UNITED STATES DEPARTMENT OF THE INTERIOR

GEOLOGICAL SURVEY

Geochemical assessment of mineral resources in the Park Range Survey Area (NV 040-154), in south-central Nevada

By

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Open-File Report

84-102

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Abstract

A stream sediment geochemical survey of the Park Range Resource Survey Area (NV 040-154) was conducted as part of the Bureau of Land Management Phase II mineral resource evaluation. During the summer of 1983, stream-sediment samples were collected from 53 first-order drainage basins within the resource area. The geochemical evaluation utilized the minus-80-mesh fraction of the stream-sediment samples and the nonmagnetic fraction of panned concentrate from stream-sediment samples. The lack of geochemically anomalous elemental concentrations from either sample media indicates the survey area has a low potential for metallic mineral resources. The Antelope/Park Range G-E-M Resources Area Technical Report, which is a literature review of the area, also indicated the Park Range Resource Survey Area has low mineral resource potential.

Introduction

The Park Range Resource Survey Area is located in south-central Nevada approximately 45 miles northwest from the village of Warm Springs (figure 1). The area is located in the Basin and Range physiographic province and contains 47,268 acres. The predominant rock type is the Tertiary Windous Butte Formation, comprising a sequence of ash-flow tuffs of quartz latite to rhyolite composition. Scattered occurrences of older dacitic to andesitic composition lavas also occur within the survey area. In the northwestern portion of the survey area, Ordovician, Devonian, and Pennsylvanian sedimentary rocks are exposed (anonymous, 1983).

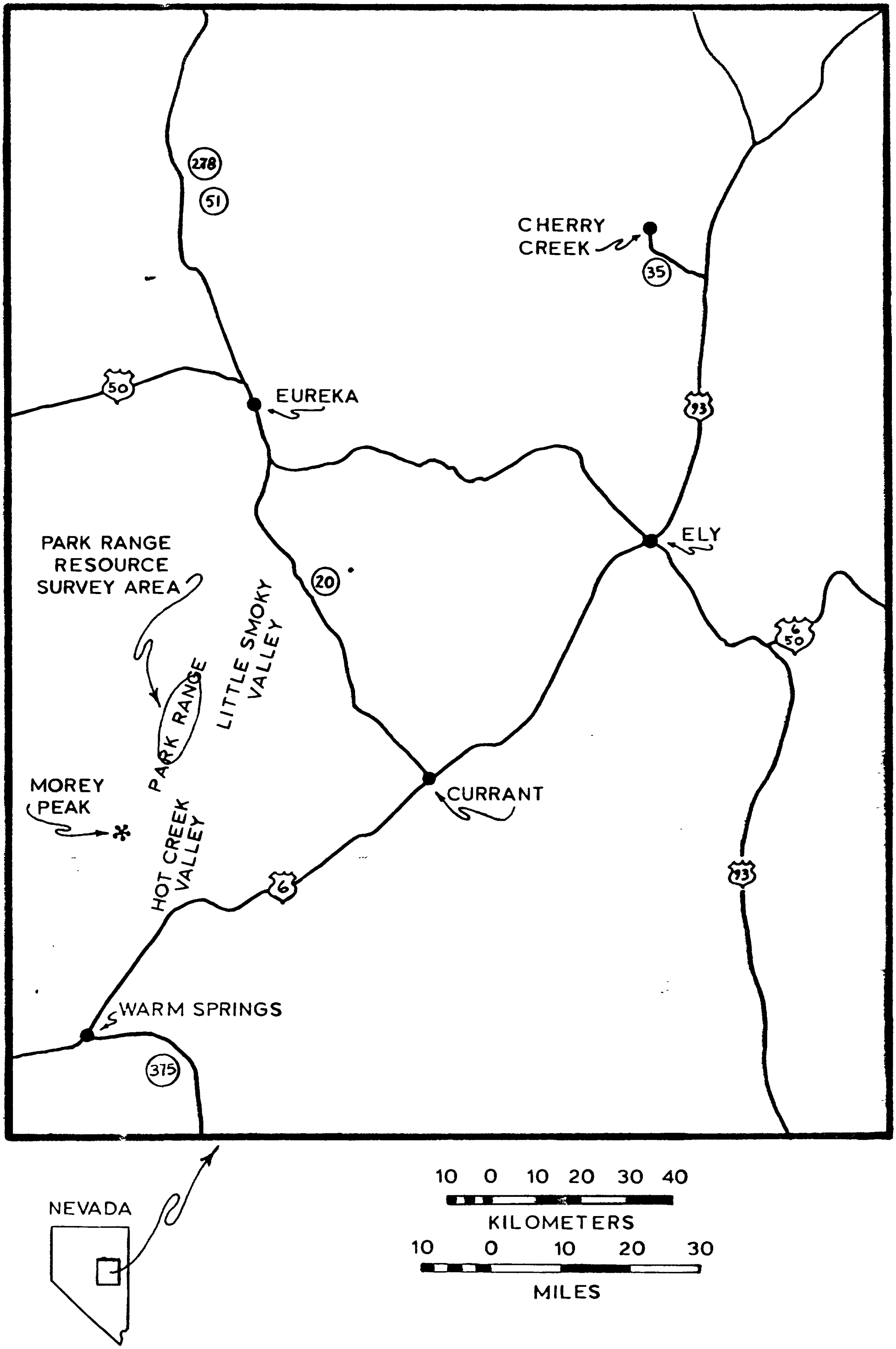

Figure 1.--Index map of the Park Range Resource Survey Area, south-central Nevada.

Sample Collection and Analytical Techniques

Minus-80-mesh stream-sediment and panned-concentrates from stream-sediment samples were collected during the summer of 1983. A composite stream-sediment sample was collected at each site. The sample consisted of sediments collected from not less than five points along approximately 100 feet of the stream channel (figure 2). Approximately 10-15 pounds of minus-2-mm sediment was collected in a large gold pan and hand mixed. About 0.5 pounds of the mixed sediment was placed in a Kraft paper bag and later sieved to minus-80-mesh. The minus-80-mesh fraction of the stream-sediment sample was oven dried at 90°C.

The second sample consisted of the remainder of the mixed sediment which was placed in a cotton sack. This sample was later panned to remove the bulk of the common rock-forming minerals such as feldspar, quartz, and calcite. The concentrate was dried and sieved to minus-35-mesh and was then placed in bromoform (specific gravity = 2.86) to remove the remaining feldspar, quartz, calcite, and other rock-forming minerals which are lighter than bromoform. The resultant heavy-mineral separates which are heavier than bromoform may contain minerals, such as magnetite, ilmenite, sphene, barite, biotite, hornblende, sulfides, and certain oxides. The magnetite and ilmenite were removed from the heavy-mineral separates using an electromagnet that was placed horizontally, with mylar over the poles. The electromagnet was set at 0.4 amperes. The concentrate was placed on a mylar covered tray which was moved slowly to a distance approximately 4-6 inches below the poles, which attracted the magnetite to the magnet. The magnetite was removed from the poles. The electromagnet was then set at 1.8 amperes. The tray was brought in contact with the magnet and moved slowly across the opening between the poles. This procedure removes the minerals that are magnetic at a 0.6 ampere

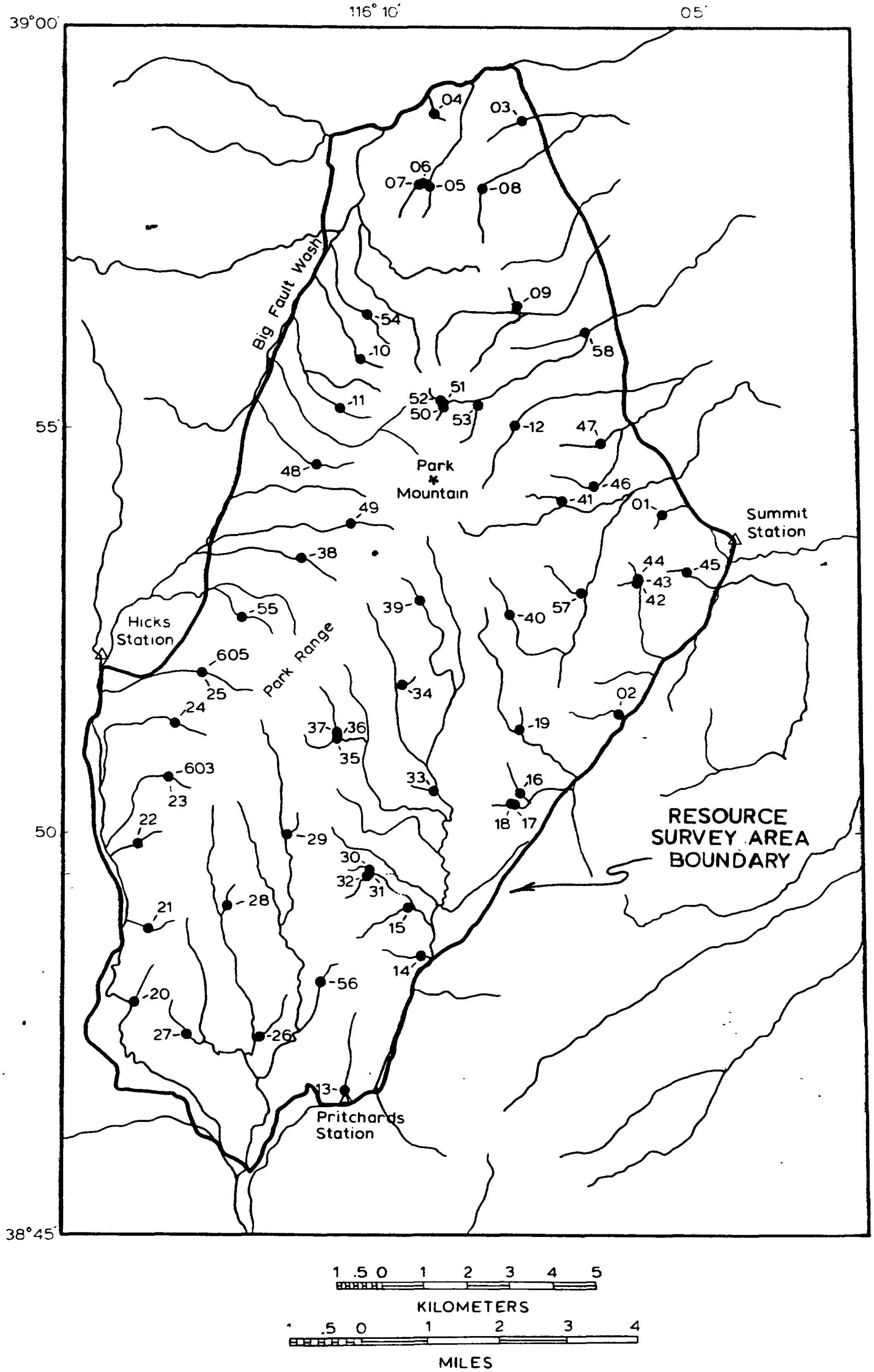

Figure 2.--Sampling sites within the Park Range Resource Survey Area, south-central Nevada.

setting when a Frantz Isodynamic Separator is used as discussed in Flinter (1959), Hess (1956), and Nickel (1968, 1969), with 15° forward slope and 10° side slope. The mineral grains left on the tray were nonmagnetic at a 0.6 amperage. The magnetic splits of the panned concentrates may contain minerals such as biotite, sphene, pyroxene, hornblende, and garnet. The nonmagnetic splits may contain minerals such as topaz, sphene, rutile, hematite, sulfides, some sulfates, carbonates, and oxides. The nonmagnetic fraction of the panned concentrate was split using a micro splitter and a representative sample was pulverized in an agate crucible.

All samples were randomized and then analyzed by a six-step D.C.-arc semiquantitative emission spectrographic method for 31 elements (Grimes and Marranzino, 1968). All of the analytical values are reported as six steps per order of magnitude (1, 1.5, 2, 3, 5, 7, or multiples of 10). These values approximate the geometric midpoints of successive concentration ranges (Grimes and Marranzino, 1968). The spectrographic method utilizes a series of elemental standards against which the elemental concentrations in the samples are compared. If a sample contains elemental concentrations above the highest standard used in the six-step D.C.-arc spectrographic method, the elemental concentration is given a "G" code. If a sample contains elemental concentrations below the lowest standard used in the six-step D.C.-arc spectrographic method, two code designations can be assigned for the concentration; if the sample concentration is slightly below the lowest standard, the elemental concentration is given an "L" code; if the sample concentrations is not detected, the elemental concentration is given an "N" code. The six-step D.C.-arc emission spectrographic method provides reproducibility within one reporting unit of the reported value approximately 88 percent of the time and within two reporting units of the reported value approximately 96 percent of the time (Motooka and Grimes, 1976).

When analyzing the nonmagnetic fraction of the panned concentrate samples, a modification of the spectrographic method was necessary to eliminate spectral interferences produced by matrix effects characteristic of this sample type. The effect of this modification was a loss of sensitivity resulting in an increase of all lower limits of determination by two reporting units. The analytical results for the minus-80-mesh stream sediments and the nonmagnetic fraction of the panned concentrates are given in Appendix 1 and 2.

Discussion and interpretation of results

The analytical data were visually examined for above background elemental concentrations that might be related to mineralization. No anomalous metal concentrations unrelated to lithology can be identified within the minus-80-mesh fraction of the stream-sediment samples or the nonmagnetic fraction of the panned concentrate. The analytical results suggest that the resource survey area has a low potential for containing potential mineral deposits.

Geology

The Park Range WSA is located within the Basin and Range province in northern Nye County, Nevada. The Park Range is a northeast trending fault block that dips slightly to the southeast. Outcrops in the area are predominantly Tertiary volcanic rocks that range in composition from andesites to rhyolites. Small amounts of Paleozoic sedimentary rocks are present in the northwestern portion of the WSA. Detailed descriptions of the physiography, rock units, structural geology and tectonics, paleontology, and historical geology are found in the G-E-M report on the Antelope/Park Range Resources Area (anonymous, 1983).

Energy and Mineral Resources

Mines in the Morey district, located approximately 10 miles south of the Park Range Resource Area produced mostly silver during the last half of the 1800's. Several prospects lie to the north of the Morey district within the southern Antelope Range, but no prospects were observed within the survey area. A detailed description of mining claims and deposit types, for both metallic and nonmetallic mineral resources, is included in the G-E-M report for this area (anonymous, 1983).

Land Classification For G-E-M Resources Potential

Land classification areas are numbered starting with the number 1 in each category of resources. Metallic mineral land classification areas have the prefix M, e.g., M1-4D. Uranium and thorium areas have the prefix U. Nonmetallic mineral areas have the prefix N. Oil and gas areas have the prefix OG. Geothermal areas have the prefix G. Sodium and potassium areas have the prefix S. The saleable resources are classified under the nonmetallic mineral resource section. Both the Classification Scheme, numbers 1 through 4, and the Level of Confidence Scheme, letters A, B, C, and D, as supplied by the BLM are included in this report (Table 1).

Land classifications have been given to the resource survey area. Where data outside the resource survey area have been used in establishing a classification within a survey area, then at least a part of the surrounding area may also be included for clarification. The land classification maps in this report are at a 1:250,000 scale.

Table 1.--Bureau of Land Management classification scheme and level of confidence scheme.

Classification Scheme

1. The geologic environment and the inferred geologic processes do not indicate favorability for accumulation of mineral resources.
2. The geologic environment and the inferred geologic processes indicate low favorability for accumulation of mineral resources.
3. The geologic environment, the inferred geologic processes, and the reported mineral occurrences indicate moderate favorability for accumulation of mineral resources.
4. The geologic environment, the inferred geologic processes, the reported mineral occurrences, and the known mines or deposits indicate high favorability for accumulation of mineral resources.

Level of Confidence Scheme

A. The available data are either insufficient and/or cannot be considered as direct evidence to support or refute the possible existence of mineral resources within the respective area.

B. The available data provide indirect evidence to support or refute the possible existence of mineral resources.

C. The available data provide direct evidence, but are quantitatively minimal to support or refute the possible existence of mineral resources.

D. The available data provide abundant direct and indirect evidence to support or refute the possible existence of mineral resources.

In connection with nonmetallic mineral classification, it should be noted that in all instances areas mapped as alluvium are classified as having moderate favorability for sand and gravel, with moderate confidence, because alluvium is by definition sand and gravel. All areas mapped as "other rock," if they do not have specific reason for a different classification, are classified as having low favorability, with low confidence, for nonmetallic mineral potential.

A. Locatable Resources

Metallic Minerals

M1-2B. This classification covers the entire resource survey area (figure 3). Almost the entire survey area is covered with Tertiary rocks related to the Williams Ridge caldera complex, but small areas of Paleozoic sedimentary rocks are exposed. Most of the sedimentary rocks are limestones or dolomites which are favorable for the accumulation of base metal sulfide mineral deposits. Numerous faults occur in these rocks, including thrust faults, that can provide suitable structural environments for mineral deposits. The nearby Williams Ridge caldron suggests a large magma body may underlie the area and may have been the source of mineralizing solutions that migrated into the surrounding rocks. The rocks have a high favorability for containing base metal sulfide mineral deposits but no mining or prospects occur in the area. The low level of confidence in this classification stems from the fact that no direct geochemical evidence of mineralization exists within the survey area.

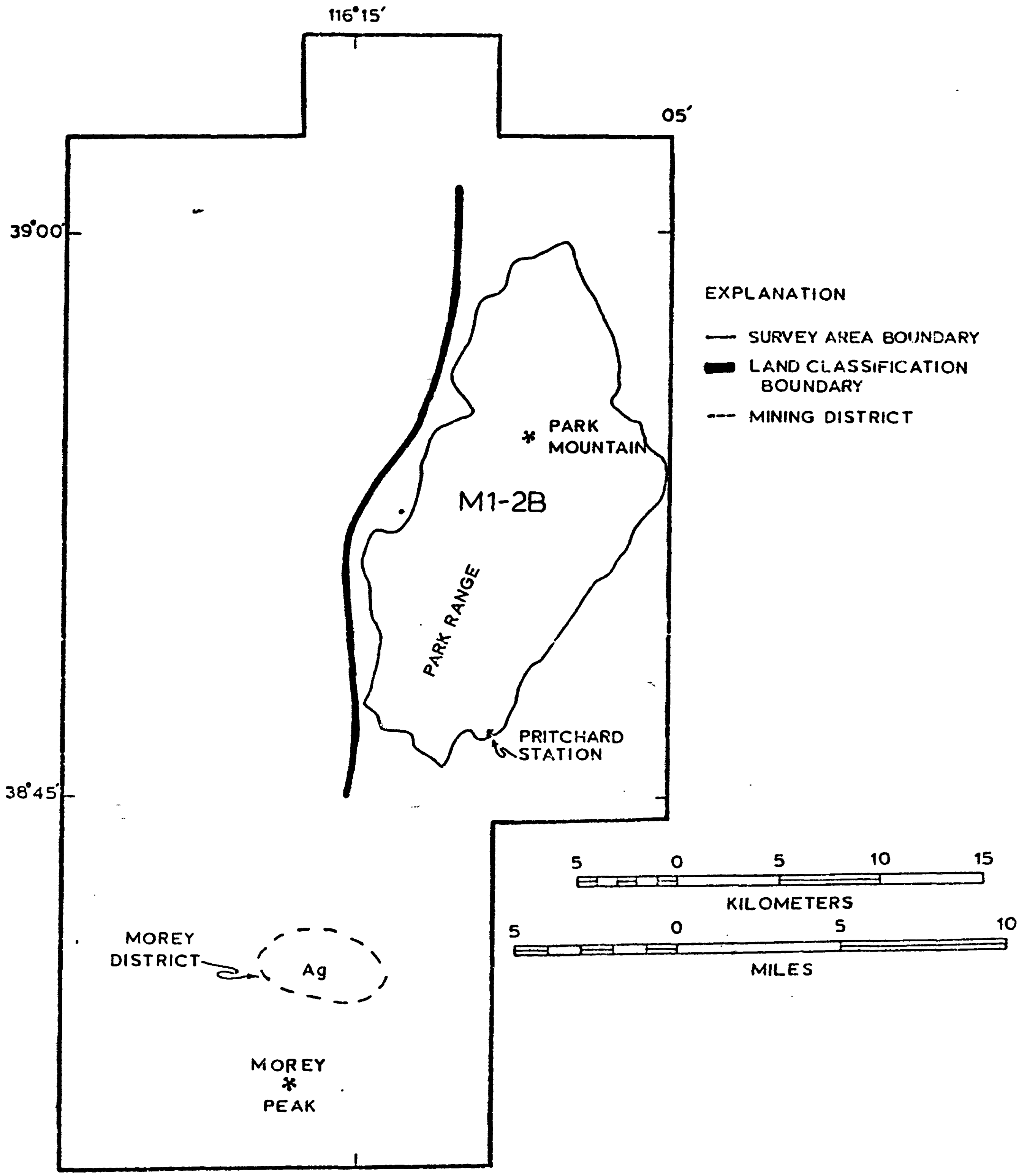

Figure 3.--Land classification for metallic mineral occurrences in the Park Range Resource Survey Area, south-central Nevada.

Uranium and Thorium

U1-2B. This land classification covers most of the resource survey (figure 4). These areas mostly consist of Tertiary welded ash-flow tuffs, with relatively minor amounts of Paleozoic sedimentary rocks exposed in the northern tip of the survey area. The areas have low favorability at a low confidence level for fracture filled uranium deposits in the tuffs and sedimentary rocks. The development of the Hot Creek Valley caldera complex may have produced structural conditions favorable for uranium deposition in fractured tuffs and adjacent Paleozoic sedimentary rocks. One uranium occurrence (Lime Ridge group) has been noted in the ash flow tuffs, indicating that the tuffs may be source rocks for such deposits.

The area has very low favorability for thorium at a very low confidence level due to the lack of known granitic or pegmatitic source rocks.

U2-2B. This land classification covers small areas on the margins of the resource survey area (figure 4). These areas are covered by Quaternary alluvium, and they have low favorability at a low confidence level for epigenetic sandstone-type uranium deposits. Ash-flow tuffs in the mountain ranges are possible sources of uranium, which can be leached by ground water and deposited in chemically reduced areas in the alluvium adjacent to the mountains.

The areas appear to have very low favorability at a very low confidence level for thorium deposits due to the lack of suitable source rocks.

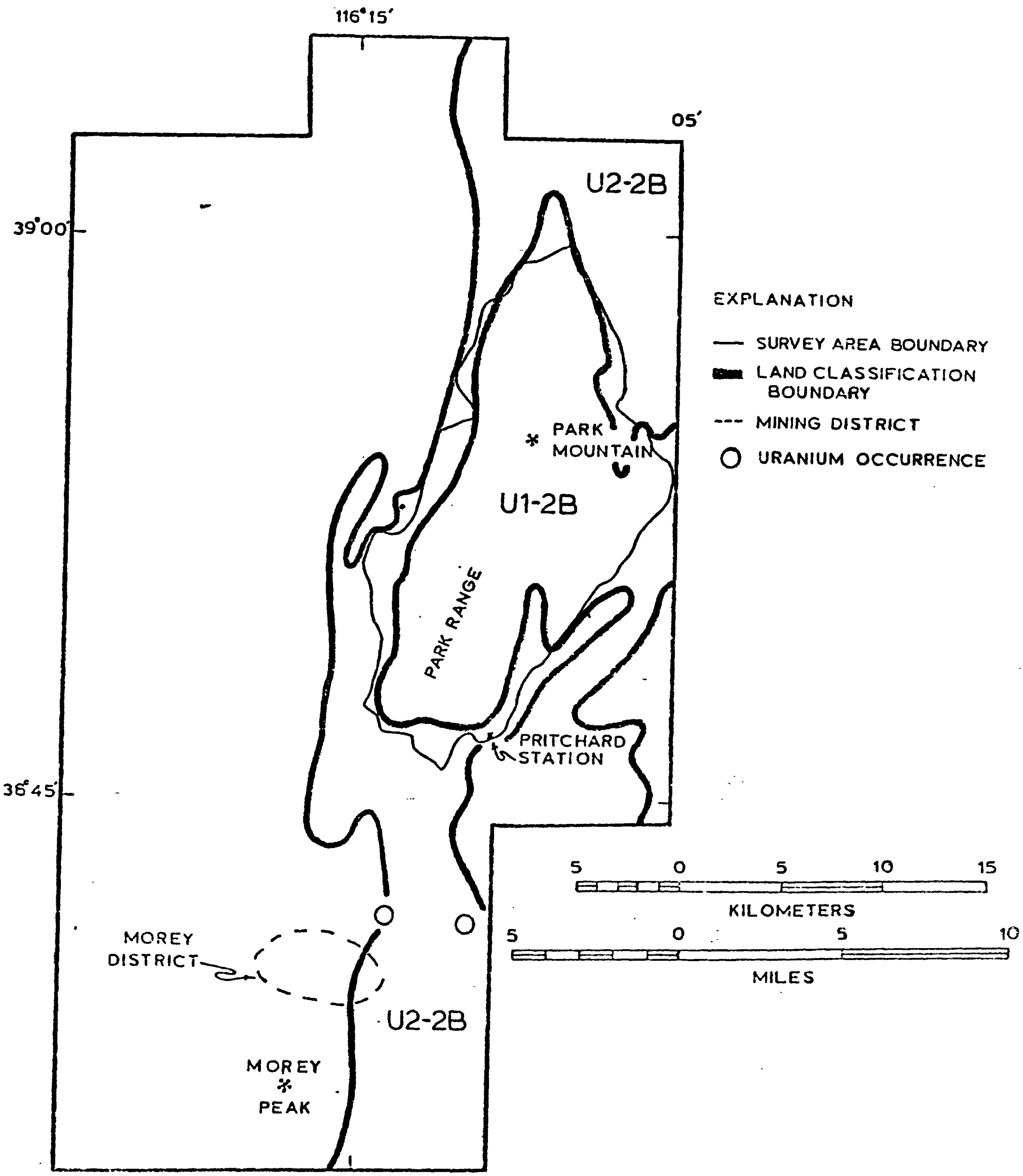

Figure 4.--Land classification for uranium mineral occurrences in the Park Range Resource Area, south-central Nevada.

Nonmetallic Minerals

N1-2B. This classification covers most of the resource survey area (figure 5). Except for a small area of Paleozoic sedimentary rocks the entire survey area is underlain by Tertiary volcanic rocks. No occurrences of exploitable nonmetallic minerals are known, therefore this area has a low favorability and the low level of confidence in the classification.

N2-3C. This classification covers parts of all the edges of the resource survey area (figure 5), where Quaternary alluvium is mapped because alluvium by definition contains sand and gravel. No sand and gravel is known to have been mined here, which is the reason for the only moderately favorable classification. The quality of the sand and gravel at any point is not known, which is the reason for the moderate level of confidence.

B. Leasable Resources

Oil and Gas

OG1-2A. This classification covers the entire resource survey area (figure 6). The survey area is underlain by broad, probably fairly thick, sections of Tertiary volcanic rocks and alluvium, which overlies the volcanic rocks. Extensive faulting is present, especially along the range front areas. Erosion at some of these fault dislocations reveals Mississippian, Pennsylvanian, and Permian strata of the Paleozoic age miogeosyncline, the focal point of the petroliferous province of eastern Nevada. These rocks include oil and gas source and reservoir horizons which are present below the volcanic and alluvium exposures.

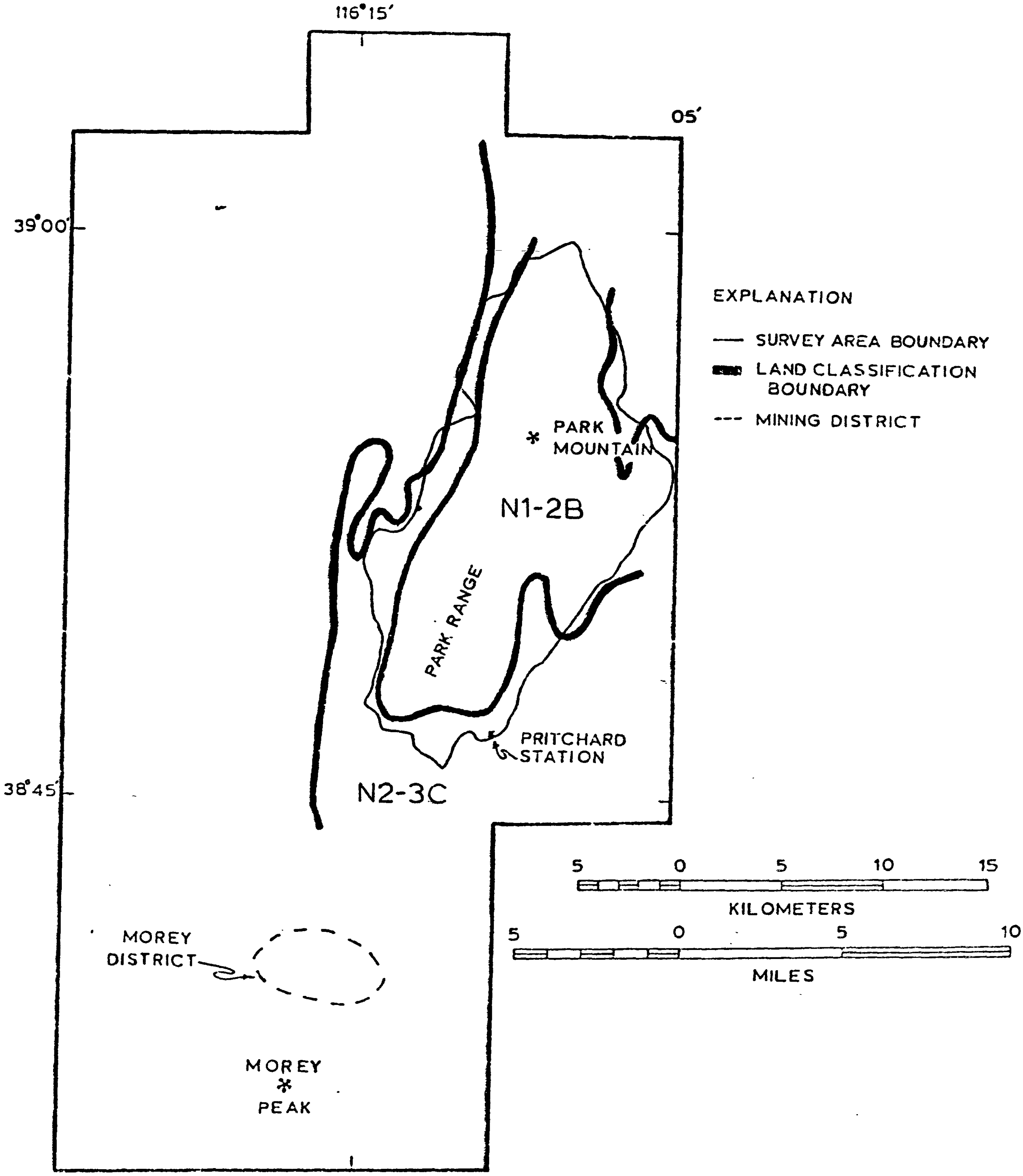

Figure 5.--Land classification for nonmetallic mineral occurrences in the Park Range Resource Survey Area, south-central Nevada.

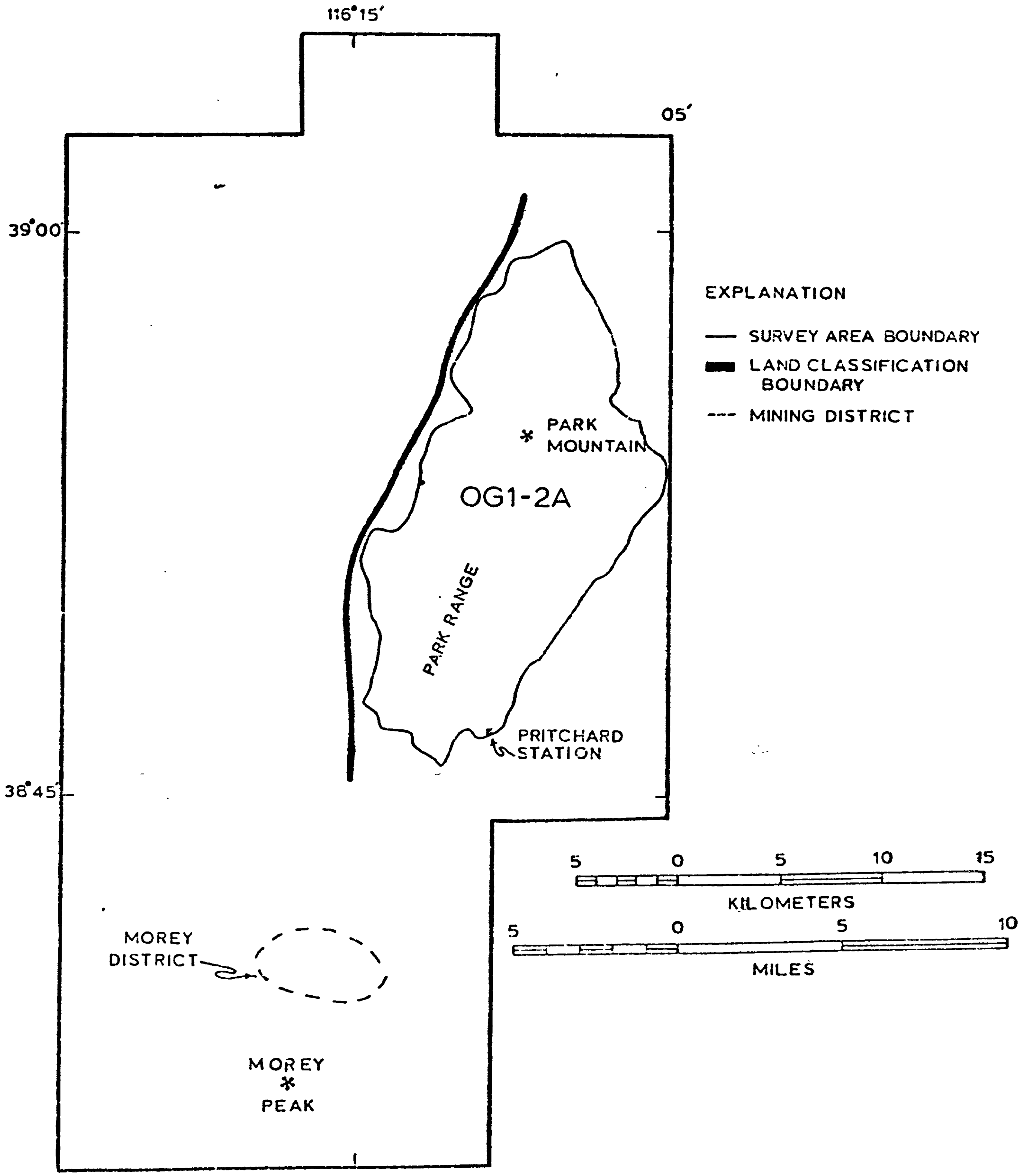

Figure 6.--Land classification for oil and gas leasable resources in the Park Range Resource Survey Area, south-central Nevada.

Geothermal Resources

G1-3A. This classification incorporates those portions of the resource survey area that are known to have regional, deep-seated faulting (figure 7). Thermal occurrences are known to exist in wells and springs outside the survey area on structural strike that would project into the survey area. These structural environments are host to literally hundreds of thermal sites in the Nevada portion of the Basin and Range province.

G2-2A. This classification includes the central portion of the resource survey area. This section of the area has low favorability due to the extensive volcanic rock cover and distance from more favorable fault controlled conduits.

Sodium and Potassium

S1-1D. No known potential exists for sodium and potassium resources, and the survey area has very low favorability with high confidence for sodium and potassium. No map is presented for sodium and potassium classification areas.

C. Saleable Resources

Saleable resources have been considered in connection with nonmetallic mineral resources.

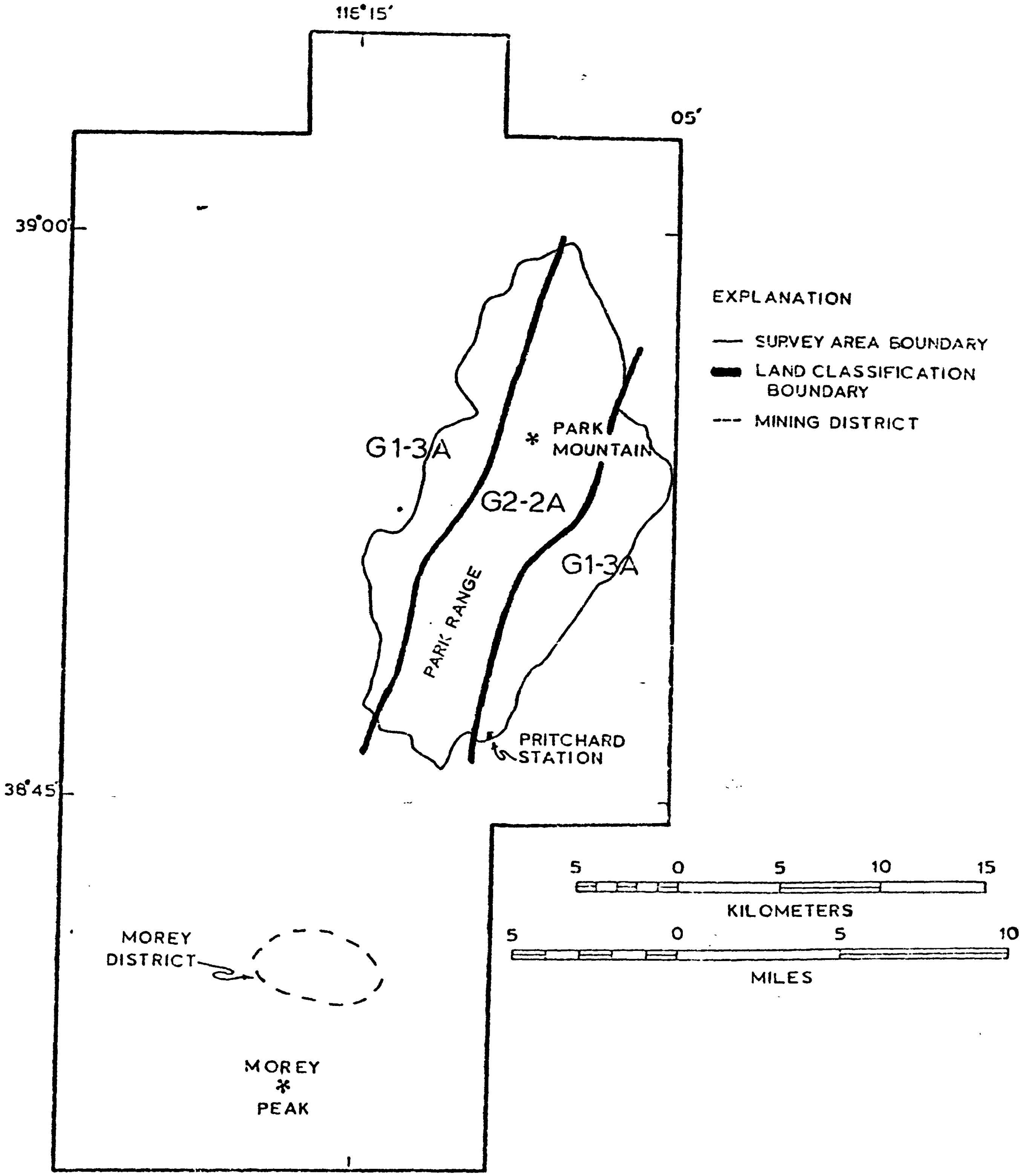

Figure 7.--Land classification for geothermal leasable resources in the Park Range Resource Survey Area, south-central Nevada.

Recommendations for additional work

Within the survey area no geochemical anomalies have been recognized that could be related to metallic resources, and additional stream-sediment sampling would not seem warranted.

Further studies using outcrop samples might include petrographic analysis, trace-element geochemistry, and dating. A comparative mineralogy of the soils and sediments and how they relate to the rocks could be undertaken. These pursuits would be of a purely scientific nature, and would not be expected to raise the level of favorability for resource occurrences.

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Appendix 1.--Analytical results for the minus-80-mesh fraction of the stream-sediment samples from the Park Range Resource Survey Area, south-central Nevada.

Sample	LATITUDE	LONGITUD	Fe %	Mg %	Ca %	Ti %	Mn ppm	B ppm	Ba ppm	Be ppm	Bi ppm	Co ppm	Cr ppm
01SS	38 53 59	116 5 27	3.0	1.0	2.0	.50	700	30	700	1	N	15	50
02SS	38 51 27	116 6 10	3.0	.7	2.0	.70	700	30	700	2	N	10	20
03SS	38 58 48	116 7 42	2.0	.7	2.0	.50	700	30	700	2	<10	10	30
04SS	38 58 54	116 9 6	2.0	1.0	3.0	.50	700	30	1,000	1	N	15	30
03SS	38 58 4	116 9 11	2.0	1.0	2.0	.50	700	20	1,000	2	N	10	30
06BD05	38 58 5	116 9 14	2.0	2.0	3.0	.20	700	20	1,000	1	N	5	15
07SD06	38 58 6	116 9 16	5.0	2.0	5.0	.70	700	20	1,500	1	N	5	50
07ADP	38 58 6	116 9 16	1.0	1.0	2.0	.70	1,000	70	1,500	5	N	5	N
08SS	38 57 45	116 8 23	3.0	.7	2.0	.70	700	30	700	1	<10	10	30
09SS	38 56 33	116 7 45	3.0	1.0	2.0	.70	700	30	700	1	N	10	50
10SS	38 55 55	161 2 20	7.0	1.0	2.0	1.00	700	20	500	1	N	20	100
11SS	38 55 5	116 10 36	2.0	.5	1.0	.70	700	30	700	1	N	5	30
12SS	38 55 3	116 7 48	2.0	.7	1.0	.50	500	50	700	1	N	5	20
13SS	38 46 53	116 10 32	3.0	.7	2.0	.50	500	30	500	1	<10	5	10
14SS	38 48 27	116 9 23	2.0	.5	2.0	.50	700	50	700	2	N	5	20
15SS	38 49 5	116 9 30	7.0	.7	1.0	1.00	1,000	30	1,000	1	<10	15	30
16SS	38 50 33	116 7 50	3.0	.7	1.0	.70	500	30	700	1	N	5	20
17BD16	38 50 21	116 7 54	5.0	.7	2.0	.50	500	30	500	1	N	10	30
18SD17	38 50 21	116 9 56	7.0	.7	2.0	.70	1,000	30	700	1	10	10	20
18ADP	38 50 21	116 9 56	3.0	.7	1.0	.30	1,000	70	700	5	N	10	20
19SS	38 51 27	116 7 45	5.0	1.0	2.0	.70	700	20	1,000	1	<10	10	50
20SS	38 47 53	116 13 53	2.0	.5	2.0	.50	700	30	1,000	2	<10	5	15
21SS	38 48 50	116 13 42	10.0	.3	2.0	1.00	1,000	30	700	1	<10	10	30
22SS	38 49 51	116 13 49	2.0	.2	1.0	.50	500	20	300	1	N	5	10
23SS	38 50 41	116 13 21	5.0	.7	2.0	.70	700	30	700	2	N	10	15
24SS	38 51 21	116 13 15	2.0	.5	2.0	.70	700	20	700	1	<10	5	20
25SS	38 51 58	116 12 49	5.0	1.0	2.0	.70	700	30	700	2	N	10	50
26SS	38 47 27	116 11 55	5.0	.5	2.0	.70	700	20	1,000	1	N	5	20
27SS	38 47 25	116 13 0	3.0	.5	2.0	.50	500	20	1,000	1	N	5	15
28SS	38 49 9	116 12 24	3.0	.7	2.0	.70	700	20	700	1	N	5	10
29SS	38 49 58	116 11 27	5.0	.5	2.0	1.00	700	30	700	1	10	10	20
30SS	38 49 33	116 10 10	2.0	.5	1.0	.50	500	30	500	1	N	5	20
31BD30	38 49 30	116 10 9	2.0	.5	2.0	.70	700	20	700	1	<10	5	20
32SD31	38 49 28	116 10 11	5.0	.5	2.0	.70	700	20	1,000	1	<10	5	20
32ADP	38 49 28	116 10 11	3.0	.5	1.0	.30	500	70	700	5	N	7	10
33SS	38 50 30	116 9 7	7.0	.7	2.0	1.00	500	10	700	1	N	15	30
34SS	38 51 51	116 9 35	2.0	.3	1.0	.20	700	30	500	3	N	7	N
35SS	38 51 9	116 10 39	5.0	.5	2.0	1.00	700	<10	500	1	<10	10	20
36BD35	38 51 4	116 10 40	7.0	.7	2.0	1.00	1,000	20	1,000	1	N	5	20
37SD36	38 51 6	116 10 40	7.0	.5	2.0	.70	700	15	1,500	1	N	5	15
37ADP	38 51 6	116 10 40	2.0	.5	2.0	.20	500	50	700	5	N	5	N
38SS	38 53 24	116 11 15	2.0	.7	2.0	.50	700	30	500	2	<10	10	30
39SS	38 52 54	116 9 23	10.0	.3	2.0	1.00	1,000	30	700	1	<10	20	50
40SS	38 52 47	116 7 58	7.0	1.0	2.0	1.00	500	30	1,000	1	N	15	20
41SS	38 54 7	116 7 6	5.0	.5	2.0	1.00	700	20	700	1	<10	10	50

Appendix 1.--Analytical results for the minus-80-mesh fraction of the stream-sediment samples from the Park Range Resource Survey Area, south-central Nevada.--continued

Sample	Cu ppm	La ppm	Ni ppm	Pb ppm	Sc ppm	Sr ppm	V ppm	Y ppm	Zr ppm
01SS	50	50	20	50	5	200	100	20	500
02SS	100	50	10	30	5	500	100	20	200
03SS	150	70	10	70	5	500	100	15	200
04SS	100	50	20	70	5	200	70	20	200
03SS	70	50	15	30	5	500	70	20	200
06BD05	70	50	5	30	7	500	50	30	300
07SD06	50	20	5	50	7	500	50	20	500
07ADP	5	150	20	20	5	500	30	20	300
08SS	100	50	10	50	5	200	100	20	500
09SS	100	30	10	50	7	300	100	20	200
10SS	50	200	15	30	10	300	200	20	500
11SS	100	20	5	50	7	500	70	20	200
12SS	100	20	5	70	7	500	70	20	300
13SS	150	150	5	70	5	200	70	15	300
14SS	70	70	10	50	5	500	70	15	300
15SS	100	1,000	10	70	10	500	200	50	1,000
16SS	70	20	10	50	7	300	70	15	300
17BD16	50	50	5	30	5	200	100	20	500
18SD17	150	100	5	50	7	200	200	20	500
18ADP	10	300	15	20	10	700	100	50	500
19SS	150	20	5	70	10	500	100	20	500
20SS	150	20	10	70	7	500	50	20	300
21SS	100	1,000	5	50	5	300	300	30	300
22SS	70	20	10	50	5	200	50	10	500
23SS	100	70	5	70	5	500	100	20	500
24SS	150	20	10	50	5	300	70	15	300
25SS	100	20	10	70	5	300	100	30	500
26SS	100	300	5	50	7	500	100	20	300
27SS	70	200	10	50	5	500	50	15	70
28SS	100	20	5	30	5	500	50	15	200
29SS	150	150	10	50	5	500	150	30	200
30SS	70	20	5	30	5	200	70	15	200
31BD30	100	500	10	50	7	300	70	30	500
32SD31	150	20	5	50	7	500	100	20	200
32ADP	10	150	70	50	7	700	70	20	20
33SS	150	500	10	50	5	500	200	20	100
34SS	5	100	5	20	7	700	50	20	150
35SS	100	1,000	5	30	7	300	200	20	500
36BD35	100	50	5	50	5	300	200	20	700
37SD36	70	20	5	20	10	500	100	20	300
37ADP	5	150	7	20	7	1,000	50	20	200
38SS	100	70	10	70	5	200	50	10	100
39SS	150	700	10	70	10	300	500	30	1,000
40SS	100	200	10	30	10	500	200	30	1,000
41SS	150	20	5	70	10	500	200	30	1,000

Appendix 1.--Analytical results for the minus-80-mesh fraction of the stream-sediment samples from the Park Range Resource Survey Area, south-central Nevada.--continued

Sample	LATITUDE	LONGITUD	Fe %	Mg %	Ca %	Ti %	Mn ppm	B ppm	Ba ppm	Be ppm	Bi ppm	Co ppm	Cr ppm
42SS	38 53 4	116 5 52	3.0	.7	2.0	.70	700	30	1,000	2	N	10	30
43BD42	38 53 5	116 5 47	5.0	1.0	2.0	.70	700	30	700	1	N	10	50
44SD43	38 53 7	116 5 51	5.0	1.0	2.0	1.00	700	20	1,000	1	N	10	50
44ADP	38 53 7	116 5 51	3.0	.7	2.0	.30	1,000	100	700	5	N	15	30
45SS	38 53 13	116 5 5	5.0	1.0	2.0	.70	700	30	700	1	N	20	50
46SS	38 54 19	116 6 31	3.0	.5	1.0	.70	700	30	500	1	15	5	15
47SS	38 55 3	116 6 31	7.0	1.0	3.0	1.00	700	20	700	1	N	20	100
48SS	38 54 33	116 10 52	1.0	.3	1.0	.30	1,000	70	700	3	N	7	30
49SS	38 53 49	116 10 12	1.0	.3	.7	.15	700	50	500	3	N	5	N
50SS	38 55 18	116 8 57	1.0	.2	.5	.10	700	70	300	3	N	N	N
51BD50	38 55 21	116 8 58	1.0	.3	1.0	.15	1,000	50	500	5	N	5	N
52SD51	38 55 22	116 9 1	2.0	.3	1.0	.15	1,000	70	700	5	N	5	N
52ADP	38 55 22	116 9 1	2.0	.5	2.0	.30	1,000	100	700	7	N	10	N
53SS	38 55 18	116 8 25	1.0	.3	1.0	.15	1,000	50	500	3	N	5	20
54SS	38 56 27	116 10 14	1.0	1.0	1.0	.30	1,000	50	700	3	N	10	100
55SS	38 52 43	116 12 14	2.0	.5	1.0	.20	1,000	50	700	3	N	15	70
56SS	38 48 8	116 10 56	1.0	.2	.7	.15	700	70	500	5	N	5	N
57SS	38 52 28	116 6 46	2.0	.5	1.0	.20	1,000	30	700	3	N	5	N
58SS	38 56 18	116 7 10	.7	.3	.7	.10	700	50	500	3	N	5	20

Appendix 1.--Analytical results for the minus-80-mesh fraction of the stream-sediment samples from the Park Range Resource Survey Area, south-central Nevada.--continued

Sample	Cu ppm	La ppm	Ni ppm	Pb ppm	Sc ppm	Sr ppm	V ppm	Y ppm	Zr ppm
42SS	100	50	15	70	5	500	70	20	200
43BD42	100	70	15	50	5	300	100	20	200
44SD43	70	200	10	30	10	500	150	30	500
44ADP	20	1,000	30	50	10	700	100	50	300
45SS	100	20	15	50	5	200	100	20	200
46SS	150	150	5	70	5	200	70	15	500
47SS	150	50	10	30	10	500	200	20	500
48SS	10	150	5	30	7	500	100	20	100
49SS	<5	50	5	20	5	500	30	10	150
50SS	<5	20	5	30	5	300	50	20	70
51BD50	7	20	5	30	5	500	50	20	100
52SD51	15	70	5	50	7	500	70	20	150
52ADP	20	300	30	50	7	700	70	30	200
53SS	7	20	5	20	5	700	50	10	100
54SS	10	100	10	30	15	500	100	20	150
55SS	7	150	10	20	10	500	100	20	200
56SS	10	20	5	30	5	500	70	20	150
57SS	5	150	5	20	10	700	100	20	150
58SS	<5	20	5	20	5	500	30	10	150

Appendix 2.--Analytical results for the nonmagnetic fraction of the panned concentrate samples from the Park Range Resource Survey Area, south-central Nevada.

Sample	LATITUDE	LONGITUD	Fe %	Mg %	Ca %	Ti %	Mn ppm	B ppm	Ba ppm	Be ppm	Cr ppm	Cu ppm	La ppm
01	38 53 59	116 5 27	2.0	2.00	2.0	.50	500	<20	300	N	200	<10	150
02	38 51 27	116 6 10	1.0	.50	2.0	.20	150	<20	700	N	N	<10	200
04	38 58 54	116 9 6	.1	.05	.5	.02	<20	<20	>10,000	N	N	N	N
06BD05	38 58 5	116 9 14	1.0	1.00	2.0	.05	100	<20	10,000	N	N	<10	N
07SD06	38 58 6	116 9 16	2.0	2.00	5.0	.50	200	<20	>10,000	N	70	<10	150
07ADP	38 58 6	116 9 16	5.0	1.50	10.0	.70	700	50	>10,000	5	70	15	500
08	38 57 45	116 8 23	.5	.20	.5	.07	50	<20	300	N	N	N	150
09	38 56 33	116 7 45	5.0	.50	1.0	1.00	700	<20	500	N	N	<10	N
10	38 55 55	161 2 20	1.0	.20	2.0	.05	100	<20	700	N	N	<10	100
11	38 55 5	116 10 36	2.0	2.00	1.5	.50	700	<20	2,000	N	300	<10	500
12	38 55 3	116 7 48	.7	.20	1.0	.10	50	<20	300	N	N	N	200
13	38 46 53	116 10 32	.5	.10	5.0	.20	100	<20	700	N	N	N	200
14	38 48 27	116 9 23	1.0	.20	1.0	.20	100	<20	500	N	N	N	N
16	38 50 33	116 7 50	1.5	.20	2.0	.10	200	<20	700	N	N	20	100
17BD16	38 50 21	116 7 54	2.0	.50	2.0	1.00	500	<20	500	N	N	<10	500
18SD17	38 50 21	116 9 56	.5	.20	2.0	.10	100	<20	2,000	N	N	N	300
18ADP	38 50 21	116 9 56	1.0	.20	2.0	.50	500	50	3,000	7	N	10	1,000
19	38 51 27	116 7 45	.5	.10	1.0	.05	50	<20	700	N	N	N	150
20	38 47 53	116 13 53	1.0	.20	.5	.10	100	<20	2,000	N	N	20	500
21	38 48 50	116 13 42	.2	.10	1.0	.10	200	<20	700	5	N	10	150
22	38 49 51	116 13 49	.5	.20	2.0	.50	200	<20	700	2	N	20	N
23	38 50 41	116 13 21	.5	.50	2.0	.50	200	<20	700	5	N	10	N
24	38 51 21	116 13 15	.5	.15	1.5	.30	150	<20	1,000	2	N	30	100
25	38 51 58	116 12 49	.5	.20	2.0	.20	200	20	700	2	70	<10	N
26	38 47 27	116 11 55	.5	.10	2.0	.20	200	20	1,000	2	N	30	N
27	38 47 25	116 13 0	.2	.05	1.0	.10	100	<20	1,000	2	N	<10	N
28	38 49 9	116 12 24	.7	.20	5.0	.07	200	<20	1,000	5	N	30	N
29	38 49 58	116 11 27	.5	.20	2.0	.10	100	20	1,000	2	N	20	N
30	38 49 33	116 10 10	.7	.20	2.0	.15	200	<20	700	5	N	<10	N
31BD30	38 49 30	116 10 9	.7	.10	1.0	.50	200	<20	700	5	N	30	200
32SD31	38 49 28	116 10 11	1.0	.50	2.0	.70	300	<20	700	5	N	<10	1,000
32ADP	38 49 28	116 10 11	.5	.20	1.0	.50	500	50	500	7	N	10	1,500
33	38 50 30	116 9 7	.2	.10	2.0	.20	100	<20	700	5	N	10	N
34	38 51 51	116 9 35	.5	.20	5.0	.20	200	<20	700	5	100	20	500
35	38 51 9	116 10 39	.5	.10	2.0	.10	100	<20	700	2	N	30	N
36BD35	38 51 4	116 10 40	.2	.10	2.0	.05	200	<20	1,000	5	N	<10	N
37SD36	38 51 6	116 10 40	.5	.10	2.0	.10	200	<20	1,000	5	N	<10	N
37ADP	38 51 6	116 10 40	.2	.10	1.0	.10	150	50	700	7	N	10	N
38	38 53 24	116 11 15	.5	.50	2.0	.50	200	20	700	5	100	15	N
39	38 52 54	116 9 23	.2	.10	2.0	.20	200	<20	700	5	N	30	500
40	38 52 47	116 7 58	.7	.30	2.0	.20	200	20	1,000	5	N	20	N
41	38 54 7	116 7 6	.5	.50	2.0	.20	200	<20	700	2	100	20	N
42	38 53 4	116 5 52	1.0	1.00	2.0	.20	300	<20	700	2	N	<10	150
43BD42	38 53 5	116 5 47	2.0	1.00	2.0	.20	300	<20	1,000	2	150	30	N
44SD43	38 53 7	116 5 51	1.0	.20	2.0	.50	200	<20	1,000	2	N	10	N

Appendix 2.--Analytical results for the nonmagnetic fraction of the panned concentrate samples from the Park Range Resource Survey Area, south-central Nevada.--continued

Sample	Ni ppm	Pb ppm	Sc ppm	Sr ppm	V ppm	Y ppm
01	100	200	30	500	70	200
02	10	20	30	500	30	150
04	10	N	30	700	<20	70
06BD05	10	N	10	200	<20	30
07SD06	50	50	30	500	50	200
07ADP	10	20	20	1,000	100	200
08	30	N	15	N	20	70
09	70	N	30	200	150	200
10	10	20	30	700	20	70
11	100	50	30	200	70	150
12	100	N	30	200	20	150
13	30	N	30	500	<20	150
14	10	N	30	200	20	100
16	30	20	30	700	50	70
17BD16	70	N	70	200	70	300
18SD17	100	N	30	500	20	150
18ADP	10	N	10	1,500	50	200
19	50	N	30	500	20	100
20	30	20	30	200	20	150
21	10	20	30	200	50	300
22	10	20	10	700	50	150
23	10	20	50	700	50	500
24	10	20	10	500	20	150
25	10	20	10	700	30	150
26	10	20	10	500	20	70
27	10	20	10	700	20	70
28	10	30	10	700	30	20
29	10	50	10	700	20	70
30	10	30	10	700	20	100
31BD30	10	20	10	700	50	300
32SD31	10	50	50	700	70	500
32ADP	10	N	10	500	50	200
33	10	70	10	700	50	200
34	10	20	10	1,000	50	70
35	10	20	10	700	20	100
36BD35	10	20	10	700	20	100
37SD36	10	20	10	700	20	200
37ADP	10	N	10	1,000	20	150
38	10	300	50	200	50	150
39	10	20	70	700	50	500
40	10	20	10	700	50	200
41	10	20	10	700	50	200
42	10	20	10	700	50	100
43BD42	10	20	10	500	150	70
44SD43	10	30	10	700	50	100

Appendix 2.--Analytical results for the nonmagnetic fraction of the panned concentrate samples from the Park Range Resource Survey Area, south-central Nevada.--continued

Sample	LATITUDE	LONGITUD	Fe %	Mg %	Ca %	Ti %	Mn ppm	B ppm	Ba ppm	Be ppm	Cr ppm	Cu ppm	La ppm
44ACP	38 53 7	116 5 51	.5	.20	1.0	.50	150	50	700	2	30	10	N
45	38 53 13	116 5 5	.2	.10	1.5	.10	300	<20	1,000	2	N	30	N
46	38 54 19	116 6 31	.5	.20	1.0	1.00	300	<20	700	5	N	<10	500
47	38 55 3	116 6 31	.5	.20	7.0	.10	200	<20	1,500	5	70	15	N
48	38 54 33	116 10 52	1.0	.50	5.0	1.00	300	20	700	2	N	20	150
51	38 55 21	116 8 58	1.0	.50	2.0	.20	200	20	700	5	N	10	150
53	38 55 18	116 8 25	1.0	5.00	10.0	.50	300	20	700	2	N	10	50
57	38 52 28	116 6 46	.7	5.00	10.0	1.00	300	20	1,000	2	N	10	100

Appendix 2.--Analytical results for the nonmagnetic fraction of the panned concentrate samples from the Park Range Resource Survey Area, south-central Nevada.--continued

Sample	Ni ppm	Pb ppm	Sc ppm	Sr ppm	V ppm	Y ppm
44ADP	70	N	10	700	70	100
45	10	20	10	700	30	70
46	10	20	70	500	100	700
47	10	20	10	700	20	100
48	10	20	70	700	70	700
51	10	30	20	700	20	200
53	10	50	10	700	50	150
57	10	70	70	500	50	700