Mineral Resources Inventory and Analysis

of the

Fort Churchill Planning Unit

Carson City District

by

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1975

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INTRODUCTION

The following narrative and accompanying plastic overlays constitute the Fort Churchill 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 units, 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 depostis 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 category 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 Fort Churchill Planning Unit encompasses most of Churchill County, eastern Lyon County, and a small portion of Storey county.

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

> "Churchill County contains abundant deposits of various non-metallic 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.

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

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.

"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 Lyon and Storey 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 mining districts such as Talapoosa, Churchill, and the Fernley limestone deposit contribute more than a minor portion of production within the planning unit, and other lesser mining.

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 1/

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 referenced to individual "districts", they will be referred to upon occasion in the following text. It should be clearly understood, however, the term "mining district", and its oftimes 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.

1/ Probably less that one million dollars in production can be attributed to lands within the Fort Churchill Planning Unit.

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
Churchill	?	prior to 1945	Tungsten	over $100,000
Talapoosa	?	prior to 1943	Gold, Silver	$315,000

Nonmetallic minerals occur widely across the planning unit. Besides limestone and sand and gravel, diatomite and perhaps salines will be the most important in the future. The most significant producers are summarized below:

Name	Year Developed	Period of Greatest Activity	Commodities Extracted	Recorded Production
Soda Lake	1868	1868-1893	Borates, Salt	Moderate
Fernley Limestone	?	To Present	Limestone	Large

Statistics on industrial minerals are not readily available because many companies request that the data be kept confidential. However, Churchill County 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 occurring 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 types of deposits.

It may be anticipated that the level of metallic mineral exploration in the planning unit will increase moderately with time, that non-metallic 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 Fort Churchill 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 Fort Churchill area. During this time the area was the site of widespread volcanic activity and local sedimentation. Volcanic 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.

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.

NW-19-3
Limestone,
Diatomite, Clay,
Perlite

Mining District: DEAD CAMEL-DESERT MOUNTAINS AREA
(Limestone, Diatomite, Clay, Perlite)

T. 15-20 N., R. 24-27
Lyon and Churchill Counties, Nevada
AMS Reno Map Sheet 1971

GENERAL BACKGROUND

Deposits of limestone, diatomite, clay and perlite are widely dispersed within the area.

South of Fernley, Nevada Cement is quarrying limestone for use in making cement. A small amount of limestone was quarried about 2 miles northwest of Wabuska in 1910.

Clay deposits occur in Section 8, T. 19 N., R. 25 E.; Section 17, T. 18 N., R. 26 E., and Section 12, T. 16 N., R. 24 E. Production has occurred from the latter deposit only.

Diatomite deposits are located in Sections 10 and 12, T. 19 N., R. 25 E.; Sections 5, 7 and 8, T. 19 N., R. 26 E.; Section 14, T. 17 N., R. 25 E.; Sections 2 and 3, T. 15 N., R. 24 E.; and Sections 19 and 29, T. 16 N., R. 29 E. It is believed that little, if any, production has come from these deposits.

Perlite deposits are located in Sections 15 and 19, T. 16 N., R. 29 E. There has been no production from these deposits.

GEOLOGICAL AND TECHNICAL DATA

The Fernley Limestone is a freshwater lake deposit of Late Tertiary Age. The limestone averages 76 percent silica. The limestone is low in iron, aluminum, magnesium, and alkali.

Diatomite is a sedimentary accumulation of the silicious skeletons of microscopic aquatic plants. Deposits occur at various horizons in tertiary sedimentary rocks and because diatomite is easily eroded, significant deposits may lie beneath shallow alluvial cover.

The clay deposits occur as interbeds in Tertiary lake sediments or in hydrothermally altered volcanic rocks.

Montmorillonite is the principal clay mineral.

POTENTIAL FOR DEVELOPMENT

The Fernley limestone deposit will continue to be used for many years.

At some time in the future when more favorably situated diatomite deposits are exhausted, the deposits within Lyon and Churchill counties will become major producers.

The Jupiter clay deposit will be intermittently mixed. Production from other clay deposits is not expected to be substantial.

COMPANIES AND CLAIMANTS ACTIVE IN AREA

Unknown

SELECTED REFERENCES

1. Moore, 1969, Geology and Mineral deposits of Lyon, Douglas, and Ormsby Counties, Nevada.

2. Papke, 1970, Montmorillonite, Bentonite, and Fuller's earth Deposits in Nevada.

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

FIELD EXAMINATION

Bennett, 1975

Fallon
NAAS Fallon
3932
Duck club
Ranch
Sand dunes
Alkali flat
US NAVY
TARGET AREA
BAKER 16
Carson
Canal
Carson Dam
Lahontan Dam
Spillway 4162
Power plant
CHURCHILL CO
LYON CO
Lahontan Reservoir
4266
BLACK BUTTE
MOUNTAINS
DESERT
NW-19-3
NW-30-15
NW-32-1
NW-31-3
Water

NW-28-6
Na, K

Mining District: CARSON SINK
(Sodium, Potassium)

T. 21-24 N., R. 29-32 E.
Churchill County, Nevada
AMS Reno Map Sheet 1971

GENERAL BACKGROUND

A number of sodium-potassium prospecting permits are pending in the Carson Sink area. Applicants include Utah Salt and Mr. W. J. Coleman. American Metal Climax (AMAX) has apparently decided that its holdings have no economic potential and has withdrawn their prospecting permit application.

GEOLOGICAL AND TECHNICAL DATA

Carson Sink is a remnant of Pleistocene Lake Lahontan. Evaporation of lake waters produced a brine containing sodium and potassium salts. For a complete description of geologic and technical data reference is made to E.A.R. 27-030-5-30.

POTENTIAL FOR DEVELOPMENT

Speculative at this time. One major company has lost interest, apparently due to uneconomical brine concentrations in their holdings.

COMPANIES AND CLAIMANTS ACTIVE IN AREA

Utah Salt
W. J. Coleman
Leslie Salt

SELECTED REFERENCES

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

2. Carson City BLM EAR 27-030-5-30

FIELD EXAMINATION

Bennett, 1974

Bennett, 1975

NW-29-1
Na, Borates

Mining District: SODA LAKE
(Sodium, Borates)

T. 19-20 N., R. 27-28 E.
Churchill County, Nevada
AMS Reno Map Sheet 1971

GENERAL BACKGROUND

Area NW-29-1 is located northwest of Fallon in the vicinity of Big and Little Soda lakes.

Soda production from Little Soda Lake began in 1868. Production from Big Soda Lake began in 1875. Between 1868 and 1893 a total of 300 to 800 tons of soda were produced per year.

An attempt was made to extract borates from Big Soda Lake in 1869. However, there was no production.

GEOLOGICAL AND TECHNICAL DATA

The lakes occupy depressions in broad, gentle cones. The source of the dissolved solids is lake and tuff beds through which spring water percolates in supplying the lakes with water.

Dissolved solids in Big and Little Soda lakes are 25,350 m/l and 5,510 m/l respectively.

POTENTIAL FOR DEVELOPMENT

The lake waters have been diluted by infiltration of irrigation water and have no ecconomic potential.

COMPANIES AND CLAIMANTS ACTIVE IN AREA

The commodities are leasing act minerals. There are no active or pending exploration permits or leases in the area.

SELECTED REFERENCES

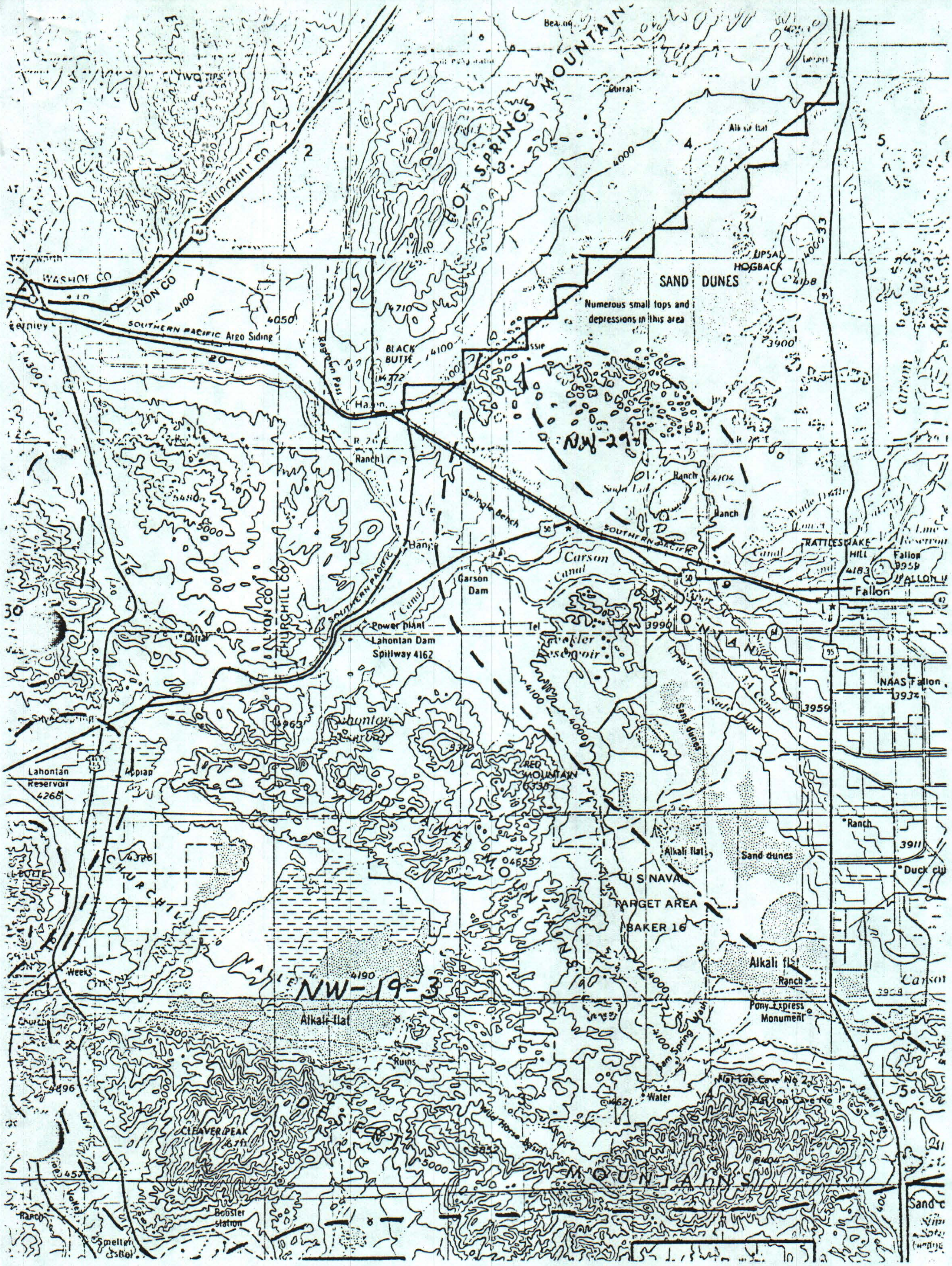
1. Vanderburg, 1940, Reconnaissance of mining districts in Churchill County, Nevada.

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

FIELD EXAMINATION

Bennett, 1974

Bennett, 1975


HOT SPRINGS MOUNTAINS
SAND DUNES
Numerous small tops and depressions in this area
UPSAL HOGBACK
WASHOE CO
LYON CO
CHURCHILL CO
SOUTHERN PACIFIC Argo Siding
BLACK BUTTE
Hazen
NW-29-1
Swingle Bench
Carson
Carson Dam
Power plant
Lahontan Dam
Spillway 4162
RATTLESNAKE HILL
Fallon
NAAS Fallon
Lahontan Reservoir
RED MOUNTAIN
Alkali flat
Sand dunes
U S NAVAL TARGET AREA
BAKER 16
NW-19-3
Alkali flat
Pony Express Monument
Ranch
Ruins
Water
CLEAVER PEAK
MOUNTAINS
Booster station
Weeks
Appian

NW-32-1
W, diatomite

Mining District: CHURCHILL
(Tungsten, diatomite)

T. 16-17 N., R. 24 E.
Lyon County, Nevada
AMS Reno Map Sheet 1971

GENERAL BACKGROUND

The Churchill district includes properties on Churchill Butte and some south of the Carson River.

A little over 100 tons of tungsten ore has been produced from 2 claims on Churchill Butte.

South of the river several claims have been located for diatomite. There has apparently been some production.

GEOLOGICAL AND TECHNICAL DATA

Scheelite mineralization occurs at the contact between limestone and granite. Ore averaged .6 - .75 percent WO_3.

The diatomite occurs as interbeds in lake sediments. Exploration trenches have exposed a portion of the deposit.

POTENTIAL FOR DEVELOPMENT

All of the tungsten production came from hand sorted ore. Little interest in the properties is anticipated in the future.

The diatomite occurrence has not been extensively explored. No information is available as to quality and quantity of the material. No intensive exploitation is anticipated in the near future.

COMPANIES AND CLAIMANTS ACTIVE IN AREA

Unknown.

SELECTED REFERENCES

1. Moore, 1964, Geology and mineral deposits of Lyon, Douglas, and Ormsby Counties, Nevada.

FIELD EXAMINATION

Not examined.

Bennett, 1975

NW-30-15
Power Plant
Lahontan Dam
Spillway 4162
Lahontan Reservoir
4268
CHURCHILL BUTTE
NW-32-1
STOREY CO
LYON CO
Alkali flat
Ranch
Weeks
NW-19-3
NW-31-3
CLEAVER PEAK
NW-32-7
Wabuska
4299
LYON PEAK
NW-31-7
MASON VALLEY
MASON BUTTE
YERINGTON IR

Mining District: LOWER CHURCHILL CANYON AREA
(Mineral Commodities Unknown)

T. 16 N., R. 24 E.
Lyon County, Nevada
AMS Reno Map Sheet 1971

GENERAL BACKGROUND

The lower Churchill Canyon area is located in section 32, T. 16 N., R. 24 E., about 8 miles southwest of Weeks, Nevada.

Lyon County records indicate that a placer claim has been filed in this area. However, the claim has not been examined and the nature of mineralization, if any, is not known. The geologic literature makes no mention of this specific area, nor is any mining activity indicated on recent topographic maps.

GEOLOGICAL AND TECHNICAL DATA

Moore's (1) geologic map of the area indicates that the mining claim is located on Recent alluvium and Tertiary volcanics.

POTENTIAL FOR DEVELOPMENT

Unknown.

COMPANIES AND CLAIMANTS ACTIVE IN AREA

1. RAINY
   William Smith, et.al.
   521 Pearly St.
   Yerington, Nev.
   Apr. 1971
   (placer claim)

SELECTED REFERENCES

1. Moore: Geology and Mineral Deposits of Lyon, Douglas, and Ormsby Counties, Nevada; Nev. Bur. Mines Bull. 75, 1969. (Includes geologic map of the area)

FIELD EXAMINATION

Not examined.

Bennett, 1975

WASHOE CO
LYON CO
NW-30-15
Talapoosa Mines
Silver Springs
Lahontan Reservoir
4268
LYON CO
CHURCHILL CO
Power Plant
Lahontan Dam
Spillway 4162
CHURCHILL BUTTE
Alkali flat
STOREY CO
LYON CO
NW-32-1
NW-19-3
NW-31-3
NW-32-7
NW-31-7
CLEAVER PEAK
Hooster station
Wabuska
PARKER BUTTE
5003
LYON PEAK
MASON VALLEY
MASON BUTTE
YERINGTON IR
DOUGLAS CO
CARSON HILL
Ranch

BLM COMMUNITY PITS
(Sand, gravel, building stone)

GENERAL BACKGROUND

Two common use area pits are located in the area. These sites, their location, and specific commodities are summarized below:

NAME	LOCATION	MATERIAL
Hooten Wells Common Use Area	T. 16 N., R. 26 E., sec. 2, 11	Building Stone
Water Tank Common Use Area	T. 16 N., R. 28 E., sec. 13	Sand and gravel, fill

GEOLOGICAL AND TECHNICAL DATA

Sand and gravel are common products of erosion that typically have been deposited by water. Common sources include alluvial fans and river and stream channels.

The building stone at Hooten Wells is a platy rhyolite.

POTENTIAL FOR DEVELOPMENT

There is every indication that continued urbanization in the resource area will require additional sources of construction material in the future. These materials are of value only if they are located reasonably close to population centers. Because of high transportation costs, their value diminishes rapidly with increased distances from consumption points. Therefore, the community pits will receive increased use in the future, and as present ones are exhausted new pits should be established to provide for orderly growth of the community.

Bennett, 1975