DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY

OPEN FILE REPORT
80-1055
PLATE 1

DISCUSSION OF THE GEOLOGY AND MINERAL RESOURCES

Geology

The Red Rocks Escarpment Instant Study area in Clark County, Nevada, is 20 miles west of Las Vegas and covers about 48 square miles (31,000 acres) of the rugged Sandstone Bluffs area in the Spring Mountains. It includes the crest of the range, which is slightly higher than 7,200 feet, the Sandstone Bluffs east of the crest where steep cliffs as high as 2,500 feet are common, and part of the gently sloping western range front. The Instant Study area is within land administered by the U.S. Bureau of Land Management.

The structural geology of the study area is dominated by the north-south trending Cretaceous and Tertiary(?) Keystone thrust, a low-angle fault along which lower Paleozoic carbonate rocks overlie Mesozoic clastic rocks. This thrust is one of the lowest and most southern of a series of thrusts of similar age within the Sevier thrust belt. The Keystone thrust is spectacularly exposed in steep cliffs east of the crest of the Spring Mountains where dark-colored resistant upper-plate carbonate rocks in the highest peaks form a sharp contrast with the more easily eroded light-colored lower-plate rocks. The thrust fault is a well-defined, curved surface dipping moderately at deeper levels and nearly flat lying at high levels. Although the fault cuts bedding of the Aztec Sandstone in lower-plate rocks where it dips moderately, it is parallel to bedding at other localities. The Upper and Middle Cambrian Bonanza King Formation is at the sole of the thrust in the upper plate and dips parallel to it.

The stratigraphy of the study area includes Cambrian through Permian marine carbonate rocks, Permian nonmarine clastic and gypsiferous rocks, Triassic rocks, Triassic(?) and Jurassic eolian sandstone, Tertiary(?) nonmarine limestone, and Quaternary surficial deposits. Paleozoic rocks are exposed in the upper plate of the Keystone thrust in the western half of the area; a nearly complete Paleozoic section, in which only Silurian rocks are missing, was apparently deposited in the Cordilleran miogeocline near the eastern margin of thick sedimentation (Stewart and Poole, 1974). Mesozoic rocks occur in the eastern half of the area beneath the Keystone thrust. Tertiary(?) nonmarine limestone rests unconformably on the Mesozoic beds in the southeast part of the area.

Many circular features ranging from 10 feet to 70 feet in diameter occur within the western part of the Instant Study area. These features, which are developed on the Paleozoic carbonate rocks and Quaternary surficial deposits derived from those rocks, have a central crater as much as 15 feet in diameter surrounded by a mound as much as 1.5 feet high of white pulverized carbonate and powdery black carbon. The central craters, which are as deep as 3 feet below ground level, contain angular fragments of black carbonized and fractured carbonate ranging from 1/4 inch to 8 inches in diameter. Sample WX was taken from two such features and is located on the sample locality map. These samples contained no detectable metal values, and no evidence of anomalous radioactivity above the normal background of 10 counts per second was observed using a scintillometer. The abundance of carbon at each feature suggests possibly explosive impact of a firefall or similar type meteor impact of a carbonaceous chondrite.

Mineral Potential

Claim location descriptions in the courthouse records were vague, and those shown on the sample locality map are only approximate. No claim posts, monuments, or major workings were found while traversing the study area, although several sites described in the records were sampled and are located on the sample locality map.

The Silverhorn site is a 1-foot by 2-inch iron-oxide zone in gray limestone. No economic mineral potential or resource is apparent from the analyses of this sample.

Anticipation and K.C. claims are along intermittent stream beds where gravel samples were taken to test for placer values. The K.C. claim is in the southwestern part of the study area while the Anticipation claim is at the junction of two drainages in the southeastern part of the area. No claim corners were found in either area, and no evidence of placer mining was noted. Samples contained no detectable gold or silver.

County records indicate that approximately 30 claims have been located within the study area, but none are currently being held. The only known mining activity took place about 1963. Fifty to sixty metric tons of thin-bedded sandstone were quarried as flagstone and used for decorative purposes (Nephi Hancock, oral commun., 1979). The site of this operation was not found during this study.

Hydrocarbon and geothermal resources are not known within or near the Instant Study area, although no exploratory drilling for either resource has been conducted within the Instant Study boundary to our knowledge. One dry hole was drilled in bedrock about 10 miles west of the study area, and several dry holes have been drilled in Las Vegas Valley to the east (Schilling and Garside, 1968). Also, there are no known seeps within the study area. Although hydrocarbons have been extracted from the Railroad Valley oil field 180 miles due north of the study area (Schilling and Garside, 1968), this field is within basin valley fill in a structural and stratigraphic setting very unlike that of the Red Rocks area. The absence of hot springs and intrusive igneous rocks indicates the lack of geothermal resources in the Red Rocks area.

Two important mining areas are located near the Red Rocks Escarpment Instant Study area. These are the Goodsprings mining district and the Blue Diamond mine. The Goodsprings district is about 12 miles south of the southern border of the study area and occurs in the same age rocks and a similar structural setting. A major difference between the two areas is the abundance of Tertiary igneous rocks at Goodsprings. No igneous rocks occur in the Instant Study area. It is thought (Hewett, 1931) that the igneous rocks at Goodsprings played an important role in the development of the orebodies there. Zinc, copper, lead, cobalt, vanadium, gold, nickel, silver, and uranium have been produced from the Goodsprings district since 1907 (Hewett, 1931). The Blue Diamond mine, the other important mining area, 5 miles to the east of the study area, produces gypsum from a member of the Kaibab Limestone (Longwell and others, 1965), which does not crop out within the Instant Study area boundary.

Geochemical samples were obtained from the Red Rocks Escarpment Instant Study area by sampling recent alluvium in channels, streams, and canyon bottoms at roughly 1 mile intervals. Alluvium, not bedrock, was sampled because weathering, erosion, and depositional processes tend to concentrate heavy metals in stream bottoms. Sampling alluvium in streams is the most efficient means of obtaining geochemical data on the heavy minerals present in bedrock at the headwater of the stream. Care was taken to get an even distribution and to insure that all of the drainage areas were covered. The alluvium was sieved through a 10-mesh screen in the field. Five samples were taken from the gouge zone of the Keystone thrust to determine whether or not ore-forming solutions may have migrated along the thrust from the Goodsprings district. All samples were analyzed using semiquantitative spectrographic and atomic-absorption techniques. A Geo-Metrics model GR-101A scintillometer[1] was carried in the field to test for anomalously high uranium concentrations.

The results of the sampling of alluvial material suggest that there are no significant concentrations of economically valuable minerals within the Red Rocks Escarpment Instant Study area. Zinc, gold, and silver were not detected in any of the samples using semiquantitative spectrographic techniques (table 1). Lead, copper, nickel, vanadium, and molybdenum were all detected in some samples using the semiquantitative spectrographic technique, but no high values were found. Lead and nickel were detected in less than half of the samples at values of 30 parts per million or less of lead (0.003 percent) and 15 parts per million or less of nickel (0.0015 percent). Although detected in a majority of the samples, copper is observed at concentrations of 20 parts per million or less (0.002 percent). Vanadium appears in nearly all of the samples at concentrations of 70 parts per million or less (0.007 percent), and molybdenum was detected in only three samples at 15 parts per million or less (0.0015 percent).

Atomic-absorption analyses (table 3) are also very low for all elements analyzed, but they give a good indication of the actual concentration of the elements tested for. Gold was not detected or was below the determination limit of 0.05 parts per million in nearly all of the samples of alluvium. Only one sample (R1 180-38) had a measurable concentration of gold at 0.30 parts per million. Copper, lead, and zinc were all detected in most of the samples, but concentrations of these elements do not vary much and are no higher than 15 parts per million of copper and lead and 40 parts per million of zinc. Scintillometer readings rarely were more than the background of about 10 counts per second, and no reading was higher than 150 counts per second. These values are low compared to known uranium occurrences.

Samples of fault gouge from the Keystone thrust include only one anomalous sample. Semiquantitative spectrographic analysis of that sample (R1 160-24d) indicates high values of 500, 200, 100, and 30 parts per million for copper, nickel, lead, and molybdenum, respectively. Atomic absorption shows that this sample is high in copper relative to the other samples, but copper is still less than 0.1 percent. The anomalous sample is a dark-colored, iron-stained concretion common to high structural levels of the thrust fault gouge and in lower stratigraphic levels of the Bonanza King above the thrust. The concretions rarely exceed a few inches in diameter. Because these concretions are small, widely dispersed, nearly inaccessible, and not widespread, they probably do not constitute an economic deposit. However, if the validity of the sampling is accepted, the Goodsprings district was sampled in a similar manner. Samples taken downstream from mines and claims were significantly higher in zinc, copper, and lead (at least one order of magnitude higher) and somewhat higher in vanadium and nickel than upstream samples or samples from the study area. Gold and silver were not detected.

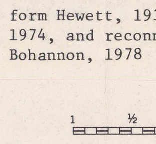
Geologic and geochemical evidence indicate there are no mineral deposits in the Red Rocks Escarpment Instant Study area that are of any economic importance. Intrusive igneous rocks like those responsible for the metallic mineral deposits in the Goodsprings mining district are absent. This makes it extremely unlikely that similar deposits will be found in the study area. Geochemistry suggests that abundant and concentrated ore-forming solutions did not migrate along the Keystone thrust from the Goodsprings district into the Instant Study area. The gypsum bed, mined at Blue Diamond mine and east of the study area, projects under the area at a depth of about 1,000 feet and could not be mined from within the Instant Study area boundary. Gypsum is common and easily accessible at many nearby localities and need not be considered a resource of the study area. Likewise, other commodities such as silica sand, cement rock, and sand and gravel should not be considered important commodities of the study area due to their abundance and accessibility elsewhere.

[1] The use of a brand name is for descriptive purposes only and does not necessarily constitute endorsement by the U.S. Geological Survey.

Base from U.S. Geological Survey, Blue Diamond, Nev., 1952; Goodsprings, Nev., 1960; Mountain Springs, Nev., 1957; and Shenandoah Peak, Nev.-Calif., 1956, 1:62,500

Geology form Hewett, 1931, Burchfiel and others, 1974, and reconnaissance mapping by R.G. Bohannon, 1978

GEOLOGIC MAP



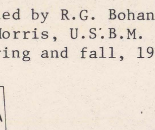
SCALE 1:62 500

CONTOUR INTERVAL 80 FEET
DATUM IS MEAN SEA LEVEL

Base from U.S. Geological Survey, Blue Diamond, Nev., 1952; Goodsprings, Nev., 1960; Mountain Springs, Nev., 1957; and Shenandoah Peak, Nev.-Calif., 1956, 1:62,500

Compiled by R.G. Bohannon, U.S.G.S. and R.W. Morris, U.S.B.M. in 1979. Sampled in spring and fall, 1978 and spring, 1979

SAMPLE LOCALITY MAP



CORRELATION OF MAP UNITS

Map unit	Epoch	Period
Qal	Holocene	QUATERNARY
Qoa	Pleistocene(?)	QUATERNARY
Qt	Pleistocene(?)	QUATERNARY
UNCONFORMITY		
Tl		TERTIARY(?)
UNCONFORMITY		
JŦa		JURASSIC AND TRIASSIC(?)
Ŧkm	Upper Triassic(?)	TRIASSIC(?)
Ŧcp	Upper Triassic	TRIASSIC
Ŧcs	Upper Triassic	TRIASSIC
Ŧmr	Middle(?) Triassic	TRIASSIC
Ŧmv	Lower Triassic	TRIASSIC
Ŧml	Lower Triassic	TRIASSIC
UNCONFORMITY		
Pkt	Lower Permian	PERMIAN
Pr	Lower Permian	PERMIAN
PPb	Lower Permian	PERMIAN, PENNSYLVANIAN
Mm		MISSISSIPPIAN
Ds		DEVONIAN
UNCONFORMITY		
O-Ꞓu	Lower Ordovician	ORDOVICIAN
Ꞓbk	Upper and Middle Cambrian	CAMBRIAN

DESCRIPTION OF MAP UNITS

Qal ALLUVIUM (HOLOCENE)--Loosely compacted, poorly sorted, poorly stratified sand, silt, and gravel; mapped only in large active wash channels where differentiable from older alluvial deposits. Sampled for chemical analysis in most cases although at many localities the sampled deposit is not mappable at this scale

Qoa OLDER ALLUVIUM (PLEISTOCENE?)--Loosely compacted, poorly sorted, poorly stratified sand, silt, and gravel; in widespread, thin deposits dissected by active streams; includes thick colluvial deposits, small alluvial fans, and deposits in minor wash channels

Qt TERRACE DEPOSITS (PLEISTOCENE?)--Compacted, poorly stratified, poorly sorted sandy and silty gravel, and conglomerate dissected by recent drainages

Tl LIMESTONE (TERTIARY?)--Resistant, gray, unbedded to poorly bedded, nonmarine limestone; possibly a tufa deposit; occurs in and adjacent to southeast part of wilderness area where it rests on Moenkopi Formation. Thickness as great as 200 feet

JŦa AZTEC SANDSTONE (JURASSIC AND TRIASSIC?)--Red, pink, and buff, moderately indurated, well-sorted, quartz arenite with well-rounded, grain-supported grains; cement is hematite(?) with calcite. Planar crossbeds as large as 10 feet thick are common. Forms cliffs. Thickness about 2,100 feet

Ŧkm ROCKS EQUIVALENT TO THE KAYENTA AND MOENAVE FORMATIONS (UPPER TRIASSIC?)--Brick-red moderately indurated, nonresistant sandstone and siltstone with veins of gypsum; discontinuous, nonparallel and lenticular bedding; low-angle cross-bedding common. Thickness about 600 feet

CHINLE FORMATION (UPPER TRIASSIC)

Ŧcp Petrified Forest Member--Dark-brown, purple, pale-green, and buff, moderately resistant, moderately indurated sandstone and siltstone; discontinuous, nonparallel bedding; some conglomeratic lenses (probably channel deposits). Thickness about 360 feet

Ŧcs Shinarump Conglomerate Member--Dark-brown, gray, and buff, moderately resistant, well-indurated conglomerate, pebbly carbonate, calcareous sandstone and pebbly sandstone. Irregular discontinuous bedding; petrified wood occurs at some localities. Thickness 30-90 feet

MOENKOPI FORMATION (MIDDLE? AND LOWER TRIASSIC)

Ŧmr Red beds--Brown, nonresistant poorly indurated claystone and siltstone; 1/8 inch to 3 inch thick parallel, even beds. Gypsum occurs locally; carbonate rich near top. Thickness about 1,100 feet

Ŧmv Virgin Limestone Member (Lower Triassic)--Gray and yellow resistant marine limestone; continuous, parallel, even beds 10 inches to 3 feet thick. Fossils abundant locally. Outcrops commonly appear banded due to alternating gray and yellow beds. Thickness 500 feet

Ŧml Lower part undivided--Includes Virgin Limestone Member and the rocks equivalent to the gypsum (Ŧmg) in western part of map. Gypsum is the predominant lithology below the differentiated Virgin Limestone Member near the Blue Diamond mine in eastern portion of map

Pkt KAIBAB AND TOROWEAP FORMATIONS UNDIVIDED (LOWER PERMIAN)--Resistant gray marine limestone with brown and gray chert bands and beds; fossiliferous. Parallel, uneven, wavy beds several inches to one foot thick. Chert gives rock a banded appearance. Occurs in two resistant cherty limestone ledges which are separated by a slope-forming unit of gypsiferous sandstone. Upper ledge and slope former comprised of Kaibab and lower ledge is Toroweap. Thickness 0-100 feet

Pr RED BEDS (LOWER PERMIAN)--Red, buff, and yellow sandstone and shale; crossbedding common; gypsum present at some localities. Thickness about 1,900 feet

PPb BIRD SPRING FORMATION (LOWER PERMIAN AND PENNSYLVANIAN)--Gray limestone in alternating resistant and nonresistant beds; forms characteristic stair-step topography. Shale and sandstone occur locally, especially near base; chert nodules common. Thickness about 2,500 feet

Mm MONTE CRISTO LIMESTONE (MISSISSIPPIAN)--Resistant dark-gray limestone and dolomite; forms cliffs; indistinctly bedded. Five members from youngest to oldest are as follows: Yellowpine, thick-bedded, dark-gray limestone; Arrowhead, thin-bedded, fossiliferous, moderately resistant gray limestone and gray shale; Bullion, unbedded gray limestone (locally dolomite); Anchor, fossiliferous dark-gray limestone with abundant chert lenses; Dawn, thin-bedded, dark-gray, fossiliferous limestone. Thickness 1,240 feet

Ds SULTAN LIMESTONE AND OLDER ROCKS (DEVONIAN)--Resistant dark-gray, medium-gray, and black limestone and dolomite; forms cliffs; beds range from 1/2 to 4 feet thick. Three members from youngest to oldest include the following: Crystal Pass, medium-gray limestone; Valentine, dark-gray limestone and dolomite; and Ironside, black dolomite and limestone containing stromatoporids and amphipora. Early Mississippian age assigned to upper part of Crystal Pass in the Arrow Canyon Range. A slope-forming unit beneath the Ironside Member is mapped with the Sultan in this report. Thickness about 1,000 feet

O-Ꞓu ORDOVICIAN AND CAMBRIAN ROCKS UNDIVIDED (LOWER ORDOVICIAN AND UPPER CAMBRIAN)--Medium-gray, indistinctly bedded dolomite with minor amounts of yellow sandstone and arenaceous carbonate. Includes Goodwin Limestone (Lower Ordovician), upper part (Upper Cambrian), and Dunderberg Shale Member (Upper Cambrian) of the Nopah Formation. Thickness about 1,800 feet

Ꞓbk BANDED MOUNTAIN MEMBER OF THE BONANZA KING FORMATION (UPPER AND MIDDLE CAMBRIAN)--Dark- and medium-gray dolomite; resistant, beds range from 1 foot to several feet thick. Thickness about 1,700 feet

CONTACT--Dashed where approximately located

FAULTS--Dashed where approximately located; dotted where concealed

High-angle fault

Thrust fault--Barbs on upper plate

Low-angle fault--Contact at base of gravity slide blocks and landslide masses

FOLDS SHOWING TRACE OF AXIAL PLANE AND DIRECTION OF PLUNGE--Dashed where poorly exposed or approximately located

Anticline

Syncline

Overturned syncline

Overturned anticline

STRIKE AND DIP OF BEDS

Inclined

Overturned

WILDERNESS AREA BOUNDARY

ADIT

CRATER

SAMPLE LOCALITY

Outcrop

Gravel

Stream sediment

Table 1.--Six-step semiquantitative spectrographic analysis of sieved Holocene alluvial samples from the Red Rocks Escarpment Wilderness area, Nevada

[Samples sieved through 10-mesh screen. Fe, Mg, Ca, and Ti reported in percent; all other elements reported in ppm. Results are in the series 1, 1.5, 2, 3, 5, 7, 10, and so on. Lower limits of determination are in parentheses. G, greater than value shown; N, not detected at limit of detection, or at value shown; L, detected but below limit of determination, or below value shown; and *, U.S. Geological Survey standard sample. Analysts: E. L. Mosier and Carl Papp]

Sample No.	(.05) Fe	(.02) Mg	(.05) Ca	(.002) Ti	(10) Mn	(.5) Ag	200 As	10 Au	10 B	20 Ba	(1) Be	(10) Bi	(20) Cd	(5) Co	(10) Cr	(5) Cu	(20) La	(5) Mo	(20) Nb	(5) Ni	(10) Pb	(100) Sb	(5) Sc	(10) Sn	(100) Sr	(10) V	(50) W	(10) Y	(200) Zn	10 Zr	(100) Th
[illegible]																															

Table 2.--Six-step semiquantitative spectrographic analysis of gouge samples from the Keystone Thrust fault, Red Rocks Escarpment Wilderness area, Nevada

[Fe, Mg, Ca, and Ti reported in percent; all other elements reported in ppm. Results are in the series 1, 1.5, 2, 3, 5, 7, 10, and so on. Lower limits of determination are in parentheses. G, greater than value shown; N, not detected at limit of detection, or at value shown; L, detected, but below limit of determination, or below value shown; *, U.S. Geological Survey standard sample; and **, Sample A is structurally lowest and sample B is highest. Analyst: E. L. Mosier]

Sample No.	(.05) Fe	(.02) Mg	(.05) Ca	(.002) Ti	(10) Mn	(.5) Ag	200 As	10 Au	10 B	20 Ba	(1) Be	(10) Bi	(20) Cd	(5) Co	(10) Cr	(5) Cu	(20) La	(5) Mo	(20) Nb	(5) Ni	(10) Pb	(100) Sb	(5) Sc	(10) Sn	(100) Sr	(10) V	(50) W	(10) Y	(200) Zn	10 Zr	(100) Th
*GXR-1	2	1	1	0.3	300	N	N	N	N	1000	1.5	N	N	10	N	50	150	N	N	15	50	N	7	N	200	100	N	20	N	300	N
R1 158-3	2	5	5	.3	700	N	N	N	100	1000	3	N	N	20	70	50	20	N	N	50	15	N	10	N	150	150	N	20	N	100	N
*BCR-1	7	.15	1.5	.7	700	N	N	N	L	300	L	N	N	20	L	20	L	N	N	5	10	N	20	N	300	200	N	20	N	50	N
R1 180-42	1	2	5	.07	15	N	N	N	10	200	L	N	N	L	10	7	N	N	N	L	L	N	L	N	200	10	N	15	N	30	N
**R1 160-24A	1	5	7	.05	300	N	N	N	L	70	L	N	N	5	10	5	N	N	N	10	15	N	L	N	N	10	N	L	N	20	N
R1 160-24B	.15	.15	.05	.07	10	N	N	N	10	100	L	N	N	5	L	L	N	N	N	L	N	N	N	N	N	L	N	L	N	100	N
R1 160-24C	.15	.1	L	.03	L	N	N	N	10	50	L	N	N	L	L	L	N	N	N	L	N	N	N	N	N	L	N	L	N	30	N
R1 160-24D	20	.5	.5	.01	70	N	N	N	20	50	1.5	N	N	30	15	500	L	30	N	200	100	N	L	N	N	10	N	10	N	15	N

Table 3.--General chemical analyses by atomic absorption for selected elements from stream-sediment samples, Red Rocks Escarpment Wilderness area, Nevada

[Samples sieved through 10-mesh screen. All values reported in parts per million. N, not detected at limit of detection, or at value shown; L, detected, but below limit of determination, or below value shown. Analysts: J. D. Sharkey, S. M. Kneipple and B. F. Arbogast]

Sample number	Au	Cu	Pb	Zn	As	Sb
R1 158-1	N (0.05)	10	15	15	L (10)	1
R1 158-2	N (.05)	5	15	10	N (10)	1
R1 158-4	N (.05)	5	10	10	L (10)	1
R1 158-5	N (.05)	5	10	15	N (10)	1
R1 158-6	N (.05)	5	L (5)	L (5)	N (10)	1
R1 158-7	N (.05)	5	10	10	N (10)	N (1)
R1 158-8	N (.05)	5	L (5)	5	N (10)	N (1)
R1 180-1	N (.05)	5	5	10	N (10)	1
R1 180-2	N (.05)	5	5	10	N (10)	1
R1 180-3	N (.05)	5	10	10	N (10)	1
R1 180-4	N (.05)	5	L (5)	10	N (10)	L (1)
R1 180-5	N (.05)	5	10	15	N (10)	L (1)
R1 180-6	N (.05)	5	5	10	N (10)	N (1)
R1 180-7	N (.05)	5	20	15	N (10)	N (1)
R1 180-8	N (.05)	5	15	15	N (10)	N (1)
R1 180-9	N (.05)	10	10	10	N (10)	N (1)
R1 180-10	N (.05)	N (5)	L (5)	10	N (10)	N (1)
R1 180-11	N (.05)	L (5)	5	10	L (10)	N (1)
R1 180-12	N (.05)	N (5)	5	5	N (10)	N (1)
R1 180-13	N (.05)	L (5)	5	10	N (10)	L (1)
R1 180-14	N (.05)	N (5)	N (5)	L (5)	N (10)	L (1)
R1 180-15	N (.05)	N (5)	N (5)	5	N (10)	L (1)
R1 180-16	N (.05)	N (5)	L (5)	5	L (10)	N (1)
R1 180-17	N (.05)	N (5)	L (5)	10	N (10)	N (1)
R1 180-18	N (.05)	5	10	25	N (10)	L (1)
R1 180-19	N (.05)	N (5)	5	10	N (10)	N (1)
R1 180-20	N (.05)	N (5)	N (5)	5	N (10)	N (1)
R1 180-21	N (.05)	10	L (5)	15	N (10)	3
R1 180-22	N (.05)	L (5)	5	15	N (10)	2
R1 180-23	N (.05)	N (5)	10	5	N (10)	N (1)
R1 180-24	N (.05)	5	10	20	N (10)	N (1)
R1 180-25	N (.05)	L (5)	5	15	N (10)	N (1)
R1 180-26	N (.05)	L (5)	5	10	N (10)	N (1)
R1 180-27	N (.05)	5	5	20	N (10)	N (1)
R1 180-28	N (0.05)	N (5)	L (5)	L (5)	N (10)	N (1)
R1 180-29	N (.05)	L (5)	5	10	N (10)	N (1)
R1 180-30	N (.05)	N (5)	5	10	N (10)	N (1)
R1 180-31	N (.05)	N (5)	L (5)	5	N (10)	N (1)
R1 180-32	N (.05)	15	5	40	N (10)	L (1)
R1 180-33	N (.05)	L (5)	L (5)	10	N (10)	N (1)
R1 180-34	N (.05)	5	10	30	L (10)	L (1)
R1 180-35	N (.05)	L (5)	10	10	N (10)	N (1)
R1 180-36	N (.05)	5	15	30	N (10)	N (1)
R1 180-37	N (.05)	10	10	10	N (10)	N (1)
R1 180-38	.30	10	10	15	N (10)	N (1)
R1 180-39	N (.05)	10	15	20	N (10)	L (1)
R1 180-40	N (.05)	10	15	25	N (10)	N (1)
R1 180-41	N (.05)	10	15	20	N (10)	N (1)
R1 180-43	N (.05)	5	15	15	N (10)	N (1)
R1 180-44	N (.05)	10	10	20	N (10)	L (1)
R1 180-45	N (.05)	10	10	20	N (10)	L (1)
R1 180-46	L (.05)	10	5	20	N (10)	L (1)
R1 180-47	N (.05)	10	10	20	N (10)	L (1)
R1 180-48	N (.05)	10	10	25	N (10)	L (1)
R1 180-49	N (.05)	10	10	25	N (10)	L (1)
R1 180-50	N (.05)	10	10	25	N (10)	L (1)
R1 180-51	N (.05)	10	10	40	N (10)	L (1)
R1 180-52	N (.05)	L (5)	5	10	N (10)	N (1)
R1 160-1	N (.05)	10	10	25	N (10)	N (1)
R1 160-2	N (.05)	10	15	30	N (10)	N (1)
R1 160-3	N (.05)	10	10	20	N (10)	N (1)
R1 160-4	N (.05)	10	10	30	N (10)	N (1)
R1 160-5	L (.05)	10	10	20	N (10)	N (1)
R1 160-6	N (.05)	10	10	25	N (10)	N (1)
R1 160-7	N (.05)	15	15	40	N (10)	L (1)
R1 160-8	N (.05)	10	15	35	N (10)	L (1)
R1 160-9	N (.05)	10	15	30	N (10)	L (1)
R1 160-10	L (.05)	10	15	20	N (10)	L (1)
R1 160-11	L (.05)	10	15	35	N (10)	2
R1 160-12	N (.05)	10	10	25	N (10)	2
R1 160-13	L (.05)	10	15	20	N (10)	2
R1 160-14	N (.05)	10	10	35	N (10)	L (1)
R1 160-15	N (.05)	10	10	30	N (10)	L (1)
R1 160-16	N (.05)	15	15	50	N (10)	2
R1 160-17	N (0.05)	10	15	35	N (10)	L (1)
R1 160-18	N (.05)	10	15	30	N (10)	L (1)
R1 160-19	L (.05)	10	10	25	N (10)	L (1)
R1 160-20	N (.05)	10	10	15	N (10)	L (1)
R1 160-21	N (.05)	5	5	10	N (10)	L (1)
R1 160-22	N (.05)	10	10	10	N (10)	N (1)
R1 160-23	N (.05)	N (5)	L (5)	N (5)	N (10)	L (1)
R1 160-25	L (.05)	5	5	15	N (10)	L (1)
R1 160-26	N (.05)	10	5	30	N (10)	L (1)
R1 160-27	N (.05)	10	10	25	N (10)	L (1)
R1 160-28	N (.05)	10	10	25	N (10)	N (1)
R1 160-29	L (.05)	5	10	30	N (10)	N (1)
R1 160-30	L (.05)	5	L (5)	20	N (10)	N (1)
R1 160-31	L (.05)	10	5	30	N (10)	N (1)
R1 160-32	L (.05)	5	5	10	N (10)	N (1)
R1 160-33	L (.05)	10	5	25	N (10)	N (1)
R1 160-34	N (.05)	5	L (5)	10	N (10)	L (1)

Table 4.--General chemical analyses by atomic absorption for selected elements of fault gouge samples from the Keystone Thrust, Red Rocks Escarpment Wilderness area, Nevada

[All values reported in parts per million. N, not detected at limit of detection, or at value shown; and L, detected, but below limit of determination, or below value shown. Analyst: B. F. Arbogast]

Sample number	Au	Cu	Pb	Zn	As	Sb
R1 180-42	N (0.05)	10	10	15	N (10)	N (1)
R1 160-24a	L (.05)	N (5)	10	L (5)	10	N (1)
R1 160-24b	L (.05)	N (5)	N (5)	N (5)	N (10)	N (1)
R1 160-24c	L (.05)	L (5)	5	L (5)	N (10)	N (1)
R1 160-24d	L (.05)	900	120	55	40	8

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In accordance with the provisions of the Federal Land Policy and Management Act (Public Law 94-579, October 21, 1976), the Geological Survey and the Bureau of Mines have conducted mineral surveys on certain areas, which formally had been identified as "natural" and "primitive" areas prior to November 1, 1975. This report discusses the results of a mineral survey of the Red Rocks Escarpment Instant Study Area, Nevada.

PLATE 1. --PRELIMINARY MAP OF GEOLOGY AND MINERAL RESOURCES OF THE RED ROCKS ESCARPMENT INSTANT STUDY AREA, CLARK COUNTY, NEVADA,

BY ROBERT G. BOHANNON, U.S. GEOLOGICAL SURVEY AND RICHARD W. MORRIS, U.S. BUREAU OF MINES