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Churchill Co.-general

Item 17

Mineral Resources Inventory and Analysis

of the

Clan Alpine Planning Unit

Carson City District

by

R. E. Bennett and C. L. Hoke

1975

for complete introduction see Churchill Co.-general files

Item 17

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INTRODUCTION

The following narrative and accompanying plastic overlays constitute the Clan Alpine Mineral Resource Inventory and Analysis.

Inasmuch as only a limited amount of time was available for field work, this inventory and analysis should in no way be considered comprehensive. As a result, the documentation, analysis, and evaluation presented herein is (1) largely based upon cursory field reconnaissance (during which not even all known mineralized areas were visited), and (2) limited library research.

The format for this report is based upon procedures outlined in the Bureau of Land Management Manual, as supplemented by amendments and instruction memos. The manual instructions infer that this inventory and analysis shall be based primarily upon mineral resource inventories prepared over the years by geologists employed by the Bureau. However, the inventory for Nevada lands is relatively old (1965) and has not been properly maintained.

Reference is made to the published literature insofar as possible. It goes without saying, however, that this study could not have been accomplished--and in fact would have very little value--without the considerable quantity of information published over the years by numerous individuals and organizations. These contributions are hereby gratefully acknowledged.

The narrative portion is composed of two parts, the Present Situation and Minerals Management Opportunities. Additionally, two sets of maps were prepared on plastic overlays in order to present some of this information graphically. They are referenced to both the existing Mineral Resource Inventory and to this narrative.

1. Mineral Status - depicts status of the mineral estate (ownership) of the unit , regardless of surface ownership.

2. Mineral Resources - depicts "indicated mineral areas", "mineral resource areas", and "mineral development areas".

   "Indicated mineral areas" are large areas, that based on geology, may contain mineral deposits, but the exact location of the deposits may not be known. Known areas of mining claims, without regard to geology, are also included. "Mineral resource areas" are located within indicated mineral areas and have a greater potential in terms of discovery of significant mineral deposits. "Mineral development areas" contain

known mineral deposits that are in production, are being developed, or are capable of being developed under existing technology. Also included in this catagory are adjacent lands necessary for dump sites, mill or plant sites, and other activities associated with the necessary development of an ore deposit.

Any attempt to assess the mineral potential of an area is a difficult task at best. When time does not permit a thorough analysis, the problems involved become impressive. Therefore this report does not presume to fully evaluate the potential of an area. Whether or not significant ore deposits will be discovered can only be determined by detailed geologic mapping and exploration. These factors must be kept in mind by anyone using this document and its related exhibits for contrary to popular impression, mineral resources are not finite in quantity, but change over time.

I. PRESENT SITUATION - MINERALS (URA-3)

The Clan Alpine Planning Unit encompasses most of Churchill County, and small portions of Mineral and Nye counties.

Willden and Speed[1/] relate the basic mining history of Churchill County as follows:

> "Churchill County contains abundant deposits of various nonmetallic minerals and a number of iron deposits, one of which has been an important producer. It has been an important producer of silver and gold and may still contain undeveloped gold-silver resources. Other metallic minerals are known to occur, but their production has been small or negligible. The productive history of the county has been largely that of three silver-gold camps - Fairview, Wonder, and the Summit King-Dan Tucker mine - but in recent years nonmetallic deposits have become increasingly important.
>
> "With the increasing importance of the nonmetallic mineral industry in Churchill County, it is perhaps significant that the first recorded mineral discovery in the county was soda in the Soda Lakes by Asa L. Kenyon in 1855. Commercial production of soda from the lakes did not begin until 1868, however, by which time several salt deposits had been exploited and metallic deposits - chiefly silver and gold - had been discovered and mining districts organized in several areas. Early discoveries include copper at Table Mountain in 1861, silver at La Plata in 1862, gold in the Desert district in 1863, and silver in Florence Canyon on the east side of the Clan Alpine Range in 1864. Production figures are unavailable for the early years, but limited underground workings and small surficial dumps and tailings indicate that none of the early discoveries became important producing mines.
>
> "The first discovery of what was to become a major producing district was made in the autumn of 1905 by F. O. Norton and C. L. Wilson in the Fairview district. A stampede followed the dissemination of news about the discovery, and this in turn led to prospecting other areas and to the discovery of rich silver ore about 18 miles north at Wonder. These two districts soon became major producers of silver and gold, and between 1907 and 1920 - when the ore bodies were essentially exhausted - they produced silver valued at $7,270,389 and gold at $2,397,155.

1/ Willden and Speed, 1974, Geology and Mineral Deposits of Churchill County, Nevada.

"The third major silver-gold-producing district in the county, the Dan Tucker-Summit King mines of the Sand Springs district, was also discovered in 1905, but had no significant production until 1937. In the ensuing 5-year period, silver and gold valued at more than $800,000 were produced from the district, and in the period 1948 through 1951, an additional $931,816 was produced."

The basic history of those portions of Mineral and Nye counties within the planning unit is similar to that of Churchill County. Prospecting occurred as early as the 1860's but little production resulted. Not until the turn of the century and later did the Regent, Mammoth, and other lesser mining districts produce millions of dollars of mineral commodities. Some mines, such as Basic Refractories at Gabbs, are still operating today.

The following list summarizes the value of mineral production through 1961 in Churchill County.

Period		Churchill County
1870-1903		$ 270,460
1904-1961		13,410,706
	Total	$13,681,166

At least an equal amount has come from the Mineral and Nye counties portion of the planning units.

Prior to the establishment of the county system of government, a number of "mining districts" were established in the planning unit to facilitate record keeping. The nomenclature "mining district" is presently archaic, but because early mining history and data is referred to upon occasion, it is used in the following text. It should be clearly understood, however, the term "mining district", and its at times vaguely described parameters, have no significance whatsoever in defining the presence or type of mineral resources or in their evaluation: The fact is that all persons concerned should avoid using the term insofar as practicable.

A number of areas exhibiting manifestations of the probable presence of valuable mineralization were noted by the early miners

in the region. It was in these areas that prospecting was concentrated. Later on these became organized and known as mining districts. Most of those that were named are summarized below:

Name	Year Developed	Period of Greatest Activity	Commodities Extracted	Recorded Production
Alpine	1864	1934-1945	gold, silver	$ 3,500
Bernice	1870	1883-1890	silver, antimony, mercury	$ 155,700
Chalk Mountain	1923	1923-1924	gold, silver, lead	$ 120,000
Copper Kettle	1908	1917-1929	copper	small
Corral Canyon	1920's	1920's-1930's	gold	small
Cox Canyon	1878	1913	gold	small
Dixie Valley	1934	1934-1941	gold, silver, lead	$ 293,300
Eastgate	1935	1935-1957	silver, gold	$ 143,900
Fairview	1905	1906-1922	silver, gold, lead, copper	4 million
IXL	1878	Prior to 1908	gold, silver	$ 20,000
Mineral Basin	1898	1951-1953	iron	283,000 long tons
Mountain Wells	1860's	1860's	gold	small
Sand Springs	1905	1930-1941 1948-1951	gold,silver	$1,756,000
Shady Run	?	1958-1967	tungsten	10,000 units
Table Mountain	1860's	?	gold, nickel, copper	small

Name	Year Developed	Period of Greatest Activity	Commodities Extracted	Recorded Production
Westgate	?	1915	gold, silver	small
White Cloud	1868	1890's 1948-1952	gold, silver, copper	$10,000
Wonder	1906	1907-1920 1934-1942	gold, silver, copper, lead	6 million
Rawhide	1906	1908-1920's 1930-1957	gold, silver, tungsten	13.5 million

Nonmetallic minerals occur widely across the planning unit. Many types of these commodities are being extracted today and some have been worked for years. The more significant such deposits are summarized below:

Name	Year Developed	Period of Greatest Activity	Commodities Extracted	Recorded Production
Fourmile Flat	1870's	1870's	Borates	small
Dixie Mine	?	?	Fluorite	666 tons
Cox Canyon	1938	---	Fluorite	830 tons
Sand Springs Marsh	1863	1870's to present	salt	large
Rainbow Mountain	?	to present	pumice	moderate

Statistics on industrial minerals are not readily available because many companies request that the data be kept confidential. However, production in 1970 alone was in the millions of dollars.

The metallic mineral of economic interest occur mainly in veins, replacement deposits, or as particles disseminated throughout pre-existing rock. Generally such deposits occur in volcanic rocks, metamorphic rocks, or sedimentary rocks (including sand and gravel). That is just about all of the rock types occuring in the planning unit with the exception of massive granite.

Nonmetallic rocks and minerals of economic value occur mainly in Tertiary volcanic and sedimentary rocks. However, many of the so-called nonmetallic or industrial minerals closely resemble common, valueless rocks, and this situation creates real problems in their identification. Furthermore, the ubiquitous overburden commonly conceals more than is revealed and hence poses considerable problems in the discovery and evaluation of these type of deposits.

It may be anticipated that the level of metallic mineral exploration in the planning unit will increase moderately with time, that nonmetallic mineral activities will increase greatly with time, and exploration for geothermal energy sources will be on a high level for at least a period of a few years over the near term. Rising gold prices will cause a considerable influx of "weekend" prospectors into the planning unit.

There is a potential for the occurrence of "leasing act" minerals in the planning unit, and exploration for such minerals is anticipated in the Carson Sink.

There is some potential for the existence of petroleum products in the planning unit, some of the larger valleys--such as Carson Sink--and conceivably might contain limited quantities.

The potential for geothermal energy resources is greater than that for petroleum. The areas delineated on the base-map overlays as KGRA's on being prospectively valuable for geothermal steam are after U. S. Geological Survey data. Basically, areas containing volcanic rocks are favorable; areas within volcanic terrain exhibiting evidence of hydrothermal alteration are more so; and, areas containing hot springs have, of course, an even greater potential. Less obvious are areas containing concealed intrusive rocks wherein probably the greatest potential of all exists for the development of significant sources of geothermal energy. Such areas would not exhibit any indications whatsoever at the surface which a non-earth scientist would associate with geothermal energy.

General Geology

The Clan Alpine area lies within the Basin and Range province, a region characterized by isolated, elongate, sub-parallel mountain ranges and broad intervening valleys. All drainage leads to enclosed interior basins rather than discharging into the sea, and for this reason the area is within the Great Basin subdivision of the province.

The mountain ranges generally trend north or northeast, and in most cases rise abruptly from the coalescing alluvial fans that border them. Playa lakes occupy low parts of some enclosed basins. Many of the flat-floored valleys are relics of more extensive lake beds formed when ancient Lake Lahontan covered a large portion of western Nevada.

The oldest rocks exposed in the area are in assemblage of Paleozoic (older than 225 million years) sedimentary and volcanic rocks. Sedimentary lithologies include sandstone, shale, etc., and their metamorphosed equivalents. The volcanic rocks consist of flows, tuffs, breccias, agglomerates and associated intrusive dikes and sills.

Mesozoic (between 65 and 225 million years old) rocks are unevenly distributed throughout the area and are extremely diverse in character. The nature and distribution of these rocks closely reflect the crustal instability that was active with varying degrees of intensity throughout Mesozoic time. Recognized Mesozoic lithologics include limestone, dolomite, shale, silt, sand, volcanics, and igneous intrusive rocks. Locally these rocks have been subjected to varying degrees of contact and regional metamorphism. The boundary between Sierra Nevada type granitic basement terrain to the west and the predominantly metamorphic terrains to the east passes through the area roughly along the 118 degree meridian. Additional intrusive bodies may be covered by Tertiary or Quaternary rocks. Some of the Mesozoic intrusive rocks exposed in the area are presumably extensions of the Sierra Nevada granitic rocks.

An unconformity separates Tertiary (between 2.5 and 65 million years old) rocks from older rocks in the Clan Alpine area. During this time the area was the site of widespread volanic activity and local sedimentation. Volanic rocks include rhyolite, dacite, andesite, and pyroclastics. Rock sequences differ widely from locale to locale, and correlation of individual units over large areas is not possible. Tertiary intrusive bodies are present locally.

Unconsolidated gravel, and valley alluvium and sand deposits of eolian origin are present throughout the area. The fan-gravel is composed of boulders of many rock types mixed with gravel and finer material deposited at the mouths of canyons. The valley alluvium consists predominantly of coarse to fine sand. Sand Mountain, east of Fallon, is a prominent deposit of wind-blown sand.

The structural geology of Nevada is extremely complex as a result of superposition, one upon the other, of several periods and types of deformation. Several cycles of deformation, mountain-building, erosion and sedimentation had occurred prior to early Cenozoic time. The structural evolution which gave rise to the alternating mountains and valleys that characterize Nevada and the Basin and Range Province today began in early Cenozoic time (about 65 million years ago). Blocks of rock strata, bounded by normal faults, have been raised or tilted to form the elongate mountains, and sediments have been deposited on the down-thrown blocks to form the flat valleys. The seismic activity and surface ruptures in Dixie Valley and other portions of the Clan Alpine area indicate that this process of block faulting is still continuing.

Churchill Co.-general

NW-27-9
Na, Borates, K

Item 17
(1 of 5)

Mining District: DIXIE MARSH
(Sodium, Borates, Potassium)

T. 23 N., R. 35-36 E.
Churchill County, Nevada
AMS Reno Map Sheet 1971

GENERAL BACKGROUND

Dixie Marsh or Humboldt Salt Marsh covers an area of about 40 square miles in Dixie Valley between the Stillwater and Clan Alpine Ranges.

Salt was first produced from the area in the 1860's for metallurgical use at the Comstock and other mining districts. A small amount of borax was produced from the northern end of the marsh in the 1870's.

The potential for potash was evaluated in 1916 and 1917, but there was no subsequent production.

GEOLOGICAL AND TECHNICAL DATA

The Humboldt Salt Marsh was once the site of a shallow lake. Evaporation of lake waters produced a mixture of salts including sodium chloride, sodium sulfate, and sodium carbonate, with smaller amounts of sodium borate and potash salts.

Sodium chloride occurs as an efflorescence over the surface of the lowest part of the basin. Underneath this surface salt layer are salt and saline muds which probably extend to a depth of several hundred feet.

Sodium chloride was mined by scraping up surface crusts and shipping direct without refining.

The borate mineral was predominately ulexite "cotton balls" that occurred as aggregates of acicular crystals.

Evaporation tests in 1916 indicated 28.7 to 38.7 grams of solids per 100 cubic centimeters of material. K_2O percentages ran from 0.19 to 0.75 percent; sodium chloride 27 percent; sodium sulfate 5 percent; and sodium carbonate 4 percent (2).

POTENTIAL FOR DEVELOPMENT

The likelihood of borate production from the area is remote.

Bennett, 1975

Generally the contained potassium salts and sodium salts, exclusive of sodium chloride, will determine the economic feasibility of a particular saline deposit. Depending upon market conditions, sodium chloride may be an undesirable by-product which is difficult to dispose of.

Profitable sodium-potassium extraction from salines requires huge reserves and large capital investments in extraction and processing facilities. What little work that has been done to date in the Humboldt Salt Marsh would in no way justify speculation of a viable mining operation developing. Additional exploration would be necessary to determine the potential for sodium and potassium production from this area. In the Carson Sink, one basin west of the Humboldt Salt Marsh, recent exploration indicates that at least part of the sink does not contain commercial quantities of sodium and potassium at this time.

COMPANIES AND CLAIMANTS ACTIVE IN AREA

These commodities are Leasing Act minerals. No exploration permits or leases are pending or active in the area at this time.

SELECTED REFERENCES

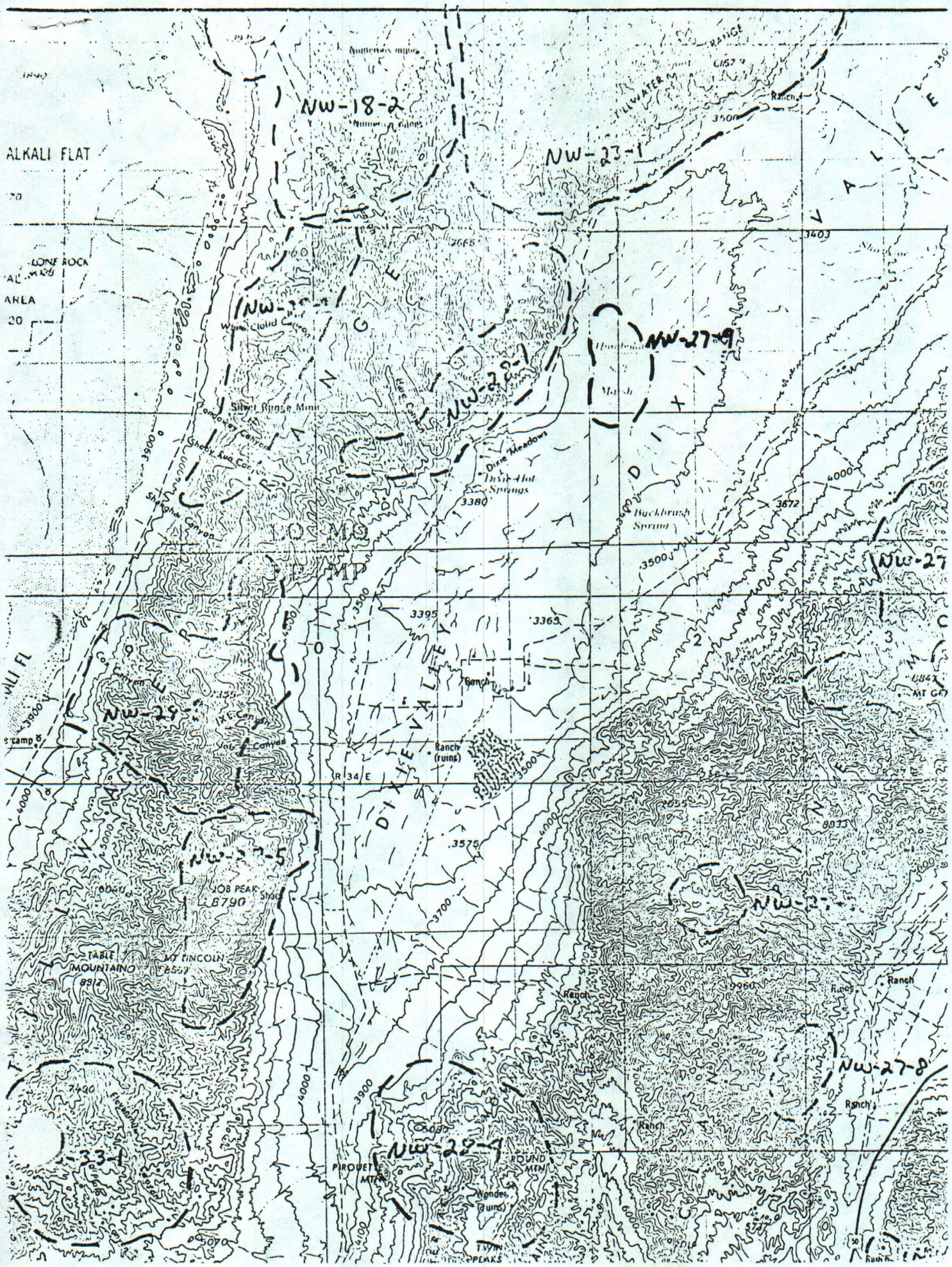
1. Vanderburg, 1940, Reconnaissance of mining districts in Chruchill County, Nevada.

2. Willden and Speed, 1974, Geology and mineral deposits of Churchill County, Nevada.

FIELD EXAMINATION

Bennett, 1974

Bennett, 1975


NW-18-2
NW-23-1
NW-27-9
NW-28-1
NW-29-
NW-27-5
NW-27-8
NW-28-7
ALKALI FLAT
Numerous mines
Silver Runner Mine
Dixie Meadows
Hot Springs
Buckbrush Spring
Ranch
Ranch (ruins)
R 34 E
JOB PEAK
8790
TABLE MOUNTAIN
MT LINCOLN
PROUETT MTS
ROUND MTN
Wonder (ruins)
TWIN PEAKS
DIXIE VALLEY
3395
3369
3380
3672
3575
3700
3500
4000
3900

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NW-27-10
?

Item 17
(2 of 15)

Mining District: McCOY PEAK AREA
(Mineral Commodities Unknown)

T. 22 N., R. 39 E.
Churchill County, Nevada
AMS Millett Map Sheet 1955

GENERAL BACKGROUND

Several shafts are shown in sections 8 and 9, T. 22 N., R. 39 E. Recent literature does not mention the area and the mineral commodities present at this location are unknown.

GEOLOGICAL AND TECHNICAL DATA

Extrusive rhyolite and rhyodacite cropout extensively in the area (1).

POTENTIAL FOR DEVELOPMENT

Unknown.

COMPANIES AND CLAIMANTS ACTIVE IN THE AREA

Unknown.

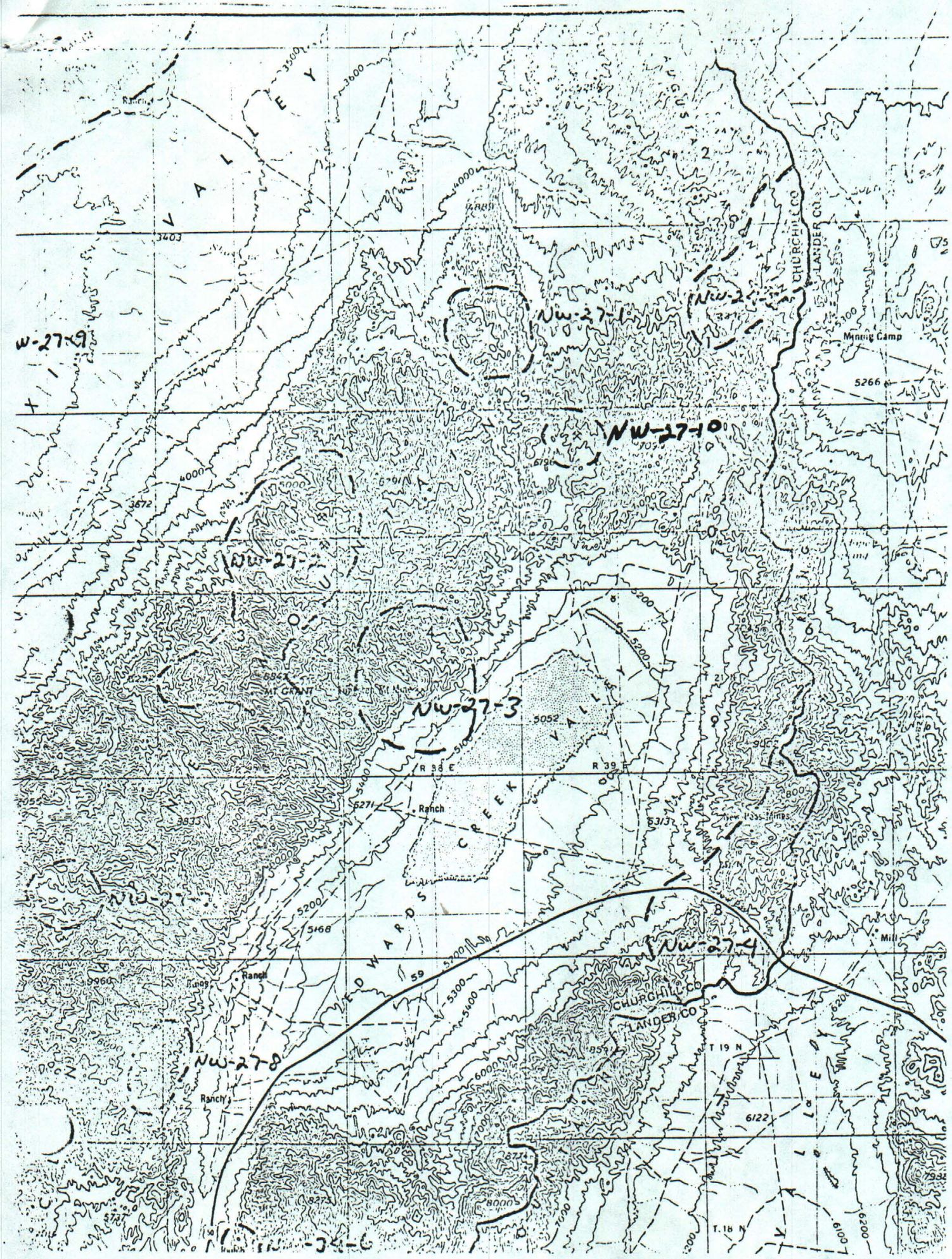
SELECTED REFERENCES

1. Willden and Speed, 1974, Geology and mineral deposits of Churchill County, Nevada.

FIELD EXAMINATION

Not Examined.

Bennett, 1975


NW-27-1
NW-27-2
NW-27-3
NW-27-4
NW-27-5
NW-27-6
NW-27-7
NW-27-8
NW-27-9
NW-27-10
MT GRANT
EDWARDS CREEK VALLEY
Ranch
Mining Camp
New Pass Tramp
Mill
CHURCHILL CO
LANDER CO
R 38 E
R 39 E
T 19 N
T. 18 N

Churchill Co.-general

NW-28-1
Au, Ag

Item 17
(3 of 5)

Mining District: DIXIE VALLEY
(Gold, Silver)

T. 22-23 N., R. 34-35 E.
Churchill County, Nevada
AMS Reno Map Sheet 1971

GENERAL BACKGROUND

The only productive mine in the district was the Dixie Comstock mine, discovered in 1934. By 1935 an amalgamation mill and flotation equipment had been installed at the property. The mine was active through 1942 and produced 17,880 tons of gold and silver ore for a value of $293,304. Ore tenor was about $16 per ton with a 2 to 3 gold-to-silver ratio.

Mine development totals about 1,500 feet and consists of an inclined shaft, level drifts, and stopes. Intense heat and large quantities of hot water which hindered mining were encountered less than 75 feet from the surface.

GEOLOGICAL AND TECHNICAL DATA

The oldest rocks in the area are Jurassic intrusives ranging in composition from diorite to gabbro. The ore body is a quartz vein in altered rhyolite that intrudes the older rocks.

A sample from the quartz vein in the shaft contained 7 ppm silver and 6.7 ppm gold. Deeper workings are reported (2) to contain values as high as 4.6 ounces of gold and 7.8 ounces of silver per ton (probably select material).

POTENTIAL FOR DEVELOPMENT

6.7 ppm of gold is equivalent to about $6.80 per ton at the old price of $35 per ounce. Recent gold prices of about $180 per ounce would indicate gold values of about $35 per ton. Even higher values are suggested in the deeper workings.

Bennett, 1975

These limited samples suggest that material of economic or near economic grade may be developed in the Dixie Comstock mine. Additional sampling would be necessary to ascertain the extent of exploitable material.

If the heat and hot water problems at the Dixie Comstock mine cannot be solved it is unlikely that any large scale underground development will take place in the future.

COMPANIES AND CLAIMANTS ACTIVE IN THE AREA

1. NUMA PAH #1-5
   W. R. Abraham
   Nixon, Nevada
   (Lode Claims)

2. MAGMATIC GOLD and MAGMATIC GOLD MILLSITE
   M. Schendel et.al.
   P.O. Box 599
   Lovelock, Nevada
   (2 lode claims, millsite)

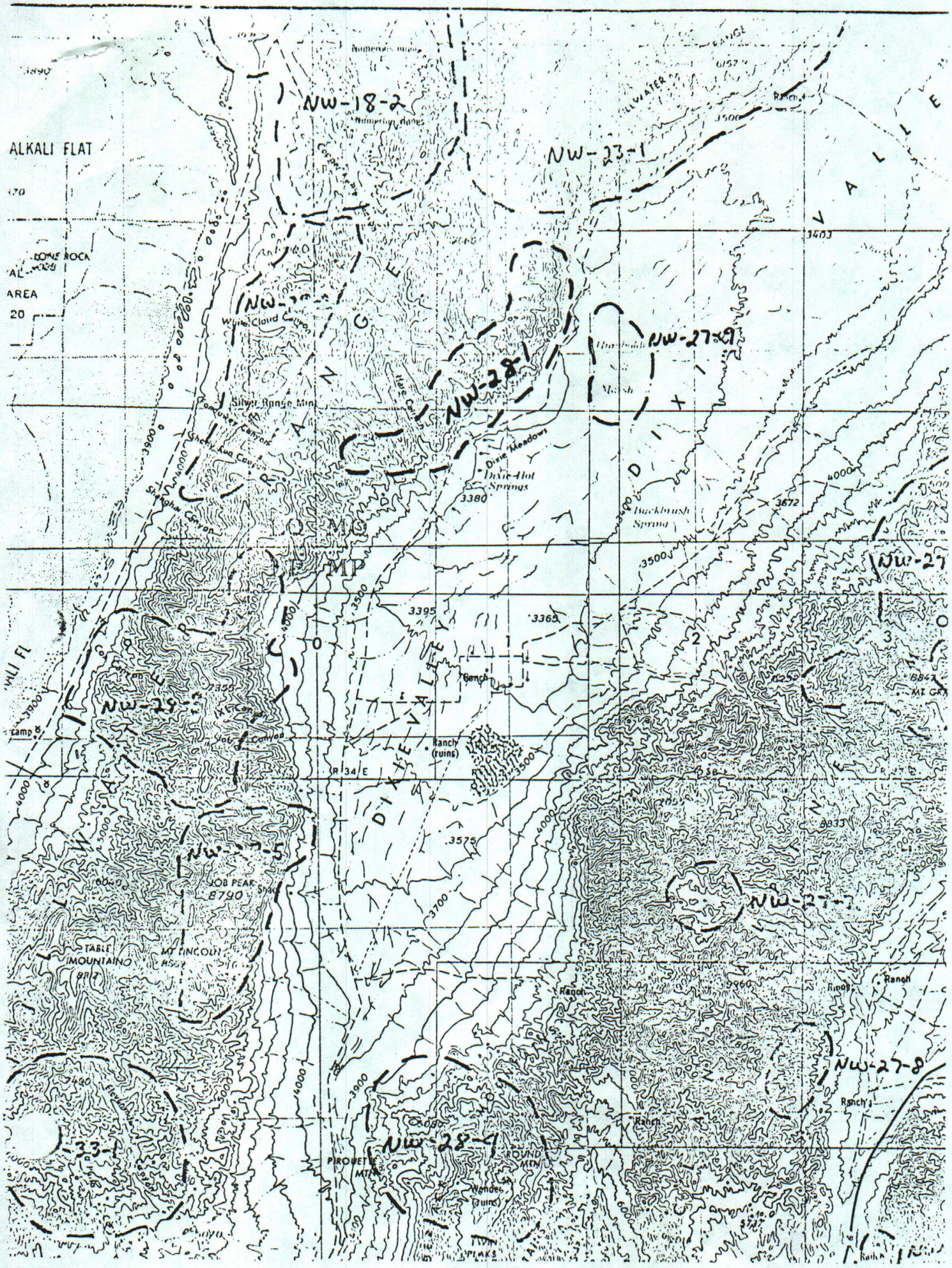
SELECTED REFERENCES

1. Vanderburg, 1940, Reconnaissance of mining districts in Churchill County, Nevada.

2. Willden and Speed, 1974, Geology and mineral deposits of Churchill County, Nevada.

FIELD EXAMINATION

Bennett, 1975


NW-18-2
NW-23-1
NW-27-9
NW-28
NW-27
NW-29
NW-27-5
NW-27-7
NW-27-8
NW-28-1
ALKALI FLAT
BONE ROCK
AREA
20
Silver Range Mtn
Dixie Meadows
Dixie Hot Springs
3380
Buckbrush Spring
3672
3395
3368
Ranch
Ranch (ruins)
R 34 E
3575
JOB PEAK
8790
TABLE MOUNTAIN
MT LINCOLN
PIROUETTE MTNS
ROUND MTN
Wendel (ruins)
TWIN PEAKS
Ranch's
3403
3500
3700
3900
4000
6000

Churchill Co.-general

NW-33-14
Pumice

Item 17
(4 of 5)

Mining District: RAINBOW MOUNTAIN AREA
(Pumice)

T. 18 N., R. 30-31 E.
Churchill County, Nevada
AMS Reno Map Sheet 1971

GENERAL BACKGROUND

The pumice deposit is located in section 7, T. 18 N., R. 31 E. The deposit is currently being used for the manufacture of light weight aggregate.

Other mining claims are in the area but it is not known what mineral commodities are contended.

GEOLOGICAL AND TECHNICAL DATA

The pumice deposit was formed by the rapid accumulation of pumice fragments in a body of standing water.

POTENTIAL FOR DEVELOPMENT

An operating property.

COMPANIES AND CLAIMANTS ACTIVE IN AREA

1. FEBRUARY PLACER
   Mrs. Richard Miller et al
   February 1, 1954
   (placer claim)

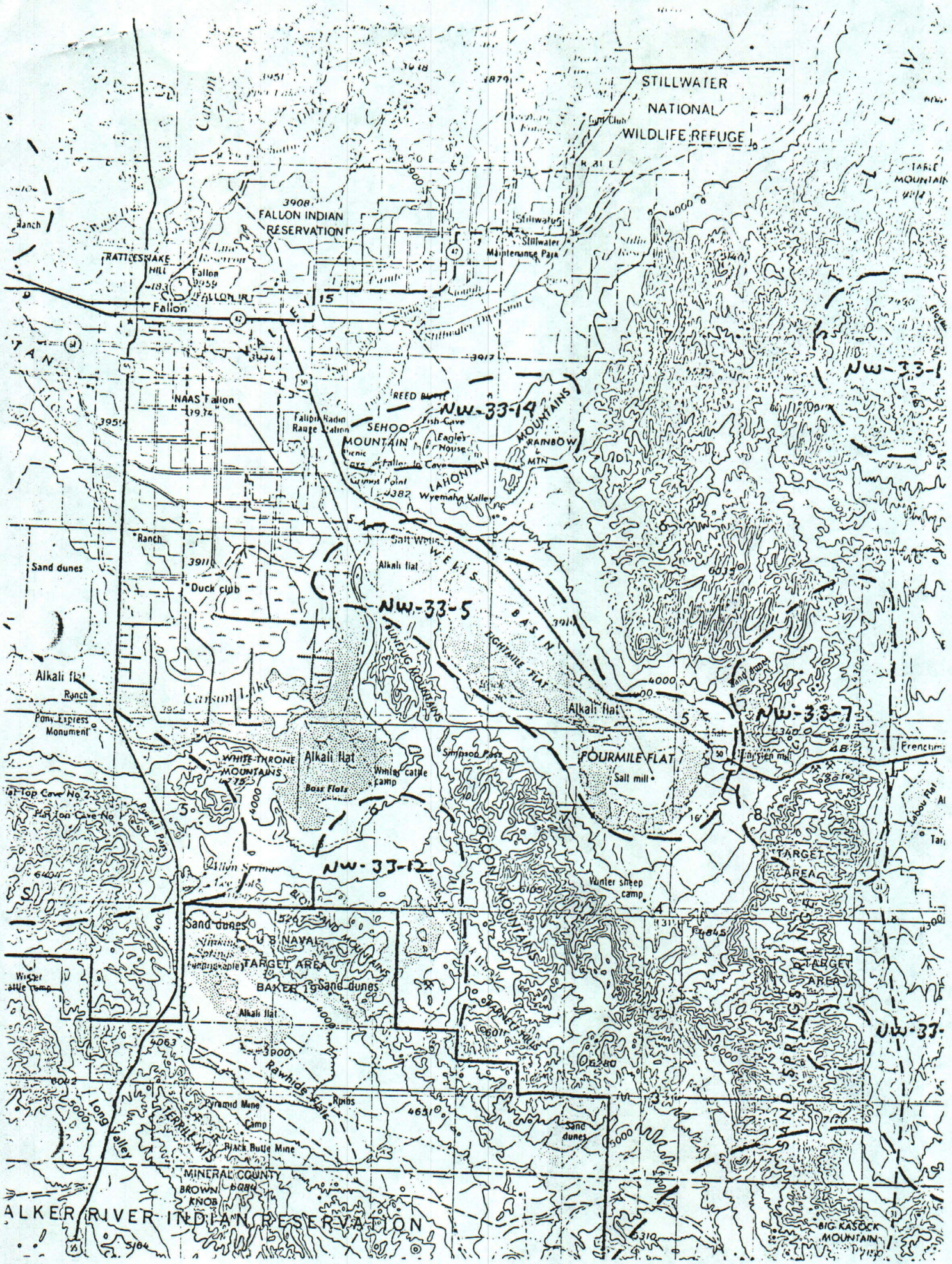
SELECTED REFERENCES

1. Willden and Speed, 1974, Geology and mineral deposits of Churchill County, Nevada

FIELD EXAMINATION

Not Examined.

Bennett, 1975


STILLWATER
NATIONAL
WILDLIFE REFUGE
FALLON INDIAN
RESERVATION
RATTLESNAKE
HILL
Fallon
Stillwater
Maintenance Park
NAAS Fallon
REED BLUFF
NW-33-14
SEHOO
MOUNTAIN
Fish Cave
Eagles
House
Falling Cave
Grimes Point
LAHONTAN
MOUNTAINS
RAINBOW
MTN
Wyemaha Valley
Salt Wells
Alkali flat
Ranch
Sand dunes
Duck club
NW-33-5
BASIN
EIGHTMILE FLAT
Alkali flat
Ranch
Pony Express
Monument
Carson Lake
WHITE THRONE
MOUNTAINS
Alkali flat
Bass Flats
White cattle
camp
Sand dunes
FOURMILE FLAT
Salt mill
NW-33-7
Frenchman
Top Cave No 2
Top Cave No 1
NW-33-12
Wunter sheep
camp
TARGET
AREA
Sand dunes
U S NAVAL
TARGET AREA
BAKER 19
Sand dunes
Alkali flat
Rawhide Flats
Ruins
Pyramid Mine
Camp
Black Butte Mine
TERRILL MTS
Long Valley
MINERAL COUNTY
BROWN
KNOB
ALKER RIVER INDIAN RESERVATION
BIG KASOCK
MOUNTAIN
TARGET
AREA
NW-33-

Churchill Co.-general

NW-34-6
Au, Ag

Item 17
(5 of 5)

Mining District: COLD SPRINGS AREA
(Gold, Silver)

T. 18 N., R. 37 E.
Churchill County, Nevada
AMS Millett Map Sheet 1955

GENERAL BACKGROUND

Seven shafts, adits and prospect pits explore silicified zones in the Desatoya Mountains immediately east of Cold Springs.

There has been no production from these gold and silver prospects.

GEOLOGICAL AND TECHNICAL DATA

Gold and silver mineralization occurs in silicified tuff and in quartz veins in the tuff.

One Sample of silicified tuff assayed 16 ppm gold and 100 ppm silver. A quartz vein assayed 1.1 ppm gold and 7 ppm silver (1).

POTENTIAL FOR DEVELOPMENT

Development is unlikely.

COMPANIES AND CLAIMANTS ACTIVE IN AREA

Unknown.

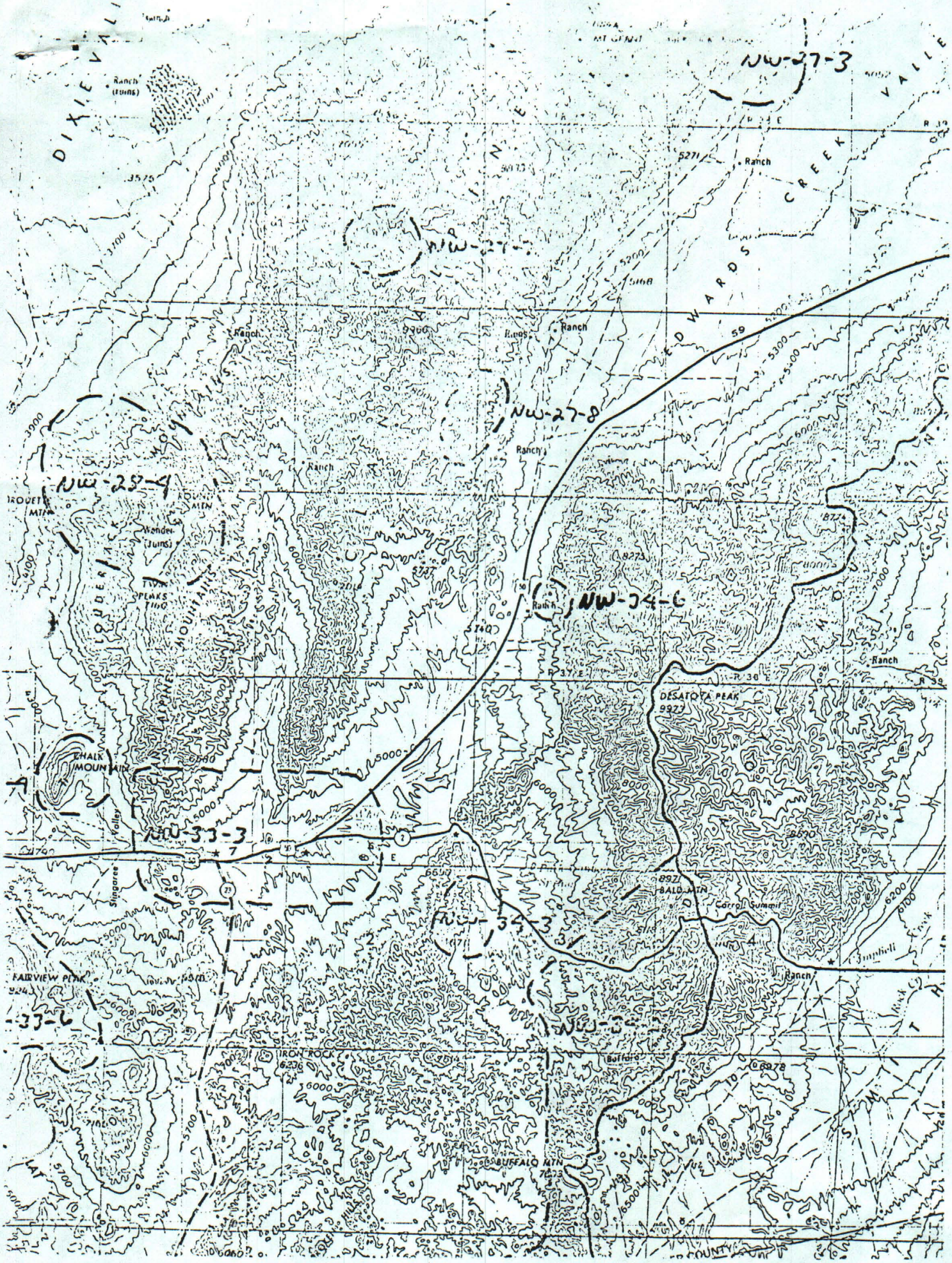
SELECTED REFERENCES

1. Willden and Speed, 1974, Geology and mineral deposits of Churchill County, Nevada.

FIELD EXAMINATION

Bennett, 1975

Bennett, 1975


NW-27-3
NW-27-
NW-27-8
NW-28-4
NW-34-6
NW-33-3
NW-34-3
-33-6
DIXIE VALLEY
EDWARDS CREEK VALLEY
Ranch
Ranch (Ruins)
Wonder (Ruins)
TWIN PEAKS
CHALK MOUNTAIN
DESATOYA PEAK
9927
BALD MTN
Corral Summit
FAIRVIEW PEAK
IRON ROCK
Buffalo
BUFFALO MTN
Singaree
Valley
Amphitheater Creek
COUNTY