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EGH
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E. GROVER HEINRICHS & ASSOCIATES

SUITE 110-4 1802 W. GRANT ROAD
TUCSON, ARIZONA, 85745 U.S.A.
(602) 624-7421

September 15, 1983

Director (580)
Bureau of Land Management
18th and C Streets, N.W.
Washington, D.C. 20240

Re: Areas of Critical Mineral Potential

Dear Sir:

In response to the BLM call for nomination of "areas of critical mineral potential", we nominate the following:

Portions in The Kofa National
Wildlife Refuge - Sheep Tanks Mine

T1S, R15W
Sec. 1
Yuma County, Arizona

Highly manganiferous brecciated zones in Tertiary andesite flows. Contains significant Au, Ag and Mn.
Has shipped ore intermittently since 1909.
Once surveyed for patent, and had a 100 T. mill which operated in 1934.
Studies by numerous well-known geologists and mining engineers available on request.

If you have any questions regarding the above, please contact me at the letterhead address.

Very truly yours,


E. Grover Heinrichs

EGH:vh
cc: Glen Mangels



E. GROVER HEINRICHS & ASSOCIATES

SUITE 110-4 1802 W. GRANT ROAD
TUCSON, ARIZONA, 85745 U.S.A.
(602) 624-7421

March 13, 1984

Ray A. Brady
Deputy State Director
Division of Mineral Resources
U. S. Bureau of Land Management
2400 Valley Bank Center
Phoenix, Arizona 85073

Re: Sheep Tank Mine
Yuma County, Arizona

Dear Mr. Brady:

Pursuant to a discussion we had when you gave a talk to A.I.M.E. last month in Tucson, I am enclosing some published information from an Arizona Bureau of Mines Bulletin, Vol. V, No. 6, dated August 15, 1934, titled, "Arizona Lode Gold Mines and Gold Mining", by B. S. Butler.

In the light of this information and other more detailed information that could be made available to your group, we urge you and your Department to set in motion the "wheels" that would withdraw from "wilderness" consideration this highly mineralized area.

Anything you can do will be greatly appreciated.

Sincerely,



E. Grover Heinrichs

EGH:vh
Enclosure
cc: Glenn Mangels
Dan Lewis
Leo Smith

P.S. A landing strip & prospecting pits
Numerous buildings, roads, a
mineral monument, mine workings
& dumps certainly are evidence of
past intensive interest in the
mineral potential. This is not
"Wilderness" as per the criteria
defined by Congress!

pediments or rock floors are concealed by talus, merit further search.

GOLD PROSPECTS IN THE ALAMO REGION

The Alamo region, as here considered, embraces a small mineralized district in the vicinity of Alamo Spring, Cemitosa Tanks, Red Raven Wash, and Ocotillo, in the northern portion of the S. H. Mountains.

Alamo Spring, which is approximately 30 miles from Vicksburg, is accessible by about 13 miles of unimproved road that branches westward from the Sheep Tanks road at the eastern entrance of New Water Pass. The Cemitosa Tanks, which are $4\frac{1}{2}$ miles northeast of Alamo Spring, are accessible by about 12 miles of desert road that branches westward from the Sheep Tanks road at a point some 8 miles south of Sheep Tanks. Red Raven Wash is about 2 miles by road southwest of Alamo Spring. The road leads westward beside this wash for 2 miles, to Ocotillo.

Many claims were located in this region about 25 years ago and have been considerably prospected from time to time. So far as known, they have produced no ore.

Here, the mountains are somewhat less cliffy and rugged than in the vicinity of Kofa. Sharp ridges and flat-topped mesas prevail, but they are separated by canyons that are rather broad, especially in the tuffaceous rocks.

The gold prospects of the Alamo region have been described by Jones.²⁰⁶ The veins occur within steeply dipping brecciated zones in andesite. They range in width from a few feet to more than 50 feet. One of them, the Geyser, is at least 2,000 feet long, but most of their exposures are much shorter. The vein filling consists generally of calcite, more or less lamellar quartz, and silicified andesite. Most of the gold occurs as fine flakes associated with films and small masses of iron oxide in the vein filling. Workings on most of these prospects consist of shallow shafts and short tunnels, but the Geyser prospect has an inclined shaft 300 feet deep.

SHEEP TANKS DISTRICT²⁰⁷

Situation and accessibility: The Sheep Tanks district centers about the Sheep Tanks Mine which is within a mile of the southern margin of the Little Horn Mountains and $\frac{1}{4}$ mile south of the southeastern corner of T. 1 N., R. 15 W. By way of the Palomas Vicksburg road, the Santa Fe Railway at Vicksburg is 30 miles north, and the Southern Pacific at Hyder is about 35 miles south-southeast of the mine.

²⁰⁶ U. S. Geol. Survey Bull. 620, pp. 160-63. His description is quoted in Ariz. Bureau of Mines Bull. 134.

²⁰⁷ For a more detailed description, see Ariz. Bureau of Mines Bull. 134, pp. 132-41.

Mining history and production: The first mineral discovery in this vicinity was made by J. G. Wetterhall in 1909. Work in the district was limited to small-scale prospecting until 1926 or 1927 when the Sheep Tanks Mines Company, of Nevada, opened up part of the Resolution vein. Between late 1928 and October, 1929, the Ibex Mines Company, with C. M. d'Autremont as manager, operated this mine. Production for 1929 amounted to 801 tons of siliceous gold ore of smelting grade which contained 1,303.27 ounces of gold, 12,525 ounces of silver, and a little copper, worth in all about \$33,514.²⁰⁸ This ore was hauled by truck to Vicksburg and Hyder and was shipped by rail to the Hayden smelter. For 1929, the property ranked fourteenth among the gold producers of Arizona.

In 1931, the Anozira Mining Company, which later became the Sheep Tanks Consolidated Mining Company, obtained the Resolution ground together with many additional claims and, during part of 1932, carried on extensive prospecting and development work. Water for all purposes was hauled from wells several miles distant. In 1933, three carloads of ore were shipped to El Paso. During the year, a 100-ton cyanide mill was built at the mine. Meanwhile, water was sought by means of shallow wells near camp and a 1,000-foot well in the plain about 3½ miles south of the mine. This deep well, which was started in loosely consolidated sediments, entered volcanic rocks at a depth of a few hundred feet but found sufficient water for the mill. In February, 1934, the plant began treating nearly 100 tons of ore per day. About thirty-five men are employed on the property.

During the winter of 1931-1932, some small pockets of rich gold ore were discovered in the vicinity of the Davis prospect, about 5 miles east of the Sheep Tanks mine. After this discovery, many people located claims in the area and carried on shallow prospecting.

Topography and geology: Here, the basalt mesas of the Little Horn Mountains are interrupted by a northwestward-trending belt, up to about 2 miles wide, of rough, narrow ridges and peaks that rise to a maximum of about 2,800 feet above sea level or 1,200 feet above the adjacent plains. These ridges consist of Tertiary rhyolite, dacite, breccia, agglomerate, and diorite-porphyr. The flows have been affected by complex faulting and fracturing, in part later than the veins.

Resolution vein: The Resolution vein, which comprises the principal ore body of the Sheep Tanks mine, occurs within a fault zone in brecciated andesite. This vein dips northward at a low angle and has been stepped down by later faults. As explored, it is approximately 800 feet long from north to south by

²⁰⁸ U. S. Bureau of Mines, Mineral resources of the United States, 1929, Part I, p. 827.

700 feet broad from east to west, and ranges from a few inches to about 40 feet in thickness. Its filling consists of irregular masses and streaks of limonite, pyrolusite, quartz of two periods of deposition, and calcite together with more or less silicified diorite-porphry. In places, irregular, vein-like masses of crystalline barite cut the earlier quartz. All of the Resolution vein contains gold and silver, but the best ore shoot is near the top of its western portion. As exposed by workings, this ore shoot consists mainly of brown and yellow limonitic material, from 2 to 5 or more feet thick, together with vein-like masses of pyrolusite and brecciated fragments, up to 2 feet in diameter, of greenish-yellow quartz. It also contains irregular masses of later, dense, grayish-white quartz and crystalline calcite within vugs and fissures. Locally, small veinlets and blebs of chrysocolla and a green copper-lead mineral are present.

Examined microscopically in this section, the greenish-yellow quartz is seen to consist of a mosaic of microcrystalline quartz, cut by coarser-grained, comb-like veinlets of quartz and adularia. In places, fragments of silicified rhyolite, mottled by fine specks of hematite, are visible. The greenish-yellow quartz contains small fissures and vugs which are lined with dense to finely crystalline grayish-white quartz and filled with limonite, pyrolusite, and calcite. Some of the fissures and vugs carry chrysocolla and a green copper-lead mineral.

Part of the gold of the Resolution vein occurs within the massive limonitic material, and some is probably contained in the solid portions of the greenish-yellow quartz, but most of the visible gold forms small, thin flakes in iron-stained fractures and vugs within the later, dense, grayish-white quartz.

Wall-rock alteration along the Resolution vein consists of intense silicification of the breccia fragments. Some tens of feet away from the vein, the diorite-porphry has been extensively chloritized and sericitized, but less silicified. This sericite is very fine grained.

Workings on the Resolution vein include several hundred feet of adit tunnels at various levels, together with open stopes and raises.

Other veins: From the 1,450-foot tunnel that penetrates the ridge beneath the Resolution vein, a 160-foot raise has explored a steeply dipping mineralized fault zone in breccia. This zone, which is from 4 to 6 feet wide, has been largely replaced by pyrolusite, limonite, and calcite. In places, lenticular and rounded masses of greenish-yellow quartz up to a few inches in diameter are present. Microscopic examination of a thin section of this quartz shows it to be similar to the greenish-yellow quartz of the Resolution vein (described on page 144) except that much of it is coarser grained and free of adularia. According to E. Mills, manager of the property, the vein, as exposed in this raise,

contains good gold ore in its upper portion and low-grade material in its lower 82 feet above the drift.

On the Smyrna claim, 2,500 feet south of camp, a gold-bearing vein occupies a brecciated zone in diorite-porphry. This zone strikes northeastward, dips from 30° to 40° SE., and has a maximum exposed thickness of 4 feet. The hanging wall of this vein is marked by a thin streak of coarse-grained gouge. As exposed by a few shallow pits, the vein material consists largely of brecciated porphyry, intermingled with limonite, pyrolusite, and angular to slightly rounded fragments, up to several inches in diameter, of fine-grained, greenish-yellow and white quartz, cemented by calcite, manganiferous calcite, and limonite. Some of the quartz is intermingled with fragments of silicified rhyolite that are cemented by silica. According to Mr. Mills, this vein, as exposed, assays a few dollars in gold per ton.

On the Black Eagle claim, 1,600 feet north of camp, a manganiferous vein occurs along a fault in the breccia. This vein, which is somewhat curved, strikes N. 65° W., dips 45° NE., and is from a few inches to about 2 feet wide. Near the surface, it consists mainly of fine, silicified breccia, cemented by abundant pyrolusite. Fractures in the breccia for 10 or more feet on both sides of the vein, are marked by limonite and manganese stain. As shown by a tunnel, certain cross-fractures are similarly mineralized. At a distance of about 175 feet in from the mouth of the tunnel, the vein is only a few inches wide and consists mainly of manganiferous calcite altering to pyrolusite. No quartz was seen in this vein, but, according to Mr. Mills, the wall rock in places carries a little gold.

The Davis prospect is 5 miles east of the Sheep Tanks mine and a short distance north of the road to Palomas. Here, a wide pediment, mantled by surface gravels, shows a few weathered rock outcrops of andesitic composition. During the winter of 1931-1932, prospecting of these outcrops revealed a brecciated zone that contained a few narrow, lenticular, quartz-carbonate stringers, carrying some gold, and small, limonite-filled pockets that were fairly rich in gold. This quartz, which is of dense texture and pinkish-gray color, contains vugs and cavities lined with white calcite and cut by veinlets of dark, ferruginous calcite. A shallow, inclined shaft, sunk upon this brecciated zone in April, 1932, by the United Verde Extension Mining Company, revealed a few small pockets of rich ore very near the surface. According to George B. Church, the first 20 feet of depth assayed several dollars in gold per ton, but the lower portion of the shaft ran less than \$2 per ton. At the bottom of the shaft, a short cross-cut and an inclined winze on the zone failed to find ore. These workings indicate that the brecciated zone strikes about N. 55° W. and dips from 30° to 50° N. Except for a few thin lenticular, quartz-carbonate stringers at irregular intervals, this zone is

marked only by a thin, wavy, gouge streak and local iron stain. Its brecciated andesite walls have been extensively chloritized and carbonatized and show local sericitization.

About 4 miles east of the Sheep Tanks mine and about $\frac{1}{8}$ mile south of the road to Palomas are some shallow workings upon claims held by J. V. Allison. Here, a mass of locally shattered and brecciated diorite-porphyrty forms low ridges of eastward trend. A lenticular area of silicified breccia contains prominent, nearly vertical fractures that strike eastward and are marked by considerable amounts of limonitic stain. An old shaft and a few shallow cuts have prospected this brecciated zone. According to Mr. Church, certain portions of the iron-stained, silicified breccia carry a little gold.

Origin of the veins: The veins of this region were originally deposited by hydrothermal solutions which rose along brecciated fault zones. Where these solutions reached the breccia on the Resolution claim, they encountered a flat-dipping fault zone with a relatively impervious cover that caused them to spread outward along the zones of greater permeability. They deposited chiefly manganiferous calcite, gold-bearing quartz of two generations, certain iron and copper minerals, and minor galena and barite. The iron and copper minerals were probably sulphides and may have been auriferous. More or less brecciation of the veins occurred before this deposition was completed. The mineralogy, texture, and wall-rock alteration of these veins clearly indicate that they belong to the epithermal type of deposits.

Subsequent uplift and erosion removed parts of the veins and oxidized the portions now exposed.

Economic possibilities of Sheep Tanks district: Only a rather limited amount of developed shipping ore remains in the Sheep Tanks region. The district contains considerable amounts of lower-grade material, part of which may be worked at a profit after a cheap water supply adequate for milling needs, has been developed.

In further search for possible undiscovered veins, brecciated zones should receive special attention. Manganese-stained outcrops that contain greenish-yellow quartz with adularia seem to be the most promising but, due to the prevalence of desert varnish in this area, are difficult to recognize from any distance.

Veins of the type that occurs in the Sheep Tanks district are generally not of economic grade below depths of several hundred feet.

TANK MOUNTAINS

Some minor gold-bearing quartz-carbonate veins occur within the granites and schists of the Tank Mountains.

One of the veins carries iron and copper sulphides and all of them contain more or less iron oxide. In general, they are narrow and lenticular with walls that typically show pronounced

Sheep Tanks Area
Yuma City, AZ
IN REPLY REFER TO



United States Department of the Interior

BUREAU OF LAND MANAGEMENT

3000 (920)

ARIZONA STATE OFFICE
2400 VALLEY BANK CENTER
PHOENIX, ARIZONA 85073

March 16, 1984

E. Grover Heinrichs & Associates
Suite 110-4
1802 W. Grant Road
Tucson, AZ 85745

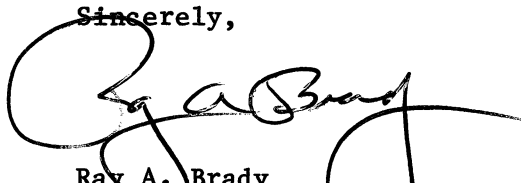
Dear Mr. Heinrichs:

I appreciated your letter of March 13, 1984 regarding the Sheep Tank Mine and wilderness review program by the BLM in the area. Your letter and concerns have been forwarded to our Phoenix District Office for a response (see attached memo).

I enjoyed our discussions in Tucson and hope to attend several of the AIME monthly meetings in the future. I am encouraged by your response to address concerns of the minerals industry and hope others will also provide information to the BLM on the mineral potential of withdrawn lands.

Please feel free to contact this office if I can be of any further assistance.

Sincerely,



Ray A. Brady
Deputy State Director
Division of Mineral Resources

Enclosure

March 16, 1984

Memorandum

To: District Manager, Phoenix District

From: Deputy State Director, Division of Mineral Resources, Arizona

Subject: Mineral Potential, Sheep Tanks District

Enclosed is a copy of a letter from E. Grover Heinrichs & Associates regarding mineral potential of the Sheep Tanks District. Mr. Heinrichs is concerned regarding the "wilderness consideration of this highly mineralized area." This area is also in the vicinity of ACHP nominations 024-16 (ASARCO), 033-41 (Southwest Minerals Exploration Assoc.), and 101-01 (Heinrichs & Associates).

Mr. Heinrichs has been advised that the Phoenix District Office will respond to his concerns and provide information on the status of the wilderness review program in this area. The enclosed Arizona Bureau of Mines Bulletin indicates historic production from the Sheep Tanks Mine and the potential for significant mineralization at current gold prices.

The District should also respond to the nominators of the ACHPs in this area, as well as the other ACHP nominations in the District. Instruction Memorandums W.C. 83-583, AZ-83-245, and AZ-84-62 have provided instructions on the procedures for processing these nominations.

I would appreciate a copy of your response to Mr. Heinrichs.

(ORIG. SCD.) RAY A. BRADY

Enclosures

RABrady/sb