UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF MINES

MINERAL INVESTIGATION OF THE SOUTH REVEILLE WILDERNESS STUDY AREA, NYE COUNTY, NEVADA

by
John T. Neubert

MLA 37-85
1985

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

STUDIES RELATED TO WILDERNESS

Bureau of Land Management Wilderness Study Areas

The Federal Land Policy and Management Act (Public Law 94-579, October 21,1976) requires the U.S. Geological Survey and the U.S. Bureau of Mines to conduct mineral surveys on certain areas to determine their mineral values, if any, that may be present. Results must be made available to the public and be submitted to the President and the Congress. This report presents the results of a mineral survey of the South Reveille (NV-060-112) Wilderness Study Area, Nye County, Nevada.

CONTENTS

ILLUSTRATIONS

ILLUSTRATIONS--Continued

TABLE

MINERAL INVESTIGATION OF THE SOUTH REVEILLE WILDERNESS STUDY AREA (NV-060-112), NYE COUNTY, NEVADA

By
John T. Neubert, Bureau of Mines

SUMMARY

The South Reveille Wilderness Study Area is comprised of 33,000 acres in the southern part of the Reveille Range in south-central Nevada. Rhyolitic tuffs and quartz latite intrusives are the dominant rock types. No mining activity has occurred within the study area; however, the Reveille mining district is close-by to the north, and a 30-ft shaft was sunk on a low-grade gold- and silver-bearing quartz vein within 500 ft of the southern boundary.

Field work and sampling led to the identification of one mineralized area and two geochemically anomalous areas. The southern 2 sq mi of the wilderness study area is a mineralized area and has an extensive zone of altered and bleached rocks, favorable structural features, fairly consistent arsenic anomalies, scattered antimony anomalies, and a low-grade precious metals vein. The Fang Ridge area and the area east of Reveille Peak yielded anomalous metal values in geochemical samples but lack any strong surface expression of mineralization.

No exploration is likely for oil and gas or geothermal resources. Industrial rock products and construction materials are present but have no unique properties and are not likely to be utilized.

INTRODUCTION

In May 1984, the Bureau of Mines (Bureau), as part of a joint effort with the U.S. Geological Survey (USGS), completed field work for a mineral investigation of the South Reveille Wilderness Study Area (WSA). The Bureau of Mines sampled altered and mineralized zones in and near the WSA. The USGS

compiles a geological map and does regional geophysical and geochemical surveys. Each agency will independently publish results of their studies, and a joint report will address the mineral resource potential of the area. This report discusses the results of work done by the Bureau.

Geographic setting

The South Reveille WSA covers approximately 33,000 acres in the southern half of the Reveille Range in south-central Nevada (fig. 1). It is in southern Nye County, about 70 mi east of Tonopah. The small community of Warm Springs lies about 30 highway miles to the northwest.

The highest elevation in the WSA is Reveille Peak at 8,910 ft (fig. 1); the lowest elevation is on the eastern boundary of the WSA at about 5,160 ft. Topography is rugged and mountainous; the climate is semiarid. Stream channels were dry with silt- to boulder-sized material in the beds.

The WSA is approximately 12 mi long and up to 5 mi wide. Its eastern, southern, and western boundaries lie along the base of the Reveille Range. The northern boundary cuts through the range about 3-1/2 mi north of Fang Ridge. State Highway 375 lies 2 to 6 mi east of the eastern boundary. An unpaved road west off of Highway 375 provides access into the WSA, just south of Fang Ridge. County-maintained gravel roads are outside the western and southern parts of the WSA (fig. 1). Numerous unmarked, unmaintained jeep trails from the county roads provide access to the base of the range.

Geologic setting

The Reveille Range is a north-northwest trending uplifted fault block within the Basin and Range physiographic province. The fault block is bounded by the Reveille Valley graben on the west and by the Railroad Valley graben on the east.

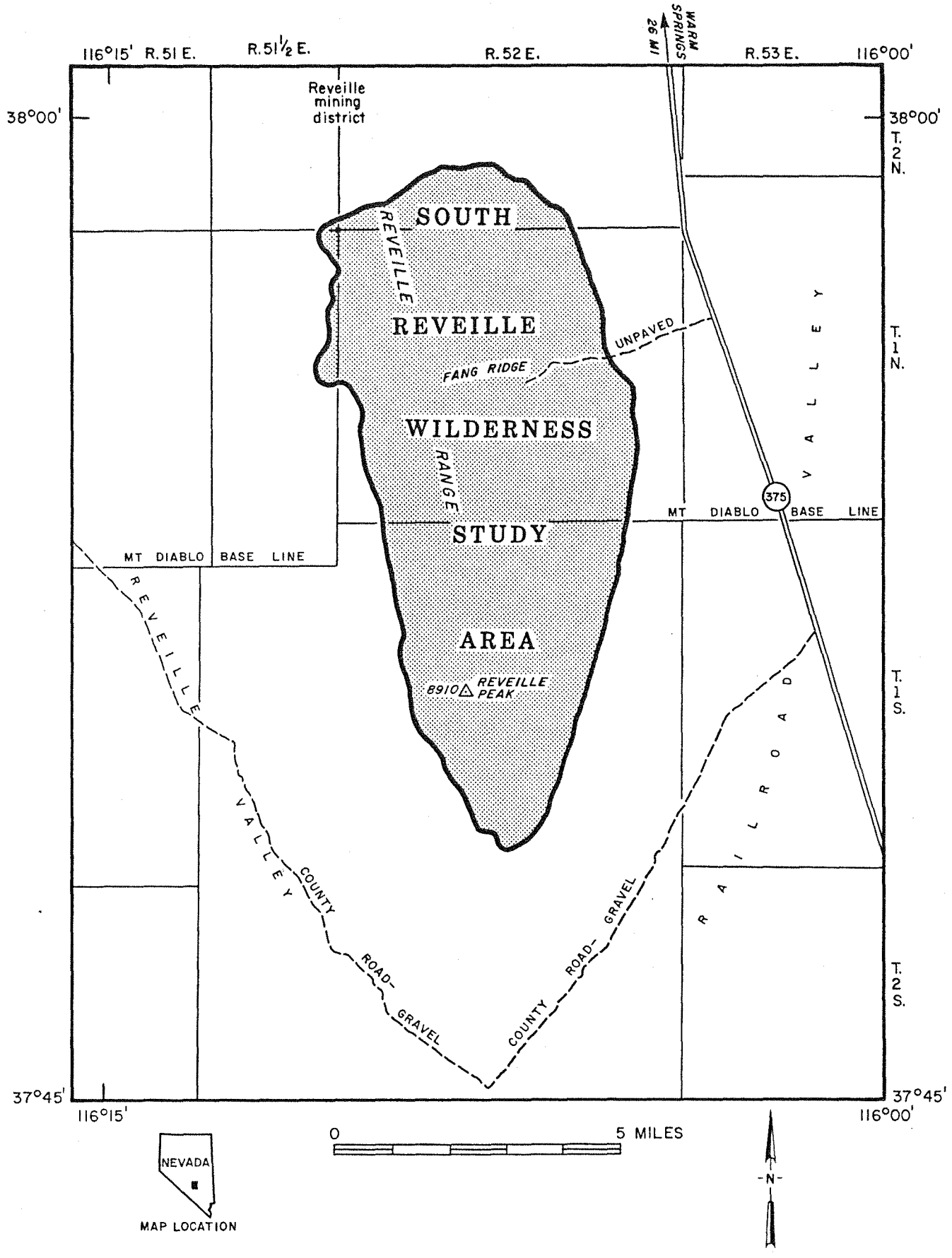


Figure 1.--Index map of the South Reveille Wilderness Study Area, Nye County, Nevada.

Rhyolite, quartz latite, basalt, and volcaniclastic sedimentary rocks crop out in the WSA. Tertiary rhyolitic tuff, at least 2,200 ft thick, is the dominant rock type. The tuff of the Reveille Range has not been dated by radiometric methods; however, correlations with tuffs of nearby ranges suggest an age of 21 to 25 million years (Ekren and others, 1973). Quartz latite that intrudes the tuffs in the area of Fang Ridge is about 19 million years old. Basalt flows, up to 300 ft thick, and dated at about 6 million years, cap the tuff locally. Volcaniclastic sedimentary rocks, with a maximum thickness of 400 ft, are interbedded with tuff in the vicinity of Fang Ridge. (See Gardner and others, 1980.)

Faults cut all the rock units within the WSA. The faults are oriented randomly; the amount of displacement along the faults is not known. In addition, the Bellehelen lineament, a major northwest-trending fault, truncates the Reveille Range on the south. The extent of the lineament to the southeast is unknown, but it continues to the northwest for up to 300 mi. (See Gardner and others, 1980.)

Visually, the rocks of the southernmost 2 sq mi of the WSA are strikingly different from the main part of the range. Bleaching is visible from a distance, and upon closer inspection, intense fracturing, abundant Liesegang bands and partial alteration of feldspars to kaolinite is evident. In addition, lenses and streaks of brown-stained rhyolite, up to 40 ft wide, are present. The streaks may be along shears, faults, or fractures that are slightly enriched in iron. Segments of the brown-stained outcrops are silicified.

Previous studies

Few geologic studies have been done in the South Reveille WSA. The southern half of the WSA was included on a map of the nearby Nellis Air Force base at a 1:125,000 scale (Ekren and others, 1971). A geologic and mineral resources report of southern Nye County, including the WSA, was published at a 1:125,000 scale (Cornwall, 1972). The most recent work is a reconnaissance geologic map of the northern Kawich and southern Reveille ranges at a 1:62,500 scale (Gardner and others, 1980).

Present investigation

Prior to the field investigation, a background search of published and unpublished reports and Bureau of Mines files was made to gather data pertinent to the geology and mining history of the WSA. Bureau of Land Management files and Nye County records were searched for mining claim, oil and gas lease, and geothermal lease information.

Field work took approximately 40 man-days. The field study included reconnaissance for potentially mineralized areas and examining the only known prospect within a mile of the WSA, a 30-foot-deep shaft about 500 ft south of the southern WSA boundary. Stream sediment samples from major drainages and rock samples were taken to delineate mineralized areas and to determine how values from mineralized areas contrast with those from unmineralized areas. A total of 42 stream-sediment, 42 random chip, 8 continuous chip, 3 select, and 3 panned concentrate samples were taken (plate 1). All samples were analyzed by the fire-assay inductively-coupled plasma technique for gold and silver, and for 40 elements (see appendix) by the semiquantitative optical emission spectrographic technique. Selected samples were analyzed for arsenic, cobalt, lead, and antimony by atomic absorption techniques, and for uranium by fluorimetry.

Mining activity

There is no evidence that mining activity occurred within the South Reveille WSA, but the Reveille mining district is about 2 mi northwest. Claim groups in that district extend to the northern boundary of the WSA (plate 1). The Reveille district was discovered in 1866 and has been worked intermittently since. Major commodities from the district are silver and lead. Most production was prior to 1920 by which time 8,261 tons of ore worth $610,982 were produced. (See Kral, 1951.)

Geology in the Reveille mining district differs from the geology of the WSA. Most of the mineral deposits in the district are in Paleozoic sedimentary rocks in contact with Tertiary rhyolite. Numerous rhyolite and latite dikes cut the sedimentary rocks. Mineralization is concentrated along the contacts of the sedimentary rocks and the dikes, with some replacement of the sedimentary rocks within favorable beds. (See Kral, 1951.)

In contrast to the Reveille mining district, no sedimentary rocks are present at the surface in the WSA. The depth to sedimentary rocks, if any are present, is unknown.

MINERALIZED AREAS

One mineralized area, the southern tip of the Reveille Range, and two geochemically anomalous areas, the area east of Reveille Peak and the Fang Ridge area, have been identified as a result of this investigation.

For purposes of this report, geochemically anomalous areas are defined as areas with multiple samples that contain one or more of the following: greater than 0.007 ppm gold; 0.3 ppm silver; 30 ppm antimony, arsenic, or uranium; 0.005 percent copper; 1 percent zinc; or 1 percent manganese (other than panned concentrate samples).

Southern tip of the Reveille Range

The southern tip of the Reveille Range, within and just outside the WSA, is a mineralized area. Facts indicating mineralization are: 1) a silver- and gold-bearing quartz vein; 2) widespread fracturing and alteration; 3) the proximity of the Bellehelen lineament; and 4) geochemical anomalies.

A silver- and gold-bearing quartz vein is exposed in a 30-ft shaft about 500 ft south of the WSA (fig. 2). The vein is 3-ft wide, strikes N. 60° W., and dips 85° S. Selected material from the dump contained 0.071 ppm gold, 25 ppm silver, 69 ppm arsenic, 230 ppm lead, 41 ppm antimony, and 0.06 percent zinc (sample 95, table 1). A 4-ft-long chip sample taken across an outcrop of the vein, about 375 ft southeast of the shaft, contained 2.3 ppm silver and 72 ppm arsenic (sample 96, table 1). The vein at the outcrop has quartz pods and stringers with inclusions of rhyolite country rock. Liesegang banding is common in the bleached rhyolite country rock associated with the quartz vein.

Rock in the southernmost 2 sq mi of the WSA, north of the shaft, is highly fractured and bleached rhyolite with partially kaolinized potassium feldspars. The fractures are subparallel and trend north to northeast. In addition, northwest-trending lenses of brown-stained rhyolite up to 40 ft wide are present; some are silicified (fig. 3). The brown is a surface stain. The zone of brown-stained lenses and streaks extends from just north of the shaft to 3,000 ft north of the shaft, within the WSA.

The southernmost 2 sq mi of the WSA is cut by numerous faults (fig. 2). In addition, the Bellehelen lineament is immediately south of the study area. Mining districts are associated with this lineament elsewhere. The closest is the Bellehelen gold and silver district located about 23 mi northwest, in the Kawich Range. (See Gardner and others, 1980.)

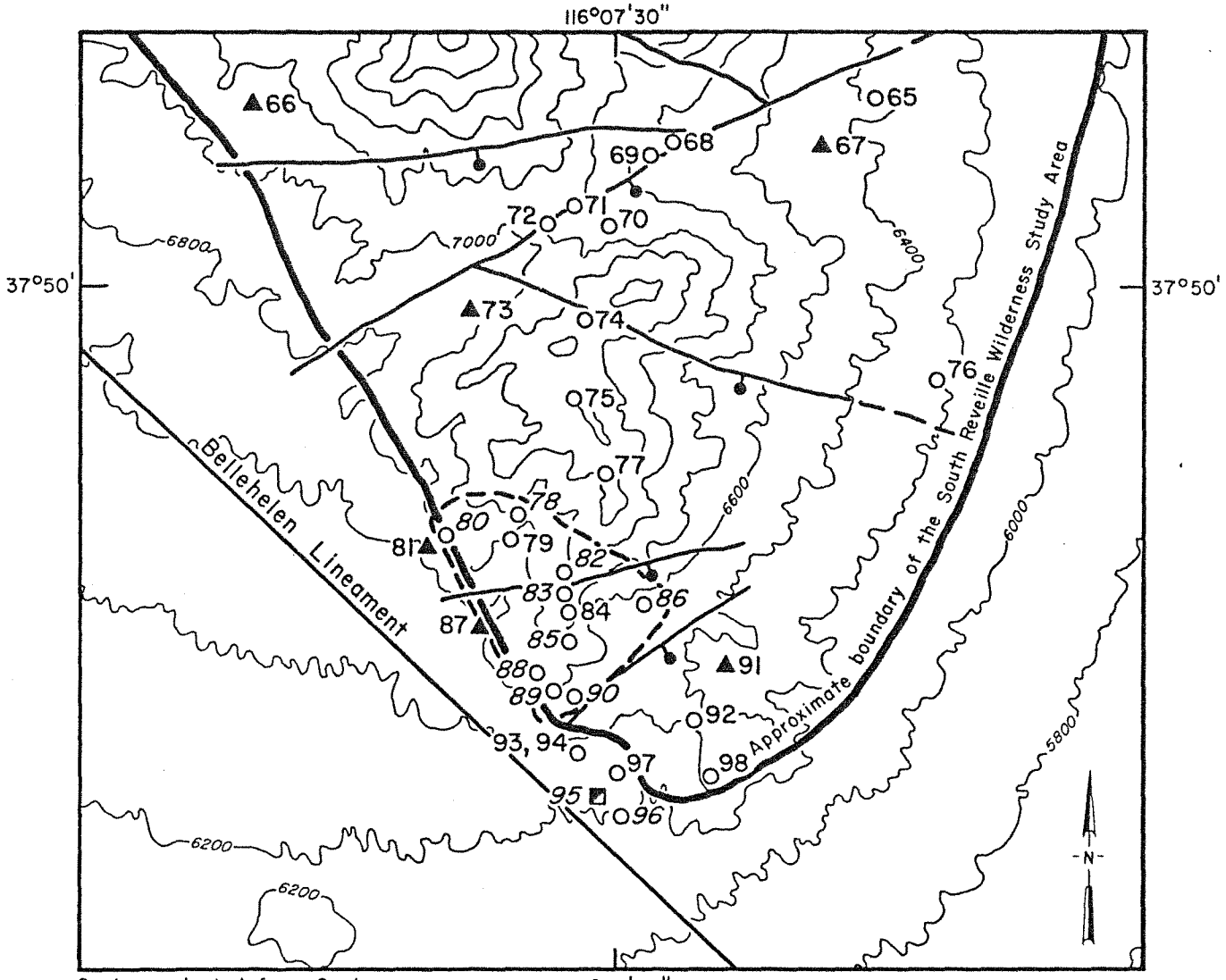


Figure 2.--Map of southern part of the Reveille Range, Nevada. Italicized numbers show samples with arsenic values over 30 ppm.

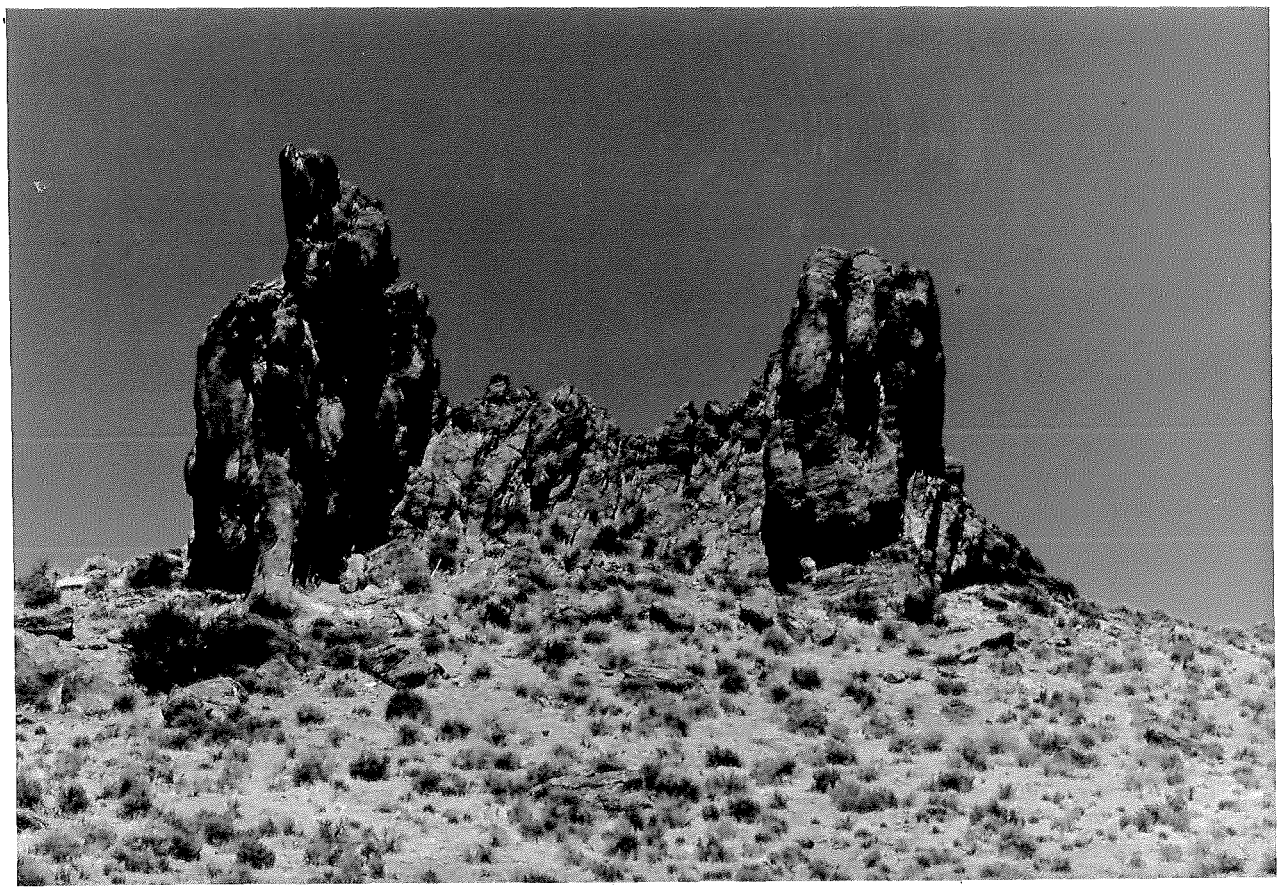


Figure 3.--Silicified rhyolite outcrop in the southernmost 2 sq mi of the Reveille Range.

The Bellehelen lineament, the precious metal vein at the shaft, and the brown-stained lenses and streaks in rhyolite are parallel to subparallel, indicating a possible genetic relationship between structures and mineralization. Fracturing in the southern 2 sq mi of the WSA is 30° to 90° off the general trend of the vein and Bellehelen lineament. Fracturing may have been caused by movement along the Bellehelen lineament.

The southern tip of the WSA is geochemically different from the rest of the range. Arsenic, a pathfinder element for disseminated gold deposits, is present in the low-grade precious metal vein at the shaft and in the bleached and fractured rhyolite inside the WSA north of the shaft (fig. 2). In addition to arsenic, sample 86 from this area contained 0.017 ppm gold (table 1). The area with the high arsenic values is about 3,000 ft by 1,800 ft and is north of a fault north of the shaft, relatively close to the Bellehelen lineament.

The arsenic and precious metal values in the 3,000 by 1,800 ft area define a mineralized area, mostly within the WSA. This area may be the surface expression of a large low-grade precious metal deposit, similar to those found elsewhere in Nevada. Bulk sampling might show that gold and silver are generally present at the surface in this area. Closer sample spacing, bulk sampling, geophysics, and drilling may help define this occurrence.

Area east of Reveille Peak

Reveille Peak is almost 3 mi north of the southern tip of the South Reveille WSA (plate 1). The peak and the area east of the peak are rhyolite tuff and are part of a wedge-shaped horst, bounded on the north by an east-northeast trending fault and bounded on the south by a northwest trending

fault (Gardner and others, 1980). Of the 5 samples taken in the horst (plate 1, samples 60-64), two stream sediment samples contained silver. Sample 60 contained 0.790 ppm silver and sample 61 contained 0.440 ppm silver (table 1).

The source of the silver values east of Reveille Peak, within the Reveille Peak horst, is not known. The values may be the result of leakage from a subsurface precious metals occurrence.

Fang Ridge area

The bedrock at Fang Ridge, just north of the center of the WSA (plate 1), is a quartz latite intrusive. Tertiary volcaniclastic sedimentary rocks and tuff flank Fang Ridge on the north and south. Numerous north-south trending faults cut the rocks, down faulting the east side of the area. A lineament, interpreted from an air photo, trends east-west along the crest of Fang Ridge through the heart of the range to the western boundary of the WSA. (See Gardner and others, 1980.) Of the 22 samples taken in the Fang Ridge area (plate 1, samples 13-34), 4 samples contained anomalous base and/or precious metal values. Stream sediment sample 20 contained 0.009 percent copper, stream sediment sample 34 contained 1.319 ppm silver, panned concentrate sample 14 contained 2 percent zinc, and chip sample 29, from a limonitic shear zone, contained 38 ppm arsenic and 100 ppm uranium (table 1).

Metal values in the samples associated with the quartz latite intrusive could indicate the presence of a near surface mineral occurrence, or the values may be the result of localized metal concentrations along the contacts of the intrusive.

ENERGY RESOURCES

The closest producing oil field to the WSA is in Railroad Valley, about 55 mi north of the WSA. Nearly all of Railroad Valley and much of Reveille Valley are leased for oil and gas. Some of these leases overlap into the

northern part of the WSA (fig. 4). Seismic surveys were made across Reveille Valley; however, no surveys have been made in the WSA. Sedimentary rocks may underlie the volcanics in parts of the WSA, but depth of burial is unknown. In a report on the petroleum potential of wilderness lands in Nevada, Sandberg (1983) assigns zero potential for oil and gas in the South Reveille WSA.

Geothermal resources are not evident at the surface in or near the WSA. Although hot springs are present in adjacent ranges, none was observed in the Reveille Range. No current geothermal leases exist in the South Reveille WSA.

INDUSTRIAL ROCKS AND MINERALS

A resource of rhyolite tuff for roadfill, construction, or industrial uses is present in the WSA. Abundant tuff for these purposes is also available outside the WSA and closer to population centers and markets. The rocks of the South Reveille WSA have no unique industrial or decorative characteristics.

CONCLUSIONS

One mineralized area and two geochemically anomalous areas have been identified by field investigation and sampling in the South Reveille WSA: the southern tip of the Reveille Range, the area east of Reveille Peak, and the Fang Ridge area.

A mineralized area that could contain a large, low-grade precious metal deposit, partially defined by a 3,000 ft by 1,800 ft arsenic anomaly within an area of highly fractured and bleached rhyolite, exists in the southernmost 2 sq mi of the Reveille Range, mostly within the WSA. The area of the arsenic anomaly should be mapped, sampled, and geophysically surveyed in detail to determine if a precious metals deposit exists. High arsenic values frequently are associated with gold deposits and this area has a high priority as an exploration target.

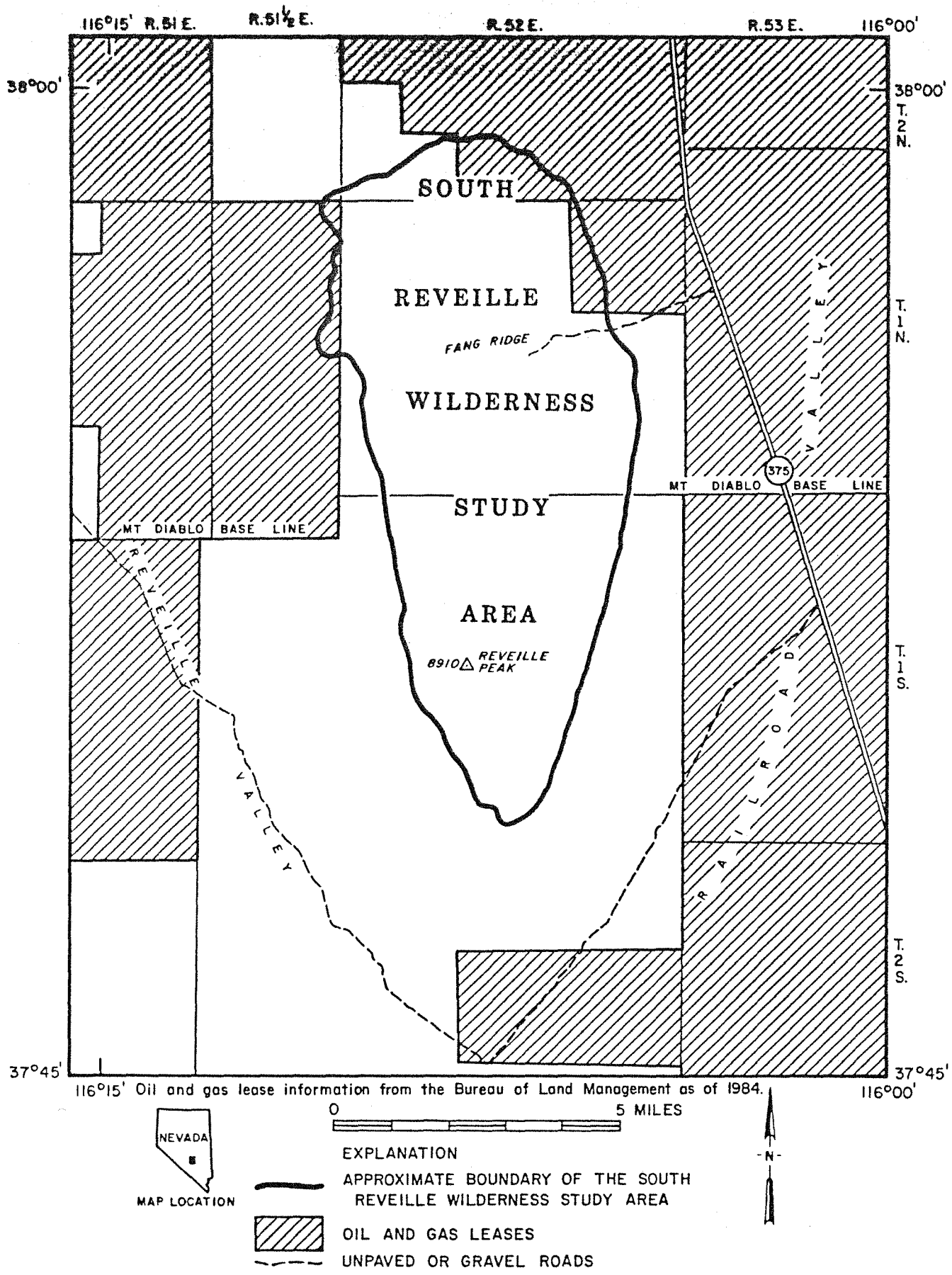


Figure 4.--Oil and gas lease map of the South Reveille Wilderness Study Area.

The rest of the southernmost 2 sq mi of the WSA should also be studied further because of the extensive fracturing and bleaching and the 0.37 ppm silver and 13.5 ppm arsenic in sample 72 (table 1). This area has a high likelihood for additional exploration interest.

The area east of Reveille Peak has little evidence of mineralization. Two of five samples from this area contained silver; however, the paucity of data from this area and the lack of any obvious surface alteration or mineralization will discourage exploration by the private sector.

The Fang Ridge area has little evidence of mineralization. Structural and geologic features seem well-suited for a mineral occurrence, but sample data are too scattered and inconsistent to draw firm conclusions.

Detailed geological, geochemical, and geophysical surveys in the area east of Reveille Peak and the Fang Ridge area should be done to determine if the anomalous sample values obtained in this reconnaissance survey are meaningful.

The South Reveille WSA has little chance for oil and gas accumulations because of the thick sequence of rhyolite, rocks not usually associated with petroleum generation and accumulation.

No hot springs are present at the surface and no geothermal leases are present in the WSA. No evidence of geothermal resources was encountered during the field investigation.

A resource of rhyolite suitable for common construction purposes exists in the WSA. Abundant sources of similar rock are available elsewhere. The rocks have no unique features and are not likely to be utilized for construction materials.

REFERENCES

Cornwall, H.R., 1972, Geology and mineral deposits of southern Nye County, Nevada: Nevada Bureau of Mines and Geology, Bulletin 77, 49 p.

Ekren,E.B., Anderson, R.E., Rogers, C.L., and Noble, D.C., 1971, Geology of northern Nellis Air Force Base Bombing and Gunnery Range, Nye County, Nevada: U.S. Geological Survey Professional Paper 651, 91 p.

Ekren, E.B., Rogers, C.L., and Dixon, G.L.,1973, Geologic and Bouguer gravity map of the Reveille quadrangle, Nye County, Nevada: U.S. Geological Survey Miscellaneous Geologic Investigations, Map I-806, scale 1:62,500.

Gardner, J.N., Eddy, A.C., Goff, F.E., Grafft, K.S., 1980, Reconnaissance geologic map of the northern Kawich and southern Reveille ranges, Nye County, Nevada: Los Alamos Scientific Laboratory and University of California-Davis, LA-8390-MAP or UC-51, scale 1:62,500.

Kral, V.E., 1951, Mineral resources of Nye County, Nevada: Nevada Bureau of Mines and Geology, Bulletin 50, 230 p.

Sandberg, C.A., 1983, Petroleum potential of wilderness lands in Nevada: U.S. Geological Survey Miscellaneous Investigations Series, Map I-1542, scale 1:1,000,000.

Table 1.--Data for selected samples from the South Reveille Wilderness Study Area, Nevada

[Detection limits: gold, 0.007 ppm; silver, 0.3 ppm; arsenic, 2 ppm; antimony, 3 ppm; uranium, 1 ppm. ---, analyzed for but not detected; NA, not analyzed for; xxx, not applicable; >, greater than; *, determined by spectrographic analysis (detection limits in appendix)]

Sample			Analytical data					
			Au	Ag	As	Sb	U	other
No.	Type	Description	ppm					percent
10	Stream sediment	xxx	---	---	---*	---*	NA	>2 Mn*
14	Panned concentrate	xxx	---	---	---*	---*	NA	>2 Mn*, 2 Zn*
20	Stream sediment	xxx	---	---	---*	---*	NA	0.009 Cu*, >0.06 Li*
29	Chip, 8 in.	Fault strikes N.86°W., dip 77° N. abundant limonite.	---	---	38	5	100	.0044 Pb
34	Stream sediment	xxx	---	1.32	---*	---*	NA	xxx
60	Do.	xxx	---	.79	---*	---*	NA	xxx
61	Do.	xxx	---	.44	---*	---*	NA	xxx
72	Chip, random	Brown- and red-stained rhyolite, hematite in fractures.	---	.37	13.5	---	9	xxx
73	Stream sediment	xxx	---	---	---*	800*	NA	xxx
78	Chip, random	Yellow and red rhyolite, Liesegang banding and altered feldspar.	---	---	37	---	5	xxx
80	Do.	Gray and pink rhyolite, Liesegang banding and altered feldspar.	---	---	61	---	4	xxx
81	Stream sediment	xxx	---	---	---*	---*	NA	>3 Mn*
82	Chip, 3 ft	Light brown rhyolite, altered feldspar, iron and manganese stain.	---	---	120	---	6	xxx

Table 1.--Data for samples selected from the South Reveille Wilderness Study Area, Nevada--Continued

Sample			Analytical data					
			Au	Ag	As	Sb	U	other
No.	Type	Description	ppm					percent
83	Chip, 5 ft	Red, brown, and white rhyolite, Liesegang banding, altered feldspar.	---	---	33	---	4	xxx
85	Chip, random	Gray rhyolite; siliceous zone strikes N.75°W., vertical dip.	---	---	58	---	4	xxx
86	Chip, 5 ft	Red and white vesicular rhyolite, Liesegang banding.	0.017	---	63	3	5	xxx
88	Chip, random	Light gray rhyolite, Liesegang banding.	---	---	38	---	4	xxx
89	Do.	Gray and red rhyolite, Liesegang banding.	---	---	37	---	3	xxx
90	Do.	Do.	---	---	70	---	4	xxx
95	Grab, select	Quartz vein, trends N.60°W., dip 85°SW.; manganese-rich, vuggy; taken at shaft.	.071	25.86	69	41	7	2 Mn*, 0.023 Pb, .06 Zn*
96	Chip, 4 ft.	Continuation of vein from shaft (sample site 95), less manganese than in sample 95.	---	2.30	72	---	5	0.02 Li*

APPENDIX--Semiquantitative optical emission spectrographic analysis detection limits, U.S. Bureau of Mines, Reno Research Center.

Element	Detection limit (percent)	Element	Detection limit (percent)
Ag	0.002	Mo	0.0001
Al	.001	Na	.3
As	.01	Nb	.007
Au	.002	Ni	.0005
B	.003	P	.7
Ba	.002	Pb	.001
Be	.0001	Pt	.0001
Bi	.01	Re	.0006
Ca	.05	Sb	.06
Cd	.0005	Sc	.0004
Co	.001	Si	.0006
Cr	.0003	Sn	.001
Cu	.0006	Sr	.0001
Fe	.0006	Ta	.02
Ga	.0002	Te	.04
K	2.0	Ti	.03
La	.01	V	.005
Li	.002	Zn	.0001
Mg	.0001	Zr	.003
Mn	.001	Y	.0009

These detection limits represent an ideal situation. In actual analyses, the detection limits vary with the composition of the material analyzed. These numbers are to be used only as a guide.

RENO RESEARCH CENTER

SPECTROGRAPHIC LABORATORY REPORT

RUN NO. 472-#823
SAMPLE NUMBERS

ELEMENT	1	2	3	4	5	6	7	8
	CONCENTRATION, PERCENT							
AG	<.0005	<.0005	<.0005	<.001	<.003	<.0007	<.0008	<.001
AL	>4.	>4.	>4.	>3.	>3.	>4.	>4.	>4.
AS	<.009	<.009	<.009	<.009	<.02	<.009	<.009	<.009
AU	<.002	<.002	<.002	<.002	<.002	<.002	<.002	<.002
B	.009	<.007	.009	<.006	.009	<.006	<.007	<.007
BA	.1	.1	.1	.1	.2	.1	.1	.07
BE	.001	.0006	.0005	.0007	.0007	.0007	.0008	.0004
BI	<.03	<.02	<.03	<.03	<.05	<.03	<.03	<.03
CA	2.	.9	1.	2.	3.	2.	1.	6.
CD	<.0005	<.0005	<.0005	<.0005	<.0005	<.0005	<.0005	<.0005
CO	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001
CR	<.0003	<.0003	<.0003	<.0003	<.0003	<.0003	<.0003	<.0003
CU	<.0006	<.0006	<.0006	<.0006	<.0006	<.0006	<.0006	<.0006
FE	3.	2.	2.	3.	4.	3.	3.	7.
GA	<.0002	<.0002	<.0002	<.0002	<.0002	<.0002	<.0002	<.0005
K	>10.	>10.	>10.	>10.	10.	>10.	>10.	6.
LA	<.01	<.01	<.01	<.01	<.01	<.01	<.01	<.01
LI	.007	<.002	.03	<.002	<.002	<.002	<.005	<.002
MG	.9	.5	.5	.8	1.	.8	.5	2.
MN	.3	.05	.2	.3	.2	.3	.5	.7
MO	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001
NA	4.	3.	4.	3.	2.	4.	4.	4.
NB	<.01	<.007	<.008	<.01	<.01	<.01	<.009	<.02
NI	.001	<.0005	<.0006	.0009	.001	<.0007	.0008	.003
P	<.7	<.7	<.7	<.7	<.7	<.7	<.7	<.7
PB	<.002	<.002	<.002	<.002	<.002	<.002	<.002	<.002
PD	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001
PT	<.0006	<.0006	<.0006	<.0006	<.0006	<.0006	<.0006	<.0006
SB	<.06	<.06	<.06	<.06	<.06	<.06	<.06	<.09
SC	<.0004	<.0004	<.0004	<.0004	<.0004	<.0004	<.0004	<.0004
SI	>10.	>10.	>10.	>10.	>10.	>10.	>10.	>10.
SN	<.001	<.0006	<.0008	<.0008	<.003	<.0006	<.0009	<.009
SR	.02	.006	.006	.02	.03	.02	.01	.02
TA	<.02	<.02	<.02	<.02	<.02	<.02	<.02	<.02
TE	<.06	<.05	<.04	<.04	<.04	<.04	<.04	<.04
TI	<.04	<.03	<.03	<.05	.2	<.03	<.06	.5
V	<.005	<.005	<.005	<.005	<.005	<.005	<.005	<.005
Y	<.0009	<.0009	<.0009	<.0009	<.0009	<.0009	<.0009	<.0009
ZN	.01	.006	.008	.01	.01	.009	.02	.03
ZR	<.003	<.003	<.003	<.003	<.003	<.003	.004	<.003

RENO RESEARCH CENTER

SPECTROGRAPHIC LABORATORY REPORT

RUN NO. 472-#823
SAMPLE NUMBERS

ELEMENT	9	10	11	12	13	14	15	16
	CONCENTRATION, PERCENT							
AG	<.001	<.001	<.0005	<.002	<.0005	<.006	<.0005	<.0009
AL	>4.	>4.	>4.	>4.	>4.	>2.	>4.	>3.
AS	<.009	<.01	<.009	<.009	<.009	<.01	<.009	<.01
AU	<.002	<.002	<.002	<.002	<.002	<.003	<.002	<.002
B	.009	<.008	.009	.009	<.007	<.007	<.004	<.007
BA	.1	.2	.1	.1	.2	.7	.1	.05
BE	.0007	.0007	.0006	.0008	.0006	.002	.0005	.0007
BI	<.04	<.04	<.03	<.04	<.03	<.01	<.03	<.03
CA	2.	3.	2.	2.	3.	.8	4.	.8
CD	<.0005	<.0005	<.0005	<.0005	<.0005	<.0005	<.0005	<.0005
CO	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001
CR	<.0003	<.0003	<.0003	<.0003	<.0003	.001	<.0003	<.0003
CU	<.0006	<.0006	<.0006	<.0006	<.0006	<.0006	<.0006	<.0006
FE	4.	3.	3.	4.	3.	10.	4.	2.
GA	<.0002	<.0002	<.0002	<.0002	<.0002	<.001	<.0002	<.0002
K	>10.	>10.	>10.	>10.	>10.	5.	10.	>10.
LA	<.01	<.01	<.01	<.01	<.01	<.01	<.01	<.01
LI	.006	.006	<.004	.01	<.003	<.002	<.002	<.002
MG	.8	.9	.7	1.	.9	.6	.9	.4
MN	.3	>2.	.3	.5	.4	>4.	.5	.1
MO	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001
NA	3.	4.	4.	4.	4.	<.4	2.	2.
NB	<.01	<.02	<.01	<.02	<.02	<.01	<.01	<.007
NI	.001	.001	<.0007	.0008	.001	.01	.002	<.0006
P	<.7	<.7	<.7	<.7	<.7	2.	<.7	<.7
PB	<.002	<.002	<.002	<.002	<.002	<.002	<.002	<.002
PD	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001
PT	<.0006	<.0006	<.0006	<.0006	<.0006	<.001	<.0006	<.0006
SB	<.06	<.06	<.06	<.06	<.06	<.1	<.06	<.06
SC	<.0004	<.0004	<.0004	<.0004	<.0004	<.0004	<.0004	<.0004
SI	>10.	>10.	>10.	>10.	>10.	>10.	>10.	>10.
SN	<.001	<.002	<.0006	<.0008	<.0006	<.06	<.001	<.0006
SR	.02	.02	.02	.02	.05	.009	.04	.003
TA	<.02	<.02	<.02	<.02	<.02	<.05	<.02	<.02
TE	<.04	<.04	<.04	<.04	<.04	<.09	<.04	<.04
TI	.1	.1	<.05	.1	<.06	1.	.09	<.03
V	<.005	<.005	<.005	<.005	<.005	.04	<.005	<.005
Y	<.0009	<.0009	<.0009	<.0009	<.0009	<.0009	<.0009	<.0009
ZN	.01	.01	.01	.01	.009	.2	.01	.004
ZR	<.003	<.003	<.003	<.003	<.003	.06	<.003	<.003

RENO RESEARCH CENTER

SPECTROGRAPHIC LABORATORY REPORT

RUN NO. 472-#823
SAMPLE NUMBERS

ELEMENT	17	18	19	20	21	22	23	24
	CONCENTRATION, PERCENT							
AG	<.0005	<.0005	<.0005	<.001	<.001	<.0005	<.01	<.0005
AL	>3.	>4.	>3.	>4.	>3.	>3.	1.	>4.
AS	<.009	<.009	<.04	<.009	<.009	<.009	<.01	<.009
AU	<.002	<.002	<.002	<.002	<.002	<.002	<.003	<.002
B	<.005	<.006	<.006	.01	<.008	<.008	<.005	<.008
BA	.06	.09	.1	.1	.04	.1	.02	.1
BE	.0008	.0005	.0006	.001	.0009	.0005	.002	.0004
BI	<.01	<.02	<.01	<.04	<.02	<.02	<.01	<.02
CA	7.	2.	3.	2.	1.	1.	<.2	2.
CD	<.0005	<.0005	<.0005	.0005	<.0005	<.0005	<.0005	<.0005
CO	<.001	<.001	<.001	<.008	<.001	<.001	<.001	<.001
CR	<.0003	<.0003	<.0003	<.0003	<.0003	<.0003	.005	<.0003
CU	<.0006	<.0006	<.0006	.009	<.0006	<.0006	<.0006	<.0006
FE	3.	3.	3.	3.	1.	2.	10.	3.
GA	<.0002	<.0002	<.0002	<.0002	<.0002	<.0002	<.001	<.0002
K	>10.	>10.	>10.	>10.	>10.	>10.	5.	>10.
LA	<.01	<.01	<.01	<.01	<.01	<.01	<.01	<.01
LI	<.002	<.002	<.002	>.06	<.002	.008	<.002	<.002
MG	.9	.6	1.	.8	.4	.4	.5	.9
MN	.3	.2	.2	.3	.04	.06	>3.	.3
MO	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001
NA	<.8	3.	2.	3.	3.	2.	<.3	4.
NB	<.007	<.008	<.007	<.01	<.01	<.008	<.01	<.007
NI	<.0005	<.0004	<.0006	.0009	<.0003	<.0005	<.01	<.0005
P	<.7	<.7	<.7	<.7	<.7	<.7	<1.	<.7
PB	<.002	<.002	<.002	<.008	<.002	<.002	<.002	<.002
PD	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001
PT	<.0006	<.0006	<.0006	<.0006	<.0006	<.0006	<.003	<.0006
SB	<.06	<.06	<.06	<.06	<.06	<.06	<.06	<.06
SC	<.0004	<.0004	<.0004	<.0004	<.0004	<.0004	<.0004	<.0004
SI	>10.	>10.	>10.	>10.	>10.	>10.	>10.	>10.
SN	<.0006	<.0006	<.0008	<.003	<.0006	<.0007	<.05	<.0006
SR	.03	.009	.03	.02	.007	.007	.002	.02
TA	<.02	<.02	<.02	<.02	<.02	<.02	<.08	<.02
TE	<.04	<.04	<.04	<.04	<.04	<.05	<.05	<.04
TI	<.03	<.04	.09	<.08	<.03	<.04	2.	<.03
V	<.005	<.005	<.005	<.005	<.005	<.005	.07	<.005
Y	<.0009	<.0009	<.0009	<.0009	<.0009	<.0009	<.0009	<.0009
ZN	.009	.009	.008	.01	.006	.004	.1	.006
ZR	<.003	<.003	<.003	.005	<.003	<.003	.1	<.003

RENO RESEARCH CENTER

SPECTROGRAPHIC LABORATORY REPORT

RUN NO. 472-#823
SAMPLE NUMBERS

ELEMENT	25	26	27	28	29	30	31	32	33
	CONCENTRATION, PERCENT								
AG	<.0005	<.0005	<.005	<.001	<.002	<.0005	<.001	<.0005	<.0005
AL	>4.	>4.	.9	>4.	>3.	>4.	>3.	>4.	>4.
AS	<.01	<.009	<.01	<.009	<.06	<.009	<.03	<.009	<.04
AU	<.002	<.002	<.003	<.002	<.002	<.002	<.002	<.002	<.002
B	.009	<.007	<.004	<.008	<.006	<.007	<.007	<.008	<.007
BA	.1	.1	.01	.1	.02	.08	.07	.1	.09
BE	.0007	.0005	.002	.0007	.0004	.0007	.0008	.0005	.0006
BI	<.03	<.02	<.01	<.04	<.03	<.02	<.02	<.02	<.02
CA	4.	2.	<.2	3.	.9	.6	1.	2.	1.
CD	<.0005	<.0005	<.0005	<.0005	<.0005	<.0005	<.0005	<.0005	<.0005
CO	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001
CR	<.0003	<.0003	.005	<.0007	<.0003	<.0003	<.0003	<.0003	<.0003
CU	<.0006	<.0006	<.0006	<.0006	<.0006	<.0006	<.0006	<.0006	<.0006
FE	2.	2.	>10.	4.	4.	4.	4.	2.	3.
GA	<.0002	<.0002	<.001	<.0002	<.0002	<.0002	<.0002	<.0002	<.0002
K	>10.	>10.	4.	>10.	10.	>10.	>10.	>10.	>10.
LA	<.01	<.01	<.01	<.01	<.01	<.01	<.01	<.01	<.01
LI	<.003	<.002	<.002	<.002	<.002	<.002	.008	<.002	<.002
MG	.7	.7	.3	1.	.9	.7	1.	.5	.8
MN	.07	.3	>2.	.3	.03	.6	.4	.3	.3
MO	<.0001	<.0001	<.0002	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001
NA	4.	4.	<.3	4.	<.6	3.	3.	5.	4.
NB	<.02	<.01	<.01	<.01	<.007	<.007	<.007	<.01	<.007
NI	<.0006	<.0005	<.008	.002	.0008	<.0005	.0008	<.0003	<.0004
P	<.7	<.7	<.9	<.7	<.7	<.7	<.7	<.7	<.7
PB	<.002	<.002	<.002	<.002	<.005	<.002	<.002	<.002	<.002
PD	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001
PT	<.0006	<.0006	<.002	<.0006	<.0006	<.0006	<.0006	<.0006	<.0006
SB	<.06	<.06	<.06	<.06	<.06	<.06	<.06	<.06	<.06
SC	<.0004	<.0004	<.0004	<.0004	<.0004	<.0004	<.0004	<.0004	<.0004
SI	>10.	>10.	4.	>10.	>10.	>10.	>10.	>10.	>10.
SN	<.0006	<.0006	<.06	<.004	<.002	<.0006	<.0006	<.0006	<.0006
SR	.03	.03	.0005	.03	.04	.007	.01	.02	.01
TA	<.02	<.02	<.09	<.02	<.02	<.02	<.02	<.02	<.02
TE	<.04	<.04	<.1	<.04	<.04	<.04	<.04	<.04	<.04
TI	<.04	<.03	2.	<.06	<.03	<.04	<.03	<.03	<.03
V	<.005	<.005	.07	<.005	<.005	<.005	<.005	<.005	<.005
Y	<.0009	<.0009	<.0009	<.0009	<.0009	<.0009	<.0009	<.0009	<.0009
ZN	.006	.006	.1	.02	.004	.02	.02	.008	.009
ZR	<.003	<.003	.2	<.003	<.003	<.003	<.003	<.003	<.003

RENO RESEARCH CENTER

SPECTROGRAPHIC LABORATORY REPORT

RUN NO. 472-#823
SAMPLE NUMBERS

ELEMENT	34	35	36	37	38	39	40	41	42
	CONCENTRATION, PERCENT								
AG	<.0005	<.02	<.0005	<.0005	<.002	<.0007	<.0005	<.0005	<.0005
AL	>4.	>4.	>4.	>3.	>3.	>3.	>3.	>4.	>3.
AS	<.009	<.009	<.009	<.04	<.009	<.009	<.03	<.009	<.04
AU	<.002	<.002	<.002	<.002	<.002	<.002	<.002	<.002	<.002
B	<.007	<.008	<.007	<.007	.01	<.007	<.006	.009	<.008
BA	.09	.1	.1	.08	.1	.02	.06	.05	.03
BE	.0006	.0008	.0005	.0008	.0008	.0007	.0006	.0006	.0008
BI	<.02	<.02	<.02	<.02	<.02	<.03	<.01	<.03	<.02
CA	2.	2.	2.	2.	1.	<.05	.7	.5	.2
CD	<.0005	<.0005	<.0005	<.0005	<.0005	<.0005	<.0005	<.0005	<.0005
CO	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001
CR	<.0003	<.0003	<.0003	<.0003	<.0003	<.0003	<.0003	<.0003	<.0003
CU	<.0006	<.0006	<.0006	<.0006	<.0006	<.0006	<.0006	<.0006	<.0006
FE	2.	4.	3.	5.	3.	1.	2.	1.	1.
GA	<.0002	<.0002	<.0002	<.0002	<.0002	<.0002	<.0002	<.0002	<.0002
K	>10.	>10.	>10.	>10.	>10.	>10.	>10.	>10.	>10.
LA	<.01	<.01	<.01	<.01	<.01	<.01	<.01	<.01	<.01
LI	<.004	<.003	<.004	<.003	<.005	<.004	<.003	.01	<.002
MG	.7	.7	.9	1.	.9	.3	.9	.2	.2
MN	.2	.3	.3	.4	.4	.03	.3	.05	.05
MO	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001
NA	4.	3.	3.	2.	3.	2.	3.	3.	2.
NB	<.01	<.01	<.01	<.007	<.007	<.007	<.007	<.01	<.007
NI	<.0005	.001	.0008	.001	.0009	<.0004	<.0003	<.0004	<.0004
P	<.7	<.7	<.7	<.7	<.7	<.7	<.7	<.7	<.7
PB	<.002	<.002	<.002	<.002	<.002	<.002	<.002	<.002	<.002
PD	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001
PT	<.0006	<.0006	<.0006	<.0006	<.0006	<.0006	<.0006	<.0006	<.0006
SB	<.06	<.06	<.06	<.06	<.06	<.06	<.06	<.06	<.06
SC	<.0004	<.0004	<.0004	<.0004	<.0004	<.0004	<.0004	<.0004	<.0004
SI	>10.	>10.	>10.	>10.	>10.	>10.	>10.	>10.	>10.
SN	<.0006	<.001	<.0007	<.001	<.002	<.0006	<.0006	<.0006	<.0006
SR	.02	.02	.01	.01	.01	.0007	.007	.001	.0008
TA	<.02	<.02	<.02	<.02	<.02	<.02	<.02	<.02	<.02
TE	<.04	<.04	<.04	<.04	<.05	<.04	<.04	<.04	<.04
TI	<.04	.08	.08	.1	<.06	<.03	<.03	<.03	<.03
V	<.005	<.005	<.005	<.005	<.005	<.005	<.005	<.005	<.005
Y	<.0009	<.0009	<.0009	<.0009	<.0009	<.0009	<.0009	<.0009	<.0009
ZN	.01	.01	.01	.02	.009	.01	.01	.005	.005
ZR	<.003	<.003	<.003	<.003	<.003	<.003	<.003	<.003	<.003

RENO RESEARCH CENTER

SPECTROGRAPHIC LABORATORY REPORT

RUN NO. 472-#823
SAMPLE NUMBERS

ELEMENT	43	44	45	46	47	48	49	50
	CONCENTRATION, PERCENT							
AG	<.0005	<.0005	<.0005	<.0005	<.0005	<.0005	<.001	<.0005
AL	>4.	>4.	>4.	>3.	>3.	>3.	>2.	>3.
AS	<.01	<.009	<.009	<.009	<.01	<.009	<.03	<.03
AU	<.002	<.002	<.002	<.002	<.002	<.002	<.002	<.002
B	.01	<.006	<.005	<.005	<.008	<.006	<.005	<.006
BA	.1	.09	.05	.07	.03	.08	.05	.06
BE	.0006	.0005	.0005	.0005	.0006	.0007	.0005	.0004
BI	<.02	<.01	<.02	<.01	<.02	<.01	<.03	<.01
CA	2.	1.	6.	2.	.5	1.	.7	.8
CD	<.0005	<.0005	<.0005	<.0005	<.0005	<.0005	<.0005	<.0005
CO	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001
CR	<.0003	<.0003	<.0003	<.0003	<.0003	<.0003	<.0003	<.0003
CU	<.0006	<.0006	<.0006	<.0006	<.0006	<.0006	<.0006	<.0006
FE	3.	3.	6.	3.	1.	2.	2.	3.
GA	<.0002	<.0002	<.0002	<.0002	<.0002	<.0002	<.0002	<.0002
K	>10.	>10.	4.	>10.	>10.	>10.	10.	>10.
LA	<.01	<.01	<.01	<.01	<.01	<.01	<.01	<.01
LI	.01	<.003	<.002	<.002	.007	<.003	<.002	<.002
MG	.8	.7	2.	1.	.3	.6	1.	1.
MN	.5	.4	.7	.3	.04	.4	.5	.6
MO	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001
NA	3.	3.	3.	3.	3.	4.	<1.	<.7
NB	<.02	<.007	<.02	<.008	<.007	<.008	<.007	<.007
NI	.001	<.0005	.003	<.0007	<.0003	<.0004	<.0006	<.0006
P	<.7	<.7	<.7	<.7	<.7	<.7	<.7	<.7
PB	<.002	<.002	<.002	<.002	<.002	<.002	<.002	<.002
PD	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001
PT	<.0006	<.0006	<.0006	<.0006	<.0006	<.0006	<.0006	<.0006
SB	<.06	<.06	<.06	<.06	<.06	<.06	<.06	<.06
SC	<.0004	<.0004	<.0004	<.0004	<.0004	<.0004	<.0004	<.0004
SI	>10.	>10.	>10.	>10.	>10.	>10.	>10.	>10.
SN	<.002	<.0006	<.004	<.0006	<.0006	<.0006	<.0006	<.0006
SR	.01	.009	.03	.01	.001	.01	.005	.004
TA	<.02	<.02	<.02	<.02	<.02	<.02	<.02	<.02
TE	<.04	<.04	<.04	<.04	<.04	<.04	<.04	<.04
TI	.1	<.03	.3	<.06	<.03	<.03	<.03	<.04
V	<.005	<.005	<.005	<.005	<.005	<.005	<.005	<.005
Y	<.0009	<.0009	<.0009	<.0009	<.0009	<.0009	<.0009	<.0009
ZN	.01	.01	.03	.01	.003	.01	.02	.01
ZR	<.003	<.003	<.003	<.003	<.003	<.003	<.003	<.003

RENO RESEARCH CENTER

SPECTROGRAPHIC LABORATORY REPORT

RUN NO. 472-#823
SAMPLE NUMBERS

ELEMENT	51	52	53	54	55	56	57	58
	CONCENTRATION, PERCENT							
AG	<.0005	<.0005	<.0005	<.0005	<.0005	<.0005	<.001	<.0005
AL	>3.	>3.	>4.	>3.	>3.	>4.	>3.	>3.
AS	<.009	<.009	<.009	<.009	<.009	<.009	<.01	<.009
AU	<.002	<.002	<.002	<.002	<.002	<.002	<.002	<.002
B	.01	<.007	.009	<.006	<.007	.01	<.008	.01
BA	.04	.09	.07	.1	.05	.09	.09	.03
BE	.0009	.0008	.001	.0006	.0007	.0005	.001	.001
BI	<.02	<.01	<.03	<.02	<.02	<.02	<.03	<.02
CA	.7	1.	.9	2.	.6	.7	1.	.7
CD	<.0005	<.0005	<.0005	<.0005	<.0005	<.0005	<.0005	<.0005
CO	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001
CR	<.0003	<.0003	<.0003	<.0003	<.0003	<.0003	<.0003	<.0003
CU	<.0006	<.0006	<.0006	<.0006	<.0006	<.0006	.004	<.0006
FE	1.	3.	2.	3.	2.	2.	2.	2.
GA	<.0002	<.0002	<.0002	<.0002	<.0002	<.0002	<.0002	<.0002
K	>10.	>10.	>10.	>10.	>10.	>10.	>10.	>10.
LA	<.01	<.01	<.01	<.01	<.01	<.01	<.01	<.01
LI	<.003	<.003	<.003	.006	.006	<.004	<.002	.008
MG	.4	.9	.5	1.	.4	.6	.3	.2
MN	.07	.4	.1	.2	.06	.09	.2	.1
MO	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001
NA	4.	3.	4.	4.	2.	2.	4.	3.
NB	<.009	<.007	<.01	<.007	<.008	<.009	<.01	<.007
NI	<.0004	<.0006	<.0004	<.0004	<.0003	<.0004	<.0005	<.0007
P	<.7	<.7	<.7	<.7	<.7	<.7	<.7	<.7
PB	<.002	<.002	<.002	<.002	<.002	<.002	<.002	<.002
PD	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001
PT	<.0006	<.0006	<.0006	<.0006	<.0006	<.0006	<.0006	<.0006
SB	<.06	<.06	<.06	<.06	<.06	<.06	<.06	<.06
SC	<.0004	<.0004	<.0004	<.0004	<.0004	<.0004	<.0004	<.0004
SI	>10.	>10.	>10.	>10.	>10.	>10.	>10.	>10.
SN	<.0006	<.0006	<.0006	<.0006	<.0006	<.0006	<.0006	<.001
SR	.003	.01	.005	.03	.004	.005	.006	.0008
TA	<.02	<.02	<.02	<.02	<.02	<.02	<.02	<.02
TE	<.04	<.04	<.04	<.04	<.04	<.04	<.06	<.08
TI	<.03	<.04	<.03	<.04	<.03	<.03	<.03	<.03
V	<.005	<.005	<.005	<.005	<.005	<.005	<.005	<.005
Y	<.0009	<.0009	<.0009	<.0009	<.0009	<.0009	<.0009	<.0009
ZN	.009	.01	.01	.009	.005	.004	.008	.007
ZR	<.003	<.003	<.003	<.003	<.003	<.003	<.003	<.003

RENO RESEARCH CENTER

SPECTROGRAPHIC LABORATORY REPORT

RUN NO. 472-#823
SAMPLE NUMBERS

ELEMENT	59	60	61	62	63	64	65	66
	CONCENTRATION, PERCENT							
AG	<.0005	<.003	<.0008	<.0005	<.0005	<.0005	<.0008	<.0005
AL	>3.	>3.	>4.	>3.	>3.	>4.	>3.	>3.
AS	<.02	<.01	<.009	<.009	<.03	<.009	<.009	<.009
AU	<.002	<.002	<.002	<.002	<.002	<.002	<.002	<.002
B	<.004	.009	.009	<.007	<.004	<.008	.009	.009
BA	.05	.1	.2	.06	.06	.06	.04	.09
BE	.0005	.001	.0009	.0006	<.0002	.0007	.001	.0007
BI	<.01	<.03	<.03	<.02	<.03	<.02	<.03	<.02
CA	.6	2.	2.	.6	.8	.2	.6	1.
CD	<.0005	<.0005	<.0005	<.0005	<.0005	<.0005	<.0005	<.0005
CO	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001
CR	<.0003	<.0003	<.0003	<.0003	<.0003	<.0003	<.0003	<.0003
CU	<.0006	<.0006	<.0006	<.0006	<.0006	<.0006	<.0006	<.0006
FE	2.	3.	3.	2.	3.	3.	1.	2.
GA	<.0002	<.0002	<.0002	<.0002	<.0002	<.0002	<.0002	<.0002
K	>10.	>10.	>10.	>10.	10.	>10.	>10.	>10.
LA	<.01	<.01	<.01	<.01	<.01	<.01	<.01	<.01
LI	<.002	.007	.008	<.002	<.002	<.002	<.002	.006
MG	1.	1.	.8	.3	1.	.5	.3	.9
MN	.4	.5	.4	.1	.4	.1	.1	.6
MO	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001
NA	1.	4.	4.	5.	1.	2.	4.	4.
NB	<.007	<.008	<.02	<.007	<.007	<.009	<.01	<.007
NI	<.0004	.001	.0008	<.0002	<.0004	<.0004	<.0005	<.0005
P	<.7	<.7	<.7	<.7	<.7	<.7	<.7	<.7
PB	<.002	<.003	<.002	<.002	<.002	<.002	<.002	<.002
PD	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001
PT	<.0006	<.0006	<.0006	<.0006	<.0006	<.0006	<.0006	<.0006
SB	<.06	<.06	<.06	<.06	<.06	<.06	<.06	<.06
SC	<.0004	<.0004	<.0004	<.0004	<.0004	<.0004	<.0004	<.0004
SI	>10.	>10.	>10.	>10.	>10.	>10.	>10.	>10.
SN	<.0006	<.002	<.001	<.0006	<.0006	<.0006	<.0006	<.0006
SR	.005	.02	.02	.005	.006	.005	.003	.008
TA	<.02	<.02	<.02	<.02	<.02	<.02	<.02	<.02
TE	<.04	<.04	<.05	<.04	<.04	<.04	<.06	<.04
TI	<.03	<.07	<.05	<.03	<.03	<.05	<.03	<.03
V	<.005	<.005	<.005	<.005	<.005	<.005	<.005	<.005
Y	<.0009	<.0009	<.0009	<.0009	<.0009	<.0009	<.0009	<.0009
ZN	.02	.02	.01	.008	.02	.009	.007	.01
ZR	<.003	<.003	<.003	<.003	<.003	<.003	<.003	<.003

RENO RESEARCH CENTER

SPECTROGRAPHIC LABORATORY REPORT

RUN NO. 472-#823
SAMPLE NUMBERS

ELEMENT	67	68	69	70	71	72	73	74
	CONCENTRATION, PERCENT							
AG	<.004	<.002	<.001	<.002	<.0008	<.003	<.0007	<.002
AL	>3.	>4.	>4.	>4.	>3.	>4.	>3.	>3.
AS	<.009	<.01	<.009	<.02	<.01	<.009	<.01	<.06
AU	<.002	<.002	<.002	<.002	<.002	<.002	<.002	<.002
B	.009	<.008	<.008	.01	.01	.01	.01	.01
BA	.1	.2	.2	.1	.02	.1	.03	.05
BE	.0007	.0007	.0009	.0008	.002	.0009	.002	.001
BI	<.03	<.04	<.03	<.05	<.03	<.04	<.02	<.04
CA	1.	3.	.1	<.05	<.1	1.	.2	<.1
CD	<.0005	<.0005	<.0005	<.0005	<.0005	<.0005	<.0005	<.0005
CO	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001
CR	<.0003	<.0003	<.0003	<.0003	<.0003	<.0003	<.0003	<.0003
CU	<.0006	<.0006	<.0006	<.0006	<.0006	<.0006	<.0006	<.0006
FE	3.	3.	2.	2.	3.	3.	4.	1.
GA	<.0002	<.0002	<.0002	<.0002	<.0002	<.0002	<.0002	<.0002
K	>10.	>10.	>10.	>10.	>10.	>10.	>10.	>10.
LA	<.01	<.01	<.01	<.01	<.01	<.01	<.01	<.01
LI	<.005	<.005	<.002	<.002	.008	<.003	<.002	<.002
MG	.8	.8	.3	.2	.5	1.	.4	.3
MN	.3	.3	.07	.3	.1	.5	.2	.06
MO	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001
NA	3.	2.	<.6	<.8	<.6	2.	<.3	2.
NB	<.007	<.02	<.01	<.01	<.007	<.01	<.007	<.007
NI	<.0007	.001	<.0006	<.0006	<.0005	.001	<.0006	<.0006
P	<.7	<.7	<.7	<.7	<.7	<.7	<.9	<.7
PB	<.002	<.002	<.002	<.002	<.002	<.004	<.002	<.002
PD	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001
PT	<.0006	<.0006	<.0006	<.0006	<.0006	<.0006	<.0006	<.0006
SB	<.06	<.06	<.06	<.06	<.06	<.06	.08	<.06
SC	<.0004	<.0004	<.0004	<.0004	<.0004	<.0004	<.0004	<.0004
SI	>10.	>10.	>10.	>10.	>10.	>10.	>10.	>10.
SN	<.0006	<.003	<.0009	<.0008	<.0008	<.004	<.0009	<.001
SR	.009	.01	.003	.002	.001	.009	.0003	.001
TA	<.02	<.02	<.02	<.02	<.02	<.02	<.02	<.02
TE	<.04	<.04	<.06	<.04	<.08	<.04	<.06	<.06
TI	<.06	.1	<.03	<.04	<.03	.1	<.03	<.03
V	<.005	<.005	<.005	<.005	<.005	<.005	<.005	<.005
Y	<.0009	<.0009	<.0009	<.0009	<.0009	<.0009	<.0009	<.0009
ZN	.01	.009	.004	.005	.02	.008	.02	.007
ZR	<.003	<.003	<.003	<.003	<.003	<.003	<.003	<.003

RENO RESEARCH CENTER

SPECTROGRAPHIC LABORATORY REPORT

RUN NO. 472-#823
SAMPLE NUMBERS

ELEMENT	75	76	77	78	79	80	81	82
	CONCENTRATION, PERCENT							
AG	<.0005	<.0005	<.0005	<.0007	<.0005	<.0005	<.0005	<.0005
AL	>3.	>4.	>3.	>4.	>4.	>3.	>4.	>3.
AS	<.009	<.009	<.02	<.02	<.009	<.009	<.009	.03
AU	<.002	<.002	<.002	<.002	<.002	<.002	<.002	<.002
B	<.006	.009	.009	.01	<.008	<.006	<.006	.009
BA	.04	.1	.06	.07	.07	.09	.2	.1
BE	.0006	.0009	.0009	.0004	.0005	.0006	.001	.0007
BI	<.02	<.03	<.01	<.04	<.03	<.03	<.02	<.02
CA	.2	1.	2.	<.05	<.05	.6	.7	<.07
CD	<.0005	<.0005	<.0005	<.0005	<.0005	<.0005	<.0005	<.0005
CO	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001
CR	<.0003	<.0003	<.0003	<.0003	<.0003	<.0003	<.0003	<.0003
CU	<.0006	<.0006	<.0006	<.0006	<.0006	<.0006	<.0006	<.0006
FE	1.	2.	3.	2.	1.	3.	3.	2.
GA	<.0002	<.0002	<.0002	<.0002	<.0002	<.0002	<.0002	<.0002
K	>10.	>10.	>10.	>10.	>10.	>10.	>10.	>10.
LA	<.01	<.01	<.01	<.01	<.01	<.01	<.01	<.01
LI	<.004	<.002	<.002	<.002	<.002	<.002	<.002	<.002
MG	.2	.4	.2	.2	.2	.7	.7	.2
MN	.1	.2	.4	.04	.03	.5	>3.	.2
MO	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001
NA	3.	4.	2.	1.	<1.	2.	3.	<.3
NB	<.01	<.01	<.007	<.01	<.008	<.007	<.008	<.008
NI	<.0003	<.0005	<.0005	<.0005	<.0004	<.0005	<.0002	<.0004
P	<.7	<.7	<.7	<.7	<.7	<.7	<.7	<.7
PB	<.002	<.002	<.002	<.002	<.002	<.002	<.002	<.002
PD	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001
PT	<.0006	<.0006	<.0006	<.0006	<.0006	<.0006	<.0006	<.0006
SB	<.06	<.06	<.06	<.06	<.06	<.06	<.07	<.06
SC	>10.	<.0004	<.0004	<.0004	<.0004	<.0004	<.0004	<.0004
SI	>10.	>10.	>10.	>10.	>10.	>10.	>10.	>10.
SN	<.0006	<.0006	<.0007	<.0006	<.0006	<.0006	<.0007	<.0006
SR	.002	.005	.002	.001	.001	.005	.01	.0005
TA	<.02	<.02	<.02	<.02	<.02	<.02	<.02	<.02
TE	<.04	<.04	<.04	<.04	<.04	<.04	<.04	<.04
TI	<.03	<.03	<.03	<.03	<.03	<.03	<.03	<.03
V	<.005	<.005	<.005	<.005	<.005	<.005	<.005	<.005
Y	<.0009	<.0009	<.0009	<.0009	<.0009	<.0009	<.0009	<.0009
ZN	.006	.007	.007	.005	.002	.01	.02	.01
ZR	<.003	<.003	<.003	<.003	<.003	<.003	<.003	<.003

RENO RESEARCH CENTER

SPECTROGRAPHIC LABORATORY REPORT

RUN NO. 472-#823
SAMPLE NUMBERS

ELEMENT	83	84	85	86	87	88	89	90
	CONCENTRATION, PERCENT							
AG	<.0005	<.0007	<.0005	<.0005	<.0009	<.0005	<.0005	<.0005
AL	>3.	>3.	>4.	>3.	>4.	>4.	>4.	>3.
AS	<.02	<.05	<.02	<.02	<.01	.03	<.02	.03
AU	<.002	<.002	<.002	<.002	<.002	<.002	<.002	<.002
B	.009	<.007	.009	<.008	.009	.01	.009	.01
BA	.09	.05	.1	.003	.2	.06	.09	.1
BE	.0006	.0006	.0006	.0005	.0007	.0006	.0004	.0007
BI	<.03	<.03	<.03	<.02	<.03	<.03	<.02	<.03
CA	<.05	<.05	.3	<.05	3.	.2	.2	<.07
CD	<.0005	<.0005	<.0005	<.0005	<.0005	<.0005	<.0005	<.0005
CO	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001
CR	<.0003	<.0003	<.0003	<.0005	<.0003	<.0005	<.0003	<.0004
CU	<.0006	<.0006	<.0006	<.0006	<.0006	<.0006	<.0006	<.0006
FE	1.	1.	2.	2.	4.	1.	1.	3.
GA	<.0002	<.0002	<.0002	<.0002	<.0002	<.0002	<.0002	<.0002
K	>10.	>10.	>10.	10.	>10.	>10.	>10.	>10.
LA	<.01	<.01	<.01	<.01	<.01	<.01	<.01	<.01
LI	<.002	<.002	<.002	<.002	.01	<.002	<.002	<.002
MG	.2	.2	.2	.009	1.	.2	.1	.2
MN	.07	.05	.3	.03	.3	.08	.02	.2
MO	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001
NA	<.3	<.9	<1.	<.3	3.	7.	3.	<.3
NB	<.01	<.007	<.009	<.007	<.02	<.02	<.01	<.01
NI	<.0003	<.0004	<.0004	<.0002	.001	<.0005	<.0004	<.0004
P	<.7	<.7	<.7	<.7	<.7	<.7	<.7	<.7
PB	<.002	<.002	<.002	<.002	<.002	<.002	<.002	<.002
PD	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001
PT	<.0006	<.0006	<.0006	<.0006	<.0006	<.0006	<.0006	<.0006
SB	<.06	<.06	<.06	<.06	<.06	<.06	<.06	<.06
SC	<.0004	<.0004	<.0004	<.0004	<.0004	<.0004	<.0004	<.0004
SI	>10.	>10.	>10.	>10.	>10.	>10.	>10.	>10.
SN	<.0006	<.0006	<.0006	<.0006	<.002	<.0006	<.0006	<.0006
SR	.004	.0002	.001	.0007	.01	.002	.002	.0006
TA	<.02	<.02	<.02	<.02	<.02	<.02	<.02	<.02
TE	<.04	<.04	<.04	<.04	<.04	<.04	<.04	<.04
TI	<.03	<.03	<.03	<.03	.1	<.03	<.03	<.03
V	<.005	<.005	<.005	<.005	<.005	<.005	<.005	<.005
Y	<.0009	<.0009	<.0009	<.0009	<.0009	<.0009	<.0009	<.0009
ZN	.005	.003	.005	.004	.02	.008	.003	.01
ZR	<.003	<.003	<.003	<.003	<.003	<.003	<.003	<.003

RENO RESEARCH CENTER

SPECTROGRAPHIC LABORATORY REPORT

RUN NO. 472-#823
SAMPLE NUMBERS

ELEMENT	91	92	93	94	95	96	97	98
	CONCENTRATION, PERCENT							
AG	<.001	<.0005	<.0008	<.0005	.01	<.001	<.001	<.001
AL	>4.	>4.	>4.	>4.	.9	>3.	>3.	>4.
AS	<.009	.03	<.01	<.009	<.01	<.02	<.009	<.02
AU	<.002	<.002	<.002	<.002	<.002	<.002	<.002	<.002
B	<.006	.01	<.008	<.006	<.007	.009	<.006	.01
BA	.07	.08	.06	.05	.01	.005	.1	.06
BE	.0006	.0006	.0006	.0006	.0008	.001	.0004	.0006
BI	<.02	<.03	<.02	<.03	<.01	<.01	<.02	<.03
CA	1.	<.05	<.05	<.05	<.05	<.1	1.	<.05
CD	<.0005	<.0005	<.0005	<.0005	<.0005	<.0005	<.0005	<.0005
CO	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001
CR	<.0003	<.0003	<.0003	<.0003	.004	.01	.005	<.0003
CU	<.0006	<.0006	<.0006	<.0006	.003	<.0006	<.0006	<.0006
FE	2.	2.	.6	2.	4.	3.	4.	5.
GA	<.0002	<.0002	<.0002	<.0002	<.0002	<.0003	<.0002	<.0002
K	>10.	>10.	>10.	>10.	<.6	<1.	>10.	>10.
LA	<.01	<.01	<.01	<.01	<.01	<.01	<.01	<.01
LI	<.002	<.002	<.002	<.002	.009	.02	.02	<.002
MG	.8	.2	.2	.1	.005	.2	1.	.07
MN	.4	.04	.04	.02	>2.	.3	.2	.03
MO	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001
NA	2.	2.	3.	2.	<.3	<.3	3.	<.6
NB	<.008	<.01	<.01	<.007	<.007	<.008	<.01	<.007
NI	<.0006	<.0005	<.0004	<.0006	<.0005	.001	.003	.002
P	<.7	<.7	<.7	<.7	<.7	<.7	<.7	<.7
PB	<.002	<.002	<.002	<.002	.2	<.002	<.002	<.002
PD	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001
PT	<.0006	<.0006	<.0006	<.0006	<.0006	<.0006	<.0006	<.0006
SB	<.06	<.06	<.06	<.06	<.08	<.06	<.06	<.06
SC	<.0004	<.0004	<.0004	<.0004	<.0004	<.0004	<.0004	<.0004
SI	>10.	>10.	>10.	>10.	>10.	>10.	>10.	>10.
SN	<.0006	<.0006	<.0006	<.0006	<.004	<.002	<.002	<.007
SR	.007	.003	.0009	.002	.0008	.0001	.008	.0005
TA	<.02	<.02	<.02	<.02	<.02	<.02	<.02	<.02
TE	<.04	<.05	<.04	<.04	<.04	<.04	<.04	<.04
TI	<.05	<.03	<.04	<.03	<.03	<.04	.1	<.03
V	<.005	<.005	<.005	<.005	<.005	<.005	<.005	<.005
Y	<.0009	<.0009	<.0009	<.0009	<.0009	<.0009	<.0009	<.0009
ZN	.01	.004	.001	.002	.06	.007	.007	.003
ZR	<.003	<.003	<.003	<.003	<.003	.003	<.003	<.003

Area Name, Number, Classification, Size

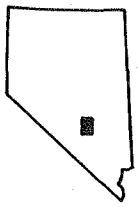
South Reveille Wilderness Study Area
060-112
33,000 acres

State

Nevada

BLM District

Tonopah Resource Area



Estimated Commodity Potential

Potential for precious metal exploration is high in the southern 2 mi^2 of the WSA. Development potential for other commodities within the WSA is low.

Recorded Production

None from the WSA or from within 1 mi of the WSA.

Mining Districts, Mines, and Claims

No mining districts or mines within the WSA. The Reveille district lies 2 mi northwest of the WSA, but it is geologically dissimilar. Parts or all of five mining claims are within the WSA. No workings are associated with these claims.

Recent Company Activity

None

Mineral Setting

At least 2,200 ft of rhyolitic tuffs in the Reveille Mountain range with unknown rocks below. Some latite intrusions are weakly mineralized near Fang Ridge. The southern 2 mi^2 is complexly faulted, sheared, and altered. Arsenic, antimony, gold, and silver are present in trace amounts in the southern end, indicating a possible precious metal deposit at an unknown depth.

Recommendation

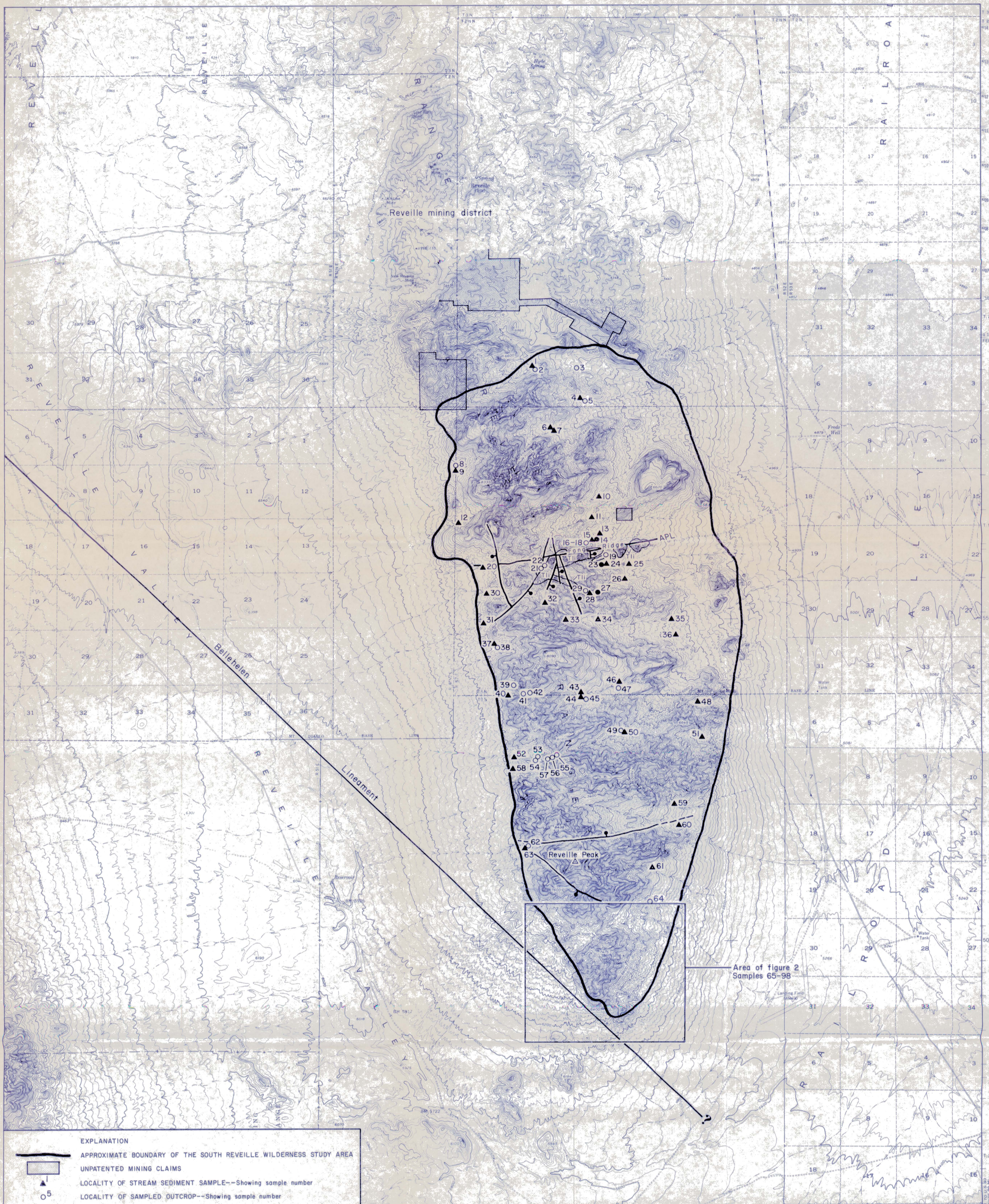
The southern 2 mi^2 of the WSA should be examined by detailed geological mapping, geochemistry, and geophysics before wilderness status is designated. The remainder of the WSA has low potential for development.

References

Gardner, J. N., Eddy, A. C., Gaff, F. E., Grafft, K. S., 1980, Reconnaissance geologic map of the northern Kawich and southern Reveille ranges, Nye County, Nevada; Los Alamos Scientific Laboratory and University of California-Davis, LA-8390-Map or UC-51, scale 1:62:500.

DEPARTMENT OF THE INTERIOR
BUREAU OF MINES

OPEN FILE REPORT
MLA 37-85
PLATE 1



EXPLANATION

- APPROXIMATE BOUNDARY OF THE SOUTH REVEILLE WILDERNESS STUDY AREA
- UNPATENTED MINING CLAIMS
- ▲1 LOCALITY OF STREAM SEDIMENT SAMPLE--Showing sample number
- O5 LOCALITY OF SAMPLED OUTCROP--Showing sample number
- ●23 LOCALITY OF PANNED CONCENTRATE SAMPLE--Showing sample number
- FAULT--Bar and ball on downthrown side; dashed where approximate
- Tli GEOLOGIC CONTACT--Showing quartz latite intrusive
- APL AIR PHOTO LINEAMENT

Base from the U.S. Geological Survey, 1:62,500
Kawich Peak, 1952; Reveille, 1968;
Reveille Peak, 1952; and Warm Springs, 1968.

Field work completed in 1984 by John T. Neubert, assisted by Richard F. Kness, Clay M. Martin, and Robert A. Welsh.
Geology adapted from Gardner and others, 1980.

SAMPLE LOCALITY MAP OF THE SOUTH REVEILLE WILDERNESS STUDY AREA, NYE COUNTY, NEVADA

BY

JOHN T. NEUBERT, U.S. BUREAU OF MINES

1985