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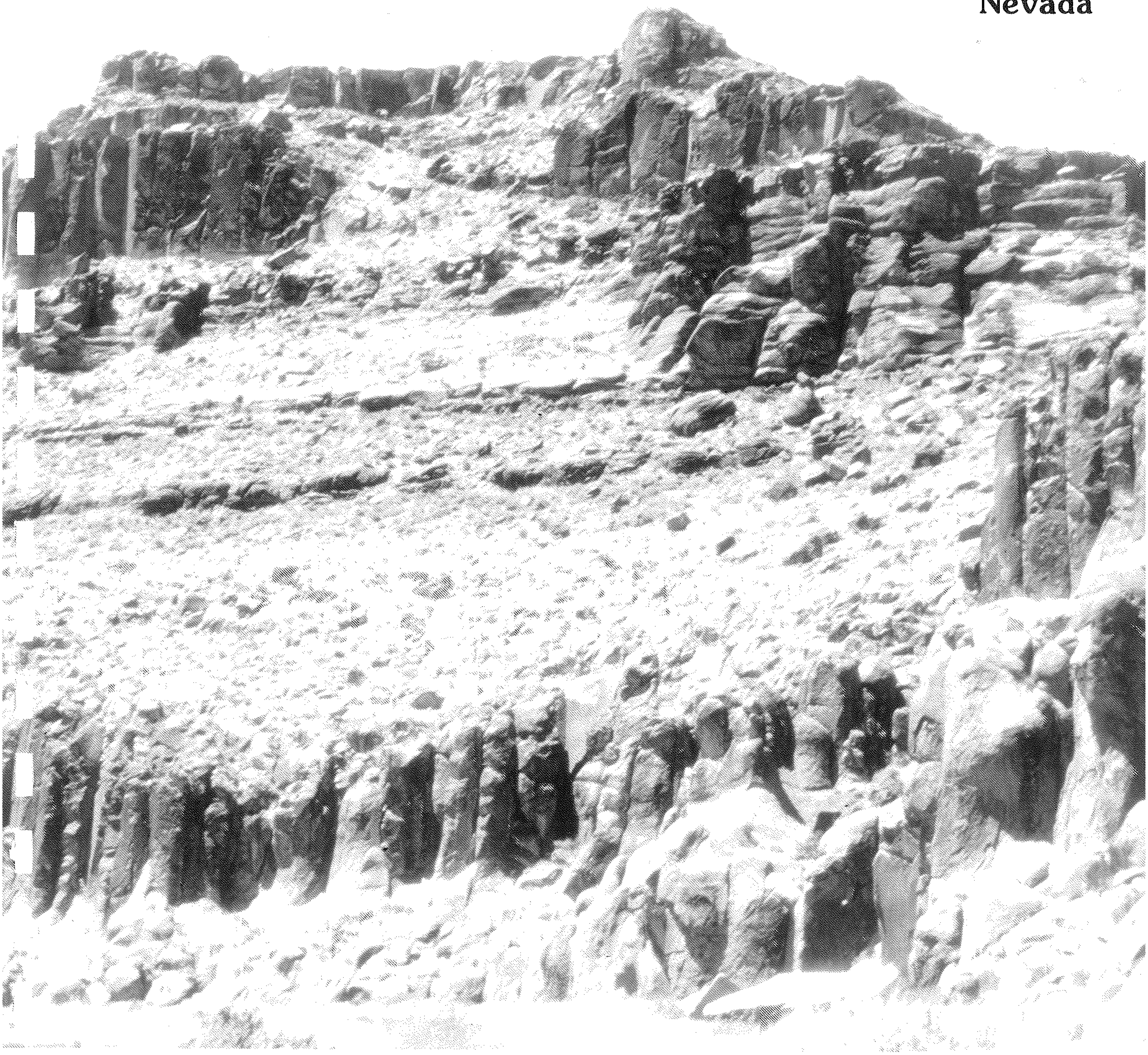
Bureau of Mines Open File Report/1985

Mineral Resources of the Weepah Spring Wilderness Study Area, Nye and Lincoln Counties, Nevada



U.S. Department
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Bureau of Mines

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MINERAL RESOURCES OF THE WEEPAH SPRING WILDERNESS STUDY AREA (NV-040-246), NYE AND LINCOLN COUNTIES, NEVADA

by

Diann D. Gese and Albert D. Harris

MLA 40-85
1985

Intermountain Field Operations Center, Denver, Colorado

UNITED STATES DEPARTMENT OF THE INTERIOR
Donald P. Hodel, Secretary

BUREAU OF MINES
Robert C. Horton

PREFACE

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 the 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 Bureau of Mines mineral survey of the Weepah Spring Wilderness Study Area (NV-040-246), Nye and Lincoln Counties, Nevada.

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

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by

Diann D. Gese and Albert D. Harris, Bureau of Mines

SUMMARY

In accordance with the Federal Land Policy Management Act (Public Law 94-579), a mineral survey was conducted in June 1984, to appraise the resources within the Weepah Spring Wilderness Study Area. The area studied consists of 50,499 acres classified as suitable wilderness in Nye and Lincoln Counties, Nevada.

Three areas of mineralization were located, one each of gold, silver, and mercury; a fourth, of reported uranium, was not located. Along the northwestern boundary of the WSA, a jasperoid breccia and the adjacent Late Devonian and Early Mississippian Pilot Shale contain anomalously high amounts of arsenic, antimony, and mercury. Samples from jasperoid outcrops averaged 214 ppm arsenic, 21 ppm antimony, and 2 ppm mercury; samples from the Pilot Shale averaged 98 ppm arsenic, 18 ppm antimony, and 1 ppm mercury. The geochemistry, host rocks, and alteration products from this part of the study area are nearly identical to those at the Alligator Ridge disseminated gold and silver deposit in White Pine County, Nevada.

A small tonnage (3,300 short tons) silver resource with an average grade of 2.13 oz silver per ton was identified on the FNB mining claims within the northeastern part the study area.

Mercury was produced from the Red Head mining claims, within and adjacent to the study area, in the 1940's and 1950's. No resource could be delineated from available information.

INTRODUCTION

In June 1984, the Bureau of Mines, in coordination with the U. S. Geological Survey, investigated the mineral resources within a 50,499 acre portion of the Weepah Spring Wilderness Study Area (WSA) in southeast Nevada. The Bureau surveys and studies mines, prospects, and mineralized areas to evaluate identified resources. The Geological Survey studies and assesses undiscovered mineral resources based on regional geological, geochemical, and geophysical surveys. This report presents the results of the Bureau's study.

Geographic and geologic setting

The Weepah Spring WSA, located along the Seaman Range, encompasses 61,137 acres in unsurveyed southeastern Nye and central Lincoln Counties, Nevada (fig. 1). It is bounded on the north by the Timber Mountain Pass road, on the east by the White River, on the south by Seaman Wash, and on the west by Coal Valley. Access to the WSA is by improved and unimproved gravel roads; access within the study area is by foot and jeep trails. Alamo, the nearest town, is approximately 50 mi south of the WSA.

The Seaman Range, a typical horst of the Basin and Range province, consists of Paleozoic sediments overlain along the southern part by Tertiary volcanics. Normal faults cut both prevolcanic and postvolcanic rock units (fig. 2) (Tschanz and Pampeyan, 1970).

Methods of investigation

Prior to the field investigation, Bureau personnel reviewed pertinent published and unpublished literature. Files at the Bureau of Land Management (BLM) State Office in Reno, Nevada, were reviewed for mining claim locations, patented mining claims, and oil and gas and geothermal leases and lease applications. Lessees, mine owners, and persons having knowledge of mineral occurrences and mining activities within and near the WSA were contacted.

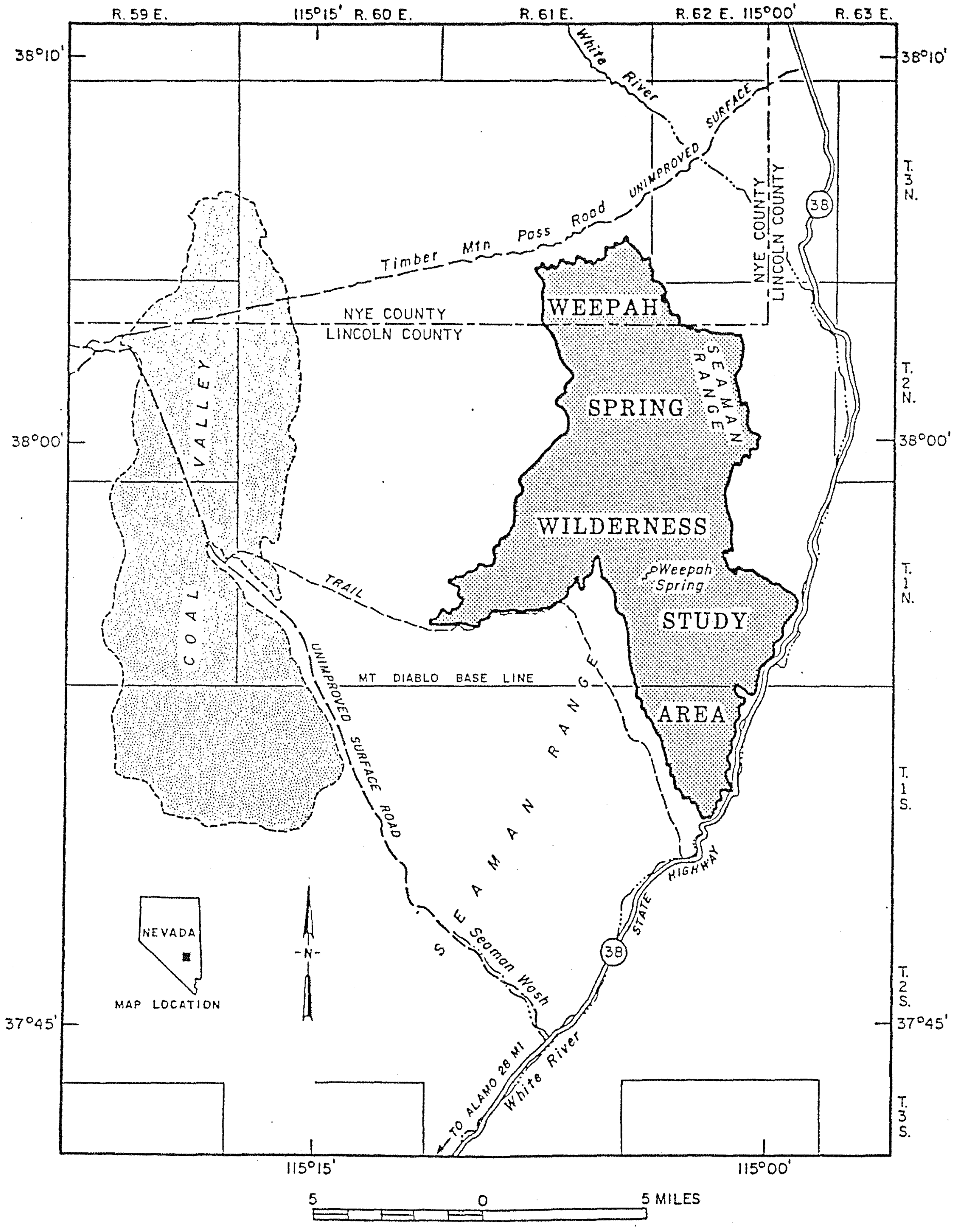


Figure 1.--Index map of the Weepah Spring Wilderness Study Area.

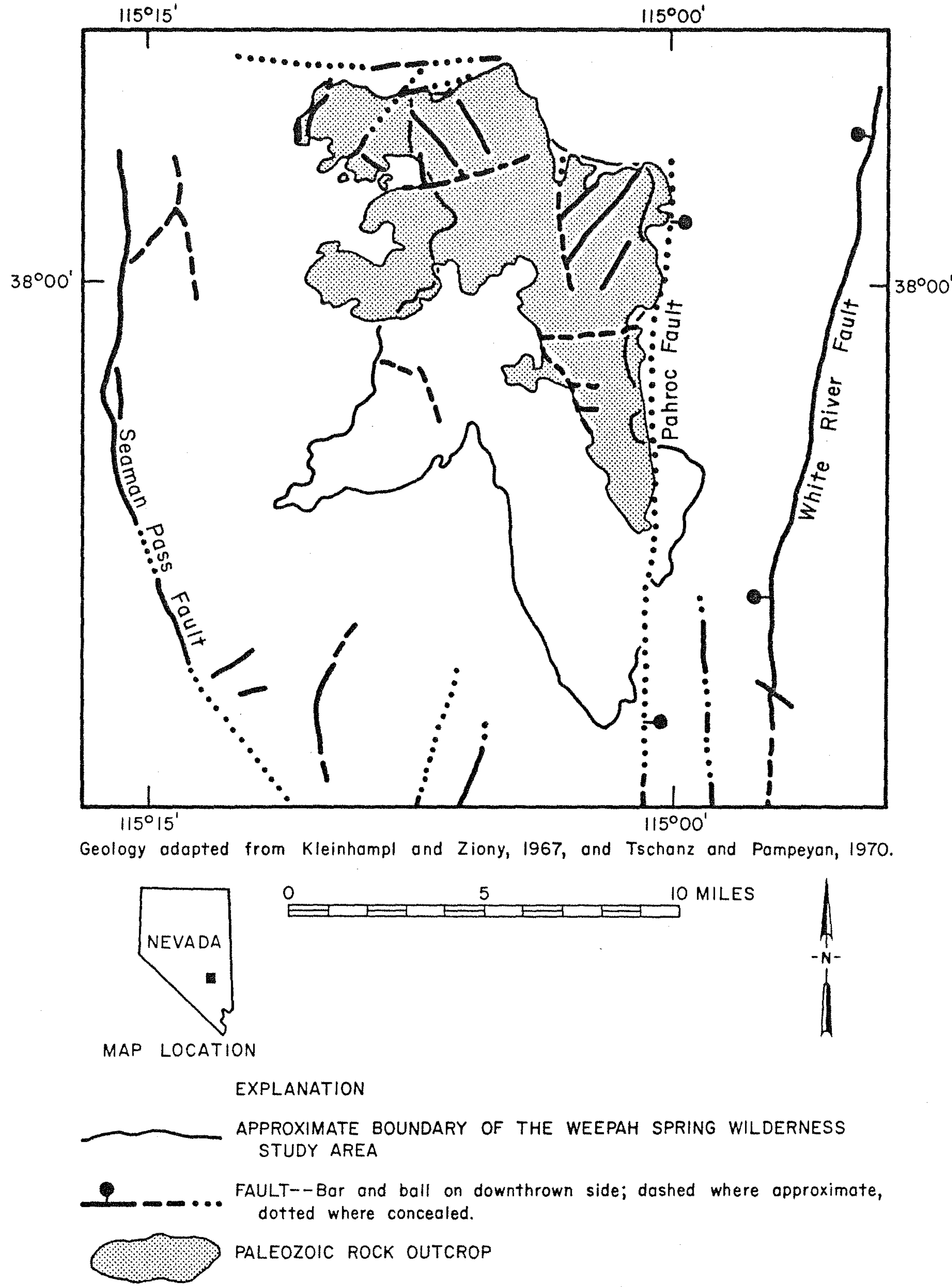


Figure 2.--Map showing faults and Paleozoic rocks within and near the Weepah Spring Wilderness Study Area.

Three Bureau employees spent 16 days in the field; 173 chip, grab, and select samples were taken within and near the WSA (table 1). All samples were analyzed for gold and silver by fire assay and inductively coupled plasma analysis; 110 samples were analyzed by semiquantitative optical emission spectrographic methods for 40 elements (see appendices). Additional analyses of selected samples were made by atomic absorption spectrophotometry for barium, copper, iron, lead, and zinc and by inductively coupled plasma analysis for antimony, arsenic, and mercury. Samples that contained less than 2 parts per million (ppm) mercury were analyzed by cold vapor atomic absorption to obtain a detection limit of 5 parts per billion (ppb).

Acknowledgments

Appreciation is extended to Nerco Inc. personnel for information pertaining to the Alligator Ridge deposit and to Glen and Le Moine Davis, claim owners, for information regarding the Red Head claims.

Mining activity

As of June 1984, mining activity within the WSA had consisted of claim staking, trenching, and drilling within and adjacent to the northwestern and western WSA boundaries. Most of the area west and northwest of the WSA is covered by mining claims (pl. 1). These claims include the Red Head, CV, and Ora blocks of lode claims.

During the Bureau's field investigation in June 1984, an exploration team from Resource Associates of Alaska, a subsidiary of Nerco Inc. staked the Ora claims, secs. 27-34, T. 2 N., R. 61 E., (unsurveyed) on part of the area previously held by AMAX Exploration Inc.

Minor amounts of mercury were produced in the 1940's and 1950's from ore extracted from a few pits and trenches on the Red Head claims. Mercury was extracted by heating the ore on site in a retort. The Red Head block of mining claims has been held by the Davies family since 1939 (Great Basin GEM joint venture, unpublished Bureau of Land Management technical report, Denver, CO, 1983, p. 23).

Since the late 1960's, Bear Creek Mining Company, the exploration subsidiary of Kennecott Corporation, has mapped, sampled, and drilled in the Timber Mountain Pass area, including the Red Head claims area (R. E. Willcox, Jr., written commun., April 1984, former exploration manager, Bear Creek Mining Co., Spokane, WA).

MINERAL COMMODITIES

There are no mining districts within or near the Weepah Spring WSA; therefore, the mineralized areas will be discussed by commodity. Gold, silver, copper, mercury, and uranium occurrences have been found in or near the study area.

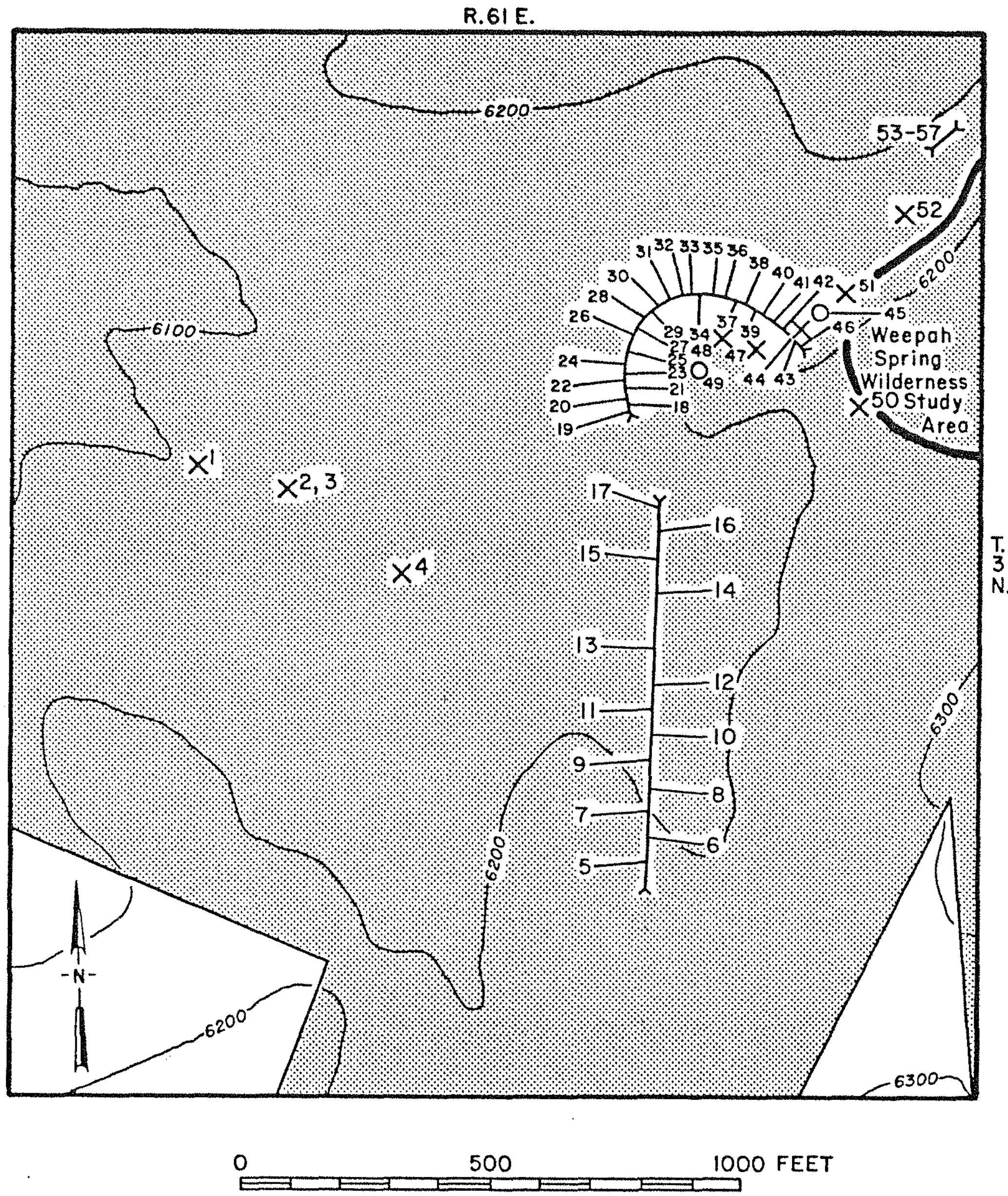
Gold and silver

Silicified carbonate rocks (jasperoid bodies), which crop out along the west side of the study area, occur along a north-trending prevolcanic normal fault that separates Mississippian from Devonian sedimentary rocks (Tschanz and Pampeyan, 1970, p. 95). Jasperoid bodies are commonly associated with epithermal disseminated gold deposits (Carlin-type). These deposits are associated with a suite of elements including mercury, arsenic, antimony, thallium, and sometimes, but not always, gold (Radtke and others, 1980, p. 670; Marsh, 1976, p. 1). All the known large-tonnage, low-grade gold deposits of north central Nevada contain this suite of trace metals (Overstreet and Marsh, 1981).

Soil samples taken in 1979 by Bear Creek Mining Company in the northwestern part of the study area defined several gold, arsenic, mercury, and antimony anomalies. These anomalies were best defined near the base of the Late Devonian and Early Mississippian Pilot Shale. In 1981, Bear Creek drilled several rotary holes to shallow depths and confirmed the presence of gold, especially near the barite-bearing jasperoids. (R. E. Willcox, Jr., written commun., April 1984, former exploration manager, Bear Creek Mining Co., Spokane, WA).

Outcrops of jasperoid and the adjacent Pilot Shale were sampled in and near the WSA by the Bureau (pl. 1; figs. 3 and 4). Fifty samples were taken from the jasperoid outcrops; 38 samples were taken from the Pilot Shale. Forty-eight of the 50 samples taken from the jasperoid contain arsenic above the detection limit with an average arsenic content of 213 ppm. All 50 samples taken from the jasperoid contain antimony and mercury. The average antimony content is 21 ppm; the average mercury content is 2 ppm. Of the 38 samples taken from the Pilot Shale, 34 have an average arsenic content of 98 ppm and 32 have an average antimony content of 18 ppm. All the 38 shale samples contain mercury, averaging 1 ppm. Gold was detected in one jasperoid sample, 0.050 ppm (table 3, sample 150).

The host rocks and geology of the western part of the WSA are similar to those at the Alligator Ridge deposit in White Pine County, Nevada. That deposit is a "Carlin-type" disseminated gold deposit with original reserves of 5 million tons of ore with an average grade of 0.12 oz gold per ton. The deposit is hosted primarily by the Pilot Shale, a sequence of thinly bedded calcareous, carbonaceous siltstones and claystones. The Alligator Ridge deposit lies in a series of north-striking folds that plunge approximately 20° S. The folds are truncated and deformed by high-angle normal faults that aided in ground preparation and acted as conduits for the ascending fluids. Mineralization occurs in both the carbonaceous and oxidized rocks; however,



EXPLANATION

APPROXIMATE BOUNDARY OF THE WEEPAH SPRING WILDERNESS STUDY AREA

UNPATENTED MINING CLAIMS

O——45 LOCALITY OF SAMPLED OUTCROP--Showing sample number

SURFACE OPENINGS--Showing sample number(s)

X2,3 Prospect pit

>—<53-57 Trench

——6200—— CONTOUR--Showing elevation in feet above sea level

Figure 3.--Map showing sample locations 1-57 taken on the Red Head claims.

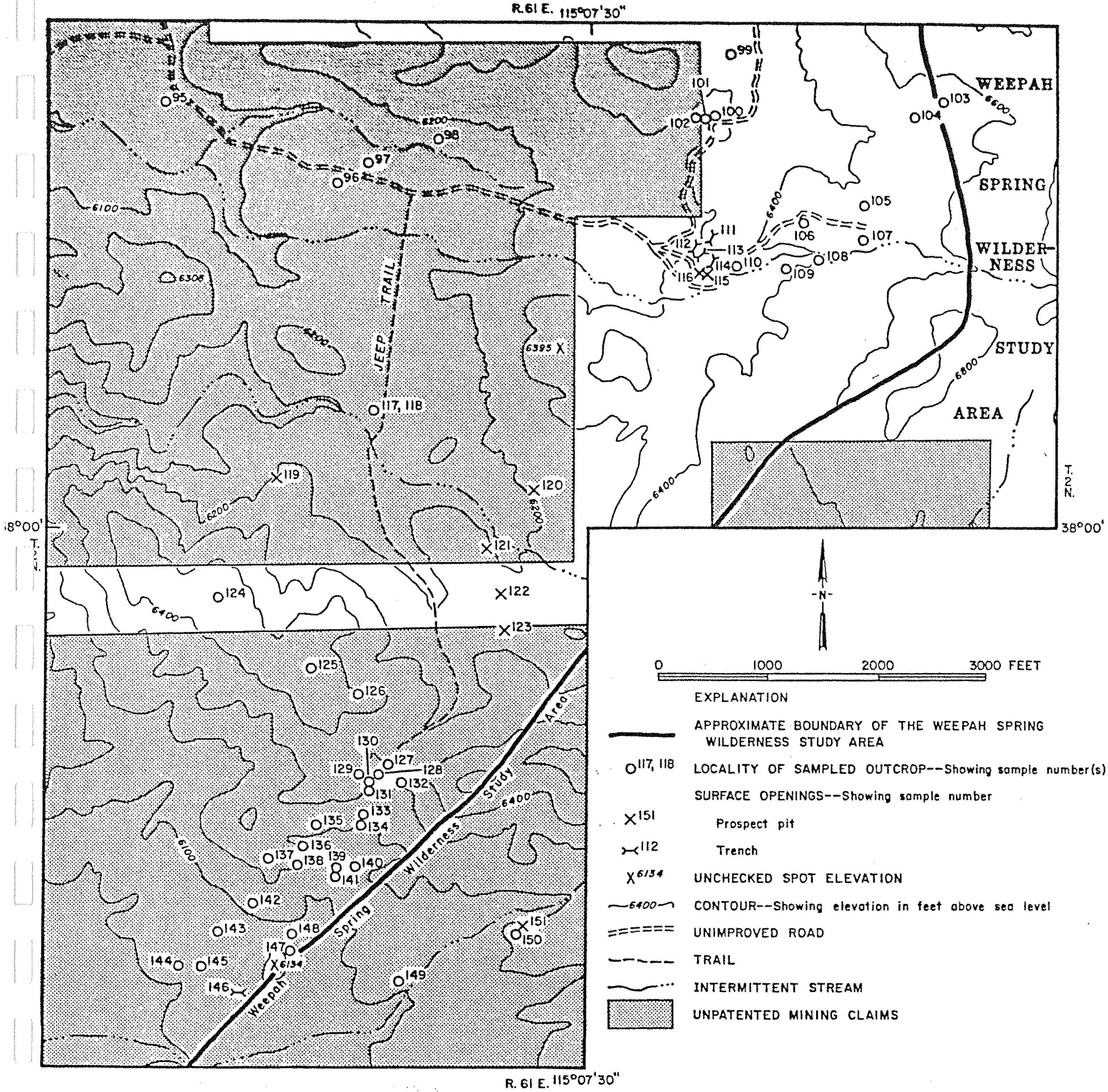


Figure 4.--Map showing sample locations 95-151 taken on the CV and Ora claims.

the upper 100 ft of the Pilot Shale typically does not host a significant amount of mineralization (see Klessig, 1984; Nerco's Alligator Ridge Mine geologists, oral commun., June 1984; Stanford, 1984). Samples taken from a series of jasperoid outcrops at the Alligator Ridge deposit during its exploration stage contained up to 0.45 ppm gold. Geochemical soil sampling revealed arsenic and antimony values up to 200 ppm, mercury values up to 1 ppm, and gold values up to 1.0 ppm (Klessig, 1984, p. 27).

Only 1 sample from the jasperoid and the shale outcrops within and near the study area contained gold above the detection limit value, but the arsenic, antimony, and mercury values from the jasperoid outcrops and the adjoining Pilot Shale are anomalously high, indicating a possible exploration target for an Alligator Ridge type gold deposit. More detailed surface and subsurface sampling would be needed to determine whether or not a gold deposit exists within and to the west of the WSA.

FNB claims

The FNB claims are in sec. 6, T. 2 N., R. 62 E., (unsurveyed), 4.3 mi southeast of BM 5985 at Timber Mountain Pass, along the northeastern border of the WSA (pl. 1). The five inactive claims encompass a 30-ft-deep shaft and a 146-ft-long adit (fig. 5). Both workings are on veins up to 3.5 ft wide composed of brecciated jasperoid, limonite, hematite, copper carbonates, specular hematite, pyrite, and calcite in a silicified dolomite country rock.

Eighteen samples, 17 chip and 1 select, were taken on the FNB claims (table 4, samples 156-173; pl. 1). All samples contained silver; values ranged from 0.01 oz/ton to 10.9 oz/ton. Seven of the 18 samples contained from a trace to 0.094 oz gold/ton (table 4).

An inferred resource, using terminology of the Bureau of Mines and the Geological Survey (1980, p. 2), of 3,300 short tons with an average grade of 2.13 oz silver per ton exists on the FNB claims within the WSA. To estimate this resource, one-quarter of the length of exposed mineralization was projected along the strike of the vein and used for the total length. One-half of the measured length of mineralization was also projected up and down dip as the depth. The assay width of all samples across the mineralized structure was weighted with respect to the sample interval. More closely-spaced surface and subsurface sampling would be needed to determine the size and grade of the silver deposit with a higher degree of certainty and accuracy. The small tonnage and low grade of the resource and the remoteness of the WSA make it unlikely that the deposit would be developed at 1984 silver prices ($8.25/oz, U.S. Bureau of Mines, 1985, p. 141).

Mercury

Mercury was found in most of the samples taken from the western part of the study area; however, the highest concentrations and the only known production of the metal were on the Red Head claims.

The Red Head block of 20 lode mining claims is partially within the WSA, secs. 32 and 33, T. 3 N., R. 61 E., (unsurveyed) (pl. 1). In June 1984, workings on the claims consisted of prospect pits and trenches up to several hundred feet in length (fig. 3). Hematite, limonite, goethite, cinnabar, realgar, orpiment, and calcite occur as coatings on and veinlets within the fractured and brecciated Paleozoic limestones and shales. Mercury was produced in the past from cinnabar ore found in a few pits and trenches.

All samples taken on the Red Head claims contain mercury (table 2). Mercury values range from 0.025 ppm to 119 ppm and average 7.42 ppm (sample

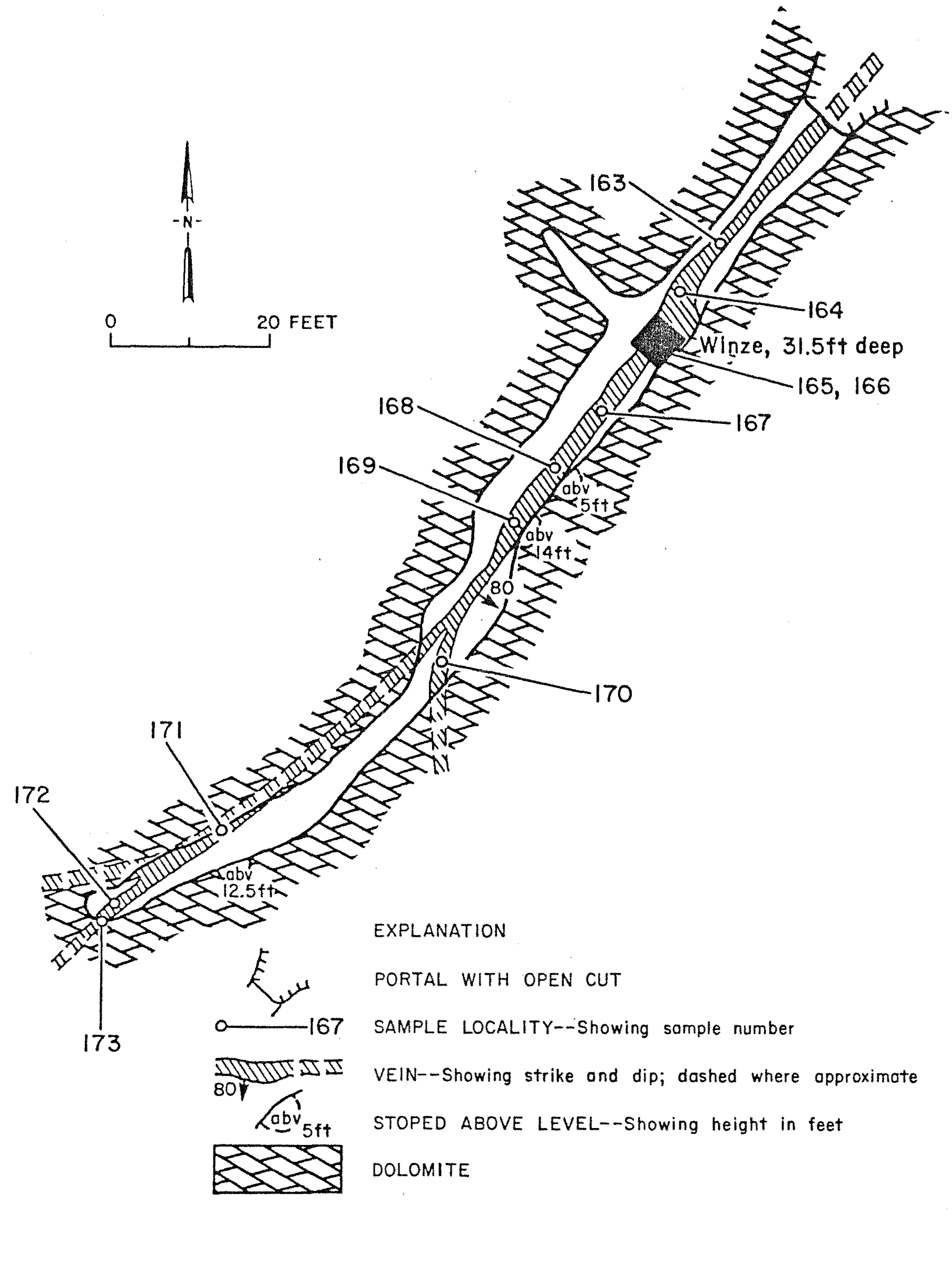


Figure 5.--Map of adit on FNB claims showing sample localities 163-173.

61, table 2 was not included in the mercury average). Analytical results and past production indicate that mercury does exist on the Red Head claims; however, further surface and subsurface sampling would be needed to determine the size and extent of a mercury resource.

Uranium

The Lucky Strike (1-9) uranium prospect has been reported on the northwest flank of the Seaman Range in T. 2 N., R. 61 E. An exact location for the prospect was not given in the literature and, although several attempts were made to find the site, it could not be located during this study. Information about the area is from King and Olsen (1956) who examined the site in 1955 and Garside (1973, p. 71). Eleven holes totaling 647 ft were drilled and select samples contained 0.016 to 0.055 percent U_3O_8. No uranium or thorium minerals were visible; radioactivity was associated with an iron-stained, silicified breccia. A uranium resource is not known to exist within the WSA.

Oil and gas

Most of the area west and northeast of the WSA in Coal Valley and White River Valley is leased for oil and gas. Parts of these leases extend into and cover approximately 1,300 acres of the study area (pl. 1). Five miles west of the WSA, in NE 1/4 SW 1/4 sec. 19, T. 2 N., R. 60 E., (unsurveyed), American Quasar Petroleum Company drilled the Adobe Federal 19-1 in 1979 to 7,706 ft (Nevada Bureau of Mines and Geology, 1982). Oil and gas shows were encountered. Tertiary volcanic rocks and the Mississippian Joanna Limestone, both potential oil- and gas-bearing horizons in the Basin and Range Province, were intersected in the test well (Great Basin GEM joint venture, 1983, p. 25). Lower to middle Paleozoic rocks crop out over most of the WSA; the younger oil-and-gas bearing strata have been eroded. On the basis of the presence of volcanic and Paleozoic rocks which may be thermally mature in the adjacent valleys, the area was rated by Sandberg (1983) as having a low oil and gas potential.

CONCLUSIONS

Gold, silver, copper, mercury, and uranium occur within and near the Weepah Spring Wilderness Study Area.

A jasperoid breccia and the adjacent Pilot Shale contain anomalously high amounts of arsenic, antimony, and mercury along the northwestern boundary of the WSA. The geochemistry, host rocks, and alteration in this part of the study area are similar to those at the Alligator Ridge deposit. Gold was detected in only one of the jasperoid samples, but the anomalously high arsenic, antimony, and mercury indicate an exploration target for a large-tonnage, low-grade disseminated gold deposit within and to the west of the WSA.

An inferred silver resource of 3,300 short tons with an average grade of 2.13 oz silver per ton is in the northeastern part of the WSA. Workings in the area consist of a 30-ft-deep shaft and a 146-ft-long adit on a brecciated jasperoid vein. Samples from the veins on the FNB claims contained from 0.01 to 10.9 oz silver per ton. The small tonnage, low grade, and remoteness of the silver resource makes it unlikely that it would be developed at 1984 silver prices ($8.25/oz). Mercury was produced in the 1940's and 1950's from the Red Head claims, within and adjacent to the study area. All but one of the 63 samples taken on the claims contained mercury. Surface and subsurface sampling would be necessary to delimit a mercury resource.

Select samples from the Lucky Strike prospect collected in 1955 contained 0.016 and 0.055 percent U_3O_8. Radioactivity from the claims was attributed to an iron-stained, silicified breccia (Garside, 1973, p. 71). The site of the prospect could not be located; no resource could be identified.

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

Element	Detection limit (percent)	Element	Detection limit (percent)
Ag	.002	Mo	.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 and 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.

Appendix B--Semiquantitative optical emission spectrographic analysis for select samples from Weepah Springs Wilderness Study Area.

	SAMPLE NUMBERS					
	2	3	4	8	13	16
ELEMENTS	CONCENTRATION, PERCENT					
AG	.006	.006	.009	<.002	<.002	<.002
AL	>4.	.5	.8	>3.	.2	.8
AS	.1	.08	.07	.05	<.009	<.009
AU	<.002	<.002	<.002	<.002	<.002	<.002
B	<.008	.01	.01	.01	<.003	<.008
BA	.05	.06	.02	.01	<.002	.005
BE	.001	.0007	.0008	.001	<.0001	<.0001
BI	<.03	<.03	<.02	<.01	<.01	<.01
CA	.1	.6	.6	7.	>10.	10.
CD	<.002	<.002	<.001	<.0005	<.0005	<.0005
CO	<.001	<.002	<.001	<.001	<.001	<.001
CR	<.0004	.004	.003	.003	<.0003	.001
CU	<.0006	<.0006	<.0006	.001	<.0006	<.0006
FE	8.	3.	2.	6.	.08	1.
GA	<.0002	<.001	<.0007	<.0002	<.0002	<.0002
K	7.	7.	4.	7.	<.6	<2.
LA	<.01	<.01	<.01	<.01	<.01	<.01
LI	.005	.02	.02	<.003	<.002	<.002
MG	.4	.03	.06	.6	.5	1.
MN	.03	.006	.008	.006	.02	.02
MO	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001
NA	<.3	<.3	<.3	<.3	<.3	<.3
NB	<.007	<.007	<.007	<.007	<.007	<.007
NI	.008	.001	.002	.01	<.0005	.001
P	<.7	<.7	<.7	<.7	<.7	<.7
PB	<.002	<.003	<.005	<.002	<.002	<.002
PD	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001
PT	<.0006	<.0009	<.002	<.0006	<.0006	<.0006
SB	<.09	<.06	<.06	<.06	<.06	<.06
SC	<.0004	<.0004	<.0004	<.0004	<.0004	<.0004
SI	>10.	>10.	>10.	>10.	>10.	>10.
SN	<.008	.006	.006	<.006	<.0006	.003
SR	.001	.002	.005	.01	.004	.003
TA	<.02	<.02	<.02	<.02	<.02	<.02
TE	<.04	.1	.1	<.04	<.04	<.04
TI	<.05	<.07	.2	.1	<.03	<.03
V	<.01	<.01	<.01	<.005	<.005	<.005
Y	<.0009	<.0009	<.0009	<.0009	<.0009	<.0009
ZN	.06	.02	.001	.08	<.0001	.005
ZR	<.003	.004	<.003	<.003	<.003	<.003

SAMPLE NUMBERS

ELEMENTS	18	23	24	27	29	30
	CONCENTRATION, PERCENT					
AG	<.002	<.002	<.002	<.001	<.0005	<.001
AL	.9	>3.	>3.	>3.	>2.	>3.
AS	<.009	.03	.04	<.009	<.04	<.02
AU	<.002	<.002	<.002	<.002	<.002	<.002
B	<.003	<.008	.01	<.005	.009	<.007
BA	.03	.04	.02	.01	<.002	.008
BE	<.0001	<.0001	<.0001	<.0001	.0003	<.0001
BI	<.01	<.01	<.01	<.01	<.01	<.01
CA	>10.	>10.	>10.	10.	2.	10.
CD	<.0005	<.0005	<.0005	<.0005	<.0005	<.0005
CO	<.001	<.001	<.001	<.001	<.001	<.001
CR	<.0003	<.0004	<.0004	<.0003	<.0004	<.0006
CU	<.0006	<.0006	<.0006	<.0006	<.0006	<.0006
FE	1.	2.	3.	2.	3.	2.
GA	<.0002	<.0002	<.0002	<.0002	<.0002	<.0002
K	<2.	3.	2.	3.	6.	4.
LA	<.01	<.01	<.01	<.01	<.01	<.01
LI	<.002	<.002	<.002	<.002	<.003	<.002
MG	2.	3.	2.	2.	.4	2.
MN	.05	.08	.07	.06	.02	.1
MO	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001
NA	<.3	<.3	<.3	<.3	<.3	<.3
NB	<.007	<.007	<.007	<.007	<.007	<.007
NI	.0008	.001	.001	.0009	<.0005	.001
P	<.7	<.7	<.7	<.7	<.7	<.7
PB	.07	<.002	<.002	<.002	<.002	<.002
PD	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001
PT	<.0006	<.0006	<.0006	<.0006	<.0006	<.0006
SB	<.06	<.06	<.06	<.06	<.06	<.06
SC	<.0004	<.0004	<.0004	<.0004	<.0004	<.0004
SI	>10.	>10.	>10.	>10.	>10.	>10.
SN	<.0008	<.003	<.002	<.0006	<.0008	<.001
SR	.006	.005	.008	.005	.0008	.004
TA	<.02	<.02	<.02	<.02	<.02	<.02
TE	<.04	<.04	<.04	<.04	<.04	<.04
TI	<.06	.2	.2	.08	<.04	.1
V	<.005	<.005	<.005	<.005	<.005	<.005
Y	<.0009	<.0009	<.0009	<.0009	<.0009	<.0009
ZN	<.0001	<.0001	<.0003	<.0001	.005	.004
ZR	<.003	<.003	<.003	<.003	<.003	<.003

SAMPLE NUMBERS

ELEMENTS	34	36	42	47	49	50
	CONCENTRATION, PERCENT					
AG	<.003	<.001	<.004	<.004	<.003	<.004
AL	>4.	1.	>3.	>3.	>2.	.4
AS	<.05	<.01	<.02	.03	<.03	<.01
AU	<.002	<.002	<.002	<.002	<.002	<.002
B	.02	<.004	.01	<.005	.01	<.003
BA	.01	.03	.01	.02	.009	<.002
BE	.0005	<.0001	.0005	<.0001	.0007	<.0001
BI	<.03	<.01	<.02	<.01	<.02	<.01
CA	.3	>10.	4.	>10.	.3	>10.
CD	<.0005	<.0005	<.0005	<.0005	<.0005	<.0005
CO	<.002	<.001	<.001	<.001	<.002	<.001
CR	.001	<.0003	<.0004	<.0003	.001	<.0003
CU	<.0006	<.0006	<.0006	<.0006	<.0006	<.0006
FE	8.	1.	2.	2.	3.	.2
GA	<.0004	<.0002	<.0005	<.0002	<.001	<.0002
K	6.	<.6	2.	<1.	5.	<.6
LA	<.01	<.01	<.01	<.01	<.01	<.01
LI	.01	<.002	.007	<.002	.02	<.002
MG	1.	2.	.7	2.	.2	.7
MN	.3	.07	.1	.2	.02	.02
MO	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001
NA	<.3	<.3	<.3	<.3	<.4	<.3
NB	<.007	<.007	<.007	<.007	<.007	<.007
NI	.003	.0007	.001	.001	.001	<.0006
P	<.7	<.7	<.7	<.7	<.7	<.7
PB	<.002	<.002	<.002	<.002	<.002	<.002
PD	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001
PT	<.0006	<.0006	<.0006	<.0006	<.0006	<.0006
SB	<.06	<.06	<.06	<.06	<.06	<.06
SC	<.0004	<.0004	<.0004	<.0004	<.0004	<.0004
SI	>10.	>10.	>10.	>10.	>10.	3.
SN	<.002	<.0009	<.004	<.002	<.005	<.0006
SR	.002	.007	.002	.006	.003	.03
TA	<.02	<.02	<.02	<.02	<.02	<.02
TE	<.04	<.04	<.08	<.04	.1	<.04
TI	.2	<.07	.1	.09	.1	<.03
V	<.01	<.005	<.007	<.005	.01	<.005
Y	<.0009	<.0009	<.0009	<.0009	<.0009	<.0009
ZN	.02	<.0001	.002	<.0002	.007	<.0001
ZR	.007	<.003	.01	<.003	.006	<.003

SAMPLE NUMBERS

ELEMENTS	52	53	54	58	60	61
	CONCENTRATION, PERCENT					
AG	<.0009	<.003	<.002	<.0008	<.003	<.002
AL	.2	.2	.1	.4	>3.	.4
AS	<.01	<.009	<.009	<.009	<.03	<.01
AU	<.002	<.002	<.002	<.002	<.002	<.002
B	<.003	<.003	<.003	<.006	.01	<.005
BA	<.002	<.002	<.002	<.002	.009	<.002
BE	<.0001	<.0001	<.0001	<.0001	.0006	<.0001
BI	<.01	<.01	<.01	<.01	<.03	<.01
CA	>10.	10.	10.	4.	<.07	>10.
CD	<.0005	<.0005	<.0005	<.0005	<.0005	<.0005
CO	<.001	<.001	<.001	<.001	<.001	<.001
CR	<.0003	<.0003	<.0003	<.0005	.003	<.0004
CU	<.0006	<.0006	<.0006	<.0006	<.0006	<.0006
FE	.3	.06	.04	.2	2.	.2
GA	<.0002	<.0002	<.0002	<.0002	<.0003	<.0002
K	<.6	4.	<.6	<2.	4.	<.6
LA	<.01	<.01	<.01	<.01	<.01	<.01
LI	<.002	<.002	<.002	<.005	.006	<.002
MG	>10.	>10.	>10.	2.	.1	.2
MN	.03	.02	.02	.04	.04	.04
MO	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001
NA	<.3	<.3	<.3	<.3	<.3	<.3
NB	<.008	<.007	<.007	<.007	<.007	<.007
NI	<.0006	<.0006	<.0005	<.0005	.0009	.0008
P	<.7	<.7	<.7	<.7	<.7	<.7
PB	<.002	<.002	<.002	<.002	<.002	<.002
PD	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001
PT	<.0006	<.0006	<.0006	<.0006	<.0006	<.0006
SB	<.06	<.06	<.06	<.06	<.06	<.06
SC	<.0004	<.0004	<.0004	<.0004	<.0004	<.0004
SI	5.	>10.	4.	>10.	>10.	>10.
SN	<.002	<.002	<.001	<.001	<.004	<.001
SR	.0001	.0005	.0002	.0006	.004	.002
TA	<.02	<.02	<.02	<.02	<.02	<.02
TE	<.04	<.04	<.04	<.04	<.09	<.04
TI	<.03	<.03	<.03	<.03	.1	<.03
V	<.005	<.005	<.005	<.005	<.005	<.005
Y	<.0009	<.0009	<.0009	<.0009	<.0009	<.0009
ZN	<.0001	<.0001	<.0001	<.0002	.002	<.0003
ZR	<.003	<.003	<.003	<.003	<.003	<.003

SAMPLE NUMBERS

ELEMENTS	62	63	64	65	66	67
	CONCENTRATION, PERCENT					
AG	<.0005	<.002	.01	<.003	<.003	<.0006
AL	.2	1.	>3.	>3.	.6	.3
AS	<.01	<.01	<.06	.05	<.05	.05
AU	<.002	<.002	<.002	<.002	<.002	<.002
B	<.006	.009	.02	.01	.01	<.003
BA	<.002	.003	.02	.03	.04	.003
BE	<.0001	.0004	.0004	.0004	.0005	.0008
BI	<.01	<.01	<.06	<.03	<.02	<.01
CA	10.	4.	1.	.5	.7	8.
CD	<.0005	<.0005	<.0005	<.0005	<.0005	<.0005
CO	<.001	<.001	<.001	<.002	<.001	<.001
CR	<.0003	.001	.004	.004	.03	<.0003
CU	<.0006	<.0006	<.0006	<.0006	<.0006	<.0006
FE	.3	3.	6.	3.	10.	9.
GA	<.0002	<.0002	<.001	<.001	<.0008	<.0002
K	<.8	5.	7.	<2.	7.	<1.
LA	<.01	<.01	<.01	<.01	<.01	<.01
LI	<.002	<.002	<.003	<.005	<.002	<.002
MG	.7	1.	.4	.03	.1	.3
MN	.004	.1	.01	.009	.009	.03
MO	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001
NA	<.3	<.3	<.3	<.3	<.3	<.3
NB	<.007	<.007	<.007	<.007	<.007	<.007
NI	<.0006	.001	.007	.001	<.001	.003
P	<.7	<.7	<.7	<.7	<1.	<.7
PB	<.002	<.002	<.004	<.002	<.005	<.002
PD	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001
PT	<.0006	<.0006	<.001	<.0006	<.0006	<.0006
SB	<.06	<.06	<.06	<.06	<.2	<.06
SC	<.0004	<.0004	<.0004	<.0004	<.0004	<.0004
SI	>10.	>10.	>10.	>10.	>10.	>10.
SN	<.0006	.004	<.01	<.005	.02*	.01
SR	.003	.001	.004	.01	.005	<.0001
TA	<.02	<.02	<.02	<.02	<.02	<.02
TE	<.04	<.04	<.07	<.08	<.06	<.04
TI	<.03	<.08	.2	.1	.3	<.03
V	<.005	<.005	.02	.02	.04	<.005
Y	<.0009	<.0009	<.0009	<.0009	<.0009	<.0009
ZN	.003	.08	.06	.005	.003	<.0006
ZR	<.003	<.003	<.003	.005	.007	<.003

SAMPLE NUMBERS

CONCENTRATION, PERCENT

ELEMENTS	68	69	71	74	75	76
AG	<.002	<.001	<.002	<.003	.03	<.004
AL	.5	.9	.4	.1	.09	.3
AS	.05	<.009	<.02	<.02	.2	<.01
AU	<.002	<.002	<.002	<.002	<.002	<.002
B	.01	<.003	<.003	<.003	<.003	<.008
BA	.01	<.002	<.002	<.002	.008	.008
BE	.0004	<.0001	<.0001	<.0001	<.0001	<.0002
BI	<.02	<.01	<.01	<.01	<.04	.05
CA	.4	>10.	>10.	10.	<.2	.8
CD	<.0005	<.0005	<.0005	<.0005	<.02	<.0005
CO	<.001	<.001	<.001	<.001	.005	<.002
CR	.01	<.0003	<.0003	<.0003	<.0004	.002
CU	<.0006	<.0006	<.0006	<.0006	2.	<.0006
FE	3.	1.	4.	.4	10.	5.
GA	<.0002	<.0002	<.0002	<.0002	.002	<.0008
K	<.8	<.6	<.6	<1.	<.6	<1.
LA	<.01	<.01	<.01	<.01	<.01	<.01
LI	<.002	<.002	<.002	<.002	<.002	<.002
MG	.1	2.	2.	>10.	.6	.2
MN	.02	.07	.1	.02	>3.	.4
MO	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001
NA	<.3	<.3	<.3	<.3	<6.	<.3
NB	<.007	<.007	<.007	<.007	<.007	<.007
NI	.002	<.0006	.001	<.0007	<.001	.001
P	<.7	<.7	<.7	<.7	<.7	<.7
PB	<.002	<.002	<.002	<.002	2.	<.002
PD	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001
PT	<.0006	<.0006	<.0006	<.0006	<.002	<.0006
SB	<.06	<.06	<.06	<.06	<.3	<.06
SC	<.0004	<.0004	<.0004	<.0004	<.0004	<.0004
SI	>10.	5.	1.	3.	>10.	>10.
SN	.004	<.0006	<.001	<.002	<.02	.005
SR	.002	.0001	.0006	.0003	<.0001	.0002
TA	<.02	<.02	<.02	<.02	<.02	<.02
TE	<.06	<.04	<.04	<.04	<.04	<.04
TI	<.03	<.03	<.03	<.03	.1	.08
V	<.005	<.005	<.005	<.005	.02	.01
Y	<.0009	<.0009	<.0009	<.0009	<.0009	<.0009
ZN	.03	<.0003	.003	.0009	.6	.002
ZR	<.003	<.003	<.003	<.003	.009	.007

SAMPLE NUMBERS

ELEMENTS	78	79	83	85	8…	
	CONCENTRATION, PERCENT					
AG	<.002	<.0005	<.002	<.0005	<.0…	[illegible]
AL	>4.	.8	>3.	1.		[illegible]
AS	<.01	<.02	<.03	<.02	<…	<.02
AU	<.002	<.002	<.002	<.002	<.…	<.002
B	.01	<.006	.01	<.007		<.007
BA	.02	.02	.03	.1		.06
BE	.0004	<.0001	<.0002	.0003	<.00…	.0004
BI	<.04	<.02	<.02	<.01	<…	<.01
CA	.7	.2	5.	.2		.4
CD	<.0005	<.0005	<.0005	<.0005	<.00…	<.0005
CO	<.001	<.002	<.001	<.002	<.0…	<.001
CR	.002	.002	.002	.004	.0…	.006
CU	<.0006	<.0006	<.0006	<.0006	<.00…	<.0006
FE	5.	3.	3.	2.		4.
GA	<.0006	<.0006	<.0002	<.0005	<.00…	<.0002
K	7.	<.6	5.	<.6		3.
LA	<.01	<.01	<.01	<.01	<.…	<.01
LI	>.05	<.005	<.002	.008	<.0…	<.003
MG	1.	.06	2.	.07		.07
MN	.2	.03	.03	.02	.…	.01
MO	<.0001	<.0001	<.0001	<.0001	<.00…	<.0001
NA	<.3	<.3	<.3	<.3	<…	<.3
NB	<.008	<.007	<.007	<.007	<.0…	<.007
NI	.002	<.0006	.003	.001	.000…	.001
P	<.7	<.7	<.7	<.7	<.7	<.7
PB	<.002	<.002	<.002	<.002	<.002	<.002
PD	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001
PT	<.0006	<.0006	<.0006	<.0006	<.0006	<.0006
SB	<.06	<.06	<.06	<.06	<.06	<.06
SC	<.0004	<.0004	<.0004	<.0004	<.0004	<.0004
SI	>10.	>10.	>10.	>10.	>10.	>10.
SN	<.003	<.002	<.0006	<.001	.004	.003
SR	.003	.009	.006	.03	.006	.007
TA	<.02	<.02	<.02	<.02	<.02	<.02
TE	<.04	<.04	<.04	<.04	<.1	<.04
TI	.3	<.08	<.06	.08	.1	<.06
V	<.01	<.01	<.005	.01	<.005	<.005
Y	<.0009	<.0009	<.0009	<.0009	<.0009	<.0009
ZN	.01	.001	.06	.008	.002	.01
ZR	<.003	.004	<.003	.004	<.003	<.003

SAMPLE NUMBERS

ELEMENTS	89	90	91	93	94	95
	CONCENTRATION, PERCENT					
AG	<.0005	<.002	<.0008	<.003	<.0006	<.003
AL	>3.	.6	.08	.6	.7	.5
AS	<.009	<.02	<.04	.07	<.009	<.03
AU	<.002	<.002	<.002	<.002	<.002	<.002
B	<.004	<.008	<.004	.009	.01	.01
BA	.003	>9.	<.002	.008	.02	.02
BE	.001	.0003	<.0001	.0005	.0004	.001
BI	<.02	<.01	<.01	<.03	<.01	<.01
CA	.7	.6	4.	.2	2.	1.
CD	<.0005	<.0005	<.0005	<.0006	<.0005	<.0005
CO	<.001	<.001	<.001	<.001	<.001	<.001
CR	<.0004	.006	<.0008	<.0007	<.0003	.02
CU	<.0006	<.0006	<.0006	<.0006	<.0006	<.0006
FE	.6	3.	2.	10.	2.	8.
GA	<.0004	<.0002	<.0002	<.0002	<.0002	<.0009
K	<2.	4.	2.	<.9	3.	<1.
LA	<.01	<.01	<.01	<.01	<.01	<.02
LI	.01	<.002	<.002	<.002	<.002	.01
MG	.03	.06	1.	.1	.1	.1
MN	.08	.01	.01	.02	.06	.02
MO	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001
NA	<.3	<.3	<.3	<.3	<.3	<.3
NB	<.007	<.007	<.007	<.007	<.007	<.007
NI	.002	.001	<.0006	.007	.001	.005
P	<.7	<.7	<.7	<.7	<.7	<2.
PB	<.002	<.002	<.002	<.002	<.002	<.002
PD	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001
PT	<.0006	<.0006	<.0006	<.0006	<.0006	<.0006
SB	<.06	<.06	<.06	<.06	<.06	.1
SC	<.0004	<.0004	<.0004	<.0004	<.0004	<.0004
SI	>10.	>10.	>10.	>10.	>10.	>10.
SN	<.0008	.004	<.001	.02	.002	.02
SR	.0002	.03	<.0001	.0004	.0003	.002
TA	<.02	<.02	<.02	<.02	<.02	<.02
TE	<.04	<.07	<.04	<.04	<.08	.1
TI	<.03	<.03	<.03	<.04	<.03	<.05
V	<.007	<.005	<.005	<.005	<.005	.1
Y	<.0009	<.0009	<.0009	<.0009	<.0009	<.0009
ZN	.02	.005	<.0003	.1	.02	.04
ZR	<.003	<.003	<.003	<.003	<.003	.004

SAMPLE NUMBERS

ELEMENTS	96	98	99
	CONCENTRATION, PERCENT		
AG	<.0005	.008	<.0007
AL	.7	.9	.3
AS	.03	<.03	.04
AU	<.002	<.002	<.002
B	<.007	.009	.01
BA	.03	.02	.02
BE	.0005	.0007	.0006
BI	<.01	<.04	<.02
CA	.4	.9	.3
CD	<.0005	<.0005	<.0005
CO	<.001	<.001	<.001
CR	.01	.01	<.0007
CU	<.0006	.002	<.0006
FE	3.	9.	2.
GA	<.0002	<.0002	<.0002
K	<.8	6.	<.6
LA	<.01	<.01	<.01
LI	<.003	<.002	<.002
MG	.02	.2	.01
MN	.03	<.003	.02
MO	<.0001	<.0001	<.0001
NA	<.3	<.3	<.3
NB	<.007	<.007	<.007
NI	.001	.008	.001
P	<.7	<.9	<.7
PB	<.002	<.002	<.002
PD	<.0001	<.0001	<.0001
PT	<.0006	<.0006	<.0006
SB	<.06	<.06	<.06
SC	<.0004	<.0004	<.0004
SI	>10.	>10.	>10.
SN	<.001	.02	<.002
SR	.02	.02	.003
TA	<.02	<.02	<.02
TE	<.07	<.04	<.07
TI	<.03	<.07	.1
V	<.005	.07	<.005
Y	<.0009	<.0009	<.0009
ZN	.04	.04	.01
ZR	<.003	<.003	<.003

ELEMENTS	101	102	103	104	105
	CONCENTRATION, PERCENT				
AG	<.003	<.001	<.002	<.0005	<.0005
AL	.9	.8	.8	.5	.3
AS	<.04	.03	<.009	<.03	<.02
AU	<.002	<.002	<.002	<.002	<.002
B	.01	.009	<.004	.01	<.006
BA	.04	.05	.004	.004	.002
BE	.0006	.0004	<.0001	.0005	<.0001
BI	<.03	<.01	<.01	<.02	<.01
CA	.8	1.	>10.	.2	7.
CD	<.0005	<.0005	<.0005	<.0005	<.0005
CO	<.001	<.001	<.001	<.001	<.001
CR	.008	.005	<.0003	.001	<.0003
CU	.004	.003	<.0006	<.0006	<.0006
FE	5.	5.	.9	1.	1.
GA	<.0003	<.0002	<.0002	<.0005	<.0002
K	<.6	<.6	<.6	<.6	<.6
LA	<.01	<.01	<.01	<.01	<.01
LI	<.002	<.002	<.002	<.002	<.002
MG	.1	.06	.2	.03	.2
MN	.05	.003	.03	.02	.04
MO	<.0001	<.0001	<.0001	<.0001	<.0001
NA	<.3	<.3	<.3	<.3	<.3
NB	<.007	<.007	<.007	<.007	<.007
NI	.005	.007	<.0006	.0008	<.0004
P	<.7	<.8	<.7	<.7	<.7
PB	<.002	<.002	<.002	<.002	<.002
PD	<.0001	<.0001	<.0001	<.0001	<.0001
PT	<.0006	<.0006	<.0006	<.0006	<.0006
SB	<.06	<.06	<.06	<.06	<.06
SC	<.0004	<.0004	<.0004	<.0004	<.0004
SI	>10.	>10.	>10.	>10.	>10.
SN	.007	.002	<.0006	.002	<.0006
SR	.03	.02	.007	.0004	.001
TA	<.02	<.02	<.02	<.02	<.02
TE	<.05	<.04	<.04	<.05	<.04
TI	<.05	<.05	<.03	<.03	<.03
V	.01	.02	<.005	<.006	<.005
Y	<.0009	<.0009	<.0009	<.0009	<.0009
ZN	.07	.09	<.0004	.004	.005
ZR	<.003	<.003	<.003	<.003	<.003

SAMPLE NUMBERS

ELEMENTS	106	107	108	109	110	111
	CONCENTRATION, PERCENT					
AG	<.0009	<.0005	<.0005	<.0005	<.0006	<.001
AL	.5	.4	.9	.8	1.	.9
AS	<.009	<.009	<.05	<.04	<.009	.08
AU	<.002	<.002	<.002	<.002	<.002	<.002
B	<.008	<.003	<.008	<.008	.009	<.007
BA	.003	<.002	.008	.009	.1	.02
BE	<.0002	<.0001	.0003	.0005	.0004	<.0003
BI	<.02	<.01	<.01	<.01	<.02	<.01
CA	5.	>10.	.3	.1	.2	.4
CD	<.0005	<.0005	<.0005	<.0005	<.0005	<.0009
CO	<.001	<.001	<.001	<.001	<.001	<.001
CR	.001	<.0003	<.0004	<.0003	.002	.003
CU	<.0006	<.0006	<.0006	<.0006	.0007	<.0006
FE	.5	.2	.9	.9	3.	5.
GA	<.0002	<.0002	<.0003	<.0003	<.0005	<.0003
K	<.6	<.6	<2.	<.6	<.6	<.6
LA	<.01	<.01	<.01	<.01	<.01	<.01
LI	<.002	<.002	.008	.006	<.002	<.002
MG	.1	.6	.2	.1	.06	.2
MN	.009	.02	.005	.005	.02	.003
MO	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001
NA	<.3	<.3	<.3	<.3	<.3	<.3
NB	<.007	<.007	<.007	<.007	<.007	<.007
NI	<.0007	<.0003	<.0006	.001	.002	.001
P	<.7	<.7	<.7	<.7	<.7	<.7
PB	<.002	<.002	<.002	<.002	<.002	<.002
PD	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001
PT	<.0006	<.0006	<.0006	<.0006	<.0006	<.0006
SB	<.06	<.06	<.06	<.06	<.06	<.06
SC	<.0004	<.0004	<.0004	<.0004	<.0004	<.0004
SI	>10.	5.	>10.	>10.	>10.	>10.
SN	<.001	<.0006	<.002	<.001	.003	.003
SR	.002	.005	.0004	.0005	.004	.007
TA	<.02	<.02	<.02	<.02	<.02	<.02
TE	<.05	<.04	<.08	<.09	<.07	<.04
TI	<.03	<.03	<.05	<.05	.08	<.07
V	<.005	<.005	<.008	<.008	<.01	.01
Y	<.0009	<.0009	<.0009	<.0009	<.0009	<.0009
ZN	.002	.002	.01	.02	.01	.005
ZR	<.003	<.003	<.003	<.003	.003	<.003

SAMPLE NUMBERS

ELEMENTS	113	114	115	117	119	120
	CONCENTRATION, PERCENT					
AG	<.0005	<.0005	<.0005	<.003	<.003	<.0005
AL	>3.	>3.	>3.	>3.	>2.	.5
AS	<.009	<.04	<.03	.4	<.02	.03
AU	<.002	<.002	<.002	<.002	<.002	<.002
B	.02	.01	<.007	.01	<.007	.01
BA	.02	.07	.1	.006	.05	.01
BE	<.0002	<.0002	.0006	.0004	.0005	.0004
BI	<.03	<.01	<.01	<.03	<.03	<.01
CA	.2	.2	.4	.3	.7	<.1
CD	<.0005	<.0005	<.0005	<.02	<.0005	<.0005
CO	<.001	<.001	<.001	<.001	<.004	<.001
CR	.002	<.0006	.005	.002	.02	.004
CU	.002	<.0006	.001	.001	.003	<.0006
FE	3.	6.	4.	8.	4.	2.
GA	<.0002	<.0002	<.0002	<.0003	<.001	<.0002
K	3.	3.	<.6	8.	<.6	<1.
LA	<.01	<.01	<.01	<.01	<.02	<.01
LI	<.002	<.002	<.002	<.002	<.002	<.002
MG	.8	.3	.2	.3	.04	.02
MN	<.002	<.003	<.002	<.0008	.006	.02
MO	<.0001	<.0001	<.0001	.0004	<.0001	<.0001
NA	<.3	<.3	<.3	<.3	<.3	<.3
NB	<.007	<.007	<.007	<.007	<.007	<.007
NI	.001	.002	.001	.003	.002	<.0007
P	<.7	<.7	<.7	<.7	<1.	<.7
PB	<.002	<.002	<.002	<.002	<.002	<.002
PD	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001
PT	<.0006	<.0006	<.0006	<.0006	<.0006	<.0006
SB	<.06	<.06	<.06	<.06	<.06	<.06
SC	<.0004	<.0004	<.0004	<.0004	<.0004	<.0004
SI	>10.	>10.	>10.	>10.	>10.	>10.
SN	<.0006	<.003	<.0006	<.01	<.003	<.002
SR	.005	.003	.03	.002	.04	.01
TA	<.02	<.02	<.02	<.02	<.02	<.02
TE	<.04	<.04	<.04	<.04	<.04	<.08
TI	.1	.1	<.04	.2	.1	<.03
V	<.007	<.005	.01	<.01	.03	<.005
Y	<.0009	<.0009	<.0009	<.0009	.005	<.0009
ZN	.001	.03	.01	.002	.02	.004
ZR	<.003	.003	<.003	<.003	.007	<.003

SAMPLE NUMBERS

ELEMENTS	121	122	123	125	126	127
	CONCENTRATION, PERCENT					
AG	<.002	<.002	<.004	<.001	<.003	.01
AL	.9	.9	1.	>2.	.3	.4
AS	.06	.03	<.01	<.04	<.02	.04
AU	<.002	<.002	<.002	<.002	<.002	<.002
B	<.008	<.005	.01	<.007	.01	.01
BA	.02	.03	.02	.03	.09	.02
BE	.0004	.0008	.0008	.0008	.0007	.0003
BI	<.02	<.01	<.01	<.02	<.02	.08
CA	2.	10.	5.	.7	1.	.2
CD	<.0007	<.0005	<.0005	<.0005	<.0005	<.0005
CO	<.001	<.001	<.001	<.001	<.002	.004
CR	.02	.004	.01	.004	.001	.001
CU	.003	<.0006	.002	.001	<.0006	<.0006
FE	4.	3.	1.	6.	2.	3.
GA	<.0002	<.0002	<.0002	<.0002	<.0009	.002
K	<.8	<.6	8.	2.	<1.	<2.
LA	<.01	<.01	<.01	<.01	<.01	<.02
LI	<.002	<.002	<.002	<.002	<.003	<.002
MG	.1	.2	.3	.08	.02	.05
MN	.004	.04	.005	.008	.03	.1
MO	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001
NA	<.3	<.3	<.3	<.3	<.3	<.3
NB	<.007	<.007	<.007	<.007	<.007	<.007
NI	.002	.005	.001	.006	.002	.002
P	<.7	9.	3.	<1.	<.8	<.7
PB	<.002	<.002	<.002	<.002	<.002	<.003
PD	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001
PT	<.0006	<.0006	<.0006	<.0006	<.0006	<.002
SB	<.06	<.06	<.06	<.06	<.06	<.06
SC	<.0004	<.0004	<.0004	<.0004	<.0004	<.0004
SI	>10.	>10.	>10.	>10.	>10.	>10.
SN	<.001	<.0007	.002	<.007	.007	.006
SR	.02	.1	.09	.01	.001	.0007
TA	<.02	<.02	<.02	<.02	<.02	<.02
TE	<.04	<.04	<.08	<.04	.2	<.06
TI	<.05	<.03	<.07	<.04	<.04	.1
V	<.01	<.005	<.005	.02	<.01	.02
Y	<.001	.009	.004	<.0009	<.0009	<.0009
ZN	.02	.06	.009	.05	.01	.02
ZR	<.003	<.003	<.003	<.003	.004	.007

SAMPLE NUMBERS

ELEMENTS	128	129	131	133	134	135
	CONCENTRATION, PERCENT					
AG	<.004	<.002	.008	<.0005	<.002	<.004
AL	>3.	.7	.9	>2.	.6	>2.
AS	<.009	<.08	.06	<.02	<.009	<.01
AU	<.002	<.002	<.002	<.002	<.002	<.002
B	.01	.01	.01	.01	.01	.01
BA	.03	.02	.02	.02	.01	.03
BE	.001	.0004	<.0003	.0007	.0005	.0008
BI	<.02	<.01	.08	<.08	<.01	<1.
CA	3.	.3	.2	.6	<.1	.5
CD	<.0005	<.0005	<.0005	<.0005	<.0005	<.0005
CO	<.001	<.002	.004	<.001	<.002	<.001
CR	.02	.006	.003	.05	<.0009	.2
CU	.001	<.0006	<.0006	<.0006	<.0006	.001
FE	4.	5.	2.	9.	1.	3.
GA	<.0003	<.001	<.002	<.0002	<.0009	<.0003
K	5.	<.6	<2.	6.	4.	6.
LA	<.01	<.02	<.01	<.01	<.01	<.01
LI	<.002	.009	.007	<.002	<.002	<.002
MG	.3	.05	.1	.2	.03	.4
MN	.2	.02	.008	.02	.009	.005
MO	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001
NA	<.3	<.3	<.3	<.3	<.3	<.3
NB	<.007	<.007	<.007	<.007	<.007	<.008
NI	.003	.001	.001	.002	.001	.001
P	<2.	<.7	<.7	<1.	<.7	<.7
PB	<.003	<.002	<.002	<.002	<.002	<.002
PD	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001
PT	<.0006	<.0006	<.001	<.0006	<.0006	<.0006
SB	<.06	<.06	<.06	<.06	<.06	<.06
SC	<.0004	<.0004	<.0004	<.0004	<.0004	<.0004
SI	>10.	>10.	>10.	>10.	>10.	>10.
SN	<.007	.009	.004	<.01	.005	<.005
SR	.03	.009	.01	.04	.001	.01
TA	<.02	<.02	<.02	<.02	<.02	<.02
TE	<.08	.1	<.04	<.04	.2	.1
TI	.1	.1	.1	.09	<.05	.2
V	<.01	.02	.02	.03	<.009	.1
Y	<.001	<.0009	<.0009	<.0009	<.0009	<.0009
ZN	.01	.003	.003	.02	.004	.007
ZR	<.003	.004	.007	<.003	.003	<.003

SAMPLE NUMBERS

ELEMENTS	136	137	138	139	140	141
	CONCENTRATION, PERCENT					
AG	<.004	.01	<.002	<.0005	<.003	<.001
AL	1.	>2.	.9	1.	.7	>2.
AS	<.009	.06	<.04	<.009	<.03	<.06
AU	<.002	<.002	<.002	<.002	<.002	<.002
B	<.008	.01	<.005	.01	.01	.01
BA	.04	.1	.01	.02	.007	.008
BE	.0008	.0009	<.0002	.0008	.0007	.0003
BI	<.03	<.1	<.02	<.01	<.03	<.02
CA	.9	.1	6.	.7	.3	<.07
CD	<.0005	<.0005	<.0005	<.0005	<.0005	<.0005
CO	<.001	<.003	<.001	<.001	<.001	<.001
CR	.01	.001	.01	.01	.002	.001
CU	.0008	.002	.001	<.0006	<.0006	<.0006
FE	8.	10.	1.	6.	2.	3.
GA	<.0002	.002	<.0002	<.0004	<.0002	<.0002
K	7.	3.	3.	3.	8.	10.
LA	<.01	<.01	<.01	<.01	<.01	<.01
LI	<.002	<.002	<.002	<.002	<.002	<.002
MG	.3	.07	.3	.2	.04	.3
MN	<.002	<.008	<.002	.03	.009	.007
MO	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001
NA	<.3	<.3	<.3	<.3	<.3	<.3
NB	<.007	<.007	<.007	<.007	<.007	<.007
NI	.004	.007	.0009	.002	.001	.0008
P	<.7	<1.	4.	<.7	<.7	<.7
PB	<.002	<.003	<.002	<.002	<.002	<.002
PD	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001
PT	<.0006	<.0006	<.0006	<.0006	<.0006	<.0006
SB	<.1	<.2	<.06	<.06	<.06	<.06
SC	<.0004	<.0004	<.0004	<.0004	<.0004	<.0004
SI	>10.	>10.	>10.	>10.	>10.	>10.
SN	.009	<.03	<.0006	.009	.003	<.002
SR	.03	.02	.03	.01	.0005	.003
TA	<.02	<.02	<.02	<.02	<.02	<.02
TE	<.04	<.06	<.04	<.08	<.1	<.06
TI	.09	.2	<.06	.1	<.06	.1
V	.04	.04	<.007	.04	<.007	<.005
Y	<.0009	<.0009	.007	<.0009	<.0009	<.0009
ZN	.05	.005	.006	.02	.004	.006
ZR	<.003	.006	<.003	.004	<.003	<.003

SAMPLE NUMBERS

ELEMENTS	142	145	146	148	149	150
	CONCENTRATION, PERCENT					
AG	<.003	<.005	<.003	.005	<.001	.005
AL	1.	.8	>3.	>3.	>2.	>3.
AS	<.01	<.009	<.01	.04	<.02	<.009
AU	<.002	<.002	<.002	<.002	<.002	<.002
B	.01	<.008	.02	.02	.02	.01
BA	.1	.02	.02	.02	.02	.05
BE	.0008	.0008	.0009	.0004	.0007	.001
BI	<.01	<.04	<.02	<.05	<.01	<.02
CA	4.	.5	.9	<.05	.3	<.1
CD	<.0005	<.0005	<.0005	<.0005	<.0005	<.0005
CO	<.001	<.001	<.001	<.001	<.001	<.001
CR	.01	.03	.002	.003	.003	.002
CU	.002	<.0006	<.0006	<.0006	<.0006	<.0006
FE	3.	9.	4.	5.	2.	10.
GA	<.0004	<.0006	<.0002	<.0009	<.0002	<.0002
K	4.	6.	10.	3.	3.	9.
LA	<.01	<.01	<.01	<.01	<.01	<.01
LI	<.002	<.002	<.002	<.002	<.002	<.002
MG	.2	.3	.4	.3	.2	.3
MN	.02	.05	.01	.02	.01	<.004
MO	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001
NA	<.3	<.3	<.3	<.3	<.3	<.3
NB	<.007	<.007	<.007	<.007	<.007	<.007
NI	.002	.008	.003	.002	<.0005	<.002
P	<2.	<.7	<.7	<.7	<.7	<.7
PB	<.002	<.002	<.002	<.003	<.002	<.002
PD	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001
PT	<.0006	<.0006	<.0006	<.0007	<.0006	<.0007
SB	<.06	<.06	<.06	<.06	<.06	<.06
SC	<.0004	<.0004	<.0004	<.0004	<.0004	<.0004
SI	>10.	>10.	>10.	>10.	>10.	>10.
SN	.005	.01	<.004	<.009	<.002	<.02
SR	.05	.001	.001	.001	.003	.02
TA	<.02	<.02	<.02	<.02	<.02	<.02
TE	.1	<.04	<.09	<.05	<.05	<.06
TI	.09	.1	.3	.2	.2	.2
V	.02	.07	<.005	.02	<.007	.04
Y	.004	<.0009	<.0009	<.0009	<.0009	<.0009
ZN	.02	.03	.05	.002	.001	.003
ZR	<.003	.008	.003	.006	.007	.004

SAMPLE NUMBERS

CONCENTRATION, PERCENT

ELEMENTS	151	153	154	155	156	157
AG	<.003	<.003	<.0005	<.0005	<.009	<.001
AL	>3.	.6	.07	.7	.08	.07
AS	<.05	<.03	<.009	<.01	<.06	<.02
AU	<.002	<.002	<.002	<.002	<.002	<.002
B	<.008	.01	<.003	<.003	<.01	<.003
BA	.3	.5	<.002	.003	.01	.007
BE	.0009	.0009	.0005	<.0001	.0003	<.0001
BI	<.03	<.01	<.01	<.01	<.01	<.01
CA	3.	.5	>10.	>10.	8.	10.
CD	<.0005	<.0005	<.0005	<.0005	<.0007	<.0005
CO	<.001	<.001	<.001	<.001	<.001	<.001
CR	.008	.006	<.0003	<.0003	<.0003	<.0003
CU	.002	<.0006	<.0006	<.0006	.03	.07
FE	5.	4.	.4	1.	9.	1.
GA	<.0002	<.0004	<.0002	<.0002	<.0002	<.0002
K	8.	4.	<.6	<.6	<.6	<.6
LA	<.01	<.01	<.01	<.01	<.01	<.01
LI	<.002	<.002	<.002	<.002	<.002	<.002
MG	.6	.03	.6	.3	.8	>9.
MN	<.002	.05	.01	.1	>10.	>5.
MO	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001
NA	<.3	<.3	<.3	<.3	<.3	<.3
NB	<.007	<.007	<.007	<.007	<.007	<.007
NI	.001	.001	<.0005	<.0005	<.009	<.0007
P	3.	<.9	<.7	<.7	<.7	<.7
PB	<.002	<.002	<.002	<.002	.6	.7
PD	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001
PT	<.0006	<.0006	<.0006	<.0006	<.0006	<.0006
SB	<.06	<.06	<.06	<.06	<.3	<.06
SC	<.0004	<.0004	<.0004	<.0004	<.0004	<.0004
SI	>10.	>10.	.04	3.	>10.	.3
SN	<.003	.006	<.0006	<.0006	<.008	<.0006
SR	.2	.009	.01	.0001	.0001	.0001
TA	<.02	<.02	<.02	<.02	<.02	<.02
TE	<.04	.1	<.04	<.04	<.04	<.04
TI	<.06	.1	<.03	<.03	<.03	<.03
V	<.01	.02	<.005	<.005	<.005	<.005
Y	.01	<.0009	<.0009	<.0009	<.0009	<.0009
ZN	.008	.006	<.0001	<.0001	.4	.1
ZR	<.003	<.003	<.003	<.003	<.003	<.003

SAMPLE NUMBERS

ELEMENTS	158	162	163	164	165	167
	CONCENTRATION, PERCENT					
AG	<.002	<.0005	.02	<.002	.01	.04
AL	.03	.9	<.008	.04	.6	.07
AS	<.01	<.01	.6	.08	.2	.2
AU	<.002	<.002	<.002	<.002	<.002	<.002
B	<.003	<.003	<.005	<.003	<.006	<.01
BA	<.002	.006	<.002	<.002	<.002	.02
BE	<.0001	<.0001	<.0001	<.0001	.001	.0006
BI	<.01	<.01	<.03	<.01	<.01	.1
CA	>10.	>10.	.4	3.	>10.	.3
CD	<.0005	<.0005	<.04	<.003	<.02	<.003
CO	<.001	<.001	<.001	<.001	<.001	.007
CR	<.0003	<.0003	<.0003	<.0003	<.0003	.001
CU	.02	<.0006	.2	.3	.7	1.
FE	3.	1.	9.	7.	10.	>10.
GA	<.0002	<.0002	<.0007	<.0002	<.0002	.003
K	<.6	<.6	<.6	<.6	<1.	<2.
LA	<.01	<.01	<.01	<.01	<.01	<.02
LI	<.002	<.002	<.002	<.002	<.002	<.002
MG	>10.	1.	.03	2.	.9	.3
MN	.4	.06	.2	.5	>2.	.8
MO	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001
NA	<.3	<.3	<.3	<.3	<1.	<2.
NB	<.01	<.007	<.007	<.007	<.007	<.007
NI	<.0006	<.0005	.002	.001	.008	<.01
P	<.7	<.7	<.7	<.7	2.	<2.
PB	.02	<.002	2.	.04	2.	1.
PD	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001
PT	<.0006	<.0006	<.0006	<.0006	<.0006	<.0006
SB	<.06	<.06	.3	<.06	<.2	<.4
SC	<.0004	<.0004	<.0004	<.0004	<.0004	<.0004
SI	3.	>10.	>10.	>10.	2.	>10.
SN	<.0008	<.0006	.02	.007	.06	.06
SR	.0002	.0002	<.0001	<.0001	<.0001	<.0001
TA	<.02	<.02	<.02	<.02	<.06	<.02
TE	<.04	<.04	<.04	<.04	<.04	<.1
TI	<.03	<.03	<.03	<.03	<.03	.1
V	<.005	<.005	<.005	<.005	.04	.04
Y	<.0009	<.0009	<.0009	<.0009	<.0009	<.0009
ZN	.09	.001	.1	.4	.7	.3
ZR	<.003	<.003	<.003	<.003	<.003	.01

SAMPLE NUMBERS

ELEMENTS	168	169	171	172
	CONCENTRATION, PERCENT			
AG	<.001	<.002	<.009	.01
AL	.08	.08	.05	.01
AS	.05	.08	.1	.1
AU	<.002	<.002	<.002	<.002
B	<.005	<.003	<.003	.02
BA	<.002	<.002	.003	.01
BE	<.0001	<.0002	<.0001	<.0002
BI	<.01	<.01	<.01	.2
CA	10.	.8	2.	.1
CD	<.0007	<.002	<.005	<.0005
CO	<.001	<.001	<.001	<.002
CR	<.0003	<.0003	<.0003	<.0009
CU	.2	.3	.3	.1
FE	9.	9.	10.	10.
GA	<.0002	<.0002	<.0003	<.0008
K	<.8	<1.	<.6	<2.
LA	<.01	<.01	<.01	<.01
LI	<.002	<.002	<.002	<.002
MG	3.	.5	>10.	.9
MN	>4.	.4	>6.	.08
MO	<.0001	<.0001	<.0001	<.0001
NA	<.3	<.3	<.3	<.3
NB	<.007	<.007	<.007	<.007
NI	<.0008	.002	<.0005	<.003
P	<.7	<.7	<.7	<.7
PB	.7	.4	1.	.3
PD	<.0001	<.0001	<.0001	<.0001
PT	<.0006	<.0006	<.0006	<.0007
SB	<.06	<.06	<.2	<.1
SC	<.0004	<.0004	<.0004	<.0004
SI	1.	>10.	.5	>10.
SN	<.007	.009	<.002	<.01
SR	<.0001	<.0001	<.0001	<.0001
TA	<.02	<.02	<.02	<.02
TE	<.04	<.04	<.04	<.04
TI	<.03	<.03	<.03	.1
V	<.005	<.005	<.005	.02
Y	<.0009	<.0009	<.0009	<.0009
ZN	.4	.3	.3	.08
ZR	<.003	<.003	<.003	<.003

Table 1.--Mineral occurrences in and near the Weepah Springs Wilderness Study Area, Nevada.

Sample no.	Name	Location	Development	Brief description
1-63	Red Head claims	Secs. 32 and 33, T. 3 N., R. 61 E., Sec. 4, T. 2 N., R. 61 E.	Prospect, active; trenches, pits; minor mercury producer.	Pilot Shale and jasperoid outcrops.
64, 65	NVNY claims	Secs. 4 and 5, T. 2 N., R. 61 E.	Prospect, active.	Jasperoid outcrops.
66-70	Unnamed	Secs. 3, 4, and 8, T. 2 N., R. 61 E.	None	Do.
71-75	Unnamed	Sec. 10, T. 2 N., R. 61 E.	None	Outcrops of calcite veins.
76-90	Unnamed	Secs. 9, 10, and 15, T. 2 N., R. 61 E.	Prospect, inactive; pit.	Jasperoid outcrops.
91-94	Unnamed	Secs. 21 and 22, T. 2 N., R. 61 E.	None	Do.
95-98, 117-121	CV claims	Sec. 28, T. 2 N., R. 61 E.	Prospect, active; four pits.	Do.
99-104	Unnamed	Secs. 28 and 27, T. 2 N., R. 61 E.	None	Do.
105-109	Unnamed	Sec. 27, T. 2 N., R. 61 E.	None	Do.
110-116	Unnamed	Sec. 28, T. 2 N., R. 61 E.	Prospect, inactive; trenches and pit.	Jasperoid, shale, and carbonate outcrops.
122,123	Unnamed	Sec. 33, T. 2 N., R. 61 E.	Prospect, inactive; two pits.	Jasperoid and limestone outcrops.

Table 1.--Mineral occurrences in and near the Weepah Springs Wilderness Study Area, Nevada--Continued

Sample no.	Name	Location	Development	Brief description
124-149, 153	Tim claims	Sec. 32 and 33, T. 2 N., R. 61 E.	Prospect, active trench.	Jasperoid outcrops.
150,151	Unnamed	Sec. 33, T. 2 N., R. 61 E.	Prospect, inactive; pit.	Do.
152	CV claims	Sec. 29, T. 2 N., R. 61 E.	Prospect, active	Do.
154,155	Unnamed	Sec. 7, T. 2N, R. 62 E.	Prospect, inactive; pit.	Calcite vein.
156-173	FNB claims	Sec. 6, T. 2 N., R. 62 E.	Prospect, inactive; 40-ft-deep shaft, 146-ft-long adit.	Brecciated jasperoid vein in silicified dolomite.

Table 2.—Analytical data and descriptions of samples 1-63 from the Red Head claims.
[Au, gold; Ag, silver; As, arsenic; Ba, barium; Hg, mercury; Sb, antimony; * determined by cold vapor atomic absorption with a detection limit of 5 ppb; —, assayed for but below detection limit; xxx, not applicable; NA, not analyzed.]

Sample			Assay data							
No	Type	Width (feet)	Au	Ag	As	Ba	Hg	Hg* (ppb)	Sb	Remarks
			ppm						ppm	
1	Chip	10.0	—	—	70	NA	28	NA	110	Quartzite breccia.
2	Chip	0.6	—	—	815	500	67	NA	270	Altered limestone and 5-in-wide vein composed of limonite, goethite, and cinnabar.
3	Chip	2.0	—	—	540	600	119	NA	290	Altered limestone with cinnabar staining.
4	Chip	6.2	0.4	4.8	280	200	24	NA	320	Brecciated and altered limestone, abundant hematite, limonite, and cinnabar staining.
5	Chip	10.0	—	—	18.8	NA	—	180	—	Fractured, bleached limestone with calcite veins.
6	Chip	10.0	—	—	32	NA	—	200	13.4	Do.
7	Chip	10.0	—	—	—	NA	—	220	—	Limestone and calcite veins.
8	Chip	10.0	—	.6	570	100	—	1500	140	Altered calcareous shale, chrysocolla.
9	Chip	10.0	—	—	9.2	NA	—	440	4	Altered and unaltered limestone.
10	Chip	10.0	—	—	—	NA	—	35	4	Limestone and calcite veins.
11	Chip	10.0	—	—	—	NA	—	80	—	Do.
12	Chip	10.0	—	—	11.9	NA	—	135	—	Limestone.
13	Chip	10.0	—	—	5	—	—	800	5	Fractured limestone, calcite veins and iron-oxide staining.
14	Chip	10.0	—	—	—	NA	—	200	4	Do.
15	Chip	10.0	—	—	31	NA	7.4	NA	6	Brecciated and altered limestone with some barite.

Table 2.—Analytical data and descriptions of samples 1-63 from the Red Head claims—Continued

Sample			Assay data							
No	Type	Width (feet)	Au	Ag	As (ppm)	Ba	Hg	Hg* (ppb)	Sb ppm	Remarks
16	Chip	10.0	—	—	50	50	28	NA	25	Brecciated and altered limestone, minor barite.
17	Chip	10.0	—	—	67	NA	10	NA	59	Breccia and jasperoid.
18	Chip	2.5	—	—	—	300	—	1950	—	Fractured and weathered siltstone and claystone, hematite and limonite.
19	Chip	2.3	—	—	54	NA	—	1800	4	Fractured siltstone.
20	Chip	1.8	—	—	—	NA	—	1350	4	Do.
21	Chip	2.4	—	—	3	NA	—	1250	4	Do.
22	Chip	1.3	—	—	61	NA	—	530	6	Fractured, calcareous siltstone.
23	Chip	2.7	—	—	—	400	—	2050	—	Calcareous siltstone, bottom 1.0 ft highly altered, small veinlets of cinnabar, hematite, and limonite.
24	Chip	2.7	—	—	210	200	—	1900	18.8	Fractured, calcareous siltstone, bottom 0.8 ft alteration zone, cinnabar, hematite, and limonite.
25	Chip	2.5	—	—	160	NA	2.8	NA	23.4	Altered calcareous siltstone, small calcite veins.
26	Chip	2.0	—	—	—	NA	2.4	NA	—	Do.
27	Chip	3.7	—	—	120	100	7.6	NA	12.7	Fractured, calcareous siltstone, bottom 1.0 ft contains chert inclusions and limonite.
28	Chip	2.3	0.2	1.4	320	NA	25	NA	140	Contact between slightly altered limestone and silicified limestone containing limonite and goethite.

Table 2.—Analytical data and descriptions of samples 1-63 from the Red Head claims—Continued

Sample No	Sample Type	Sample Width (feet)	Au (ppm)	Ag (ppm)	As (ppm)	Ba (ppm)	Hg (ppm)	Hg* (ppb)	Sb ppm	Remarks
29	Chip	5.0	0.1	0.5	460	---	12	NA	130	Shear zone in jasperoid; brecciated jasperoid, cinnabar, quartzite, and barite.
30	Chip	11.0	---	---	170	80	2.8	NA	17.3	Fault zone and clay gouge at contact between altered calcareous siltstone and jasperoid.
31	Chip	1.9	---	---	43	NA	---	420	5	Fractured and altered shale, limonite.
32	Chip	2.0	---	---	18	NA	---	160	7	Clays derived from the alteration of shale.
33	Chip	1.3	---	---	22.2	NA	---	440	4	Do.
34	Chip	1.2	---	---	25.5	100	---	210	4	Clays, bottom 0.2 ft black, fissile shale, abundant limonite.
35	Chip	11.0	---	1.3	100	NA	---	530	7	Bleached, highly fractured shale.
36	Chip	3.0	---	---	86	300	---	550	20.3	Altered and replaced calcareous shale, limonite.
37	Chip	1.8	---	---	71	NA	2.6	NA	12.7	Altered siltstone.
38	Chip	8.0	---	.8	48	NA	4.8	NA	25.8	Vuggy, silicified limestone.
39	Chip	1.2	---	---	47	NA	9.0	NA	60	Altered siltstone.
40	Chip	3.0	---	---	150	NA	24	NA	160	Silicified limestone and altered siltstone, hematite-stained quartzite at base.
41	Chip	1.0	---	---	160	NA	8.1	NA	90	Top 0.4 ft unaltered calcareous siltstone, bottom 0.6 ft limonite-stained quartzite.
42	Chip	1.5	---	---	100	100	---	1700	44	Altered quartzite.
43	Chip	1.5	---	---	77	NA	7.4	NA	28.9	Sandy, altered quartzite.

Table 2.—Analytical data and descriptions of samples 1-63 from the Red Head claims—Continued

Sample			Assay data							
No	Type	Width (feet)	Au	Ag	As	Ba	Hg	Hg* (ppb)	Sb	Remarks
			ppm						ppm	
44	Chip	2.0	---	---	82	NA	---	1350	11.9	Residual soil and rock fragments.
45	Chip	1.7	---	---	11	NA	---	145	---	Sandy clay, no rock sampled.
46	Chip	2.1	---	---	---	NA	---	105	---	Do.
47	Chip	2.0	---	---	94	200	---	800	34	Highly altered shale, abundant pods of chalcedony, veinlets and coatings of cinnabar and limonite. Shale directly below jasperoid.
48	Chip	2.0	---	---	110	NA	---	230	3	Calcareous siltstone, partially silicified.
49	Chip	6.0	---	---	130	90	6.5	NA	26.5	Fractured jasperoid, abundant hematite and limonite.
50	Chip	5.0	---	---	15.4	---	---	95	6	Fossiliferous limestone, calcite veins.
51	Chip	3.4	---	2.0	130	NA	18	NA	775	Fractured, highly altered limestone(?), abundant cinnabar and limonite staining, slickensides.
52	Chip	2.9	---	---	51	---	6.5	NA	31	Fractured, silicified limestone, abundant cinnabar staining, pods and veins of calcite.
53	Chip	2.5	---	---	7	---	---	780	8.9	Fractured limestone with hematite staining, bottom 1.0 ft alteration zone, small pods of cinnabar.
54	Chip	2.5	---	---	8	---	---	970	10.4	Fractured, silicified limestone and abundant limonite, hematite, and cinnabar.
55	Chip	2.0	---	---	8	NA	---	780	9.7	Sample taken directly below sample #54, alteration zone; realgar, orpiment, and cinnabar, a few pods of cinnabar and secondary calcite.

Table 2.—Analytical data and descriptions of samples 1-63 from the Red Head claims—Continued

Sample			Assay data							
No	Type	Width (feet)	Au	Ag	As	Ba	Hg	Hg* (ppb)	Sb ppm	Remarks
			ppm							
56	Chip	3.3	–––	–––	11.9	NA	–––	790	7	Moderately altered limestone; realgar, orpiment, and cinnabar staining.
57	Chip	2.3	–––	–––	8	NA	5.0	NA	9.7	Highly fractured, silicified limestone, realgar, cinnabar, and orpiment staining.
58	Chip	3.0	–––	–––	–––	–––	–––	670	4	Silicified dolomite with boxwork structures.
59	Chip	1.0	–––	–––	6	NA	–––	1250	7	Brecciated, silicified dolomite, boxwork structures, calcite veins, hematite and limonite staining.
60	Chip	25.0	–––	.9	77	90	2.6	NA	15.7	Red and yellowish brown jasper and silicified dolomite.
61	Chip	6.0	–––	–––	25.5	–––	NA	_5000	21.1	Cherty limestone cut by calcite veins, cinnabar and limonite staining.
62	Grab	xxx	–––	–––	51	–––	–––	370	21.9	Hematite-and limonite-stained geyserite.
63	Chip	6.0	–––	9.8	120	30	2.6	NA	670	Hematite- and limonite-stained quartzite breccia; cinnabar staining.

Table 3.—Analytical data and descriptions of samples 64-155.

[Au, gold; Ag, silver; As, arsenic; Ba, barium; Hg, mercury; Sb, antimony; NA, not analyzed; ---, assayed for but below detection limit; xxx, not applicable; * mercury determined by cold vapor atomic absorption with a detection limit of 5 ppb]

Sample			Assay data							
No.	Type	Width (feet)	Au	Ag	As ppm	Ba	Hg	Hg* (ppb)	Sb ppm	Remarks
64	Chip	4.0	---	---	290	200	2.8	NA	26.5	Silicified carbonate, limonite and hematite.
65	Chip	3.0	---	---	270	300	---	1250	35	Limonite-stained jasperoid.
66	Chip	10.0	---	---	100	400	---	780	8	Jasperoid, silicified limestone.
67	Grab	xxx	---	---	490	30	2.8	NA	32	Hematite-goethite vein in dolomite.
68	Chip	5.0	---	---	150	100	2.8	NA	97	Limonite-stained jasperoid, silicified dolomite.
69	Chip	2.0	---	---	450	---	5.0	NA	17.2	Alteration zone in silicified dolomite, liesegang banding, collapse feature in hematitic sandstone and conglomerates.
70	Chip	2.5	---	---	650	NA	---	500	28.9	Same alteration zone as #69, at contact with dolomite.
71	Chip	4.0	---	---	840	_20	---	600	120	Hematite and calcite fissure vein in dolomite.
72	Chip	5.0	---	---	140	NA	2.8	NA	13.7	Alteration zone in dolomite; calcite stringers.
73	Chip	7.5	---	---	310	NA	---	60	7	Hematite-stained calcite vein in altered dolomite, irregular alteration and replacement of dolomite.
74	Chip	3.4	---	---	55	---	2.8	NA	10.1	Do.
75	Grab	xxx	_0.1	284 (7.8 oz/ton)	1480	80	17	NA	5900	Hematite and calcite veins in dolomite.

Table 3.—Analytical data and descriptions of samples 64-155—Continued

Sample			Assay data							
No.	Type	Width (feet)	Au	Ag	As (ppm)	Ba	Hg	Hg* (ppb)	Sb ppm	Remarks
76	Chip	3.0	—	—	37	80	—	110	4	Sandstone; hematite and limonite.
77	Random	xxx	—	0.4	62	NA	—	1050	25.8	Jasperoid.
78	Channel	16.0	—	—	48	200	—	30	2	Fissile shale, limonite and hematite in fractures.
79	Chip	3.0	—	—	230	200	2.8	NA	27.2	Brecciated jasperoid, quartzite clasts in matrix.
80	Random	xxx	—	—	180	NA	—	2350	9.5	Red, brecciated jasperoid, quartzite clasts in matrix.
81	Select	xxx	—	—	140	NA	2.8	NA	19.4	Brecciated jasperoid.
82	Select	xxx	—	—	170	NA	—	2350	93	Do.
83	Grab	xxx	—	.8	14	300	—	175	3	Black shale from drill hole.
84	Select	xxx	—	—	170	NA	5.0	NA	24.4	Limonite- and hematite-stained jasperoid breccia.
85	Select	xxx	—	.5	440	1000	2.8	NA	21.5	Do.
86	Select	xxx	—	.4	65	NA	2.8	NA	25.8	Silicified limestone breccia, jasper.
87	Select	xxx	—	—	57	400	—	1350	16.5	Silicified limestone breccia.
88	Select	xxx	—	.4	130	600	6.0	NA	34	Silicified limestone and jasperoid.
89	Chip	2.0	—	—	43	30	—	140	—	Limonite-stained limestone.
90	Chip	15.0	—	—	240	>90,000 (≥9 percent)	—	810	5	Altered silicified limestone, limonite staining.

Table 3.--Analytical data and descriptions of samples 64-155--Continued

Sample No.	Sample Type	Sample Width (feet)	Assay data Au (ppm)	Ag (ppm)	As (ppm)	Ba (ppm)	Hg (ppm)	Hg* (ppb)	Sb ppm	Remarks
91	Select	xxx	---	---	31	---	---	25	---	Limestone; boxwork structure of jasperoid, chalcedony, and epidote.
92	Random	xxx	---	---	70	NA	---	45	3	Limestone; boxwork structure of jasperoid.
93	Chip	6.0	---	---	730	80	---	760	5	Limonite-stained brecciated jasperoid.
94	Random	xxx	---	---	27	200	---	95	5	Brecciated jasperoid with quartz veins.
95	Chip	3.0	---	---	170	200	---	700	12.3	Brecciated jasperoid.
96	Chip	10.0	---	---	230	300	---	510	42	Brecciated jasperoid, hematite and limonite staining.
97	Chip	3.0	---	1.5	320	NA	---	410	36	Do.
98	Chip	3.0	---	---	180	200	3.4	NA	24.4	Limonite-stained jasperoid.
99	Chip	2.0	---	---	100	200	---	55	5	Jasperoid.
100	Chip	2.5	---	.5	220	NA	---	135	7	Brecciated jasperoid.
101	Select	xxx	---	1.8	290	400	---	530	9.5	Do.
102	Chip	6.0	---	2.4	380	500	---	175	55	Altered dolomite.
103	Chip	1.8	---	---	---	40	---	690	5	Shear zone in silicified limestone; argillic alteration and hematite staining.
104	Random	xxx	---	---	---	40	---	100	3	Jasperoid body in limestone.
105	Chip	6.0	---	---	27	20	---	40	2	Fractured and altered shale.
106	Chip	5.0	---	---	---	30	---	30	---	Jasperoid.

Table 3.—Analytical data and descriptions of samples 64-155—Continued.

Sample No.	Sample Type	Sample Width (feet)	Assay data Au	Ag	As	Ba	Hg	Hg* (ppb)	Sb ppm	Remarks
			ppm							
107	Chip	1.5	---	---	8	---	---	30	2	Alteration zone in brecciated limestone; abundant iron-oxides, chert.
108	Chip	1.7	---	---	14	80	---	90	3	Moderately brecciated jasperoid; chalcedony and secondary calcite veins.
109	Chip	3.7	---	---	29	90	---	90	3	Jointed jasperoid, iron-oxide staining; secondary calcite.
110	Chip	4.0	---	1.0	54	1000	---	145	12.3	Jasperoid.
111	Chip	5.0	---	1.0	1420	200	---	720	31	Brecciated jasperoid, limonite and cinnabar staining.
112	Random	xxx	---	---	320	NA	2.8	NA	10.1	Altered limestone.
113	Random	xxx	---	.9	58	200	---	590	5	Fractured, green, fissile shale.
114	Chip	3.0	---	---	120	700	---	145	6	Sandy limestone and cinnabar veinlets.
115	Chip	4.0	---	1.9	550	1000	---	230	35	Altered dolomite, limonite and cinnabar.
116	Chip	1.5	---	---	42	NA	---	710	2	Do.
117	Chip	1.8	---	---	310	60	---	300	---	Iron-stained alteration zone in dolomite.
118	Select	xxx	---	---	11	NA	---	100	---	Brecciated jasperoid.
119	Chip	10.0	---	3.7	160	500	---	85	27.2	Bleached and altered limestone.
120	Select	xxx	---	.4	87	100	2.8	NA	2	Jasperoid and silicified limestone.
121	Chip	3.0	---	4.1	950	200	---	380	23.7	Iron-stained, altered limestone and jasperoid.
122	Chip	2.3	---	1.2	620	300	---	160	14.4	Brecciated, iron-stained limestone and jasperoid.

Table 3.—Analytical data and descriptions of samples 64-155—Continued

Sample			Assay data							
No.	Type	Width (feet)	Au	Ag	As ppm	Ba	Hg	Hg* (ppb)	Sb ppm	Remarks
123	Chip	2.5	—	6.6	66	200	—	125	6	Unaltered limestone, hematite and limonite staining.
124	Chip	4.0	—	.5	81	NA	—	85	—	Brecciated jasperoid with hematite.
125	Chip	3.0	—	.6	480	300	2.8	NA	50	Carbonaceous shale containing hematite veinlets.
126	Chip	2.0	—	—	81	900	—	40	4	Jasperoid and chalcedony.
127	Chip	3.0	—	—	25	200	—	240	—	Silicified limestone and jasperoid.
128	Chip	2.0	—	2.9	50	300	—	250	—	Sericitic, fine-grained dike rock, light green color.
129	Chip	3.0	—	.8	70	200	—	410	10.1	Jasperoid.
130	Select	xxx	—	—	21	NA	—	90	—	Altered limestone; secondary calcite, jasper, and chert inclusions.
131	Select	xxx	—	—	94	200	—	70	8.8	Silicified limestone; limonite staining.
132	Chip	4.2	—	—	770	NA	—	95	34	Altered limestone; abundant limonite staining and chert inclusions.
133	Chip	5.0	—	.5	190	200	—	70	7	Jasperoid.
134	Random	xxx	—	—	8	100	—	120	—	Highly brecciated, altered shale; minor chalcedony.
135	Select	xxx	—	1.8	42	300	—	410	8.9	Altered and silicified siltstone; minor jasper.

Table 3.—Analytical data and descriptions of samples 64-155—Continued

Sample			Assay data							
No.	Type	Width (feet)	Au	Ag	As (ppm)	Ba	Hg	Hg* (ppb)	Sb ppm	Remarks
136	Random	xxx	—	1.6	340	NA	—	135	14.2	Brecciated jasperoid, limonite and hematite staining and chalcedony along fractures.
137	Random	xxx	—	—	210	1000	—	40	4	Jasperoid, slickensides.
138	Chip	1.0	—	8.8	12.7	400	—	45	—	Altered, black fissile shale containing chalcedony. Capped by jasperoid sampled in sample 136.
139	Chip	8.0	—	1.8	66	200	—	25	8	Brecciated, red jasperoid.
140	Chip	10.0	—	—	23.8	70	—	60	—	Siltstone, chalcedony and angular clasts of jasperoid, limonite and hematite staining.
141	Select	xxx	—	.4	35	80	—	70	4	Altered shale, light green and fissile to yellow and calcareous, contains veinlets of jasper; limonite and hematite staining.
142	Random	xxx	—	4.6	42	1000	—	70	7	Silicified limestone and jasperoid, explosion breccia, yellow staining along fractures.
143	Random	xxx	—	.9	27.1	NA	—	80	3	Calcareous siltstone, yellow staining along fractures.
144	Random	xxx	—	2.2	290	NA	—	65	12.7	Calcareous siltstone containing specular hematite.
145	Chip	12.0	—	—	120	200	—	45	16.5	Calcareous siltstone locally replaced by red jasperoid.

Table 3.—Analytical data and descriptions of samples 64-155—Continued

Sample			Assay data							
No.	Type	Width (feet)	Au	Ag	As (ppm)	Ba	Hg	Hg* (ppb)	Sb ppm	Remarks
146	Random	xxx	---	---	23.8	200	---	50	4	Altered red and yellow shale.
147	Chip	3.0	---	6.3	33	NA	---	30	8	Altered shale, fissile with abundant limonite staining.
148	Random	xxx	---	.6	72	200	---	125	7	Altered and brecciated siltstone, limonite staining.
149	Chip	15.0	---	.4	31	200	---	50	9.7	Highly fractured shale, minor replacement by jasper, limonite and hematite in fractures.
150	Chip	4.0	0.05	---	61	500	---	65	9.7	Red, siliceous rock and veinlets of chalcopyrite and bornite.
151	Chip	10.0	---	3.2	79	3000	---	280	4	Yellow calcareous siltstone, slightly silicified, minor chalcopyrite and bornite in dump rocks.
152	Chip	2.0	---	---	65	NA	---	65	4	Brecciated and altered dolomite and chalcedony clasts.
153	Random	xxx	---	.8	120	8000	---	230	25.0	Brecciated yellow and red jasperoid and chalcedony.
154	Chip	3.0	---	---	20	NA	---	250	8	Calcite vein.
155	Chip	2.0	---	---	86	30	---	155	15.8	Hematite vein.

Table 4.—Analytical data and descriptions of samples 156-173 from the FNB claims.
[Au, gold; Ag, silver; As, arsenic; Hg, mercury; Sb, antimony; NA, not analyzed; ---, assayed for but below detection limit; * determined by fire assay.]

Sample			Assay Data					
No.	Type	Width (feet)	Au	Ag	As	Hg	Sb	Remarks
			ppm					
156	Chip	0.6	---	23 (0.6 oz/ton)*	15	---	130	Jasperoid vein.
157	Chip	3.5	---	2.2 (0.065 oz/ton)	150	4.0	380	Brecciated jasperoid vein, limonite and hematite in silicified dolomite, copper staining.
158	Chip	1.5	---	4.9 (0.14 oz/ton)	NA	NA	NA	Two-in.-wide brecciated jasper vein in silicified dolomite; limonite and hematite.
159	Select	xxx	trace	105 (3.0 oz/ton)*	2510	5.0	530	Dump, vein material, limonite and copper staining on silicified dolomite, contains 1.15 percent copper.
160	Chip	0.2	---	15 (0.45 oz/ton)	NA	NA	NA	Same as #156, malachite, contains 25.2 percent copper.
161	Chip	0.3	---	302 (8.5 oz/ton)*	300	6.0	680	Jasperoid vein.
162	Chip	1.0	---	0.5 (0.01 oz/ton)	140	3.6	25.8	Do.
163	Chip	1.5	---	133 (3.3 oz/ton)*	NA	NA	NA	Brecciated jasperoid vein, hematite and limonite, contains 2.77 percent lead.
164	Chip	2.0	---	23 (0.67 oz/ton)	960	NA	840	Brecciated jasperoid vein, limonite, specular hematite, and calcite.
165	Chip	1.0	---	30 (0.9 oz/ton)*	440	11	510	Brecciated jasperoid vein, limonite, specular hematite, and jarosite (?).
166	Chip	1.3	trace	93 (2.9 oz/ton)*	NA	4.4	NA	Brecciated jasperoid vein, limonite and hematite.
167	Chip	1.2	---	66 (1.8 oz/ton)*	NA	NA	NA	Brecciated jasperoid vein and iron-oxides.

Table 4.—Analytical data and descriptions of samples 156-173 from the FNB claims—Continued

Sample			Assay Data					
No.	Type	Width (feet)	Au	Ag	As	Hg	Sb	Remarks
					ppm			
168	Chip	1.5	---	24 (1.1 oz/ton)*	NA	NA	NA	Brecciated jasperoid vein and iron-oxides, contains 1.21 percent zinc.
169	Chip	1.5	trace	21 (0.5 oz/ton)*	NA	NA	NA	Brecciated jasperoid vein and iron-oxides.
170	Chip	2.0	trace	378 (10.9 oz/ton)*	NA	NA	NA	Do.
171	Chip	1.5	0.094	17 (0.48 oz/ton)	960	NA	840	Do.
172	Chip	1.0	.009	17 (0.5 oz/ton)	NA	NA	NA	Do.
173	Chip	2.0	.008	16 (0.47 oz/ton)	2170	2.0	280	Brecciated jasperoid vein, limonite, specular hematite, and jarosite(?).

United States Department of the Interior

BUREAU OF MINES

P. O. BOX 25086
BUILDING 20, DENVER FEDERAL CENTER
DENVER, COLORADO 80225

Intermountain Field Operations Center

July 24, 1985

Mr. John H. Schilling
Director and State Geologist
Nevada Bureau of Mines
University of Nevada
Reno, NV 89557-0088

Mr. Schilling:

Enclosed is a copy of the following U.S. Bureau of Mines Open-File Report:

MLA 40-85 MINERAL RESOURCES OF THE WEEPAH SPRING WILDERNESS STUDY AREA, (NV-040-246), NYE AND LINCOLN COUNTIES, NEVADA

Sincerely,

Uldis Jansons

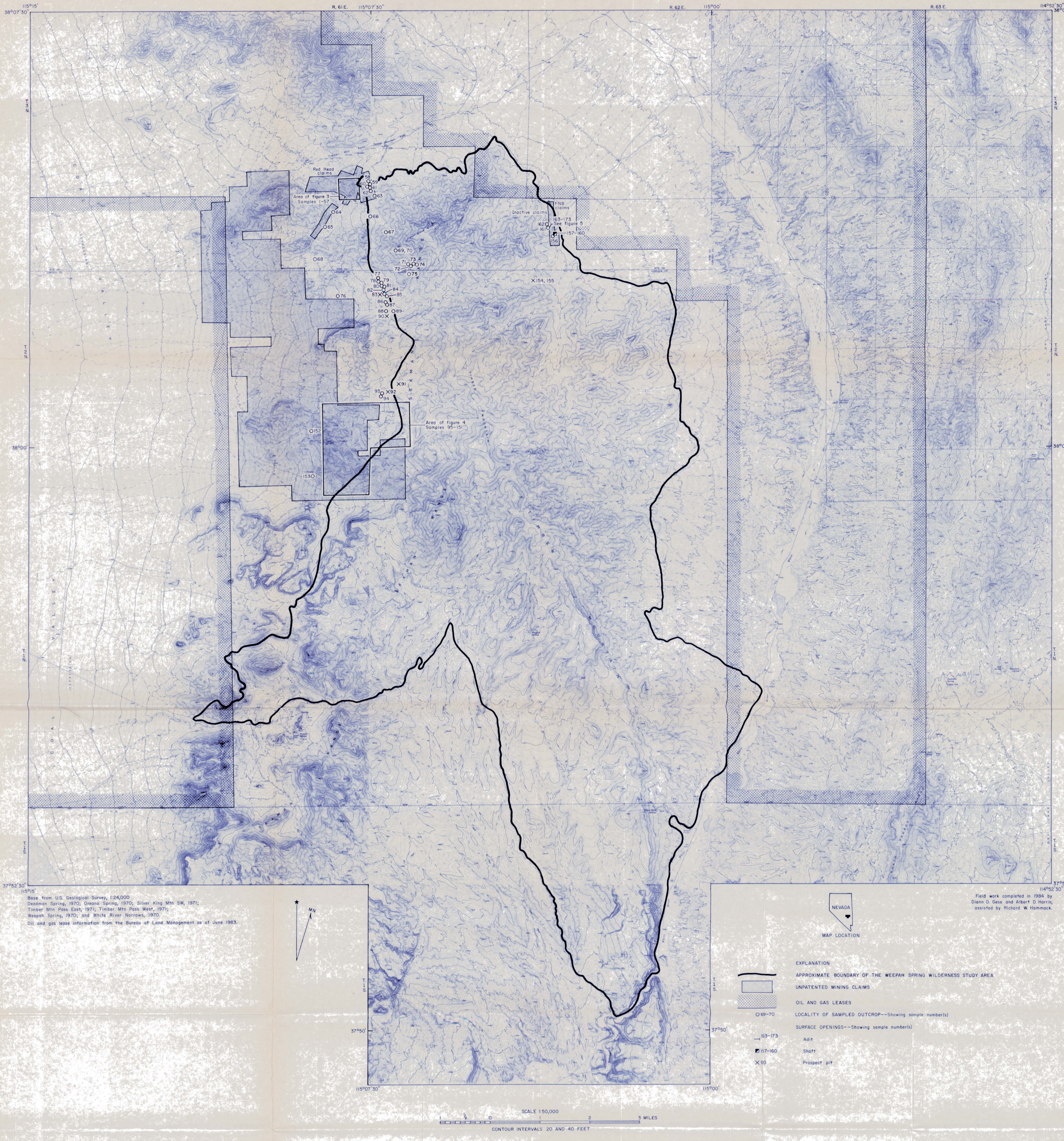
Uldis Jansons, Chief
MLA Branch

Enclosure-1
(listed above)

cc: Project File

DEPARTMENT OF THE INTERIOR
BUREAU OF MINES

OPEN FILE REPORT
MLA 40-85
PLATE 1



Base from U.S. Geological Survey, 1:24,000
Deadman Spring, 1970; Oreana Spring, 1970; Silver King Mtn SW, 1971;
Timber Mtn Pass East, 1971; Timber Mtn Pass West, 1971;
Weepah Spring, 1970; and White River Narrows, 1970.

Oil and gas lease information from the Bureau of Land Management as of June 1983.

NEVADA

MAP LOCATION

Field work completed in 1984 by
Diann D. Gese and Albert D. Harris;
assisted by Richard W. Hammack.

EXPLANATION

APPROXIMATE BOUNDARY OF THE WEEPAH SPRING WILDERNESS STUDY AREA

UNPATENTED MINING CLAIMS

OIL AND GAS LEASES

○69–70 LOCALITY OF SAMPLED OUTCROP--Showing sample number(s)

SURFACE OPENINGS--Showing sample number(s)

163–173 Adit

157–160 Shaft

×90 Prospect pit

MINE AND PROSPECT MAP OF THE WEEPAH SPRING WILDERNESS STUDY AREA, LINCOLN AND NYE COUNTIES, NEVADA

BY

DIANN D. GESE AND ALBERT D. HARRIS, U.S. BUREAU OF MINES

1985