.1	na	na	na	Adit-portal-vein-chip-2.5 ft.
178	200	-	-	70	T	.2	na	na	na	Outcrop-dike-chip-2.5 ft.
179	400	-	-	<70	T	.1	na	na	na	Outcrop-chip-35 ft.
180	200	-	-	<70	T	.2	na	na	na	Outcrop-chip-50 ft.

TABLE 11.—*Analyses of samples from study areas*

		Semiquantitative spectrographic analyses											
		percent						ppm					
Sample	Location T. R. S.	Al (.003)	Ca (.02)	Fe (.004)	Mg (.004)	Mn (.003)	Ti (.001)	B (100)	Ba (1,000)	Cr (30)	Cu (20)	Mo (20)	Ni (20)
181	44- 7-24*	M	0.2	4.0	0.2	0.02	0.1	-	1,000	30	40	-	-
182	44- 7-23*	>5.0	.5	3	.8	.8	.1	-	-	200	200	-	<20
183	44- 7-23*	M	.2	6	.4	.05	.2	-	-	60	80	-	-
184†	44- 7-16*	2	.04	1	.1	.02	.05	<100	<1,000	60	80	-	-
185	44- 7-16*	M	.3	3	.4	.05	.2	-	<1,000	60	80	-	-
186	44- 7-21*	4	.1	2	.3	.03	.1	-	-	100	80	-	-
187	44- 7-21*	4	.1	2	.3	.03	.1	-	-	100	80	-	-
188	44- 7-21*	3	.1	4	.4	.05	.1	-	-	-	40	-	-
189†	44- 7-17*	.5	.03	4	.006	.02	.2	-	-	50	10,000	20	-
190	44- 7-17*	2	.02	3	.05	.2	.02	-	-	100	300	30	-
191†	44- 7-17*	1	.03	3	.1	.2	.1	100	-	100	80	70	-
192	44- 7-17*	4	M	6	.8	.05	.1	100	-	100	40	-	-
193†	44- 7-17*	.2	-	2	.05	.1	.01	-	-	50	300	70	-
194	44- 7-17*	.7	-	1	.05	.1	.02	-	-	50	80	70	-
195†	44- 7-17*	M	.1	3	.5	.4	.2	300	-	100	40	-	-
196†	44- 7-17*	.7	.03	1	.01	.03	.02	-	-	300	600	<20	20
197†	44- 7-18*	.2	.1	2	.5	.2	.2	300	-	100	600	-	-
198	44- 7-18*	1	.03	2	.01	.05	.05	-	-	300	60	20	20
199	44- 7-18*	3	.5	3	.2	.2	.05	-	40,000	300	300	<20	20
200†	44- 7-18*	1	-	4	.01	.03	.05	-	30,000	500	300	70	20
201	44- 7-18*	.2	.06	3	.05	.05	.05	100	-	100	40	-	-
202	44- 7- 7*	M	.03	4	.4	.01	.2	100	-	50	200	50	-
203	44- 7- 7*	5	.06	3	.2	.05	.1	-	40,000	60	200	30	-
204	44- 7-18*	3	1	M	.8	.1	.1	-	-	60	200	20	-
205	44- 7-18*	2	.5	2	.3	.2	.06	-	-	300	100	<20	20
206	44- 7-18*	M	.06	3	.2	.03	.2	200	-	50	100	30	-
207	44- 7-18*	.2	-	1	<.004	.003	.006	-	-	300	200	30	20
208	44- 7-18*	1	.4	.4	.3	.2	.02	-	-	200	1,000	<20	20
209†	44- 8-12*	2	.06	3	.1	.8	.05	-	7,000	50	3,000	50	-
210†	44- 8-12*	3	.3	2	.3	.4	.1	-	M	300	300	30	20
211†	44- 8-12*	2	M	2	.1	.2	.1	100	4,000	30	40	<20	-
212†	44- 8-12*	.2	.06	1	.02	.4	.006	100	40,000	-	1,000	-	-
213†	44- 8-12*	.3	.06	1	.05	.2	.006	-	M	60	1,000	30	-
214	44- 8-12*	M	.3	4	.8	5	.2	300	2,000	60	400	30	-
215	44- 8-12*	2	.5	3	.4	3	.1	-	1,000	60	300	30	-
216†	44- 8-12*	2	.3	1	.3	.2	.05	100	6,000	60	600	-	-
217†	44- 8-12*	.7	.03	1	.1	.05	.01	-	4,000	60	600	70	-
218	44- 8-12*	4	M	2	1.5	.4	.2	200	2,000	60	80	-	-
219	44- 8-12*	1	.5	1	.4	1	.1	200	2,000	60	200	-	-
220†	44- 7- 7*	.7	-	4	.1	.05	.01	-	1,000	60	3,000	50	-
221†	44- 7- 7*	2	-	2	.2	.05	.01	-	-	60	1,000	70	-
222	44- 7- 7*	5	2	2	3	.2	.1	200	2,000	60	100	-	-
223	44- 7- 7*	.7	1	1	.1	.1	.01	-	-	60	40	30	-
224†	44- 7- 7*	.3	.2	4	.1	5	.02	-	M	60	200	30	-
225	44- 7- 7*	5	4	1	1.5	.05	.1	1,000	-	30	20	-	-
226†	44- 7- 7*	4	.2	1	.4	.05	.05	1,000	-	30	20	30	-
227†	44- 7- 7*	.7	.1	1	.1	.1	.003	-	70,000	30	80	70	-
228†	44- 7- 7*	.3	.3	.4	.05	.1	.003	-	M	30	40	500	-
229†	44- 7- 7*	2	.5	3	.2	.1	.02	-	M	60	160	30	-
230	44- 7- 7*	.1	M	.4	.1	.4	-	-	30,000	30	80	30	-
231	44- 7- 6*	.7	.1	1	.2	.05	.05	-	-	30	20	-	-
232	44- 7- 6*	2	.5	2	.2	.05	.05	-	-	300	80	30	-
233	44- 7- 6*	.02	M	.2	.2	.05	-	-	-	-	20	-	-
234	44- 7- 6*	4	4	1	.8	.05	.05	1,000	-	60	40	-	-
235	44- 7- 6*	3	.2	1	.8	.05	.05	1,000	-	30	40	-	-
236	44- 7- 6*	5	4	1	1.5	.05	.1	1,000	-	30	20	-	-
237	44- 7- 6*	2	M	.4	.4	.05	.05	-	-	60	40	-	-
238	44- 7- 6*	3	M	.4	.8	.05	.1	-	-	60	40	20	-
239	44- 8-12*	2	1	.4	.2	.1	.02	-	-	-	300	-	-
240	44- 8- 1*	2	M	.6	.4	.2	.02	-	-	-	300	-	-

contiguous to the Uncompahgre Primitive Area—Continued

	Semiquantitative spectrographic analyses--Continued				Fire assay		Atomic absorption analyses			
	ppm				oz/ton		percent			Sample data
Sample	Pb (100)	Sr (1,000)	Zn (1,000)	Zr (70)	Au	Ag	Cu	Pb	Zn	
181	400	-	-	<70	-	T	na	na	na	Outcrop-chip-10 ft.
182	200	-	-	70	T	0.1	na	na	na	Outcrop-chip-6 ft.
183	700	-	-	<70	T	.2	na	na	na	Outcrop-chip-15 ft.
184†	100	1,000	-	<70	T	T	na	na	na	Adit-dump(150 tons)-grab
185	100	1,000	-	<70	T	T	na	na	na	Adit-portal-vein-chip-4 ft.
186	-	-	-	70	T	T	na	na	na	Adit-face-chip-3 ft.
187	-	-	-	70	-	-	na	na	na	Do.
188	700	-	-	100	T	.1	na	na	na	Adit-portal-vein-chip-1.5 ft.
189†	700	-	1,000	100	0.09	12.7	1.68		4.7	Shaft-stockpile(150 lb.)-grab
190	M	-	M	100	.01	6.9	na	1.36	2.77	Shaft-dump(600 tons)-grab
191†	20,000	-	5,000	100	T	15.3	na	1.08	.57	Shaft-dump(250 tons)-grab
192	100	-	-	100	T	T	na	na	na	Shaft-dump(150 tons)-grab
193†	10,000	-	1,000	100	T	9.5	na	.58	.18	Shaft-dump(500 tons)-grab
194	10,000	-	-	100	.01	4.5	na	.47	na	Adit-dump(800 tons)-grab
195†	700	-	2,000	100	T	.2	na	na	.08	Adit-dump(150 tons)-grab
196†	M	-	3,000	70	T	39.8	.07	6.97	.05	Adit-dump(75 tons)-grab
197†	700	-	1,000	100	-	.2	.02	.02	.04	Adit-face-chip-4 ft.
198	700	-	-	70	T	.3	na	na	na	Adit-dump(400 tons)-grab
199	6,000	-	20,000	<70	T	6.1	na	.45	1.07	Adit-dump(600 tons)-grab
200†	10,000	-	5,000	<70	.01	6.3	na	1.08	.23	Adit-dump(1,500 tons)-grab
201	400	-	1,000	100	T	.3	na	na	.03	Adit-dump(600 tons)-grab
202	200	-	-	100	T	.1	na	na	na	Adit-wall-vein-chip-6 ft.
203	10,000	-	2,000	<70	T	.5	na	.12	.05	Adit-face-chip-3 ft.
204	700	-	-	<70	T	.1	na	na	na	Pit-dump(50 tons)-grab
205	400	-	-	<70	T	4.9	na	na	na	Adit-face-chip-6 ft.
206	6,000	-	3,000	100	T	.5	na	.21	.29	Pit-face-vein-chip-1 ft.
207	10,000	-	6,000	-	T	3.8	na	.91	.52	Pit-dump(200 tons)-grab
208	300	-	-	-	T	1.2	.19	na	na	Adit-stockpile(500 lb.)-grab
209†	M	1,000	M	100	T	29.5	.15	8.28	6.36	Adit-stockpile(1 ton)-grab
210†	10,000	-	3,000	<70	T	22.4	na	.45	.13	Adit-stockpile(300 lb.)-grab
211†	30,000	<1,000	3,000	<70	.02	20.2	.08	1.06	.29	Adit-stockpile(1 ton)-grab
212†	10,000	<1,000	40,000	<70	.02	6.2	.05	1.11	2.22	Adit-stockpile(1.5 tons)-grab
213†	10,000	2,000	10,000	-	T	14.7	.12	.56	.75	Adit-stockpile(600 lb.)-grab
214	8,000	-	4,000	<70	T	1.6	na	.44	.22	Adit-face-vein-chip-2.5 ft.
215	400	-	-	<70	-	.3	na	na	na	Adit-face-vein-chip-1.5 ft.
216†	8,000	-	2,000	<70	T	2.9	0.7	.15	.10	Adit-muck pile
217†	20,000	-	-	-	.02	5.6	.13	.79	na	Adit-back-chip-2 ft.
218	700	-	-	100	T	.4	na	na	na	Adit-wall-vein-chip-0.75 ft.
219	1,000	-	-	<70	-	.4	na	.03	na	Adit-wall-vein-chip-1 ft.
220†	50,000	-	5,000	-	.27	22.7	.30	1.32	.44	Adit-face-chip-2 ft.
221†	50,000	-	3,000	-	.12	10.8	.16	1.23	.19	Adit-face-vein-chip-2 ft.
222	500	-	-	<70	T	.3	na	na	na	Adit-caved stope-grab
223	200	-	-	-	-	.3	na	na	na	Adit-wall-vein-chip-4 ft.
224†	10,000	5,000	-	-	.01	1.1	na	1.34	na	Adit-wall-vein-chip-7 ft.
225	100	-	-	70	-	-	na	na	na	Adit-face-chip-4 ft.
226†	3,000	-	1,000	70	T	2.3	na	.16	.15	Adit-face-chip-4 ft.
227†	30,000	8,000	40,000	-	T	1.4	na	1.11	2.67	Adit-stockpile(2 tons)-grab
228†	10,000	4,000	3,000	-	-	.6	na	.51	.12	Do.
229†	50,000	4,000	5,000	70	T	3.3	na	2.00	.30	Do.
230	3,000	1,000	2,000	-	-	.7	na	.27	.05	Adit-winze-vein-chip-2.5 ft.
231	-	-	-	70	-	-	na	na	na	Adit-face-chip-5 ft.
232	200	-	-	-	T	-	na	na	na	Adit-wall-vein-chip-1.5 ft.
233	-	-	-	-	-	-	na	na	na	Adit-face-chip-2 ft.
234	100	-	-	<70	-	-	na	na	na	Adit-face-chip-4 ft.
235	100	-	-	<70	-	-	na	na	na	Do.
236	100	-	-	70	-	.1	na	na	na	Adit-stope-grab
237	800	-	-	-	-	.1	na	na	na	Adit-face-chip-4 ft.
238	100	-	-	<70	-	T	na	na	na	Adit-face-chip-4.5 ft.
239	4,000	-	4,000	100	-	.2	na	.15	.20	Pit-dump(10 tons)-grab
240	5,000	-	5,000	70	T	.1	na	.40	.36	Adit-face-vein-chip-3 ft.

TABLE 11.—*Analyses of samples from study areas*

		Semiquantitative spectrographic analyses											
		percent						ppm					
Sample	Location T. R. S.	Al (.003)	Ca (.02)	Fe (.004)	Mg (.004)	Mn (.003)	Ti (.001)	B (100)	Ba (1,000)	Cr (30)	Cu (20)	Mo (20)	Ni (20)
241	44- 8- 1*	4.0	1.0	0.6	0.4	0.05	0.05	200	-	-	40	-	-
242	44- 8- 1*	1	.4	.6	.4	.05	.05	100	-	-	40	-	-
243	44- 8- 1*	2	M	.4	.2	.05	.02	200	-	-	600	-	-
244	44- 8- 1*	3	M	2	.8	.05	.1	100	-	60	40	-	-
245†	44- 8- 1*	2	2	2	.4	.05	.1	200	-	60	10,000	30	-
246†	44- 8- 1*	3	.06	3	.8	.2	.1	-	-	300	60	<20	1,000
247	44- 7- 6*	2	.02	2	.05	.01	.05	-	-	30	40	20	-
248	44- 7- 6*	4	.06	2	.1	.1	.1	-	-	200	60	<20	-
249	45- 7-31*	>5	1	3	.8	.1	.1	-	-	100	40	<20	-
250	45- 7-31*	2	.06	1	.1	.1	.06	-	-	100	60	<20	20
251	45- 8-36*	4	.06	2	.1	.03	.07	-	-	70	30	-	<20
252	45- 8-36*	4	.1	2	.1	.05	.07	-	-	70	60	-	<20
253	44- 8- 2*	2	>4	2	.8	.05	.1	-	-	200	300	-	20
254	44- 8- 2*	3	>4	2	2	.05	.1	-	-	200	80	-	20
255	44- 8-10*	.3	M	-	.4	.02	.02	-	-	-	20	-	-
256	44- 8-10*	3	M	-	.4	.02	.02	-	-	-	20	-	-
257	44- 8-10*	2	.02	2	.1	.05	.05	-	-	100	60	-	-
258	44- 8-11*	5	M	2	.8	.1	.2	300	-	100	80	-	-
259†	44- 8-11*	1	.13	3	.8	.4	.1	100	-	-	400	-	-
260†	44- 8-11*	3	.13	4	.4	.05	.2	-	-	-	40,000	30	-
261†	44- 8-11*	M	.13	2	.2	.1	.1	100	40,000	-	30,000	30	-
262†	44- 8-11*	2	3	2	.3	3	.05	-	70,000	30	1,500	30	-
263	44- 8-11*	4	M	3	3	.1	.1	100	40,000	60	1,500	70	-
264	44- 8-22*	M	.5	5	.8	.05	.2	-	-	100	60	-	-
265	44- 8-22*	5	4	4	.8	.1	.2	-	-	100	40	-	-
266†	44- 8-23*	3	.3	2	.6	.1	.1	-	1,000	60	80	30	-
267	44- 8-23*	M	.2	1	.6	.2	-	200	-	60	1,500	-	-
268	44- 8-23*	M	1	4	.8	2	.1	100	1,000	60	1,500	-	-
269†	44- 8-23*	3	1	1	.4	1.6	.05	-	-	30	7,000	-	-
270†	44- 8-23*	2	2	1	.6	M	.02	-	3,000	30	7,000	-	-
271	44- 8-23*	5	5	1	.8	.1	-	100	-	30	80	-	-
272	44- 8-23*	M	3	1	.8	.1	-	100	-	30	80	-	-
273	44- 8-24*	M	4	1	1	.2	.1	100	-	100	300	-	-
274†	44- 8-24*	5	1	4	1	6	.1	100	1,000	100	20,000	-	-
275	44- 8-23*	3	M	4	.4	.1	.1	100	20,000	50	3,000	-	-
276†	44- 8-24*	3	.06	.2	.4	.02	.1	100	-	100	10,000	30	-
277	44- 8-23*	.3	.1	4	.2	.04	.02	-	-	100	160	30	-
278	44- 8-23*	.1	M	2	.4	.4	-	-	2,000	-	20	-	-
279†	44- 8-23*	M	-	3	.4	.05	.2	2,000	4,000	100	30	70	-
280	44- 8-23*	5	1	2	.8	.1	.05	200	-	50	40	-	-
281	44- 8-23*	4	M	2	.8	.4	.05	-	2,000	-	40	-	-
282	44- 8-23*	3	M	1	.4	.2	.05	-	-	50	40	30	-
283	44- 8-23*	.7	1	2	.2	.2	.02	-	-	100	160	-	-
284	44- 8-23*	M	1	2	1.5	.1	.2	1,000	1,000	60	40	-	-
285	44- 8-23*	3	.03	3	.4	.02	.02	-	-	-	40	-	-
286	44- 8-23*	M	.1	3	.4	.02	.2	1,000	-	-	40	30	-
287	44- 8-23*	.3	1	2	.05	.05	.01	-	-	-	40	-	-
288†	44- 8-23*	.3	-	2	.02	.02	.01	-	70,000	-	160	70	-
289	44- 8-23*	2	.1	3	.1	.02	.02	-	2,000	-	80	70	-
290†	44- 8-23*	2	.03	2	.05	.02	.02	-	M	-	600	70	-
291†	44- 8-23*	1	.02	2	.02	.05	.02	-	M	-	80	30	-
292†	44- 8-23*	3	.02	1	.02	.1	.02	-	2,000	-	160	30	-
293	44- 8-23*	2	.5	1	.1	.1	.02	-	-	-	60	30	-
294	44- 8-23*	2	.03	2	.1	.05	.02	-	-	-	60	70	-
295	44- 8-26*	3	-	7	.2	.05	.1	-	-	100	200	30	-
296	44- 8-26*	M	.2	7	1.5	.1	.2	100	1,000	50	60	-	-
297	44- 8-27*	5	.06	5	.8	.2	.2	200	-	100	40	100	-
298	44- 8-27*	3	M	4	.8	.05	.2	-	-	100	40	-	-
299	44- 8-28*	M	.02	2	.1	.05	.05	-	-	100	60	-	-
300	44- 8-28*	5	M	6	3	.2	.2	-	-	100	100	-	-

contiguous to the Uncompahgre Primitive Area—Continued

	Semiquantitative spectrographic analyses--Continued				Fire assay		Atomic absorption analyses			Sample data
	ppm				oz/ton		percent			
Sample	Pb (100)	Sr (1,000)	Zn (1,000)	Zr (70)	Au	Ag	Cu	Pb	Zn	
241	100	-	-	100	-	T	na	na	na	Adit-face-chip-3.75 ft.
242	200	<1,000	-	100	-	-	na	na	na	Adit-back-vein-chip-0.5 ft.
243	700	-	1,000	-	0.03	0.2	0.25	na	0.16	Adit-face-chip-6 ft.
244	700	-	-	100	T	.3	na	na	na	Adit-dump-(50 tons)-grab
245	1,500	-	3,000	100	T	.7	.44	0.04	.17	Adit-wall-vein-chip-1-75 ft.
246†	200	-	3,000	<70	T	.1	na	na	.15	Pit-dump(5 tons)-grab
247	400	-	-	<70	T	.1	na	na	na	Pit-dump(15 tons)-grab
248	200	-	-	70	T	.2	na	na	na	Do.
249	200	-	-	70	T	.2	na	na	na	Outcrop-chip-3 ft.
250	200	-	-	<70	T	.1	na	na	na	Adit-dump(500 tons)-grab
251	-	-	-	<70	T	T	na	na	na	Pit-dump(25 tons)-grab
252	-	-	-	<70	T	T	na	na	na	Shaft-dump(75 tons)-grab
253	-	-	-	<70	T	.2	na	na	na	Pit-dump(50 tons)-grab
254	-	-	-	<70	T	.2	na	na	na	Pit-vein-chip-2 ft.
255	-	<1,000	-	-	-	-	na	na	na	Adit-face-chip-2.75 ft.
256	-	<1,000	-	-	T	.1	na	na	na	Adit-face-chip-3.25 ft.
257	100	-	-	70	-	.3	na	na	na	Pit-dump(15 tons)-grab
258	1,000	-	-	<70	-	-	.01	.05	na	Adit-dump(125 tons)-grab
259†	3,000	<1,000	3,000	100	T	.5	na	.16	.05	Adit-face-chip-4 ft.
260†	1,500	<1,000	3,000	70	-	45.1	3.25	.09	.37	Adit-back-vein-chip-1 ft.
261†	10,000	<1,000	3,000	70	-	38.0	2.74	.58	.28	Do.
262†	3,000	2,000	1,000	70	T	4.8	.18	.20	.07	Adit-dump(1,000 tons)-grab
263	6,000	1,000	-	70	-	1.6	.06	.20	na	Adit-dump(500 tons)-grab
264	200	-	-	70	-	.1	na	na	na	Shaft-dump(300 tons)-grab
265	100	-	-	70	-	-	na	na	na	Trench-dump(20 tons)-grab
266†	700	-	-	<70	T	-	na	na	na	Shaft-dump(100 tons)-grab
267	200	-	-	70	T	T	.06	na	na	Pit-vein-chip-0.5 ft.
268	700	<1,000	-	<70	-	.2	.17	na	na	Adit-dump(1,700 tons)-grab
269†	400	<1,000	-	<70	-	2.4	.82	na	na	Do.
270†	700	<1,000	-	<70	-	4.3	.82	na	na	Do.
271	-	-	-	70	-	.1	na	na	na	Adit-face-chip-4 ft.
272	100	-	-	70	-	-	na	na	na	Do.
273	100	-	-	100	-	-	na	na	na	Pit-face-chip-4 ft.
274†	-	4,000	-	70	-	.4	1.44	na	na	Pit-stockpile(150 lb.)-grab
275	400	-	-	100	-	.4	.22	na	na	Adit-face-chip-4 ft.
276†	400	-	-	100	T	.08	.60	na	na	Pit-face-chip-6 ft.
277	200	-	-	-	-	-	na	na	na	Adit-face-chip-4.5 ft.
278	-	-	-	100	-	T	na	na	na	Adit-face-vein-chip-1 ft.
279†	50,000	-	5,000	100	T	1.9	na	1.11	.23	Adit-dump(2,000 tons)-grab
280	-	-	-	70	-	-	na	na	na	Adit-face-vein-chip-1.25 ft.
281	-	-	-	-	-	-	na	na	na	Adit-face-muck-grab
282	200	-	-	-	T	-	na	na	na	Outcrop-vein-chip-15 ft.
283	200	<1,000	-	100	-	-	na	na	na	Outcrop-vein-chip-10 ft.
284	400	-	-	100	-	.1	na	na	na	Adit-dump(75 tons)-grab
285	700	-	-	-	T	.2	na	na	na	Pit-dump(200 tons)-grab
286	1,500	-	1,000	100	-	.1	na	.04	.06	Adit-face-vein-chip-1 ft.
287	800	-	2,000	-	-	.1	na	.02	.24	Adit-face-muck-grab
288†	100,000	1,000	80,000	-	T	3.1	na	8.57	4.86	Adit-stockpile(500 lb.)-grab
289	80,000	-	20,000	-	T	1.3	na	2.55	1.15	Adit-stockpile(300 lb.)-grab
290†	80,000	2,000	80,000	-	-	20.8	.04	2.00	4.29	Adit-stockpile(800 lb.)-grab
291†	30,000	2,000	20,000	-	-	1.6	na	.99	1.08	Adit-stope-muck-grab
292†	30,000	-	80,000	-	.2	9.8	na	1.75	4.62	Adit-stockpile(1,000 lb.)-grab
293	3,000	-	5,000	-	-	.3	na	.17	.40	Adit-face-vein-chip-3 ft.
294	3,000	-	2,000	-	T	.3	na	.17	.14	Adit-winze-muck-grab
295	10,000	-	20,000	100	-	.6	na	.37	.78	Outcrop-vein-chip-0.5 ft.
296	200	-	-	100	-	T	na	na	na	Outcrop-vein-chip-1 ft.
297	<100	-	-	70	-	.2	na	na	na	Adit-portal-vein-chip-2 ft.
298	100	-	-	70	T	-	na	na	na	Outcrop-dike-chip-6 ft.
299	100	-	-	70	-	-	na	na	na	Outcrop-dike-chip-1 ft.
300	100	-	-	70	-	-	na	na	na	Outcrop-dike-chip-2 ft.

TABLE 11.—*Analyses of samples from study areas*

Sample	Location T. R. S.	Semiquantitative spectrographic analyses											
		percent						ppm					
		Al (.003)	Ca (.02)	Fe (.004)	Mg (.004)	Mn (.003)	Ti (.001)	B (100)	Ba (1,000)	Cr (30)	Cu (20)	Mo (20)	Ni (20)
301	44- 8-32*	1.0	0.03	4.0	0.006	0.02	0.05	-	-	200	60	100	-
302	44- 8-32*	M	M	4	.4	.05	.2	-	<1,000	200	40	-	-
303	44- 8-31*	5	.03	4	.1	.1	.1	-	-	100	40	-	-
304	44- 8-31*	3	1	2	.4	.2	.05	-	-	60	-	-	-
305	44- 8-31*	M	M	6	.8	.2	.8	-	-	200	40	-	-
306	43- 8- 6*	2	.3	4	.4	3	.1	-	-	100	80	-	-
307	43- 8- 6*	M	.3	4	.8	.2	.2	-	-	200	150	-	-
308	43- 8- 6*	3	1	5	.8	1.6	.1	-	-	200	80	-	-
309	43- 8- 6*	5	2	4	.4	.8	.1	-	-	100	80	-	-
310	43- 8- 6*	M	.1	6	1.5	.2	.2	-	1,000	200	60	-	-
311†	43- 9-12*	5	.3	4	.4	.4	.2	-	M	100	300	<20	20
312†	43- 9-12*	3	.2	M	.2	6	.1	-	5,000	200	1,300	-	-
313†	43- 9-12*	3	1	7	.8	6	.1	-	1,000	200	150	-	-
314	43- 9-11*	M	.02	3	.4	.01	.2	-	-	100	40	-	-
315	43- 9-12*	M	1	M	1.5	.8	.2	-	2,000	300	80	40	-
316†	43- 9-12*	M	.2	7	.4	.3	.2	-	-	100	80	-	-
317†	43- 9-14*	M	.4	5	.8	.05	.2	-	-	60	80	<20	-
318†	43- 9-14*	M	.4	5	.8	.05	.2	-	-	60	80	<20	-
319†	43- 9-13*	M	.1	6	.4	.02	.4	100	-	100	40	<20	-
320	43- 9-13*	M	.2	3	.2	.4	.2	-	-	100	80	20	-
321	43- 9-13*	>5	.03	2	.2	.1	.1	-	-	200	40	<20	20
322†	43- 9-13*	5	.03	7	.2	6	.2	200	-	-	80	30	-
323	43- 9-24*	M	1	4	.8	.1	.2	100	1,000	60	20	-	-
324	43- 9-24*	>5	.3	4	.2	.1	.3	-	4,000	200	40	<20	20
325†	43- 9-24*	4	.3	5	.8	.2	.2	200	-	60	40	20	-
326	43- 9-24*	5	.1	4	.6	.1	.2	100	1,000	60	160	-	-
327†	43- 9-24*	M	.06	3	.4	.05	.2	200	-	60	20	20	-
328†	43- 9-24*	4	.5	4	1.5	.2	.2	100	1,000	60	80	-	-
329†	43- 8-19*	>5	.1	3	.2	2	.2	<100	4,000	200	60	<20	20
330†	43- 8-19*	4	.06	3	.1	.1	.2	100	-	300	60	30	20
331†	43- 8-19*	5	.3	2	.2	.2	.3	100	-	200	40	<20	20
332†	43- 8-19*	M	.2	4	.4	.4	.2	200	1,000	100	160	20	-
333†	43- 9-24*	M	2	6	1.5	.2	.4	200	1,000	60	40	30	-
334†	43- 9-24*	M	.3	M	.8	.4	.8	100	-	100	80	20	-
335†	43- 9-24*	M	.4	7	.8	.05	.2	200	-	100	160	30	-
336†	43- 9-24*	5	.4	6	.8	.05	.1	100	-	60	80	-	-
337†	43- 8-30*	5	.1	3	.2	.8	.2	100	-	100	50	-	-
338	43- 8-30*	>5	4	3	4	.2	.2	-	-	100	80	-	-
339	43- 8-30*	>5	1	3	2	.2	.2	-	-	70	40	-	-
340	43- 8-30*	>5	1	3	2	.2	.2	-	-	70	50	-	-
341	43- 8-30*	>5	2	3	2	.2	.2	-	-	30	50	-	-
342†	43- 8-30*	.7	M	2	.8	.4	.02	-	1,000	-	40	-	-
343	43- 8-30*	5	4	4	1.5	.1	.2	100	1,000	30	20	-	-
344†	43- 8-30*	5	2	4	1	.05	.2	100	1,000	30	40	-	-
345†	43- 8-30*	>5	1	5	1	.1	.2	100	-	100	80	-	-
346	43- 8-30*	5	>4	5	.8	.4	.2	200	4,000	60	40	-	-
347	43- 8-30*	>5	2	4	1	.05	.2	-	-	60	80	-	-
348	43- 8-30*	>5	1	5	1	.05	.2	100	-	30	40	-	-
349†	43- 8-30*	>5	2	4	1	.1	.2	100	-	30	40	-	-
350	43- 8-30*	>5	2	3	.2	.2	.2	-	-	70	50	-	-
351	43- 8-30*	>5	2	3	.2	.2	.2	-	-	70	50	-	-
352	43- 8-30*	>5	.3	3	.2	.2	.2	-	-	30	50	-	-
353	43- 8-30*	>5	1	6	1	.4	.2	100	-	60	80	-	-
354	43- 9-25*	2	.5	1	.8	.2	.1	-	-	60	80	-	-
355	43- 9-25*	.3	M	.4	.6	.1	.02	-	-	60	20	-	-
356	43- 9-36*	5	.2	2	.4	.1	.2	100	1,000	60	40	-	-
357	43- 9-36*	4	.03	2	.2	.05	.1	100	1,000	60	20	-	-
358	43- 9-36*	.7	.02	1	.03	.05	.02	-	-	60	20	-	-
361†	43- 9-22*	5	.06	5	.8	.05	.2	300	-	40	40	70	-
362	43- 9-22*	5	.06	3	.6	.05	.1	200	-	<30	20	30	-

contiguous to the Uncompahgre Primitive Area—Continued

	Semiquantitative spectrographic analyses--Continued				Fire assay		Atomic absorption analyses			
	ppm				oz/ton		percent			Sample data
Sample	Pb (100)	Sr (1,000)	Zn (1,000)	Zr (70)	Au	Ag	Cu	Pb	Zn	
301	100	-	-	-	-	-	na	na	na	Outcrop-chip-8 ft.
302	100	-	-	100	-	-	na	na	na	Outcrop-dike-chip-12 ft.
303	700	-	-	70	T	0.2	na	na	na	Adit-dump(50 tons)-grab
304	-	-	-	-	T	-	na	na	na	Adit-face-chip-4 ft.
305	100	-	2,000	200	T	T	na	na	0.08	Adit-caved stope-grab
306	1,000	-	3,000	-	-	.1	na	.17	.37	Adit-face-vein-chip-3 ft.
307	700	-	1,000	70	-	-	na	.03	.05	Adit-face-vein-chip-1 ft.
308	700	-	1,000	70	T	.1	na	.02	.08	Adit-face-vein-chip-2 ft.
309	1,000	-	2,000	70	T	.1	na	.05	.17	Adit-face-muck-grab
310	200	<1,000	-	70	-	.1	na	na	na	Pit-dump(5 tons)-grab
311†	1,000	1,000	3,000	70	-	.6	0.25	.72	.17	Adit-dump(30 tons)-grab
312†	3,000	-	10,000	70	T	1.2	.01	.48	1.98	Adit-face-vein-chip-2.5 ft.
313†	20,000	-	30,000	70	T	14.4	.04	.77	.80	Adit-dump(1,200 tons)-grab
314	-	<1,000	-	100	-	.1	na	na	na	Pit-vein-chip-4 ft.
315	200	-	-	100	-	T	na	na	na	Adit-face-vein-chip-3 ft.
316†	10,000	-	10,000	100	T	.1	na	.24	.48	Shaft-drift-face-vein-chip-4 ft.
317†	400	-	1,000	300	T	.2	na	na	.06	Outcrop-vein-chip-6 ft.
318†	400	-	1,000	300	-	.2	na	na	.02	Pit-vein-chip-9 ft.
319†	700	-	1,000	300	T	-	na	.01	.01	Adit-dump(300 tons)-grab
320	700	-	1,000	100	T	.1	na	.10	.13	Adit-face-vein-chip-4 ft.
321	400	-	-	70	T	.2	na	na	na	Outcrop(talus)-grab-300 ft.
322†	3,000	-	2,000	100	.01	.3	na	.14	.08	Pit-vein-chip-14 ft.
323	200	-	-	300	T	.2	na	na	na	Pit-dump(60 tons)-grab
324	100	-	-	70	T	.2	na	na	na	Pit-vein-chip-0.75 ft.
325†	400	-	-	100	-	.1	na	na	na	Pit-dump(10 tons)-grab
326	200	-	-	300	T	T	.01	na	na	Adit-dump(40 tons)-grab
327†	400	-	-	100	T	.1	na	na	na	Outcrop-vein-chip-4 ft.
328†	200	-	-	100	T	.1	na	na	na	Pit-dump(100 tons)-grab
329†	10,000	-	-	70	.01	.6	na	.31	na	Adit-wall-vein-chip-1.75 ft.
330†	10,000	-	-	70	.01	.3	na	.40	na	Adit-back-vein-chip-3.5 ft.
331†	100	-	-	70	-	.2	na	na	na	Adit-wall-vein-chip-2.5 ft.
332†	8,000	-	1,000	300	.01	.5	.01	.32	.07	Adit-dump(250 tons)-grab
333†	600	-	-	300	-	.3	na	na	na	Do.
334†	200	-	-	300	T	.2	na	na	na	Adit-back-vein-chip-2.5 ft.
335†	400	-	-	300	T	.1	.01	na	na	Adit-back-vein-chip-1.5 ft.
336†	400	-	-	300	-	.1	na	na	na	Pit-dump(200 tons)-grab
337†	900	-	-	70	-	T	na	na	na	Outcrop-vein-chip-12 ft.
338	-	-	-	100	-	.2	na	na	na	Adit-dump(75 tons)-grab
339	-	-	-	100	-	.1	na	na	na	Adit-dump(100 tons)-grab
340	-	-	-	70	-	T	na	na	na	Adit-dump(40 tons)-grab
341	-	-	-	100	-	-	na	na	na	Adit-dump(700 tons)-grab
342†	100	1,000	1,000	70	-	-	na	na	na	Adit-back-vein-chip-1 in.
343	-	-	-	100	-	-	na	na	na	Adit-caved stope-grab
344†	100	-	-	70	-	-	na	na	na	Adit-back-vein-chip-6 ft.
345†	100	-	-	100	-	-	na	na	na	Adit-face-chip-3.5 ft.
346	100	-	-	100	-	-	na	na	na	Adit-wall-vein-chip-2.5 ft.
347	100	1,000	-	70	-	-	na	na	na	Pit-dump(20 tons)-grab
348	100	1,000	-	70	-	-	na	na	na	Pit-dump(35 tons)-grab
349†	100	1,000	-	70	-	-	na	na	na	Pit-dump(20 tons)-grab
350	100	-	-	100	-	T	na	na	na	Adit-portal-floor-specimen
351	-	-	-	100	-	.2	na	na	na	Pit-dump(15 tons)-grab
352	-	-	-	70	-	.1	na	na	na	Outcrop-vein-chip-2.5 ft.
353	400	-	-	100	.02	1.2	na	na	na	Adit-dump(400 tons)-grab
354	100	-	-	-	T	T	na	na	na	Adit-dump(40 tons)-grab
355	-	-	-	-	T	.2	na	na	na	Adit-dump-specimen
356	200	-	-	300	T	.1	na	na	na	Trench-dump(20 tons)-grab
357	200	-	-	100	-	.2	na	na	na	Pit-dump(20 tons)-grab
358	200	-	-	<70	-	.1	na	na	na	Pit-stockpile(200 lb.)-grab
361	<100	-	-	70	-	-	na	na	na	Adit-face-vein-chip-0.5 ft.
362	<100	-	-	70	-	-	na	na	na	Adit-dump(15 tons)-grab

TABLE 11.—*Analyses of samples from study areas*

		Semiquantitative spectrographic analyses											
		percent						ppm					
Sample	Location T. R. S.	Al (.003)	Ca (.02)	Fe (.004)	Mg (.004)	Mn (.003)	Ti (.001)	B (100)	Ba (1,000)	Cr (30)	Cu (20)	Mo (20)	Ni (20)
363	43- 9-21*	>5.0	4.0	5.0	2.0	0.2	0.2	100	-	400	60	-	80
364	43- 9-16*	5	1	3	.8	.05	.2	-	-	30	1,300	-	-
365	43- 9- 9*	5	2	3	.4	.2	.2	100	-	60	80	30	20
366	43- 9- 9*	M	.03	2	.1	.01	.1	-	-	60	40	<20	-
367	43- 9- 9*	3	.03	3	.3	.03	.1	-	-	300	80	-	20
368	43- 9- 9*	3	.1	2	.3	.02	.1	-	-	100	40	-	20
369	43- 9- 9*	3	.1	2	.3	.03	.1	-	-	100	40	-	-
370	43- 9- 8*	>5	4	7	.1	.1	.2	200	-	60	40	-	-
371	43- 9- 8*	3	M	6	.4	.1	.2	500	-	60	20	-	-
372	43- 9- 8*	>5	.03	4	.8	.05	.1	100	-	60	40	-	-
373	43- 9-18*	>5	.4	3	3	.2	.2	-	-	500	80	-	-
374	43- 9-18*	5	.3	3	5	.1	.09	-	-	300	600	-	-
375	44-10-36*	>5	4	3	3	.2	.2	-	-	500	80	-	-
376	44-10-36*	>5	.5	3	3	.1	.2	-	-	70	40	-	-
377	43- 9-30*	M	2	5	1.5	.1	.2	-	-	40	40	-	-
378	43- 9-30*	M	4	7	1.5	.1	.4	-	<1,000	40	40	-	-
379	43- 9-30*	M	4	6	1.5	.1	.4	-	<1,000	40	40	<20	-
380	43- 9-30*	4	1	2	1	.1	.1	-	-	30	20	<20	20
381	44-10-25*	4	.5	2	.2	.03	.2	-	-	200	40	<20	20
382†	44-10-25*	M	.5	4	.4	.1	.2	<100	1,000	-	20	-	-
383	44-10-25*	>5	.4	2	.2	.03	.2	-	-	200	40	<20	20
384†	44-10-25*	M	.5	4	.4	.1	.2	<100	1,000	-	40	-	-
385	43-10-10*	M	2	4	1.5	.05	.2	-	-	-	600	60	-
386	43-10-10*	5	.5	3	.8	.02	.1	-	-	-	1,300	30	-
387	43-10-10*	3	1	2	1.5	.05	.05	-	-	60	80	-	-
388†	43-10-10*	M	.5	3	.8	.02	.2	100	-	-	600	30	-
389	43-10-10*	3	.13	6	.4	.02	.05	-	-	-	160	-	-
390	43-10-26*	.3	M	.1	.4	.05	.01	-	-	-	20	-	-

1. 400ppm V
6. 100ppm Co, 30ppm Sc
31. 17.4% Ba, 0.03% Sb
32. 0.03% Sb
33. 1.7% Ba, 0.06% Sb
34. 38.7% Ba, 0.16% Sb
35. 0.06% Sb
37. 0.68% Sb
42. 0.07% Sb
49. 17% Ba, 0.05% Sb
50. 0.05% Sb
51. 0.05% Sb
52. 7.21% Ba, 50ppm Sn
53. 9.85% Ba, 0.10% Sb, 50ppm Sn
59. <0.01% U_3O_8
61. 0.10% U_3O_8
62. 100ppm Bi
68. 31.9% Mn, 300ppm Co, 0.06% Mo, 300ppm Sn, 900ppm V
71. 20ppm Sn
72. 40ppm Sn, 100ppm V
75. 9.11% Mn, 80ppm Sn, 500ppm V
76. 100ppm V
77. <0.01% U_3O_8
78. 40ppm Co
79. <0.01% U_3O_8
80. 0.01% U_3O_8
83. 0.01% U_3O_8
84. 40ppm Be
86. 40ppm Be
98. 0.07% Sb
101. 0.05% Sb
103. 0.04% Bi
104. 100ppm Bi
106. <0.01% Sb
110. <0.01% U_3O_8
115. 0.10% U_3O_8
117. 0.07% U_3O_8
120. 30ppm Sn, 100ppm V
129. 100ppm Bi
130. 0.04% Bi
131. 52.6% Fe, 800ppm V
132. 30.2% Fe, 800ppm V
136. <0.01% U_3O_8
149. 52.2% Fe, 400ppm V
156. 300ppm Sc
160. 4.2% Ba
165. 100ppm V
166. 100ppm V
168. 0.04% W
184. 0.07% Sb
189. 0.14% As, 0.25% Sb
191. 0.05% Sb
193. 0.03% Sb
195. 50ppm Sc
196. 0.04% Sb

contiguous to the Uncompahgre Primitive Area—Continued

	Semiquantitative spectrographic analyses--Continued				Fire assay		Atomic absorption analyses			
	ppm				oz/ton		percent			Sample data
Sample	Pb (100)	Sr (1,000)	Zn (1,000)	Zr (70)	Au	Ag	Cu	Pb	Zn	
363	<100	-	-	100	-	-	na	na	na	Adit-dump(250 tons)-grab
364	200	500	-	70	-	-	0.25	0.02	na	Adit-dump(300 tons)-grab
365	400	-	1,000	100	-	-	na	.03	0.13	Pit-dump(5 tons)-grab
366	200	-	-	<70	T	T	na	na	na	Pit-vein-chip-3 ft.
367	200	-	-	<70	-	-	na	na	na	Pit-dump(25 tons)-grab
368	-	-	-	70	-	-	na	na	na	Adit-face-vein-chip-2 ft.
369	<100	-	-	70	-	-	na	na	na	Adit-dump(100 tons)-grab
370	-	-	-	100	-	-	na	na	na	Adit-dump(3,000 tons)-grab
371	-	-	-	70	-	-	na	na	na	Adit-stockpile(50 lb.)-grab
372	-	-	-	100	-	-	na	na	na	Adit-portal-vein-chip-8 ft.
373	-	500	-	100	-	0.1	na	na	na	Pit-vein-chip-6 ft.
374	-	-	-	70	-	-	.05	na	na	Adit-dump-(20 tons)-grab
375	-	-	-	100	-	-	na	na	na	Pit-dump(3 tons)-grab
376	-	900	-	100	0.32	T	na	na	na	Outcrop-vein-chip-6 ft.
377	200	-	-	100	-	.2	na	na	na	Adit-dump(500 tons)-grab
378	100	<1,000	-	100	T	.1	na	na	na	Adit-face-chip-4 ft.
379	100	<1,000	-	100	T	.3	na	na	na	Adit-face-vein-chip-10 in.
380	-	-	-	70	T	.1	na	na	na	Adit-dump(60 tons)-grab
381	100	-	-	70	T	.1	na	na	na	Outcrop-chip-15 ft.
382†	400	-	-	300	T	.2	na	na	na	Outcrop(talus)-specimen
383	100	-	-	100	T	.1	na	na	na	Outcrop-dike-chip-3 ft.
384†	-	-	-	300	T	.1	na	na	na	Outcrop-dike-chip-10 ft.
385	-	-	-	100	T	-	.06	na	na	Adit-portal-vein-chip-0.25 ft.
386	-	-	-	70	-	-	.16	na	na	Adit-portal-vein-chip-4.5 ft.
387	200	-	-	-	-	.1	na	na	na	Adit-dump(150 tons)-grab
388†	-	-	-	70	T	.2	.07	na	na	Adit-dump(70 tons)-grab
389	200	-	-	-	.15	T	na	na	na	Adit-stockpile(150 lb.)-grab
390	100	-	-	70	T	-	na	na	na	Adit-floor-specimen

197. 50ppm Sc
200. 0.04% Sb
209. 0.08% Sb
210. 24.9% Ba, 0.05% Sb
211. 0.03% Sb
212. 0.02% Sb
213. 15% Ba, 0.15% Sb
216. 0.02% Sb
217. 0.12% Sb
220. 0.03% As, 0.21% Sb
221. 0.04% As, 0.14% Sb
224. 26.4% Ba
226. 0.015% Mo
227. 15% Ba
228. 36.1% Ba
229. 18% Ba, 0.015% Mo
245. 0.24% As
246. 0.016% Ni
259. 0.02% As
260. 0.03% As, 0.60% Sb
261. 0.10% As
262. 11.7% Ba, 4.7% Mn, 0.06% Sb
266. 0.01% As
269. 0.24% Sb
270. 11% Mn, 0.20% Sb
274. 4.5% Mn
276. 0.03% Sb
279. 0.01% As
288. 11.6% Ba, 0.04% As
290. 13% Ba
291. 22.8% Ba, 0.03% Sb
292. 80ppm Co
311. 6.6% Ba, 40ppm Co
312. 40ppm Co, 9.23% Fe, 5.6% Mn
313. 0.04% Sb, 200ppm Sc
316. 20ppm Sn
317. <30ppm Sc
318. <30ppm Sc
319. <30ppm Sc
322. 5.64% Fe, 3.85% Mn, <30ppm Sc, 50ppm Sn
325. 0.09% As, 20ppm Co
327. 0.13% As
328. 20ppm Co
329. 0.26% As
330. 0.30% As
331. 0.17% As
332. 0.23% As, <30ppm Sc
333. 0.02% As
334. 5.86% Fe, 0.03% As 100ppm Co, 100ppm V
335. 40ppm Co, 100ppm V
336. 20ppm Co
337. 0.41% As
342. 20ppm Co
344. 100ppm V
345. 20ppm Co
349. 20ppm Co
361. 0.05% As
382. <30ppm Sc
384. <30ppm Sc
388. 0.01% Sb

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