CONTACT INFORMATION
Mining Records Curator
Arizona Geological Survey
416 W. Congress St., Suite 100
Tucson, Arizona 85701
602-771-1601
http://www.azgs.az.gov
inquiries@azgs.az.gov

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Dr. R. Anderson & Associates
7513 Monterey Circle/Sandy, Utah 84070
(801) 943-3726

Attachment II

Amasa Valley Placer Property

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PRELIMINARY REPORT ON AMASA VALLEY PLACER CLAIMS

- Introduction
- Location
- History
- Geology
- Conclusions

Maps of Area & Location

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Standard Exploration Agreement

Clients Benefits Information

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Legal Opinion

Exhibit I - Tungsten Deposits in Utah - US Bureau of Mines Circular 8014

Exhibit II - Placer Gold Deposits of Utah - Geological Survey Bull. 1357

OMEGA MINERAL RESOURCES, INC.

431 South 300 East • Salt Lake City, Utah 84111

Preliminary Report
Amasa Valley Claims
Millard County, Utah

The Amasa Valley Claims contain a significant quantity of gold and tungsten. The Amasa Valley placer deposit which is covered by these claims extends to over an area in excess of 1 ½ miles wide by 3 miles long. Placer ore gravels in excess of 5,000,000 cubic yards are available for exploration with values estimated to be at least $7.00 in free gold and $38.00 in tungsten per cubic yard. This calculation is based on placer gravel ore to a depth of 5 feet whereas the average depth determined to date exceeds 20 feet.

Location:

The Amasa Valley placer mining claims are a group of 135 unpatented claims located wholly in West Central Utah, in Western Millard County, some 50 miles directly west of Delta, Utah. They are located in the mountain range called the House Range, near Notch Peak.

The elevation ranges from 7400 to 7800 feet. Limited vegetation is on the property with scattered Cedar and Pinion Pine trees. The land is not a major animal habitat but deer and cattle graze on the area and is controlled by the BLM. The claims are sufficiently proximate to human activity to prevent extensive use by wild animals.

History:

There are several lode mines surrounding the area and operations from these mines have been successful and profitable since 1954 with major emphasis on tungsten production. Several records available show substantial shipments of ore and concentrates over the years. The property goes as far back as 1933 with continuous but limited activity (Exhibits I & II).

The present high prices for gold and tungsten combined with advanced recovery and refining methods now make many mining properties economically feasible to extract values therefrom.

There is adequate water (a reservoir constructed in 1941 on the property) to process the ore gravel and concentrate the ore material prior to refining. A building originally built for gravity concentration is in good condition for use. Electricity will need to be generated at the site. All ground is Federal Land and is controlled by the BLM. No Forest Service property is included.

A trommeling plant and concentrating systems can be assembled to produce high grade gold and tungsten concentrates for refining into final metal products.

Geology

Amasa Valley is an intermont basin approximately 3 miles long and 1 ½ miles wide, that owes its existence to a highly resistant aplite sill that prevented rapid downward cutting. The valley is flat-floored to the edges of the quartz

monsanite, where erosion has been greatly accelerated and has given rise to the contrasting topography at the head of Weeks Canyon. It is transected by fringes and tongues of the granite porphory intrussion and contains gravels on the Valley floor that have been tested by vertical shafts without reaching bedrock. The gravel contains black sands, scheelite, and free gold, the latter minerals assaying an average of $38.00 and $ 7.00 per cubic yard, respectively. Since discovery of the minerals in 1880, intermittent placer mining activities have continued, until the present time.

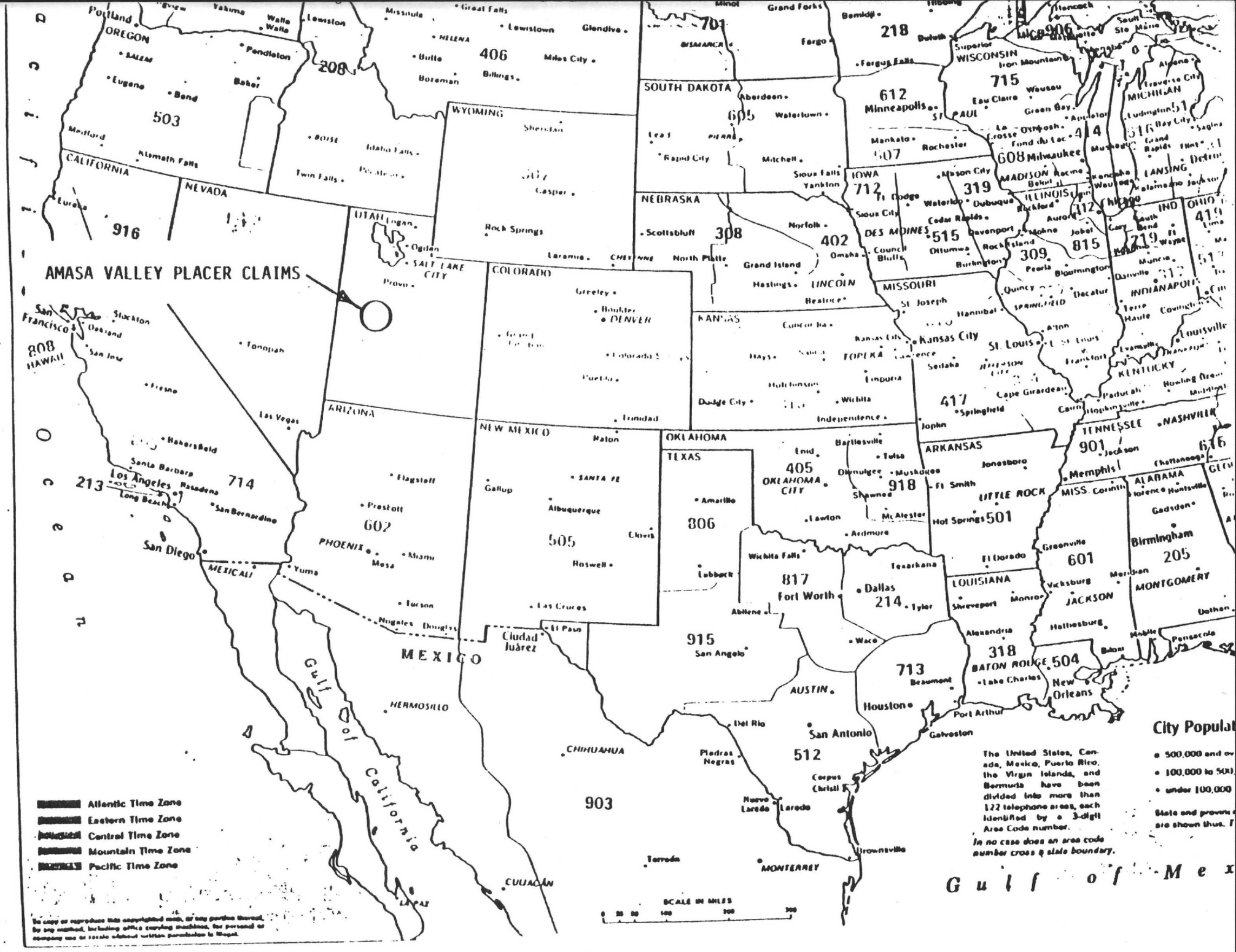
Crawford and Buranek have reported that gold occurs in arkose sands and had its origin in quartz veins. The original source of the gold is not positively known.

Conclusions:

The computations given here are fro only 5,000,000 cubic yards of placer ore gravel with gold values of $3.50 per cubic yard and tungsten values of $19.00 per cubic yard which are ½ of those averaged to dated in values. No allowance is made for values carried in the Black Sands which appears to be equal to the free gold content or values. This gives a total of $112,500,000 for the ore body: $17,500,000 for gold at $250.00 per tr. oz. and $95,000,000 for tungsten at current prices.

There appears to be probable ore reserves of up to an additional 45,000,000 cubic yards and the additional values understated by at least 50% makes this a very exciting ore body to harvest values from.

Dr. Ralph Anderson
Chemical Engineer & Metallurgist
PhD, University of Calif. Berkeley
7513 Monterey Circle,
Sandy, Utah 84070

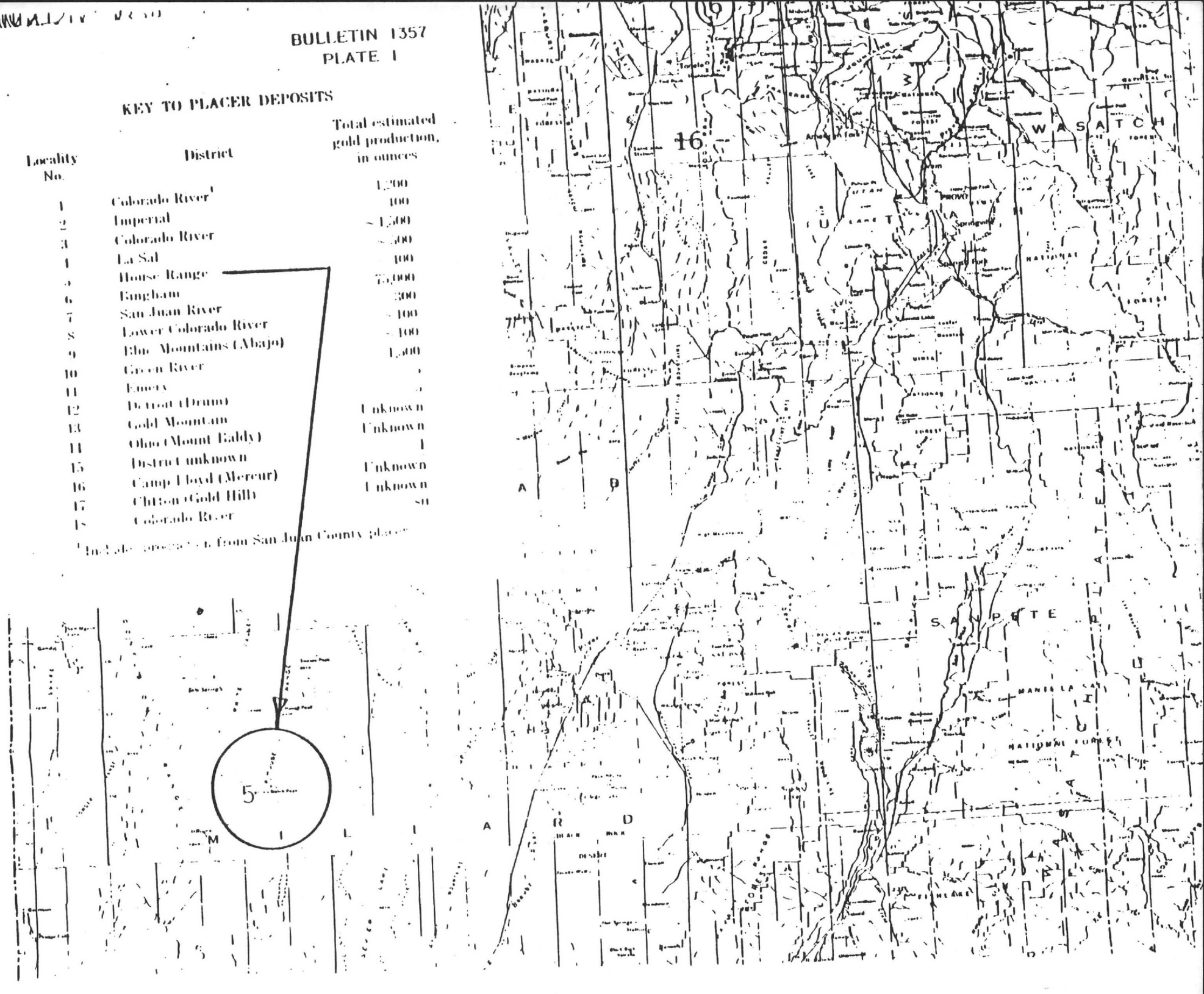

AMASA VALLEY PLACER CLAIMS
OREGON
CALIFORNIA
NEVADA
UTAH
WYOMING
COLORADO
ARIZONA
NEW MEXICO
NEBRASKA
KANSAS
OKLAHOMA
TEXAS
MISSOURI
IOWA
SOUTH DAKOTA
WISCONSIN
MICHIGAN
ILLINOIS
INDIANA
KENTUCKY
TENNESSEE
ARKANSAS
LOUISIANA
ALABAMA
MEXICO
Gulf of California
Gulf of Mex
Atlantic Time Zone
Eastern Time Zone
Central Time Zone
Mountain Time Zone
Pacific Time Zone
SCALE IN MILES
City Populat
500,000 and ov
100,000 to 500
under 100,000
The United States, Canada, Mexico, Puerto Rico, the Virgin Islands, and Bermuda have been divided into more than 122 telephone areas, each identified by a 3-digit Area Code number.
In no case does an area code number cross a state boundary.

BULLETIN 1357
PLATE 1

KEY TO PLACER DEPOSITS

Locality No.	District	Total estimated gold production, in ounces
1	Colorado River[1]	1,200
2	Imperial	100
3	Colorado River	~1,500
4	La Sal	~500
5	House Range	100
6	Bingham	75,000
7	San Juan River	300
8	Lower Colorado River	~100
9	Elk Mountains (Abajo)	~100
10	Green River	1,500
11	Emery	[illegible]
12	Detroit (Drum)	[illegible]
13	Gold Mountain	Unknown
14	Ohio (Mount Baldy)	Unknown
15	District unknown	1
16	Camp Floyd (Mercur)	Unknown
17	Clifton (Gold Hill)	Unknown
18	Colorado River	[illegible]

[1] Includes [illegible] from San Juan County placers



OQUIRRH METALS, INC.
P.O. Box 151267 • Salt Lake City, Utah 84115 • Telephone (801) 943-3726

CERTIFICATE OF ANALYSIS

MAY 25, 1979

To: James Watson

Report On: Four (4) samples for assay from Amasa Valley Placer

Submitted By: Moody

Date Received: May 19, 1979

Analysis: Gold & Tungsten

Analytical Methods: Fire assay recovery with Atomic Absorption

Sample No. ; Wt. of Sample Received		Gold, opt	Tungsten, %
1, black placer	52 lbs	0.058	0.17
2, buck-shale	26 "	0.153	0.27
3, placer gravel	65 "	0.046	0.16
4, stream bed	54 "	0.052	0.165

ASSAY REPORT

UNION ASSAY OFFICE, Inc.

J. V. SADLER, President
A. C. SELBY, Vice-Pres. & Treas.
A. C. SELBY, JR., Secretary

Salt Lake City 10, Utah

LEPHONE 3-3302

Hand Sample Serial 83219

Mine Don Moody

Nov. 15, 1954

RESULTS PER TON OF 2000 POUNDS

NO.	GOLD Ozs. per Ton	SILVER Ozs. per Ton	LEAD Per Cent Wet	COPPER Per Cent	INSOL Per Cent	ZINC Per Cent	SULPHUR Per Cent	IRON Per Cent	LIME Per Cent	Per Cent	Per Cent	VALUE GOLD
				MO	WO_3	P						
-54 P1 #1				2.339	67.70	0.041						

TONGSTEN CONCENTRATE PRODUCTION ASSAYS

AMASA VALLEY AREA

Remarks

Charges $ 10.00

ASSAY REPORT

UNION ASSAY OFFICE, Inc.

J. V. SADLER, President
A. C. SELBY, Vice-Pres. & Treas.
Lily M. Hottinger, Secretary

Salt Lake City 10, Utah

Telephone 3-3302

Con. Serial 714

Mine Rare Metals Mining Company

Mr. Don Moody

RESULTS PER TON OF 2000 POUNDS

Nov. 9, 1954

LOT	GOLD Ozs. Per Ton	SILVER Ozs. Per Ton	LEAD Wet on Ore	COPPER Per Cent	INSOL Per Cent	ZINC Per Cent	SULPHUR Per Cent	TUNGSTIC OXIDE Per Cent	IRON Per Cent	LIME Per Cent	Per Cent
Don Moody								21.92			

Remarks

Sampled By

Charges $ 5.00

RESUME

Ralph Anderson
7513 Monterey Circle
Sandy, Utah 84070

Personal

Married - 5'9" - 180 lbs. - 48 years old

Education

B. Eng. Sc. Degree, 1956, Brigham Young University

Major: Chemical Engineering
Minor: Chemistry, Math

M.S. Degree, 1956, Brigham Young University

Major: Physical Chemistry
Minor: Physics
Thesis: Recovery of Molybdenum from Low Grade Ores with the Aid of Microorganisms

Ph.D Degree, 1961, University of California, Berkeley

Dissertation: Physico-Chemical Properties Controlling the Non Ideal Thermodynamics of Liquid Mixtures

Experience

1956-1958	Shell Development Co., Emeryville, California Process Research & Development of Chemical and Physical Separation Systems
1958-1960	University of California, Berkeley
1960-1966	United Technology Center, Sunnyvale, California Chief, Chemical Physics Research & Development Section Chief, Mechanical Properties Development Section
1966-1969	Consolidated Engineering & Technology Corporation Mountain View, California, Vice President Research & Development and Manufacturing - Precious Metal Recovery Systems
1969-1973	Future Systems, Inc., Los Gatos California, President Development and Manufacturing of Advanced Silver Recovery Systems and Hydrometallurgical Processing of Base and Precious Metal Ores and Concentrates

1974-Present Hymet Corporation, Salt Lake City, Utah, President Development of Precious Metal Recovery Systems, Precious Metal Ores Consultant on Processing and Metallurgy: Berkely Enterprises, Geneva, S.A.; Universal Oil, Hong Kong; Oquirrh Metals, Inc.; Frontier Metals, Inc.; Red Rock Flourspar, Inc.

Background

Brought up in Central Utah. Have traveled extensively and worked in most all the Western States. Lived in Northern California for 18 years. Experience is in geological analysis and placer mining and recovery and processing of base and precious metal ores and concentrates.

In summary, Dr. Anderson has had extensive experience in all phases of management, from production layout, to set-up, to start-up and then to production. He is thoroughly conversant and competent in security systems, transporation systems and management of mining and milling operations and precious metal recovery processes in both design, set-up and operation. Of particular interest are the difficult metallurgical problems such as what are commonly referred to as "Black Sands." He has been particularly successful in rendering the values from these difficult types of materials.

RESUME

Steven C. Hansen
255 Harvard Avenue
Rexburg, Idaho 83440

Personal

Married - 6'1" - 175 lbs. - 41 years old

Education

B.S. Degree, 1962, Utah State University

Major: Geology

M.S. Degree, 1964, Utah State University

Thesis: Geology of the South Western Part of the Randolph Quadrangle Utah-Wyoming

Ph.D. Degree, 1977, University Idaho

Dissertation: Economic Geology of the Wikieup Intrusive, Mohave County, Arizona

Societies, Honors, Organizations

Member: Sigma XI, Sigma Gamma Epsilon, American Institute of Mining Engineers, Idaho Academy of Science

Registrations

Registered Professional Geologist, State of Idaho, Certificate no. 90

Experience

1962	Summer geological assistant, Texaco, Inc.
1964-1965	Exploration Geologist, Humble Oil Company
1965-1966	Teacher at Bonneville High School
1966-Present	Professor of Geology, Ricks College Geology Department Coordinator, Ricks College Professor, Extension classes in Geology, Idaho State Univ. Brigham Young University Director - Silver Moon Mining Corp., Universal Exploration Corporation

1965-Present Consulting geologist for Silver Moon Mining Company, Idaho Travertine Corp., D.M. Murphy private citizen, U.S. Silver Corp., Universal Exploration, Universal Resources, S.M. Hansen and Associates, Orval Hansen, Lawyer, Utah-Idaho Sugar Co., Calida Mining Co., Inc.

Background

Brought up in southeastern Idaho. I have traveled and worked in all of the western states. My experience is in both oil geology and mining geology. My present interests are in mining geology, geothermal energy, and associated energy or natural resource areas.

TUNGSTEN DEPOSITS IN UTAH

By F. D. Everett

information circular 8014

UNITED STATES DEPARTMENT OF THE INTERIOR
Stewart L. Udall, Secretary

BUREAU OF MINES
Marling J. Ankeny, Director

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this range is the southward continuation of the Chaqui Range. A body of monzonite about one-half mile in diameter has intruded dolomitic limestone in the southwest part of the range (22). Scheelite has been found in tactite bodies in the dolomitic limestone near the igneous contact at the Desert Tungsten and Lockheed properties (24). The contact of dolomitic limestone and monzonite is exposed at the surface for approximately 1 mile. The Desert Tungsten mine was worked during World War II and in 1951 and 1956, and several thousand tons of ore averaging slightly under 1 percent WO_3 was produced.

House Range

The House Range is a continuation of the Fish Springs Range, extending about 45 miles southward in western Millard County. Scheelite deposits have been found around the periphery of the Notch Peak intrusive, which is approximately 1-1/2 miles north of Notch Peak, a prominent limestone landmark. The surface area of the intrusive is roughly 3 by 6 miles (fig. 4) and the intrusive rock is quartz monzonite (9). Surrounding rocks are the gently dipping limestones of the Upper Cambrian Notch Peak and the Orr and Weeks

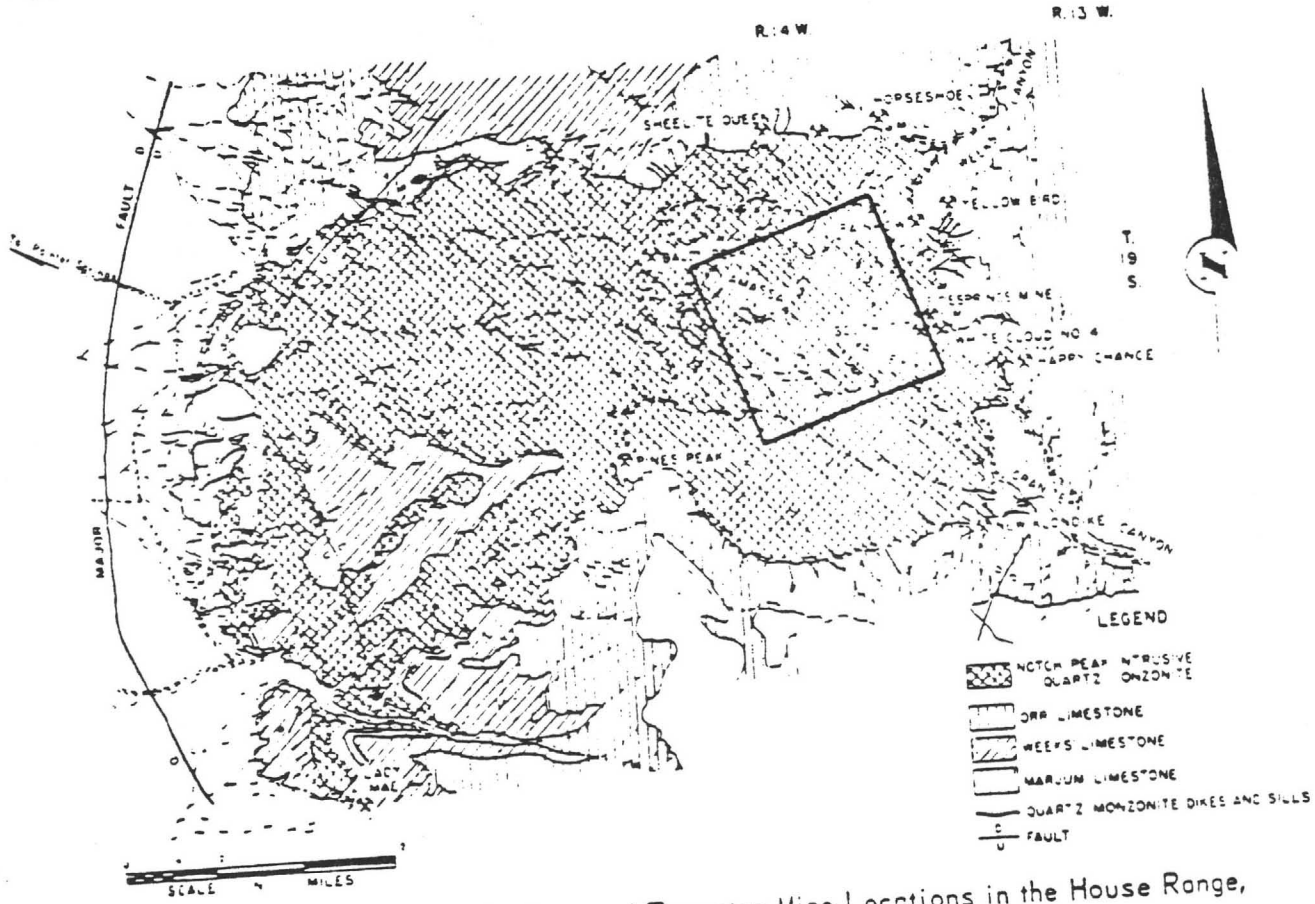

FIGURE 4. - Generalized Geology and Tungsten Mine Locations in the House Range, Millard County, Utah.

formations (23). Several small lenses of scheelite have been found in tactite zones near the contact of the quartz monzonite and the limestone. The zone of contact extends about 15 miles, and about half is barren of overburden. Much of the contact along the north and east side of the intrusive is covered by 1 to 20 feet of overburden.

Production has come from 10 properties. Some of the ore has been relatively high in grade, but much has averaged 0.2 to 0.3 percent WO_3.

Mineral Range

The Mineral Range is in eastern Beaver County between the towns of Beaver and Milford. It trends northward and covers an area about 25 miles long and 7 miles wide. In the central part of the range, an elongated granite mass is bordered by Paleozoic and Mesozoic sediments and Tertiary extrusive rocks. In the south and east parts of the range, thin strata of Kaibab limestone of Permian age flank the granite and form many of the foothill slopes (fig. 5). Many dikes and sills of granite have intruded the sedimentary rocks, and pegmatite lenses are abundant in the granite. Scheelite has been found in tactite zones in limestone near granite contacts. Contacts of limestone and granite are traceable for 8 miles around the southern end of the range. Some tungsten occurs with lead, zinc, silver, and gold in veins and along igneous contacts in the area north of Minersville. However, most of the scheelite has been found in tactite deposits along the east side of the range (6, 13), although a heavy cover of overburden obscures most of the contacts. Considerable prospecting has been done since scheelite was discovered in the area in 1940. Two prospects attained the productive stage. The latest exploration was in 1956, when 10 holes were diamond drilled to intersect a mineralized zone at the Garnet mine. Accurate reports of the drilling results are not available, but scheelite was reported in the holes.

Future discoveries probably will be found along the obscured contacts of limestone and granite beneath the overburden.

San Francisco, Rocky, and Star Ranges

The San Francisco, Rocky, and Star Ranges in western Beaver County are similar to other basin ranges in that they trend north-south, rise abruptly above the basin floor, and contain acidic intrusives flanked by Paleozoic sedimentary rocks. The Rocky Range may be considered a spur of the Beaver Lake Range, and the Star Range is a continuation of the Rocky Range. In the San Francisco Range the Grampian limestone flanks a quartz monzonite stock. Smaller stocks in the Rocky and Star Ranges are bordered by calcareous sediments.

The Old Hickory is the only mine that produced much scheelite, although tungsten was found in several other properties during World War II (13). The contacts of limestone and intrusive rock can be traced about 5 miles on the surface. Scheelite occurs in tactite in both low-grade disseminations and higher grade concentration. Hobbs (13) has estimated reserves for mines in the area in 1946.

upper adit. Some scheelite was found along the contact, and several places appear worthy of additional exploration under proper price incentive.

Pines Peak

The Pines Peak mine in the House Range is in a limestone roof pendant near the southern edge of the Notch Peak quartz monzonite stock (fig. 4). The property consists of 12 unpatented claims, Copper King and Copper King Nos. 1 to 7, Eagle Point mill claim, and Eagle Point Nos. 1 to 3, situated about 3 miles from Baldy Peak, the highest point at the northwest end of Amassa Valley. The claims were located in 1952 and are owned by Amalgamated Tungsten, Inc., K. E. Farnsworth of Salt Lake City, president.

Tactite zones occur near contacts of the limestone with tongues of quartz monzonite. The area has been developed by five small open pits. Production has totaled 175 tons ranging in grade from 0.2 to 0.29 percent WO_3, from which 53 units of WO_3 was recovered. About 300 tons of ore assaying 0.3 percent WO_3 is stockpiled on the property.

Treasure Mountain Mining Co.

Treasure Mountain Mining Co. owns 52 lode claims and 27 placer claims and holds under lease an additional 27 lode claims, all in Amassa Valley of the House Range. The company was reorganized from the Mineral Valley Gold Mining Co. Don and Floyd Moody of Delta, Utah, are officers of the company, which has produced scheelite ores from five deposits. A mill was constructed in 1955, but it operated only for a brief period. Some of the ore was trucked to the Metcalf mill at Tule Springs in Millard County, but most of it was concentrated at the H M & S and Combined Metals Reduction Co. mills. The concentrates were refined by Salt Lake Tungsten Co.

A total of 4,200 tons of ore was shipped to mills and 2,431 units of WO_3 was recovered. The ore averaged 0.80 percent WO_3. An additional 5,000 tons of ore has been mined and stockpiled. Mines operated by this company are Baldy Peak, Rainbow, Horseshoe, Sidesprings, and South Pit. (See fig. 4, p. 9.)

Baldy Peak

This mine is on Baldy Peak, an isolated limestone roof pendant at the northwest rim of Amassa Valley. The pendant is entirely surrounded by quartz monzonite and has been penetrated by aplite dikes. Tactite zones occur in the limestone at the quartz monzonite contact. The limestone beds dip 20° to 25° SW. Scheelite occurs as finely disseminated grains irregularly distributed in the tactite zone which may be traced on the surface in an irregular block about 375 feet long and 180 feet wide. The property has been developed by two large-size adits 65 feet long on the south side of the hill and by an adit on the east side. The contact was explored by bulldozer stripping and several wagon-drill holes. About 4,000 tons of low-grade ore was mined, and some of the ore is stockpiled at the workings.

Placer Gold Deposits of Utah

By MAUREEN G. JOHNSON

GEOLOGICAL SURVEY BULLETIN 13

A catalog of location, geology, and production with lists of annotated references pertaining to the placer districts

UNITED STATES GOVERNMENT PRINTING OFFICE, WASHINGTON : 1973

UNITED STATES DEPARTMENT OF THE INTERIOR

ROGERS C. B. MORTON, *Secretary*

GEOLOGICAL SURVEY

V. E. McKelvey, *Director*

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Hunt, 1958, Geologic map of the North La Sal stock (pl. 40), scale 1:20,000.

Richmond, 1962, Geologic map of the Quaternary deposits of the La Sal Mountains (pl. 1), scale 1:48,000.

Access: From Moab, it is about 16 miles northeast on State Highway 128 to the road leading southeast through Castle Valley. Dirt roads lead south from the Castle Valley road about 7 miles southeast of State Highway 128 to placer areas.

Extent: Gold occurs in glacial deposits on the mesas southwest of North La Sal Mountain and south of Castle Valley and in Miners Basin and Placer Creek on the west flank of North La Sal Mountain at the western edge of Castle Valley. The placers on Wilson Mesa (approximately secs. 10 and 15, T. 26 S., R. 23 E.) and Bald Mesa (approximately sec. 19, T. 26 S., R. 24 E.) occur in Pleistocene pre-Wisconsin deeply weathered glacial gravels, which vary from thin layers to deposits 50 feet or more thick. The gravels are composed of subangular debris (mostly soda syenite, feldspathoidal rocks, metadiorite, and amethystine quartz) derived from the central part of North La Sal Mountain. The gold is disseminated throughout the gravels and occurs as small wires or flakes that do not appear to be waterworn. The placers in Placer Creek, east of Pinhook (approximately sec. 16, T. 26 S., R. 24 E.), and in the upper part of Miners Basin (approximately sec. 15, T. 26 S., R. 24 E.) are found in little-weathered glacial outwash and moraine; the gold is fine and sparsely distributed.

Production history: The placers on Wilson Mesa were discovered in 1907 and were worked intermittently until 1948. Most activity took place during the first few years after discovery of the gold; sluicing was the most common mining technique used. For many years the placer production from Miners Basin and that from Wilson Mesa were reported separately; judged by these records, the Wilson Mesa placers were the most productive.

Source: The placer gold was derived from fissure deposits in the North La Sal Stock (predominately diorite porphyry with a central core of metadiorite and soda syenite); the gold occurs in pyrite in quartz veins along the fissures and in altered wallrock. Where the pyrite has been oxidized, free gold can be panned. According to Hunt (1958, p. 355), the deeply weathered gravels offer more promise for higher gold concentrations than the later less-weathered gravels, because gold contained in sulfide minerals in the igneous rocks in the gravels would be freed by long periods of oxidization.

Literature:

Butler and others, 1920: Quotes Hill's description of placers (1913); discusses origin of the gravels.

Hill, 1913: Extent of placer gravels; thickness; size of debris in gravels, lithology of gravels; fineness and size of gold; placer-mining techniques, production; source.

Hunt, 1958: Location; character of placer gravel; source. Areas suggested for prospecting.

Mining Review, 1910b: Reports value of placer gravels at 25¢ to 87½¢ per yard (at $20.67 per yard); production in 5 months by two men, $1,900.

Mining Science, 1910: Names creeks where placer gold was found; reports values of 25¢ to $1 per yard (at $20.67 per yard) in Wilson Mesa; depth of gravels.

MILLARD COUNTY

5. HOUSE RANGE PLACERS (SAWTOOTH DISTRICT, NOTCH PEAK PLACERS)

Location: Central part of the House Range in Amasa Valley and Granite Canyon, T. 19 S., R. 14 W.

Topographic map: Notch Peak 15-minute quadrangle.

Geologic map: Hanks, 1962, Geology of the central House Range area, scale about 1 in. = 1 mile.

Access: The placer area lies within the part of the House Range between U.S. Highway 6-50 and old U.S. Highway 50, about 44 miles west-southwest of Delta. Amasa Valley and Granite Canyon are accessible by dirt roads branching off these highways.

Extent: Placer gold has been recovered from the arkosic sands and gravels in Amasa Valley (sec. 2, T. 19 S., R. 14 W.) and from gravels in Granite Canyon near the point where the north and east forks of the creek join the main canyon bed (sec. 12, T. 19 S., R. 14 W., projected). Granite Canyon is named "Miller Canyon" on the topographic map of the area.

Production history: Placer production in the House Range was first recorded in 1932 and continued yearly until 1943 and intermittently until 1957. The production was credited to the Sawtooth district from 1932 to 1940 and in 1957, and to the House Mountains, from 1941 to 1953. Most of the placer gold was recovered from claims in the Amasa Valley, but gold was recovered from Granite Canyon in 1940. During the late 1930's, the placers were investigated by the Mineral Valley Gold Mining Co., but large-scale placer mining was never attempted.

Source: The source of the gold in the placers is uncertain. The arkosic sands and gravels in which the placers are found were derived by weathering of the quartz monzonite stock that forms Notch Peak. Crawford and Buranek state that the gold was derived from quartz veins, but Gehman (1958, p. 46) points out that the only quartz observed was found in pegmatites and scheelite veins barren of gold.

Literature:

Crawford and Buranek, 1944: Source of placer gold in Granite Canyon.

Gehman, 1958: Lithology of placer gravels; source of gold in Amasa Valley.

Hanks, 1962: Placer-mining production.

Mining Journal, 1938: Reports gold, mercury, tungsten, and molybdenum in gravels as much as 30 feet thick.

Powell, 1959: Notes presence of placer claims in Granite Canyon.

SALT LAKE COUNTY

6. BINGHAM DISTRICT

Location: In the Oquirrh Mountains, in and adjacent to the Bingham open-pit copper mine, T. 3 S., R. 3 W.

Topographic maps: Bingham Canyon and Lark 7½-minute quadrangles. Bingham mining map, special edition, 1901, scale 1:20,000 (for location of gulches before open-pit mining).

Geologic maps:

Boutwell, 1905, Map of economic geology of Bingham mining district and index to mines, pl. 16 (shows distribution of placer gold deposits), scale 1:20,000.

Utah Geological Society, 1961, Kennecott Copper Corporation surface geology map of the Bingham district (pl. 2), scale ½ in. = 1,000 ft.

Access: From Salt Lake City, 12 miles south on U.S. Interstate 15 to Midvale; 14 miles west on State Highway 48 to Bingham.

Extent: Placers were found in Bingham Canyon from its upper branches—Carr Fork, upper Bingham Canyon, Bear Gulch—downstream along the main canyon to the mouth of Bingham Canyon, where the creek enters Jordan Valley. Most of the original topography has been obliterated by the open-pit mine and waste dumps outside the mine. Placer gold was found in bench and creek gravels (as much as 250 ft thick) which represent deposition, reworking, and redeposition of eroded material at successively later periods of dissection of Bingham Canyon. Most of the gold values were found at one of two horizons—the gravels immediately overlying bedrock, and the "upper leads," where the gold is concentrated in paystreaks above dense gravel beds forming a false bedrock. The gravels consist of the more resistant rock types exposed in the area (predominantly quartzites and porphyries) and become progressively more rounded downstream; the gold contained in the gravels becomes finer and more rounded downstream. The gold content of the gravels varied considerably in different deposits—sampling at the Argonaut pit (about 1900) indicated an average of 10¢ per yard for the lower 30 feet of bench gravels, a yield of $31 per cubic yard of gravel (probably from a rich pocket over bedrock) at the Old Channel deposit.

Production History: The Bingham placers were discovered in 1864, 1 year after the discovery of lead ore. Historically, the placers at Bingham were the largest in Utah in production and extent; in the 20th century, the

placers at Bingham have had negligible production. About $1 million placer gold was recovered from the gravels by 1871, and another $500,0 by the turn of the century. The greatest period of placer-mining activi was from 1868 to 1872; after that time, placer mining declined in impo tance relative to lode mining. Most of the early work utilized sluicin drift mining, and hydraulic mining techniques. Many of the placer d posits were considered to be worked out by the late 1800's, but Boutw (1905, p. 377) indicates that in 1900 some workable deposits probab remained at Dixon Bar, Bear Gulch, and buried creek gravels in low Bingham Canyon. Small amounts of placer gold were recovered fro the district during the period 1920–21 and again during the peri 1932–35.

Source: Gold occurs in minor amounts in the porphyry-type copper or and in the "nonporphyry" copper and lead-zinc-silver ores. In some the oxidized parts of the nonporphyry ores, gold has been concentrate in honeycombed siliceous gangue, and rapid erosion of these depos provided the source for most of the placer gold in the district. Boutw (1905, p. 342) points out that some of the placer gold in upper Be Gulch does not seem to have been derived from oxidized ore and probabl was derived from mineralized porphyry. The relation of intrusion of t Bingham stock to the alteration and subsequent mineralization in t district has been studied in detail by many geologists. Moore, Langhe and Obradovich (1968) date the intrusion of the Bingham stock at 37 / 37.2 m.y. (million years) and the age of alteration at 36.5 m.y (average thus, the ore minerals in the Bingham district, some of which were t source of placer gold, formed about 36.5 m.y. ago.

Literature:

Boutwell, 1902: Abstract of U.S. Geological Survey Prof. Paper 38.

——— 1905: Detailed and complete description of placer deposit Includes map showing location of placers; description of gravels; gol content; past placer-mining operations; erosional history of Bingha area; source of placer gold; problems encountered in placer minin future potential in placer mining.

Burchard, 1882: Production statistics for 1881.

Butler and others, 1920: Quotes Boutwell's description (1905) of th placers.

Hammond, 1961: History.

Maguire, 1899: History.

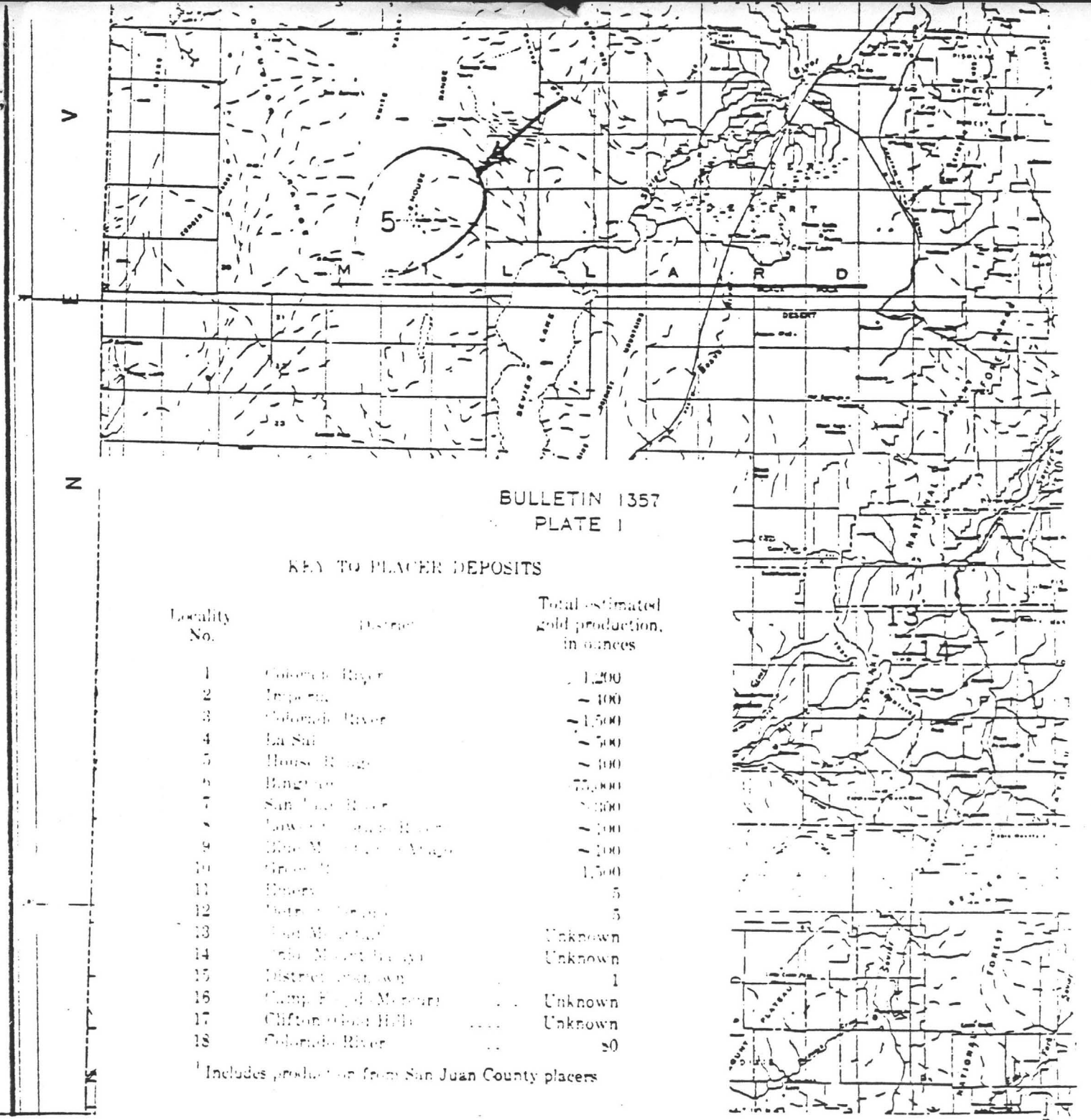
Moore and others, 1968: Radiometric ages of altered and unaltere igneous rocks; age of mineralization.

Raymond, 1870: Early small-scale placer-mining operations in 186

——— 1872: Placer-mining operations in 1870.

——— 1873: Placer-mining activity in 1871; production.

——— 1874: Placer-mining activity in 1873; production.



BULLETIN 1357
PLATE I

KEY TO PLACER DEPOSITS

Locality No.	District	Total estimated gold production, in ounces
1	Colorado River	1,200
2	Imperial	~ 400
3	Colorado River	~ 1,500
4	La Sal	~ 500
5	House Range	~ 400
6	Bingham	75,000
7	San Juan River	[illegible]
8	Lower Colorado River	~ 100
9	Blue Mountain (Abajo)	~ 100
10	Green R[illegible]	1,500
11	Emery	5
12	Detroit (Grand)	5
13	Gold Mountain[1]	Unknown
14	Ohio (Mount Baldy)	Unknown
15	District unknown	1
16	Camp Floyd (Mercur)	Unknown
17	Clifton (Gold Hill)	Unknown
18	Colorado River	80

[1] Includes production from San Juan County placers

SCALE 1:1 000 000

25 0 25 50 MILES

25 0 25 50 KILOMETERS

MAP SHOWING PLACER GOLD DEPOSITS IN UTAH

PUBLISHED QUARTERLY BY UTAH GEOLOGICAL AND MINERAL SURVEY

SURVEY NOTES

formerly **QUARTERLY REVIEW**

Vol. 13 No. 2 Service to the State of Utah May 1979

DIGGIN'S

UTAH VALLEY WILDCAT

warrant testing. No cores or drill stem

ENVIRONMENTAL GEOLOGY

ENERGY DEVELOPMENTS

OPEN FILE REPORTS

78-336 Proceedings of Conference IV The Use

78-1094 Measured Sections of the Lower

vary in proportion to the hold up copper as oxidized minerals. Similarly silver may be held up where chlorine and bromine are prevalent to variable degrees. At Ajo the gangue is so intensely reactive that nearly all of the copper remained in sites as oxides converging rapidly into primary sulphides with minor enrichment. At Bullfrog in Nevada the same was true as regards silver. The oxide silver mineral (cerargyrite) persisted down to the old water table where a rapid transition to primary silver minerals occurred.

The zoning of enriched ores or transitions from oxidized ores to primary ores is controlled to a marked extent by fluctuations in the geological water table. In this region and most of the entire Cordilleran Region, the water table started rising shortly after the Miocene Revolution, and continued to rise in spurts until late Pleistocene. The even rise of the water table was apparently interrupted at least three times during this period of rising humidity. At Pearce three enrichment zones in the mine were closely tied to three stop points in the history of Old Lake Cochise, west of Willcox. The stop points were evidenced by three old shore lines each of which contained fossil mammalia by which they could be dated. Since remnants of old lake beds of unknown depth have been reported in the Silver Reef area, it is possible that at least one and maybe more stop points may have existed here also. Similar lake deposits are prevalent all over the Cordilleron region, some of which, such as "Lake Mahontan" and others in Nevada, had a vertical range of up to 500 feet during the period of rising humidity. The Benson and San Pedro Lake beds have considerable depth range. The apparent light upper enrichment in the east half of the Silver Reef claims, probably represents the top of the water table fluctuation. The deepest penetration in the claims is 325 feet in the Silver Reef No. 3 claim. Oxidation and strong leaching is present throughout most of this depth as evidenced by silica boxworks and lead oxides. Where did the silver, which once occupied these cavities, go? Obviously since the prevailing fractures are nearly vertical, the silver in solution must have descended. Three competent observers reported that argentite, or what they believed to be this mineral, was present in the lower level of the Silver Reef No. 3 workings. Argentite is generally believed to be the prevailing silver enrichment sulphide. The reported argentite was found as a sooty coating in galena fractures. The galena had partly been converted to vanadinite and wulfenite in most cases.

Therefore, in lieu of the climatic history of the region, and the presence of argentite and lake deposition, it would seem out of line to condemn a claim, or a group of claims, in a known mineral district, on no more than surface assay conditions, especially since these outcrops show strong evidence of leaching of sulphides. This is particularly pertinent when one looks at the evidence from such deposits as Morenci and Pearce in particular, and others of less positive appearance without the opportunity to find out.